

# MODEL BUILDER

ICD 08545

APRIL 1983

\$2.50

volume 13, number 135



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winning CAP 21



# FULLY AEROBATIC 1/4 SCALE CAP 21



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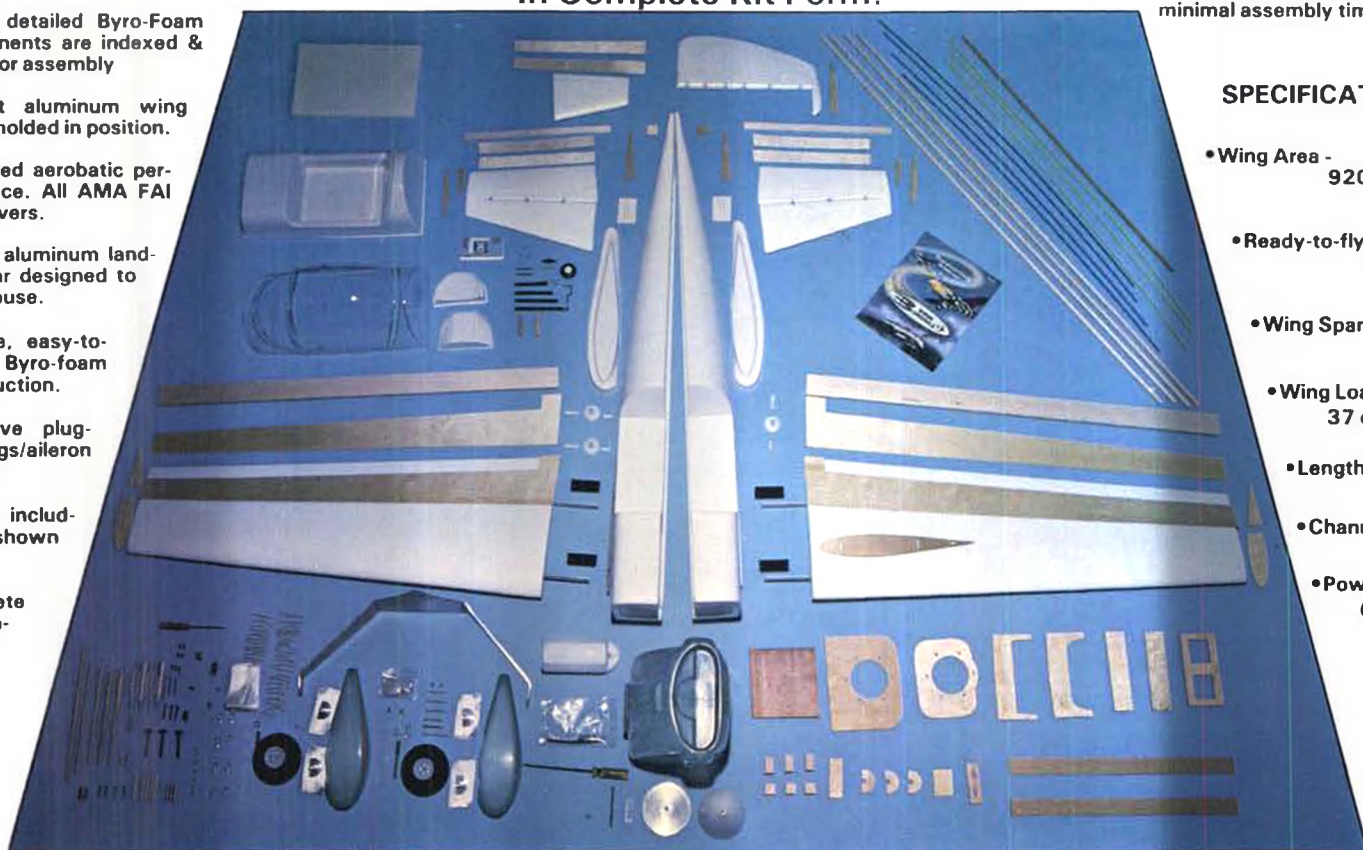
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APRIL

1983

volume 13, number 135

621 West Nineteenth St., Box 10335, Costa Mesa, CA 92627-0132 Phone: (714) 645-8830

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Cover: "That's far enough . . . there's no way I'll fly this airplane under those clouds!" Skirting the edge of a retreating early fall storm, the pilot of this restored 1930 Franklin Sport biplane takes a last look before wisely deciding to keep his pretty machine in the sun, where it belongs. Whether 1930 or 1983, the rules haven't changed . . . light sport planes must be flown with a healthy respect for the weather. Construction article for an electric powered R/C scale model of this little beauty begins on page 18.

## STAFF

### EDITOR/PUBLISHER

Wm. C. Northrop, Jr.

### GENERAL MANAGER

Anita Northrop

### ASSISTANT GENERAL MANAGER

Dawn Holcomb

### DRAWINGS BY

Al Patterson

### OFFICE STAFF

Edie Downs

A. Valcarsel

Mike Whitney

### SUBSCRIPTIONS

Jo Anne Glenn

## CONTRIBUTING EDITORS

Al Alman	Joe Klause
Jerry Dunlap	Eloy Marez
John Elliot	Walt Mooney
Bill Forrey	Mitch Poling
Jim Gager	John Pond
Bill Hannan	Fernando Ramos
Dick Hanson	Dan Rutherford
Ray Hostetler	Bob Stalick
Ken Johnson	Dave Thornburg
	Bob Underwood

## ADVERTISING REPRESENTATIVES

Bill Northrop

Home Office, Costa Mesa

Al Novotnik

4 Beverly Pl., Norwalk, CT 06850

Bus. Phone (203) 847-7478

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Andy's Hobby Shop  
36 Main Street  
**KINGSTON**  
J & J's Hobbies Inc  
78 Broadway  
**RICHMOND HILL**  
Wilson Hobby  
10440 Jamaica Ave  
**ROCHESTER**  
Dan's Crafts & Things  
24 Bursen Street  
**SYRACUSE**  
Wall's Hobby & Craft  
4300 W Genesee St  
**UTICA**  
American Hobby & Sports  
2107 Whiteboro Street  
PH 315 224 4959  
**NORTH CAROLINA**  
**CHARLOTTE**  
Source Hobbies Inc  
2615 Central Ave  
**EDEN**  
Coke's For 4 & Hobby Shop  
PH 2 Box 222  
**CRYSTAL**  
Pleasantburg Shopping Center  
1426 Laurens Road  
PH 803 235 8320 or 242 4229  
**MYRTLE BEACH**  
Ed's Hobby Shop  
501 West to Fanny  
Sign Company  
**SUMMERVILLE**  
FWP Hobby Shop  
908 Becons Bridge Road No 4  
**TENNESSEE**  
**KNOXVILLE**  
Tennessee Model Hobbies  
RI 62 Oak Ridge Hwy Solway  
PH 615 482 2900  
**NASHBOROUGH**  
The Toy Mart  
113 Graylin Drive  
PH 615 883 1648  
**TEXAS**  
**ABILENE**  
The Hobby Center  
Westgate Mall  
**ARLINGTON**  
The Hobby Hub  
903 A Pioneer Parkway West  
**AUSTIN**  
J & J Hobbies  
610 Kensington Dr  
**CORPUS CHRISTI**  
Lessor Time Hobbies  
1326 Airline  
**DENTON**  
Yellowhawk Hobbies  
117 W Hickory  
**EL PASO**  
Har's Hobby Shop  
No 57 Sunrise Center  
PH 915 755 1914  
**FORT WORTH**  
Hobby Shop  
400 C Seminary Dr E  
PH 817 334 0197  
**FORT WORTH**  
Mitt's Hobby Shop  
7241 Grapevine Highway  
PH 817 281 0921  
**HOUSTON**  
Clear Lake Models  
11131 Camino S Shopping Ctr  
PH 713 488 6315  
**HURST**  
Roy's Toys (For Big Boys)  
1309 Norwood  
**SULPHUR SPRINGS**  
Miller's Hobbies  
624 Bellevue St  
**UTAH**  
**OREM**  
Manitara Aircraft Prod  
811 W 400 N  
**PROVO**  
The Model Shop  
42 W 300 N  
**VERMONT**  
**NORTH FERRISBURG**  
Vandoe's House of R/C  
**SWANTON**  
The Hobby Shop  
RD 1 Rt 7  
PH 802 524 2715  
**VIRGINIA**  
**ANNANDALE**  
Model Masters, Inc  
6920 Braddock Rd  
**RICHMOND**  
Bob's Hobby Center  
3002 Cary St  
**VIRGINIA BEACH**  
Hobby Craft Centers  
#1 967 Providence Sq Svc  
#2 62 Princess Ann Wc  
**WASHINGTON**  
**BELLEVUE**  
R/C Model Shop  
14020 N E 21st St  
PH 747 9914  
**BELLINGHAM**  
Hobby Hve (Graham's)  
111 E Mangolia St  
**KENT**  
Kent Hobby Craft  
Kent W Mall 1343 W Meeker  
**PUYALLUP**  
Fargrove Model Supply  
10611 136th St East  
PH 845 9675  
**SEATTLE**  
Webster Supply Co  
17818 Aurora Ave N  
**TACOMA**  
Bill's Hobby Town  
14914 Pacific Ave  
PH 206 531 8111

**LANCASTER**  
The Flight Box  
Lancaster Shopping Center  
PH 509 529 2618  
**LANSDALE**  
Pinn Valley Hobby Ctr  
837 W Main St  
**LEHIGHTON**  
Carpenter Hobbies  
R D 3 Box 111  
**MILTON**  
Krebs's Newstand  
83 Broadway  
**PITTSBURGH**  
Bill & Wall's Hobby Shop  
116 Smithfield St  
**READING**  
Iron Horse Hobby House  
60 South 6th St  
**READING**  
City's Hobbies  
536 N 10th St  
**SLATINGTON**  
Valley Hobbies & Collectibles  
102 Main Street  
**WARMINGSTER**  
J C R/C Hobbies  
13 York Road  
PH 215 672 9200  
**WAYNE**  
Hwell Hobby House  
Gateway Shopping Center  
**RHODE ISLAND**  
**PROVIDENCE**  
Hobby Hut  
7442 Post Road  
**SOUTH CAROLINA**  
**GREENVILLE**  
The Great Escape  
Pleasantburg Shopping Center  
1426 Laurens Road  
PH 803 235 8320 or 242 4229  
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117 W Hickory  
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PH 845 9675  
**SEATTLE**  
Webster Supply Co  
17818 Aurora Ave N  
**TACOMA**  
Bill's Hobby Town  
14914 Pacific Ave  
PH 206 531 8111

**WALLA WALLA**  
Harley's R/C  
Route 1, Box 277A  
PH 509 529 2618  
**WEST VIRGINIA**  
**CHARLESTON**  
Fountain Hobby Center  
500 W Washington St  
**WILKINSON**  
BERVER DAM  
Park Electronics Hobby Hut  
713 Park Ave  
**GALVESTON**  
R/C Unlimited  
825 Park Drive  
PH 608 562 2893  
**MARSHFIELD**  
Med Wisconsin Hobby Center  
Hortway Mall  
503 E Ives St  
**MEMPHIS**  
True Value Hardware  
1512 9th Street  
L. Mart Shopping Ctr  
MILWAUKEE  
Campana's Hobby  
1423 S Mustang Ave  
PH 414 672 2700  
**CANADA**  
**BAYWILF ALBERTA**  
B & P Transport Ltd  
Box 6  
PH 373 3953  
**CALGARY ALBERTA**  
Hobby World Canada  
Box 968 Sun M  
**CALGARY ALBERTA**  
P M S Hobby Craft  
Calgary North Hill Centre  
WINNIPEG, MANITOBA  
Gorch's Hobbies  
646 Portage Ave  
ST JOHN'S NFLD  
Capitol Hobby Centre, Ltd  
6 Freshwater Road  
**DUNDAS ONTARIO**  
Sycraft Hobbies Inc  
139 York Road  
**SCARBOROUGH ONTARIO**  
The Toy Mart  
113 Graylin Drive  
PH 615 883 1648  
**TEXAS**  
**ABILENE**  
The Hobby Center  
Westgate Mall  
**ARLINGTON**  
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Webster Supply Co  
17818 Aurora Ave N  
**TACOMA**  
Bill's Hobby Town  
14914 Pacific Ave  
PH 206 531 8111

**CALIFORNIA (Foreign Dist.)**  
IRVINE  
Egortations Ltd  
17835 Sky Park Circle #E  
PH 714 957 1331

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



## from **Bill Northrop's workbench**

• • •

• We're very pleased to announce that Peter Westburg and **Model Builder** magazine have come to an agreement whereby prints of all of Pete's precisely accurate aircraft drawings are now available through **Model Builder**. All of the drawings are 28 by 40 inches, border-to-border, and are scaled either one inch to the foot (1/12) or 1.2 inches to the foot (1/10), with the exception of two half-inch scale (1/24) drawings.

The aircraft subjects chosen by Pete to document in scale drawings all come from the Golden Era, between-the-wars period, and include both military and civilian aircraft from that time slot. Thirty-seven different subjects are covered, taking from one to four sheets to complete each subject . . . 109 drawings in all.

The Westburg drawings represent years of careful fact gathering and cross-checking for accuracy, plus many more long hours at the drafting table . . . so many hours, in fact, that Pete's eyes finally gave in to the strain, resulting in very expensive operations to replace the lenses. Although he can see better now than he did for many years in the past, the durability required for many continuous hours of drafting is no longer there. It is very unlikely that any more aircraft will be recorded for history by Pete Westburg.

Check our advertising section for the complete list of Westburg drawings and how to obtain them.

### THINGS TO DO

The interest and activity in electric powered model flight continues to grow.

April 17, 1983 marks the date for the first ever "U.S./International Open Invitational" for electro powered motor



Al Tuttle, who flew over from the Hawaiian island of Maui to help run the IMS trade show in Pasadena, January 8 and 9, holds on to the raffle ticket cage while Bill Northrop reads off a winning number. Anita Northrop stands by to pull out the next ticket. Read all about the show, beginning on page 12.

gliders, sponsored by Leisure Electronics, co-hosted by the Harbor Soaring Society and S.E.A.M. (Society of Electric Aircraft Modelers) Chapter #1.

To be held at Fairview Recreational Park, Costa Mesa, California, it is an AMA sanctioned, FAI F3E event, using international rules. A minimum of three rounds will be flown. First, second, and third place prizes will be \$500, \$250, and \$125, respectively. Top U.S. and European competitors are expected to be present for this one.

To make it a two-day affair, Saturday will be devoted to a demonstration fun-fly, featuring "two-meter sportsman class" electro powered gliders, based on rules proposed by S.E.A.M. No entry fees or prizes on Saturday . . . just fun!



Addendum to the Comet story by Walt Grigg, in our February issue. This photo, taken in November, 1929, shows Bill Bishop with his model built from the plans featured in the article. When Bill's brother passed away recently, this photo was found in his effects.

For further information and registration, contact Soaring Associates, Box 2501, Orange, CA 92669.

★ ★ ★

A news release from the Joint Public Affairs Office of the USMC (that's the "Semper Paratus" gang over at the Marine Corps Air Station, El Toro, Santa Ana, CA 92709) and the Third Marine Aircraft Wing and M.C.A.S. (Helicopter), Tustin, California, are hosting a Model Aircraft Fly-In, on May 15, 1983.

Tied in with the 5th Annual Armed Forces Day Celebration, the MCAS (H) Marines will feature an air show comprised of an estimated 200 scale fixed and rotor-winged aircraft, both flying and static. Also included on display will be Marine helicopters, antique and classic cars belonging to the National Street Rod Association (NSRA), a 5K/10K race, and of course, the gigantic WW-II-vintage blimp hangars.

For further information, write or call the Commanding Officer, Headquarters and Headquarters Squadron, MCAS (H), Tustin, CA 92710; (714) 651-7321.

### INDUSTRY NEWS

B&B Industries, 908 E. Rosecrans St., Spokane, WA 99208, has concluded acquisition of the following companies over the past three years: Logictrol International, E.K. Products, Marix Model Boat Co., and Geo. Aldrich Model Co., all Texas based concerns. Also acquired is Master Airscrew Wood Propeller Division (California), Jamac and Jerbee Model Co. (Washington), Swiss Automation (Idaho), Spokane Plastic Mfg. Co. (Washington), and finally, all of the Testors dope inventory (Illinois).

All of these, plus a few more companies, will be operated under the single company name of Full Command Systems, owned and operated by Bruce L. Batch, a name familiar to many who have been in the model industry more than a few years.

*Continued on page 104*



# OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases furnished by the manufacturers and for 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.

• Novak Electronics, 2709-C, Dept. 60, Orange Ave., Santa Ana, CA 92707, is introducing an expanded line of surface and airborne radio packs for 1983.

The NER-6 is a new six-channel receiver which provides the same high quality circuitry as the NER 1-9 deluxe, high performance custom receiver, yet at an economical price. The NER-6 features an internal Futuba-compatible block connector and a plug-in crystal (provided). It weighs 1.27 oz., and is factory tuned to a specified frequency. It has a double tubed front end, double balanced mixer, and is voltage stabilized. It's also compatible to all modern A.M. transmitters, and is priced at \$69.95.

The NER-2S is a new mini two-channel receiver weighing only 3/4 oz. and measuring 1.45 x 1.3 x .70 inches. It decodes the first two channels of all modern A.M. transmitters, has a triple tuned front end, and is voltage stabilized to operate on three to six NiCds. The NER-2S comes two ways; as a car/boat receiver with a 12-inch antenna tuned to a specified frequency band and uses a plug-in crystal (not included) for \$59.95, or as an aircraft receiver with a 36-inch antenna, tuned to a specified frequency, including plug-in crystal, for \$64.95.

Novak offers three different servos: the NES-1A, a midjet servo for small



Satellite City's Hot Stuff with new Hot Tips.

aircraft on up to .60 size, and for 1/12 electric cars; the NES-2, for general purpose in many cars, boats, and aircraft; and the NES-2H, a high torque, ball bearing/water tight servo for large airplanes, off-road electric cars, and gas-powered cars.

Finally, Novak Electronics offers various surface and airborne package combinations of the above receivers and servos:

NERP-1, using the mini NER-2S surface receiver, two NES-1A servos, and Futuba-compatible connectors, \$105.00.

NERP-2, using the mini NER-2S surface



Hot Stuff Super 'T' also with new Hot Tips.

receiver, two NES-2H servos, choice of battery pack, and mini switch harness, \$135.00.

NEAB-2, using the NER-6 receiver, four NES-1A servos, choice of battery pack, a mini switch harness, and 6-inch extension, \$175.00.

NEAB-3, using the NER-2S airborne receiver, two NES-1A servos, choice of battery pack, mini switch harness, and two trays, \$125.00.

Send a 4-1/2 x 9-1/2 SASE to Novak Electronics for the free brochure. Be sure to include Dept. 60 in the address. We want to get credit for telling you



Bavarian Precision Products new HB .21 carb.



MRC's new Honda F-2 electric 1/10th car.



New 7 gram, 12 pack of Hot Stuff & Hot Tips.  
about these great radio components.

★ ★ ★

In an effort to make life easier and less frustrating for the model builder who hates to watch glue dry or mess with clogged glue bottles... Satellite City has come up with a new applicator tip for its instant glues Hot Stuff and Hot Stuff Super 'T'. Now, "Hot Tips" are sold as standard equipment on every bottle of cyanoacrylate adhesive that Satellite City sells. Hot Tips won't clog like teflon tubing can, because of their far superior draining action. Hot Tips come with an air-tight cap for sealing off the bottle when not in use.

Satellite City hasn't left the modeler without a choice of applicators. Hot Tips can be used in conjunction with the standard teflon tubing (supplied), or not used at all by inserting the teflon tubing



Professional Spray Can Holder from Coverite.

directly into the hole provided in the top of the bottle, the choice is yours.

Hot Stuff and Hot Stuff Super 'T' are available at your local hobby shop or directly from Satellite City. The quarter-ounce bottles are sold in a neat 12-pack (stock No. HS-2, Hot Stuff; and No. HST-2, Super 'T') which is perfect for keeping your own private stock in the kitchen freezer and taking out individual bottles as you need them... a great way to insure yourself against running out in the middle of a project and to insure a factory-fresh bottle every time. The half-ounce and two-ounce bottles can be purchased individually from your local hobby dealer or factory direct. Write to Satellite City, P.O. Box 836, Simi Valley, CA 93062.

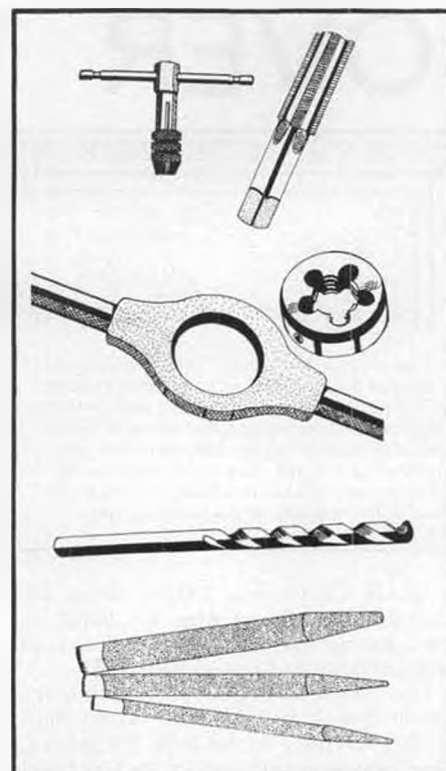
★ ★ ★



Novak Electronics NER-2S receiver.



Novak Electronics NER-6 receiver.



Ace R/C's new products: carbon steel dies, taps, handles; aircraft length drill bits; Speed Sticks for sanding.

The Honda F-2 Racer is now available from MRC (Model Rectifier Corporation) in 1/10-scale, electric powered. The RS-540S motor is operated through forward/reverse speed control, which is stepless, with variable braking. The car is 438mm long, 192mm wide, 100mm high, with a 240mm wheelbase. Write to MRC at 2500 Woodbridge Ave., Edison, NJ 08817 for further information from Frank Ritota.

★ ★ ★

From Ace R/C Inc., Box 511, 116 West 19th St., Higginsville, MO 64037, (816)



Novak Electronics NERP-1 airborne package.



Novak Electronics NERP-2 airborne package.

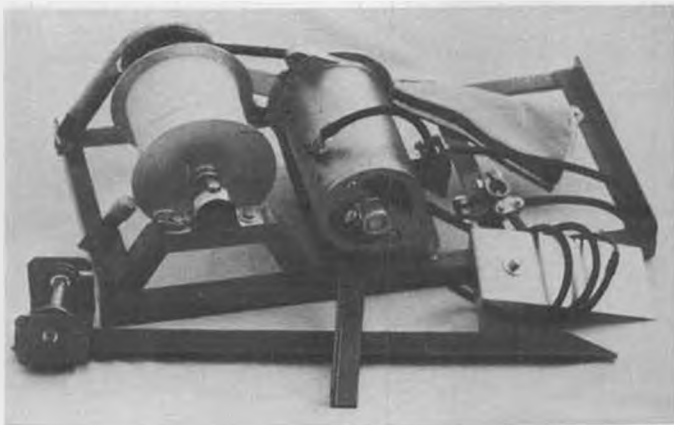


Novak Electronics NEAB-2 airborne package.



Novak Electronics NEAB-3 airborne package.

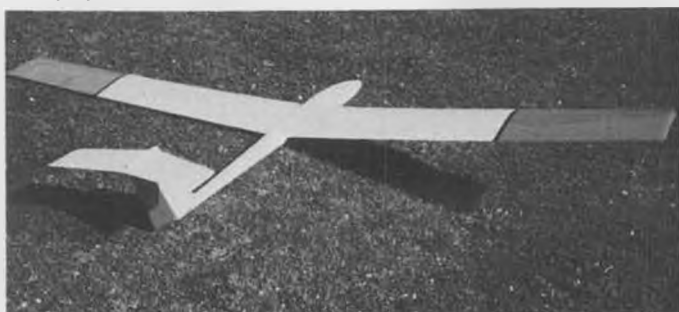




Davey Systems new Pow'r tow winch for 12v zoomies and X-country.



T&D Fiberglass Specialties latest 'glass cowls.



Southern Sailplanes new T-Bird 2-meter glider (above) features 'glass fuselage, foam wings; and SLP Ricochet kit (right).



Updated Fliteglas Models P-51D Mustang.

584-7121, it's time for tools!

Ace has several new items for the model workshop. Aircraft length drill bits, in 6 and 12-inch lengths, 1/16, 3/32, 1/8 3/16, and 1/4. By the 5-piece set they're \$9.95 and \$21.95 respectively. Carbon steel dies: 2-56, 3-48, 4-40, 6-32, 8-32, 10-32, and 1/4 x 20. Buy them individually, and the handle, or get a complete set, with handle, for \$24.95. Carbon steel taps, same sizes, available separately, plus handles, or get a complete set with a small and a large handle, for \$14.95.

Speed Stix are various size sanding sticks. Not sandpaper wrapped around dowels, the grit is adhered to the round and pointed sticks. Not for heavy stuff or hardwoods, but great on balsa and liteply. The regular assortment of nine Stix is \$4.79, or the six mini Stix assortment is \$2.95.

★ ★ ★

T&D Fiberglass Specialties, 30925 Block, Garden City, MI 48135, (313) 421-6385, is adding still more 'glass cowls to its ever-increasing list. Latest cowls are to fit models built from Bis-Cap Plan Service Plans, 4777 South Iva Rd., Merrill, MI 48637. All except one are for 1/4-scale models. In the photo, the cowls are (top l to r): Super Cub, Skyote, 40-60 powered Super Cub, and Nieuport 17; (bottom l to r): Dreamer Acro II, Fokker D-VII, and Fokker DR-1 or D-VIII. Send \$1.00 for complete price list.

★ ★ ★

Pacer Technology & Resources, Inc., 1600 Dell Ave., Campbell, CA 95008, (408) 379-9701, offers a complete line of cyanoacrylate glues and related products. In addition to the regular thin adhesive, ZAP/CA, and the thick, slower adhesive ZAP-A-GAP/CA+, there is ZAP LOCK for locking fastener threads, Zip Kicker, to accelerate the glue setting, Z-7 Debonder for softening the adhe-



Supersafe liquid solder from H&N Electronics.

sive and/or separating glued parts and human skin, and Z-Ends, universal dispensing tips for all Pacer products. For more information on these and other Pacer Products, contact Frank or Lois Milo, at the above address and telephone.

★ ★ ★

If you are looking for a great little competition airplane for that nostalgia gas event contest you are thinking of entering . . . or if you are just looking for a free flight design to build around your



Pacer Technology & Resources, Inc., Zap/CA glues in three sizes.



Pacer Technology & Resources, Inc., Zap/CA+ (thick).



Pacer's new Zip Kicker CA accelerator.

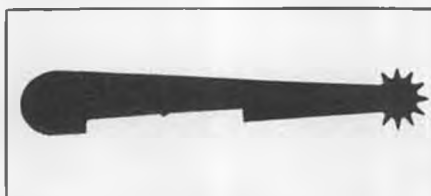
favorite Cox .049 engine . . . you should consider Campbell's Custom Kits new Zeek kit.

The Zeek is a deluxe kit in every way. Plans are beautifully drawn by Harry Murphy, all ribs and fuselage sides are precut, the best quality balsa is used throughout and real Japanese tissue is provided in contrasting colors for a beautiful finish. The Zeek will climb like a champ on Cox .049 or similarly powered engines without any signs of over powering. Wingspan is 33 inches, and wing area is 176 square inches. The Zeek is a bargain you won't want to pass up at only \$15.98.

Other kits offered by Campbell's are: the Quaker 84, a 1936 vintage, 84-inch



Pacer's new Z ends dispensing tips.



Eldon J. Lind's new Digger hinge slot tool.



Central Florida Hobbies composites.

old timer design for .40 to .60 motors that goes for \$65.00; the Quaker 54, a 54-inch "shrunk" version of the Q84 above for .09 to .15 motors, and two or three channel R/C, which sells for only \$34.98; the Dallaire Sportster, a big winner at SAM Nationals with a 108-inch span, a whopping 1550 square inch area, and a .45 to .90 engine . . . a really big model for a very reasonable \$80.00.

If hand launch gliders are your between-flight fancies, or if HLG is your main thing . . . investigate this little group of "chuckies;" for the beginner or tender-of-arm youngster who wants a place to start in HLG, try the Tiny Piglet for \$3.79; for a contest winning glider with dethermalizer, try the Thermal Piglet at \$5.29; and here's another contest winner called the Merlin 2 that comes with all the goodies including dethermalizer for \$5.29.

Send a 20-cent postage stamp to Campbell's Custom Kits, P.O. Box 5996, Lake Worth, FL 33461, and they will send you the latest catalog. That's the best way of making sure that you aren't missing out on some of the best kits around.

★ ★ ★

Soaring types will be interested in the new Pow'r tow winch offered by Davey Systems Corporation, One Wood Lane,



Pacer's new Z-7 Debonder.

Malvern, PA 19355, (215) 644-0692. This new winch has all of the same features of the Pow'rwinch, which it replaces, including the same price.

So how is it new, you ask? The answer is found when you examine the new motor. Davey Systems has decided to replace the Pow'rwinch's motor with a much larger, and more powerful 12-volt motor. This new motor is capable of launching the larger cross country ships

*Continued on page 100*



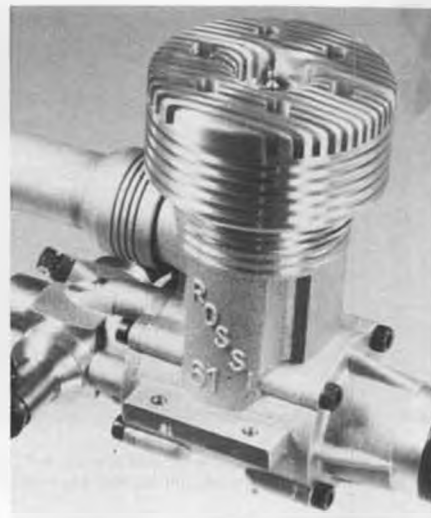
Pacer's Zap Lock thread locking compound.



# FUEL LINES

JOE KLAUSE

P. O. Box 2699  
Laguna Hills, CA 92653



This is the latest Rossi engine: an .81 designed especially for Byron ducted fan models.

## NOSTALGIA

During the past years, I've received a variety of inquiries about .15 displacement engines. Quite a few of them have concerned the Cox .15 engines that were produced during the general time frame of about 1961 through 1966. So, without any further ado, here's a brief synopsis of some of the Cox .15 engines... specifically those that were commonly referred to as Tee Dee .15s. Please note that there were two other earlier Cox .15 engines, namely, the Sportsman and Olympic 15s which were introduced during 1959. Hopefully, I'll be able to devote an entire future column to these two distinctive engines.

For the present, the Tee Dee .15 was presented at the 1961 trade shows. The Cox Thimble-Drome product brochure for that year actually announced four new front rotary valve engines: the Tee Dee .010, Tee Dee .020, Tee Dee .049, and the Tee Dee .15. In retrospect, that obviously was a great year for Cox. If you have a penchant for economics, the first Tee Dee .15 listed for \$12.98.

So much for the money bit. How about the distinctive features of the so-called Tee Dee .15s? Well, basically, there were three series of the engine. The first one, as inferred above, was introduced during 1961. It was simply called a Tee Dee .15, and it is shown in the first photograph.

It's most appropriate at this point to thank Dale Kirn for the use of his Cox engines for the accompanying photographs. Dale also provided Cox brochures and personal background information.

To continue, the first Tee Dee .15 engine had a ball-socket piston and connecting rod, and rather shallow bypasses which nevertheless were contoured quite well. Actually, there were three milling cuts per bypass; similar to the geometry we all are familiar with on the Tee Dee .049 engines. Externally, the

distinguishing feature of this engine is the relatively narrow cylinder diameter below the fins. This will be most obvious as you compare this first photograph with the next two.

In 1962, the Cox .15 Special was introduced. Modelers often referred to it as a Tee Dee .15 Special even though the "Tee Dee" was not part of the official nomenclature. With only a cursory glance, it seems quite like the first Tee Dee .15. However, look closely at the second photograph. The cylinder diameter below the cooling fins is obviously larger. This change enabled Cox to do two things: (1) increase performance by increasing transfer cross sectional area; and (2) decrease manufacturing operations by using only a single milling cut for each transfer port. Also notable was a change to a 50 degree upper angle transfer cutter. This directed the incoming fuel/air mixture more toward the upper portion of the combustion chamber than the original Tee Dee .15 transfers. It improved cylinder scavenging.

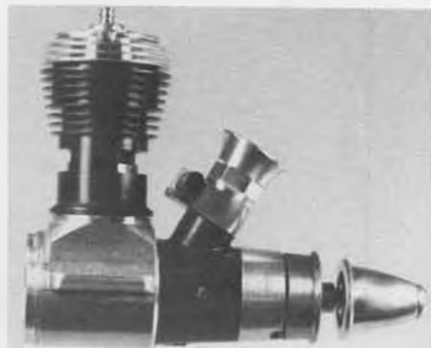
The Cox .15 Special was continued for another two years. However, there were subtle changes. The initial .15 Specials had a ball-socket joint connecting rod. Later versions had a stamped, or blanked, aluminum rod and wrist pin. Further, some of the first ball-socket group had an aluminum bushing in the lower end of the rod together with a lubrication hole. To further muddy the waters, some of the stamped rods were press fitted onto the wrist pin. Spacers on each side of the rod kept the wrist pin in position within the piston. This configuration was soon discarded in favor of a free floating wrist pin that was retained in place by a rather unique holding spring, grooved wrist pin, and spacer arrangement. To my knowledge, this is the only instance of the use of such a system. All other manufacturers of .15 engines have used either the familiar clips or pads at the end of the wrist pin.

In 1962, Cox also introduced the Medallion .15. This was similar to the Tee Dee, but it was really a sport engine, whereas the Tee Dee and Special were competition engines.

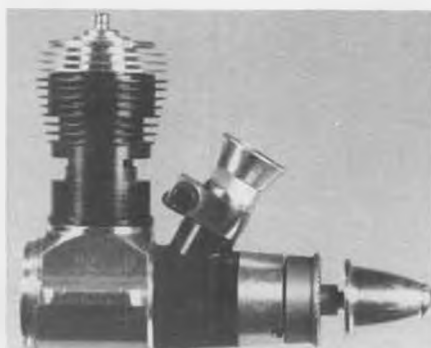
The .15 Specials with their minor modifications continued through 1964. In 1965, Cox introduced the Mark II Special .15. This engine was significantly different than previous .15s. There was only one exhaust port (on the left side) and there were three transfer ports. Two mirror ports angled from the bottom left side of the crankcase, upwards, and towards the right side of the cylinder. In between, there was an additional transfer port. Today, we call it a boost port. Interestingly enough, the Cox third transfer opened before, or led, the opening of the mirror side transfers. Today the accepted engineering practice seems to be just the opposite.

Another unique feature of the Mark II was that the initiation of the threads of both the crankcase and the cylinder were exactly controlled. This was necessary to ensure that the single exhaust always pointed in the same direction. Externally, this engine was differentiated from the first Special, not only by the single exhaust, but also by having a gold anodized crankcase. Our third photograph shows a Mark II engine. Unfortunately, the difference between the

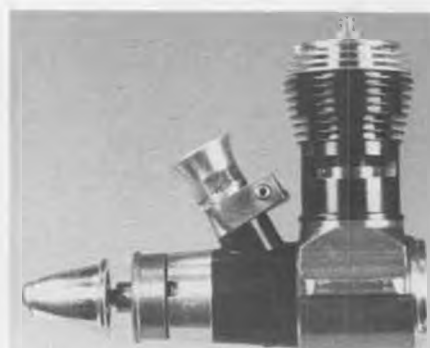
*Continued on page 78*



The Cox Tee Dee .15 was originally introduced in 1961.



Cox .15 Special differed from the Tee Dee by its wider cylinder base. Explanation in text.



The Cox Mark II Special .15 featured a single exhaust port and gold anodized crankcase.



Tony Naccarato flies the 23-1/2 ounce, R/C 1/4-scale, electric powered Farman Moustique he and his mother Addie constructed.



Larry Jolly demonstrates the Ishimasa electric powered R/C helicopter. It will also fly much longer using grounded car battery.



# WORLD

By BILL NORTHROP  
PHOTOS BY BILL FORREY



## PASADENA



Preparing rubber powered R/C ship, Addie Naccarato on the winner. A totally new sight for many spectators, F/F or R/C!



Charlie and Bill Cannon. Their radios used in all of the indoor, electric powered models demonstrated.



Granger Williams, in the Williams Bros. booth. For a surprise, see John Pond's column!



Lois and Frank Milo, representing Pacer Technology and Resources . . . Zap, to you!



Wally Warner, the really running radial man. The nine is ready!





Cliff Rausin and Alberto Dona, Condor Hobbies, importers of the Ishimasa electric powered helicopter.



The Kraft gang (l to r): Jack Albrecht, Ray Forbes, Gordon Boudewyn, and Dan Lutz, Bridi designed Vagabond in front.



Bart Fury, of Robart (get it?), who is also central states supplier/warehouse of Pacer Products.



House of Balsa's Don Dombrowski and Joe Dzankiewicz. HOB's the west coast Pacer distributor.

• The first major model trade show of the 1983 season, the Pasadena, California IMS (International Modeler Show), took place on January 8 and 9, at the Pasadena Center, which is located just one block south of Colorado Boulevard, the path of the world famous Rose Parade, which was seen on television just one week prior.

Any doubts about the spirit and optimism toward 1983 of both the model industry and the modelers themselves could be confidently put to rest after witnessing the turnout for this show. The number of exhibitors increased by

exactly 20% over last year, and there was an 14% increase in spectators. The signs of optimism could just be the reaction to a new year; cleaning the slate, turning over a new leaf, etc., but on the other hand, this nation's economy seems to pivot on the automobile industry, and the current upturn in auto sales could indicate a loosening trend in spending.

Whatever the explanation, the show was definitely bigger and better this year. The turnout of new models for the static competition might also be an indicator. Having year-round flying weather, southwestern modelers don't

really have a "building season", and therefore, new models appear more or less at a slow and random rate throughout the year. However, the large crop of new models that showed up in Pasadena could be the result of modelers staying home more, rather than spending money on traveling, vacationing, eating out, going to shows, etc. In past years, out of about 40 categories of static competition, as many as 15 trophies went unclaimed. This year, all 43 trophies were awarded, and at least five new categories will be added next year.

Another increase in activity was cen-



Dennis Otsuka and Mike Costello, on hand to answer questions about Hobby Shack's various lines of Japanese imports.



Suzanna and Bob Boucher of Astro Flight. Silent flight is right; first it was sailplanes, and now electric power.



AMA's Vince Mankowski, and Dist. X VP Jim Scarborough awarding Distinguished and Superior Service plaques to Mike Gilbertson for his outstanding efforts in securing new R/C frequencies.



Tony Avak, past IMS Blimp contest winner, collapses this whole model into a shoebox for transport! Travelled from east coast to fly . . . and visit relatives.



Carl Goldberg and the "thing", during early stages of construction. Curved legs demonstrate ease of laminating with Jet cyanoacrylate glue.



Hazel Sig-Hester with the popular new Kobra, designed by Klaude McKullough, who skipped 'c' in the alphabet.

tered around the Swap Shop. Undoubtedly, the addition of a MECA (Model Engine Collectors Association) "Collectogether" on Saturday evening, was partly responsible for the larger attendance. "Red" Garlough, a professional swap meet organizer, and a very active MECA member, operates the IMS



Darlene Lind certainly makes anything produced by Eldon J. Lind Co. much more appealing. New hinge slot digger is great!

Swap Shop. Tentative plans for next year include a new location adjoining the exhibit hall, that will provide a convenient separate entrance, near lots of parking area, where swappers can unload and set up their merchandise entirely away from the exhibitors' loading area. It is likely that the MECA



Bill McCooley, of Northeast Engineering, Bridgeport, Conn., really enjoyed his first IMS show. Will be back again for sure.

Region 1 and 2 collectogether will be held in the same area as the Swap Shop and during regular show hours, which should spur even more buying, selling, and swapping activity. And don't be too surprised if an auction doesn't find its way into the schedule!

The live indoor flying demonstrations



Lloyd Taylor and Chris Comley, of L. R. Taylor & Co. His electronic devices will be described in Eloy Marez's column.



Bert Smith and Elmer Good, Good Development, with cross-linked polyethylene floats. Five-cylinder O.S. 60 four-cycle radial.





Rich Bauer and Dean Copeland are surrounded by fantastic Byron Originals aircraft. Window light fooled meter.



Johnie Casburn, Jim Neal, and Super Lucky Fly, from Fort Worth, Texas. Product review coming.



Dave Robertson, California Model Imports, surrounds himself with nice company; Nancy Valencia (left) and Sandra Robertson.



John Gorham and Mike Sutton, Gorham Model Products. They built a Cricket during the Sunday show, and donated it to raffle!

have been a unique and exclusive feature of the IMS show since it came to Pasadena, and will continue to be a part of the show in the future. Some changes are planned, however. Tentative plans call for shortened show periods, from 30 to 45 minutes down to 10 to 15 minutes, but having three shows on Saturday, and two shows on Sunday. As those who have attended know, spectator traffic has to virtually come to a standstill during the flying demonstrations, and too long a show period can become inconvenient and somewhat annoying. Even so, many exhibitors admit that they enjoy having a short "breather" from

the continuous barrage of spectator inquiries (which ain't all bad, y'unnerstand!).

Perhaps the most exciting new indoor demonstration this year was the electric powered helicopter. About the size of the Gorham .19 to .25 powered Cricket, the electric chopper, by Ishimasa of Japan, will presently fly for about 2-1/2 to 3 minutes on a charge. However, an "umbilical" cord about 25 feet long is also available, permitting you to fly for as much as an hour, semi-tethered to an automobile battery. The electrochopper was ably demonstrated by Larry Jolly, in both power modes, and we're sure that

Cliff Raussin and Alberto Dona of Exportations/Condor Hobbies will be busy filling orders for this machine. I know for sure of one order they have!

This brings us to another type of demonstration that will not be continued in the future . . . outdoor, gas-powered helicopters. Although there is enough space on the Pasadena Center park grounds to fly a helicopter, and in fact, Larry Jolly even flew his Electricus (electric powered sailplane featured in our March '83 issue), from this site on Friday afternoon during exhibitor setup time, it is not a safe place to fly with hundreds of spectators in attendance.



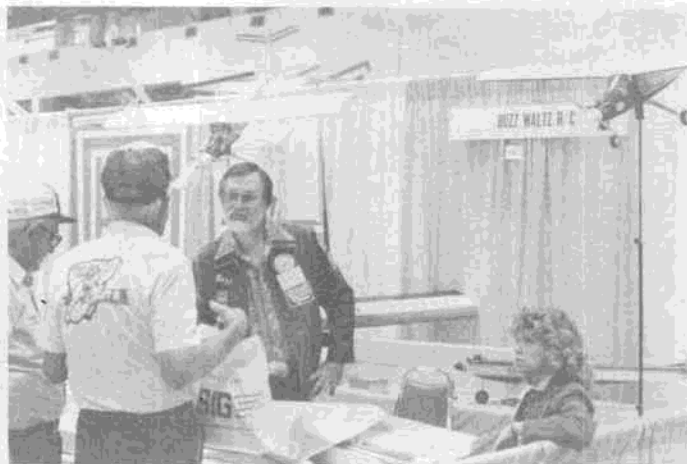
Roland Boucher, Nancy Boucher's chief helper at Leisure Electronics. Don't knock it till you've tried it!



Sid and Estelle Cole, recently arrived U.S. agents for Roy Lever's Powermax company in England.



Dave McAllister, George Steiner, Wally and Germaine McAllister. Goodyear really started something. It doesn't need a muffler!



Buzz and Linda Waltz field a question from a spectator. They're based in Palm Springs.



Ralph Warner and quarter-scale ice-bucket lid, or the world's largest Bott's Dot, or his coffee cup saucer!



Jack Strickland and the Magnum engine that powered three of the T.O.C. entries in 1982.

Although they have kindly consented to fly demonstrations in past years, both Gorham and American R/C Helicopters suggested that it be discontinued in the future. Pilots such as John Simone, Jr., John and Bob Gorham, Larry Jolly, Tony Frackowiak, and others, certainly have the confident skill to fly safely in such close quarters, but no one can be sure when a blade may get thrown, or a stray radio signal (the Pasadena Center is located right in the middle of downtown

Pasadena) may find its way into one of the receivers. The advent of the electric chopper, which can be flown indoors, though restricted in its maneuvers, sorta fills the gap, however.

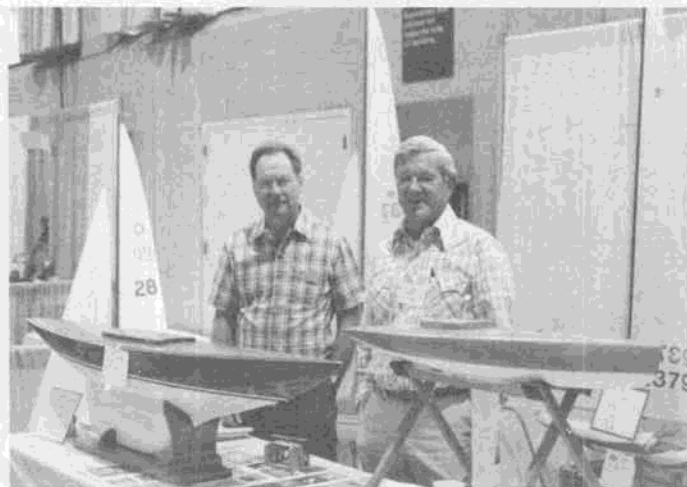
It is unfortunate that our photo coverage of the show is not as extensive as it should have been. To avoid the inconsistency of flash, with its "hot spots" and deep shadows, we normally shoot Tri-X film at 1200 ASA and have it compensated ("pushed") during development.

Somehow the process was botched, and many of the photos could not be used. We apologize to those exhibitors whose pictures do not appear.

Eloy Marez covered all of the exhibits dealing with radio or electronics, and his article will appear in the next issue. We might also mention that he will be attending the world's largest trade show in Nurnberg, West Germany, and his report on that will appear in the June issue. Bill Forrey's report on any and all



EMS stands for Electronic Model Systems and E. Mark Schwing, and lots of electronic goodies. See Eloy's column next month.



"Sparks" McClellan and Andy Littlejohn were on hand to talk about R/C yachting and AMYA.





Belinda Northrop solos an electric powered Boeing P-26 "Peashooter" as Addie Naccarato keeps a close eye on things.

exhibitors having something to do with R/C sailplanes will be found elsewhere in this issue, so we'll briefly fill you in on the rest.

How about starting things off with a flying saucer!? From Klagenfurt, Austria, Hanno Prettnner's home town, this saucer is basically a foam ring three feet in diameter with a center portion suspended from wires and mounting a .60 size engine with conventional propeller, pointing straight up! Remember the

DuBro 505 helicopter? Anyway, we brought one from the show, and will give you a more detailed report later.

Suggestion . . . buy, beg, borrow, or steal the big colorful poster from Pacer Technology, called "Z-Hints from Zap Man". On it are just 18 thought-provoking hints on how to use the various cyanoacrylate glues and related products from Pacer: Plasti-Zap, CA + Zap-A-Gap, Zap/Ca, Slo-Zap CA-, Zap Lock, Zip Kicker, Z-7 Debonder, Z Magnum,

and Z-Ends. It's Z greatest! Oh . . . tell Frank Milo we sent ya.

At the show, Pacer was flanked by two of its regional warehousing and sales offices, Robart (Central) and House of Balsa (West). Next to HOB was Ralph "RAM" Warner, the electronic devices man. His new items will be covered in Eloy Marez's column next month. Just be careful about accepting collect UPS

*Continued on page 97*



This slot car racing, 1/32 size, has never left the scene. Lee Stokley ran this display. A very popular exhibit.



Ted and Janice Dodd, TEJA, representing CMB Motori, Italy, in the USA. They came down from Bakersfield.



Truman Berkland, new president of DaCa Products Inc. Dave and Caren Litt no longer involved.



Dave Shuck, Dean Brown, and Dan Morrow, came to tell all about Delta Mfg's racing cars.



Gary Conley, like Wally Warner, of Technopower, is not making shelf engines. They run well and operate vehicles!



# FRANKLIN SPORT BIPLANE

By BILL GILCHRIST . . . Here is a two-inch-to-the-foot scale electric powered biplane that is sure to turn heads at the flying field. The Franklin Sport qualifies as a S.E.A.M. Golden Age Scale aircraft, too!

• The Franklin Sport was a small sport biplane manufactured by Franklin Aircraft Corporation of Franklin, Pennsylvania during the years 1930 and 1931. Seventeen of the Franklin airplanes were manufactured. I suspect that the depression of that era prevented a larger production. At least this certainly was the case with a number of other manufacturers. Twelve of the seventeen airplanes were the Sport "A" type, our subject model.

Full-scale construction was very typical for its time. The fuselage and tail feathers were welded 1025 SAE steel tubing. Wing construction was built-up ribs and solid Sitka spruce spars. The 22 x 10 x 4 Goodyear airwheels provided the shock absorbing. The aircraft was powered by a Velie M-5 engine of 55/70 hp. As I understand the history of that time the Velie engine assembly operation was closely associated with, if not part of, the Mono Aircraft Corp. of Moline, Illinois, manufacturers of the

monocoupe.

The full-scale Franklin Sport upper wingspan was 26 feet and the lower wingspan was 24 feet. The wing chord was four feet which resulted in a wing area of 185 square feet. Full-scale cruising speed is listed at 85 mph and landing speed at 30 mph. At 2 inches per foot scale (1/6-scale) this works out to an upper wingspan of 52 inches, a lower wingspan of 48 inches and a chord of 8 inches. The wing area is 740 square inches or 5.14 square feet.

Sport "A" N10147 started out as NC10419 and carried serial No. 8. The original color scheme was orange wings and a black fuselage. N10147 was restored prior to 1963 and at that time was owned and flown by Robert L. Morris of Springfield, Ohio. The plane modeled here is the restored aircraft. The color scheme is horizontal flying surfaces in white along with the movable rudder. The fuselage and fin are Loening yellow with black trim as shown.

My radio control modeling has been involved with several biplanes. This goes back to the days of galloping ghost proportional. It is not at all surprising that my entry into the field of electric flight would involve a biplane. The reference material used for this effort was published in *Model Airplane News*, April 1963. The drawings and information were the work of Richard Anderson. My plans and information are from his efforts. I have preserved it through several moves always with the intention of using it someday. This also points up my strong love for things scale. This one just had to be built when I had the time.

The model was designed with sport scale in mind. However, for those who might desire something more precise, the airframe construction is as scale as possible considering the difference between full-scale and the model. All dimensions are as accurate as they could be made. The only liberty taken with any outline is enlargement of the stabilizer



The Franklin Sport "A" at the local farm model airport. Lettering on this side was not completed . . . Author sez "One's enuff!"



The Franklin as it appeared in the September "Electric Power" column of *Model Builder*.



This view of the upper and lower right wings shows spar extensions required in the top wing and locator tongues required in bottom.



Step 1, rigging procedure: template positions center section of top wing while holes in end ribs receive spar extensions of wing panels.

one rib spacing on each side of the fuselage. (You would have never guessed it, if I hadn't told you.) The scale outline is shown, but I would strongly advise against its use for geared down electric power. My experience has shown that a small stabilizer just isn't worth the trouble it can cause. It is possible to fly a model with a scale stabilizer, but it isn't something associated with pleasure. It can result in continual damage to the model's undercarriage. Geared down electrics tend to fly nearer to scale speeds, and therefore do better with a slightly enlarged stabilizer.

The following design ideas helped put this ship together. First, the wing structure was made as light as practical, and the strength was provided by the biplane rigging. This means that all rigging wires and struts are functional, and the plane cannot be flown without them. This applies also to the stabilizer/rudder brace wires.

Second, the balsa sheeting used to simulate the fuselage front cowling also supplies the strength to support the ply bulkhead on which the motor and speed reducer are mounted.

Third, instead of sheet doublers to provide fuselage strength, ply gussets are used at critical joints in the fuselage framework. Another concept that came out of this project was the attachment of the stabilizer with small screws and blind nuts (T nuts) in order to provide for

adjustment. Once the rigging is in place, it is not easy to make changes in the biplane's wing incidences. This allows adjustment at the stabilizer for best flight trim.

The model was designed for, and test flown with, what is now called the Astro 15 standard flight system. In the meantime, Astro Flight, Inc. has been developing a 15XL with more power, more duration, and about four ounces heavier. Best flight trim with the new system may require some small adjustments. These are to be covered later.

Another way to go would be to run a Leisure LT50 motor with a three-to-one

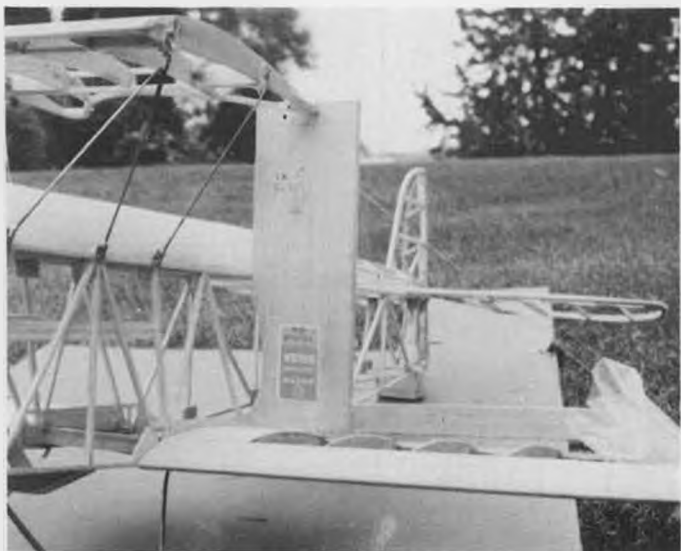
gear reducer (Part No. 6003), and power it with a seven (or eight) cell Sanyo pack. In this case the prop you will need is an 11 x 7. This will give you a lighter system with a slightly slower speed range.

Because an electric powered model has the larger portion of its weight in the flight system (motor, batteries, and speed reducer) it is customary to fly them as a three-channel ship, without ailerons. This model takes this all in stride. As with all three-channel ships, large corrections on the final approach are *not* recommended.

I have one request before we go into some of the building details. Most of us



Step 3, rigging procedure: one pound bags of shot are used to stretch out the landing wires and straightedges are used to adjust wing incidence from root to tip.



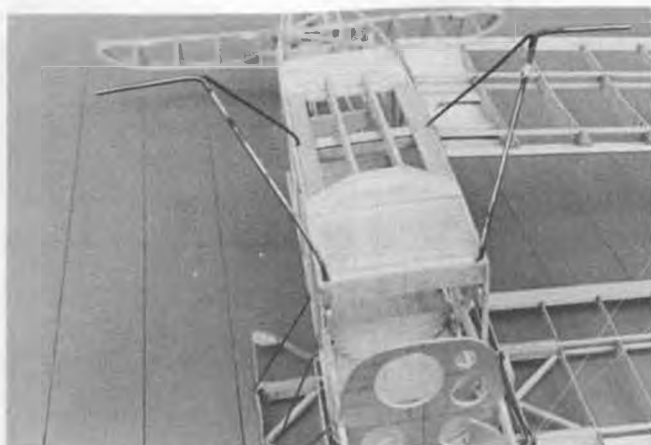
Step 2, rigging procedure: an L-shaped template (87 degrees) is used to adjust landing wire length for 3 degrees dihedral. Note shot bags.



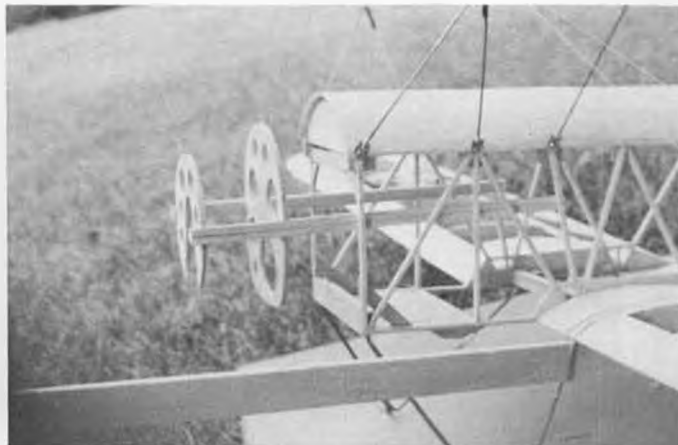
Step 4, rigging procedure: upper wing spar extensions slide into the space between the center section's spars.







Fuselage hatch holds the rear landing gear wire in place on the bottom of fuselage. Metal tabs will hold front L.G. wire in place.



Forward bulkheads are held in place by 1/8 x 3/8 balsa sticks glued to fuselage framework. Full-scale thrust line duplicated here.

who build models for radio control have a habit of adding extra reinforcement, extra doublers, and extra glue to existing design plans. Please don't launch yourself into a big redesign and reinforcement program. The results of your effort are sure to be a model that is too heavy to fly well. The design as shown has held up well through all the hard landings and hard bumps of getting both the prototype and the scale model into flyable trim. The use of the 1/8 square spruce as longerons and wing spars is a direct result of the prototype testing.

A word about gluing. The use of cyanocrylate glue is recommended. I find myself framing the structure with the cyanocrylate and then reinforcing with Titebond after it is off the board. I don't always trust the closeness of all my joints to be the best for cyanocrylate. The use of excessive glue is not recommended. One application of Titebond on one side of the joint is as strong as will

be required. Titebond is a must when gluing the 1/8 square spruce. It is a good idea to apply enough Titebond to the fuselage gussets to have a good fillet between the 1/8 square stock and the ply gusset.

*(If you haven't given Satellite City's new Hot Shot a try, you absolutely should. Super T and Hot Shot will give you the fastest, cleanest, neatest fillets you ever wanted to see, and they are every bit as strong as the Titebond fillets mentioned above. wrl)*

#### LAMINATED BOWS

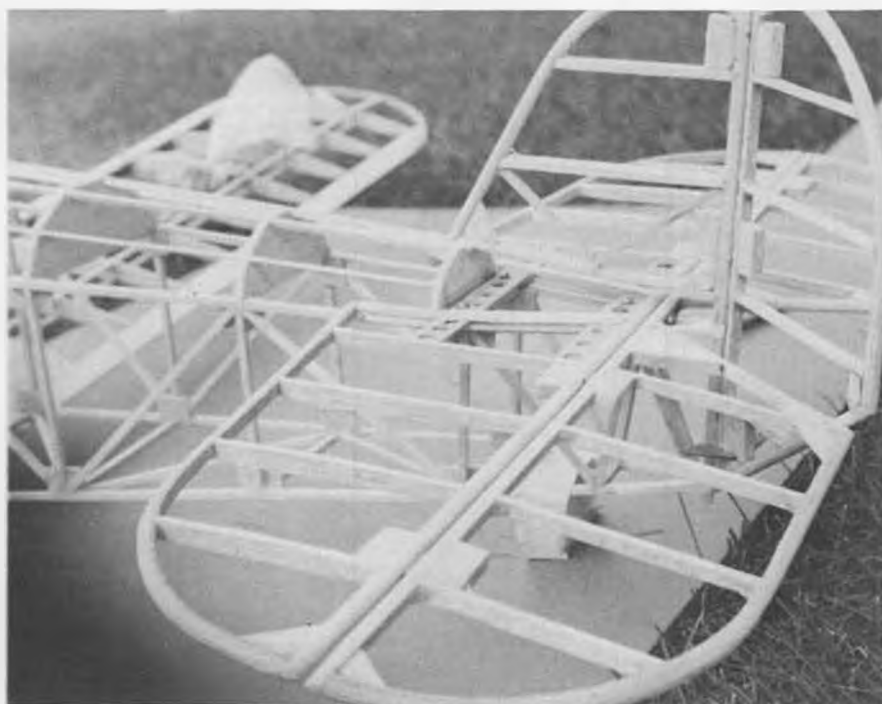
There are two types of laminated bows called for on the plans. The wing tips and the bow for the upper wing center section are to be made from 1/32 aircraft ply cut into 3/16 wide strips. The strips should be cut across the grain of the ply for maximum flexibility. The bows for the stabilizer and rudder are made from strips of 1/32 sheet balsa. These strips should be cut parallel to the grain and

the balsa should be as hard as can be obtained. As soon as Titebond is applied to the balsa strips they become flexible enough to conform to the necessary curve. One-thirty-second balsa sheet cut cross-grain does not produce a laminate stiff enough to make a good structure. If your 1/32 sheet is softer than you would like, one laminate of 1/32 ply in the group will stiffen the bow. If in the past you have made satisfactory bows out of strips of 1/16 balsa, go ahead and use your method. I started with the 1/32 sheet and have not tried other thicknesses.

I have had good results with forms made from 1/4 ply, and also from any kind of composition board. To make the wing tip bows, a workable procedure is to cut out a half circle out of the ply with a diameter equal to the inside diameter of the bow. Cut out another piece from this board to equal the outside diameter of the bow. Now, cover the edges of the forms that will be exposed to the glue with wax paper. To make the laminated bow, apply Titebond to the surface of the strip ply and form them around the half circle. Press the outside diameter piece around the outside of the bow and squeeze the laminate into shape. It may be easier to cut the outside diameter piece in halves and press the halves into place. The forms can be nailed or clamped to the work table to hold them while the glue dries (overnight). Excessive pressure is not necessary.

#### FUSELAGE CONSTRUCTION

Fuselage construction is started by building two sides directly on the plans. These need to be done carefully as they are the basis for the rest of the model. If you usually build the second fuselage side on top of the first, do so, as they need to be identical. Next, glue on the 1/8 and 1/16 ply gussets to the inside of each fuselage side (use Titebond). Left and right fuselage sides are required. When the gussets are dry, the 2-56 blind nuts (T nuts) can be located. Drill 1/8 diameter holes and use epoxy or model airplane cement to hold them in place and prevent their turning. The edges of the 1/8 ply gussets at the cabane strut area need to have their upper edges



This photo shows how the horizontal stab is secured with four 2-56 screws and blind nuts. This technique allows for decalage adjustments during flight tests. Fill with block when trimmed.







Installation details for the Astro Flight 15 motor with 10/15 speed reducer. Holes in forward bulkheads allow cooling air to flow through to battery. A 12v blower is used while charging.



Shows scale motor cylinders, hatch, receiver and power switch and charge jack locations.

sanded at an angle to provide clearance for the cockpit covering. Now, set up the fuselage sides and glue in the cross braces and fuselage bulkheads. Take time to check and recheck that the structure is straight and true. The vertical fin should not be glued in place at this time. I would advise finishing the stabilizer and covering its framework before putting the stabilizer in place, and then afterwards gluing vertical fin in place. The holding screws can be left out until the fuselage and vertical fin are covered for convenience in working around the stabilizer.

A convenient way to install the fuselage front end is to glue 1/8 x 3/8 balsa sticks as shown inside the fuselage framework with their center line at the full-scale thrust line. When the glue is dry, mount the forward fuselage bulkheads using the 1/8 x 3/8 cut out at each side of the bulkheads. The larger of the bulkheads is the motor mount so it should be square and true with the rest of the structure.

It is very handy to make the wiring installation before the fuselage is covered and the front is sheeted. There will be sufficient lead length with the flight batteries to allow for movement at final assembly to put the C.G. at the desired position. If the wiring is done before covering, the wire lengths can be held at a minimum. Short leads help reduce that unwanted weight build up as the model is being assembled.

#### WING CONSTRUCTION

The wing construction is pretty conventional. The trailing edge should be raised up 1/32 at the rear edge to provide the correct airfoil shape. For the lower wing sections, it makes things easier if the position of the slot is marked on the second rib (Rib 2). The tongue can be installed through the slot and glued into the position using the mark as a guide. Be sure to install the 1/16 ply ribs (Rib 1) in each wing section, the seventh rib from the root. The ply rib is a vital part of the strength provided by the

rigging. The 1/16 ply ribs are also required for the outside ribs at the upper wing center section.

The least enjoyable task of building this model is cutting the holes through the ply ribs between the spars of the center section. This should be done before the 1/8 sheet balsa webs are glued in place. The webs provide the sides while the spars provide the top and bottom of a box to accept the upper wing spar extensions. Glue the basic structure well before cutting the holes. Work carefully with an X-acto saw, drill, and file. If the joints crack in the process, glue them back carefully and let them dry before finishing the job. When the holes are completed, the webs can be glued in place. The resulting box cavity should be cleaned of extra glue before the structure dries. The spar extensions

should fit inside the resulting box with very little filing and fitting.

#### WING RIGGING AND WING STRUTS

On the plans are decimal dimensions beside each cabane strut and each interplane strut. These are the calculated dimensions from center to center of the wing hardware holes or to the blind nut locations in the fuselage. These should be used only as a guide. The final lengths must be those that produce a straight and true biplane structure. The cabane struts can be made up as shown. Their sheet metal ends can be adjusted by soldering to the required length, if necessary.

Temporary interplane struts from soft wire should be made up to the plan dimensions.

*Continued on page 95*



Profile view of Franklin Sport "A" reveals dummy motor and cowl details. White lettering was made from thin white plastic sheet which was cut to shape and glued on with RC-56.



1. Bob Martin, of the model company that bears his name, poses with an array of his R/C sailplanes at the recent IMS show in Pasadena, Calif.

# R/C SOARING

By BILL FORREY

PHOTOS BY THE AUTHOR

• On January 14, 1983, the world soaring community lost a generous and good friend. Lee Renaud, the man behind the Aquila, Olympic, Sagitta, and Questor families of gliders manufactured by Airtronics, died of a stroke after a short stay in a hospital with diabetes complications. As of this writing, I have no further knowledge pertaining to his family or business.

I didn't know Lee very well. I had met him several times both on the flying field in various contests from California to Illinois, and socially at club meetings, personal interviews, and parties. That

may seem like a lot of contact, but it really wasn't. I don't suppose there is more than two hours of conversation with Lee in the whole lot... I wish there could have been more. I feel a great sense of loss and tragedy, as I'm sure anyone who knew him does.

Good-bye, Lee... we'll miss you.

## NATIONAL SOARING SOCIETY

The NSS is recognized as the official voice of R/C soaring in the United States by the Academy of Model Aeronautics. The NSS is a fine organization with competent officers and a bi-monthly newsletter/magazine, the *Sailplane*. The

NSS organizes a yearly Soar-In contest and an excellence award program that recognizes top pilots in the country. Dues are *cheap* (only \$10!!!) considering what you are getting... the magazine alone is worth that much. And finally, if you have any idea of how the AMA works when it needs information regarding R/C soaring, you know that the NSS is where it turns first... so stand up and be counted, join the NSS!

NSS, c/o Doug Dorton, 3058 Bernina Dr., Salt Lake City, UT 84118.

## GLIDERS GALORE AT THE IMS

If you were present at the sixth annual International Modeler Show in Pasadena, California last January, you were treated to a staggering number of soaring aircraft. If you missed the show, the best that I can do for you is tell you about it, and let you see some of the gliders through the lens of my camera. It's no substitute for actually being there, as



2. Top Flite's Scott Christensen holds the Metrick two-meter.



3. Jim Benson of Aircraft Spruce and Specialty Co. with catalog.



4. Bob Sliff of Hobby Horn holds the Sensear two-meter glider.



5. Mark Rebeck of California Slope Designs with the Savage.



6. Consolidated Models representatives, Ellis Chee and Joe Zimmerman.

you are well aware, but it will have to suffice until next year when, hopefully, you can make plans to be there personally.

Bob Martin RC Models had one of the most eye-catching booths at the show to highlight his line of slope and thermal gliders. Photo No. 1 displays five of the six gliders that Bob Martin carries in his lineup. From left to right are: the Coyote, an acrobatic, 72-inch, slope glider which features plywood skinned, foam core wings, and an unbreakable Dura-lene plastic fuselage; the SR-7 which is another fast, aerobatic slope glider of 54-inch span also featuring an unbreakable Dura-lene fuselage and

foam core wings; next is the world famous Hawk (a.k.a. Hobie Hawk) which is now back into production and hardly needs a description here; the Gryphon flying wing is making a strong comeback after a radical restyling and airfoil modification which has improved its light air performance, a new Dura-lene fuselage makes the Super Gryphon even faster to build than before; finally, the Katie II (far right) is Bob Martin's "transition" aircraft or aileron trainer for slope flying, featuring, you guessed it, a Dura-lene fuselage for the crash landings that occasionally happen to inexperienced pilots (gee, I know some "experts" who could use unbreakable

fuselages, myself included!).

Photo No. 2 shows Scott Christensen (a.k.a. LSF "Numero Uno") holding the stand, which is holding the sailplane, that Scott designed. The Metrick is a two-meter soaring machine that is docile enough for the novice, yet offers competition pilots some outstanding flight characteristics. The Metrick features an all-moving, mid-fin stabilizer, a strong D-tube, modified Eppler 205 wing which is capable of handling the club's 12 volt winch, and a third channel, spoiler/releaseable tow hook system as an option. For more details, I will refer you to Willie Richards' product review in the January '83 **Model Builder** (page



7. US F3B Team booth. Adam Peltz, Dave Peltz, and Mike Reagan.



8. Two Worlds International's Soarcraft Mini-Merlin. Ken Wardrip.



9. Charlotte Jolly and the Pantera. Larry Jolly Model Products.



10. Craft Air's new Freedom glider with designer, Jack Caldwell.



11. Larry Hargrave with the Hargrave Enterprises Jaguar 2-Meter.





12. Alex (the F3B "Kid") poses with Larry Jolly and the Meteor, a LJMP model.

20).

Photo No. 3 is the intermediate to advanced scratch builder's paradise booth, or if you prefer, Aircraft Spruce and Specialty Co. If you need foam, fiberglass, kevlar, dynel, carbon fiber tow or cloth, aircraft aluminum or steel tubing or bar stock, acetate plastic sheets for molding canopies in your oven, contact cement, Safe-T-Poxy, phenolic sheet for bellcranks and control horns that will not break . . . the list goes on and on! Did I forget to mention spruce? Write for the **Model Builder's Edition** of the AS&S catalog at 201 W. Truslow Ave., Box 424, Fullerton, CA 92632, it's FREE!

Photo No. 4 depicts Bob Sliff holding the Sensoar glider, one of literally thousands of items which he carries in his mail order catalog of 65 pages (8-1/2 x 11). If you are in the market for a



13. Roger Wildman of Hi Johnson Model Products and American Eagle II unlimited class ship.

practical, economical, two-meter thermal, slope, or 05 electric powered glider, don't pass this one by . . . it's only \$16 for a machine cut and sanded kit, *incredible!* Write to Hobby Horn, P.O. Box 2212, Westminster, CA 92683 and get the catalog and the glider. There is no price printed on the cover of the catalog, so there is a good chance it's free for the asking.

Photo No. 5 shows the underexposed (sorry 'bout that) face of Mark Rebeck and the properly exposed sailplane, the Savage. Mark had an excellent videotape playing at the front of his California Slope Designs (not *DESIN*, Mr. Sign Maker) booth which rather graphically displayed both his aerobatic flying skills and the aerobatic capabilities of the Savage. The Savage is a 70-inch span aileron slope ship with built-up (not foam) wings, machine cut balsa and plywood parts, full-size, rolled plans with instruction booklet, and complete hardware . . . all this for only \$54.95. Also very prominently located within Mark's booth was a fiberglass version of the Savage fuselage which is available for a very reasonable \$35 (length from nose to rear tip of the fin is 43 in., weight is 6 oz.).

Photo No. 6 shows a couple of gliders and a couple of glider salesmen. Ellis Chee and Joe Zimmerman hold the Deadbeat II slope aerobatic glider, a 62-inch span, 496 sq. in., V-tailed, two-channel model designed by Dale Winder. In the background is the Hustler, another aerobatic slope design with swept wings, conventional tail, a span of 58 inches and an area of 470 squares . . . for two-channel control, also designed by Dale Winder. Write to Consolidated Models, P.O. Box 5661, Buena Park, CA 90622, or call (714) 761-2196 for prices and details.

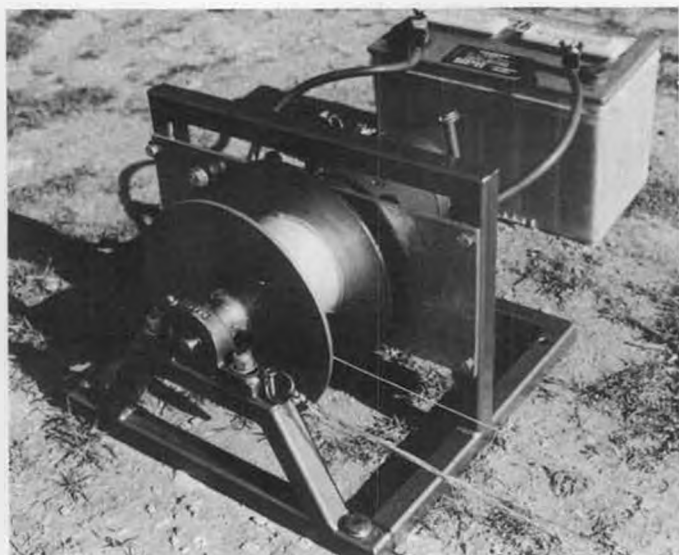
Photo No. 7 is the United States FAI/F3B Team booth manned (when this shot was taken) by (left to right): Adam Peltz, Dave Peltz, and Mike Reagan. The white airplane in the background is a Tai-Tai belonging to Gary Ittner, and the gray (gold, actually) and black airplane is Dick Odle's RO-16, both sailplanes saw action in the U.S. Team Selection Finals in Joliet, Illinois last summer. Alex Bower flew another Tai-Tai at the finals which differed from the one you see here by its airfoil, an MB (that's Mike Bame, not **Model Builder**) 253515 airfoil. One of the signs under the Tai-Tai reads, "World's fastest F3B sailplane!" with an explanation of the claim below the bold



14. Robert Webb poses with his canard glider, the Ahiru, or duck in Japanese. Robert placed third in best original design glider competition. Note the small F/F model on the table.



Mike Reagan poses with the two-meter that he plans to fly at the 4th 2MWC this June 11, 12.



The solution to the FAI winch mess? This is one of five identical, standardized winches for the 4th Two Meter World Cup. See text.



Mike Bame, of MB airfoil infamy, poses with the two-meter that he thinks is "just right" for the World Cup meet this June.

headline. Alex turned in a sizzling 20.0 second speed run in the finals (the fastest official speed run ever) in the 150-meter, four lap course with an average speed of over 77 miles per hour!

Also visible in the photo is the banned (boo, hiss...) "Gorilla" winch which consistently propelled the Tai-Tai 200 or more feet higher than its rivals in the contest. See what all the fuss was about later in this column.

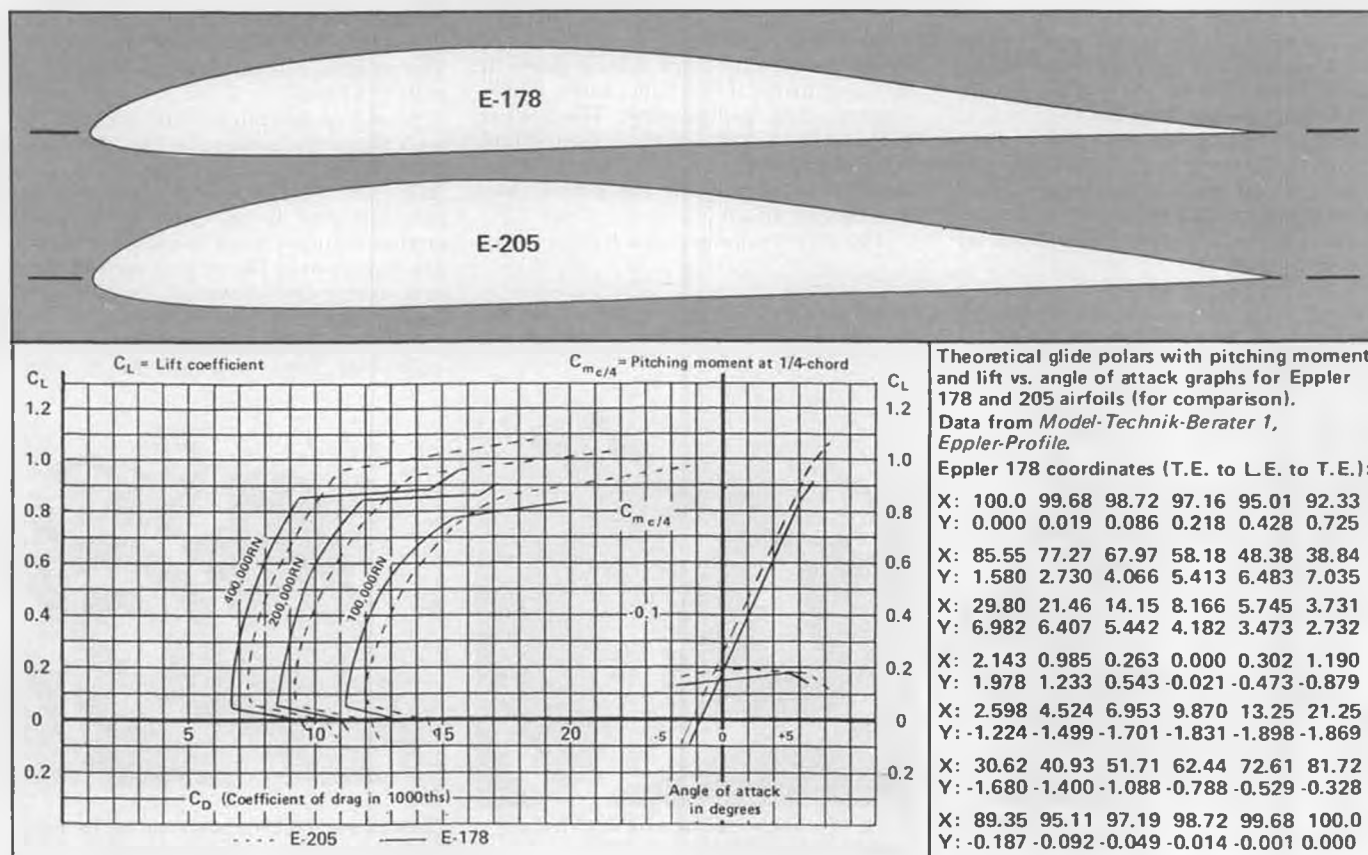
Please help support your F3B team this month (and next...) by purchasing decals (\$3), pins (\$5), and patches (\$6) from the team manager, Dick Odle (c/o Spectrum, 5775 Los Angeles Ave., Suite 210, Simi Valley, CA 93063). Believe me,

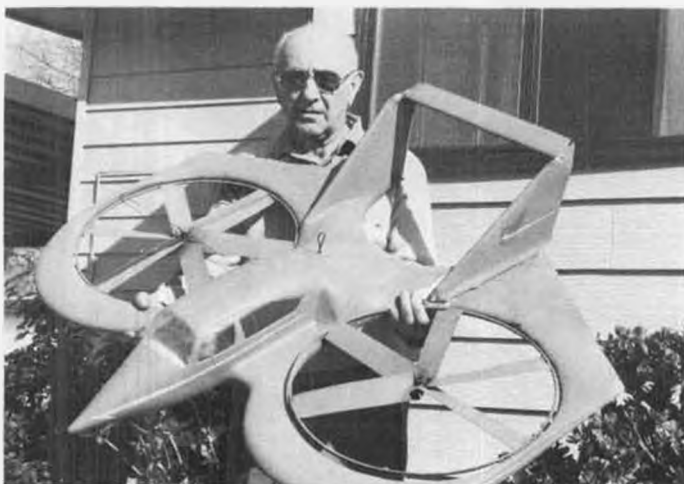
EVERY DONATION HELPS, no matter how large or small, but the *most important* thing is that *everyone* who is in any way involved in R/C soaring in the United States makes an effort to show the world what a great country we have, and what a unified group of enthusiasts we are. The team logo (I'm sorry I don't yet have a picture of it) looks strongly like the seal of the President of the United States... VERY CLASSY! Get one of each, and wear them proudly!

In case you are wondering why it is important to support the team, it might interest you to know that the AMA, as generous as it is, cannot afford to send as many people to England as is *absolutely*

necessary to compete effectively. We pay, through our F3B team selection participant fees and AMA soaring budget, for the transportation to the host country (and to the flying site) for the three contestants, one team assistant, and the team manager, period, nobody else. Food and shelter expenses are also taken care of for these five people, but that is all, folks. Equipment expenses, transportation expenses (other than shuttle service to the field), expenses encountered during team practices, expenses incurred getting to the airport (LAX in this case, but it could have been

Continued on page 89





Ed Glenn holds his rotor-craft invention (seen here without the tail rotor) which he believes could be scaled to full-size vehicle.



Another of Ed Glenn's projects was this working replica of a Wright Whirlwind radial engine. Over 10 hp produced.

# Ed Glenn - *INVENTOR*

By GEORGE SIPOSS . . . Ed Glenn is one of those rare individuals whom you wish everyone could know, his ideas are always stimulating and challenging, his life is always busy and full . . . a real dynamo!

• What do you do when an inventor shows you a really wild idea of his, something that has never been done before? You tend to disbelieve him . . . unless his record is so good that it leaves no doubts in your mind.

When I first met Ed Glenn, a 78-year-old Newport Beach, California inventor, I never thought that I would be exposed to so many interesting ideas. He told me about some automatic machines that he designed and made, fantastic flying machines, boats, engines, ice boats, etc. Then I saw his shop where he made working prototypes of all these inventions. Then I found out that he was the president of a company that manufactured hardware for space ships (NASA) and other specialized machinery. I learned to trust Ed and everything he said.

There are very few real craftsmen left

in this world, and Ed must be one of the few. He was educated in Aeronautical Engineering at Curtiss University and Lane Institute of Technology in Chicago. His thesis at the end of his apprentice year was a working replica of a Wright Whirlwind radial engine. It took him almost two years to finish it in 1922. This engine is still in excellent condition ready to be fired up.

Ed's masterpiece is a nine-cylinder radial engine, with one-inch bore and one-inch stroke, as near as he can remember it (the cylinders have not been disassembled for a long time). It has a centrifugal sand-cast sump which supports the components. The rocker arms of the valves are drop-forged and have adjustments on them. He used the smallest spark plugs he could find, they are 11 mm Bosch.

The oil is contained in a half-pint can

from where it is pumped up into the dry-lubricated sump by a gear pump. The average oil pressure is 8 psi. The gage can indicate up to 10 psi. Regular gasoline is contained in a 1-1/2-pint tank. A small hand pump supplies air pressure to force the gas into the float controlled carburetor. Ed says that the engine will run almost an hour on one tank.

Ignition is by a battery and points, by means of a regular car ignition coil. A toggle switch is used to stop the engine.

The length of the engine is 14 inches, diameter at the very outside is 13 inches. The weight, without battery is approximately 11 lbs.

An adjustable pitch metal prop of 30-inch diameter is mounted on the main shaft. When revved up to approximately 2800 rpm, Ed believes that the engine puts out over 10 hp. Once he had the engine mounted on a 16-foot skiff with 8 passengers in it. The engine started with two swings and powered the skiff at a respectable speed.

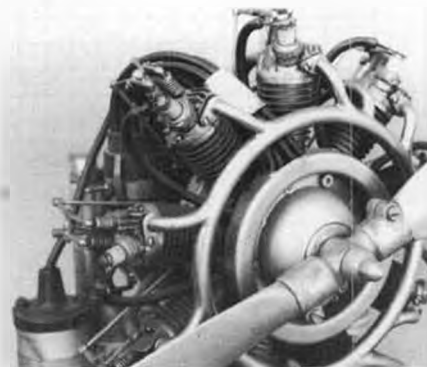
As a craftsman, Ed would like to see his engine displayed in a museum. If some-



Closeup shot of the Whirlwind replica shows distributor and rocker arm details.



Bosch 11 mm spark plugs were used. Note collector ring and rocker arm details.

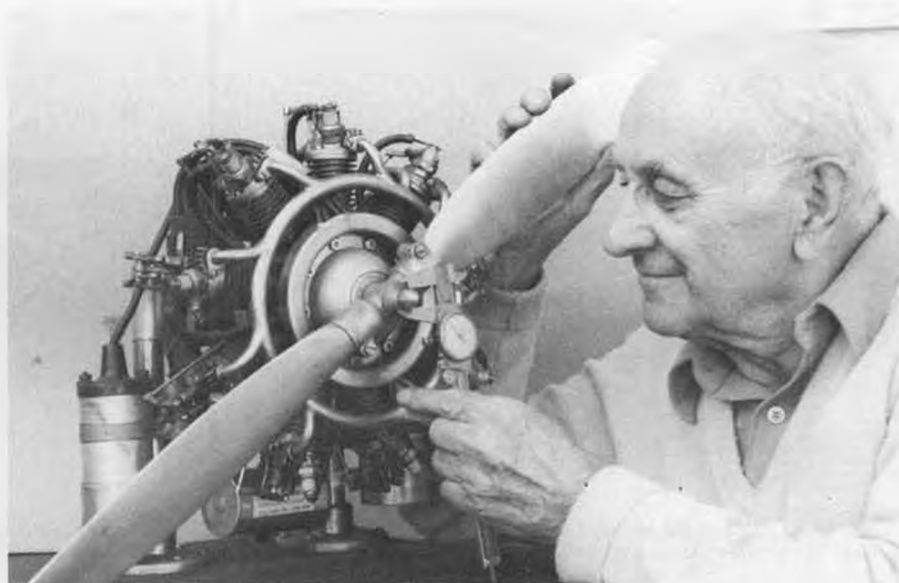


Front view of the Whirlwind replica. Ignition coil was automotive type. Metal prop.





Rear view of the Wright radial reveals fuel system details. Note carb air horn at cylinder.



Ed Glenn's beloved thesis project is a work of art to the mechanically minded. This engine took almost two years to complete back in 1922. Still runs!

one wanted to "give it a good home" he would sell it for approximately \$3000.

Having seen the intricate detail and workmanship that was put into this engine, I believed every word of Ed's story from there on.

Another of his pet projects is a helicopter design which shows a great deal of thought. Two slow-rotating six-bladed props are used as "wings" to provide lift. The prop's extreme tips are connected to a metal circle which has tiny scoops formed in it and runs on ball bearings. Thus, no center shaft is employed. Drive is provided by the exhaust gases of the engine being directed against the scoops in a turbine-like fashion.

A third six-bladed fan in the tail aids in the initial vertical take off and is eventually rotated to a horizontal position to provide forward thrust. Control is provided by differentially directing the driving gases against each main rotor. This allows "aileron" control as well as pitch control at low speeds. At high speeds the regular fin and elevator take over.

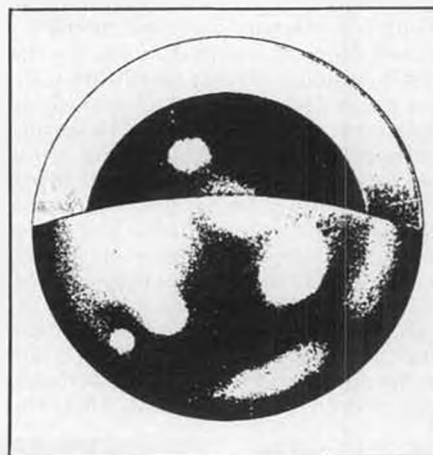
In order to reduce the weight of the

plane, Ed had to develop hollow aluminum balls. As the main rotors ride on balls, any weight saved in a ball is multiplied by the number of balls. In a full-size ship this can be a saving of 75 percent and hence more payload is possible. So what does an inventor do to develop hollow balls? Ed Glenn invented a machining process which makes hollow metal spheres automatically. The U.S. patent office awarded two patents for his process and the hollow balls are used in aircraft landing platforms, ball bearings, and as heat shield float-blankets.

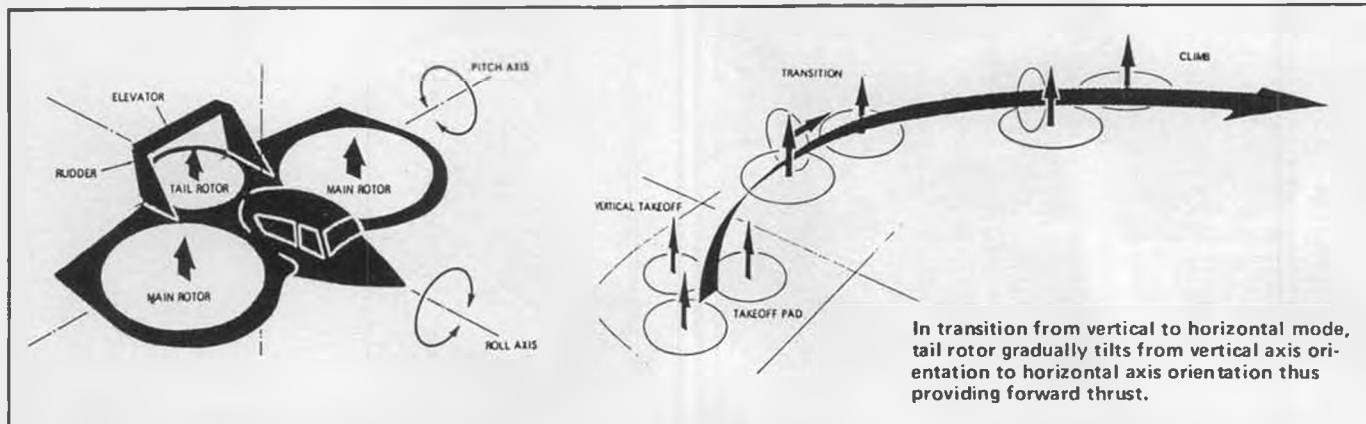
As he has diminished strength to work on his projects, Ed would like to have hobbyists pick up his idea for the rotor-craft and develop it into radio controlled models. Eventually, perhaps a company might be interested in producing full-size planes based on this concept. Design projections predict a plane that will seat six, climb at 2900 ft/min, and cruise at 350 mph with a 160 hp engine.

If you are interested in cooperating with Ed, please send a self addressed,

stamped envelope, and a description of your facilities/experience to: Mr. Edward Glenn, 2300 Laurel Place, Newport Beach, CA 92663. If you measure up to his standards, you might be in for a mind-boggling experience! •

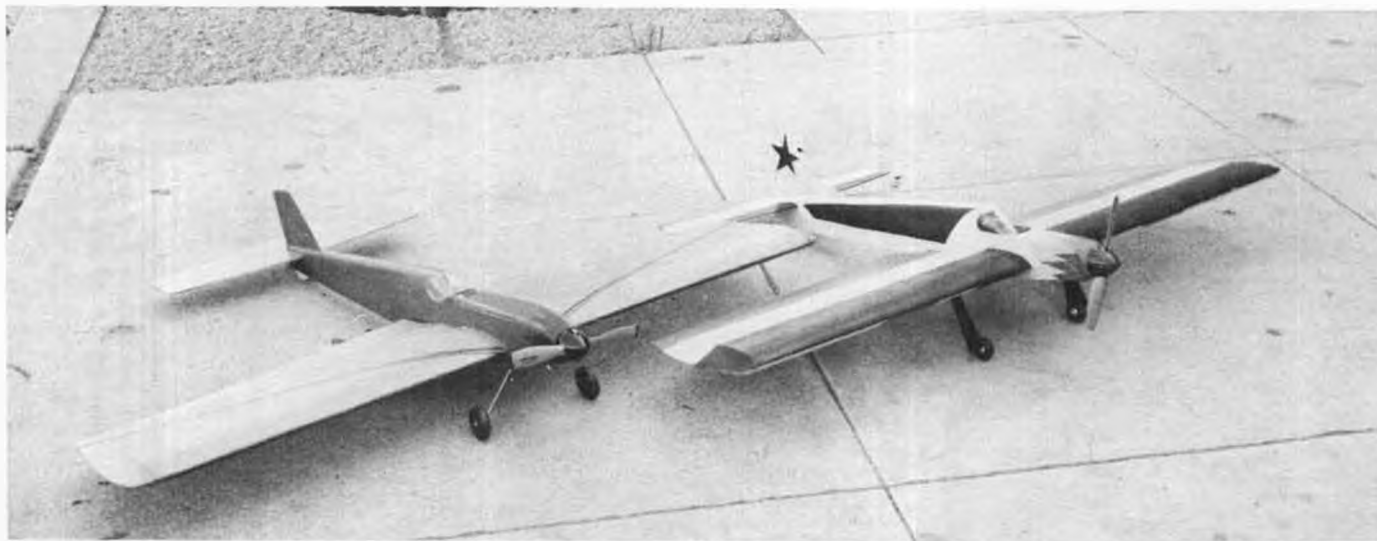


Another Glenn invention . . . hollow ball bearings for the rotor-craft's main blades.



In transition from vertical to horizontal mode, tail rotor gradually tilts from vertical axis orientation to horizontal axis orientation thus providing forward thrust.

Pilot controls power flow to main rotors by throttle. Differential power feed is linked to conventional roll axis controls. During vertical ascent, tail rotor contributes to lift and controls pitch. Forward flight allows normal elevator and rudder controls to become effective.



Addie Naccarato of T&A Hobby Lobby in Burbank, CA, designed and built these two beautiful little control line electric airplanes affectionately called "Little Stars". Details of these models are included in the text below. If you were at the IMS show this year, you probably saw one fly!

# **ELECTRIC POWER**

By MITCH POLING

• The Society of Electric Aircraft Modelers was organized about a year ago with the purpose of promoting all forms of electric powered aircraft. I joined then, and waited a while for the first newsletter. It was worth the wait: ten pages of topics ranging from wiring diagrams to rules proposals. The second newsletter, which arrived just a few weeks ago, is even better with articles on charging, lists of hobby stores that carry electrics, and contest news. The newsletter is quarterly, and it alone is well worth the \$10 annual dues to join SEAM.

Electric fliers really do need an organization, both for communication and a sense of direction. If you are interested, send a self-addressed and stamped envelope to SEAM, 11632 Fla-

mingo Dr., Garden Grove, CA 92644. This will get you a sample newsletter, well worth the effort of a SASE. Anyhow, on to some of the items. . .

Rule making is a pain, mostly because you will never satisfy anybody, so you try to set it up so it is as simple as possible and leaves everyone equally dissatisfied! The fact is we need rules so we can have contests, and I'll have to admit, contests do provide the spur for development, and for inspiration. So, SEAM has tackled this nest of hornets with a couple of competition class proposals. These are Sportsman 2-Meter R/C Sailplane, and Golden Age R/C Sport Scale. I'll just list the rules here. SEAM welcomes input, so if you have some comments, send them to SEAM.

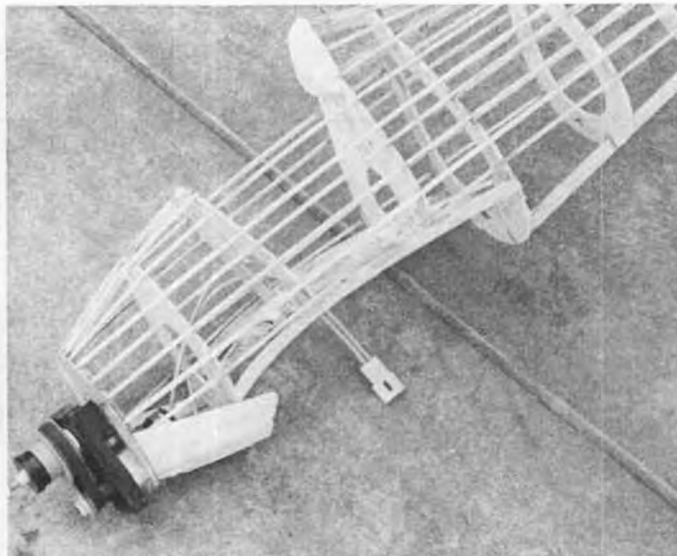
## **SPORTSMAN 2-METER R/C SAILPLANE**

This class is to encourage new people to join in electric competition, and is intended to be a simple and inexpensive beginner's class. The basic rules are: maximum wingspan, two meters; controls, rudder, elevator, and motor; no cobalt motors; three pole armatures only; the motors must have been produced in quantities of 500 or more; direct drive; maximum prop 7 x 4 with no modifications; only six-cell sub-C battery packs or eight-cell 600 mah (or less) battery packs allowed.

This really comes down to using simple, direct drive sailplanes with stock 05 systems and props, which is definitely the easiest and the best way for beginners to go.



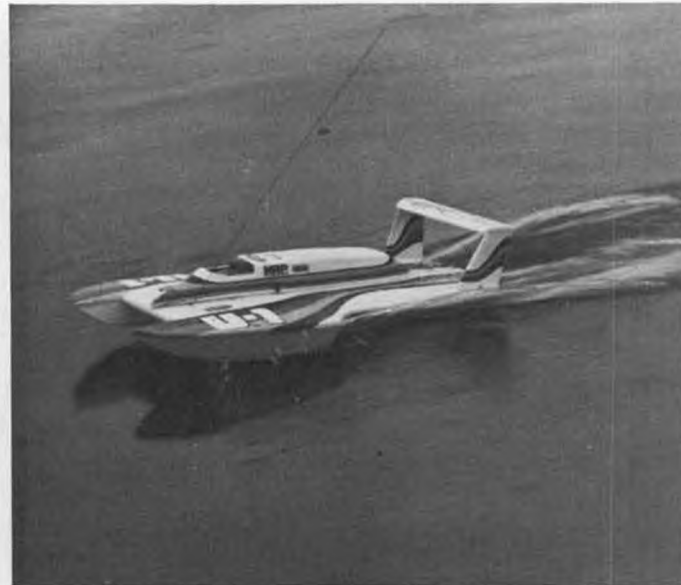
Tony Naccarato poses with the Little Stars. Models are 035 electric powered, and are capable of the full AMA stunt pattern.



This is how an Astro 020 is installed in a Guillows plane . . . simple bolt-on technique . . . nothing fancy! Model is Boeing Peashooter.



Charles Hampton poses with his Ishimasa helicopter which is twin 05 powered, and carries eight sub-C cells. KRC meet, Hatfield, PA.



Mitch Poling puts the MRP hydroplane through its paces. Model is fully on the step, not plowing. Balance should be 2 in. behind step.

There is no question that you can get more performance from cobalt motors and gear drives with folding props, in fact, you can double the climb, and there is a place for that type of sailplane too. In fact, in my next column, I will talk about that type of system. There should be, and will be, I'm sure, another class for the expert with "all out" equipment.

The Golden Age R/C Sport Scale class looks like a winner to me. This would be for 1929 to 1941 civilian aircraft. These are a natural for electric, the light wing loading allows them to fly slowly, and most of them are so stable that you could teach beginners to fly with them. They are also ideal for gear or belt driven props, so they would make a good class for those wishing to try prop speed reduction. If you power them with an Astro 15 or larger, they can take off from mowed grass, which adds to the realism. The Astro Flight kit of the Porterfield is an excellent example, it flies slowly and realistically, and can take off from grass.

The Leisure Electronics second annual Grand Championship will have this event, on Sunday, February 27, at Mile Square Park, Fountain Valley, California. The only requirements in the rules are: not over 10 foot span nor over 10 pounds ready to fly; judging will be done according to AMA Sport Scale rules. This should be a fun event; I wish I had the time to build a plane for it.

I fly a full-size Taylorcraft on floats, the same one, in fact, that Walt Mooney drew plans for which Model Builder sells, good old Kurtzer 95871 (MB Plan No. 8723, Taylorcraft, 24-inch span \$1.50; or MB Plan No. 579-O.T., 1/4-Scale Taylorcraft, 9-foot span, \$12.00). What an ideal subject it would make! Well, someday, when I get my book on electrics done, finished, and kicked out the door! The full-size plane is a delight to fly, stable, yet responsive. I can trim it so that all I have to do is sit as a passenger and enjoy the scenery... a lot like flying my R/C "old timers"; yet, when I want to do a

gentle turn, I can do it with one finger on the wheel (it does have a wheel, not a stick).

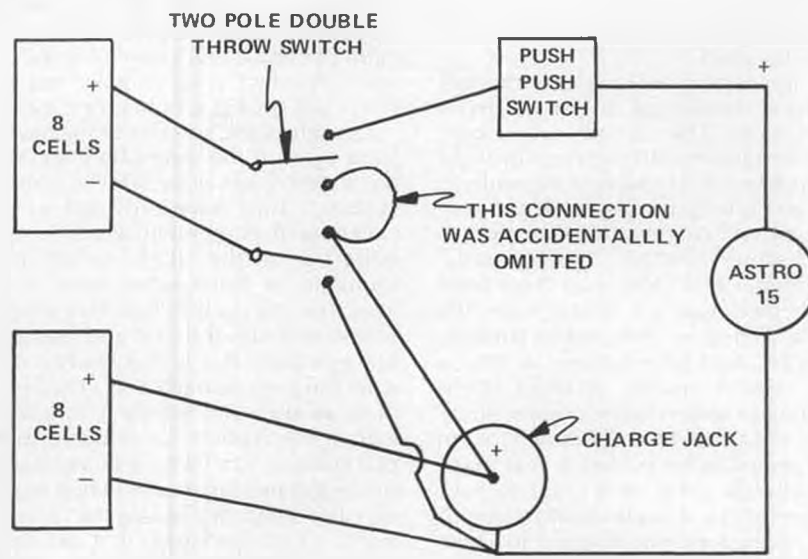
There's nothing like taking off from Lake Union in Seattle on a clear winter day and flying south toward Olympia, and looking at the snow covered Cascades to the east, the Olympic mountain range to the west, and three huge volcanos bulking in the south, Rainier, Hood, and St. Helens (yes, the one that blew up). But, I disgress, that's what Golden Age Scale will do to you! Definitely a good event!

Another item in the SEAM newsletter is a list of hobby dealers that carry electric items, two of these I just visited recently. T&A Models, in Burbank, California (213-842-5062) sells just about anything you can think of in electrics. Their stock is really impressive, and Tony and Addie Naccarato are without question two of the most knowledgeable electric modelers I have met. They ship

mail order (UPS), in fact, I just ordered a Miss America (Midway Models, 020 size) from them. If you ever get the chance to go to their store, do so, it is quite an experience!

Addie is almost always building something, the day I was there it was a Guillows scale P-26 Boeing "Peashooter" for 020 electric U-control. Tony and Addie, along with the Black Sheep Squadron club, have really gotten into electric U-control, and they are always a feature at the IMS show. They even do carrier landings inside the exhibition building on a carrier deck they built! Flying is done on 20 foot, .008 steel lines (from Sig), with either the Astro 020 FF or the RC unit. I had wondered how the motor was installed, as I had never seen one of their U-control planes disassembled, and since Addie was building one, this was the opportunity. The photo

*Continued on page 79*



Here is the corrected charging circuit that replaces the circuit that appeared in the January '83 "Electric Power" column.





Team Sweden as they appeared at the end of last year's FAI Scale competition in Reno.



Sweden's Kjell-Ake reaches for an elusive, taunting mirage in the Reno desert.

# 1 TO 1 SCALE

By BOB UNDERWOOD

• Fifty is a terrible age. (Actually it's 51, but who's really counting.) There was a time when a stick made a perfectly acceptable rifle for the battles and safaris of youth. From old wheels, a board, a handful of nails, and imagination was produced a vehicle capable of surging beyond all bounds of human thought. Hours upon hours were spent stretching mental bounds in flights of fancy. But that was years ago, and things have changed. Now the games require realistic accoutrements that retire the imagination to a shelf. The snap together, bigger than life items that feed our lives shadow the flashing screen and munching men.

It's interesting to note the changes that have developed in our hobby in recent years. The 50 and over crowd recall the age of modeling which brought the modeler's full powers of ingenuity to bear on solving problems. They were slow times when glue took overnight to dry. "Vacuum formed," "fiberglassed," "extruded," and "ARF" may have been in the dictionary or heard from the neighbor's dog, but they weren't modeling terms. And here we are, in 1983, a "chip" world unable, or more likely, unwilling to return to the simpler times.

I am not certain I really want it to, but there seems to be evidence that many do. Most assuredly, it is great to have equipment that is complex and dependable. It's heaven not to have to jiggle those switches on a reed transmitter that weren't simultaneous, proportional, or very reliable for that matter. Why, those

were the days in which you were lucky to get it to fly, let alone worry about whether it looked like a *real* airplane.

Now when you cruise through the magazines and look at the ads and articles, there are models of enormous complexity (not to mention cost). Kits of \$200, \$300, \$700 with machined gizmos and fiberglassed what's-its containing all the details in "living realism." A choice of "ultimate" machines parade before your very eyes, each just as "ultimate" as the one to follow, thereby coining a new definition for an old word. When we finish our "ultimate" kit, we find the "ultimate" radio, engine, retracts, and paint (whoops! that's not "ultimate"... that's "perfect"). Gosh guys and gals, aren't we getting a but carried away?

Enough of the spoof! I really have no hang up with the state of our art. What the industry has done for the hobby is fantastic. They have provided us with exceptional equipment which is really quite free of the "junk" quality items found in so many other areas of our lives. This speaks well for those who are concerned with the care and feeding of our ego trips. But isn't it really hard to wow the guys nowadays. It's hard for all of us to be a Bill Kinsey with a nightmarish mechanical masterpiece, push-pull Dornier, or a Tom Cook with a super successful two fan model (when most of us can't keep one going for a whole flight), or a Steve Sauger that can make a little tiny things look so-o-o real and nonmodelish.

One must really admire the determi-

nation, skill, and ingenuity of persons of their ilk. I for one salute you gentlemen and all those who exercise the Edison-like qualities of pioneering. They subscribe to the theory that one never fails... one only succeeds on a limited basis. As Edison probably could have suggested, long about the 50th time that his light bulb didn't work, "I haven't failed. I know of 50 things that are eliminated because they won't work."

## FAI SCALE TEAM SELECTION, 1983

The dates are firm, the place is set, and the team selection for the FAI Scale Team for 1984 is on its way. NASA, through the AMA, developed the contest for August 12 through 14 at E.P. "Tom" Sawyer State Park in Louisville, Kentucky. The local support for the contest will be provided by the Southern Indiana R/C Modelers, the same group that has presented the excellent Mint Julep meet for a number of years. The judges are being selected from experienced FAI and AMA personnel around the country.

The event will select both the control line and R/C teams using *only* FAI rules and specifications. There are, as of this writing, some questions as to which FAI rules will be used; those which have been in effect, or the newly developed set which basically eliminate precision. In any event, whatever rules will be used will be published soon.

The new set of rules, if they are used in Paris 1984, involve a hands-off technique of judging. The models are judged from three meters and one meter, but are *not measured*. If this system will be used in 1984, we will be selecting only three members for R/C with two alternates rather than the present three precision and three standoff for R/C, and three for control line. At the very earliest date possible that a final determination concerning the rules can be made, they will be published.

*Continued on page 76*



1. Smiling Gordon Walker (Jim's nephew) came to the Walker Fun-Fly with an original Fireball on floats.



2. M. Rodney Russel (left) with his 1939 replica Fireball in company with Eugene Kleiner holding a Jim Walker-owned Fireball.



# PLUG SPARKS

By JOHN POND

• In the fall of 1981, this writer received an invitation from Frank Macy, the spark plug behind the American Junior Historical Project, to attend the first Fireball Fun Fly held in Portland. This writer did attend, was tremendously impressed at the gargantuan effort by Frank Macy, and reported the fun in "Plug Sparks."

There was just too much going on in 1982 for this writer to attend the Second Fireball Fun-Fly held on October 10 at the Jim Walker Memorial Field. Our thanks to Frank Macy for many good photos and a good reporting job on the hi-jinks.

As Frank reports, the Fun Fly was everything it was supposed to be: a sunny day with some strong winds at times, lots of spectators and plenty of flying. There were about 20 Fireballs, six American Junior whip powered control models, five Firebaby variations and a beautiful static display area for other early control line models.

Photo No. 1 shows what we mean. This shot was taken before the area in the background was filled up. This Fireball is an "original", meaning that it is the original form as first produced in 1940. Later models featured closed canopies instead of the earlier cockpit model somewhat resembling a Howard "Pete". The model has been put on floats (one of

Jim's favorite variations), painted "fireball red" with black and white trim. Floats, of course, being Edo type, are silver.

All in all, 50 models showed up. Some of the modelers flew their newly built replica Fireballs for the first time. What a thrill for them! As can be seen in Photo No. 2, M. Rodney Russell is shown on the left holding his new 1939 Replica Fireball (which he flew at the event), and Eugene Kleiner is seen displaying a Fireball originally owned by Jim Walker. This model really scoots, being powered by a Bunch Tiger. As a matter of interest, Kleiner was responsible for the design of the Fireball wing with instructions from Jim. Kleiner also did all of the Fireball assembly instruction sheets accompanying the plans. He has also inked and



5. Jim Walker's beloved family (left to right): Joan (daughter) Marilyn (daughter), Mrs. Dora Walker, and Valerie (daughter).



3. This scaled up Fireball is the next plan project for Frank Macy. The 6/4 A-J Fireball will be designed for R/C. See text for details.



4. Pat Webb was the official emcee for the Walker Fun-Fly.



6. Best of the Show award was given to Terry Miller by Maxine Walker (right). Dora Walker holds the Golden Fireball Trophy.



7. SAM 35 staged this beautiful display of old timers at the First National Exhibit in the Shefford Hall, Sheffield, England.

signed the plans for the new A-J "Fun-Pak" as being marketed by Macy.

All Fireballs were real replicas; all balsa as per the original, and scratch built from the original plan. Actually, the emphasis appeared to be on different types of Fireballs, as Frank says there was every variation you could think of.

Gordon Walker, Jim's nephew, gave a demonstration flight of the whip powered P-39 original without the bamboo pole. The eight-foot fishing rod he employed worked just great! Terry Miller, of Roseburg, flew a twin engined (two .049s) Firebaby that gave a very startling performance.

As can be seen in Photo No. 3, Frank Macy displays what he calls his Six-Quarter Fireball, which is actually a 1-1/2-scale Fireball. (Get it?  $6/4 = 3/2 = 1-1/2$ ). Frank also reports he is also developing a radio control version with ailerons. Plans should be available around February or March from Frank Macy, 5200 S.E. Jennings Ave., No. 11, Milwaukie, OR 97222. If you can't wait, call him at (503) 653-7436.

There had to be someone to keep the fun going, so we are printing Photo No. 4 to show Pat Webb, the Master of Ceremonies, doing his thing on the microphone. This traveling announcer was able to cover all phases of the activities going on in the park. Not content with that, Pat got off his buggy and proceeded to do some flying of his own. Then to get everyone in the fun, he started teaching young people, beginners, etc., how to fly a Fireball! Don't know who had more fun, Pat or the crowd!

Naturally, with all these Fireballs, the

Walker family had to be properly honored. Photo No. 5 shows the Jim Walker family (left to right): Joan Walker Anderson, Marilyn Walker Portwood, Dora Walker, and Valerie Walker Alexander. Jim would be proud of his girls!

Also honored were many former A-J employees who came out to witness the fun. With such a generation of interest, it goes without saying, other control line models were encouraged to be brought out. One of the old beauties was Wayne Spear's Boxcar with a McCoy 60 ignition, which was brought out to fly demonstrations, but that old crudded-up tank kept Wayne grounded. For his efforts, Wayne won the specially prepared "Smash Hit of the Day" trophy. Everyone who participated received a special trophy for this event. Nothing like encouraging the boys!

Talking in that same theme, Photo No. 6 shows Terry Miller with a plaque presented by Maxine Walker. On the left is Dora Walker with a "Golden Fireball Award" for the "Best of the Show". This little Fireball is one-fourth the size of the original, covered with 23K gold leaf, and mounted on a suitable hardwood base.

For all this, Terry Miller wrote to Frank saying, "The Fireball Fun-Fly was marvelous, as well as gangs of fun. Comradeship was better than any event I have attended. Everyone was so helpful and supportive." Terry continues, "I'd love to try the multiple plane thing (three Fireballs at once) someday, or the famous Walker Sabre Dance ... I've never seen these done, but then I had never flown a Fireball either before this

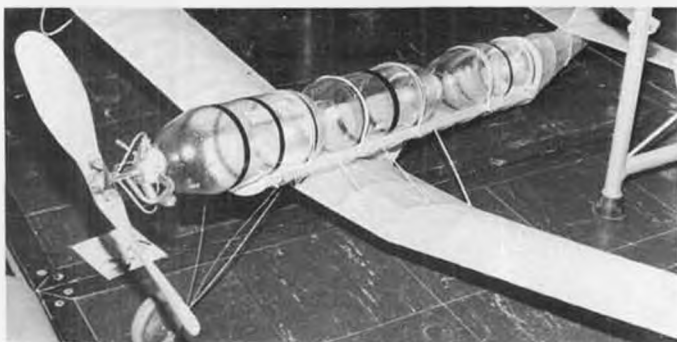
event. Flying the two Fireballs and shooting touch-and-goes in that fierce wind was probably a bigger thrill for me than for most of the spectators who did not understand or appreciate what was going on in my head as well as out at the end of the 60-foot lines."

Macy also says with such interest generated, there are actually enough modelers to renew the charter for the old Aeroliners Club, a control line group active in the '60s and early '70s.

Frank Macy says more exciting things



10. Richard Greer produced this scaled Ethy, a Dick Schumacher design. K & B 35 power.



8. Joe Humphries built this 1930s Joe Ott compressed air design and powered it with three plastic soda pop bottles! We've seen it all, now.



9. Here's an in-flight shot of a Frank Zaic New Yorker IV built and flown by SAM 35 Chairman, Ray Albans.





11. Probably the first Valkyrie seen in South Africa is pictured here with its builder, Len Edelstein. Looks like original construction, too!



12. Ben Boxall, South Africa, gasses up his Draftee, a real rare one powered by a P.A.W. 19 diesel.

are ahead with his idea of marketing the "A-J Fun-Pak". The American Junior kits will be done on a limited edition basis because the whole thing is still a small operation compared to the original Walker plant, and will only be a part-time job. Kits will be as authentic as quality will allow.

Each production run will feature its own A-J Fun-Pak as a series: Fireball A-J Fun-Pak, Sky-Diver A-J Fun-Pak, Interceptor A-J Fun-Pak, etc. Eventually, the line will contain all of the outstanding designs produced by Walker.

Frank Macy is going to be busier than a one armed paper hanger if he is to get all of the following lined up: 1) Fireball, 2) Sky Diver, 3) Interceptor, 4) Ceiling Walker, 5) "74" Fighter, and 6) Hornet.

In addition to that, Macy has been responsible for an extensive exhibit in the Oregon Historical Society Museum showing all the memorabilia of the American Junior aircraft. In addition, the Museum of Flight in Seattle will also feature artifacts from Jim Walker's estate.

Last but not least, the book *Jim Walker: Fireball in the Sky* is now completely written covering the time period from 1905 to 1933. This biography has turned out to be a monumental task. Ask Frank if Jim was ever busy!

#### ENGINE OF THE MONTH

This month's subject is the 1940 ver-

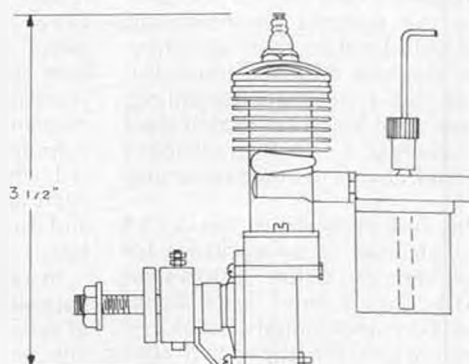
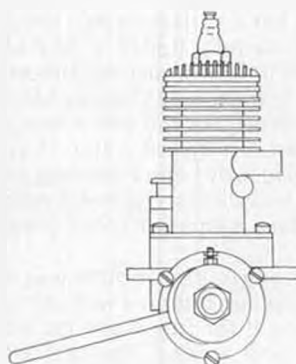
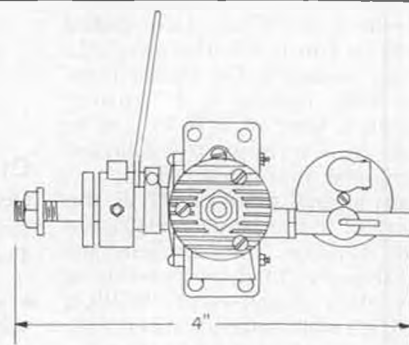
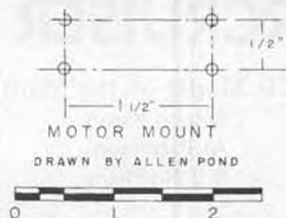


13. Don Brimmer inspects a small collection of old timers built by the new SAM 46 Chapter members. Clockwise: Playboy, Bombshell, So Long, and Covert Berryloid.



14. Bob Nolan with his Covert Berryloid Winner at Jacksonville. Dennymite power.

### MADEWELL 14





15. Bill Baker and George Perryman pose with Melissa Groebe (two thorns and a rose) while showing off their converted old timer biplane rubber models.

sion of the Madewell motor as produced by the Madewell Mfg. Co., 2901 E. 7th St., Oakland, California. We are indebted to Bill Simpson, who kindly loaned us a complete engine to copy. Matter of interest, this engine was originally in the Dave Brodsky collection.

Not too many old timers are aware of this motor manufacturing interest in the San Francisco Bay Area, as the large companies in the southern portion of California such as Ohlsson, Cyclone, etc., took up most of the publicity. Be it as it may, there was also a hot bed of engine manufacturers in the northern portion consisting of Madewell, Keener, Vivell, Brown, and a host of small manufacturers. We didn't mention Hornet motors as this is considered central California.

The motor illustrated this month is a follow-on to the original which featured a displacement of .147 cu. in. compared to the 1940 version at .140. This was made possible by reducing the stroke from 19/32 to 9/16, making it a "square" engine with a bore of 9/16 in. For its weight of four ounces, this Class A engine enjoyed a rating of 1/8 hp.

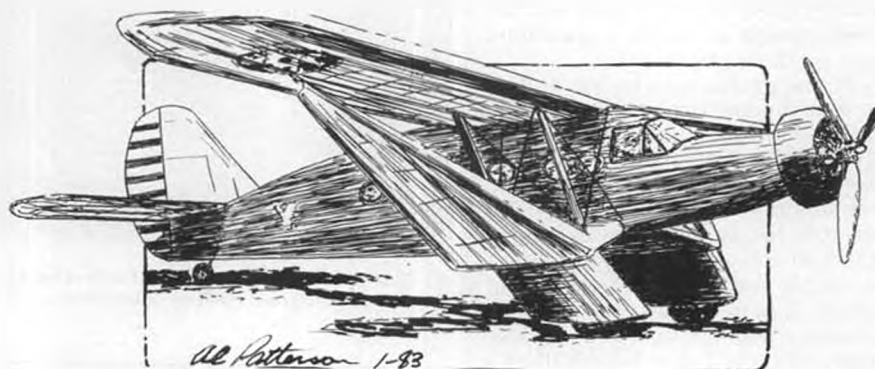
With an original price of \$17.50, the advertisement in the January 1940 issue of *Model Airplane News* proudly announced the new Madewell version at \$12.50. As their slogan went, "If it's a Madewell, it's well made", was certainly an improvement over the first model.

Among the features the Madewell people pointed out in their advertisement was the new enclosed timer, the option of radial or beam mounting, transparent tank, and a fabricated steel cylinder wherein it was claimed there were no trick covers to come loose and leak.

A Smith coil designed to run on 1.5 volts was claimed as an exclusive for Madewell motors. Other features, as designed by Jack Keener, were aluminum from permanent molds. Piston and cylinder were cast iron lapped to fit after the bypass intake and exhaust manifolds were brazed onto the steel cylinder. A

final cut on the bore was then made assuring a perfectly round bore free from welding distortion. The aluminum head was fitted to the cylinder with only three screws. To go this one better, the

*Continued on page 79*



## BELLANCA AIRCRUISER

### OLD TIMER Model of the Month

Designed by: Joseph Kovel

Drawn by: Al Patterson

Text by: Bill Northrop

- How many times have you heard someone say, "I'm gonna build that model one of these days." Well, this writer has been harboring that thought about Joe Kovel's Bellanca Aircruiser ever since it first appeared almost 46 years ago, in the July 1937 issue of *Model Airplane News*. Back then, it was too complicated a project for this 15-year-old, who had only been modeling a few years and was still carving solid models and building simple, 10-cent Megow kits.

In later years, the model was still appealing to me, but now with the idea of enlarging it for free flight gas scale. The next time around, the mid-'60s, I thought about R/C scale, but I was unable to find the necessary documen-

tary back-up material. In recent years, it began to look good again, as a giant sport scale model (lightweight, of course) for the Technopower radial.

Now, at last, we're back to square one, and the original "someday" comes closer, as I turned the full size plan project over to Al Patterson. The original magazine plan was in six plates, with many components drawn full size. Only the fuselage and wing had to be enlarged.

The original model employed a motor stick, still popular in the mid-'30s but rapidly disappearing. Unless you're a super-purist for duplicating the original, we'd suggest going to 3/32 square spruce or 1/8 square balsa for the main fuselage structure and mounting a rear peg to hold the rubber motor. Incidentally, the original model must have been real light, as only four strands of 3/16 flat were recommended for power.

The original model was covered with tissue, in military colors: blue for the fuselage, and all the rest in yellow. The text called for balancing the model 1/3 of the wing chord back from the leading edge.

Don't wait 46 years to build yours! •



16. Yes maw! This twin pusher flies! John Pond at Mead Missile Base, 1982 Nats.





# Electronics Corner

By ELOY MAREZ

## NEW AND OLD FREQUENCIES

It will be rather old news by the time you read this, though it is new at the time that it is being written. We are presenting it as a sort of reminder as there is always a certain percentage who don't get the word, and then too, we can't let such an important event go by without some mention.

The word is, of course, that finally, after months and years of effort on the part of a lot of dedicated individuals, we are no longer second class citizens in the world of R/C... our government has granted us just about everything we asked for in the way of new R/C frequencies and regulations.

The whole program has been extensively covered in the pages of *Model Aviation*; the February 1983 issue included a complete and easily understood explanation of the new frequencies and the frequency control system. If you haven't seen it, borrow a copy and study it. Additional copies of the chart are offered by the AMA, and it certainly seems like a good thing to have hanging on the wall of the hobby shop and on the club bulletin board.

The whole thing in a nutshell, is that as of Jan. 1, 1983, now, you airplane fliers have a total of 18 frequencies, which we are now supposed to start referring to as "channels". They are:

FREQUENCY	CHANNEL	COLORS
72.030	12	Brown/Red
72.080		White/Brown
72.160		White/Blue
72.240		White/Red
72.320		White/Purple
72.400		White/Orange
72.550	38	Orange/Gray
72.590	40	Yellow/Black
72.630	42	Yellow/Red
72.670	44	Yellow/Yellow
72.710	46	Yellow/Blue
72.750	48	Yellow/Gray

72.790	50	Green/Black
72.830	52	Green/Red
72.870	54	Green/Yellow
72.910	56	Green/Blue
72.960		White/Yellow
75.640		White/Green

Note that there are no channel numbers assigned to the old frequencies, which will eventually phase out, according to the overall plan. But don't panic, you have until January 1988 before you have to change. However, it is recommended that those of you flying on 75.640 change to one of the 72 frequencies, uhh, I mean channels, as soon as possible, as 75mHz is now to be the exclusive domain of surface (cars & boats) models.

In addition to the 27 mHz channels, which are not affected by the new rules, and the shared 72 mHz frequencies (72.160, 72.320 and 72.960), R/C car and boat operation may now be done on:

FREQUENCY	CHANNEL	COLORS
75.430	62	Blue/Red
75.470	64	Blue/Yellow
75.510	66	Blue/Blue
75.550	68	Blue/Gray
75.590	70	Purple/Black
75.670	74	Purple/Yellow
75.710	76	Purple/Blue
75.750	78	Purple/Gray
75.790	80	Gray/Black
75.830	82	Gray/Red
75.870	84	Gray/Yellow

There is bound to be some confusion down at the flying field before we all get used to the new system. Keep in mind that similar systems are in use in other countries which had many more frequencies than we have for years, and it works. But most important, keep in mind that no one at the field is as interested in keeping your channel clear when you are in the air as you should be. So follow the established frequency

control system if one is in effect where you fly, and if not, find out who else shares your channel, and always sing out loud and clear before you turn on.

There is yet another important piece of legislature pending, which might even have taken place by the time you are reading this. This one would eliminate the need for individual R/C licenses of any sort, on the 27, 72-75, and now license free low power 49 mHz bands. It is expected that the AMA may attempt some sort of transmitter registration, at least for those who intend to enter AMA sanctioned competitions, but there is no word on that at this date.

**IMPORTANT!** Note that the above reads 27, 72-75 and 49 mHz are license free. The Six-Meter, 53 mHz band will still require an Amateur Radio Station License of Technician Class or higher.

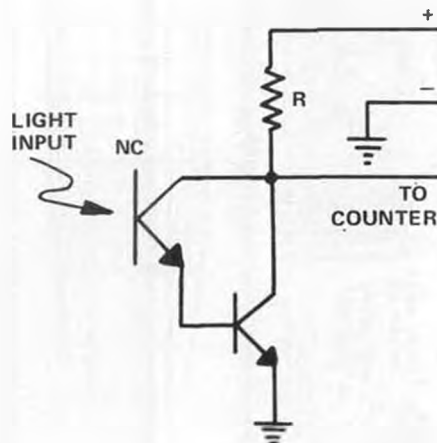
As for converting existing equipment, most of the manufacturers and importers have announced a relatively low priced conversion for their previously sold systems. Check their ads, or contact them directly for details on how you too may enjoy and benefit from one of our new R/C channels.

## TACHOMETER CALIBRATOR

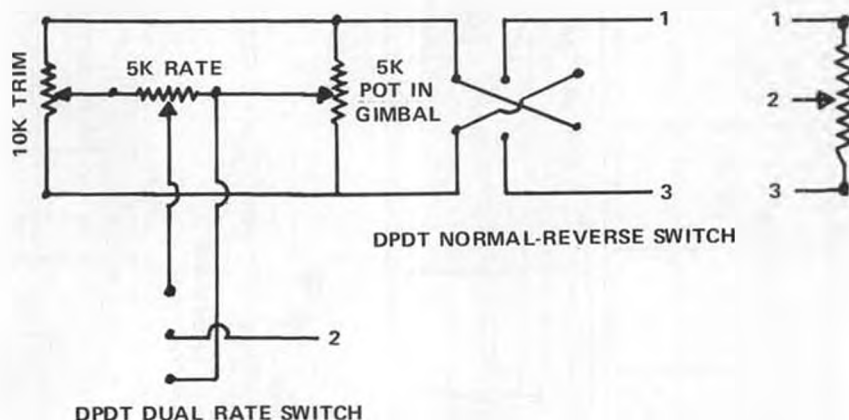
A couple of weeks ago we were in a flying field discussion about engines and engine RPM, and as I always do in these cases, I asked what kind of tachometer was being used, as I don't believe that you can accurately read rpm on a meter that reads 0-25,000 revs on a 1-1/2 inch scale. This lead to some discussion about why tachs give different values and how one can recalibrate or check the calibration of his.

To review, most tachs are calibrated by being aimed at an incandescent light, and adjusted to read usually 1800 or 3600, as multiples of the 60 Hertz (cycles) at which the light is driven and at which rate it is blinking, though the human eye can not see it doing so. This is fine at that rate, but by the time you are reading 20K or so, the calibration error, along with the reading, has been multiplied at least six times. Not good, and the reason for the variation in readings of different tachs on the high ends.

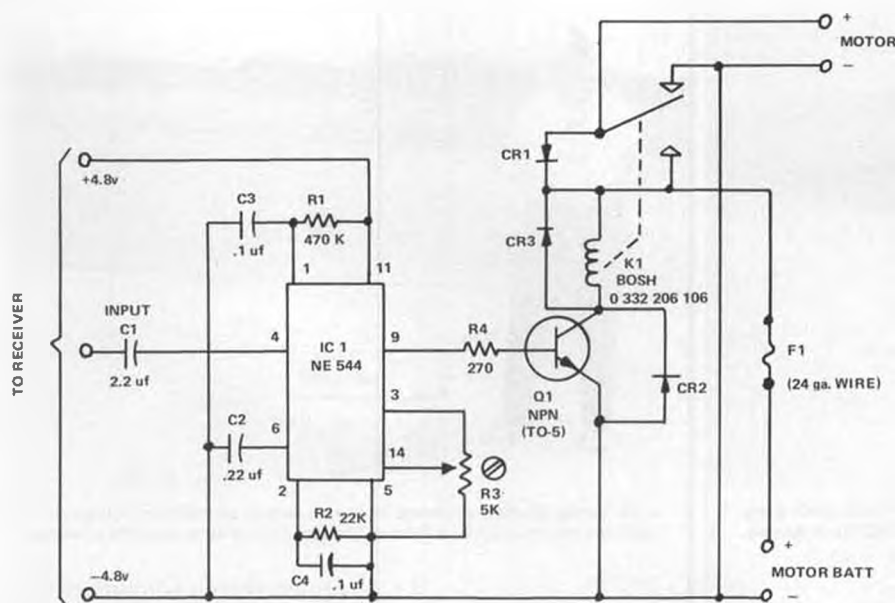
Obviously what we need is a light



Phototachometer adapter enables frequency counter to indicate rpm. See text for part I.D.



Dual rate and servo reversing circuit for Futaba FP-T4L transmitter. This modification was submitted by David Burwell of San Jose, California.



Here is a schematic drawing of Floyd Carter's electric motor control circuit, the actual PC board of which appears below.

blinking at a higher rate, and of course an accurate way of calibrating the light. I really can't help there, though I am sure that one would have to go to a strobe to insure the light would turn off before the next pulse came along, something that a filament lamp probably would not do. Tying the strobe circuit to a crystal driven oscillator would give us the necessary accuracy, at least at one given point, which if it was, say, at 20 thousand, would give us greater accuracy at the high end where it is important, than the 60Hz calibration point does. Anyway, this is all theory on my part; if you've got it all worked out and would share it, we would appreciate it.

I do have a workable method of calibration though, which does require a frequency counter, but it is a common piece of electronic test equipment these days, and one can usually be borrowed for the ten minutes it'll take to calibrate a tachometer.

The enclosed circuit is used to drive the counter, you may recognize it as similar to the front end of most optical type tachometers. For parts, use a Radio Shack 276-130 for the phototransistor, 276-2009 for the other transistor, and 10K, 1/4 or 1/2-watt for R. The battery is a nine-volter.

In use, the adapter is similar to your optical tach. However, to prevent a possible error from incandescent light interference, use it either with daylight, or with a direct current light source, better known as a flashlight! To convert the counter's reading to rpm, use the following formula: rpm equals frequency in Hertz times 60, divided by the number of reflections per revolution.

To calibrate another tach to the adapter, you'll need an engine's rpm with the adapter/counter, then adjust the tach's reading to coincide. You may want to do this calibration a little more conveniently than having to run an engine in which case you can use an

electric motor as a signal source. By inserting a low value pot in series with the power source, you can vary the speed to calibrate the tach at any desired point, and if you have trouble finding a motor that'll turn high enough, simply add more blades to the prop. Actually, a real prop is not required, a simple strip of metal, with no pitch, acting only as a light reflector or interruptor is all that is necessary.

#### ELECTRIC SWITCH O.M.T.

I had a letter from Floyd "Capacitive Discharge Ignition System" Carter, of Sunnyvale, CA, who wrote:

"Dear Eloy,

"I congratulate WCN for promoting 'Electronics Corner'. Not since the old 'Grid Leaks' have we electronics 'freaks' had a forum for the exchange of new ideas.

"In the January 1983 MB, you presented Mr. Mueller's switch for electronics. I presume it works, I didn't built it or closely analyze it. But it parallels some work I did recently. I approached the task by requiring a very precise switching threshold point: I wanted the circuit

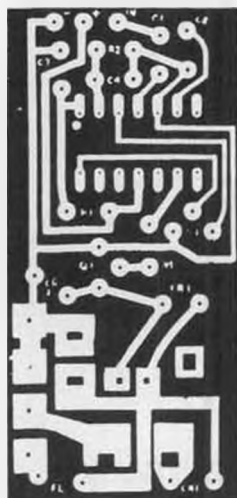
to switch ON/OFF at exactly 1.5 milliseconds (the center of the throttle stick of my transmitter). I designed my circuit around the Signetics NE 544, as used in many of today's servos. The internal reference one-shot is set to 1.5 milliseconds by the trim pot, R3. The input from the receiver, then, varies from 1.0 to 2.0 milliseconds, as the result of throttle stick movement. But the very center of stick movement is the switch point. (In operation, you bang the stick from top to bottom, but there is no adjustment and no indecision about if it will work every time, or not).

"The NE 544 compares the input pulse (a positive-going pulse) with its internal one-shot. If the input is greater than the reference (in this case, 1.5 milliseconds), the output at pin 9 is positive, and that causes Q1 to turn on and pull in K1. An input less than 1.5 milliseconds causes pin 9 to be zero volts, and Q1 is off and the relay is not energized.

"Q1 and K1 are both operated by the motor battery, since K1 requires a constant 140 ma. We don't want that to drain the receiver battery pack. The flight pack powers the IC, however, which doesn't require more than the idle current of a normal servo.

"K1 is a Bosch unit which is rated to 30 Amps. I got this unit from Bosch, but I later discovered this is also used on the VW Rabbit. (I don't have the VW part number, but it is the same device enclosed in a plastic box and fitted with plug-in lugs. Perhaps a little research will make this unit available from VW dealers.) Also note that the NC contact of K1 is used to short out the flight motor. This is useful in getting the propeller to stop horizontally to prevent possible breakage. The way this is done is to wait until the plane is close enough for you to see the prop. If it is not horizontal, blip the motor control a bit. OFF motor will cause the flight motor to stop instantly due to the braking action of the shorted armature. Hopefully, you will get it horizontal before the model lands. It takes a bit of luck, and practice.

Floyd, I certainly appreciate you sharing the results of your work on the



#### COMPONENTS LIST

SYMBOL	VALUE/DESCRIPTION
(+)	+4.8 volts from receiver battery pack
(-)	-4.8 volts from receiver battery pack
IN	input signal
C1	2.2 uf capacitor
C2	.22 uf capacitor
C3	.1 uf capacitor
R2	22K ohm resistor
C4	.1 uf capacitor
	Signetics NE 544 integrated circuit
R1	470K ohm resistor
R3	5K ohm resistor
Q1	NPN transistor
R4	270 ohm resistor
CR1,2,3	1N 4004 diode
F1	24 Ga. wire
K1	Bosch relay (No. 0-332-206-106)

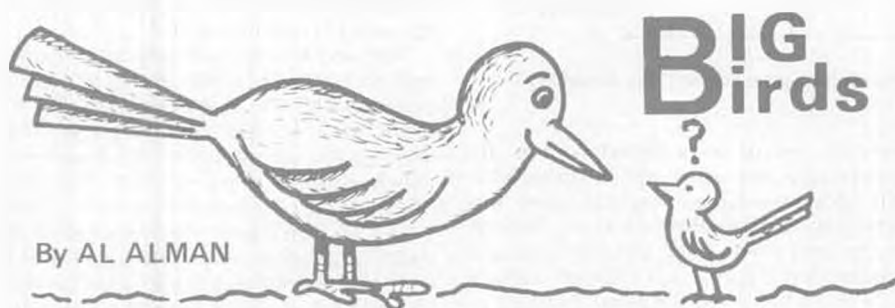
Motor control printed circuit board reproduced actual size.



"My daddy says cross-controlling is easy . . . ya just close your eyes . . . like this!" Adam Alman, 2-1/2 year-old son of BIG Bird Alman.



J. W. Jones, Dallas, demonstrates an unusual aircraft restraint system with his much modified Nosen Champ. BIG Bird is Quadra powered.



#### TRASH BARRELS: THE (W)RIGHT TRADITION

Tradition . . . is a leather flying jacket, goggles, helmet, and a six foot long white silk scarf flapping in the prop-wash. . .

Tradition is also a trash barrel at the flying field.

Y'see, after Wilbur and Orville had flown four times on that historic day at Kittyhawk, a severe gust of wind overturned and wrecked their wooden flyer. So, grumping something fierce, they stuffed the broken pieces and torn fabric into BIG barrels and shipped them back to their cycle shop in Dayton . . . and so began a revered and time

honored custom.

This explains why flying fields the world over, however Spartan and austere they may be, always have, at the very least, a very prominent trash barrel. Now it so happens that folks flying the (ugh) "smaller stuff" have grossly over-used and prostituted this most honored of traditions; however, we know that, in truth, Barrel Stuffing was originated as a BIG Bird Happening and therefore comes very close to being an unwritten religious precept. (Strange rumors abound that the quality of flying at some of the Western Washington fields is such that their barrels have remained virginal and unsullied.)



The normally banal barrel is a focal point at flying fields. This barrel, more banal than most is at the Mt. Ranier RC Club site.



From the wilds of Texas comes D. L. Grammont's diamond "foiled" "BIG Quickie." Wife Ethel holds the 84 in. flying machine.

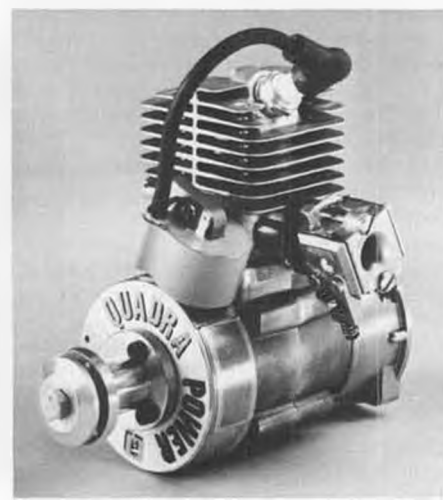
We, as airmen, share a certain kinship with the Wright Brothers, but a select few of us have even closer ties to those giants of yesteryear. These special few have been "chosen" to pay homage to those pioneers and founders of our most cherished tradition. Each group of BIG Bird Lovers usually has one, or if they're really blessed, two of these most esteemed pilots in their midst; and these are the inveterate barrel stuffers, those who have, through dedication, turned a labor of love into a fine and highly respected art.

Most deserving of honorable mention amongst these "chosen" are the relative newcomers, who furiously make up in quantity what they presently lack in expertise.

On the other hand, the more experienced, in their crafty but subtle manner, can and do finesse themselves by neatly planting two (or more) of their own birds within the same hour.

Our deepest respect and admiration is, of course, showered upon the real "Eagles" . . . those who have mastered the epitome of trash barrel stuffing: simultaneous quality and quantity.

With deep expectations, we the "unchosen," rub shoulders with these



BIG Bird pilots looking for more power for their airplanes will welcome this new 50cc version of the Quadra. What, no six-bolt hub?



barrel stuffing paragons, daring to hope that eventually, their lust for tradition will also become our own consuming obsession.

### THE THREE STOOGES???

I'd hate to think of the damage they'd do in a pit area . . . or anywhere else on a flying field for that matter. No, The Three Stooges would be too much! But one BIG Bird Stoooge, now that's a different story. . .

Would you believe that the same kind of engineering skill, foresight, and expertise that gave you the BIG Bird Balancer (BIG Birds, October '82), now offers another technological marvel: behold the BIG Bird Stoooge (BBS). This magnificent example of man's ability to surmount all obstacles was the result of a short, but pregnant skull-session with Tacoma's Bruce Edwards. To be perfectly honest, Bruce had the basic stoooge all done; however, I did my part by adding the sophistication and superb technical details so necessary to a project like this . . . and although I did none of the actual work, I expended a lot of energy supervising. Bruce and I worked so well together that we're seriously thinking of also collaborating on something I've dreamed of for years: the Schnuerle Ported Windsock. In fact I've already promised *Ye Olde Editor* an exclusive on the upcoming Windsock construction article.

From what I've seen, most BIG Bird pilots have enough smarts to use a helper during engine start-up, which makes that part of the total flying sequence a whole lot safer (there's far less chance that a right arm is gonna end up looking like a sliced bologna). But, even with another person holding, you're still not out of the woods. You may, at times, have to rely on someone who's not too familiar with BIG Birds, and he might very well jump, or flinch, and let go when that two to three cubic inch brute coughs and roars to life. This BBS would be a terrific safety back-up for both pilot and helper, insuring peace of mind for both individuals.

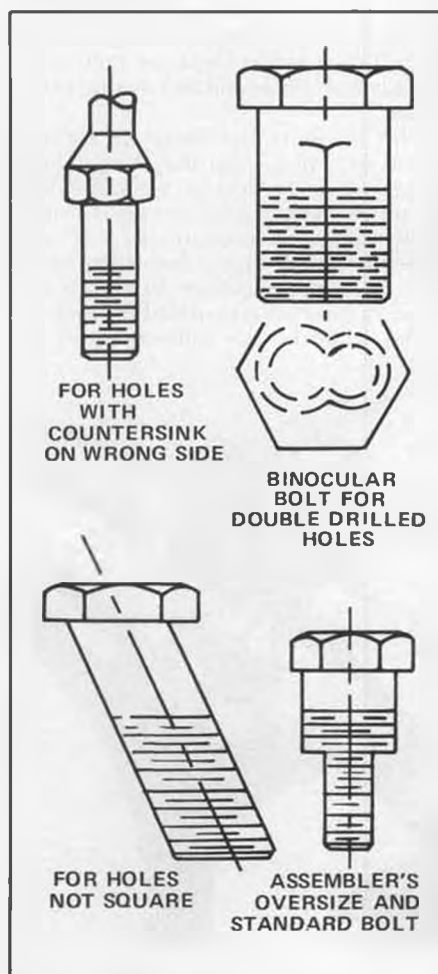
And then there are those who always crank up without any hold-down help whatsoever. These people are MAD! Somewhere, somehow, they've acquired a death wish. Hopefully, their refusal to accept help is limited to people only . . . so a stoooge might find its way into their list of necessary tools. By building and using a BBS they're gonna cut down those terrible odds and will probably be around to fly a lot more BIG

Birds.

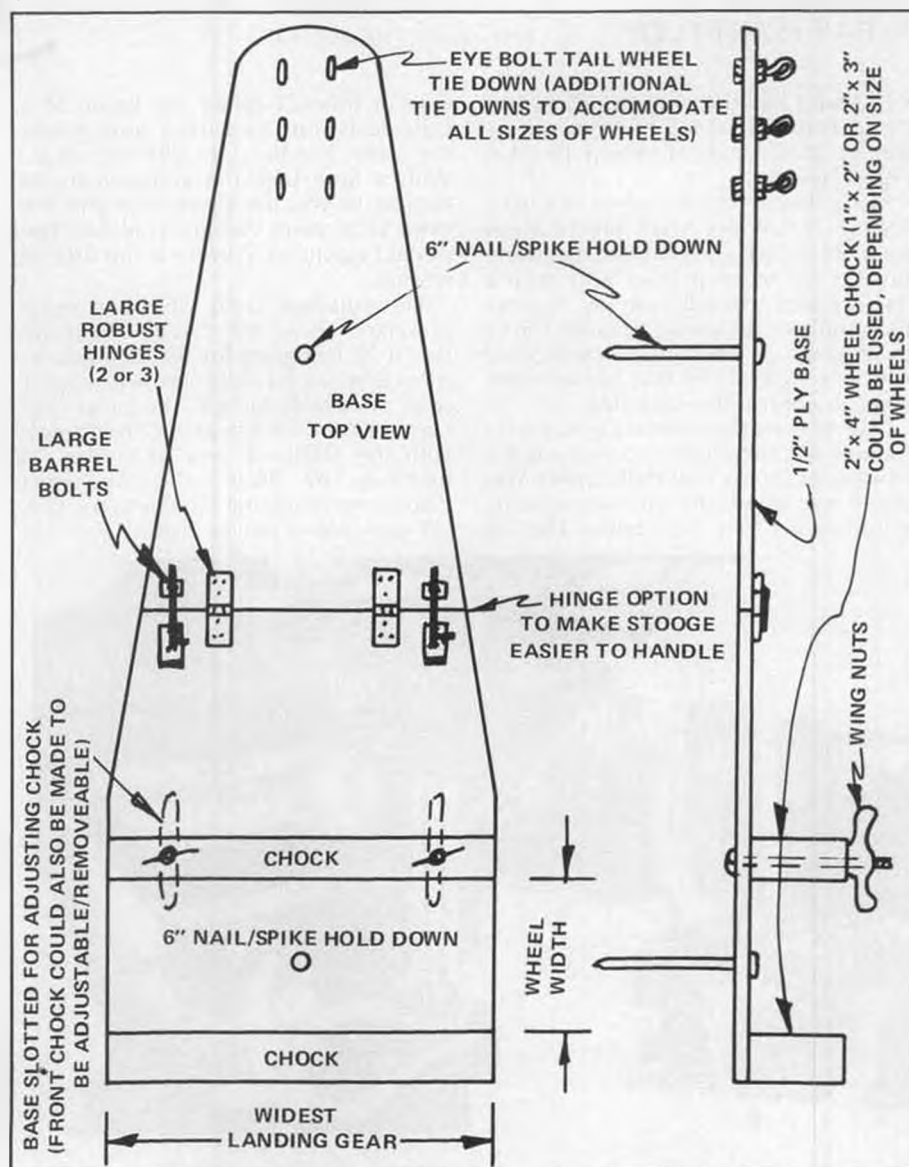
Anyone who can build a flyable airplane can certainly put a stoooge together; it's a basic and simple project. In order to accommodate different diameter wheels, either or both 2 x 4 wheel chocks can be made adjustable by slotting the half-inch ply base and using wing nuts with long bolts for locking the chocks in place. If you're going to stick with smaller wheels (4 to 4-1/2-inch diameter), 2 x 3 or even 1 x 2 chocks could be used. Bruce has six-inch wheels on his Canadian Fleet and built the stoooge accordingly, feeling that 2 x 4 chocks gave him more of a safety margin.

I'd recommend using either bungee or nylon rope for securing the tailwheel, although I know a lot of you guys will probably resort to the ol' No. 64 gum-mies just because they're handy. If you do, please use at least two fresh bands to start with, and inspect them often. And you might want to install two or more pair of eye bolt hold-downs spaced three to four inches apart so your stoooge

*Continued on page 70*



Custom made bolts for BIG Birds.



Bruce Edwards's BIG Bird Stoooge.



Marty Barry of Circus Hobbies, Las Vegas, holds the Baron 20 helicopter with collective pitch for the author's camera.



Two Circus Hobbies helicopter kits, the Baron 50 (bottom) and the Custom Baron (top), are pictured here. Note black side frames of CB.

# CHOPPER CHATTER

By RAY HOSTETLER

PHOTOS BY THE AUTHOR



• Last fall I had the opportunity to visit Circus Hobbies, which bases its operation at 3132 South Highland Dr., Las Vegas, Nevada.

Marty Barry is the President of Circus Hobbies. I had met Marty previously at the trade shows, and told him that some day I'd try to stop over and take a "factory tour". Needless to say, I wasn't disappointed. It's always so much fun to go through a helicopter warehouse! (My wife figured she had better come along to control the spending. . .)

One of the other primary reasons for the visit was the chance to sort out the varieties of Circus' Kalt Helicopters. You see, in past issues I haven't yet correctly identified a Circus helicopter. The last

case in point, I called the Baron 50 a Custom Baron. Sure, they look nearly the same, but they are different ships. With a little luck I'm going to try to explain to you the Circus line and the extra accessories that are available. The prices I quote are current at this time of writing.

The smallest (and I believe most popular) ship in the Circus line is the Baron 20. Designed for .19-.25 displacement engines, it is very cute, with a rotor span of only 43 inches. The latest "hot combination" for the Baron 20 is fitting it with the relatively new O.S. Max .28 engine. The .28 is a slightly larger displacement engine fitted into the O.S. .25 case. More power at the same size

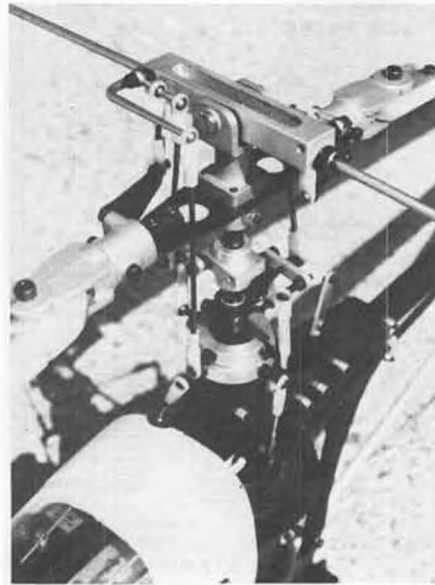
and weight. The Baron 20's performance is most impressive with this engine.

The smallest Baron is slightly unusual in that it is a collective pitch helicopter with a "Hiller only" control head. Most small ships are fixed pitch and Hiller only. Other larger ships are collective, usually with Hiller and Bell mixing to the head.

This is where the Baron 20 options come into play. You may buy a Bell-Hiller mixer to add on to a standard Baron 20. What this gives you is a small helicopter that incorporates not only collective pitch, but a Bell-Hiller head. The mixer itself sells for \$9.59, but you have to have an articulated follower to make it work. The follower goes for



A closeup view of the Baron 20 reveals the five servos that control the chopper: collective servo is at far left, throttle servo is bottom center, tail rotor is middle, and top two are cyclic pitch.



Bell-Hiller mixer installed on the Baron 20. Black follower visible below mixer on shaft.



This very neat, high quality gadget is a Kalt pitch gauge which can measure from -9 to +18 degrees on clockwise rotating heads.



The two helicopter heads you see here are the Kalt K-1SB (top), and the Blackhead II (bottom). See text for details.

\$10.59. So for a little over \$20.00, the Baron can have a Bell-Hiller head. One photo shows the Baron 20 fitted with the mixer and follower, the other photo shows the mixer and follower assemblies as they come out of the bag.

Also available for the Baron 20 is an autorotation assembly. The autorotation unit is \$24.79, which must be fitted to a different main shaft. The different shaft is \$5.59. Slightly over \$30.00 for a complete autorotation retrofit. The spare plastic gears are also different, depending on whether or not you have autorotation. The standard gear is \$5.19, and the autorotation gear is \$5.59. Make sure you specify which gear you want when you order spares. . .

Next comes the Baron 40, with a 47-inch diameter rotor and designed for .40-.50 engines. This is the simplest helicopter that Circus carries. It is fixed pitch with a Hiller only head. It sells for \$179.95.

The largest "series" of helicopters in the Kalt-Circus line is the Baron 50. Here is where it gets tricky to sort out what goes where, and when. The 50 series has the Baron 50, Baron 50A, and a Baron 50C. They all look like the Baron 20 shown in the photos, except they're

larger, with 56 to 57-inch diameter rotors. The first thing to throw you is that while the ships are "50's", they are all .60-powered helicopters. Circus does carry mounts for the O.S. 50 FSR-H engine, but they are extra. The standard kits all come with mounts for .60's. Let's look at the straight Baron 50 first.

The Baron 50 is essentially a large Baron 20, or vice-versa. It sells for \$262.95. It has collective pitch and a Hiller-only head (K-1SB). Just as the 20, there is a Bell-Hiller mixer available at extra cost. The mixer, KB5A07, goes for \$34.39; and the follower, KB5404 for \$10.75. This mixer is slightly different from the Baron 20. It includes adjustable balls so you can vary the ratio of Bell vs. Hiller mixing, and the whole mixer unit is ball bearing supported instead of using simple bushings.

The standard Baron 50 does not come with autorotation, but the autorotation unit can be purchased separately when you are ready for autos . . . KB5A06 at \$49.59. The Baron 50 does not need a main shaft retrofit with the addition of an autorotation clutch.

Now the Baron 50 A, priced at \$288.95, is the same thing as the Baron 50 except that it comes with autorotation and a tail

boom support as standard. The same Bell-Hiller mixer for the Baron 50 will convert the 50A to a full Bell-Hiller head.

From the top of the Baron line comes the 50C or Custom Baron. Actually there are two Customs, one with the K-1SB head at \$367.95, and one with the Blackhead II at \$461.95. The rotor heads are the only difference in these two ships. (see photo).

Before we look at each rotor head, I want to clarify that now (January '83) both Customs come with the "standard" mixer, KB5A07. So the helicopters come to you with a Bell-Hiller set-up. However, by the time you read this the Customs will be upgraded by using the "C" mixer, or Mark III as it is interchangeably called. This mixing system will include as standard: an in-line swashplate (all balls on the same plane, a-la Kavan), the follower, mixer, pitch control link, and new one piece links to connect the short distances between the swashplate and mixers. The Custom kit prices are estimated to be 25 to 30 dollars higher than I have quoted above with the new "C" mixer standard.

If you should desire the new Mark III system with in-line swashplate as an update kit, it will cost \$74.95, and is easily installed to the Baron 50, 50A, or older Custom Baron series helicopters.

These paragraphs remind me to emphasize the significant difference between a Kavan JetRanger head and

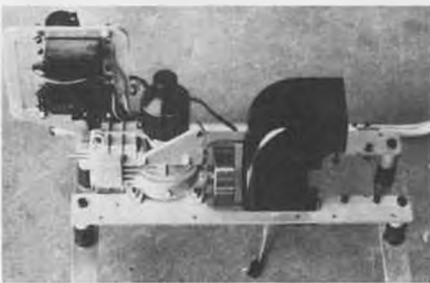
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"Aw shucks, Marty . . . ya got lots more of these things back in the warehouse, can't ya look the other way for a minute?"



Complete Bell-Hiller mixer and articulated follower (black piece at bottom) convert the Baron 20 to a Bell-Hiller head.



Kalt transmission unit as used on Kalt scale helicopters. The fiberglass fuselage will secure to this unit during final assembly.



Circus Hobbies JR Apollo radio used in author's helicopters. See text.





The author's latest project to carry the Duplex Receiver System is this beautiful, Great Planes 1/4-scale Cosmic Wind. Extensive test flights were successfully performed using the Duplex System on smaller, less precious aircraft.

# DUPLEX R/C Receivers

By ELOY MAREZ . . . If the longevity of your favorite R/C model is a concern of yours, then you should pay attention to what MODEL BUILDER's "Electronics Corner" columnist has to say.

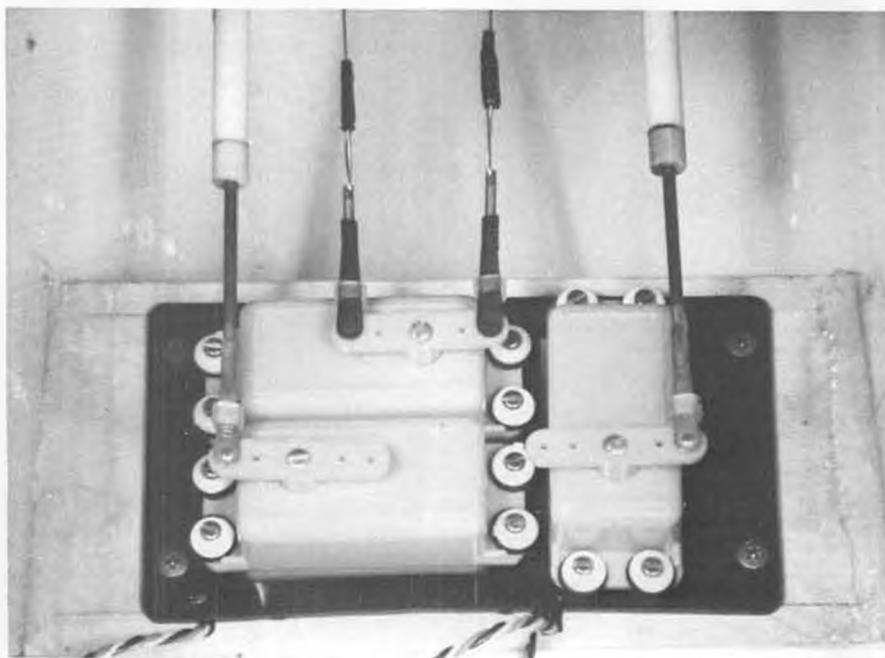
• I am going to take away your excuse! The excuse that it is always the radio's fault . . . airplanes are never crashed for mechanical or aerodynamic reasons, or horrors, because of pilot error. It is always the poor radio's fault.

Well, unless you are ready to admit that your next crash was caused by a hinge pulling out, a sticky-taped servo coming unstuck, a 98.9 percent balance point, or that you allowed a total loss of airspeed, altitude, and ideas to occur simultaneously, you really won't want to read this, or to apply the ideas to be presented.

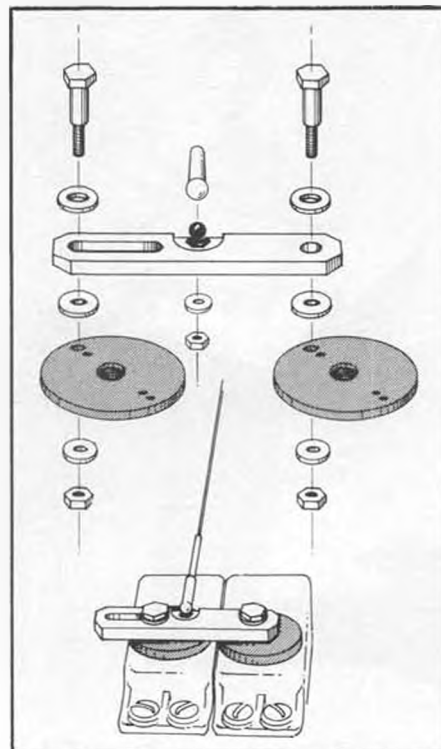
No, unfortunately, we have not come up with a 100 percent trouble free radio system. True, they are wonders of reliability, more so considering the environment in which they operate, but still, now and then, we still hear the "I ain't got it!" followed by a dull, sickening "thunk". What we will present to you is a type of fail-safe back-up radio system, one that will allow safe maneuvering and landing of your R/C model in the event of a partial radio system failure. The odds of a complete failure in this case are infinitesimally small. We can accomplish this with presently available

equipment at some additional cost, true, but how much is a present day scale or competition aircraft worth? We will do this wonderful thing by installing dual airborne systems; two separate receiving systems, both operated by the same transmitter in the normal manner.

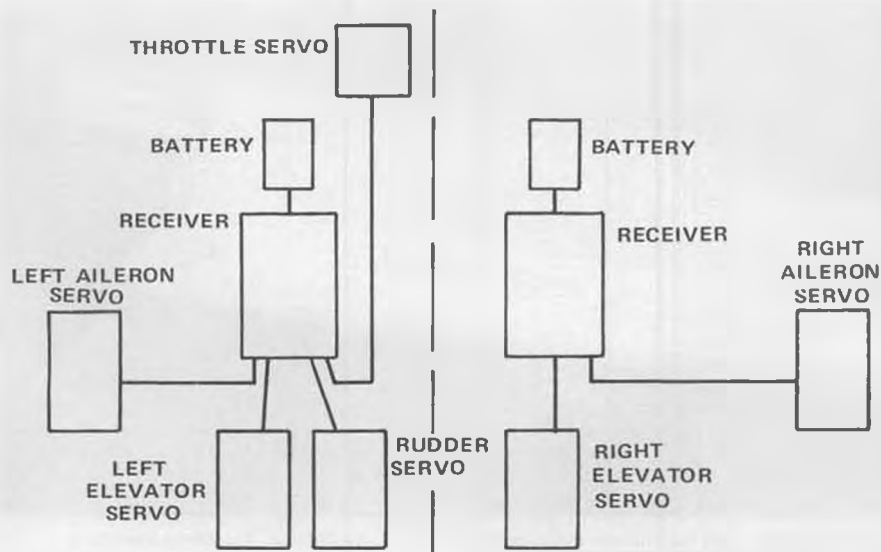
After seriously reviewing most crashes, we find that by far, the greatest percentage of equipment failure is with the airborne components. Initially, they are built using the same techniques and



This cluster of servos actuates all tail surfaces. Clockwise from upper left are: pull-pull rudder servo, left elevator servo, and right elevator servo. Novak NES-2s used in this installation.



C.B. Associates new Servo Doubler which couples the output of two servos to a single rod.



Schematic diagram of the Duplex Receiver System as described in the text. Loss of either system permits safe landing with remaining system.

quality as the transmitters, but there are some readily understandable reasons for their higher mortality rate. They are subject to much more vibration and shock, more improper installation, servos are allowed to be mechanically stalled, control surfaces flutter, plugs are removed by yanking on the wires, and so on, and on, and on. Very seldom do we hear of a case in which the transmitter was at fault. So, to increase the chances for longer survival of your flying machine, we should look at some way to reduce airborne equipment failures.

We can borrow a page from full-size aircraft practice in which many important electronic and mechanical systems will have a back-up, and often a back-up for the back-up! I have managed to accomplish this with a back-up airborne system of sorts. For some time now, years actually, I have been flying R/C airplanes in which I have installed two receiving and power systems, and while not exactly double the number of servos, at least two additional ones are required. Now, the systems share absolutely nothing . . . not battery, not switch harness, not antenna . . . nothing. They are complete and operational in themselves.



Control surface hardware is identical to normal configuration. Elevators are independent.

I split the control hookups: one system will operate one aileron and half of the elevator, the other one will work the other aileron and elevator. As a throttle failure is not likely to be fatal, I have not included it in this scheme, it is simply operated by either system.

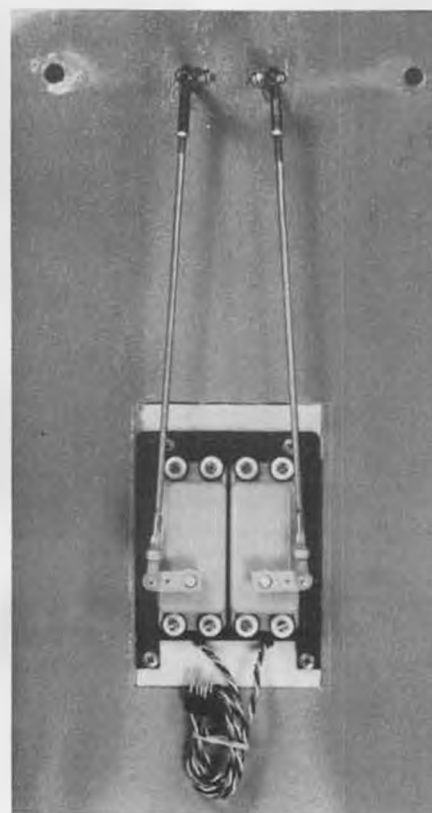
As all of the planes I have flown in this manner are low wingers in which the ailerons are the most effective yaw/roll control surface, I have also operated the rudder singly, in a normal way. In a high winger, with a rudder equally or more effective than ailerons, it would be wise to include it in the dual installation.

The idea is that in the event of one airborne receiving system failing, the other one will remain in operation, leaving you with enough control to maneuver and land. If you ever have a simultaneous airborne failure, somebody up there hates you, you'd best take up stamp collecting.

Now, this is not just theory! My first such equipped model carried yet one more servo aloft . . . to operate a micro switch with which I could turn off one of the receivers, in this case, the one that worked one aileron and one half of the elevator, called No. 2 receiver. The



Maximum reliability in electronic hardware is important . . . Kraft KP-7C Mk III used here.



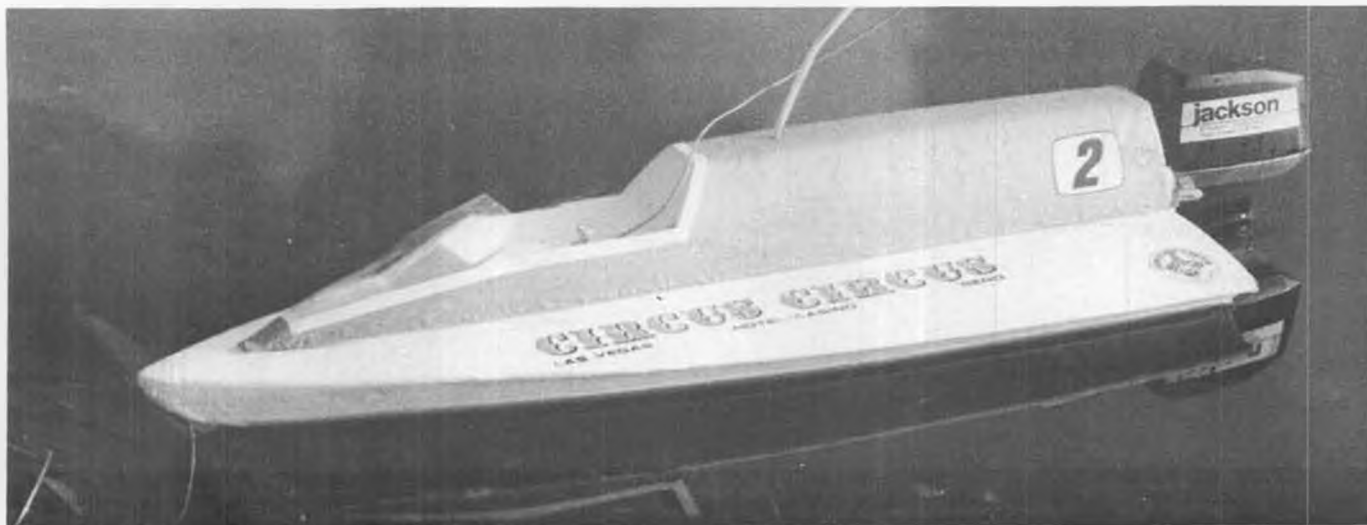
Two aileron servos are required in the Duplex System. Both servos rotate in same direction.

throttle and rudder remained live at all times, along with one aileron and the other half of the elevator. My first flight tests consisted of simply turning off the No. 2 receiver with all of the control in neutral. The effects was similar to that of going to low rate on the transmitter: full aileron deflection rolls were twice as long, loops were twice as large. I then started turning off the No. 2 set with increasing amounts of control deflection left in, until I got to full deflection (a full stick roll, for example). With the aileron then turned off in that position, roll can be neutralized, and the airplane recovered back to straight and level, by holding the stick full over in the opposite direction. You can only turn one way, of course, by releasing stick pressure in the proper direction . . . an odd way to fly, yes, but you can get back on the ground in one piece. By moving the trim all the

*Continued on page 85*



One method of actuating independent elevators. See text for alternate method.



Octura Models is currently distributing this new Koyosho Corporation monoplane outboard called the Santa Monica. The Santa Monica is powered by the new Jackson 38 outboard also manufactured by Koyosho. More details in text.

# R/C POWER BOATS

By JERRY DUNLAP

## ELECTRIFYING NEWS FROM OCTURA MODELS

That lead was used on the latest product brochure from Octura Models. I thought it was a rather catchy method to inform folks that the company that has provided model boaters with quality hardware, propellers, and boat kits is now the United States distributor for Koyosho Corporation model boats and electric outboard motors. A Japanese model manufacturing firm, Koyosho Corporation is one of the world's largest producers of model aircraft and boats.

The Jackson Outboard from Koyosho is rather scale-like in appearance, and is available with either a Mabuchi RS 380 or RS 540 motor. The "Jackson 38" develops 10,000 rpm (unloaded) and the "54" series will provide 12,000 rpm (unloaded). These figures are based on using a 7.2-volt battery pack like those used for the 1/12-scale electric cars. The weight of the "38" is 7-1/2 ounces while

the more powerful "54" tips the scales at 10-1/2 ounces. Twenty-six dollars and ninety-five cents is the price of the Jackson 38 and the Jackson 54 is only \$3.00 more.

The Santa Monica monoplane hull and the Casablanca tunnel hull are the Koyosho boats available from Octura for use with the Jackson Outboard. The Casablanca was featured on the cover of our December 1982 *Model Builder*. I don't know if Eloy Marez used that boat with the radio system he describes in that issue. It may be that Eloy plans to do something in a future issue telling about the Casablanca. This particular Koyosho boat was intended for twin motor installation, and has a certain "zoomy" appearance to it. Made from ABS plastic, it is 25 inches in length, weighs a bit over three pounds, and is supposed to be capable of speeds around 15 mph with two Jackson 54s on the transom. I can't actually verify the speed as I haven't seen the boat run.

The boat that I do know something about is the 22-inch, all foam Santa Monica. This boat, along with both a "38" and a "54" Jackson Outboard were supplied for this review.

Before getting into the actual review, let me mention a couple of features of both boats. The kits are pretty complete with about the only things needed to run them being the acquisition of a two-channel radio system, and a battery system for the outboard. Among the items included in the kits are a speed control (the Santa Monica has two speeds forward and one reverse), a hardware package, wires, decals, and an instruction booklet. The Santa Monica comes with a single Jackson 38, and is priced at \$66.50. For \$115.75, the Casablanca is available with twin Jackson 54s. Remember, the radio system and battery pack for the motor or motors is not included. It seems to me that a six-cell fast charge battery pack costs somewhere around \$50. For quick charging, the resistance wire charging method is the least expensive.

There really isn't a great deal to tell about the installation of the outboard motor, speed control, radio system, and battery. The Santa Monica's center section is sufficiently wide to accommodate all the above mentioned items except for the outboard motor, and everyone knows that goes on the transom.

To mount the speed control, I glued wooden strips along the foam mounting rail because I felt that the screws would hold better in wood than in the foam. It was necessary to cut away some of the transom area to allow the rudder linkage to connect the rudder servo to the motor. A piece of 1/8-inch plywood was glued to the motor mount pad on the transom to provide a more solid material

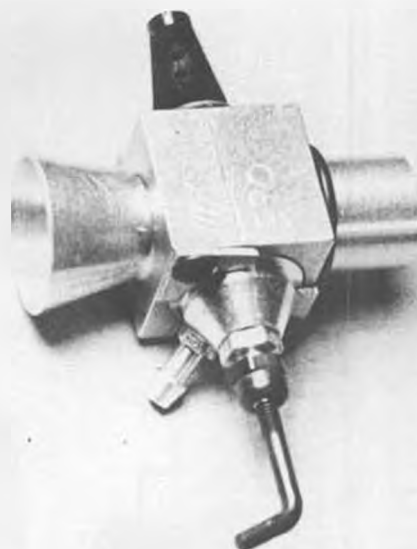


The Santa Monica monoplane hull electric powered boat is very maneuverable. It exhibits good handling and slower speeds that are perfect for beginners.





For proper balance, the six-cell battery pack should be positioned in the forward compartment. Receiver and its battery, servos, and speed control are amidships.



Metal Concepts' new high performance carburetor (OPS 65) for carbs with .390 bores.

when using screws to affix the outboard to the transom.

In order to provide a more secure method for holding the cowling in place, I developed a simple method of keying the front end of the cowl in place, and using flat, snap links at the transom, to hold the cowl down at the back. There is another method shown in the instruction manual, and it probably works adequately, I just felt that a more secure method was needed. This is not to imply that the radio equipment is waterproof. Such is definitely not the case. However, if the servos are mounted up off the bottom of the boat, and if the battery pack for the receiver, and the receiver itself are wrapped in plastic baggies, there shouldn't be any major problems.

I believe there is a definite problem with this boat that needs some attention. My concern is that the foam is easily dented, and great care must be taken when handling the boat. During the installation of the radio equipment and motor, I managed to put some dents and dings in the foam hull.

Knowing the rough handling my boats generally receive, I knew I'd have to do something to protect the foam from

abuse. My experience with covering model airplanes made from foam gave me the idea of covering the hull with some leftover Coverite, as that is pretty rough stuff. However, after getting started with the Coverite, I found out that I had to be really careful because the amount of heat needed to apply the material could cause the foam to melt. It would be my recommendation that a covering material requiring low application temperature be used to cover the hull. It certainly is possible to run the boat without covering the hull, and if one is careful, the foam won't get dented.

For the person who is accustomed to running gas or glow powered model boats, the speeds of these electric outboards is not going to cause a rapid climb in one's pulse rate. I would estimate that the Santa Monica with the Jackson 38 is capable of somewhere near 10 mph, and with the "54" series probably close to 12 or 13 mph. There is a noticeable difference in speed between the two motors along with a noticeably shorter running period when using the larger motor. My personal feeling is that for the extra \$3.00, the "54" is a good buy, because it does provide more power.

I'm sure Octura Models would be willing to sell the Santa Monica with a "54" series motor.

When I switched from the Jackson 38 to the Jackson 54, it was necessary to shim the larger motor under the transom slightly to prevent the boat from bouncing. This is easily accomplished by wedging something like a washer between the motor plate and the transom. The extra weight of the "54" motor probably had something to do with the need to adjust the prop angle. The Santa Monica with the "54" motor had runs between three and four minutes before draining the battery to the point of slow boat speed.

The Santa Monica proved to be a very maneuverable boat which could be turned both left and right equally well. The boat banks into turns and is ideal for the person just learning how to control a radio controlled boat. My son brought along one of his friends when we first took the Santa Monica out to run, and the young man had a great time running the boat. A note of caution should be mentioned about running the boat in reverse. Because the Santa Monica has a

*Continued on page 84*



Another running shot of the Santa Monica from Octura Models. Top speed with the Jackson 38 is about ten miles per hour . . . not that fast by gas engine standards, but a lot cheaper to run!



One of Dirty Racing Team's old indoor oval track cars with a Dodge/BoLink body. Text has details of unusual front bumper.

# R/C AUTO NEWS

By DAN RUTHERFORD  
PHOTOS BY AUTHOR

• In case you aren't aware of it, I work as a sales rep for a company dealing in hobby and toy merchandise. As you can imagine, the Christmas season can be very hectic for me . . . This year was even crazier than usual, so much so that I had completely forgotten about getting ready to write this month's column. No problems really, I can always find something to write about.

As taking and printing pictures each month is part of getting ready to do a column, there aren't any around. So, take a look at those heading this column to see what RC cars were like a few years ago. First up is the MRP Class B gas car in 1/12 scale. This particular car was my very first RC car a number of years ago, at that time it was the hot tip: looks pretty funky today, doesn't it? Power was a Cox TD 049, tricky to keep running

although they could be massaged into pretty fair reliability. But you had to know all the tricks, and you had to be patient. When they ran they were very fast, much faster than even the hottest 1/12 electric cars of today. Uh, not fast as in quick through the twisties, fast as in blasting down a straightaway. These cars would not corner worth beans compared to any contemporary electric. However, with a power to weight ratio that was quite good, with the short wheelbase that these cars had, with no thought of using diffs, and with handling characteristics that were suspect even back then, they could be a very interesting handful coming out of corners!

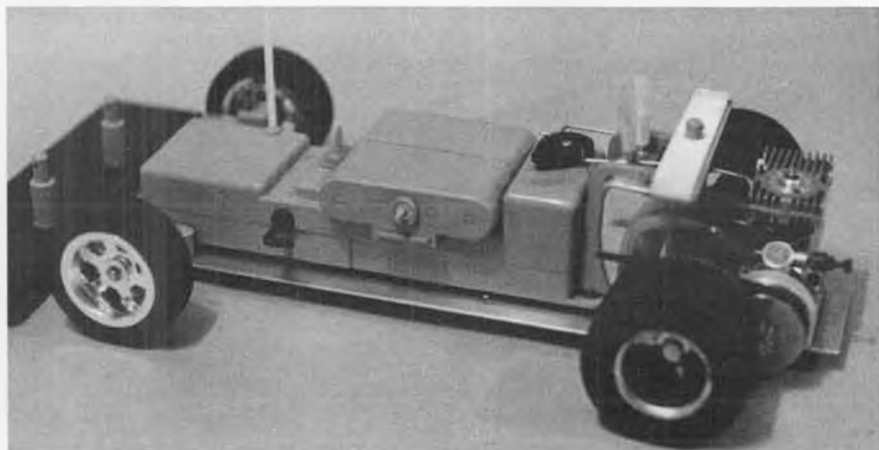
Actually, "interesting" wasn't exactly the word for the situation, it wasn't unusual at all to see cars spin out halfway down a long straight. The power they

had kept the back end very loose, and a careless wiggle on the steering wheel would hook the car right into the wall!

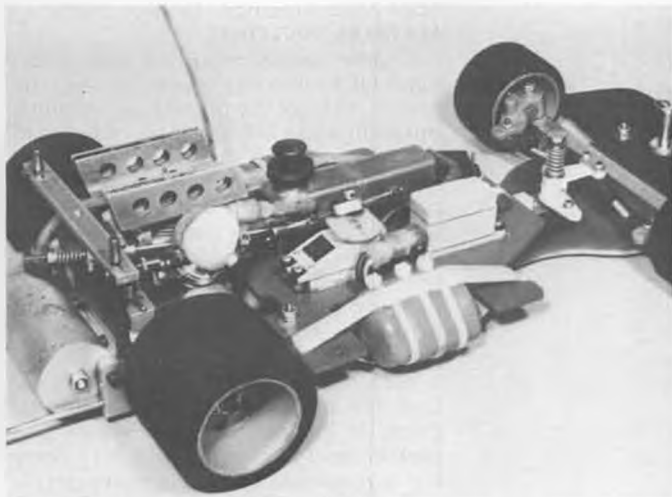
The car pictured is fitted with a JoMac brick type radio, which was standard issue for both Class B and Class A cars. This car was later updated with a fast-fill tank and glass chassis pan. I drug it along to a Nationals race at Rattey's where instead of winning Amateur class, I crashed my brains out in the 100-lap main event, ending up third or fourth. Bob Welch was then convinced to use the car in Expert class, which he won easily.

Say, that is something I had almost forgotten about, those long main events in 1/12 Gas. Yes, they really were 100 lappers, and not on a short track either; if anything, the tracks used at the Nationals were longer than is presently the norm in 1/12. So a 100-lap race with lap times in the 18 to 20 second range took a good half hour to complete . . . so maybe those cars weren't quite as unreliable as is remembered. At that particular Nationals this car was very reliable, it did die a couple times in my main, but I was stuffing it into immovable boards at some good speed. In Bob's main event it ran perfectly from start to finish, all we had to do was put in some more fuel every once in a while.

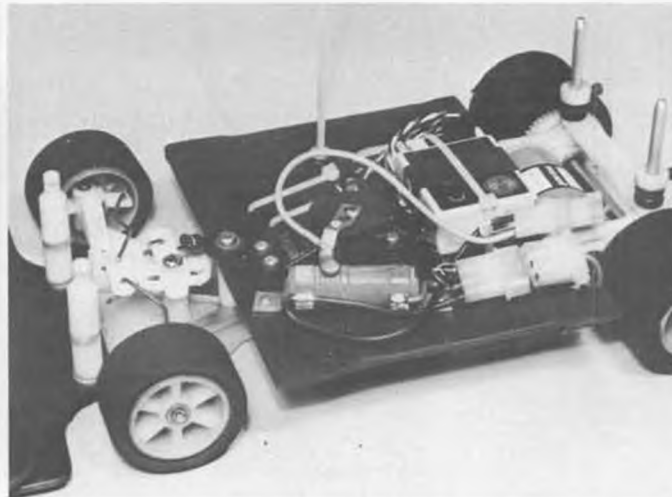
Next is the MRP electric car, which, as you should easily be able to see, is not much more than a conversion of their gas car. I don't recall when this picture was taken, but by this time JoMac had made over their brick radio some with an electronic speed control in place of the throttle servo. At the time, this car was just fine; we still didn't know that



The way it used to be . . . Here's an MRP gas powered 1/12 car that was typically very fast in the straights, squirrely in the turns, and loose coming out of the turns.



A few dated items can be seen on this early Delta Super J: hard tank, suspended battery pack, rear-mounted can muffler, slow servos.



Underneath the old Dodge/BoLink body hid this tank-like rendition of an RC12E. Bumper-mounted aircraft wheels allowed wall-riding.

much about making the cars handle, but everything is relative, and this was a relatively decent handling car, plus it was tough as nails. Release of Associated's RC12E quickly made this type of car obsolete. The more observant among you will notice there are two main gears on the rear axle assembly. If you don't know why, you are definitely a new guy to this hobby. . .

The number "45" stock car pictured is a piece that I used for a month or so in an indoor oval track series of races we had a few years ago. It was real crash 'em, bang 'em type racing, for a clue as to what those round things sticking out from the front corners of the body are, skip to the photo of the naked (and hardly recognizable) Associated RC12E. Sure enough, those are wheels, Don's Rat Race wheels from CI flying, attached to the huge bumper. Getting bumped into the walls was a common thing in these races, the wheels let the car ride the wall without getting stuffed into it. Yes, it is a dumb idea now, hardly brilliant even back then, but it did work!

Check that oversize radio tray, it was whittled out of Kydex and sized to just fit inside the body shell. The car was a rolling tank, but did win its share of races on the oval.

Finally, a kinda old-timey picture of a 1/8 gas car, this is a Delta Super J with which the Dirty Racing Team still actively campaigns, although the rear mount, muffler, flat slide carb, hard tank, and S-27 servos are now history.

#### OFF-ROAD RACING

I have had a few requests for coverage of off-road cars and equipment, plus more than a few letters just wanting to know how to get started in off-road. So, it seems time to address the situation, even if some of you won't care for what I have to say about off-road.

First, I don't race off-road. We do have a couple of MRC/Tamiya kits, one built and operational, the other still in the box. The runner is used for roosting around in the back yard and that's about it. However, I have been to a couple of off-road races here locally, so am not a

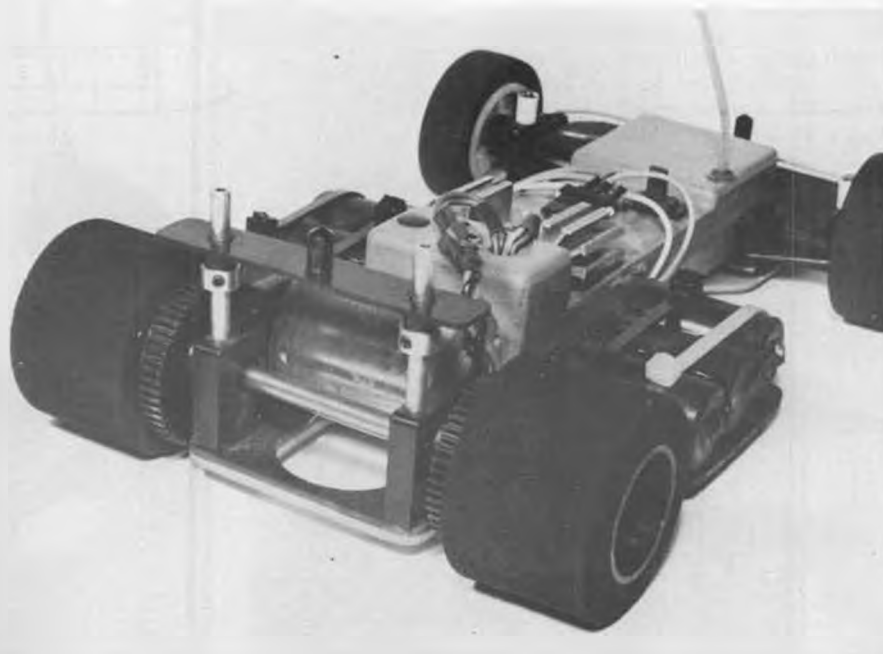
complete stranger to the activity. First impression of the cars, even the modified numbers, is that they are really slow. I suppose a guy off the street sees them as kinda fast, but then he hasn't seen a honkin' 1/8 road car, or even a current 1/12 road car.

The cars are really heavy. Every time I mention this weight thing to an off-road guy he replies that the car has to be heavy to handle properly. C'mon, people, that just can't be! OK, maybe today's off-road cars do in fact handle better, or are just more controllable, when weighted down, but piling on more weight simply can't be the ultimate answer to the problem of getting an off-road car fitted with handles. The chassis has to be the key here, it seems to me that the off-road guys add more cells and hotter motors until the car turns into an evil handling machine, and then they add on a bunch of weight, if not as outright ballast then as nerf bars, roll

cars, double shocks, and so on until there is enough extra weight to get them right back to the power to weight ratio they had before all the extra batteries and the hopped up motors were added. Then an even hotter motor comes along, the chassis is again over powered, and the cycle starts over again.

Hey, we used to have a similar situation in 1/8 gas, the chassis, at least a few of them, simply could not handle much power. Drop in a killer motor and the chassis would twist and shake all over the track, it took an excellent racer to be able to herd the things around the track in good time. Yet you could take that same car, fit it with a mild motor, and it would instantly turn into a pussy cat that was easy to drive. Not only easy to drive, but quicker as in quick to get back to the finish line, not quick as in ripping down the straights.

*Continued on page 83*



MRP's first 1/12 electric . . . Basically, it was a 1/12 gas car converted to electric. The result was a car that ran well, but slower.





"The beginning of every action is a thought."

• Year-end time again, as this column is being composed, and the above quotation, found in a Chinese fortune cookie, reminded us to pause and reflect upon the passage of another 365 days. Each year seems somehow shorter than the preceeding one. We never manage to finish nearly as many projects as were planned, but perhaps we do enjoy those that were completed a bit more than heretofore.

And certainly we appreciate the model flying sessions more than ever! Just being among model building friends is a privilege; if the weather is nice too, what more could anyone ask of life?

Our reader support has been most rewarding, as it has always been. Never has there been a shortage of things about which to write, and we are perpetually supplied with photographs at a greater rate than they can be employed. Apologies are in order for the delay in publishing some of them, but we do try to achieve some sort of meaningful balance, involving subject matter, geographical mix, and image quality.

Bill Northrop and his staff have also been 100% supportive, for which we are most grateful. Yes, it has been another good year for being a model builder, and we eagerly look forward to the next!

#### AERODYNAMICS, BY GEORGE!

"In this wonderful world of foam and fiberglass, and ready-to-fly models, aerodynamics is becoming a lost art. This is a pity, because aerodynamics has been very INSTRUMENTAL in making air-

planes fly. Which is why we have terms like PIANO wire, elevator HORN, BELL-crunk, wing CHORD, SCALE effect, to mention too many. Take airfoils for example. Where would we be without them? Flat plates are OK, but they have their limitations. . . (the gravy keeps running off the edge)."

The preceding was abstracted from *Almost All You Would Rather Not Know About Aerodynamics*, by San Diego

#### Scale Staffel member George Harris. FLAPPERS, ANYONE?

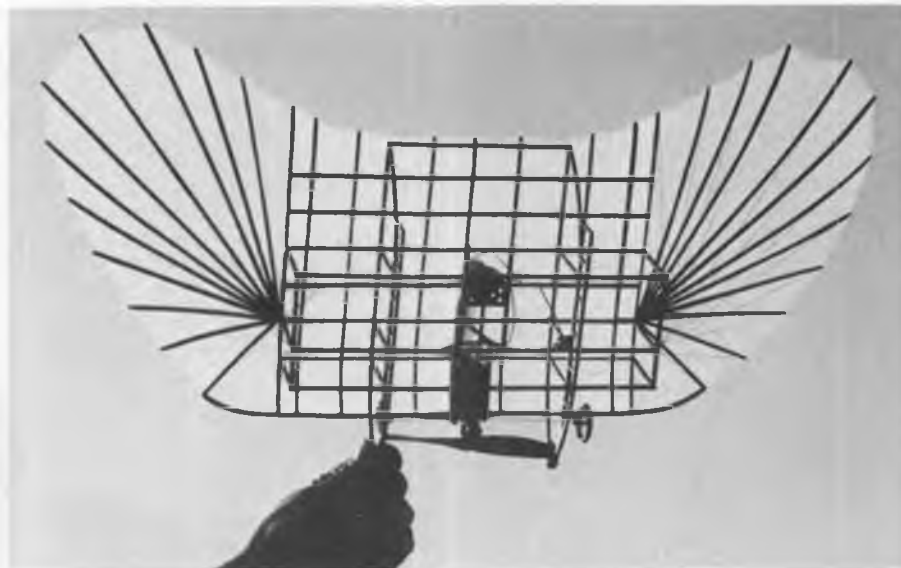
Charlie Sotich reports a new international model ornithopter contest. The event will be of the postal type, in which duration times will be sent in rather than the actual models. Rules are simple and limitations are few. Briefly, the supporting area shall not exceed 1,000 square centimeters; the sum of the areas of any fixed supporting surfaces must not exceed one-half the area of the flapping surfaces, and power is limited to rubber strands. There are no weight restrictions.

Cash prizes of \$40 for 1st and \$25 for 2nd will be awarded, with additional prizes if the number of entrants and performances warrant. And NO entry fee is required! Complete entry details are available from: David W. Erbach, 1738 St. Mary's Road, #702, Winnipeg, Manitoba R2N 1G8, CANADA. (For a change, more flap from a contestant is encouraged! wcn)

#### AND SPEAKING OF ORNITHOPTERS

Model Builder's indoor columnist, Ken Johnson, has hit the jackpot in the publicity department. Stories about Ken and his model flappers have appeared in the Los Angeles Times as well as other newspapers in various parts of the country. Additionally, Ken has been interviewed for radio and television.

*Continued on page 73*



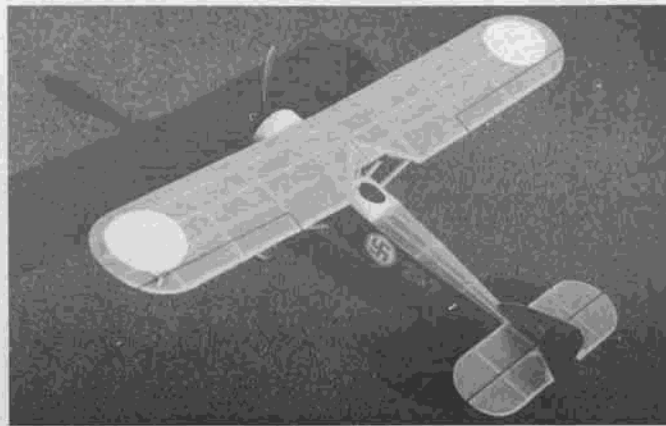
This 1908 Etrich I, by Carlo Godel, is a Telco CO<sub>2</sub> powered model of incredible structural detail. Shadows of the many wing warp wires are visible on the wing skins.



Frank Allen III shot this picture of a beautiful DH2 built by Bob Greenaway. Model spans 18 inches, powered by Brown Jr CO<sub>2</sub>.



Ichiro Yamada took this photo of Jiro Sugimoto's winning Japanese indoor Peanut Dornier Komet. Time: 76 sec. Weight: 2.8 gms.



# MORANE-SAULNIER MS 50C



By WALT MOONEY . . . The Peanut Perfessor journeys to WW-II Finland and returns with this interesting parasol-winged light plane that's sure to please.

• The Morane-Saulnier MS 50C is a classical shape for an airplane with its parasol wing. This particular design has almost as many struts as an umbrella has braces hence the classification of the MS 50C as a parasol monoplane is particularly apt. Ordinarily, a lot of struts tend to be a discouraging design characteristic for a scale model project, but the simplicity of the rest of the design is encouraging. The Finnish insignia is interesting, with its blue swastika on a white field inside of a yellow circle.

The peanut model follows standard building procedures in almost all respects, so no long put-part-A-next-to-part-B write-up will be presented. What we'll cover instead is a short, incomplete list of sources of three-view drawings.

Before this list is started, two paragraphs will be devoted to the model.

Wing mounting on a model with a parasol configuration is generally tedious, so a new approach was tried on this model which is presented here for consideration. The model was completely assembled in the uncovered phase. The wing and all its struts were

assembled on the fuselage as shown in the skeleton photo. Usually this is done with only the slightest amount of adhesive just to get the photo. It is easy to locate all the struts, as well as cutting them to size, when there is no covering on the model. Minimal glue was used on this model where the struts contacted the wing as usual, but the bottom end of all the struts were permanently cemented in place. After the photo of the skeleton was made, the wing was disassembled from the strut system. Next, the wing and the rest of the model was covered and finished. A little extra care is required to cover the fuselage while avoiding the struts, but this is not too difficult. Final wing assembly to the fuselage is very simple on the struts which are already secured in place.

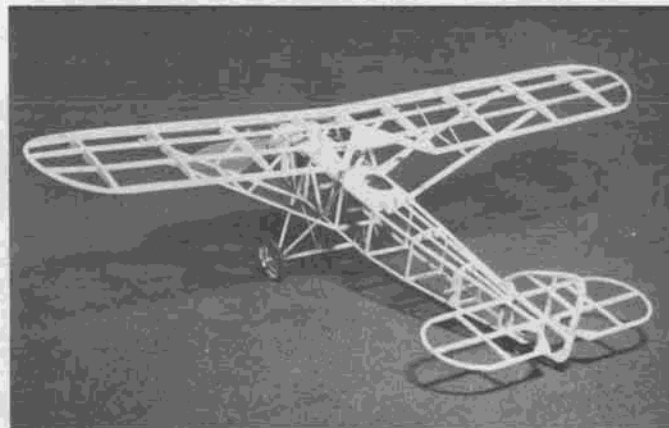
The model is a good stable flyer, but is not one capable of long durations. As built, weighing 12-1/2 grams without its rubber motor, it is probably capable of flights of about 30 seconds. Mine did not fly right off the board. It required a little ballast on the nose to move the balance point forward to the position indicated on the plans. It also required some left

rudder to open up a right turn, and a slight amount of down thrust to eliminate a stall under power. A loop of 3/32 flat rubber, twice the length of the motor base, was used to power the model on its first test flights. While this is enough power for testing, a slightly larger rubber strip should probably be used outdoors.

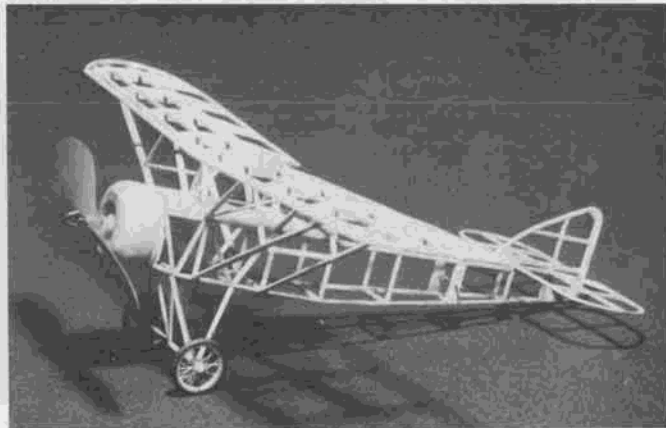
Now for some sources of three-views. One of the nicest, is *Aces of the Air*, by Francis K. Mason, published by Mayflower Books, and distributed by W.H. Smith Publishers Inc., 112 Madison Avenue, New York, NY 10016. This book covers the careers of over sixty famous pilots and has color four- or five-view illustrations of the planes they flew. The plane isn't always the most familiar one either. For instance, Ernst Udet's airplane is a red fuselage Siemens Schuckert DIII, and William Bishop's is a Nieuport 17.

Another, is *Conquerors of the Air, The Evolution of Aircraft 1903 to 1945*, by Heiner Emde and Carlo Demand published by The Viking Press, Inc., 625

*Continued on page 84*

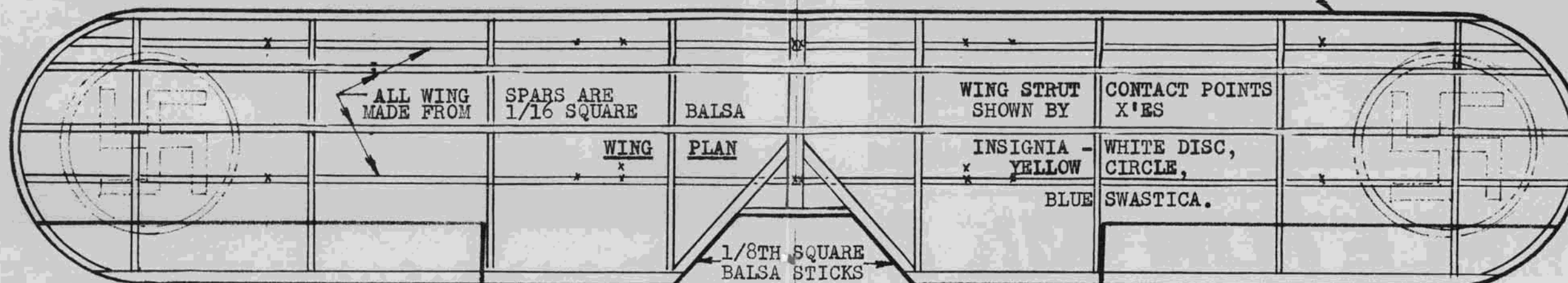


Left rear view of this month's Peanut, the MS50C.



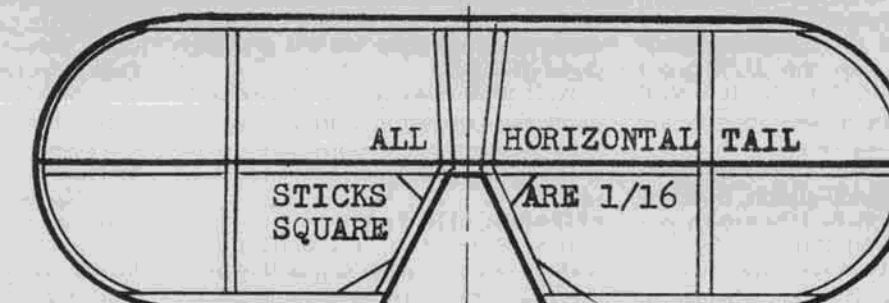
Left side view of the Morane-Saulnier showing wheel and engine cowling detail.

USE HARD BALSA 1/16 BY 1/8 STICK FOR LEADING EDGE - SANDPAPER FRONT ROUND TO MATCH AIRFOIL SHAPE



1/16 BY 1/8 BALSA STICK TRAILING EDGE - TAPER TO TRIANGULAR SHAPE TO MATCH AIRFOIL SECTION  
ALL WING RIBS ARE CUT FROM 1/16 SHEET BALSA. ALL FLYING SURFACE TIPS ARE LAMINATED, USING THIN MODEL RAILROAD BASSWOOD STRIPS.

TOP OF FUSELAGE IS 1/32 SHEET BALSA FORWARD AND TISSUE OVER THREE 1/32 SQUARE BASSWOOD STRINGERS AFT.  
ROUND BAMBOO REAR MOTOR PEG



ALL WING STRUTS, (AND THERE ARE A LOT OF THEM), ARE MADE FROM MODEL RAILROAD BASSWOOD STICKS, CARVED AND SANDED TO A STREAMLINED CROSS-SECTION.

NOSE BLOCK CAN BE MADE FROM A SOLID BLOCK IF DESIRED

THIN PLASTIC WINDSHIELDS  
BODY TOP VIEW

DIHEDRAL

CUT FUSELAGE FORMERS FROM 1/32 SHEET BALSA

ALL VERTICAL TAIL PIECES ARE 1/16TH THICK

THIN PLY TAIL SKID

BUILT UP NOSE COWL SHOWN IN THIS SIDE VIEW

SIDE VIEW

1/16TH THICK FUSELAGE SIDE FRAME STICKS ARE SHOWN HATCHED FOR EMPHASIS. ALL CROSS STICKS ARE 1/16TH SQUARE BALSA. A COMMERCIAL PLASTIC PROPELLER AND THRUST BEARING ARE USED ON THIS MODEL  
USE LIGHTWEIGHT TISSUE FOR COVERING THE MODEL  
FULTON HUNGERFORD SPOKED WHEELS ARE JUST GREAT.

7/8 DIAMETER WHEELS

USE .015 MUSIC WIRE FOR THE LANDING GEAR STRUCTURAL MEMBER.

FRONT VIEW

MORANE - SAULNIER MS 50C  
Halt Mooney 10-01-82





With the proper amount of scrounging in the scrap wood pile, these four 1/2A racers, (less engine) could be made for under ten bucks!

# TEMPLETON MK II

By JAMES MARTIN . . . For Juniors and other circle burners on a restrictive budget, the Templeton Mk II can be the answer to a lot of frustrations. Here's a two-for-the-price-of-one model . . . just for you.

• As I walked into a local auto parts shop the other day, the young man in back of the counter said, "I remember you! You're the guy with the 1/2A proto racers. I still got mine." This enlightened my ego as I thought back to how the 1/2A Templeton was developed.

The juniors of the club had been throwing hand launch gliders, but now they just sat and watched the grown-ups fly Ringmasters and Flite Streaks with their screaming .35s. Watching is no fun. Why not get some balsa, wheels, an engine, some line, and get those kids in the air?

It is not easy to come up with a decent 1/2A design; and often 1/2A designs are taken too lightly. The design we needed must be simple, easy to maintain, fly well, cost little, and be intended for an activity in which all juniors can participate.

How about sport racing where there are speed, time, and distance aspects?

With only a sheet of 1/4-inch balsa, some 1/8-inch balsa scrap, 1/8-inch plywood, music wire, wheels, and an

.049 reed engine . . . there were possibilities. Maybe two airplanes could be made from the one 1/4 x 4 x 36-inch sheet of balsa?

With all of these design objectives in mind, the Templeton Mark II was born. What follows are the instructions for building two of these great little 1/2A racers.

## PREFABRICATED PARTS

1) Mark the 1/4 x 4 x 36-inch sheet with a ruler and a felt pen as shown on the plan. These are the wing and fuselage parts.

2) Cut out these parts using a sharp modeling knife (Uber Skiver) with a number 11 blade and a straightedge.

3) Sand all parts lightly with 400 grit sandpaper so that the edges are square.

4) On the 1/8 x 2 x 36-inch medium grade sheet balsa, lay out a pair of rudders, horizontal stabilizers, and elevators as shown on the plan. Note that the grain of the wood for the rudder runs vertically.

5) Cut out the 1/8 sheet parts.

6) Sand the 1/8 sheet parts lightly,

rounding the edges.

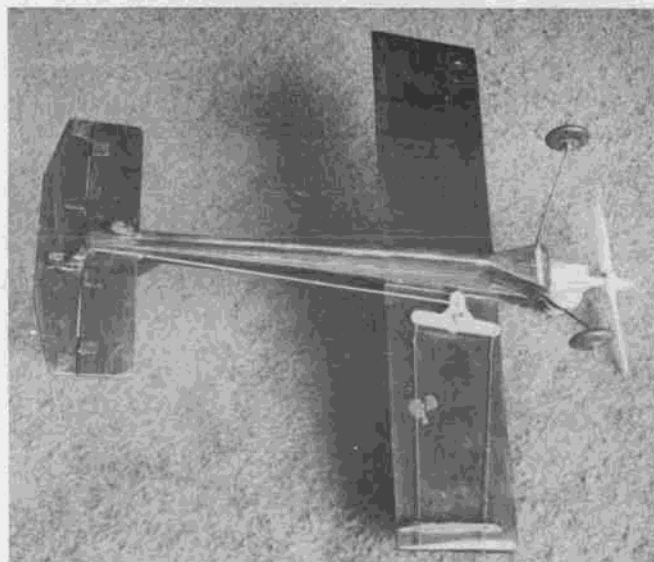
7) From popsicle sticks, cut out tail skids, elevator horns, and line guides. Drill holes before cutting to length. Drill 1/16-inch holes in the elevator horn and 1/8-inch holes in the line guide. Note: 1/8 plywood can be substituted.

## WINGS

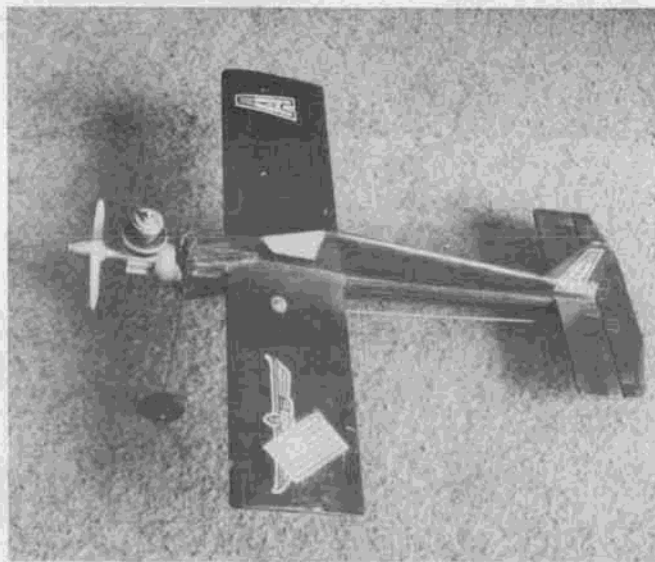
1) Shape the 1/4 x 3 x 14-inch balsa wing stock. The airfoil is flat on the bottom with Philips' entry on the lower leading edge beginning 1/2 to 1/3 inch from the L.E. radius. The top surface is contoured with the maximum thickness of the airfoil occurring 1/3 inch from the L.E. radius as shown. Sand to shape using sanding blocks with medium and fine sandpaper for smoothness. Round the wing tip edges.

2) Drill mounting holes for the 2-inch bellcranks at the following location: 1-1/4 inches back from the leading edge and 1-1/4 inches out from the fuselage on the center line of the left wing panel. Hole size will be determined by the type

*Continued on page 94*



Control details are incredibly simple: a control horn, pushrod, bellcrank, and two lead-in wires.



The Templeton Mk II is the perfect "first airplane" for the tyro interested in something that "really flies!"





Jim Knudson of Oklahoma City mugs Dave "VTO" Lindstrum's camera at the 1982 Nats. The model that Jim holds is his "Midi-Pearl".

# FREE FLIGHT

By BOB STALICK

• The Nostalgia Event has seemed to me to be just the ticket for us free flighters who have trouble forgetting the "good old days." Maybe that's why I like it so much. I don't have to mess around with those batteries, coils, and condensers that give me so much grief in Old Timer, yet I can build models that look a little like Old Timers and fly them in an event . . . with my old glow engines. Nostalgia is in . . . especially as the average age of most of us inches toward the half-century mark (or beyond).

So, this month, it's Nostalgia Month.



Aaron Markos, a member of the Chicago Aero-nuts, placed first in 1/2A Junior event at '82 Nats. Model is a "Cultured (Mini-) Pearl."

## RUSS HANSEN'S T-BIRD, APRIL THREE-VIEW

For an out of the ordinary Nostalgia 1/2A, try this month's three-view, the T-Bird. Russ Hansen, the designer, said, "We moved to Chicago in 1953, and soon became very friendly with Gerry Ritz. A year later, Gerry brought Ossie Czepa here to work in his furniture factory. This was a fun time as the models were all that concerned us . . . a lot of ideas and a lot of things were tried. At an FAI meet in 1954, we met a young fellow from South Bend, Indiana by the name of Jack Greene who had a high thrust line model with an unusual configuration . . . the rudder was on the bottom, a la the Spacer. Other high thrust models had very little, if any, spiral stability, and these were designs with the rudder on the top. Greene sent me a set of plans. With an Oliver Tigre, it was a real hot



Jim Walston of Atlanta, Georgia gives his WG-1 Class C model a pre-flight examination. WG-1 ("Wild Goose") is a Lucky Lindy type: trim with rudders. Linstrum pic.



Melanie Stanford (Texas), 1982 Nats Sullivan Award, holds her first place Junior .020 payload model, "Mighty Mouse." Linstrum pic.

flying model. It won many contests for me.

"We went to Galesburg in 1955 for the FAI trials, and at the end of the second round we were leading. However, a thunderstorm came through, and we put the third flight in a big downer. You might get a chuckle out of the fact that we were the first ones to VTO. When I made my flights, there would be eight or nine guys on their hands and knees making sure that I had the three points down on the takeoff. At this point Ritz and I combined features and came up with some of our high thrust designs, namely the T-Bird and the Hot Head. These were essentially the same except for stabilizers. From our experience with



the original models we found that we did not have as good a glide as low thrust models, but much better power patterns that were easier to adjust. The beginnings of the 1/2A T-Bird evolved from these designs. A number of features which we think were a first were the now called "Starduster" type fuselage construction, the rudder on the bottom, and we VTO'd.

"The 1/2A in its last form as kitted by Midwest, if built light, was a fast climber, but glided fair. With an Atwood Wasp, it was a good flying combo. With a 'timer tank' you could eliminate the 3/4 oz. for a timer, and it could be built to weigh 5 oz. However, with a Thermal Hopper, it would do some beautiful snap rolls, because it was lacking in rudder area.

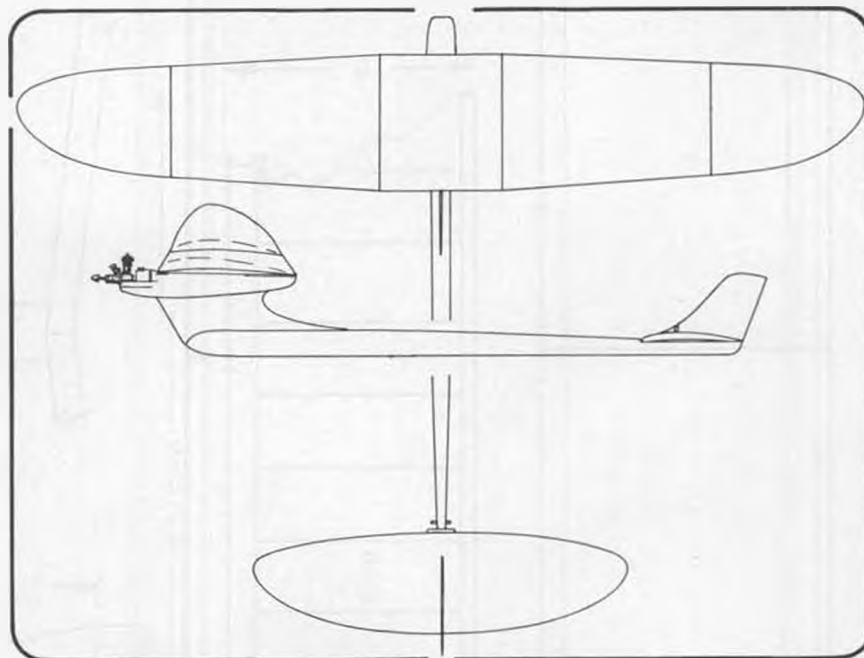
"I still have the original. The covering is in bad shape, but I may rebuild it to have some fun at a Nostalga contest. . . " Russ Hansen, as quoted in the "CIA Informer."

By the by, John Pond's Old Time Plan Service has copies of the T-Bird plans available in full size. Drop him a line and some \$\$\$, and get to work building one for this summer.

#### MYSTERY MODEL FOR APRIL

For the first time in a long time, the Mystery Model is a "newer" design than the three-view. This one is a high thruster with the rudder on the top. I have always liked its lines, and I even ordered the plans once upon a time, but I got a little scared by the undercambered wing and stab . . . G-610B in both instances. One of our WMC club members built a number of the A size of this ship . . . 14 ounces powered by a hot T.D. 15, and won A gas at the 1963 Nats at Los Alamitos. Anyhow, this one is the 1/2A version, complete with upthrust. Name it, and you can claim a one year subscription to *Model Builder*. Send your entry to Bill Northrop first and you are a winner.

Rudy Kluiher, Lakewood, Ohio, was first to name the August '82 Mystery Model as Ken Pruitt's "Holy Mackerel." And as sometimes happens, the designer himself was heard from. "I just had to drop a few lines. I doubt if anyone but Dennis Phillips and myself would still recognize that old bird. It flew in 1/2A (with Atwood Wasp), A (with Arden .19), B-C (with Torp .29-.32), and C-D (Atwood .49-.51), and even had a few spin-offs like "Holy Smoke", "Holy Toledo", and "Holy Terror". Now, 30 years later, I'm still modeling, but now 12 inches to



APRIL MYSTERY MODEL

the foot, restoring antiques and building WW-I replicas. Current project is a Sopwith Pup, about 75% completed."

September's Mystery Model was Reino Hyvarinen's "Sans Egal" (without equal). A top Finnish A/2 model for several years in the '50s, it was published in the April 1959 issue of *Aeromodeler*. The earliest postmarked correct answer came from Bill Park, of Charlotte, North Carolina.

Ed Turner, of Fort Worth, Texas, was first to correctly identify the November Mystery Model as the "Nor'Wester", a Wakefield design by Bob Duffield, and published in the October 1966 issue of the *NFFS Digest*.

December's Mystery Model really stirred up a flurry of responses, which was all the more surprising as it was not a competition model. Called the "Executive", the twin Jetex powered model was reprinted in the 1952 *Air Trails Annual*. Appropriately for a two-engine model, two correct answers tied for first place, and so subscriptions go to Ronald Bales, of Salem, Oregon, and Don Hambly, of Mount Hope, Ontario, Canada. Almost every answering modeler commented about the difficulty in getting two engines working simultaneously, and also lamented the fact that Jetex power

units are no longer being manufactured.

They did it to us again! Tom Winter, of Lincoln, Nebraska, and Eugene Jensen, of Gresham, Oregon, tied with the first correct answers to the January Mystery Model, the late Tom Hutchinson's "Egghead" A/1 Nordic. The plans, drawn by Dotty Conover, appeared in the *Sig Air-Modeler*, March-April 1967 issue. Another modeler was half right in his answer. He called it the "Soarhead"!

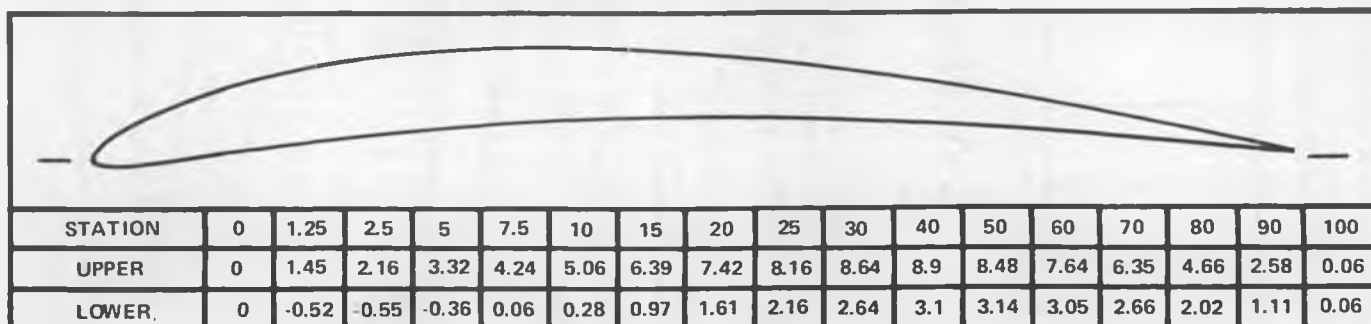
#### DARNED GOOD AIRFOIL: NACA 6406

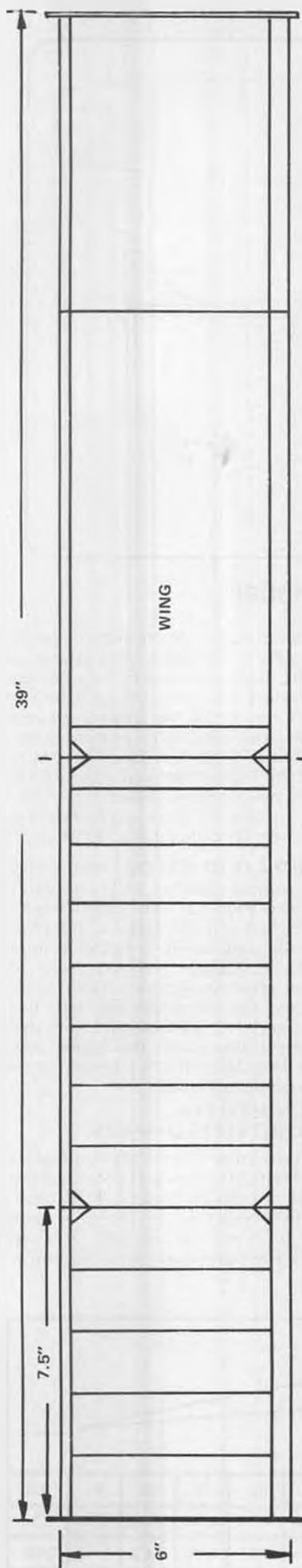
The thinner brother to last month's DGA, the 6406 has the same characteristics, but offers a faster climb. It is especially well suited to lighter weight models . . . Coupe and A-1 come to mind as good applications. Good glide characteristics are expected with this series, and the 6406 should not disappoint. It also passes the Eppler test, which Tom Hutchinson stressed in his article on airfoil quality.

#### MORE NOSTALGIA: PROPOSED RULES CHANGES

The San Valeers were the originators of the Nostalgia event and proposed the first set of rules in January, 1979. Now, after three years of use, the rules have had a good test. So, recently, the San Valeers have proposed some modifica-

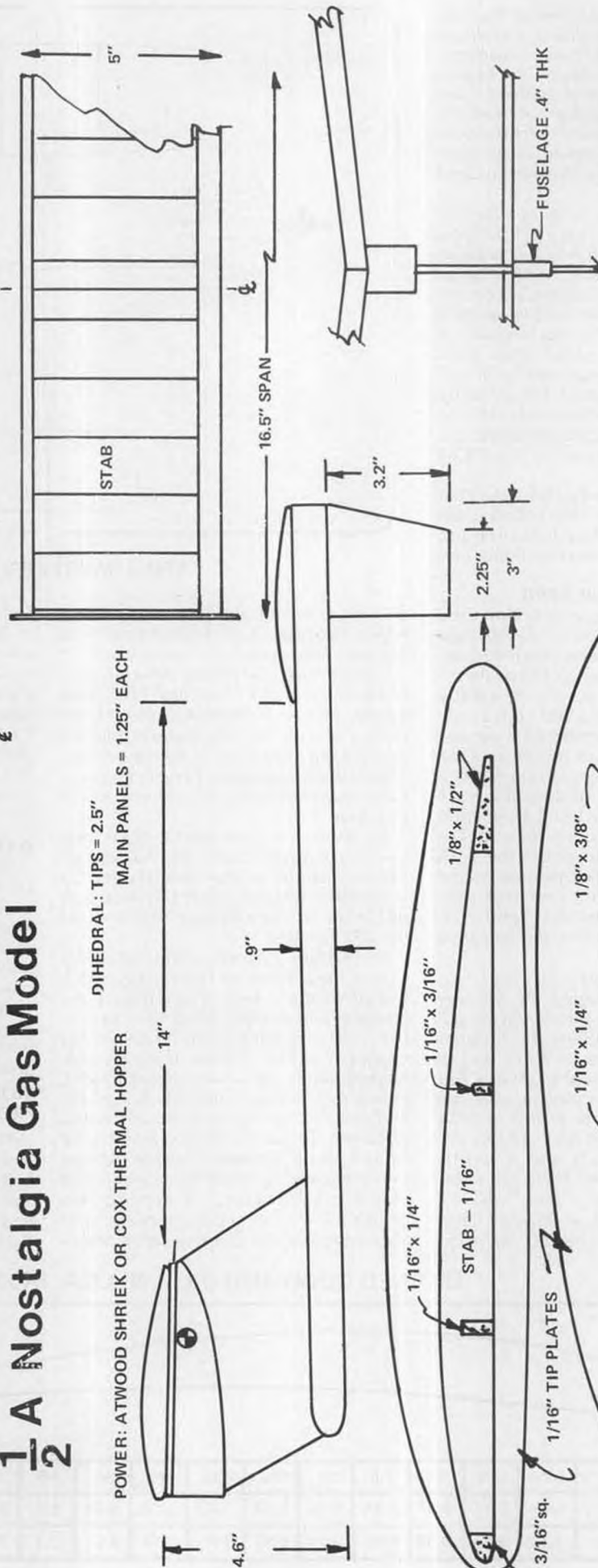
#### DARNED GOOD AIRFOIL — N.A.C.A. 6409





## 1 1/2 A Nostalgia Gas Model

POWER: ATWOOD SHRIEK OR COX THERMAL HOPPER  
DIHEDRAL: TIPS = 2.5"  
MAIN PANELS = 1.25" EACH



## T-Bird by Russ Hansen

234 sq. in. HIGH THRUSTER  
DESIGNED IN 1955



Jim O'Reilly of Wichita, Kansas checks dethermalizer on his "O'Reilly's Wake" at the '82 Nats. George Perryman times.



Billy Chennault of Fort Worth, Texas poses for another Linstrum photo . . . this time the model is a tiny "Super Mini Pearl."

tions to those rules. The following summarizes the changes and the rationale behind those changes:

#### 1) ELIGIBLE DESIGNS

Now reads: "Any free flight design published or kitted either in the United States or Foreign country national magazines or kit manufacturers recognized from December 31, 1942 through December, 1956."

#### Rationale for the Change

Why not begin Nostalgia eligibility from the end of the Old Timer period . . . namely, December, 1942 in order to eliminate the orphan models and the gap in the rules that presently exists?

#### 2) ELIGIBLE DESIGNS, ADDITION

Add: "Also those designs that were flown by the designer or other persons having access to the original design

details during the period December 31, 1942 through December, 1956. These eligible designs shall meet the construction requirements stated in the Nostalgia rules under the paragraph 'Modifications'."

#### Rationale for Change

Many good designs existed, but were never published. The problem is, "How do you administer this change?" The answer is the same as that arrived at by the SAM fathers: permit documentation to authenticate the date of design. Such designs can be authenticated, and then published as officially recognized Nostalgia models. The Contest Director can decide, on the field, when such occasions arise. The experience at the contest field has been that modelers have not tried to pull any "fast ones." That's why the event is a fun event.

#### 3) ENGINE RUN

Change the Nostalgia rules in the paragraph, "Official Flight," to read: Exception to the six minute maximum will be in the 1/2A Class where the max shall be five minutes. The same exception shall apply to fly-off flights."

#### Rationale for Change

Some of the older 1/2A designs were so small, that the six minute maximum caused the models to go OOS in a thermal. Changing the max for small models will keep them in sight for the max (we hope) and should save more models from being lost.

#### 4) POWER

Change the eligible engines to include the Cox .15 (non-Schnuerle).

#### Rationale for Change

This change compensates for an oversight in the original drafting of the rules. Cox actually produced three contest type .15s. The original Cox Olympic BB 15, the Tee Dee and Cox .15, and the final version, the Cox 15 Mk.II Special. The latter can be distinguished by its gold anodized finish. The Mk II is easily the most powerful of the whole set of Cox .15 non-Schnuerle engines.

#### FINAL COMMENTS ABOUT NOSTALGIA

One of the nicer features about this event, in my opinion, is that the rules are purposefully loose. They are based on

the intent of the event . . . to relive those golden days of yesteryear in the free flight field. These proposed changes are easily done, and intended to keep the event within its regular intent. Our experience here in the Northwest is that the event is flown with the same kind of joie d'vivre as Old Timer. It's as it should be with all events, I think.

#### IN CLOSING, SOME HUMOR FROM OUR CANADIAN FRIENDS

As the contest season looks us straight in the face, Ken Chamberlain of the

*Continued on page 102*

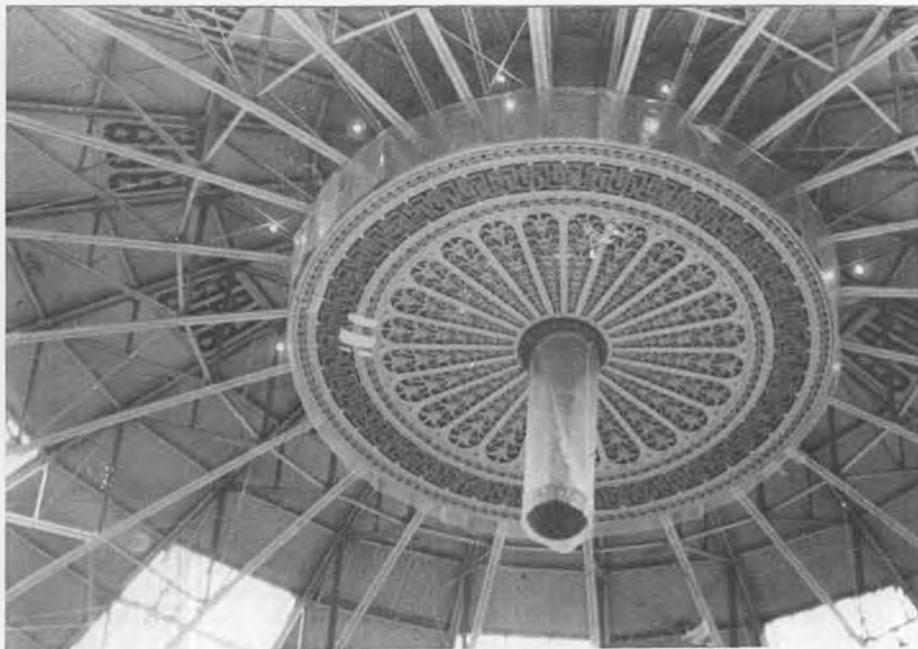


Don Zipoy launches his "Crispy Critter", a nostalgia-ish semi-original design. Wings and stab from Clipper Cargo. Tom Hutchinson pic.

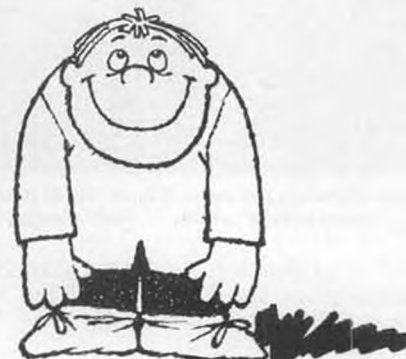


Chuck Markos keeps an eye on the sky for his next thermal. Model is an OHLG with Tomy timer VIT. Linstrum pic at '82 Nats.

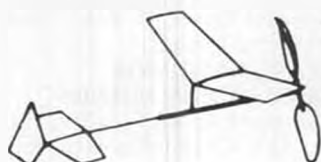




Bob Andrews captured four indoor models flying near the ceiling of the West Baden atrium in this photo. Plastic covers keep models out of the "dish" . . . once author was a "dish" retriever.



"Things are looking up . . . since I started flying indoor!"



# INDOOR

By KEN JOHNSON

## WHAT DOES WEST BADEN MEAN?

In indoor modeling, we are all held together with a bond of common interest. We appreciate the effort a fellow modeler puts into his airplane. The work we put into cementing a bunch of little sticks together, covering them with a flimsy material, stringing the whole thing with thread or wire, and making this into a beautiful flying machine. Because this whole process is so much of an effort, a chore, a labor of love, we admire each model that is put into the air.

Once each year, many of us gather, in a place near the center of the country to enjoy our efforts, and to share our common bond with each other. A lot of effort goes into the planes we bring to this meet. Every bit of work is rewarded a hundred fold, by the flight times, the scale scores, the records we set and most of all by the communion we share with each other. All the evenings and weekends in construction, the planning, the anticipation enroute to the Mecca of indoor modeling are all to bear fruit in June of 1983.

We come from the south, the north, and from every other direction and descend on the little city of West Baden, Indiana. It makes me wonder what we did before someone discovered this beautiful building in the Hoosier state. I suppose we all did our own thing, in our own little corner of the world. We went to the Nationals and met some of the fellow enthusiasts in the world of indoor. Surely, there was not the variety of events that are flown at West Baden. At

the Nats, one had to stay in a nearby city or on a military base or in a camper, and then get up each day and drive a distance to the flying site. Then there is West Baden, where the flyers can stay right in the building and eat there as well. The flying is non-stop and you fly as long as you can stand.

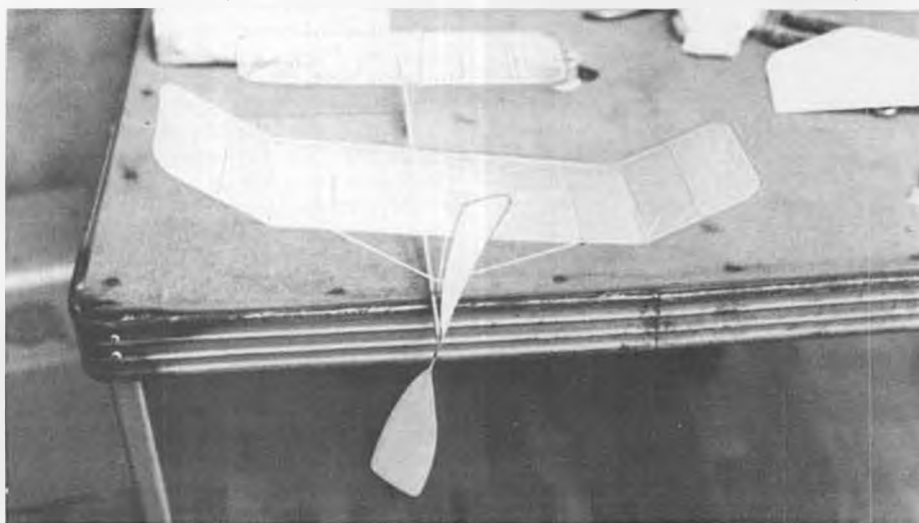
Most probably, after the '83 WB weeklong gathering, the circle will be broken. The Northwood Institute people are selling the building. Who knows what will happen to this historical landmark? This may well be our last gathering at the atrium. Where do we go from here? There are no other buildings of this size centrally located to all. None

with sleeping and eating accommodations. None with the perfect circular shape and dead air.

Well, you have one more chance to enjoy the atmosphere of a week of indoor flying with the best in the country. I hope you decide to come and join us this last time. You will not be disappointed in what you see and experience. Whether you fly mic, paper duration, autogiros, ornithopters, helicopters, hand launch gliders, Boston, or Manhattan cabin, any of the scale or Peanut scale events, etc., this three ring circus has it all. Come and "Put up with the IN crowd" at the atrium in West Baden, Indiana. See you there.

## PAPER WING SOCKETS

Are you using paper tube sockets on your duration models? They are not so hard to make. Start with a four-inch length of music wire. File the burr off both ends. In fact, file a slight taper at



One of the many Pennyplane entries at the Taft indoor meet in 1982. The models may be plastic covered because of the extreme humidity in this building. Johnson photo.



Here's a beautiful Bostonian built by Hurst Bowers. It's called the "Boston Robin". Photo by Tom Schmitt.



Doc Martin's Peanut Mitsubishi Navy Type 10 Torpedo Bomber. The weight of model is 9 grams; it has flown 40 sec. ROG. Andrews pic.

each end. The tubes are made from red Japanese tissue. Dope one side of a two-inch length of tissue with a wide brush, and roll the tissue around the steel rod while the dope is still wet. Continue to spin the tissue between the thumb and forefinger until the dope begins to dry. At this point, try to slide the paper tube along the steel rod so that it does not cement itself to the rod. After several minutes, slide the paper tube off the end of the steel rod being careful not to collapse the tube. About three to four wraps of the tissue is about right. The tube may be cut into quarter-inch lengths while still on the steel rod. Simply run a razor blade around the tissue until it is severed. This prevents the tissue tube from being crushed while cutting it into sections.

To insert the tube into the motor stick, cut a 1/16-inch diameter hole into the top of the motor stick at the point where the wing will set. Before you cut the holes in the stick, determine the correct wing position along the stick. Locate the balance point of the model by first cementing the stab and fin to the motor stick. Attach the propeller to the stick, and hang a rubber motor (about one-

inch longer than the distance between the front and rear hooks) in position on the stick. Slide the stick back and forth on your finger until it balances horizontally. Mark this spot. Figure that this is 60 percent of the wing cord. In other words, mount the center of the wing just forward of this mark.

After measuring where the leading and trailing edges of the wing will be, drill the 1/16-inch holes in the top of the stick. Put a drop of cement on one end of the precut tube socket and insert the tube down into the hole in the stick. Check the alignment to vertical on the tube and run a thin bead of cement around the tube where it sets into the top of the motor stick. Repeat the same procedure with the other tube socket.

The wing posts should be sanded to a round cross section before attaching them to the wing. To do this, fold a small square of medium sandpaper and spin the wing post wood back and forth until it is round. Taper one end of the wing post slightly so that it will slide down into the paper socket easily without crushing the delicate socket.

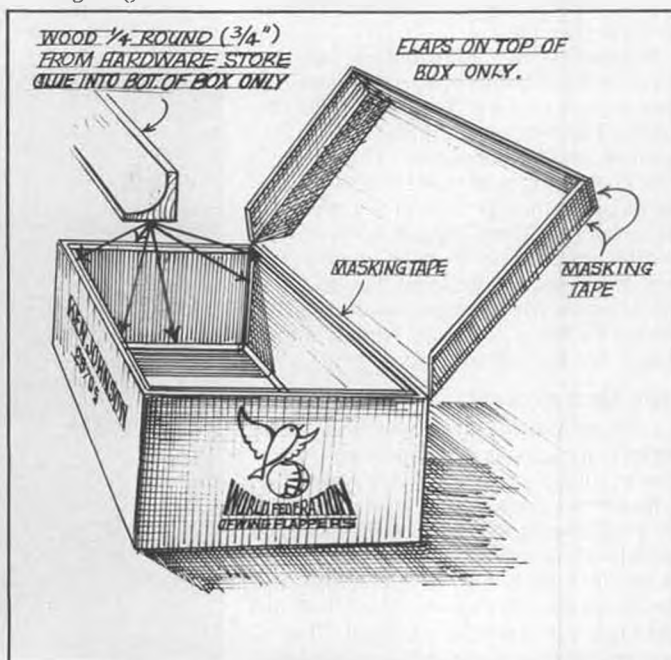
**ANOTHER INDOOR SUPPLY SOURCE**  
California's Mike Mulligan got into

the model supply business sometime ago. He took over Oldtimer Model Supply from Jim Noonan. Recently, I asked Mike for a list of the materials he carries that would be useful to the indoor builder. In my continuing search for more suppliers for indoor, and for lower prices for the economy minded builder (especially the youngsters who are buying supplies on an allowance), I offer this sampling from Mike's catalog: Rubber-Filate in 2 and 3 mm sizes  
Pirelli in 1, 2, 3, 4, 5 and 6 mm sizes  
FAI in 1/16 and 3/32 in. sizes  
Rubber lube  
Plastic props in 3-1/4, 4, 5, 6, and 7 in. diameters

An endless supply of balsa wheels for indoor scale  
Teflon washers (60¢ per doz.) and brass washers (40¢ per doz.) sizes down to .020, .030, and .040 hole sizes  
Piano wire in .010, .012, and .016 diameter (6 ft. coil, 30¢)  
Absolute covering (transparent type that's 25% lighter than Microlite)  
13-1/2 in. x 36 in., \$2.50  
Condenser paper, light weight (.000275) \$2.00, and super light weight (.00020) \$3.00. Rolls are 15 in x 10 ft.



Millard Wells of Florida Keys holds his beautiful Weirido Class P-38 at 1982 West Baden meet. Flies 38 seconds. Linstrum photo.



Ken Johnson's indoor "field box" for the care and transportation of fragile ornithopters and other indoor models. See text for details.



Los Angeles modeler, Scott Rubke, built this Peanut Douglas Sky-raider using various parts from a Monogram plastic kit. Rubke photo.



Ah yes, the all too familiar judging table. These D.C. models are Grant Carson's Pilatus and Dave Ree's Blackburn.

The lightest Japanese tissue sold today Imperial tissue (once called Superfine tissue) lighter than Japanese tissue, 18 in. x 24 in. sheets are 85¢

Mike's emphasis is on lower prices and good variety in model supplies. Write to: Mike Mulligan's Oldtimer Models, P.O. Box 913, Westminster, CA 92683.

My intent is not to favor one supplier over another, but to make my readers aware of what is available in materials.

The other two major suppliers in indoor are: Micro-X Products, Inc., P.O. Box 1063-A, Lorain, OH 44055. (Your editor designed the logo for Micro-X many years ago, as well as a line of super-light indoor kits, which are now redesigned.) And Indoor Model Supply, Box C, Garberville, CA 95400. Indoor Model Supply touches a soft spot in my heart by having the only Ornithopter kit produced in the U.S.

Also available are indoor kits from Japan. These can be ordered from T&A Hobby Lobby, 3512 Victory Blvd., Burbank, CA 91505. They include: several small duration types, two larger duration types (including Microfilm), and an Ornithopter kit.

Repeating the information on that super indoor book by Ron Williams, I've had several requests for a source on this book. The title is, *Building and Flying Indoor Model Airplanes*. The price is \$13.95, and it is available from the above mentioned Indoor Model Supply. Also write IMS for Lew Gitlow's book *Indoor Model Airplanes*: forty-six pages and one hundred illustrations for \$3.95. A must book for Peanut builders is Bill Hannan's book, *Peanut Power*, eighty pages for \$7.95 from IMS.

## OUT TO LAUNCH

I am constantly aware of how many people are unable to launch an indoor model into its correct flying speed.

Recently, your editor was a guest on an early morning TV show, here in Los Angeles. I was asked to bring many types of models, including prop models and ornithopters. This low budget show did not tape and edit the material. That is, everything that was shot, was used. We preselected about five models to fly on camera. The conversation was unre-

hearsed. When the filming started, the hostess asked several questions, and then insisted on launching my Microlite ROG model . . . herself. I described how to hold the fully wound model and how to gently push the plane away on launch. With the camera rolling, she threw the model across the room like you would throw a dart. I was agast! The wheels broke off, the wings collapsed, and the prop came apart in mid-air. I held back the four letter words, and we finished the ten-minute segment.

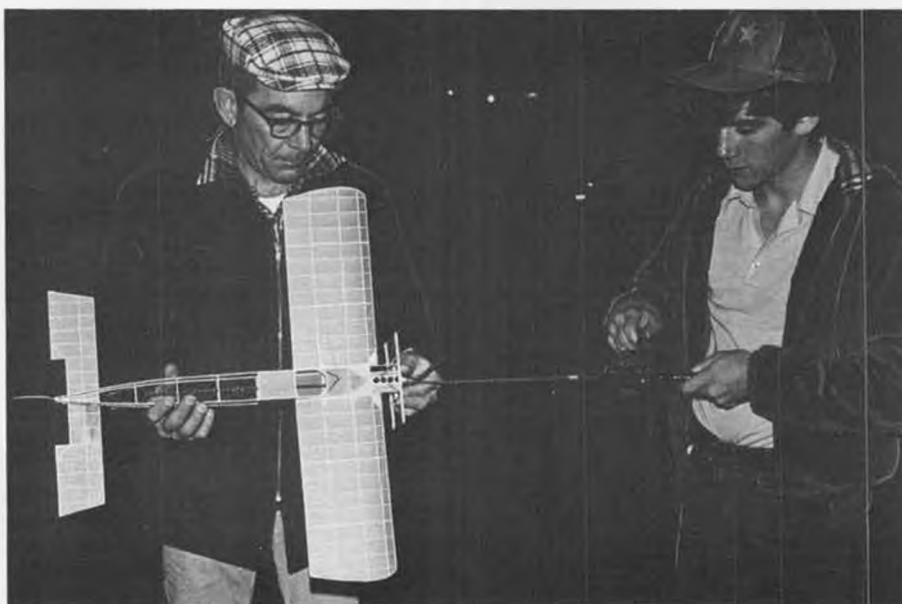
Many modelers launch their airplanes so softly that they stall and drop, or so fast that the wings peel off. The only way to learn the correct launch speed is by practice and feel. Watch the speed at which the model cruises and try to match this when you launch. It is not wise to push your plane on an ROG. A push can cause it to ground loop, or can crush the landing gear if you are pushing down and forward. Make sure the wings are level and the fuselage is horizontal as you release. Push the airplane away in a straight line and not in an arc around your body. Begin the model's flight with a good launch, and the flight will be a much better one.

## GENERAL PURPOSE INDOOR BOXES

Over the years, I've seen many beautiful indoor duration box designs: ones that separate in the middle, ones that have see-through sides, and ones that have slide-out wing platforms. Some have storage and supply areas built in them . . . What about the fliers who just need "boxes"?

For scale, hand launch, Peanut, Boston cabin, etc., I have mentioned using blanket storage boxes from K-Mart and Newberry's. I have suggested going to tropical fish stores for those foam shipping boxes that are used to transport fish. Now, I would like to offer a few tips on making simple, large cardboard boxes. I like a box about 12 inches high. Twenty-two by thirty inches is a good size. A trip to the rear of your local mattress, furniture, appliance, or motorcycle store should net you at least one large dimension cardboard box. Refrigerator or mattress boxes are the best.

Cut the boxes into large sheets. You will need a long straightedge and a yard stick. An artist's T-square is very useful also. Using the straightedge, cut one side nice and straight. Measure the two big sides with the yard stick. Using the T-



Roger Laudati and son put some winds into their 1911 Cessna scale model. The original was a design by Henry Struck; very stable flier. Photo taken at D.C. Maxecutors.



square on the edge that's already cut, draw a pencil line to mark off the sides of each face of the box. Remember that you need two sides that are 22 in. x 30 in., two at 12 in. x 22 in., and two at 12 in. x 30 in. After all the sides are cut, you will use one-inch wide masking tape to assemble the box. Tape one of the 12x30 sides to the 22 x 30 bottom using the tape only on the outside of the box. Next, tape one of the 12 x 22 ends onto the two pieces already assembled. Tape the remaining side and front onto the rest, and you should have a five-sided box with no top. Do not put the top on yet.

Now, you will need several eight-foot lengths of quarter-round from the hardware store. Choose 1/2 or 3/4-inch wide wood. These are cut and cemented (using white glue) on the inside corners of the box. Make sure the quarter-rounds are held tightly in place while drying. Tape the top piece on the back edge only, inside and out. Cut two

strips of cardboard 3 in. x 22 in. and one strip 3 in. x 30 in. to form an outside flap on the lid of the box. Tape these in place (on the outside) to the top of the box. The side flaps should be cut to a 45 degree angle at the back. See sketch. Do not put any quarter-rounds in the lid of the box.

This kind of box is very lightweight and strong. The flaps on the top are to keep the lid from falling down inside the box, crushing the models inside, and to keep the wind from blowing into the box while it is being carried outside. I have used boxes of this type for 15 years with no damage. Eventually, the tops will begin to sag a little, but you can live with that. Good luck, if you decide to build some of these. You may want to try several sizes to accommodate different sizes of models.

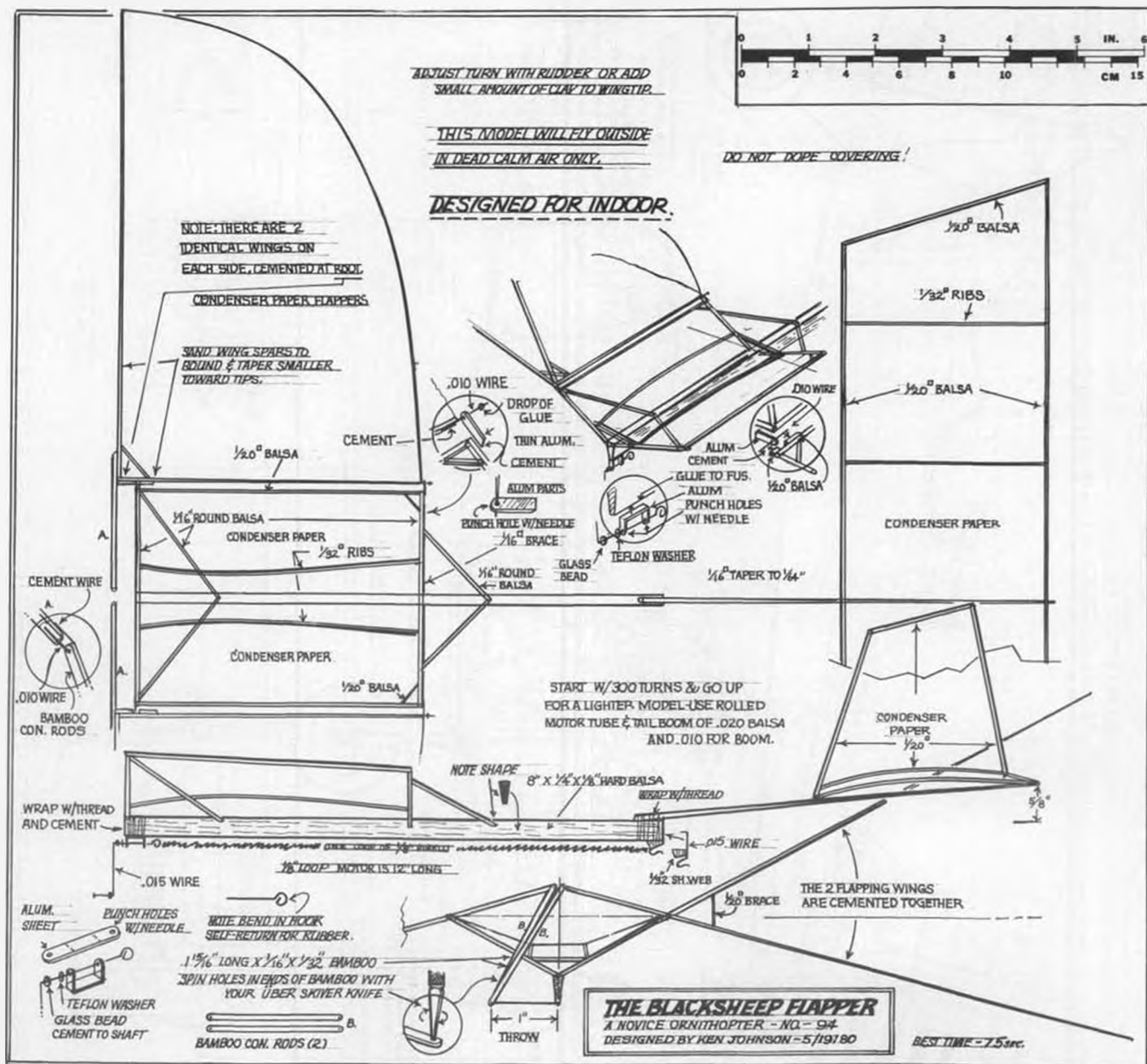
#### COVERING WITH MICROLITE

At our last flying session, Andy Faykin came out with a new pennyplane

covered with Microlite. He described covering with the plastic material as though it were microfilm. He puts the Microlite or Absolite on a frame and attaches the wing or tail with dope or rubber cement. Then, he trims the film away from the frame with a chemical called Methylene Chloride. This liquid is painted on the film with a small artist's brush, which simply dissolves it. A call to your local chemical supply store should locate this chemical.

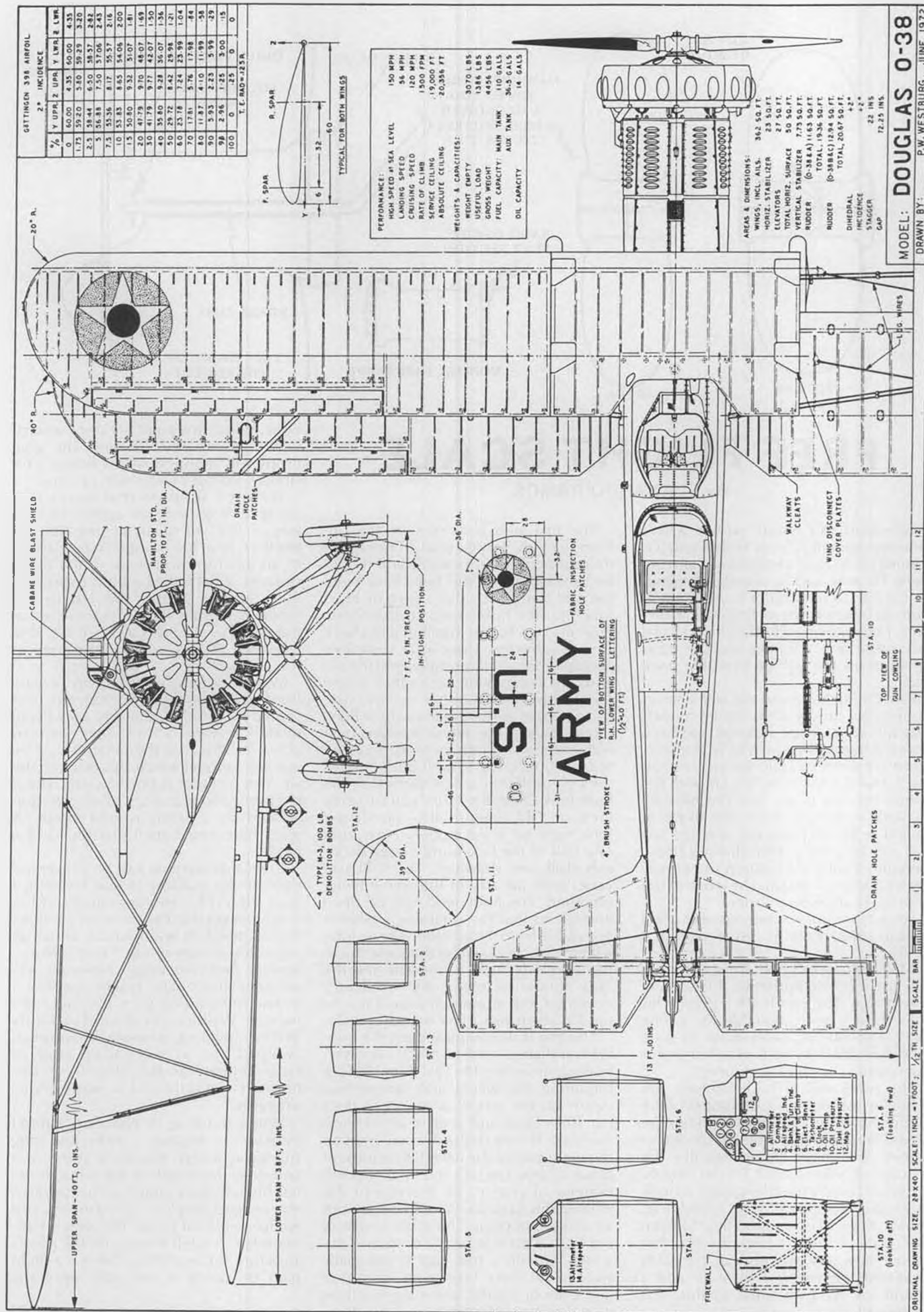
Dihedral breaks are a problem when covering with this film. Some modelers are covering the wing flat, and adding the dihedral breaks after the wing is covered. Another method is to build the wing in sections, and after covering, simply cement the wing sections together.

Write suggestions and questions to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. P.S. Please send photos for the column.

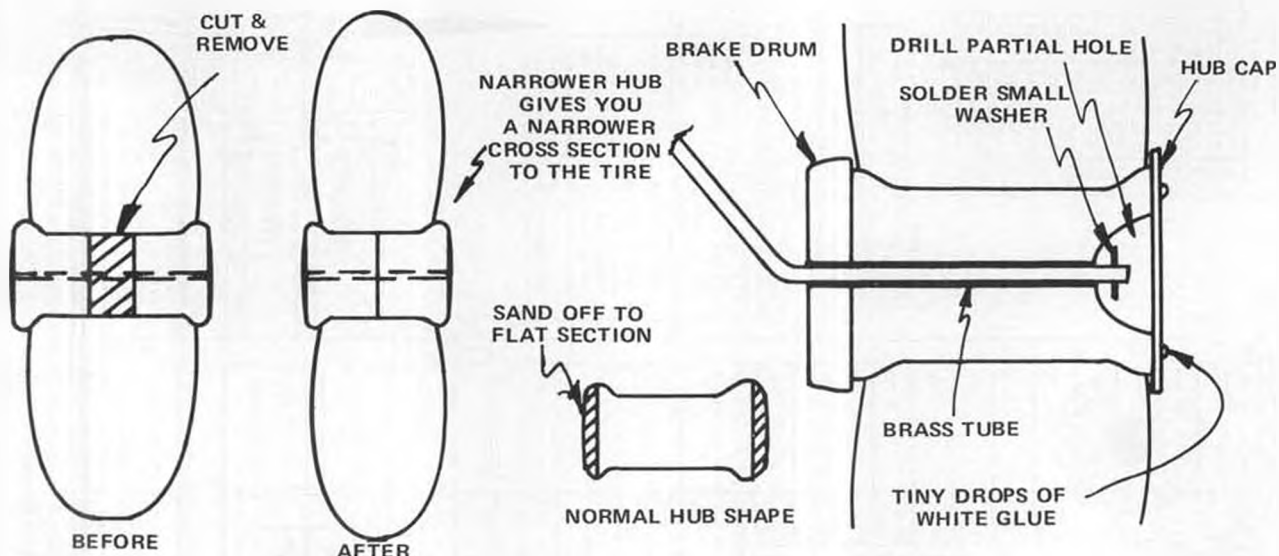


This month's model plan was designed for the Blacksheep Club of Burbank, CA for a session featuring ornithopters and autogiros. It can be built as a bi- or mono-flapper as shown on the plans. This is a simple, solid stick model for beginners to "get their feet wet" in flapper building.









## FREE FLIGHT SCALE

By FERNANDO RAMOS

● Let's start this month with a what's new department. Classic Scale Models is coming back. I had a telephone call from Gene Thomas, and by popular demand, he has had to reconsider his retirement from producing these fine kits. However, I believe he will offer these kits by mail order only. I'll keep you posted as to when his kits will be available once again.

Paul Plecan has come out with a series of plans for mostly scale rubber models that will knock your socks off! He has a series of five packets, of which, I believe, three are finished. The last packet had the Schneider Racer MACCHI, with the contra rotating props, and the ARADO 76. Both beautifully done. The five plan packet is \$17.50 postpaid, and the last two will be sent as Paul finishes them. Certainly Paul's work doesn't need any explanation, as I feel that he is one of the premier draftsmen around.

For further information write to: Paul Plegan, 3723 Polk St., Riverside, CA 92505.

Mike Mulligan's Old Timer Models has just received authentic, black Japanese tissue. The cost is 40¢ a sheet. This color hasn't been available for a long time, and will be good news to scale modelers. Black tissue is usually used for registration numbers and letters.

The other day at Lake Elsinore, Jim Schocley was flying a CO<sub>2</sub> model of the French homebuilt design, the Jodel. The model was sporting a set of Trexler air wheels, but these didn't look like the regular air wheels that Trexler makes. Jim had cleverly modified them to look more like real aircraft wheels and tires. That is, they no longer had the "balloon tire" look to them. Check the sketches to see how the wheels can be easily modified. However, I want to add a couple of my own ideas to this neat modification.

The first step is to remove the tire from the hub, very carefully. Tearing the thin rubber is quite possible and should be avoided. Once the hubs have been cut and narrowed, slip a wire or brass tube into the hub halves to align them. Push the two halves together and check to see whether they butt together evenly. If not, sand carefully until the cut ends are square with each other. These should be glued together using epoxy. *(Don't forget to remove the wire or brass tubing before the epoxy hardens or it will become a permanent part of the hub. wrf)* When dry, sand both ends of the hub until they are perfectly flat. The hubs look OK as they are if you are using them on Old Timer models, but do not look right on scale models. Next, drill one end of the hub using a large diameter drill (see drawing). The drill size varies with the size of the wheel being modified. The hole need only be deep enough so that the retaining washer is not visible from the outside. A brass tube with the inside diameter the same size as the axle wire used is inserted into the hub. Aluminum tubing might be lighter in weight, but aluminum should not be used as a bearing surface because it galls.

The tire is now replaced on the hub. When inflated, it will be much narrower, looking more like the real thing. Before mounting the wheel and tire permanently on the model, a couple of discs cut from balsa and acetate are recommended. The two balsa discs are used on the inner side of the wheels to represent brake drums. The size and thickness will depend of course, on the size of the wheel. This balsa disc should be painted an aluminum color. The other two discs cut from acetate fit on the outside of the wheel, literally a hub cap. If you really want to get fancy, take some white glue and a pin or needle, and make five little glue drops equidistant around the disc's

edge. When dry, paint the discs according to your color scheme. The glue drops will represent screw heads. Obviously, do not make them too big!

Warps! I suppose that warps in a model's wings and tail appear to be a way of life. All of us, at one time or another, have lost a model in a crash due to an inconspicuous twist in the flying surfaces. What is the best way to prevent them and to correct them once the model is finished? I'm sure there are as many ways to do this as there are wise tales, but I'll give you my approach to the problem.

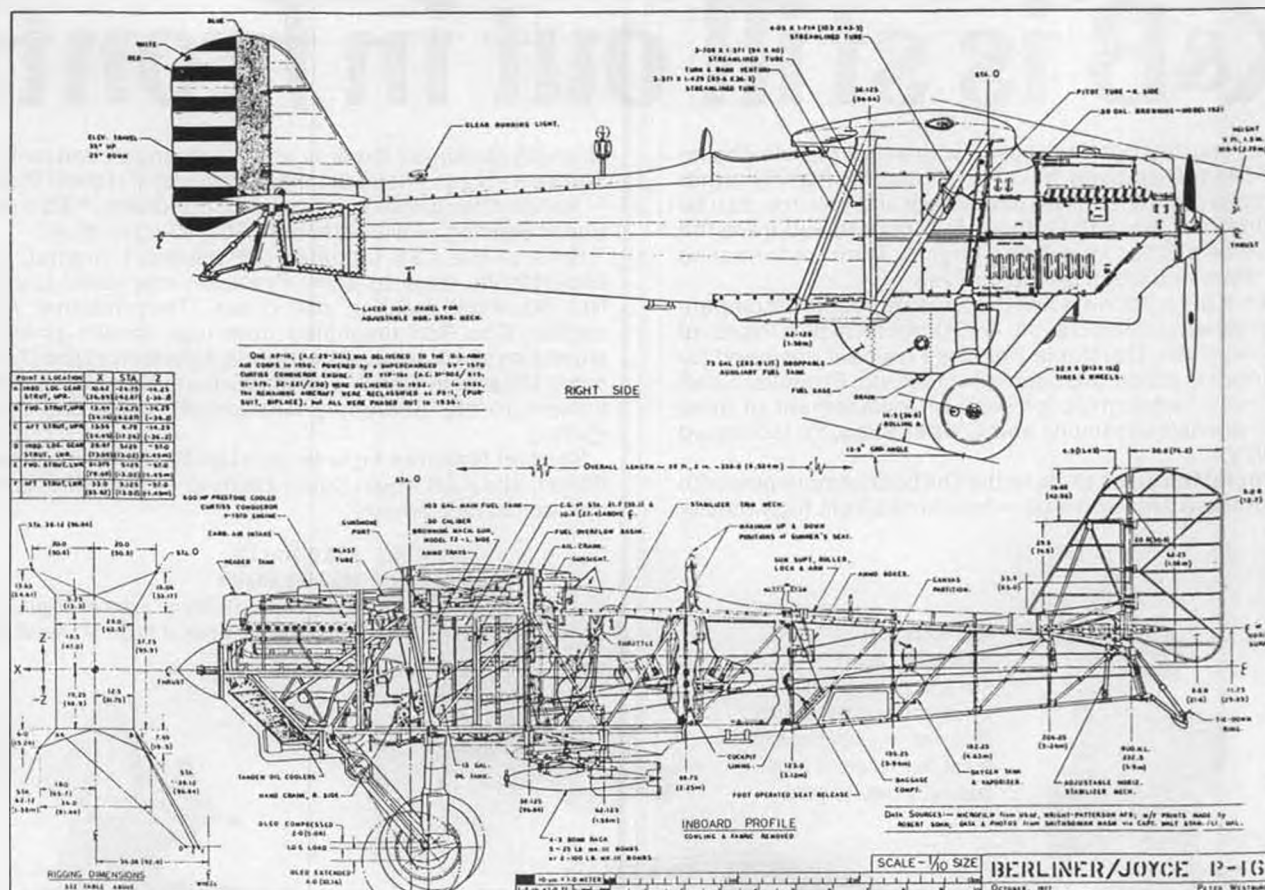
Warped wings, undoubtedly, create the biggest problem for modelers, and should be avoided. On very slow flying models a warp or two does seem to affect stability, but the same cannot be said for a model which zips through the air. This includes rubber models. There is a tremendous amount of acceleration created by a tightly wound motor. A warp here could spell disaster for the model.

I feel that warping can be prevented right at the building board, but first, I must digress for another minute. It has taken me years to convince myself that I should build in washout on all wings regardless if scale or not. I simply like to look at nice, flat wings. However, experience has finally taught me that I should build washout on all wings from here on. Washout, for those of you fairly new to modeling, is having the wing tips "warped" up at the trailing edge as viewed either from the side or front. This helps the stability of a model considerably.

When building in washout, I don't measure in degrees. I make one long triangular wedge that starts at the root and goes the length of the wing to the last rib before the wing tip. The height of the wedge is only 1/8-inch at the tip. This wedge is placed under the wing's trailing edge. It is left there until the wing's structure is completed. There is a slight pain on doing it this way, since the

*Continued on page 69*

# Peter Westburg's SCALE VIEWS



**SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.**

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Douglas XO-36-XB-7

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Boeing P-12E

Curtiss A-8 Shrike

Curtiss Gulfhawk IA

Curtiss N2C-2 Fledgling

Curtiss O-1B/A-3 Falcon

Curtiss P-1B Hawk

Curtiss XP/YP-23

Curtiss SBC-4 Helldiver

Shts \$

1 4

1 4

4 16

3 12

3 12

3 12

2 8

4 16

3 12

3 12

3 12

4 16

Czech Avia B-534

Davis D-1K

Douglas O-25C

Douglas O-31A/O-31B

Douglas O-38/O-38B

Douglas O-43A

Douglas O-31C/Y10-43

Douglas O-46A

Fokker D-17

General Western Meteor

Grumman F2F-1

Grumman F3F-2

Stearman 4E Mailplane

Travel Air 2000

2 8

2 8

3 12

3 12

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1 4

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2 8

2 8

Waco ATO Taperwing

1/10 scale: 1.2" = 1 ft.

Berliner/Joyce P-16

Curtiss BFC-2 Goshawk

Curtiss F9C-2 Sparrowhawk

Curtiss P-6E Hawk

Fiat CR-32

Great Lakes Trainer

Hawker Fury Mk I

Hawker High Speed Fury

Hawker Persian Fury

Monocoupe 90A

Swedish Sparmann P-1

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2 8

Shts \$

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Price includes 3rd or 4th Class mail. For Airmail or First Class in U.S., add 25% of total order. For Overseas Airmail (includes Canada and Mexico), add 50% of total order. Remit by International Money Order

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## FF Scale . . . Continued from page 66

trailing edge is *propped up* off the building board, spaces have to be used under each rib so they are even with the trailing edge. However, I prefer to build the wing first, then place the long triangular wedge under the trailing edge. This is followed by a complete dousing of Windex spray of the entire wing panel. The wing is then left to dry for several days. This is the stage that, I believe, helps to eliminate warping. Stresses are inherently built into a structure, and as they "work", warps can result. There is just enough ammonia in Windex to help eliminate these stresses. I haven't done any scientific research on this, but I do know that it works!

Another aid in preventing wing warping is the use of small multi-spars. This is ideal for rubber models. Two or more 1/16 square balsa spars are used and placed near the leading edge of the wing. This helps to keep the wing flat after covering. So often a light wing structure will form an upward curve from the root to the tip. This really is annoying, but can be eliminated by using the aforementioned spars on the wing.

Another area where warping can become a problem is after covering, water shrinking, and doping. First, I cover all of my structures using thinned-out white glue. When a wing has been

covered, I use alcohol in an airbrush to "water" shrink the tissue. If the wing is a one piece wing, I only spray one-half of it, and immediately pin it down on the workbench. This should be done with spacers so that air can circulate on the underside. Also, the washout wedge is put into place. This is left to dry thoroughly. Then the other half of the wing is done similarly. I do exactly the same thing when doping. Incidentally, I use nontautening nitrate dope, available where finishes for real aircraft are sold. This dope is already plasticized, so the addition of TOP or other plasticizers is not necessary.

Tail surfaces should be covered using the wood frame covered with tissue. I've mentioned this procedure several times already, so I won't elaborate here. Therefore, if you follow some of these procedures, you should have warps under control.

What do you do when a warp does crop up after covering? For years I've read about steaming out warps, and for years those warps have persisted. The best way, I feel, is to use *dry heat*, like an electric heater. This has worked quite satisfactorily for me. Naturally, great care has to be taken anytime you bring anything as flammable as nitrate dope in front of a source of heat! The procedure is the same as for steaming. Hold the surface so that the warp has been removed, and hold it in front of the heat. When you remove it from the heat it should maintain that position. If not,

twist it a bit more in the opposite direction of the warp, but not so much as to warp the surface in the opposite direction. In my opinion, this is the best and easiest way to remove unwanted warps.

I've always said that scale modelers are a clever bunch, and Ron Schneider is no exception. I know that there are many scale modelers who like to build fun-type scale models (not for contests) and power them with .020 engines. The question may arise, how can you consistently shut off the engine after say 10 or 15 seconds? Ron has shown me a simple but effective way of doing this. All of you, I'm sure, know that the intake of the Cox PeeWee is at the back of the engine. Should this be restricted, the engine will not run. So what Ron does, is hook up some fuel line tubing onto the intake, then squeeze it off by using a Tatone flood off timer. This way you can set the timer for any length of motor run.

Ron does this by removing the little screen covering the intake, and soldering onto the intake a piece of brass tubing, which just slips over the flange. For some, this little job may be too much of a hassle. I would simply glue the tubing on using Hot Stuff Super T. If you find that the outside diameter of the tubing is too large to accommodate the fuel tubing, use a series of telescoping tubes until you end up with the correct o.d. tube. The timer can be inconspicuously placed on the belly of the model. Clever eh?

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I've never used this system before, but it looks as though I will have to give it a try. I've always used a syringe and placed a measured amount of fuel in. This works okay, but too often if the engine doesn't start right off, you add a bit more fuel. Next thing you know the model is off for a long, powered flight!

**Big Birds . . . Continued from page 41**

can be used with virtually any size biggie.

Whether flying off of a hard surface, or a grass strip, most everyone will have an area soft enough to sink the six-inch hold-down nails/spikes into. If, however, you've got nothing but a B-I-G expanse of concrete, then pound those spikes into the inevitable cracks . . . or use rocks or weights of some kind . . . but do anchor that stooge so it can't move or slip.

For those who can barely get their BIG Bird into that small car, but desire the safety of a stooge, here's an idea: make both chocks removable/adjustable and cut and hinge the base in the middle . . . keeping it locked open by installing barrel bolts at each end of the hinge line.

As mentioned earlier, this is just a basic idea for a stooge, and most certainly can be improved upon and/or modified to suit individual needs. Please remember that we are involved in an inherently dangerous hobby/sport, and

it makes sense to cut the odds down as much as possible even before you service that BIG Bird. A good preflight and postflight should be a part of your regimen, and a BIG Bird Stooge, complete with fire extinguisher, is the best way I know to help establish a safe, no nonsense engine starting procedure.

#### WHAT'S BEST, DIESEL OR IGNITION?

Danged if I know how to answer that frequent question. There's a lot of interest in converting those big glow engines, but I have no definitive answer for anyone, mainly because I enjoy using both diesel and ignition. As with most everything, it's strictly a personal choice based on your particular "druthers" . . . and needs.

Both types of conversions allow you to swing a much larger than normal prop with efficiency and far less chance of overheating, thanks to their ability to develop good torque at lower revs than a glow engine. So, either of these would be great for that 12 to 14-pound bipe, puddlejumper, or old-timer . . . but not for a sport/pattern type bird that needs more get-up-and-go. When you're underpowered and/or overweight, your only salvation lies in more cubic inches; however, keep a sharp eye on that wing loading, 'cause if your craft is really obese, those extra cubes will turn her into a guided missile that's gonna takeoff, fly and crash all at point nine Mach. There'll be no room for error because of an extremely narrow speed

envelope, so the resulting high stall speed will make sudden snaps and high speed stalls the order of the day.

I like the diesel setup because it's so simple: no battery to charge or to forget; no extra switch to worry about; and no extra components to install. Not only will a well adjusted diesel yield much the same great economy as an ignition unit, but it has the edge on being able to swing an even larger prop . . . which makes it sound great, too. The diesel conversion itself costs less (for most engines) than going the ignition route, and I happen to find the smell of diesel fuel less objectionable than the smell of glow fuel.

I've also got a number of solid reasons for liking the ignition conversion: the C & H Electronics prototype unit I've been flying with for almost a year has given faultless performance; it's simple to install and adjust; it allows a larger than normal prop to be used efficiently; the seven ounces of battery and electronics are no problem in a BIG Bird as far as space goes, and help with balancing since the vast majority of us always seem to need more weight in the nose; although it does cost a bit more than a diesel conversion, the 5:1 gasoline/Klotz Oil mix costs much less than diesel fuel and is easier to come by . . . and this conversion also makes the engine sound very realistic.

I've found out one thing for sure: neither conversion is going to make a sick engine run better. In order to realize optimum performance for both diesel and ignition, your engine must be in good shape . . . or else you're throwing your money away. It's much like buying a proven competition design and expecting that new bird to automatically make you a better flier; in this case, it can't and won't happen unless you are willing to put the time and practice needed into sharpening your skills. . .

In regard to fuel: you can lower your diesel fuel bill by buying the stuff by the case (four gallons) from Bob Davis (Davis Diesel Development, Box 141, Milford, CT 06460) and save 25 percent. I encountered no problems using year-old diesel fuel that was tightly capped. Since I have more control over mixing ignition fuel (Klotz Oil is usually available at cycle shops), I prefer to mix enough for a week's flying; I feel better flying with fresh gasoline-based fuel.

Both conversions start with ease: a few chokes, and without having to adjust or change any settings, first flip starts are almost always the rule. After trying to determine the difference in vibration levels, I've come to the conclusion that my engines run at the same l-o-w vibration level, whether glow, diesel or ignition. And radio interference is not a problem area either . . . being absolutely no sweat with a diesel, and coming nowhere near the horror stories attributed to ignition add-ons. I've found that at least one inch separation between ignition components (especially the battery) and the radio battery are all

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that's needed. In any BIG Bird, space should not be one of your problems.

There's only one complaint that I have about both types of conversions: I'm still stuck with that stupid single nut to hold the prop on with, so there's no way to track prop tips on those 16 and 18-inch diameter props... which is a good way to induce vibration.

Here's the address for C & H Electronics, Inc.: P.O. Box 1732, Riverton, WY 82501. And for you Tartan Twin and Gemini Twin owners, the new systems designed for your engines are available now...

#### WHAT IS A BIG BIRD?

That's one helluva good question, and I get it thrown at me often. To some of us, it can only be 25 pounds of airplane powered by a gas engine with lotsa displacement. To others, it means a 12 to 14-pound puddlejumper type with a diesel or ignition converted 60 or 90 up front.

Now none of this applies to barely-turned-teenager Eric Mulford, of Dunnellon, Florida. Like so many youngsters his age, Eric operates on a very restricted budget and is more than happy to call Craft Air's "Butterfly II" his BIG Bird. He wanted to try something BIG, and since he already had a Max .10, the Butterfly was an obvious choice. And until he's able to afford bigger engines and more expensive kits, Eric will be sticking with this type of BIG Bird. The important thing is that he's enjoying himself...

and getting to be a better and safer pilot.

Quite a bit older, and in much better financial shape is D.L. Grammont of Irving, Texas. He's been flying for a number of years, has quite a few planes and radios, and likes to "roll my own." The "Big Quickie" shown with his wife, Ethel, who is also an active flier, is his first BIG Bird and he's been having a ball with it. To make this original easier and quicker to build, D.L. used the same symmetrical, diamond shaped airfoil he's been flying on a .40-size ship.

"All our local experts told me it wouldn't fly well, if at all, but I've been proving them wrong for years," D.L. pointed out. "That 12-1/2 percent diamond 'foil section worked so well on my smaller bird, I couldn't see why it wouldn't do at least that well on an 84-inch wing."

Can't fault his reasoning, and the proof is in the pudding; the BIGshoulder wing monoplane has proven to be a capable flying machine. The OS .90 and 14 x 6 prop do a nice job of pulling this 12-pound Quickie through maneuvers, and its 23-1/2 oz./sq. ft. wing loading allows for mighty s-l-o-w and easy landings. (D.L. has a thing for EK radios, and can usually be seen flying this, and other assorted airplanes, with a red transmitter in his hand. Being an inveterate horse trader, he can hardly resist any offer to get involved, and keeps adding to his EK collection; for all I know he may already have the best assortment

of EK relics in the country...)

What's my point in all of this? Only that you should enjoy yourself, and not worry about the size of your engine, or even what kind of fuel it burns. In fact I wouldn't sweat the wingspan, either. IMAA's recommended minimum of 80 inches for a monoplane is exactly that... a recommendation. As far as I'm concerned, anything over six feet qualifies as a BIG Bird, no matter what it has or hasn't got for power. Have fun... but FLY SAFELY.

#### BAKING SODA FOR SALE

Anticipating doing a lot of building using a lot of Hot Stuff, I recently stocked up on baking soda (six boxes worth 'cause the price was right... and besides, my wife does bake once in a while)... which I'm now prepared to almost give away at a fantastic price.

No, there's nothing wrong with the baking soda; the problem is I just got through trying out Satellite City's new Hot Shot cyanoacrylate accelerator and found out it's an amazing product. I purposefully tested it on two old and pitchy pieces of pine... pieces so old that even mucho baking soda couldn't effect a truly strong bond. Yet a one second spritz of Hot Shot on the bond area really fused those pieces together... and I do mean fused. For closed bond areas, Bob and Bill Hunter recommend that you lightly spray Hot Shot on one part just before bonding; then apply Super T to the other side... and fit



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together for a guaranteed permanent joint.

This stuff not only eliminates the need for baking soda and micro-balloons, which saves some weight and a lot of sanding, but it doesn't foam the cyano . . . and good, strong fillets can be made in just a couple of seconds. According to Bob Hunter, "Hot Shot makes anything bond to anything," and after testing it on those old pieces of pine, I'm a believer. . .

Although I haven't used any of Pacer's Zip Kicker, I hear that it, also, does a great job of forcing an immediate cure on any of the super glues. Can't see as how anyone will be able to build without having a spray bottle of accelerator on their glue shelf.

#### THE NEW Q50

That's what Quadra calls their new 50cc engine, which according to the press release, is officially on the market. A few guys I know have been flying with some prototypes, and all of them liked the engine. To be sure there were some random unfavorable comments (remember that these were early prototypes), but for the most part the engine was well received. Also, six new distributors, in addition to US Quadra, will be named. "TML feels this new distribution system will improve service to modelers by better geographic representation."

As you can see from the picture, it's a dandy new Quad; but why, as they were going to the trouble of making a hub assembly, didn't they make it the universally accepted six bolt hub, instead of

continuing this stupid love affair with a single bolt hub?

#### CUSTOM MADE BOLTS FOR BIG BIRDS

Because of their size and weight, and because fidelity to scale has become such an obsession with so many, different and special tools and equipment have come to being. Often, what seems to work well for a small, glow powered birdie just doesn't hack it for a BIG Bird, and we find ourselves teetering on the edge of absolute and total destruction.

Sooooo, here are some custom made BIG Bird bolts (see drawings) that are guaranteed to help keep things together longer and to generally take the strain out of having to get down to the nitty-gritty every time a hole is drilled or threads are tapped.

#### IMAA FESTIVAL

This Third Annual Fly-In Festival will be a full four day affair, from Thursday, August 18 to Sunday, August 21 . . . and it's going to be held at Ida Grove, Iowa, thanks once again to Byron Godbersson. I'll have IMAA Festival brochures to send, so write and ask for one. These brochures are real grabbers, and are going to have you hooked before you're even halfway through!

Some of the folks who attended last year's festival came away unhappy because they felt the small amount of flying they did get in, no way justified the trip to Ida Grove . . . and someone even used the word "cheated." Guys, this really isn't a fly-in . . . but in every sense is a FESTIVAL. If all you want to do is fly, you're gonna be much happier staying home and racking up that stick time. If, however, you want to celebrate the great big world of BIG Birds and have on helluva good time doing it (and still manage a few flights or so), then write for the brochure; but don't delay, 'cause with the number of people expected, preregistration is gonna be the only way

to go to get in) . . . and August is not too many months away.

#### SOME NO-NO'S

This is for you guys who are new to BIG Birds, and for others who can't seem to break old habits and want to continue building everything the same way:

1) **DON'T USE THOSE PLASTIC SERVO TRAYS.** Throw them out! They're not safe for use in a BIG airplane. Use 1/8 or 3/16 ply plates anchored to spruce rails.

2) **DON'T FORGET TO BALANCE YOUR PROPS,** because in spite of what you've heard, very few new props will balance perfectly on a High Point Balancer . . . and all it takes is an out of balance prop to really start tearing your bird apart.

3) **DON'T FORGET TO USE AT LEAST A 1000 mah or 1200 mah BATTERY PACK WITH THE AIRBORNE SYSTEM.** A 500 mah (standard) pack will not deliver any more than a third of the airtime that a 1200 mah pack will . . . if that much, and the less perfect your control systems are, the faster that battery is gonna be drained.

4) **DON'T FORGET THAT YOUR STANDARD CHARGER WILL NOT BE ABLE TO CHARGE HEAVY-DUTY BATTERY PACKS PROPERLY.** Most of these chargers are set for a 50 ma charge, so the "normal" 16 hour charge will barely charge a heavy-duty pack halfway. Your gonna need a charger that puts out between 100 to 150 ma; otherwise you'll have to leave that standard charger on for at least 40 hours to top off that 1200 mah pack . . . which isn't practical.

5) **DON'T FORGET TO TRACK THOSE PROP TIPS, USING THE SIX-BOLT HUB.** You can easily nullify all the good things your balanced flywheel and prop are doing. . .

6) **DON'T FORGET TO USE FRESH FUEL.** A stale mix can easily cause rough running, which translates into vibes. Mix only as much as you're probably going to use for the coming week's flying. It's not that much bother, and it'll make for better and safer flying . . . 'cause your engine will put out more power.

7) **DON'T FORGET TO CLEAN THAT SPARK PLUG EVERY FEW HOURS.** Build-up on the electrodes will most probably cause radio "funnies," if not worse . . . and who needs that?

8) **DON'T FORGET TO BALANCE THAT BIG BIRD BEFORE LEAVING YOUR WORKSHOP.** A windy flying field is no place to attempt something as vital as balancing; it just can't be done.

#### TIP OF THE MONTH

Here's one of the commandments of BIG Bird Building: "Beat To Fit . . . Paint To Hide!"

Al Alman, 2713 Alderbrook Court, N., Puyallup, WA 98373. I appreciate the input, guys . . . but please do keep it up. And let's hear about what's going on, and what's about to go on . . . like fly-ins and such. **FLY SAFELY, Al.**



More recently, Ken has been gaining media attention for his Gustave Whitehead pioneer aircraft model activities, and we shall have more to say on this subject in a future *Hangar*.

#### PRESERVE YOUR PIRELLI!

From *Indoor News and Views*, edited by Bud Tenny: "I recently received a letter from Fernando Migani in Italy. His news is that Pirelli rubber strip will no longer (be) produced. So, unless you are a bit sneaky, your present hoard is all you are likely to have!"

#### HOW 3-VIEWS GET THAT WAY

Scale modelers are frequently frustrated by inaccuracies found in most, if not all "scale" drawings. How could so many discrepancies creep in? Well, here's what someone had to say on that subject in the British *Flight* magazine: "For the preparation of *Flight*'s three-view drawings, the aircraft companies concerned would supply original blueprints, which we usually rearranged, inked over, cut up, blanked off, whited out, or otherwise 'processed' to suit our particular purposes." So now you know! Quoted by H.F. King in his book *Sopwith Aircraft 1912-1920*.

#### PROJECT DESTINY

Cliff McBaine reports on a fascinating planned flight intended to complete the mysteriously interrupted 1937 voyage of Amelia Earhart. Miss Grace McGuire expects to fly a 1935 Lockheed 10E Electra, very similar to Amelia's, from New Guinea to Howland Island, Honolulu, Oakland, and finally, Miami, Florida.

On her journey, Miss McGuire intends to carry (as did Amelia) special philatelic covers. Each cover will be cancelled at every stop along the route, and will become valued collector's items. Advance orders are being solicited now at \$25 for regular covers or \$28 for autographed covers. If for any reason the flight does not take place by July of 1983, all money will be refunded. Grace McGuire, Project Destiny, 4518 Raleigh Ave. #202, Alexandria, VA 22304.

#### POLITICS, ANYONE?

"Everything we do is political in some way, I think. Even making a Peanut model rather than an R/C pylon racer has implications on economic, sociological, and ecological levels (probably psychological as well)." Bill Warner.

#### ICARUS

One of our favorite columns appears monthly in the fine British magazine *Scale Models*. Entitled "Icarus," it features musings about the modeling scene, and although oriented primarily toward plastics, often has relevance to all forms of scale model building. Witness this extract: "Reports and photos filtering back from the 1982 SBAC show at Farnborough all confirm the surprising fact that the paintwork on the B1 (bomber) was scruffy. Added to that the noticeable brushmarks on the undersides of the 'Rio Vulcan' and you might be forgiven for thinking that standards

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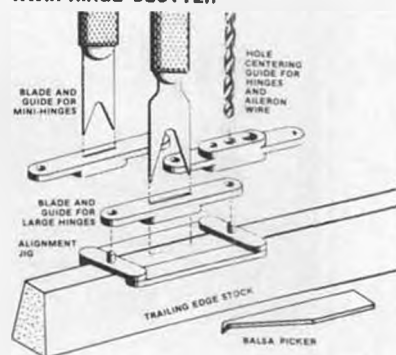
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of painting are declining rapidly. As one friend said to me, 'If I put a B1 into a (model) competition painted that badly it would be laughed out of sight!'

"Now, no doubt, the B1 will turn out to have been painted in temporary distempers, and certainly the Vulcan underside was a rush job, so it might be argued that these aircraft are the exceptions. Is that really so, or is it just that we modellers like to think of the real things as fitting into the various styles of painting that we use on our models?"

## DAVID DIELS DESIGNS

Builders of stick and tissue models should be aware of the comprehensive variety of plans offered by David Diels, P.O. Box 101, Woodville, OH 43469. Peanuts include the FW Stosser, Brewster SBN-1, Northrop Pioneer, Boeing P-26, Lockheed Orion, Vultee Vanguard, Morane-Saulnier A-1, and more. Larger designs, approximately 18 inch span, are intended for rubber power but might also be adaptable to CO2. These include the Vought V-143, Brewster Buccaneer, Lavochkin LA-5FN/LA-7, Macchi Folgore, and Curtiss SBC4, plus the Vultee Vanguard. Prices are reasonable, ranging from \$1.25 to \$3.25, including instruction sheets along with the construction drawings.

David also does custom designs for those who may have a particular aircraft type in mind that is not currently available. A stamped, pre addressed envelope will bring you the complete list, and we'd appreciate you telling 'em Model Builder sent you.

## THOUGHTS FOR THE DAY

Ed Lockhart favored us with these modeling laws which he probably borrowed from unimpeachable sources:

"The more kits you buy the fewer you will manage to complete. Kits are especially difficult to store, because they expand beyond the space available, making you feel guilty about not con-

structing them!"

"Reference material requires more storage space than you have, and it is seldom possible to retrieve what you are searching for regardless of your filing system."

## SMAE JUBILEE

John Blagg sent us a copy of the Society of Model Aeronautical Engineers anniversary program. The SMAE is the outgrowth of an early group originally known as "The Kite Flying Association of the United Kingdom", which in turn became the "Model Aeroplane and Kite Flying Association of Great Britain", circa 1910! We found the anniversary program sprinkled with delightful commentary relating to the entire aeromodeling spectrum, from which we've abstracted these few snippets: "Why on earth do people want to be bothered with free flight rubber powered scale models when with apparently very little extra effort they can equip themselves with a set of radio gear, put an engine in the model, and have full control over the model's flight. It seems to be a contradiction in terms and it has been suggested on more than one occasion that these free flight rubber scale folk are a little potty, to say the least! It is generally recognized that this is the hardest branch of the hobby in which to get your model to fly, so why bother? Surely the prize has got to be the joy experienced when your latest masterpiece is gently circling overhead on a still, warm summer evening.

"... Ah! you might say, this is all very well, but any model without an adequate fuel supply can't stay up for very long. But you would have missed the point; that the model flies at all provides a lot of satisfaction, but if it looks realistic and stays airborne for around 30 seconds, our joy knows no bounds." Barrie Hotham.

And this about Old-Timers: "The

fascination of vintage building and flying stems from a combination of three elements: the sheer variety and beauty of the models themselves; the challenge of their often elaborate construction; and the unique comradeship on the flying field itself." Peter Michel.

From Eric Coates (who has flown all facets of scale): "Notwithstanding all the recent developments in R/C models, F/F and C/L models are still produced, although naturally not in the same profusion as in the years prior to introduction of R/C flying. Rubber F/F scale models have seen a considerable revival in recent years, however, particularly in the smaller sizes suitable for indoor flying. This, no doubt, is natural reaction against the high technology of today's sophisticated R/C model."

We thought this observation from D.S. Goodwin, Chairman of the SMAE especially apt: "Model flying is a world wide occupation... there is probably no country in the world where there is not a group of model flying enthusiasts such as ourselves, and of course, world championship events are held each year. It is at these events where one can meet model flyers from other countries and share techniques and socialize... rarely do the political barriers erected by various governments interfere with the undoubted friendship that is immediately founded when a common interest is shown."

## SMILIN' JACK

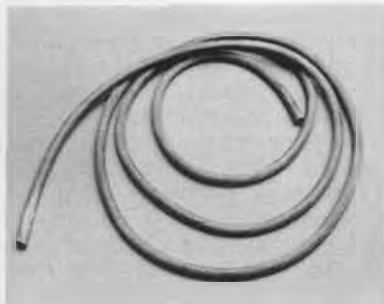
One of the best-known aviation theme comic strips was *Smilin' Jack*. Who could forget the realistically drawn aircraft, "Fat-Stuff" with his button-eating chicken, the faceless "Downwind", and all those gorgeous "lil de-icers" girls? What ever became of that strip? Well, it was retired during 1973, after some 40 years of publication. Artist Zack Mosley is, however, very much in action, marketing a series of retrospectives, including *Hot Rock Glide* (featuring 1938-1939 episodes) priced at \$5.95 plus \$2.20 first class postage; *Brave Coward Zack* (the artist's autobiography, price unknown), and *De-icers Galore*, priced at \$7.95 plus \$2.20 first class postage.

Zack also offers some original Sunday pages in sizes 25 x 17 inches and 19 x 13 inches, and a price list is available for the asking. We ordered the *De-icers Galore*, and were pleased to receive an autographed copy. Reprinted with the permission of Tribune Company Syndicate Inc., *De-icers* features a Grumman Goose looking remarkably like the one in the current TV series "Tales of the Gold Monkey," on the front cover, and dozens of classic aircraft in the comic strips themselves, from 1934 through 1942. A few examples, selected at random: Boeing P-26, Aeronca C-3, Stinson Reliant, SPAD, Lockheed 12, Bleriot, Waco C-6, Campbell Swallow-tail pusher and the Percival Mew Gull. Some of these were intended to be pasted on cardboard "for your Smilin' Jack airport". It is quite interesting to note the gradual changes in art style through the years, which happened so gradually that



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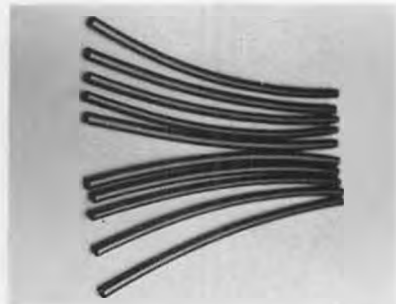


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most readers were probably not aware.

In line with the fictional hero aircraft mentioned in this column some time ago, we understand that John R. Walker is working up a flying Smilin' Jack *Stratoplane* model, which may soon appear in **Model Builder**. Meanwhile, why not invest in a bit of aviation comic art nostalgia from: Zack Mosley, Studio Drawer 375, Stuart, FL 33495.

#### SIGN-OFF

Thanks to John J. Brown for this inspiring passage from the 1910 book *Model Balloons and Flying Machines*: "Should success not be attained at the first attempt, more adjustment will be required; either the propeller blades are not properly set, or the elevator is at a wrong angle . . . in fact, something is wrong somewhere. Do not be discouraged; persevere; make an alteration here and an alteration there, and we have no fear but success will finally reward the experimenter, who will find that patience and perseverance perform wonders . . ."

Choppers . . . Continued from page 43

Schluter Heli-Boy head vs. the Kalt heads. The JR and Heli-Boy heads achieve Bell-Hiller mixing in the heads. By contrast the Kalt heads achieve the additional Bell system by the addition of the mixers on the main shaft as described throughout this article. I was confused for quite a while over this

point because I thought the K-15B and Blackhead II rotor heads were Bell-Hiller to start with (everything done in the head . . .). As it turns out *all* Kalt heads are Hiller to start with, it's just that some kits come with the Bell mixers standard and some don't.

The K-15B is a nicely cast rotor head. In some respects it reminds me of the improved version of the Kavan head, except the mixer arms are reversed. On the Kavan head the mixers pivot near the center of the Hiller seesaw and the mixers stick out. The K-15B head has it's mixers pivoting at the ends of the Hiller seesaw with arms pointing inward. This is nearly identical to the Bill Youmans modification to the Kavan head years ago, when he reversed the Kavan arms to change the Bell-Hiller ratio. (See "Chopper Chatter" in the November '82, December '82, and January '83 issues of *Model Builder* for full Bell-Hiller ratio information.) The K-15B head also uses bushings to support the flybar and mixer arms, and the head rigidity can be adjusted if you wish by adding washers (not included) to the sides of the rubber damper in the center of the seesaw. This compresses the damper, giving a "tighter" head.

The other Baron 50C head is the Blackhead II. This is a completely machined rotor head with ball bearings in the seesaw, mixer arms, and blade holders. It also has variable head rigidity by adjusting a screw on the bottom of the seesaw. In short, it is a very high

quality piece of equipment. The Blackhead II is available separately at \$179.95. Naturally, I would suggest it to only the accomplished helicopter pilot who (1) could appreciate the fine workmanship and (2) not crash it!

As far as the Custom Baron itself goes, it comes with autorotation standard, and a black anodized frame. This is the easiest way to tell the Custom Baron from the Baron 50 and 50A, just look at the frame color. The Custom has a machined white main drive gear instead of a black molded one. The cooling shroud comes in two pieces. Essentially you can remove the top of the cooling shroud to see the carburetor opening as you set up the linkages. The Custom also has metal bellcranks (instead of plastic on the 50 and 50A), and a higher quality "four way" clutch comes standard. The four way clutch is a \$44.00 option for the Baron 50 or 50A. Lighter, white "stunt" paddles are standard for the Hiller flybar system. The pitch control plate for the tail rotor comes with ball bearings for smoothness and added support. The plate is nice because it includes a "quick adjust" feature. Simply loosen one locknut and slide the plate in or out; then snug up the locknut and fly. There are no set screws and wheel collars to fiddle with.

The tail rotor speed is 20 percent faster over the 50 and 50A, and the high speed tail rotor uses wooden blades (The 50 and 50A use plastic tail rotor blades). The increased tail rotor speed is technically

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called "acceleration drive" by Kalt. To finish off the special features and make landings soft, the tubular (not flat aluminum) landing gear is Lord mounted to the fuselage.

Circus offers five scale ships from Kalt. A Huey Cobra, JetRanger, Hughes 500, Bell 222, and the Ecureil, Europe's version of the French A-Star, as it is known in the U.S. All scale ships are .60-powered with collective and autorotation standard. They can be fitted with any Kalt collective pitch rotor head as desired. The fuselages are made of fiberglass, which bolt to a base transmission plate as shown in the photo.

One of the handiest accessories Circus offers is the Kalt pitch gage, which goes for \$11.95. It has adjustable thumb screws which allow you to set or measure pitch from -9 to +18 degrees. This is on a clockwise rotating head. When I used the gage on my Jet Ranger (counter clockwise head) I found that it goes from -18 to +9 degrees. So don't expect it to

go to +18 when used on a different rotor rotation helicopter. Other than that hint, I've found it to be a very useful and accurate aid when I set up my ships.

★ ★ ★

Since last fall when I received the American R/C Super-Mantis with the Circus Apollo radio, I've had the chance to fly the Apollo in other helicopters, too. In particular, I flew the Apollo in the Stunt Homer at the Grand Canyon.

The more I fly it the more I like the gimbals in the transmitter. They are tensioned just right; not too stiff and not too soft. Most important, they center very well. The only problem I've had with the transmitter has been a bad collective trim pot. Circus replaced it free of charge as I brought my transmitter along on the "factory tour".

The servos have given me no problems at all. The gear train is probably the best feature. They are indeed slop-free as advertised. All servos will move on the third "click" of trim. This is not bad considering there are 29 clicks total in a trim lever. I should mention that I am using the "sport" servos, NES-L501. The "competition" servos are series 4.001, 8.001, etc. I have not had a chance to fly with these servos yet, so I can't say how they compare to the 501s that I have been flying. I can say that I have been pleased with the link from the stick, to the servos, to the rotor head, that the 501 servos provide.

Of particular interest is the reliability or solidness of any new radio. The Apollo seems to be about average in this respect, in that it will tolerate some receiver antenna placements and not others. Once the correct antenna location has been found the radio will be quite solid.

For a few examples: I initially installed

the radio in the Stunt Homer with the receiver antenna exiting the bottom of the canopy and then strung out to the tail skid. The antenna touched the landing gear as it went rearward. With this arrangement the radio would glitch in a hover... not enough to really affect control, but enough to make me uncomfortable. Letting the antenna dangle directly down from the bottom of the canopy solved the glitches.

Generally, in helicopters, the best receiver reliability has been had by just letting the antenna dangle, as above. The only problem is that it gets stepped on, and tries to wrap itself around the skids... (Most long-time R/Cers agree that the most glitch-free antenna position is perpendicular to the aircraft... pointing up, or pointing down. wcn)

To try another way, I ran the antenna directly out the side of the canopy and back to the tail skid. This worked fine, and I have used this arrangement since that time.

One quirk that I ran into was a temporary "freeze" for a second or two while I was flying with the antenna dangling. I was about to send the radio in to get it retuned when a good friend of mine suggested that it might be interaction between my quartz watch and the transmitter! It was at that time that I moved back to L.A., so I never had the opportunity to try flying in the same location without the watch.

Since then I have flown without the watch, and the "freeze" has not re-occurred. Now was I flying in a bad spot at the Canyon, or was it the watch? I have to do some more trial and error testing on this one before I draw any conclusions. Radio experts out there (Eloy Marez...), could the watch affect the transmitter? I'd appreciate any feedback one way or the other.

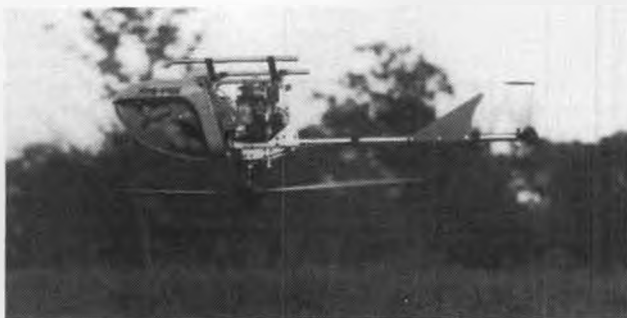
That about does it for this month. I hope I have clarified the line of helicopters that Circus Hobbies offers. And if you're experiencing any glitches with your radio, take off your quartz watch and see if there is any difference in performance! See you next month...

(Omigod! I can see every flier at the field wearing a hand-wound watch or not knowing what time it is! wcn) •

Scale . . . . . Continued from page 32

The entry fee at present is set at \$50 with half of this being used for contest administration and awards (plaques and certificates), and half being placed in the AMA Scale Team Fund for use in 1984. In addition, NASA is soliciting individual and industry help as well as making available a commemorative 1984 team patch. Patch sales in past years have added a healthy sum to team fund coffers.

Hopefully, you will make plans to be at this event in 1983. This is also an excellent opportunity for you to compete rather than merely spectate. If the new rules apply, there is a wealth of models out there in "Scale Land" that



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aren't quite the all precision style, but are really super standoff variety and can easily stand a one-meter scrutiny by the judges. Read the FAI section in your AMA rule book carefully, and watch for the recent changes.

### SOME LITTLE HINTS

Some of these items may have appeared in this column or others over the year, but they probably have become lost in the shuffle.

1) Do you eventually rub through the paint over the rivets on your model, and don't want to? That's no problem on the weathered job, but you may want to keep the paint on the rivets on some models. Try mixing a little powdered tempa paint of the right shade in whatever you are using for rivet material. With the color going all the way through, you've eliminated the problem. Another solution is using RC-56 by Wilhold. This glue dries clear and the painted surface below shows through. It won't necessarily stand up under super close inspection, but *tain't bad* from a meter or so.

2) Got a drag brake or dive brake to duplicate and afraid the air pressure will be too much for the servo to hold in place without straining? Just zip out to your handy dandy hobby shop and latch on to a 1/2A retract gear system. The little, light plastic jobby won't add much weight, but it moves to a locked down position with little servo effort, and will

stay put while the servo rests. You can take it a step beyond and use an air cylinder to do the pushing, then you need only a little, bitsy servo to move the valve.

3) Double strut landing gear can create wheel attachment problems. One reasonably successful method consists of using two commercially available axles that fit the 5/32 wire struts. Cut the axle length of each to 1/2 of the total strut width. Slip a piece of brass tubing over the axle after cutting it to the strut width. Short pieces of larger tubing can be cut to use as spacers to keep the wheel centered. You'll have to drill out the wheel. Severe side loads can spring the assembly apart, but then that's not necessarily all bad since it might save some internal structure.

### OTHER BITS AND PIECES

The Nats at Westover AFB in Massachusetts will feature some new "features" this year! A super effort will be put forth to include noncompetitive events such as seminars and workshops. These will be designed to fit into the weekly program of the Nats. At this time, NASA is committed to providing at least two. We intend to make these real, working events that include as much sharing as possible. Hopefully, we can include a three-view swap shop. Start looking through your stock, and stack them up . . . ready for the last week in July. Here's a chance for all scalers (FF, CL, RC) to get together.

The Underwoods receive a number of

notes and cards from our scale friends around the world. This is one of the many pluses that result from being a part of the international modeling fraternity. I'd like to share a letter with you from Kjell-Ake (Shell-a-ke) Elofsson of Sweden. It gives you an idea of the great times that competitors share when they travel abroad.

Dear Friends!

*I here send some pictures from us as we promised.*

*After the competition in Reno we stayed another five weeks in USA. We did go by car to California, Mexico, back to California again and followed the Colorado River north and "happened" to come to Las Vegas. As I learned how to handle a slot-machine in Reno, I left Las Vegas with a profit of \$40. From there we did go into Utah and then to Grand Canyon, which was a remarkable experience and I have not seen anything like that anywhere. (We were there when it was moon-darkness.) Some days later we came to Phoenix, Arizona, where we left the car and took an airliner to Memphis.*

*In Memphis we picked up another car and followed the Mississippi River south to New Orleans, where we spent some days. Later on we came to Florida, where we did do nothing else but bath, sun and like that. The only exception from that was flying PT-17 in Vero Beach.*

*Unfortunately we had to leave the USA at the end of July after a wonderful trip. We left from Miami the 23/7 and*



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was back in Sweden again the day after. After a week's rest, I had to start working again the first week in August.

The best regards to you from Kjell-Ake

This is one really great gentleman. His quiet exterior belies a super sense of humor which is often impish, but never cutting. The picture in this column shows a staged picture of Kjell-Ake during the Reno competition. One afternoon during the flying, I saw the entire Swedish team and group of supporters way out at the edge of the aircraft apron, quite some distance away from the flying area.

Being a basically curious soul, I mopedaled my way out there to find out what was up. As you can see, it was "what was down." Kjell-Ake pretending to crawl from the desert to find some suitable libation in order to survive! We all laughed at his very realistic acting.

As we parted this soul-rending scene, I paused and suggested, over my shoulder, that someone be posted to watch out for the rattlesnakes often found in

"desert" areas. Strangely, the photo session finished up quickly. In the Swedish team photo, Kjell-Ake is third from the right in the front row.

To conclude this month, I have included a nice letter from Norm Rosenstock concerning the "Impression Scale" concept that I mentioned a few months back. It contains some interesting thoughts that you may want to file away for future reference.

Dear Bob,

I am writing to you in response to your comment in your column of the January 1983 issue of **MB** about the judging of scale models. Your comment struck a familiar cord, as I also have had thoughts along similar lines.

Perhaps you may remember me. At the 1980 Nats I had that 1/4-scale WACO. You were then flying your D.H. 88, which I admired so much. It broke my heart when you lost it.

Since then I have taken a more serious attitude about scale modeling. At the present time I am engaged in the production of Giant Scale plans, you may

have seen my ads in the magazines. Since meeting you at the '80 Nats I have been reading your column regularly, and have enjoyed it very much. However, your comments on scale judging, finally prodded me to write you.

My thoughts on scale judging were: Make the distance that models are judged from proportional to the size of the model. After all, a 1/4-scale Heath Bullet is only 54 inches in wingspan and a 1/20th-scale Hughes Spruce Goose would span 16 feet! On flight scoring, I think that the present system is a hold-over from pattern flying. We have to divest ourselves from the pattern flyer's mentality, think of scale in terms of the "Grand Illusion," and look at the flight portion of the judging from that perspective.

I thought that the flight of a scale model should be viewed as choreography, depicting a flight typical of that particular aircraft. The scoring, I thought, might be arrived at by using a multiplying factor .1 thru .9, 1.0 would be a perfect score. For example: a static score of 94 (out of a possible 100) would get a flight score multiplication factor of .9 and would end up with a score of 84.6. A flight score of 1.0 would give a final score equal to the static score. Therefore, no score would exceed 100.

The present system permits a superb pattern flier to enter scale with a mediocre aircraft and win over a builder who perhaps spent 500 to 1000 hours developing a magnificent scale model. The scale builder has spent his time building, instead of flying at every opportunity and honing his flying skills. The pattern flier has his event, and I feel that the scale builder needs an event that reflects his efforts.

Well, I've run out of nickels, so I'll get off my soap box.

Very truly yours,  
Norm Rosenstock

**Fuel Lines . . . Continued from page 11**

gold anodized case and the natural aluminum cases of the first two photographs is not especially obvious. Guys, you'll just have to take my word for it.

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Sadly, the era of the Cox competition .15s did not last nearly as long as that of the Tee Dee .049s and .051s, which are still the premier engines in their displacement categories. The Cox .15s were overtaken by the Super Tigre .15s, which were later eclipsed by the Rossi .15. Today, there are a lot of great .15s available: the Nelson, Rossi, and OPS, to name a few. Nevertheless, many modelers will always fondly recall the three Cox .15s they remember as Tee Dees.

As an aside, if you'd like more information on any Cox engine, just drop me a post card about your interests. If reader response is quite positive, then very specific details and photographs can be provided in future columns. Sincerely, how about letting me know your interests.

So much for nostalgia. . .

#### THE PRESENT STATE OF THE ART

What follows is certainly not the complete picture about recent engine introductions. It is only one. The fourth photograph shows it . . . the new Rossi .81 that has been specifically designed for the various Byron jet aircraft models. The photograph is a bit impressive. The engine in hand is most impressive. I'm sure you'll hear a lot about this one in the near future. Just remember that you heard about it first in **Model Builder**. Not just this issue, but also the one of November 1982 when the development of the .81 was reported.

Guys, take care. . .

**Electric** ..... *Continued from page 31*

shows how it is done, very simple.

What it all boils down to is following the directions in the Guillows kit for installing a glow motor, just substitute the electric motor. Addie was using a belt drive (3:1) Astro 020 so that she could use a large prop to clear the cowl on the P-26. Most of the models are direct drive, but this one has a huge cowl. As you can see, the kit is built stock, as is. Addie even covers it in tissue. The result is very good looking. A well built Guillows kit is to be taken seriously! I keep thinking that these should fly very well with miniature R/C, such as the Cannon micro digital radio.

Tony and Addie have also started to use larger units in U-control. The photos show their stunts with the Astro 035. These are larger than the Guillows kits, about 30-inch span and 14 ounces. They are very good looking, and I sure wish Addie would make up some plans! They are made of balsa and tissue, fly on 26 to 35 foot .008 steel lines, and will do the full AMA stunt pattern. Addie, the designer and builder, calls them the "Little Star". They look capable of star performance. These were flown at the IMS show, so those who were there had a chance to see electrics doing the stunt pattern. Neat!

The other hobby store I visited was Wilshire Model Center (213-828-9362), run by Hans and Maddy Weiss. This was

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really interesting, as they carry all the German electric products, but I will save that for the next column, and give you more details then.

There are a few back items that I have to cover from previous columns, first, a boo-boo! The circuit that I ran in the January issue for charging a 16-cell pack from a Leisure Electronics digital charger had an error. Murphy strikes again! Bruce Klees, the designer of the circuit, sent me the correction, which appears here. The result of the boo-boo was that half the pack would not be charged, which would show up very fast when you tried to fly! Whoops!

I also said I would run a photo of Charles Hampton and his helicopter, then I forgot to do it! So, here is the photo. I understand that it tipped on takeoff, so the flight was only a few seconds long . . . oh well. I'll probably put mine on floats so that if (or when) it tips over, the damage will be minimal other than a dunking.

Finally, one more item . . . I mentioned that I had heard that you could use color negatives to do black and white prints in a column a couple of months back. Since then, I did a product review on the MRP electric hydro. Gary Kyes at MRP handed me a bunch of color negatives and said, "Try it in black and white." I did, and it works! It turns out that Gary has been doing it that way for years!

All the photos for this column are from color negatives. If you have color photos, send me your color negatives, and I will do the black and white prints and return the negatives. That saves you the expense of doing the prints yourself, and the magazine gets the benefit of your photos.

For the photographers among you, I use grade F (glossy) Kodak Polycontrast RC paper (experiment with the filters for correct contrast), and Dektol (1:3 dilution) for developing. Thanks Gary, for

the help.

As you can also see from the photos of the hydro, it moves! With an 05 motor and seven cells, it is doing close to 20 mph. I found out that balance is critical for proper planing. The boat must be balanced two inches to the rear of the step. If it is nose heavy, it will plow, and you just won't get the performance. Thanks again, Gary, for pointing that out to me too! If you are interested in hydros, contact MRP, 12702-D NE 124th St., Kirkland, WA 98033, (206) 823-8000.

Till next time, enjoy the wonderful variety in electrics! ●

**Plug Sparks** . . . *Continued from page 36*

cylinder was attached to the crankcase with only two screws. Certainly didn't take much work to disassemble this motor!

Like all small motors in 1940 that were made in small lots, it didn't take Ohlsson very long to run all the rest off the market with his new Ohlsson 19. Only the Bantam as produced by Ben Shershaw was competitive (in many cases considered superior).

#### SKY CHARGER REVISITED

Every so often, much to this writer's pleasure, someone takes the time to comment on the series of engines being featured by this column.

Last year, Robert Washburn of 25204 45th Ave. South, Kent, WA 98031, wrote to say that if he had known that a column was going to be done on the Sky Charger, he could have added some color.

Bob recalls that while scratching around for definitive information on the Sky Charger, he received a four-sheet set of engineering drawings on this particular engine. The date on the drawings is August 22, 1936, with the only name on them that of the draftsman J.D. Jones. However, from a machining and engine building standpoint, the drawings are

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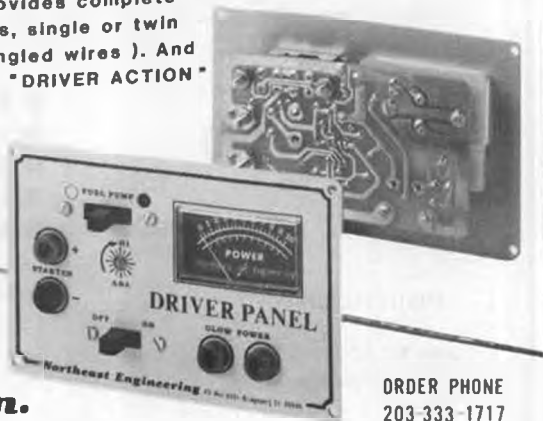
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not complete.

Regardless, Washburn has embarked on the process of manufacturing a limited quantity of Sky Charger reproductions. This is, of course, with the express permission of Bob Veir, successor (along with Frank) to Reginald Denny Industries.

In his search for additional information, Robert contacted Larry Boyer, who had one of the few Sky Chargers in existence. However, very little info was elicited as Larry had sold the motor to someone who in turn traded it to someone else. Bob was unable to get photos taken of this particular engine.

Bob then built a foundry utilizing Ed

Kelly's son, Jim, an apprentice pattern maker, to make up a new crankcase pattern. Then the fun started. Washburn's experience as a foundryman was nil. This turned out to be a more difficult and exasperating project than learning to machine. To date, only five successful castings have been made!

Bob reports the distinct difference between the drawings he has and those produced in **Model Builder** are the nine machined and tapered cooling fins extending out 3/16 in. beyond the cylinder bypass lobe in the cylinder. Fins are 1-1/2 in. diameter. The cylinder heads are different in that his drawing has one tapered cooling fin machined

on the head giving a total as shown in the Pond drawing.

Other minor differences appear in the timer bracket which seems to clamp around the steel extension of the main shaft journal. The drawings do not contain lines that would indicate a clamp arrangement and no clamping screw is detailed. However, Bob says he will make his engine with a clamp.

In conclusion, Bob says he derives great joy from machining model engines. His excitement is magnified by these research efforts on an engine. Furthermore, he enjoys exchanging information with other interested persons. More different ways to have fun! **30 YEARS AGO...**

Seeing that this column is headed up by the Walker Memorial Meet, why not write up Jim Walker? After all, Frank Macy has provided this columnist with some excellent material. Why improvise when you can plagiarize. Haw!

Any old timer worth his salt, regardless of whether he ever flew control line or not, knows of Jim Walker, the foremost promoter of control line flying. What most people don't know is that he was born Nevilles E Walker on April 29, 1905 (incidentally, the E was just an initial), in Tuolumne, California.

When he was five years old, the Walker family moved to Portland, Oregon where Jim made this city his home for the rest of his life.

Aviation always fascinated Jim. Even at an early age he was building and flying model aircraft, often constructing them for his neighborhood buddies. It was only natural for him to gravitate to flying real aircraft. However, a very stern mother put the kibosh on this idea of being a pilot.

Being a free soul, Jim surreptitiously built and flew a few full-size gliders. Came the day he crashed, mother found out, and Jim was permanently grounded.

With his interest in aviation still undeterred, Jim decided to go into model airplanes as a manufacturer. In 1925, he formed a partnership with his brother, Bill, as Junior Models. This was later changed to Junior Aircraft. Jim couldn't have hit the market at a better time as "Lucky Lindy", Charles Lindbergh, successfully flew the Atlantic solo in 1927. This set off a tremendous aviation craze which benefited the tyro company immensely.

A year of many events in Jim's life was 1929. He married his childhood sweetheart, Dora Williams. Then with his wife and brother, Bill, they were able to obtain financial backing leading to the formation of the American Junior Aircraft firm. The final major event was the advent of the Great Depression. What a time to get married and start a business! (Records show that one out of four small businesses failed in that unfortunate era.)

Depression or no depression, the American Junior Aircraft grew, increasing to the point where it was commonly called the "Model Airplane Capitol of the World". With his A-J Interceptors,

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Ceiling Walkers, and folding wing catapult gliders, Jim was easily able to tap the department store trade . . . in short, the toy industry, which could be extremely lucrative as was proven by Joe Ott.

Jim had a lot of ideas that he was constantly marketing. Not all were aviation oriented as he invented a light meter for photography (still in use today), modern potato chip packaging, and some ideas like the "balsa-ply" which failed. The latter idea consisted of a giant peeler type lathe which was to peel logs of balsa into veneer to form balsa-ply. Biggest problem was keeping the knives sharp as balsa is notorious for dulling the sharpest of tools. Another idea that died because of expensive tooling.

In 1940, Jim Walker hit it big with his Fireball, a partial pre-fab of a control line model designed around the popular Ohlsson 23. Again Jim's timing was fantastic, as in two short years or less, America found itself embroiled in WWII. The immediate effect of this was to drastically curtail all free flight flying and reduce altitudes models were permitted to attain.

Control line flying was a natural substitute, as flying sites were available at the nearest park, school yard, or open space. During those war years, control line continued to grow. Nobody in their right mind would have guessed just how great control line flying would become in popularity.

When the war had ended, the dike of reserve cash broke and control line flying became the craze. No longer did a contest sponsor have to try to attract the public to the outlying areas, airports, etc., when he could simply use the dozens of good parks to be found in any municipality.

Prizes like a full-size Piper Cub were given away to the lucky modelers who were prepared for this unexpected deluge of control line flying. Like all fads, control line finally subsided to the point where it has been universally accepted as a form of competition flying.

With his idea of steam forming sheet balsa for fuselages, wings, etc., paying off in the form of A-J Pursuits, A-J Racers, etc., Jim acquired some time to travel around the country attending the Nationals, Plymouth meets, and other large contests where he would demonstrate how to fly Fireballs (three at a time!), gliders, and his popular Ceiling Walkers.

Radio also claimed Walker's interest in the early stages. With his most entertaining radio control lawn mower (which was used to chase spectators much to the amusement of the onlookers) a standard demonstration feature, there was no holding Jim back in R/C competition. A look at the results of the early 1945-50 Nats results show Walker always in the top three. Walker also had some ideas about radio, inventing a sounding system for control of a glider.

Frank Macy, who is writing the book



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*Fireball in the Sky*, a history of Jim Walker, estimates there must have been over 232 million American Junior Models produced! This was over a period of 30 years of experimenting, perfecting, and producing quality products.

Alas, the Head Timer in the Sky turned Jim's card in on March 12, 1958. Walker passed away at the tender age of 53. No question about it, we have missed his tremendous promotional talent!

An interesting sidenote turned up in Frank Macy's letter mentioning some spinoffs occurring at American Junior. A recent interview with a nameless A-J employee reveals that the Pacific Coaster as designed by Joe Weathers was produced in kit form by A-J. Only 74 kits, according to records, were produced.

This Pacific Coaster kit was something this writer has been unable to pin down until this time. With so few kits produced, it was quite difficult to even ascertain if the Weathers Pacific Coaster was ever kitted. Learn something new every day!

#### SAM SALLIES

SAM 35:

With the terrific amount of drive generated by Dave Baker, Alex Imrie, Ray Albans, and a host of other modelers dedicated to old timers, it is small wonder this particular segment of modeling is sweeping England like wildfire.

One of the most enterprising things that SAM 35 is coming out with (besides their great SAM 35 newsletter) is the

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Those fellows visiting England would do well to call Dave at 01-883-9013. He has been of immeasurable help to fellows looking for a little fellowship in this hobby game.

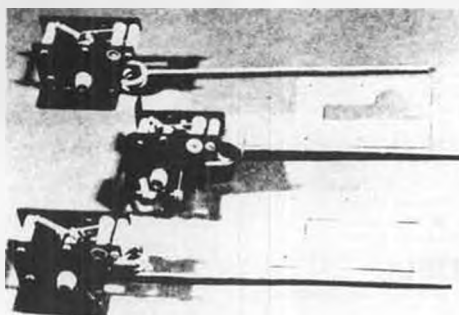
Baker also reports SAM 35 put on a very successful First National O/T Model Exhibition at Shefford. If you don't think there wasn't a real turnout, look at Photo No. 7 showing only a segment of the display. If you look hard enough, you can find just about every popular old timer represented.

In that same time, there were an interesting number of displays. Photo No. 8 is one that shows a compressed air tank out of plastic "Tizem" bottles. Looks like Jack Humphries (builder) has gone Bert Pond one better. Bert had made quite a stir by making compressed air tanks out of aluminum beer cans. The model, incidentally, is a 1930 Joe Ott C.A. design that appeared in the book written by Joe Ott in 1932.

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The Old Warden Bash sponsored by *Aeromodeller* suffered from high winds with a resulting low amount of entrants. However, the following brave souls placed:

- A. Danny Sheelds Twin Pusher Trophy (12 entrants)
  - 1. Bob Walden
  - 2. John Meaney
- B. Rupert Memorial Trophy (Jackdaw)
  - 1. Don Knight
- C. Chobham Trophy (Mass Launch Wakefield)
  - 1. Peter Michel (Isis)
- D. Junior Achilles (K.K.) (Under 16)
  - 1. Dave Hardwick
  - 2. Master Kemp
  - 3. Gavin Welch

Photo No. 9 shows Chairman, SAM 35, Ray Alban's New Yorker as designed by Frank Zaic in full flight. Rubber models are extremely popular in England. SAM 29:

We are indebted to "Bo" Buice for some excellent photos taken at the last Planesmen meet. Picked out as a good example of what SAM 29 is doing is Photo No. 10, depicting Richard Greer of Fort Worth holding a scaled up "Ethy", a design by Richard Schumacher that appeared in the 1938 Zaic Yearbook. Powered by a K&B 35 and covered with orange silk, Dick has got himself a fine flyer for Class C.

#### AFRICA ROARS:

The above title is no joke as Jack Abbot of 223 General Hartzog Rd., Vereeniging, South Africa 1930, reports the club has had to expand the number of annual old timer meets to six!

Probably the best shot to arrive at this columnist's desk is Photo No. 11 showing Len Edelstein displaying (with all due pride) his Valkyrie. Jack thinks this is a first in South Africa. Talk about your California fields, this photo could pass for Taft if it weren't for the high grass.

Another Photo (No. 12) by Jack Abbot is of a fellow club member, Ben Boxall, with a rarely seen "Draftee". This design appeared in late 1941 *Flying Aces* just about the time the U.S. went to war. The long moment arm is an attractive feature of this model for long, smooth glides. Ben powered this model with an English P.A.W. 19 diesel.

#### SAM 46:

This is the latest SAM chapter to be formed in the north Florida area. Bob Nolan is quite enthusiastic about the fun reporting that 20 members were the nucleus. At every contest the members are out to try and get new converts.

Biggest problem sez Bob, is that they are spread so thin over the state. The last two contests were held at Jacksonville and the club's own field at Springhill (about 40 miles from Dunedin). So far the contests draw 10 to 15 entrants.

This is fine for openers, but Nolan feels the Old Timer contest scheduled for Melbourne, Florida in March or April should bring out a goodly amount of contestants.

Photo No. 13, showing Don Brimmer, certainly indicates there is no lack of enthusiasm in this new chapter. Seen in the picture is an Ohlsson powered Buzzard Bombshell, Super Cyclone powered Playboy Sr., an Ohlsson 23 powered So Long, and a Dennyrite powered Coovert Berryloid Finish Winner. This shot was taken at Jacksonville during the May meet.

Of course we couldn't leave out the spark plug, Bob Nolan, as seen in Photo No. 14 with his Harold Coovert Berryloid Finish Winner at Jacksonville. Might also mention we didn't have space for another member, Tony Naples, as Nolan sent a group of photos.

#### SAM 82:

Another fairly new club, SAM Houston Chapter 82 informs this writer they

started with 13 members. In less than six months, they have grown to 21 active fliers.

The October 31 meet in Pasadena, Texas, was a bit low in attendance, reflective of the windy day and season's end. Jim Horner reports, at present, there are more members than models but there will be plenty of time before spring to get new ones built.

Burt Streigler reports the Houston R/C club has already locked up two 1983 dates for Old Timer contests. SAM 82 will assist in the running of these spring and fall meets.

Also, of interest is the news that the San Antonio group is planning more contests. Looks like a banner year for O/T flying in Texas!

#### SAM 39:

We have been remiss in reporting activities of SAM 39 and we have no excuses. We have been receiving their newsletter quite regularly, but unfortunately only a few photos. Note must be made of their successful contest at Plum Brook on November 7. As President Jack Ross says, "The best way to sum up this contest is to say the temperatures were mild (sunny day), wind was marginal (horrendous), and the fliers were brave (crazy). All in all, a good turnout showed, although not everyone flew. Surprisingly, in spite of the wind, there were no major damages to airplanes. The worst hazard was the burrs collecting in our pants as a result of chasing downwind models unable to penetrate to the landing area."

Results show Ralph Turner winning Class A-B, Art White copping Class C Ignition, Jack Ross taking Class C Glow, Antique, and Texaco events. Whew! Also noted were the "chickens" (wise men) whose numbers totaled eight (no-shows). Next year will be better, men!

#### RUBBER DAZE

With such good FAI rubber available, there has been a terrific stampede to the rubber events, both locally and at the Nationals. Bill Baker of Norman, Oklahoma sent a couple of shots taken at the recent AMA Nationals, Lincoln, Nebraska.

Photo No. 15 is a horrible example of what could happen to you if you want to win bad enough. In the shot of Bill Baker (left) and George Perryman (right) the reader will note they used old-timers to compete against the modern boys in the Biplane Rubber Event. Baker reports the old timers fly better than ever with the extra wing. Baker used a standard Korda Wakefield using an 020 Replica Brooklyn Dodger wing (long story, doesn't want to talk about it, haw!), while George Perryman effectively enhanced his California Champ with a wing of his own design. They both flew just super!

Young lady in the middle is "Miss Biplane" alias Melissa Groebe, daughter of Lou Groebe. She is a good modeler, winning two firsts in Pennyplane and P-30! Maybe some of the talent will rub off, fellows!

Baker also sent in Photo No. 16 show-

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ing Pond with his four-year-old twin pusher he has been carting around to the various SAM Champs. Shades of Erle Moorhead! This year, the old man finally flew it, getting third place with an untried model. Gettun next year!

### THE WRAP-UP

Received a most disconcerting letter from Frank Fisher, 14718 "O" Circle, Omaha, NE 68137, wherein the Omahawks R/C club are being sued for a financial settlement resulting from our equipment generating and disseminating a high frequency noise. When you consider the site is over a half-mile from the plaintiff and the club's noise abatement program is much stricter than AMA standards, this is no time to laugh. Some lawyer has possibly found another pot of gold at the expense of someone's hobby.

The Omahawks have spent well over \$3,000 in court costs already. They need help! This could affect you! If you have a couple of dollars to spare, send them to Frank. Every little bit helps! •

R/C Auto . . . . Continued from page 49

Today, most all 1/8 cars can handle good amounts of horsepower. My first experience of racing with a 1/8 car that could take all the power I could feed it was with a Delta Super J. Now, both the Delta Eagle and the Associated RC500 (both suspension cars) can transfer all

the power the strongest 21s can put out straight to the track and be easy to drive to boot. This is the way I see off-road racing having to go: development of chassis that can take wild amounts of power, yet remain light and durable. And don't tell me that the off-road cars have to be heavy to survive the pounding they take. At least don't do so until you see the tremendous punishment both the RC500 and the Eagle can take without shedding parts.

The other concern I have about off-road is that it is changing so quickly. Trick this, trick that, big buck wowies. When I build a race car, I like to think that after a little fine tuning it will be a competitive piece for a season at the least. I have never had a race car that was competitive for less than a full season; in most cases they are competitive for a couple of seasons of racing. With the off-road cars it seems like it takes an awful lot of new stuff to stay current and running strong. When it comes right down to it, I suppose I am a little concerned that off-road is potentially a fad thing that will price itself out of existence. I sure hope not, but I see the potential for a serious problem, and the place to attack this problem is with the off-road rules. At this time the rules are, in my estimation, terrible. Uh, possibly that is worded too strongly as parts of the rules are OK, but there are sections that promote obsolescence and rising racing costs.

As for a bright spot in the off-road scene, I am looking for Associated to introduce some sanity into the proceeding with an off-road car designed from scratch for the sole purpose of covering rough ground in the smoothest, quickest way possible. At this time they have prototypes out and racing; by the time this article hits the stands, many of you will have seen pre-production examples at a trade show.

I have absolutely no idea how well the Associated car works, there is even a remote chance it will be a load, but if they can do in off-road what they did in 1/12 road racing with the RC12E, we can all have access to a competitive car right out of the box, one that has already been developed to a high state of tune, and needs only minor detailing before going racing. And if that happens, look out, I'm going off-road!

### NEXT MONTH

I promise to have an article on the new Delta Super Phaser. I still haven't completed my own (waiting for a Novak road pack to install) but word is out that the car is hot.

### AND AFTER THAT...

I have an interesting (well, I think it will be) couple of articles coming up, all having to do with what I will probably call the Leftover Special. Seems that Associated has quite an assortment of what are leftover spares for their RC100 and RC200 cars. Rather than watch this stuff gather dust on the shelves, they



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**C.J.M. PLANS**

session. The car is now running on a set of Delta shocks, and it works very well. We'll put in a few runs with the car as-is, then switch to the new Associated shocks for a direct comparison. For now, I suspect that if you are using Delta shocks on an RC500 it would be a good idea to let somebody else spring for the \$60.00 asking price for a set of four new shocks before tossing a very good set of used shocks. However, if your RC500 is still running around on stock shocks, rip those camels off the car and install these new numbers . . . You probably won't believe the difference!

**Peanut . . . . . Continued from page 53**

Madison Ave., New York, NY 10022. This is a historical book covering most of the famous planes and pilots, and has nice color sideviews of the airplanes covered plus smaller scale views of the other two aspects of the aircraft.

A great book for color schemes, (accurate and dated) with three-, four-, or five-views of all the important WWII airplanes is *Aircraft of World War Two*, by Bill Gunston, published by Crescent Books, a Division of Crown Publishers, Inc., One Park Avenue, New York, NY 10016. This book will give you all the color and configuration detail you could desire if famous WW-II airplanes are your bag.

A book that has superb three-views of a specialized group of airplanes is *The Aircraft of the Swiss Air Force Since 1914*, by Jakob Urech, drawings by Emil Hunziker, translated by Leo Kaufmann and Roland Hinchliffe, published and printed in 1975 by Verlag Th. Gut and Co., CH-8712 Stafa ZH. Both the Airforce Museum in Dayton, Ohio and the National Aerospace Museum in Washington D.C. handle this book in their sales area.

Another nice source of specialized three-views is *The Speed Seekers*, by Thomas G. Foxworth published by Doubleday & Company, Inc., New York. This book is a good source of three-views and photos of racing and record setting airplanes for the years from 1919 to 1926.

There are a lot of sources for three-views available besides those mentioned

above. *The Observer's Book of Aircraft*, by William Green is a nice source that is published every year by Frederick Warne & Co. Ltd., London, England. It has most of the new, important aircraft. It is a small book and the three-views are also small, but it provides a lot of new subjects for the scale enthusiast at relatively low cost.

Model builders who are dyed-in-the-wool scale fanatics will not be satisfied with a single source, but a single three-view should be enough documentation for all but national or international contests.

This is especially true in view of the fact that airplanes are seldom if ever built exactly like the first three-view drawn, and three-views are seldom if ever brought up to date by aircraft companies or home builders. This was forcefully brought to my attention by a visit with Bill Hannan recently. He had a new design taking shape on his drawing board, a batch of photos of the airplane, and at least five three-views. All of the three-views had errors, and not a single three-view or photo showed the air inlets at the front of the cowl. Well, c'est la guerre and model building is still fun.

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

low transom, water will enter the center radio compartment when the boat is run in reverse.

There is one aspect of scale model electric boats that the Jackson Outboard could certainly provide a new direction. Why not scale outboard cabin cruisers? There are numerous opportunities to model full-size boats in the eighteen to twenty foot range that use outboard motors for power. When a cabin cruiser design, it would be possible to employ a larger battery source like a gel cell battery. This would allow for longer engine runs. The cabin cruiser design would also allow for use of the reverse capability of the motor because the transom would be sufficiently high to allow the boat to be maneuvered in reverse without having water wash over the stern. There certainly are many possibilities for use of the Jackson Outboard in scale model boating activities.

**ANOTHER NEW ITEM FROM OCTURA**

Taking note of the success that some model boaters have experienced using a reworked X-445 propeller on their 3.5 outboard tunnel boats, Octura Models now has available an X-442 that will fit the K&B 3.5 Outboard without any modifications. I have recently tried the X-442 on my 3.5 tunnel and found it to work equally as well as the reworked X-445. This X-442 prop is still quite a large prop for the 3.5 outboard, and to get optimum performance from the prop, it may be necessary to run the engine higher on the transom. I found that by removing about 1/16 inch from the trailing edge of this prop, my engine would keep up its rpm better through

have put together a kit called the RC150, and it is designed as a pure club racer. Nothing fancy or exotic, just a solid car for weekend racing.

The great thing about this kit is the price, only \$75.00 for a basic kit less engine, radio, and body! If you want a motor to go with it, spring for \$100.00, and they will kick in with a Veco 19 that has a heatsink head but no carb. Order yours with the motor . . . don't race with it, instead sell it to an RC guy that flies airplanes, even without a carb it is worth more than \$25.00

Got a little off-track there, but Associated is sending an RC150 to the DRT, and the plan is to build it up with stuff that is leftover from some of our older race cars, the same kind of equipment that you ought to be able to pick up used from racers in your area. I'll show you how to get into 1/8 racing for not much money at all if you can just shop around a little.

#### SHORT SHOT

In the test of the Associated RC500, I really dumped on the stock shocks supplied in the kit, but now the optional shocks are available, and they look very good. Excellent machining is evident on all pieces, they are easy to assemble, and they are properly designed with the shock piston operating in pure oil instead of an air/oil mix as in many others.

I have assembled a set of four of these shocks, and just as soon as possible I plan to take the RC500 out for a practice

the corners. The X-442 should prove to be an excellent propeller for the 3.5 outboard.

#### NOW YOU CAN "UNSTUFF" IT

Golden West Fuels, Inc., P.O. Box 6400, Woodland Hills, CA 91365, provided me with a sample of their Ultra Super Solvent for use in removing unwanted bonds or messes made with any of the cyanoacrylate adhesives. The substance comes in a two fluid ounce plastic bottle and is non-toxic.

I've had an opportunity to try out Ultra Super Solvent and it really works great. While putting together a plastic model car, my son Paul managed to get some Hot Stuff on our kitchen table. As per the directions, USS was applied and allowed to sit for a minute. A cloth was then used to wipe off the Hot Stuff. The wife was happy, even though the Hot Stuff really wasn't noticeable. I also used the material to help in the removal of a sponson strip which I had Hot Stuffed on my 3.5 tunnel. USS was applied to an exposed edge and allowed to soak. After a minute, I slid my knife blade between the two pieces and gently began lifting the strip and applying more USS as the piece came loose. Using this process, the strip was removed from the sponson without any damage to the strip or the sponson bottom. Neat stuff to have around the workshop if you're into instant glues.

#### HIGH PERFORMANCE CARB FOR .65 ENGINES

One of my racing buddies, Gary Jensen, decided there had to be a better carburetor for his OPS 65 . . . so he developed one himself. Although Gary may not be known by many folks outside of the Northwest, he is one of the most respected model boat racers in this region. In fact, we usually give Gary a bad time because his son, David, is often the recipient of more model boating accolades than Gary.

Gary's company, Metal Concepts, Inc., produces a variety of items made from different metals for commercial use in business and industry. With this type of production capability, making a high performance carburetor for model boating application wasn't all that difficult. The carb body is heat treated aircraft alloy aluminum made to fit an OPS 65, and it can be sleeved to other sizes. The barrel is brass with a .390 bore. The carb is designed so that control linkage can be taken off either the left or right side. The fuel intake may also be rotated 360 degrees to fit different requirements.

This carb has been successfully tested under race conditions for the past racing season and Gary believes it is superior to the stock carburetor. Metal Concepts, Inc. has a guarantee you can't argue with. If you're not satisfied you get your money back. Of course, you also have to give back the carb.

To purchase this carb, send \$39.95 plus \$2.50 for mailing and handling to Metal Concepts, Inc., 10635 N.E. 123, Kirkland, WA 98033. Residents in Washington need to add six percent for sales tax.

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#### ANOTHER VIEW ON SKILL LEVEL GROUPING FOR MODEL BOATING

Ed Ryalen of Coral Springs, Florida had some things to say regarding comments made a number of issues back about separation of experts and beginners at national boating events.

"I recently read your article in the October issue of Model Builder. My partner, Louis Pinasco, and myself attended the I.M.P.B.A. Internats in Orlando, Florida this past August. The problem of having novice race drivers (such as myself) competing with experienced competitors was extremely obvious. It made for some very unbalanced and unfair races.

"The experienced drivers were really the ones who were handicapped as many of the accidents were caused by inexperienced boat handlers. I also believe that many of our less experienced boaters refrain from entering both local and national events as they are uncomfortable competing with the superstars.

"I heartily concur with your thinking about the need for an advancement system. Our new I.M.P.B.A. president, Gus Johnson, is a close friend, and I intend to recommend to him club legislation aimed at achieving this goal. I believe this could be one of the strongest single steps towards furthering the development of our hobby/sport."

Thanks Ed for sharing your thoughts on this topic. I've certainly discovered there is interest on both sides of this issue. I wish you success in your efforts with I.M.P.B.A.

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Duplex . . . . . Continued from page 45

way in the direction opposite the locked aileron turn, you are back to being able to turn in both directions, though naturally, more so in one than in the other. If you have a dual rate equipped transmitter, you would want to be in

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"high" at this time.

The same applies for the elevator. A fully deflected and locked half elevator can be overcome with full stick movement in the opposite direction, with similar effects of both the main control stick and the trim as described for the ailerons.

The final proof was to turn off both aileron and elevator at full deflection. Again, the stick was cranked completely over which brought the airplane back to straight and level. Admittedly, this is awkward flying, with a different control technique being required, but a safe landing is not beyond the skill of any reasonably experienced R/C pilot.

The additional cost mentioned consists of the price of another receiver (naturally, it must be tuned to the transmitter with which it is to be used), a battery pack, switch harness, and two or three extra servos. This can add considerably to the total price of any R/C project, but I don't advocate this system for your average Sunday flying airplane, though it should be a consideration for any scale or large airplane in which you've already got a substantial time and money investment. Think of the extra equipment as insurance.

In addition, there is a bonus of sorts . . . which will have a bearing in some applications. That being the fact that you use two servos on the main flight con-

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trols, already common practice in large airplanes anyway, so that the actual additional cost is only that of a receiver and battery.

My latest project to be so equipped is a Great Planes Quarter-Scale "Cosmic Wind", as shown in the photos. This airplane represents a fair amount of bucks, and an unbelievable mount of sanding time alone, not to mention all of the other hours involved in its construction. Someday, it will go, as all airplanes do, but I don't want it to be over something preventable. Before the initial flight, and periodically after, everything is checked, and double checked, and only when everything is A-OK do we take to the air.

Everything in the Cosmic Wind was chosen with an eye to longevity, starting with the transmitter. The Kraft KP-7C used has long ago established itself as a reliable design, the MKIII version used is the latest one, featuring servo reversing, dual rates, a roll button, and a dual battery voltage/RF output meter which I really like. The batteries have been well

tested, and a considerable amount of flying, all trouble free, was done with a test airplane before the Cosmic Wind was put in the air under its control. This transmitter has always worked flawlessly; I have developed a lot of faith in it.

For airborne equipment, I chose Novak Electronics components, with the NES-2, the larger Novak servos. I have done a tremendous amount of flying with Novak equipment since the inception of this company, and have learned to trust and respect its products. But again, nothing was left to chance, all of the components were subject to many air hours, with the companion KP-7C, in other more expendable airplanes prior to their installation in the Cosmic Wind.

I have not tested all existing receivers in this application; there is a possibility of interference from one to the other when they are operated in close physical proximity such as this. This extraneous coupling can easily be detected with a scope, but for the nontechnician without one, a perfectly workable method exists. Set up a test range using one receiver with one servo and establish a maximum antenna-down or antenna-less distance. Then place another receiver/servo in about the same relative position as it will go into the airplane, turn it on, and again check the range. There should be little, if any, reduction in distance.

The position of the receiver antenna will have some effect on this; they should be separated as much as possible. Install the receivers, with as much distance as possible between them, so that the antenna exit the fuselage on opposite sides, if you have a skinny fuselage, then go to opposite tips of the horizontal stabilizer. In fatter fuselages, they can be installed completely internally. In my Cosmic Wind, they run in plastic tubes along opposite sides of the

fuselage. Back in the tail cone, where they would meet if allowed to travel along the sides, one goes to the bottom, the other to the top. As previously mentioned, make a one system range check, then a comparison check with both systems operating after final installation in the aircraft.

Still, with an eye towards maximum possible reliability in everything electronic, I am using SR batteries to power the airborne systems. These are relatively new arrivals in the R/C field. They are advertised as aerospace quality Ni-Cds, and are endowed with a lot of qualities desirable for R/C use. I have flown and tested SRs extensively, and am completely convinced of their high quality. A definite and easily understood plus in their favor is the fact that they are capable of consistently higher output capacity than other cells of the same size and weight. This is a bonus anytime, but certainly an important consideration in all large aircraft with their higher servo current consumption. They have some definite mechanical advantages over standard Ni-Cds as they are claimed not to develop a cell memory, and to hold their charge better in the interim period between charge and use. I have installed two SR-900 flat packs in the Cosmic Wind; they've performed flawlessly, and have become a most important part of the electronic package.

Obviously, it takes two switches. How you mount them will depend on the type furnished with your system, and the accessory hardware available for them. Rather than have two knobs or levers sticking out of the airplane, I mounted the two in tandem, with a connecting wire link between them, and a single push-pull wire coming out of the fuselage side. Neat, and not gaudy... however, the choice is yours.

Here is a hint for the mounting of switches in these larger aircraft. If the switch is mounted internally, with a wire pushrod to actuate it, keep the wire short and mount the switch close to the fuselage side. There have been cases of crashes caused by radios going dead in the air, which were found with turned off switches amongst the rubble. I believe that if the wire is long enough, it can set up enough vibration at certain engine speeds to actuate the switch. This is one theory that I am not going to test; it's best to have an airplane in one piece than to prove I'm correct.

Now, as to tying the flight controls to the servos. Nothing new or exotic here! The throttle and rudder connection in the Cosmic Wind are normal: a flex cable for the former, and pull-pull nylon covered steel cable (Prather Products) for the latter. The difference is in the ailerons and elevators. The ailerons are actually standard torque tube and push-rod arrangements, however, you will need two servos that rotate in the same direction. The elevator gets a slightly different treatment as there are two ways to go. I am using a two piece elevator, two horns, two pushrods, and



of course, two servos. This does require servos whose travel is identical throughout their entire travel range, which has not been a problem with the Novaks I have used. However, a local friend who has also flown this dual system did mention that he had problems matching acceptable servos with his different brand system. There is also another point which has been mentioned to me as undesirable associated with a two piece elevator such as this. And that is the rolling effect that will occur in some cases with only one side of the elevator moving. True, and it is noticeable to a slight degree on the test airplane at high angles of climb with a good head of steam built up, but I don't consider it a problem, as the idea at the time of radio failure is not to fly the new turnaround pattern, but to get back on the ground safely.

Both problems of the two piece elevator and the rolling effect disappear, along with one horn and one pushrod, with the installation of a new device from C.B. Associates. It is called a "Servo Doubler", a small, lightweight unit made especially to couple the output of two servos, with a single pushrod then going to the control surface. The device does not require perfectly matched servos either, and will continue to operate with only one, in the event of the loss of one servo in any position. It can be used with the dual system as described here, or simply to join two servos driven from a single receiver output to obtain more power or added reliability.

My reason for not applying the dual servo idea to the rudder in the Cosmic Wind is that this airplane, as with most low wingers, is more effected by the ailerons than by the rudder. However, with a high winger this is not always true, the rudder will often have more effect than the ailerons, and if the rudder were to lock at full movement, it might render the model uncontrollable. The C.B. Associates Servo Doubler would be a must for a dual servo driven rudder, otherwise you'd have to resort to splitting the rudder either in half by area, or vertically, having each side move outwards only for control. Don't bother; use a Servo Doubler.

Installation of the rest of the radio gear is normal. . . follow the instructions provided by its maker. Charge, check once more to see that left is left, up is up, etc., check the range again, and enjoy . . . secure in the knowledge that the most common R/C equipment fault, an airborne system failure, is not going to cause rekitting of your latest effort. •

Electronics . . . Continued from page 39

pulse control switch for electrics. There were a number of letters in response to the Mueller circuit, so we know there is interest in such items amongst our readers. Yours is a slightly different approach so we are presenting it also

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(see diagram) for those who find it more suitable for their particular needs.

The only thing that I might add, for those who have never done so, is that the electronics parts houses carry complete kits, from material to chemicals, plus instructions, for making printed circuit boards. Of course the circuit can also be wired on a perf board, with slightly larger results. And also, the NE-544 servo IC is available both from Ace R/C and Royal Electronics.

In reading your opening paragraph, Floyd, I had to reflect a moment back to the "Mac 5" days, and trying out the latest circuits and ideas from "Grid Leaks". I also wondered how many of the present generation of solid-state electronics technicians will read it and think, "Hmm, I wonder what's a grid?" And how many will think "What's a WCN?"

## ELECTRONIC SWITCH RELAY

I had a letter from David Shook, Brighton, who is apparently taking advantage of his building season to work on some electronic projects. He inquired about the type of relay to use in Fritz Mueller's Electronic Switch circuit in our January issue.

Well David, I would say that any 5 to 6 volt DC relay with points adequate to handle the switched voltage and current would work. Fritz gives us only one rating, 1 amp at 125 VAC for the contacts, for the Radio Shack relay that he used. In looking over the available relays in the catalog, I would guess that he used a 275-215 relay. However, the 1983 catalog lists a couple of new relays which should work, and which have some features worth considering. The No. 275-240 is the smallest, has a 5 volt coil and the same contact rating that Fritz specified. A slightly larger one, also 5 volts, with a better contact rating, is No. 275-243. The latter is the most attractive, current wise, as it's coil only needs 72 mA, compared with 90 for the -240, and 100 for the -215.

An even more attractive relay, from the standpoint of it's current consumption, is No. 275-004. It is OK on the contact ratings, and is stated to have a typical current drain of only 12 mA, at 6 to 9 volts. Though it'll probably pull a few more mils at 5 volts, and might



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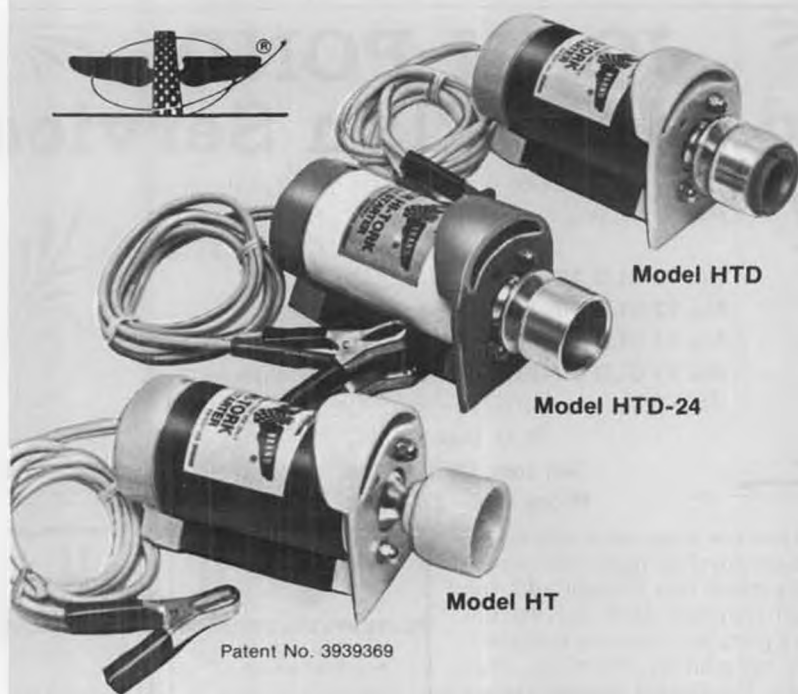
require a slight adjustment of the spring tension (just like in the old days, guys!), but it should operate reliably on 5 volts.

Good luck David, be sure and pass along the results of your experiments with us.

## FUTUBA DUAL RATE & SERVO REVERSE

I want to share with you a very nice letter from Mr. David Burwell, of San Jose, CA:

"The circuit you printed in the January issue of Model Builder looks like it might solve the problem I've had with my helicopter, that of blowing the glow plug out at idle, with this I can turn on an onboard starter and glow plug energizer, really trick.



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"This is something you might have seen before, but I thought I'd send it anyway. Now, not having the money for a 'trick' radio, one with all the bells and whistles, I've tried to add as many of the 'trick' features to my stock Futaba FP-T4L transmitter. The circuit below is perfect for Futaba transmitters, others I don't know.

"To trim the dual rate, throw the on-off switch to on, then turn the 5K rate pot from stop to stop, watching the servo for change in trim. If there is some, turn the 10K trim pot slightly in one direction, turn the rate pot and wait for a change in trim. If it gets worse, turn the trim pot in the opposite direction, until you can turn the rate pot from stop to stop without any change in trim. This dual rate circuit should give about 10 percent of normal to 100 percent normal throw.

"After installation, some adjustment of the control pot may be required to keep the servo from moving when switching the reverse back and forth. This is accomplished by breaking loose the pot from its mounting and rotating it slightly, then throwing the switch, turn the pot, then switch, until there is no change in trim when throwing the switch. Then reattach the control pot using a soldering iron.

"As far as the dual rate goes, this is the best I've found.

"But, being as I'm involved with helicopters, the one add-on I'd really like to find is a mixer circuit or tail rotor comp. This circuit would increase the

pitch on the tail rotor as the throttle is increased, but would not have any effect on the throttle when the tail rotor is changed.

"I hope you can help me, as I'm pretty much as far along as I can get without some sort of tail rotor comp, and without spending the money on a new radio, I'd rather buy a Kraft Gyro."

Well David, as a fellow tinkerer, I can well imagine the grin of satisfaction, well deserved, I might add, when, after that pot tweaking and switch throwing, you get the desired results. And whether something is old or new is relative. I always remind myself that the many things about the hobby that we experienced modelers take for granted are a complete mystery to the guy who just got interested last weekend. Thanks for sharing, I'm sure there will be many FP-T4L owners out there who will also thank you. I'm not familiar with that transmitter's circuitry, and I can't tell either, if your mods will work with other radios or not. If anyone tries, hopefully they will let us know.

About the mixer, I do have a couple of suggestions. Or, more accurately, a couple of leads. One is RCM for April 1976, in which Jim Oddino discusses such things, and includes a not too complicated circuit with which to accomplish them. Then, in the December 1978 issue of the same magazine, a more detailed do-it-yourself article by a gentleman named Kukulich appears, based on the information in the first reference. I have an idea too, David, that

the Ace Silver Seven and the Futaba encoder might have some similarities, in which case the Mixer Option, as furnished for the Ace transmitter, could probably be adapted. It is worth investigating.

If you can stand the weight and room, it might be easier to do the necessary mixing at the receiver. In this case, I can recommend two outboard mixers. One is available from Jomar Products, 2028 Knightsbridge Dr., Cincinnati, Ohio; the other is the "Christy Mixer", from Ace R/C, whose address is found elsewhere in their ad. Both of them have the feature you describe; mixing in one channel, independent or individual control with the other. The Ace unit might be more desirable for your apparent likes, as you can build it up from a kit, and can do so with the type of mixing you desire, and it does have a controllable mix ratio.

Slightly off the subject, I have one more suggestion for you. If you don't already have one, get yourself a Digital Pulse Meter, such as the original one available from Royal Electronics, or Ace's "Datamaster", which also includes a servo drive circuit. This handy-dandy measures and displays pulse length, and this servo center or movement, on a digital display, in milliseconds. It is invaluable for establishing the centers and shifts of which you speak, normal servo travel, and for setting the amount of travel in low rate. Try it. I know you'll like it. ●



# ace high MK II



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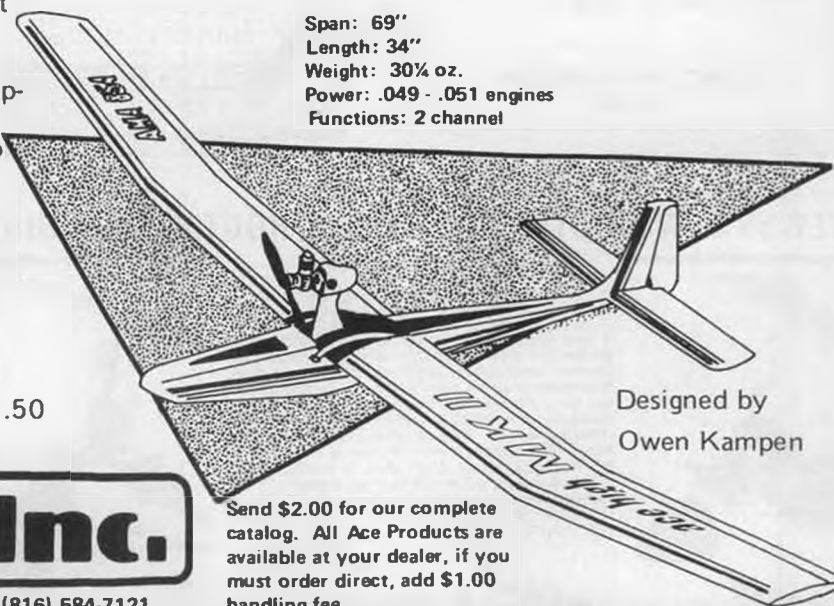
This all time favorite has been updated to a 2 channel, trainer/sport model. The fuselage is die cut pop ply, and goes together in minutes with cyanoacrylate adhesives and Cyano-Set. The polyhedral foam wings are pre-cut and only require gluing on the trailing edge. Lots of room for your favorite radio system.

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Functions: 2 channel



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### Soaring . . . . .Continued from page 27

San Francisco if it was cheaper), and the inevitable "unforeseen expenses" (which will probably be in the hundreds of dollars per individual, my guess) . . . there just ain't no mun, hun! So do what you can (I am) to help out. We have the best team ever this time, and in the past we've taken two of the three individual world championship trophies (Skip Miller in 1979, Dwight Holley in 1981), so let's make it a team championship as well as an individual championship this time!

All of which brings us to . . . Photo No. 8 Two Worlds International has taken over the old (but good) Soarcraft line of products including the Diamant, Centurion II, Magnum 12, Glasflugel 604, Libelle, and the almost brand new Mini-Merlin (pictured). Ken Wardrip holds the sleek Mini-Merlin for you to see its aerodynamically "clean" and very skinny fiberglass fuselage. The M-M has very successfully competed in F3B and multi-task (a la Two Meter World Cup) competitions. It also makes one heck of a good slope ship as its modified Eppler 374 airfoil section allows a fantastic range of speed and efficiency for poor lift conditions or high winds. The M-M features: foam core wings which are predrilled for ballast tubes (included), epoxy-glass fuselage, two-channel hardware (aileron and elevator, but you could modify with CAR or separate

rudder), preshaped balsa and ply parts, and the whole two meter ship weighs only 40 ounces ready-to-fly! Write to Two Worlds International, 20 Galli Dr., Novato, CA 94947, or call (415) 883-1245 for more info.

Photo No. 9 is of last month's cover girl, Char Jolly holding Larry and Jim Jolly's latest sailplane design, the Panthera. The Panthera (one of seven kits available from Larry Jolly Model Products), is a 100-inch, multi-task sailplane designed for AMA thermal duration and club-level F3B contest flying. It is an excellent flying machine (I have flown it many times), and one of my all-time favorites. The kit features: machine cut Eppler 205 ribs (not die cut), full hard-

ware, highest quality balsa and spruce, and a very sleek, molded epoxy-glass fuselage.

Also visible in the background of Photo No. 9 is the Meteor, a 127-inch span, unlimited class sailplane. It features a very sexy-looking fiberglass fuselage as well as the same high quality machine cut ribs (Eppler 205 from root to poly break, then transitions to Eppler 178 at the tip), and everything else you are going to need to put this beauty together except adhesive and covering materials. L/D hasn't been tested yet, but the manufacturer claims far better than 20 to one, which is very credible.

Other products in the LJMP lineup include: last month's feature construc-

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tion article, the Electricus (MB plan No. 3831), the Electralite (93-inch, V-tailed electric sailplane for 05 to 075 motors), the Icarus (AMA two-meter champ), the Whistler (42-inch span 05 electric sport-plane), the Interceptor (Carl Goldberg-Old Timer rendition enlarged to 69-inch span), and the SULA Bird (a 100-inch, rugged sailplane trainer designed for the Soaring Union of Los Angeles as a club fun plane and one-design contest glider). Whew! Anything else you need to know? Contact Larry Jolly, 5501 W. Como, Santa Ana, CA 92703.

Next we have Photo No. 10 and Jack Caldwell holding the Freedom slope glider (RCM, October 1982) which is being manufactured by Craft-Air, 20115 Nordhoff St., Chatsworth, CA 91311. Craft-Air also has the Viking (Mks I and II), Windrifter, SD-100, Golden Eagle, and the Sailaire in its lineup... all sailplanes that are well-known on the contest circuits and in clubs across the country. The Freedom is a highly aerobatic, lightweight, 74-inch slope ship capable of inverted flight, inside and outside loops, snap rolls, vertical figure eights, and more. Unique among kit slope soarers is the dive brake (visible on trailing edge of wing) for glide path control. Check it out at your local hobby shop.

Photo No. 11 features Larry Hargrave of Hargrave Enterprises and his Jaguar 2M slope and thermal ship. The Jaguar is a pseudo-military looking swept wing machine with a V-tail configuration,

Dura-lene fuselage, clear plastic canopy, foam core, balsa sheeted wings, and precision cut balsa tail group. The Jaguar 2M also comes as a 69-inch slope glider (simply called the Jaguar) which has a tail group that is very similar to a Phantom jet fighter in that it has slight *anhedral* in the stabilizer. Both the Jaguar 2M and the Jaguar are being marketed by Bob Martin RC Models.

Photo No. 12 is a graphic top view of Larry Jolly's Meteor which is being held on a wing tip by Larry himself with the "F3B Kid" acting as a supervisor (Alex Bower). Larry was recently elected the FAI/F3B District Ten Representative, and the Meteor is Larry's unlimited class national championship design (how's that for two unrelated facts?). See Photo No. 9 details for a description of the Meteor.

Photo No. 13 is a picture of part of the Hi Johnson Model Products booth highlighting the American Eagle II unlimited class thermal and cross-country ship, and Roger Wildman, Hi Johnson rep. If you are into sailplanes and R/C soaring (and I have to assume that you are), you are eventually going to need something that this company manufactures. What might those products be, you ask? Here's a very partial list: foam wing cores (custom ordered or from stock); ASA plastic fuselages (five varieties); inexpensive wingskin materials; wing rods; bellcranks; supertape (adhesive for foam core wingskins that is instant and weighs next to nothing);

arrowshafts and trimloks; molded canopies; and a catalog that is like an encyclopedia of model construction with Hi Johnson products. Write to Hi Johnson Model Products, 11015 Glenoaks Blvd., Pacoima, CA 91331, (213) 899-4312. Send in \$2 for their 40-page catalog... it's worth is hundredfold your investment.

The last IMS photo we have for you is No. 14. Robert Webb poses with his "Ahiru" (Japanese for duck), the third place R/C Sailplane, Original Design winner. This is not a kit, and Robert is not a manufacturer. In fact, he is a transportation vehicle designer by profession with an impressive portfolio of designs that he has dreamed up... Disney or Lucas should "discover" this guy!

The Ahiru was something he threw together to test some basic canard flying characteristics before moving on to his final design, a 100-inch aileron wing canard sailplane which he hopes to publish in a magazine soon (possibly this magazine, if it is successful). Yes, this Ahiru does fly well, and Bob had photos on display of it zipping around in the mineral-rich air over Pomona, California. If that wing looks familiar to you, it should, it is actually a House of Balsa 2S wing (100-inch version of the 2X2) with flow fences and/or vertical fins added to the polyhedral break, which are hard or impossible to see because one is knife-edge to the camera and one is behind Bob's back. This was the best picture of Robert, so I ran this one instead of another one which was a little better of the airplane. Note the small F/F canard glider on the table next to the Ahiru. Burt Rutan, are you listening?

Now that I have you in the habit of flipping back and forth between the pages of this magazine looking at the photos, I have two more that I would like to call your attention to: Photo No. 15 and No. 16. Mike Reagan is a very good, nay, *excellent* multi-task glider pilot, who, when he is not getting shot down, gives everyone a run for their money in the various contest circuits by virtue of his aforementioned skills. Well sir, he's gonna do it to whoever flies against him this June at the Two Meter World Cup in Modesto, California if they aren't prepared! What you see here is a very strong (read: "Gorilla-proof"), sawed-off F3B ship that now spans two meters. It features the near-famous MB 253515 section (Tai-Tai section), all-moving stab, hatchless Mike Bame Model Products 2-Meter Fuselage molded in epoxy-glass, and dual-rate Futaba Gold Series tranny. Watch out!

Número 16 is a (stop drooling, guys!) very nice 12-volt winch... if you want to fly off this gem, you can! All ya gotta do is enter the Two Meter World Cup this year (details elsewhere in this column), and "you vill lonch off dis winch!" It is the all new, standardized (yippee!), super deluxe, double ball bearing supported, 3-1/2-inch wide takeup drum, six-volt starter motor, 12-volt battery, anti-backlash/anti-kite deviced winch. Don't you wish you had one?

Photo No. 17 ties in with No. 15 in that

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it is also a picture of an F3B/Two Meter World Cup airplane. This one belongs to the guy who designed the MB airfoils . . . you guessed it, Mike Bame. Mike has a small garage type business that he works part-time. That business is manufacturing parts (fuselages, wing cores, stab cores) for people who like to design their own sailplanes, but don't have the tools or materials to cut foam cores or make fuselage molds and lay up parts. It's really a very handy service for the guy who wants to get an original design in the air fast. Write to Mike Bame Model Products, 830 26th St., Santa Monica, CA 90403, or call Mike at (213) 828-1726 for fees and prices.

## U.S. F3B TEAM PRACTICE, AND INVITATIONAL CONTEST

Last December, the U.S. F3B Team held an invitational F3B contest at the Soaring Union of Los Angeles' field. Present were several well-known F3B fliers from the Southern California area: Don Edberg, Alex Bower, Gary Ittner, Mike Reagan, Mike Bame, Angel Sanchez, Larry Jolly (CD), Rick Schrameck, Casey Goeller, and a few others whose names escape me. Conspicuous by his absence was the number one guy from the U.S. Team, Mark Smith. Nobody knew just why he missed practice, but it was a big disappointment to all present.

The weather was heavily overcast . . . as will be England next summer, more than likely, which was an unusual plus for Don and Alex. The practice went off

without a hitch, and everyone had fun. **SAFETY, EXPEDIENCY, INTERPRETATION, CONFUSION, POLITICS**

These are just a few of the words that come to mind when I try to sort out all of the facts, half-truths, innuendoes, and ramifications of all of the recent (early January) happenings in the fast-paced world of FAI/F3B flying. I find myself in a rather delicate position . . . on the one hand, as a reporter, I feel I have the responsibility of airing newsworthy events . . . on the other hand, I am a fallible human being who is trying to piece together a story based almost entirely on the testimony of other fallible human beings who are very much personally and emotionally involved in the issue at hand. The question becomes, how can I put this tactfully, truthfully, and hopefully without libel under these conditions?

You are probably asking yourself, "What is this guy talking about . . . another Washington-style screw-up?" Well, that depends upon your viewpoint (how's that for being evasive?).

Last December at the C.I.A.M. F3B Sub Committee meeting, an emergency "safety" rule was voted on (and passed) limiting the physical size of electric winch motors, batteries, and take-up drums. The origin of this emergency rule proposal was the British representative. The Brits, as you may know, are hosting the 1983 World Soaring Championship

in England (York to be exact). This rule, and all of the ramifications of its implementation, as well as the action (or lack of action) taken by the U.S. representative at that meeting, are the center of the controversy.

What I hope to do here is present four different viewpoints from four different parties either directly affected by the rule changes, or directly involved with the system that passed it. First, from the parties that are directly affected.

Alex Bower qualified for the U.S. Soaring Team last summer in Joliet, Illinois by virtue of his excellent flying skills, and by virtue of a highly refined F3B flying "system" consisting of a launching device and a sailplane almost perfectly matched to that device. As a result of the new rules, half of this system has been outlawed . . . the launching device affectionately called "the Gorilla" which Don Edberg was also planning to use.

This is not where a competitor in a world championship contest wants to be seven months prior to the event. Bower is now faced with a total redesign of his flying equipment from the ground up, literally. This is a serious handicap, as you can obviously see. However, in spite of this, Alex agrees with the ruling in so far as the suspected intent of its proponents was to somehow limit the available power of the winch system for safety's sake. In fact, Alex is very understanding and sympathetic of Dan Pruss' position

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as a major supporter of safety and common sense in the area of launching devices. He realizes that it is not an easy decision to make when voting for the limitations means hurting your country's team, possibly seriously, and voting *against* it means going against your basic beliefs and public declarations.

Alex's biggest complaint against the present rules is the "weak link" rule, which he feels is not a fair, or a safe, means of limiting launch system power. He feels that the weak link limits the size of the *sailplane*, not the size or the power of the *winch*. A small sailplane can accelerate to incredible speeds and attain incredible heights without coming close to breaking the weak link. Not so with the more efficient, larger sailplane. He would have liked to have seen this rule dropped from the books.

Dick Odle is the U.S. Team Manager. His job is to see that his team has all of the advantages (within the rules) and equipment (within the rules) that they need to win in England. He tries to make sure that all of the logistical, monetary, and legal needs of the team are met so that the individual members can concentrate on strategy and flying with, a minimum of worries or distractions. That's one tough job!

When the winch limitation rules were passed, his job became a lot tougher. Now, on top of everything else, he has to help find, develop, and most importantly, finance the additional expense of replacing the team's launching equipment. He feels that the new rules haven't limited the available power of the winch system at all . . . they've simply made that power *more expensive!* And that is something that none of us wants.

He also feels that Dan Pruss, as the U.S. representative, should have been more considerate of the U.S. team when he abstained from voting on the issue (in this case the same as a yes vote) regardless of his personal views or political aspirations.

Looking at it from Dan's point of view, in the final analysis it made no difference at all which way he voted. The British were *adamant* about their position. They indicated that whether or not the rules proposal was passed, they were going to impose the rules anyway. Legally (and this is where it turns into a "what's the intent of the law" question), they have the right to do so. Section 5.3.2.2 of the F3B rulebook states: "LAUNCHING,

GENERAL. . . Unless otherwise specified, all launches will be made by equipment approved by the organizer or contest director. Contest notices shall contain a description of launching equipment to be available and its general capabilities." Dan points to the clause, "approved by the organizer," as the loophole that the British were intending to use (which, by the way, is unprecedented in the history of F3B WCs).

However, as the "Unless otherwise specified" indicates, if this new winch limitation rule had been voted down, Dick Odle feels that any ruling made against the team's "Gorilla" winch could have been protested, and sent to an FAI jury because it does not violate any rules "otherwise specified," namely that a winch power source shall not exceed 12v. It doesn't. So, if frogs had wings (they wouldn't have to kick themselves in the butt to fly), and if Dan had used his influence to sway the voting against the new rules proposal, it *could* have all come down to a "day in court" on a beautiful English field . . . and the team might have had more trouble than they bargained for.

Finally, we come to the British viewpoint. Here I am at a big disadvantage because I have had no personal, direct communication with the people involved. I have had some correspondence with one individual, Sean Walbank, who basically posed the question, "Where will it all end?" (and supplied a rhetorical answer: either total outlawing of winches, some kind of limitations, or an outright, uncontrolled power race), but that's about the extent of it.

Based on reports from Dan Pruss, the British were concerned primarily with spectator and participant safety. If you ask Dick Odle, David Peltz, or Jerry Krainock the question, "Why do you think the British did it?", they might tell you that they suspect that it was because they didn't want anyone with a more powerful winch spoiling their home field advantage. It has been suggested that the rather odd dimensions given as the parameters for the winch motor, battery, and drum were derived by measuring Sean Bannister's equipment . . . I personally doubt that this is the case, but it could be true, I suppose.

Anyhoo . . . it's all a sticky wicket if you ask me. I think that the only answer is a standardized, host country provided winch system as is currently the practice with the Two Meter World Cup. Everyone should be notified of the characteristics and specifications of the winch at least a year in advance of the WCs so that the various teams can duplicate and practice with at least similar if not identical equipment, and that the equipment should be within a certain cost limitation so that it can be afforded by every country entered (\$400 per unit?).

If anybody out there would care to write me concerning the issue of new rules in F3B flying, I'd love to hear from you. If you disagree with me on any of my views on this subject, please let me

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# IMPORTANT NOTICE!

I received a note from Ed Slobod recently regarding the 1983 Two Meter World Cup. It was included with a press release and a photograph (reproduced here) which I wish to share with you at this time. The following is a word-for-word reproduction of that press release:

## TWO METER WORLD CUP

The Modesto Radio Control Club is pleased to announce the Fourth Annual Two Meter World Cup. The event will take place at Beyer High School, June 11 and 12, 1983.

The Two Meter World Cup was started in 1979 by the Antelope Valley Soaring Association and the San Fernando Valley Silent Flyers. The event quickly attracted international interest with contestants from England, Canada, and New Zealand attending as well as sailplane flyers from Alaska, Florida, New Hampshire, and most of the other contiguous states. The two-time defending champion is Don Edberg, who was sixth at the 1981 F3B World Championships.

Contest Director Richard Hansen states that "The community of Modesto is excited by the prospect of hosting the Two Meter World Cup and a June date should bring excellent weather for the competition."

Five identical Two Meter World Cup winches have been designed and built by Buddy Fox of the San Fernando Valley Silent Flyers. These winches utilize a six volt starter motor with a three and one-half inch drum supported between ball bearings (see photo). The World Cup winches are optimized for two meter sailplanes and are approximately ten percent more powerful than the winches we have been using.

The Two Meter World Cup is conducted in a man on man format and for this to work properly, all twenty-three AMA frequencies will need to be utilized. Potential entrants are advised that they will be required to have more than one frequency available to fly on during the contest and therefore they should plan accordingly. As the contest is limited to one hundred entries from the United States, the contest organizers expect the old seven frequencies to fill up quickly. Entry on six meters, or the eleven new frequencies, is encouraged. Foreign competitors are advised that they may use their own radio equipment but the organizers make no guarantees about frequency interference.

Entry forms will be mailed out May 1, 1983 and entry will close May 31, 1983. Entry forms will be mailed to all previous contestants. If you are not on our mailing list and wish to receive an entry, contact:

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(LJMP sailplane) looked like, I'm enclosing all the data you could ask for (almost) regarding this Eppler airfoil. I've never used this airfoil, but I have it on good authority that it is a worthwhile subject for us to study.

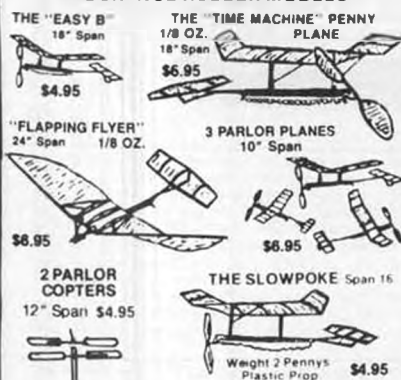
I spoke with Jim Jolly, the co-designer and co-engineer of the Meteor, and asked him why he and Larry chose the Eppler 178 for the wingtip section. His reply was that they were looking for a section that would give them thinner and lighter wing tips which would improve the handling characteristics a great deal on the 127-inch span glider by reducing mass and drag where it is least wanted. He said that they looked at the 174, 176, 178, 180 airfoil family for the

section that most nearly matched the 205's glide polars. They decided on the 178 because it was the closest, and because it was a flat-bottom airfoil that could be easily manufactured and assembled by the model builder. The fact that its L/D curve was a little flatter, and that it seemed to have the same lift coefficient as the 205 at higher speeds was also a consideration... Jim said that this means that in a turn where the outside wingtip is traveling a little faster than the rest of the wing, the lift coefficient remains the same and roll exaggeration is decreased. The inside wingtip will not stall or misbehave, as much as it might if it were an E-205 all the way to the tip, because the stall speed of the 178 is lower than the 205.

Judging by what Larry says about the

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performance of the Meteor, and by the fact that Larry won the Unlimited Class Championship at the Nats flying this design, it must work pretty darned good. Give it a try and let me know how you make out, OK?

### WHERE TO WRITE

If you would like to air your views, share a good idea with other soaring enthusiasts, or communicate with me regarding this column, write to Bill Forrey, P.O. Box 10335, Costa Mesa, CA 92627 ... that's the **Model Builder** mailing address, thank you and good lift!

*Templeton . . . Continued from page 50*

of bellcrank used.

3) Recess and epoxy a 1/2-inch steel flat washer to the underside of the right wing panel 1/2-inch from the leading edge and 1/2-inch from the wing tip.

4) Glue the line guide to the underside of the left wing 1/2-inch in from the wing tip perpendicular to the line of flight as shown on the plan. Use an

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aliphatic resin glue.

### ASSEMBLING THE TEMPLETON

1) Glue the body sides flush with the top of the lower body, and glue the six filler triangles to the lower body. Note that all the long edges of the filler triangles face the same direction, and that all are flush with the motor mount.

2) Glue the wing to the lower body and body side: 3/4-inch back from the motor mount, and be sure the wing is perpendicular to the lower body.

3) Glue the horizontal stabilizer to the rear end of the lower body by notching the body top to fit the trailing edge of the wing and the horizontal stabilizer. Glue in place.

5) Fit and glue the cabin to the lower body. Take care to fit the cabin to the wing; this can be done by superimposing a trace line on the cabin piece. With a felt pen, place a mark on the lower edge of the cabin 3/4 inch from the front. Place the right wing panel on a flat surface, then place the cabin on the flat surface aligning the mark with the right front edge of the wing tip. Now, mark the cabin by tracing the curvature of the airfoil. Cut out the partial airfoil shape, then fit and glue.

6) Glue the remaining four filler triangles to the body top. Note that two triangles are trimmed to fit between the wing and the engine mount.

7) Fit and glue rudder. The 1/8-inch rudder pieces have an extension on their lower rear edge. This extension rests on the top of the horizontal stabil-

izer near its rear edge and its center line, and butts up against the 1/4-inch body top providing a greater gluing area for strength. The difference in widths provides for rudder offset.

### ELEVATOR INSTALLATION

1) Stabilizer hinges are made by gluing four pieces of 3/8 in. x 3/4 in. nylon cloth to the top side of the stabilizer as shown on the plan leaving 3/8 inch hanging over the trailing edge.

2) Elevator hinges are made by gluing four pieces of 3/8 in. x 3/4 in. nylon cloth to the top side of the elevator as shown on the plan leaving 3/8 inch hanging over the leading edge.

3) Turn over the model so that the bottom side of the stabilizer is facing up. Likewise, turn over the elevator, and bring together the edges with the loose ends of hinge material. The hinges are brought up through the gap and glued to their opposite flying surface.

4) Epoxy the elevator horn and its support doubler (made out of 1/8 x 1/8 x 3/4-inch balsa) to the underside of the elevator as shown. A small nylon radio control horn can be substituted.

### ENGINE MOUNT AND LANDING GEAR ASSEMBLY

1) Bend to shape two lengths of 1/16-inch music wire as shown on the plans.

2) Cut out four pieces of 1/8-inch ply 1-1/8 in. x 1-1/2 in.

3) Cut or rout out V-shaped notches on two of the four 1/8 plywood pieces to a depth of a little better than 1/16 inch. (Use a pencil to mark the wire's position on the plywood, then with an Uber Skiver, cut along the outline. Use the end of a piece of 1/16 music wire to rout out the grooves. A little effort makes a firm engine mount and landing gear support.)

4) Epoxy the landing gear in place by sandwiching it between the two 1/8-inch plywood engine mounts.

5) Drill four holes aligned with the engine mounting holes for the 2-56 blind nuts.

6) Sand the front of the fuselage (using a sanding block with medium sandpaper) at a slight angle to provide right thrust.

7) Install the 2-56 blind nuts behind the laminated engine mount. This side is to be epoxied to the fuselage.

8) Epoxy the engine mount and landing gear assembly to the fuselage. Caution: do not put any epoxy on the blind nuts. The fuselage front may be recessed to receive the blind nuts. Use rubber bands to hold the assembly in place while it cures.

### WHEELS

1) Slip the one-inch wheels on the landing gear. Wrap some small, polished bell wire around the axle to hold the wheel in place, yet allow it to spin freely, then solder the wire.

### TAIL SKID

1) Make a deep, rectangular-shaped hole on the rear underside of the lower body to receive the tail skid as shown on the plans.

2) Glue the tail skid in place and tap in lightly.

## CONTROLS

1) Bend the 1/16-inch music wire pushrod as shown. Both ends have an 1/8-inch Z-bend. At the center of the rod make a half-inch V-bend. By opening and closing the vee, the length of the pushrod can be varied to adjust elevator position.

2) Install the pushrod at the elevator horn so that the vee bend faces downward.

3) Leadouts are made from .025 music wire. Leadouts are fastened to the bellcrank with an elongated loop which is then wrapped around itself as shown. The leadouts then pass through the line guide and extend past the left wing tip. The ends are looped and wrapped as shown.

4) With the pushrod attached to the bellcrank, install the assembly to the wing adding flat washers as necessary to insure free operation.

## FINISHING

1) Sand the model lightly with fine sandpaper taking down any high spots.

2) Apply two coats of sanding sealer and sand lightly with a very fine sandpaper.

3) Now paint the model. Paint the cabin area white or silver to simulate cabin glass. Paint the remainder of the model the color of your choice.

Install the engine and run it up to get familiarized with engine operation. Cox .049 engines were used extensively; other makes of .049 engines have been tried. The big advantage of using the Cox engine is the ability to interchange parts from other Cox variants to get improved performance without a major rework. For example, by varying cylinder head gaskets, and installing a low compression head, higher rpm can be obtained because of the hemispherical head effect.

The Templetons are just about ready for flight. Out to the flying field we go with fuel, lines, propellers, and a bit of stroked ego.

Hook up the control lines. But first, let's check a few things out. Is "up" at the handle also "up" on the elevator? Minimum up travel at the elevator is 5/8 of an inch. Is the elevator streamlined with the stabilizer when the handle is in the neutral position? Be sure that the controls operate smoothly. For 1/2A control line models, start with 27 to 30 feet of dacron line. As the model is tested and adjusted, lengthen to 35 to 42 feet using steel lines.

Make sure there are no power lines nearby, and that the spectators are standing well back. Fire up that engine but do not lean it out all the way. Have your helper hold the model down until you give the signal to let the Templeton go.

"Now!" and Templeton is off! With a little practice, Templeton is airborne in a couple feet and speeding away. With good fuel and a stock engine, 50 miles per hour is a close call, but rework that engine by scrambling stock parts, giving it a new reed and a new propeller, and you are into the 50s or 60s and coming!

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## LIST OF MATERIALS FOR TWO TEMPLETONS

Qty	Description
1	1/4 x 4 x 36 in. medium sheet balsa
1	1/8 x 2 x 36 in. medium sheet balsa
1	1/16 music wire, 36 in. length
2	2 in. bellcranks
2	pairs 1 in. wheels
2	popsicle sticks
1	1/8 plywood, 5 x 6 in.
2	1/2 in. steel washers
1	.025 music wire, 36 in. length
8	screws and blind nuts, 2-56 x 1/2 in.
1	18 in. fine bell wire

Franklin . . . Continued from page 23

I have found the following rigging procedure to work very well without the use of extensive templates and jigs. The procedure should be done when the airframe is finished and before it is covered. After covering, the assembly operation should require only slight adjustment to obtain a straight and true structure.

First, install the upper wing center section using a template to position it to proper incidence relative to the cockpit

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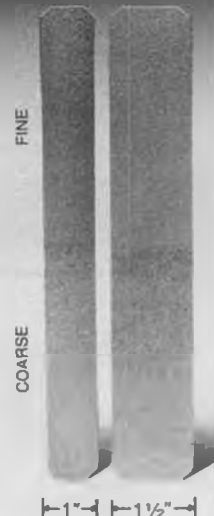
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covering. This is best done before the cockpit holes are cut and windshields installed. Make the necessary adjustments to cabane struts and solder the end brackets.

Second, install the lower wings into the fuselage slots. Use tape to hold in place for the next step. Make up templates to place against the fuselage sides and set the lower wings at the required three degrees dihedral.

Third, install temporary landing wires from the solder lugs "S" at the front of the center section down to the solder lugs on the top of the lower wings. Stretch the landing wires by placing approximately one pound weights on each of the lower wings. Bags of shot



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work very well. Adjust the landing wires to proper length to produce a three degree dihedral angle and constant incidence of the wing from root to tip. The dihedral can be checked with the templates against the fuselage sides and the incidence can be checked from root to tip with two straight edges held to the bottom of the wing section by rubber bands. Sight along the straight edges from beyond the wing tip and make adjustments to the landing wires until the straight edges are parallel.

Fourth, install the upper wings into the upper wing center section.

Fifth, install temporary interplane

struts made from soft wire so that they can be adjusted by bending, etc. Using a piece of scrap balsa as a measuring device, install and adjust the rear interplane struts to produce the same distance between the T.E. of upper and lower wings on both sides.

Sixth, install temporary front interplane struts. Check incidence of upper wings on both sides from root to tip, and make adjustments to front interplane struts as necessary. At this point, just measuring the length needed for the diagonal interplane struts should be sufficient.

Make up interplane assemblies to be installed later. I used .012 diameter braided control line wire for rigging and No. 2 turnbuckles. The turnbuckles are somewhat expensive, but do allow small adjustments after rigging is completed. However, the job can be done without them. I use a piece of 1/16 diameter aluminum tubing 3/8 inch long to secure the ends of the rigging. Install the tubing over the wire and then feed the wire through the hole in the solder lug and back inside the tubing. The rigging wire can be adjusted for tightness by pulling on the free end and sliding the tubing down close to the loop. To secure, permanently crush the tubing with pliers. In my experience, so far, I have not had such a joint come loose from bumps, hard landings, etc. If turnbuckles are used, secure them with soft wire according to the manufacturer's recommendations. They like to unscrew themselves at the least excuse.

#### COVERING

There are several good possibilities. I used Fabrikote Lite because it was new at that time and simulated full-scale fabric. The wings were done in the Fabrikote Lite natural white color. The fuselage and rudder fin were Fabrikote Lite in the yellow color. (White would do as well as color dope was applied.) The fuselage was given one coat of clear dope, one filler coat in the areas that are metal cowlings on the full-scale, followed by one coat of clear and three coats of Sig yellow dope. The last coat was thinned somewhat. One more application of the talcum powder and dope mix used for filler would have been an improvement.

as would one more coat of yellow. My use of regular Monokote as trim is easier than masking and painting. If you are building for scale competition, the painting and masking is a must.

Covering the bottom surface of undercamber wings seems to be a little tricky with any covering material. With Fabrikote it is perhaps a little less so. The secret seems to be in the amount of shrink (heat) applied to the bottom surface. Sealing around the edges of the wing structure as the material is applied to the bottom surface is all the shrink necessary. Now seal the material to the lower surface of each rib using the sealing iron, but be careful to apply pressure and heat only at the rib surface. This method results in a tight covering that conforms to the undercamber surface. Too much heat and you could end up with a flat bottomed airfoil.

#### DUMMY MOTOR AND NOSE COWL

In order to simulate the Velie M-5 engine and the nose cowl, I recommend a structure built up on a round disc of 1/16 ply and a pentagon shape made from rectangles of 1/16 balsa sheet. The pentagon is shown dotted in the front view. The cylinder wells are 3/4 x 1 x 3 balsa blocks glued on the face of the pentagon structure. By using a fair amount of cutting, trimming, and ingenuity the nose assembly can be made to fit the fuselage front and clear the motor and speed reducer. The lower two cylinders were cut in half to clear the motor. When you arrive at this point in the construction, I would suggest you write me at Route 1, Oskaloosa, IA 52577. I will be glad to share the information I have for additional source material and sketches showing how I built up the motor cylinders from balsa sheet and manila folder stock. These details are too lengthy to be included here.

#### LANDING GEAR AND HATCH

The landing gear wire is formed to fit into slots (made from ply boxes) in the fuselage bottom. The front part of the gear (1/8 diameter music wire) can be held in place by screws and metal tabs to prevent the gear from falling out of the slot. The rear part of the gear (3/32 diameter music wire) fits into a slot 1-1/2 inches to the rear of the lower wing L.E. The hatch structure holds this part in place. When the hatch is removed, the L.G. can be removed if desired. This makes access to the wiring, R/C equipment and battery a little easier. On my first scale model I put the flight system fuse in a clip inside the fuselage. If you are flying mostly for fun, the fuse should be on the outside where it is accessible.

#### EQUIPMENT INSTALLATION

In this model the Astro 15 motor and the speed reducer are far enough forward to result in a C.G. close to the desired location. This means the flight battery will ride far enough back in the fuselage to allow the wiring harness to be installed well ahead of the front cockpit. I would suggest that the servos be mounted so that they are accessible for service through the rear cockpit. I

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have had good results with the flight battery mounted between two rails of 1/4 x 1/2 balsa. The battery is secured by rubber bands (No. 64s) looped over the top and held by large screws driven into the rails. This arrangement allows for a little movement when hard knocks occur and saves other structure. Position the flight battery so that the plane balances just slightly nose heavy at the C.G. position shown.

The Sanyo cells used in the 15XL system come in groups of six with their cases glued together in a straight line. I resoldered the 12 cells into a package three cells high and four wide for use inside this fuselage. In all my electric models I have provided large ventilation and weight reducing holes in the front bulkheads. Also, I provide air baffles inside to direct the air flow during flight back past the motor, through the fuselage, and endwise through the battery pack. Some feel this is not all that effective in flight, but I feel it is a must to cool down the flight batteries while charging in hot weather. I use a blower fan placed over the front of the fuselage to blow cooling air past the battery pack as in flight. It may be less expensive and troublesome this way than rotating two sets of batteries. In cold weather (45 degrees Fahrenheit or less) the blower fan is not needed.

#### FLYING

During the test flying of the scale model I experienced radio problems in the form of "glitches" while in flight. If the plane had not had good stability it would not have survived.

Takeoffs are a snap once you get the hang of it. The plane usually wants to go to the left a little at the start, so you might want to anticipate with a little rudder. The wing incidence arrangement allows the plane to hold out well just above the ground on landing. Remember to keep the nose down and approach the landing with good gliding speed. Biplanes seem to want to set themselves up in a nose high glide which results in a hard bump instead of a soft landing if it is not corrected as you enter the lower speed air close to the ground.

Flying the ship is a pleasure. This is the big reason I stayed with it through prototype to scale model. Make the first flights with about 3/4-inch rudder throw on each side and about 1/2-inch elevator throw each way from neutral. The ship should climb out without much help at the controls. Be rather gentle at first till you get used to the ship. Its three channel acrobatics are quick enough to satisfy most fliers and easy to do.

If you are installing the 15XL system in your plane, the upper wing incidence should be set at 2-1/2 degrees instead of the 3 degrees shown, and the lower wing should be set at 1/2 degree instead of the 1 degree shown. This amounts to a 1/16-inch drop at the center section L.E. The dimensions for the cabane struts should be front: 5.521 inches, center: 4.939 inches, and rear: 4.934 inches. A template to determine the upper wing

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incidence should be 4-1/8 inches long, 3-7/32 inches wide at the front, and 3-5/32 inches at the rear. The lower wing slot should be lowered 1/32 at the forward end from the position shown.

I had hoped that my Franklin Sport scale project would have brought forward more facts about the full-scale ship. I would be pleased to hear from anyone who knows about its present status, ownership, or from anyone who has seen it recently. I hope you get as much pleasure from building and flying this model as I have.

#### R/C World . . . Continued from page 17

packages from this man. They may contain a used brick, as ours did!

If you hadn't seen American R/C Helicopters' latest ad, you would have done a classic double-take when you approached the booth . . . a monstrous Atlas Van Lines Unlimited, "Thunderboat", in two versions, both for Quadra power, or equivalent, were the main attractions. Hopefully, IMPBA will soon consider an official class for these . . .

they should be an impressive sight thundering across the local pond!

For the R/C hobbyist who doesn't have the know-how or time to build an R/C model, we've seen nothing better than the ready-built models by Pilot, of Japan, and marketed in the U.S. by Hobby Shack. If you're an experienced builder, and have a somewhat justified negative opinion about the quality of most factory pre-builts, we don't blame you. However, if you take the time to carefully examine one of these Pilot models, you'll discover the exception to the rule.

No gathering of modelers such as this would be complete without exhibits representing some of the many local and national organizations involved in different categories of modeling. The IMS show has always emphasized the fact that although sport R/C dominates the hobby, there's much to be enjoyed from other facets. The San Valeers free flight club had a very impressive display of contemporary competition free flight models, dominated by those huge, awe-inspiring Class D gas monsters. Morrie Levanthal was there with a booth full of

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control line models and representing the So. Cal. Control Line Association. The American Model Yachting Association showed the latest in national class racing yachts. The U.S. FAI Team for Class F3B (R/C sailplane) was there to raise money for its members and to pass on the word about this activity. The Society of Antique Modelers (SAM) is well represented in Southern California by the SCAMPS, SCIFS, and SAM '49ers. And SAM's own "Daddy Warbucks", John Pond, is always on hand with his O.T. Plans Service. Of course, the granddaddy of them all, the Academy of Model Aeronautics, was well represented. On Sunday afternoon, AMA President Walt Grigg presented two awards to Mike Gilbertson for his superior efforts relating to the obtaining of the new R/C frequencies; the Distinguished Service Award for his testing and reviewing of the proposed frequencies in 1980 and 1981, and the Superior Service Award for his counterproposal which helped defeat a proposal by another company which was against the AMA frequency acquisition.

The relatively new electric powered model aircraft hobby was well represented in one continuous row of exhibitors, including Astro Flight, Hobby Horn, S.E.A.M. (Society of Electric Aircraft Modelers), Larry Jolly Model Products, and Leisure Electronics. Of course, electric powered models have domi-

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WORLD WIDE

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nated the indoor live demonstrations over the past years of the IMS show, but this was the first time that industry support was so evident.

In the "infernal combustion" department, probably the most attention was gained by Gary Conley and his fine and quiet running V-4 and V-8 engines. He had installed the V-4 in an MRC/Tamiya pickup truck chassis in order to demonstrate that it was more than just a gimmick to look at and/or run on the bench. Gary ran the car in the demonstration area at various times throughout the show... minus body. We'll be publishing an article about this setup in the near future.

Of course, Wally Warner, of Techno-power, was also running his radials, which are so quiet that he could be telling you about the new nine-cylinder engine, in a normal voice, while standing right next to the running demo model.

There's another radial in town, too. This is the huge, three-inch displacement, five-cylinder job by Elmer Good. Elmer also introduced some beautiful seaplane floats made of the same, bullet-proof, cross-linked polyethylene he developed for the Hobby Hawk nose cone.

The single-cylinder set was also well represented, with exhibits by Bavarian (HB), RJL, C.B. Associates (Kawasaki), Contempo (Magnum), and TEJA Engi-

neering (CMB of Italy).

What do you put on engines? Props and mufflers. Joe Zingali and family had props for any engine available, even for some that haven't been built yet! And between John Tatone and Wally McAlister, you have no excuse for a noisy engine... or a poorly mounted one!

In the airplane kit department, Byron Originals certainly has the largest and most impressive line of 'glass and molded foam model aircraft in the business. No matter what is currently available, there's always something just down the line that keeps you full of anticipation... like right now, that beautiful staggering Beechcraft biplane is ready to hatch very soon. According to Dean Copeland, it's a smooth, easy flier, yet it has amazing aerobatic capabilities... more than the full-scale model, no doubt.

Johnnie Casburn was a welcome newcomer to the show, although he's not new in the kit business. His neat, foam cored wing with balsa sheet and rib caps, is unique in the field, and we'll be testing one soon. Great to see this good ole Texas boy visiting the West Coast!

When it comes to kit models made of traditional materials... such as wood... Top Flite and Sig are the tops. Top Flite's current star is the Hot Canary, a staggerwing sporty forty design that can be raced, razzle-dazzled, or just plain run around the approach pattern, according to your mood and/or capabilities. Sig's biggie at the moment is a biggie... the beautiful J-3 Cub in quarter-scale that pretty much tops off the hundreds of different J-3 Cub kits that have appeared over the years.

The newest kit company to show at Pasadena was Buzz Waltz R/C, and we'll give you one second to figure out the company owner/operator's name. First model is a quickly built, sensible sized, trike-gear trainer, designed around the HB .25.

Consolidated Models, of Buena Park, California, offers a complete line of kits, ranging from high wing trainers, through pattern, slope soarers, and fun scale.

Royal Products' line of scale kits from Japan is never-ending, running the gamut of World War Two fighters and bombers, modern and classic civilian aircraft, and offers hundreds of scale reference publications for documentation.

Two Worlds International is described in our Workbench column this month, but it offers two extremes... a line of Japanese indoor model kits, and R/C sailplanes (the former Soarcraft series).

And Powermax, of England, has landed on U.S. shores. This long established British kit and accessory firm is establishing warehouse and distribution facilities in the San Diego area. Watch for its ads. The U.S. rep, Sidney Cole, is also handling a separate line of operational R/C submarines. A few technical problems prevented live demonstration of the R/C submerging/surfacing system, but the subs are impressive and very much to scale.

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will be covered by Eloy Marez next month. However, some modelers may still not be aware of the continually increasing line of Joe Bridi-designed aircraft kits now being offered. At present, there are four power models, including trainers, sport, and pattern aircraft, a two-meter sailplane, and floats for 40-size models.

We mentioned helicopters earlier, but did not list all of the exhibitors. Gorham Model Products, American R/C Helicopters, and California Model Imports were all repeat exhibitors from past IMS shows. This year, Miniature Aircraft Supply, of Orlando, Florida,

representing Schluter Helicopters, was added to the exhibitor list.

California Model Imports also showed an interesting line of foam constructed sport and scale rubber powered free flight models. These all feature a unique geared motor drive unit, which is now available separately.

In the accessory area, Aircraft Spruce & Specialty Co. has a unique line of tools and materials, based on its many years of supplying full-scale homebuilt enthusiasts with their needs. The overlap of useful items to modeling is rather amazing.

Da Ca Products Inc. was sold by Dave

and Caren Litt, but the model holding packs, snow skis, and field boxes are still in production, with more items coming.

Eldon Lind, maker of the uniform sanding and Extra Hands covering devices, has added a handy little tool for centering and digging out the slots for R/C hinges. It's so simple, it's hard to describe. Just go to the hobby shop, pick one up, and see for yourself.

And speaking of hinges, the combination hinge and control actuator called the Swingee, by Scan Am, has to be the most unique, simple, and fool-proof device to come along since the clevis. We've shown it before. Like they say,

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It was lucky for Carl and Beth Goldberg that we didn't have a three-day show! The monstrosity they built out of scrap balsa and ply, using jet and Super Jet cyanoacrylate glue, was beginning to get out of hand!

Granger and Larry Williams, in addition to offering many fine scale model accessories, also offer a high quality line of plastic scale display models. Many flying model builders, who look with scorn upon plastic shelf models, would have second thoughts if they could get a close look at the finely detailed little beauties that were displayed in the spotless plexiglas showcases.

Also using glass showcases was Peck-Polymers, with its many neat little Peanut Scale models. Peck, the prime purveyor of Peanuts (sorry, couldn't resist it), also goes to the other extreme, with the Pony Blimp, the 12-foot long, Goodyear blimp-like model for electric power. No, it wasn't in a showcase... but it did make numerous circuits of the exhibit hall, showing very precise control of altitude and direction.

Something a little out of the ordinary that was on display this year was slot cars. No... not the tiny little HO size fleas that are so unrealistic and toy-like. These are big, 1/32-scale cars with steerable front ends, very accurate in scale, that can be driven with skill, drifting through turns and pouring it on down the straights. Yes, there's actually an association of 1/32 scale racing enthusiasts,

and many ready-built and kit cars are available, as well as slotted track and various power and track accessories. More info on request.

Delta Mfg. was the only major 1/8 gas and 1/10-1/12 electric R/C car manufacturer present. Delta cars hold many titles in national and world competition.

Well, Delta wasn't truly the only car exhibitor. As MRC, though it did not send its usual huge display, was on hand and showed the latest foam trainer, radio systems, and the Tamiya off-road R/C vehicles.

To finish out the exhibitors, there was RMS Tooling with a very smooth-acting 16 to 1 indoor rubber winder, and Wardlow Mfg., which offered wing covers to prevent hangar and transportation rash from affecting your favorite model.

As we mentioned earlier, both Eloy Marex (electronics and radios) and Bill Forrey (R/C gliders) are writing about other exhibitors not mentioned herein.

Late Sunday afternoon, the IMS Raffle took place. From opening time on Saturday, through about 3:30 Sunday afternoon, raffle tickets were sold for a huge list of hobby items, all provided by exhibitors in attendance. Ticket holders did not have to be present to win, but it was sure a lot more fun to be able to hand a prize to a winner. Just to give you an idea, here are some of the prizes won: Byron CAP 21 quarter-scale kit, Kraft KP5K radio system, Peck-Polymers blimp kit, Top Flite Hot Canary, a completed Gorham Model Products Cricket helicopter (built during the show on Sunday!), Sig J-3 Cub (Quarter-Scale), G-Mark 5-cylinder radial engine from Cannon R/C Systems, Hobby Shack Aero Sport 4 radio, a round trip flight to Hawaii (!), and many others.

Ya better come next year!

We'd like to express very special thanks to several very helpful individuals. Without their always attentive assistance and ability to carry out a job, it would have been just about impossible to get through the weekend. Bill Stroman completely took over the giant task of signing in the static competition models, correctly spotting them on the display platforms, judging and awarding trophies and ribbons to all of the category winners, and supervising their removal from the hall. Only thing is, I didn't win Best Old Timer Rubber Power for my Pacific Ace. Gonna have to do something about that!

Sheree La Porte was the gal who faithfully peddled raffle tickets almost single-handedly all weekend. For some reason, when she's selling tickets, a lot more are sold.

Of course, the Number One Supreme Exalted Go-fer of all is Al Tuttle. Al flew back to the mainland from his home on the island of Maui, Hawaii, just to work at the show, and work he did. "Al Tuttle, we need more tables." "Al Tuttle, open the roll-up door so whatsisname can get his whatchamacallit out." "Al Tuttle, there's a green Ford blocking the exhibitor's entrance." It went on and on, and Al was always there. Funny thing is, he enjoyed every minute of it, and will be back again (this was his second show) next year. "Hey Al, get me a beer, please?"

Speaking of next year, the dates are January 14 and 15, in 1984. Hope we see you there!

Counter . . . . Continued from page 10

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**No. 7812 BIG PROP CHARTS \$1.50**

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task sailplane; yet with all of this increased power, the new Pow'rtow winch motor only draws a maximum of 75 to 80 amps . . . about the same as the smaller Pow'rwinch motor.

Here are some of the very nice features of the new Pow'rtow: welded steel tow line drum with three-inch diameter spool center; F3B-style anti-kite drum brake; ball bearing line swivel to prevent line twist; 1800 feet of 115 lb. test, low-stretch, braided nylon line; parachute; elevated ball bearing hub turn-around; heavy duty battery cables with bolt-on terminals; low profile design for easy storage and transportation; 40 lb. total weight (less battery, foot switch, and turn-around); and low current drain motor (25 to 75 amps peak).

This last feature is a real sleeper that not everyone will appreciate at first. When you compare this with the starter motor type winch, you will find that it has about 1/3 the current drain on the battery. This means that you will get three times the number of launches with the same battery using the Pow'rtow as you would with a common starter motor winch. Why, you could add a Davey Systems Retriever to the Pow'rtow and still have "juice" to spare!

★ ★ ★

From south of the equator (and west of Hawaii) comes news of two fantastic new models manufactured by Southern Sailplanes, 31 Queens Parade, Burwood, Vic., 3125, Melbourne, Australia.

The T-Bird, an 80-inch (2.03 meter) span, two-channel R/C sailplane, is an easy to build foam and fiberglass job with a modified Eppler 193 airfoil and a very strong .375-inch aluminum wing joiner. The T-Bird is a multi-task, high performance two-meter class sailplane that is very popular among Australian R/C enthusiasts. The kit features: beautifully finished, high strength molded fiberglass fuselage; accurately cut and pre-slotted foam core wings; all balsa sheeting necessary as well as strip wood and hardware; a fully illustrated and comprehensive instruction booklet; and an optional ballast facility in the wings which can hold two pounds of lead. Price for the T-Bird Kit is \$97.50, add \$5.00 for the ballast option, and \$7.50 for insured surface postage.

The other sailplane offered by Southern Sailplanes is the SLP Ricochet, a slightly larger airplane of the same basic configuration (except the horizontal stabilizer, which is mid-fin). Write to Southern Sailplanes (Ralph Learmont) for prices and specifications on this one.

Dealer inquiries are invited.

★ ★ ★

Coverite introduces its newest tool: the Professional Spray Can Holder. In five seconds this handy tool can be snapped on to the top of any aerosol can converting it to a nifty spray gun format . . . no more messy, tired fingers! Painting is easier, cleaner, faster.

If this handy tool looks good to you, you can buy one from your local Coverite dealer or order direct from Coverite, 420 Babylon Road, Horsham, PA 19044, (215) 672-6720. The list price for the Professional Spray Can Holder is \$2.95.

★ ★ ★

Bob Violett Models has introduced a series of light weight, super strength construction materials that it calls Magnalite. Magnalite is the product line name for a variety of professionally processed balsa, graphite, glass, and epoxy laminates and rod stock. The strength-to-weight ratio of these composite materials allows the removal of 20 percent of the normal airframe weight with proper application. Magnalite materials eliminate heavy hardware plywood, and metals, as well as allowing the model builder to use the lightest balsa in areas that were impossible before.

Magnalite composites are available in many stock sizes and are sold direct to modelers to keep price to a minimum. A brochure describing the many uses and applications of these products is available for \$1.00. The sampler kit shown in the photo contains each of six different products and is available (including a brochure) for \$10.00. Contact Central Florida Hobbies, 491 State Road 434, Altamonte Springs, FL 32701, for the sampler or brochure.

★ ★ ★

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solder flux to the model trade. It's called **SUPERSAFE** Soft Solder Liquid Flux and it is available in a four-ounce bottle. **SUPERSAFE**, unlike most flux, contains no rosin, zinc, ammonium chloride, or other strong acids or acid forming substances. In the container, the flux is a mild acid which is chemically converted into a neutral salt through the heat of soldering.

**SUPERSAFE** is used extensively in the aerospace industry for all types of soldering. By using solid wire solder, your work will be much cleaner and free from the usual flux build up. Work clean-up is easy as **SUPERSAFE** is water soluble (no alcohol or solvents necessary). Once heated, **SUPERSAFE** becomes chemically neutral, non-corrosive, non-hygroscopic, and electrically

non-conductive. Whether you are soldering printed circuit boards, landing gear wire, or throttle cables, you will find **SUPERSAFE** makes soldering easier. A four ounce bottle is available for \$3.95 at your local Hobby Shop, or send \$4.00 (continental US), or \$5.00 (outside the continental US), to H&N Electronics, 10937 Rome Beauty Drive, California City, CA 93505. Dealer inquiries invited.

★ ★ ★

Fliteglas Models, R.R. 1 Box 392, Neoga, IL 62447, has announced some major updates on two of its products. The Fliteglas P-51D Mustang has a new set of plans and a new 12-page booklet to aid in construction. Retractable landing gear (including tailwheel) is now shown on the plans.

The P-51D kit contains a beautiful fiberglass fuselage, foam wing and stab cores, 3-3/4 inch aluminum spinner, landing gear wire, canopy, and scale exhaust stacks.

The P-51D is a stand-off scale kit that has been on the market since 1968. It has won more contests (both pattern and scale) than any other scale model on the market today. This is the same kit aircraft that won the 1978 AMA National Championship and has won four out of six Warbird Races held in the midwest.

The basic kit retails for \$121.95, while the deluxe kit is \$166.95. Order direct from Fliteglas or through your dealer.

The other product that Fliteglas has updated is its Liquid Masking Film which is now available in three sizes: four ounce, pint, and quart volumes. Prices are \$2.95, \$7.25, and \$11.95 respectively.

Liquid Masking Film is a sprayable liquid that is used in place of masking tapes for painting trim, numbers, and insignias on model airplanes, cars, boats, and trains. After applying the liquid and allowing it to dry, the film is cut with a sharp knife or razor blade and peeled away from the area to be painted. Paint runs and masking tape "bleeds" are eliminated, and complex curves and shapes are easily masked.

Liquid Masking Film is available from your local hobby shop or directly from Fliteglas.

★ ★ ★

Attention R/C car racers, here is a product you should know about . . . Bavarian Precision Products Co., P.O. Box 6, 22 East Avenue, New Canaan, CT 06840, has announced the availability of its new HB .21 Slide Valve Carburetor (Model 2953) which is specially designed for the HB .21 Schnuerle Car Engine, but can also be used on any .21 car engine with a carb opening of .49 inch. This carburetor was designed to meet the demands of competitive car racing. The "inline" slide valve makes installation a snap. The two-speed multi-mix feature makes for top performance and easy adjustment.

Many other carburetors are available from Bavarian Precision Products for engines ranging from Picco, to K and B, to Webra, to Enya, and Irvine. The best thing for you to do is to write to BPP and ask for more information.

★ ★ ★

For those model builders who hate to dig out hinge slots, there is now a product available from Eldon J. Lind Company, 2912 Walker Lee, Los Alamitos, CA 90720, that promises to make a life a little easier. That product is called the "Digger," and it is the simplest thing you ever wanted to see . . . you'll probably ask yourself, "Now why didn't I think of that?"

The Digger is a small metal tool about three inches long with two distinguishing features on it (see photo). The first is a centering device which tells you where to dig out the slot, and the second device is the actual digging tool, which looks like a miniature cowboy boot spur. Price is \$2.95.

**Free Flight . . . Continued from page 59**

Vancouver, B.C. Free Flighters suggests the following predictions for 1983:

Bill Giffen will leave a wing of an unbeatable model on the sofa when he leaves for a contest.

Norm Beattie will break two motors in his favourite unlimited ship and then fly a Sleek Streak to victory in the event.

Chris Beattie will withdraw from the event, thus allowing his father to win.

Bob Hornidge will throw a hand-launch glider so hard that he'll win OHLG in an Idaho contest.

Phil Barber will let a model go without the dewaterizer set, and after the clearing of parts from the crash, will explain how he was trying for more roll in the transition.

Peter Johnson will, after much berating from Phil Barber, feed him his A-2 with no salt.

Greg Davis will add a bellcrank and leadouts to his Taube and fly it as a combat ship.

Captain Doug Hannay will do another header off his Harley Davidson while riding sidesaddle and looking at an old time rubber ship in a thermal.

Tom Cashman will show us all how to convert a Tomy toy into a timer, and then lose three models on the same day because of timer malfunction.

Steve Helmick will show Josh Chamberlain how to circle tow, and then lose to him in the same contest.

Herb Carlson will find out that it is harder to chase his son Jeff's models because they fly farther than his.

Earle "Foggy" Moorhead will try to get his P-20 entered as a Spitfire in a scale contest.

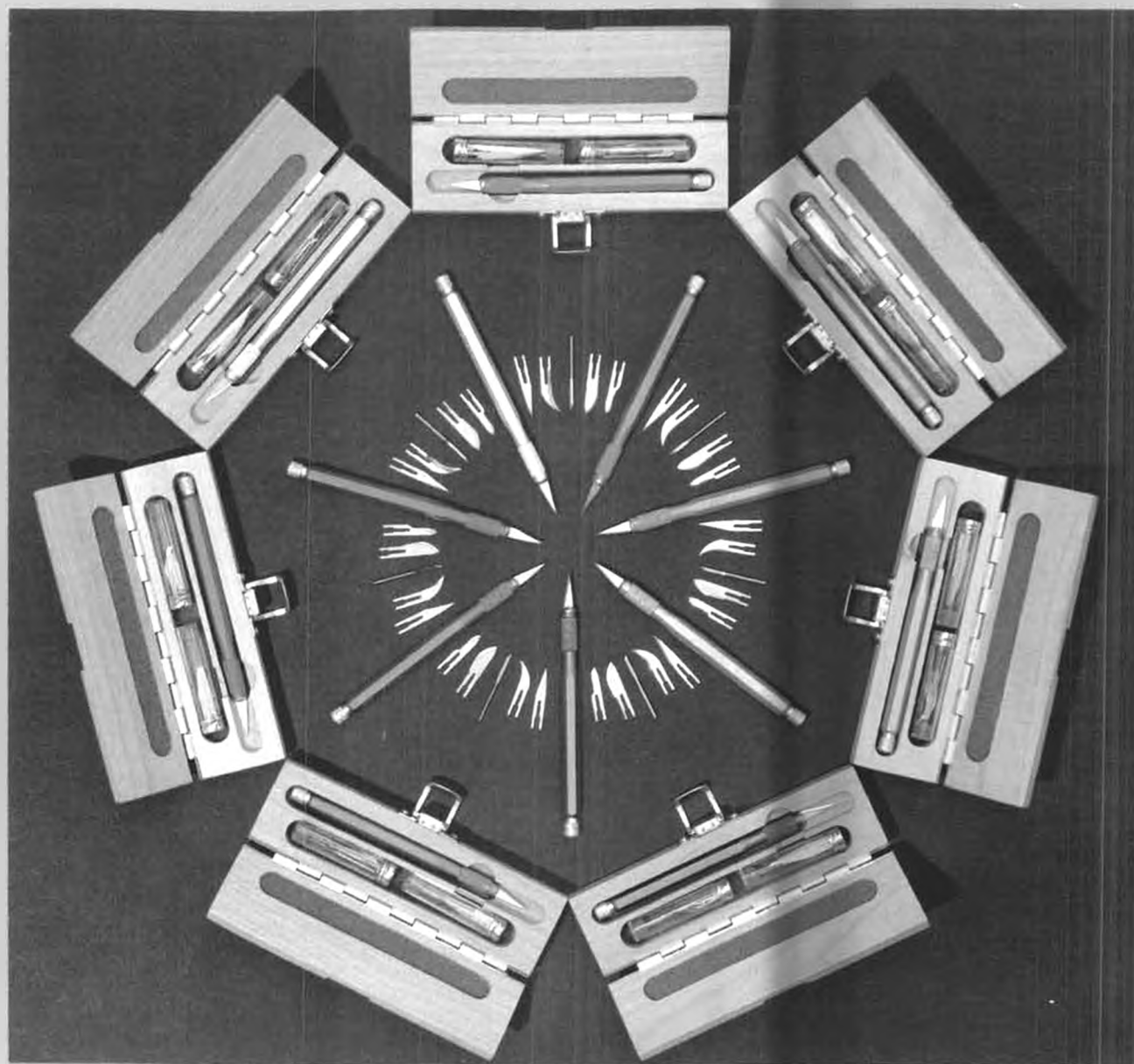
Bob Stalick will design a new model, and won't know what letter to put in front of "Quell" to give it a name.

John Lenderman will be appointed Ambassador to Russia for the AMA, and wind up preventing World War III.

Al and Dee Grell will build and install a sign over their home that says, "Modeler's Hostel of the Northwest," and then find out that they've been feeding and sleeping 74 transients each year . . . none of whom are contestants.

In closing, I should point out that the above predictions will very likely come

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## APRIL 8, 9 & 10

**FRIDAY 9 am to 6 pm**  
**SATURDAY 9 am to 6 pm**  
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**P.O. Box 5772**  
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true . . . knowing the folks in the roles as I do. I should also point out that in a previous issue, I commented on the availability of Tomy Robots from Herm Newkirk. Herm writes that he has exhausted his supply, and all of you who have been wanting some will have to wait. He is looking for more.

I guess that's it for March. Have a good month and build, build, build. •

*Workbench. . . . Continued from page 6*

★ ★ ★  
Two Worlds International, 20 Galli Dr., Novato, CA 94947, (415) 883-1245, which up to now has been known in the modeling world for its exquisite line of indoor model kits imported from Japan, has acquired Soarcraft Products, originally founded and manufactured under the direction of Hugh Stock, but during recent years, in a state of suspension.

For the benefit of latecomers to the R/C hobby, Soarcraft was known for its high quality line of R/C sailplane kits, which includes: Mini-Merlin, a two-meter ship with epoxy-glass fuselage, ballast tubes, foam wing cores; 10-foot span semi-scale Diamant, 'glass Glasflugel 604, 'glass fuselage, built-up surfaces; Libelle, 111-1/2 inch span; Magnum 12 is the largest, at 148-inch span, with low profile 'glass fuselage, and built-up surfaces; and the Centurian, a 100-inch span, all built-up, for the newcomer, but not the usual boxy beginner's design.

In addition to sailplanes, the Soarcraft line includes two scale aerobatic ships for .60-size engines; the Steen Skybolt, which spans 50 inches, and the Spinks Akromaster, at 64-inch span. Both ships feature fiberglass fuselages, cowls and wheel pants, plus many extras.

Contact Two Worlds' Jimmy Walker for further information.

★ ★ ★  
Wayne Ulery, designer of the 1/3-scale Laser 200 used by many of the contestants at the 1982 Las Vegas Tournament of Champions, is now offering plans for this aircraft. The model is highly aerobatic, however, it is very easy to fly and makes an excellent sport project. Unlike the many highly over-wing-loaded clunkers that have evolved with the coming of large displacement model aircraft engines, the Ulery Laser 200 is designed to weigh between 17 and 19 pounds, depending on the engine used (2.0 to 4.2 cu. in. engines recommended). Span is 98-1/4, wing area is 1615 sq. in.

For further information, or to order a set of plans at \$20 postpaid in the continental USA, the address is 2564 Fox Hollow Rd., Springfield, OH 45502.

★ ★ ★  
A note from Bob Hunter of Satellite "Hot Stuff" City indicates that a sequel to the very popular "Video Tips #1" is in the works. The first tape, of which a thousand duplicates were made, has been a tremendous building aid to modelers all over the world, and its

success has spurred other model companies into producing similar public relation devices. In addition to their informative value, videotapes provide a welcome relief to model club officers, who are constantly on the lookout for interesting programs that will increase attendance at meetings.

By the way, if you haven't tried "Hot Shot", Satellite City's cyanoacrylate accelerator, you're really missing the best adhesive device since the introduction of cyano glues. Supplied in a pump spray bottle, "Hot Shot" can be sprayed on a joint either before or after application of thick or thin Hot Stuff, or similar products. The adhesive takes off almost immediately upon application of Hot Shot, and especially if Super-T is used, a nice looking, and obviously stronger, filleted joint results.

Our first experience with Hot Shot came during the repair of a woven cane chair. Super-T was applied, parts were held together . . . (wiggle, wiggle) . . . and held . . . (wiggle, wiggle) . . . nothing. Without adding any more Super-T, we hit the joint with a light spray of Hot Shot, and were lucky that the pieces happened to be lined up, because in an instant, the stuff locked up solid!

★ **LEE RENAUD** ★

Just before going to press we were notified that Lee Renaud, glider designer, kit manufacturer, and co-owner of Airtronics, passed away on Friday, January 14, 1983, after suffering a stroke. Memorial services were held on Saturday, the 15th.

Lee had just completed negotiations, and in partnership with Sanwa of Japan, had reacquired ownership of Airtronics from Leisure Dynamics. It is understood that Lee's wife Barbara and their daughter and sons, Shelley, Tom, Tim, and Bob, will take over the Airtronics operation. We tender our sympathies to the family and wish them well in keeping the highly respected Airtronics name in the forefront of modeling.

**A NEW PROJECT**

I may have bitten off more than I can chew, but the latest project is the attempt to rebuild a grand style player piano. Player pianos, which haven't been manufactured since the early '30s, operate on a vacuum system, involving miles and miles of tubing and over a hundred bellows-type pneumatic activators to operate the piano keys and control various expressions and mechanical switches. First designed long before electricity was readily available, only the "later" models used an electric powered vacuum pump in place of the more plentiful foot-pedal pumps. Even then, the electric goes only as far as the motor and the on-off switch, everything else is vacuum operated!

If there are any player piano fixer buffs out there, we'd like to hear from you . . . with words of encouragement! The piano is a Chickering baby grand, and the player is a Model "A" Ampico. (Don't laugh, it was probably built about the same year as Henry Ford's Model "A"!)





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Top Flite's biplane gets you out of the workshop and into the air quicker because there's no difficult wing or cabane struts to build. Designed specifically for .40 engines, it's remarkably stable yet fully aerobatic. Add a super wide flight "edge" flight, and you've redefined Sunday flying.

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#### SPECIFICATIONS:

Wingspan .... 38 in.  
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Length ..... 41½ in.  
(without spinner)

Engine Size .... .40 or .35-.45  
Flying Wt. .... 72-88 oz.  
Radio Equip. .... 4-channel  
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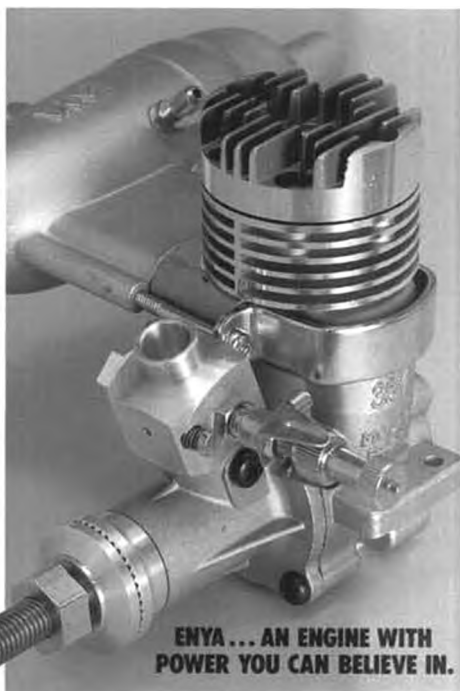


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We throttled back on the stick and watched as the pair taxied effortlessly and roared aloft. We circled the field, performed an inside loop with ease and even barrel rolled. The engine's response was smooth. The power was there at a touch. No hesitation. No mid-range sagging or overheating. We brought them in under perfect control and landed with a precision, 3-point landing.



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