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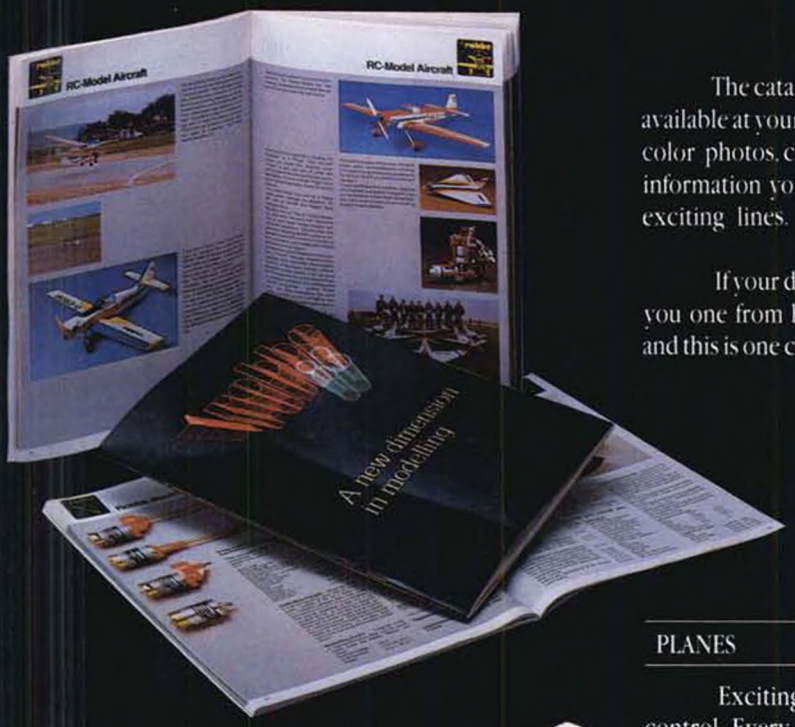

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COVER: Few things go together better than a beautiful girl and a beautiful glider. This month's cover is proof! May we introduce you to Cindy Fuller, of San Rafael, California, and her Astro Flight *Californian*. The scenic location is one of the North Bay Soaring Society's flying fields somewhere in the Napa-Sonoma wine country of California.
COVER INSET: The colorful flags of the various participating countries at the 1983 World Aerobatic Championships wave in Pensacola, Florida's warm breezes as spectators watch the precision flying of 70 of the world's best pattern pilots. See page 11 for coverage of the event. Color transparencies by Ed Wood and Bill Northrop.

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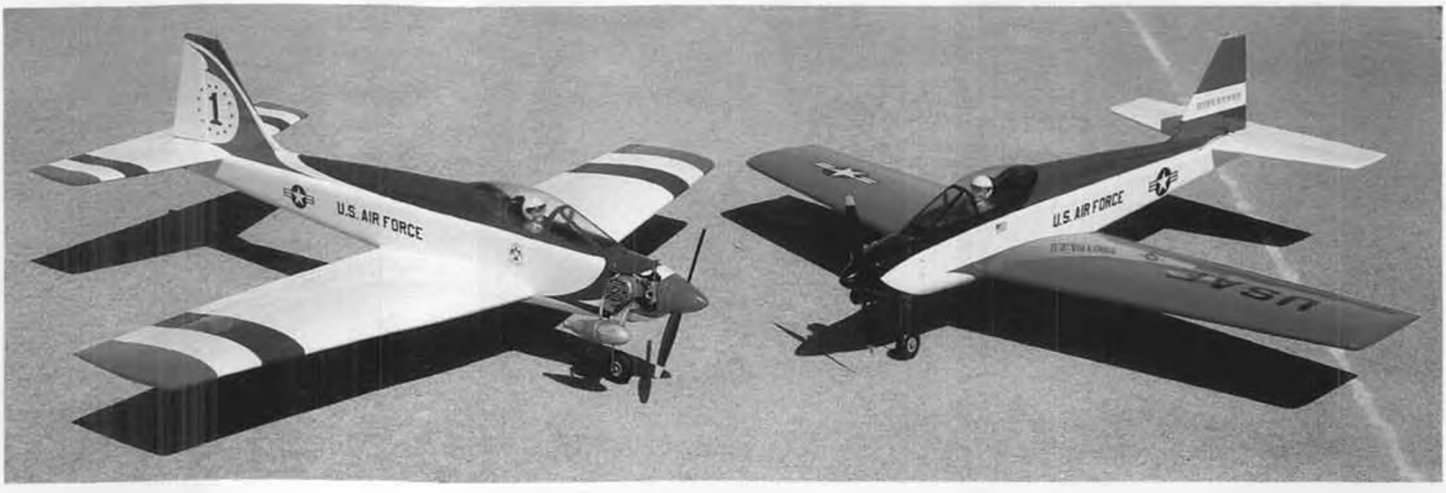

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MYRTLE BEACH
Ed's Hobby Shop
Hwy 501 Next to Fanjoy
Sign Company
TENNESSEE
KNOXVILLE
Tennessee Model Hobbies
Rt. 62 Oak Ridge Hwy Solway
PH: 615-482 2900
NASHVILLE
The Toy Mart
113 Graylynn Drive
PH: 615-883 1648
TEXAS
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Kennaston Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Airline
DENTON
Yellowbird Hobbies
117 W. Hickory
EL PASO
Hall's Hobby Shop
No. 57 Sunrise Center
PH: 915 755 1914
FORT WORTH
Mott's Hobby Shop
7241 Grapevine Highway
PH: 817 281-0921
HOUSTON
Clear Lake Models
117 Camino S. Shopping Ctr.
PH: 713-488-6315
HURST
Roy's Hobby Shop
1309 Norwood
SAN ANTONIO
Clayton Hobbies
5707 E. Mobud
UTAH
OREM
Miniature Aircraft Prod
811 W. 400 N.
SALT LAKE CITY
Douglas Models
P.O. Box 9276
2065 E. 33rd South
VERMONT
SWANTON
The Hobby Shop
RFD 1 Rt. 7
PH: 802 524 2715
VIRGINIA
ANNANDALE
Model Masters, Inc
6920 Braddock Rd
RICHMOND
The Hobby Center
1709 Willow Lawn Dr
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N.E. 21st St
PH: 747 9914
BELLINGHAM
Hobby Hive
111 E. Magnolia
CASTLE ROCK
Aero Motive Products
607 Spirit Lake Highway
KENT
Kent Hobby
1313 W. Meeker
Suite 110 Meeker Mall
PUYALLUP
Fairgrove Model Supply
10611 136th St. East
PH: 845 7675
SEATTLE
Webster Supply Co
17818 Aurora Ave. N.
TACOMA
Bill's Hobby Town
14914 Pacific Ave.
PH: 206-531-8111
WALLA WALLA
Harley's R.C.
Route 1, Box 277A
PH: 509 529 2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W. Washington St.
WISCONSIN
MARSHFIELD
Mid Wisconsin Hobby Center
Northway Mall
503 E. Ives St
MENOMONIE
True Value Hardware
1512 9th Street
L Mart Shopping Ctr
MILWAUKEE
All In 1 Hobby
South Gate Mall
333 So. 27th Street
PH: 414-645 4555
MILWAUKEE
Casanova's Hobby
1423 S. Muskego Ave
PH: 414-672 2700
WAUSAU
Pope's Hobby Land
640 South 3rd Ave

CANADA
BAWLF, ALBERTA
B & P Transport Ltd
Box 6
PH: 373-3953
CALGARY, ALBERTA
Hobby World Canada
Box 968 Stn M
CALGARY, ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINNIPEG, MANITOBA
Cellar Dweller Hobby, Ltd
1354 Main St
PH: 589-2037
WINNIPEG, MANITOBA
Gooch's Hobbies
646 Portage Ave
ST. JOHN'S, NFLD
Capitol Hobby Centre, Ltd.
6 Freshwater Road
DUNDAS, ONTARIO
Skycraft Hobbies Inc.
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave. E
PH: 416-755 1766
WILLOWDALE, ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH: 222-4721
ANCIENNE-LORETTE, QUEBEC
Passe-Temps Phoenix
1459 Notre Dame
PH: 418-872-4113
ARVIDA, QUEBEC
LeModele Reduit Enr
118 Mathieu CP 341
PH: 418-548-2136
HAUTERIVE, QUEBEC
Le Centre Du Modeliste
Allard 1223 Lestrat
MONTREAL, QUEBEC
Can Air Hobbies
5850 Gouin Blvd. Ouest
PH: 514 332 3565
SASKATOON, SASKATCH
Collins Aero Craft
238 First Ave. North
PH: 652-4775
YORKTON, SASKATCH
Radio Control Hobbies
39 Betts Ave

AUSTRALIA
SYDNEY, N.S.W.
Pyrmont 2009
Burmax
137 Pyrmont Street
PH: (02) 692-0694
BRISBANE, QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
ENGLAND
NORFOLK, NR17 1DG
Pegasus Models, Ltd
Caston, Attleborough
NEW ZEALAND
INVERCARSILL
Model Shop
55 Arcadia Dee St.
PH: 89439
VENEZUELA
CARACAS 1070-A
Hobby World, C.A. (Dist.)
Apartado Postal 75054
PH: (02) 34 33 02

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

from Bill Northrop's workbench

• I wonder how many people share my concern for the future of this hobby of building and flying model aircraft? No, this isn't going to be another lecture on the continual disappearance of retail hobby supply outlets and the short-sighted business activities of the mail-order discount companies, although both of these are primary factors affecting the future of the hobby.

The focus of my concern this month is on the emphasis given by the model airplane hobby industry on the high-ticketed facets of the hobby, most of which are connected with anything relating to radio control. Don't get me wrong, I'm as much of a radio control enthusiast as anyone else in the R/C hobby, having been designing, building, flying . . . and crashing R/C models for the past 28 years. But, like the majority of today's permanent modelers in R/C (as compared to the buy-em, crash-em, in-and-out faddists), I've had a solid background, and continual interest in the basic, and comparatively low-cost facets of the hobby, i.e., rubber and gas sport free flight, the physical and technical challenge of hand launch gliders, the dream-like slow motion of indoor, the maneuver - it - yourself - without - radio simplicity of backyard control line. . .

My concern is that the industry is not looking ahead with respect to the future of the hobby, not seeking to engulf new generations of youngsters . . . the industry's future customers . . . into the permanent hobby of model aircrafting.

Some say that the industry *is* gearing toward the youngsters, with easy-to-build, easy-to-fly, "inexpensive" radio control trainers. BULL! Back in the 30's, a Brown Jr. at $21, was worth roughly 100 times as much as a Megow or Comet stick-and-tissue model airplane kit . . . and therefore the Brown was unattainable to the average youngster whose parents were not "into" the hobby. You dreamed about owning the Brown, but you could still build, and fly, and trim, and crash, and overcome failures, and learn basic modeling and aerodynamics, and be totally ecstatic over your first thermal ride.

Today's youngster is in the same boat. The "inexpensive" R/C trainer (?) still costs about 100 times as much as the few stick-and-tissue kits available . . . and is still unattainable to the average youngster whose parents don't understand the value of the hobby. The big difference between then and now, however, is that the equivalent of the Megow or Comet model is almost extinct, and instead of being available as they were in various department stores, hardware stores, drug stores, five-and-tens, and local hobby shops that any kid and his bike could get to, they are now only in thinly scattered hobby shops in larger towns and cities, mostly out of bicycle range.

What it kinda boils down to is that years ago, a youngster could discover modeling on his own, and could afford to get his feet wet, no matter what his financial level. If only ten percent out of a million kids exposed to the hobby caught the bug, you had 100,000 modelers! Today, in most cases, it takes a modeling adult to lead a youngster into the hobby. If you assume, based on AMA's 80,000 membership, that there are double that number of adults in the hobby in the U.S.A., and their success rate, if they even try, to get their youngsters into the hobby is a better than ten percent. You're looking at a paltry 16,000 newcomers.

What can be done about it? There's no easy answer. We live at a continually accelerating speed. There are still 24 hours in a day, but we jam much more into an active day than ever before. There are less and less people taking less and less time to stop and smell the roses. The instant result plastic shelf model has taken the place of the "solid" model, which you carved, and shaped, and sanded from blocks and sheets of wood.

Many of us have heard these words, "I tried modeling once, but didn't like it." Next time you hear it, ask a few questions. Nine times out of ten, I end up discovering another victim of the greatest set-back to model aircrafting ever created, the reed valve .049 powered, brightly colored plastic "Pukie Ukie". Ask any experienced control line modeler to tell you how these things "flew". Imagine how many hundreds of thousands of uninitiated potential modelers received one of these things as their first "model airplane". If a few of them were lucky enough, without the help of someone who knew how, to get the engine started and running, how could they possibly get it to fly when even an expert had a devil of a time doing it? There were a few models that were worthwhile, such as the Cox PT-19, which was rubber-banded together and could take a helluva beating, but the "Lil Stinker" Pitts was a totally unstable "rock-on-a-string."

***MB's* Editor/Publisher congratulates Hanno Prettner of Austria on yet another major triumph in radio controlled aerobatics, the 1983 FAI World Championships in Pensacola, Florida. Report begins on page 11.**

No, these were no help. It's still the good old stick-n-tissue model that provides the important beginning. Even AMA shows signs of recognizing this with the *Cub*, but there's no follow-up. You can't win a fight by throwing a single left jab and then sitting back to wait for the decision. The *Cub* or *Dart* should be followed up with "stepping stone" designs, then local and regional contests . . . and then the Sunday Punch . . . industry sponsored regional winners going to an "AMA Junior Nats" with about ten beginner-type categories, with scholarship and other education-assist prizes.

It doesn't take a lot of money spent on an exotic and complicated model aircraft to really enjoy this hobby . . . if you're a real modeler. Here's a good example of stopping to smell the roses.

Last weekend I went to Mile Square Park to look in on the Annual Flying Wing contest. As I drove onto the flying area, I noted that there was a longer string of cars at the free flight strip than at the R/C strip, so decided to go there first. Among the many familiar faces was Bill Hannan, our *Hannan's Hangar* columnist.

Bill had just completed a modified version of his *"Stringless Wonder"*, a contrivance consisting of less than 20 sticks of wood on a motor stick, shaped like a kite, and powered by one loop of rubber turning a Flight Streek plastic prop. Oh yes, the model was covered with tissue.

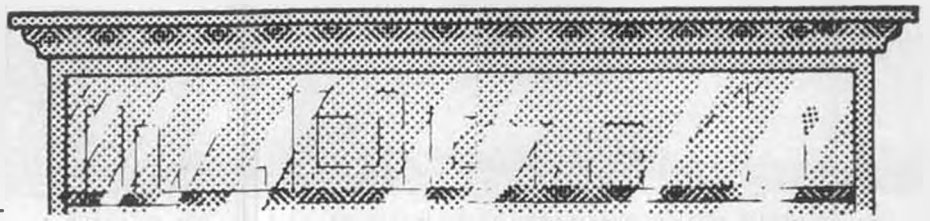
Standing with me, and kibitzing on the relative merit of Bill's model, was Jack Elem, a fine modeler of many years, and one of the most accomplished "dirty old men" I have ever known. As Bill's "MSW" was totally untested, he drafted Jack to hold on while he short-wound the rubber for the first flight. The power portion of the hop was fine, but the glide was only good if you were concerned about its flying away.

At this point, a three-man committee was formed, and we met after each test

Continued on page 100

OVER THE COUNTER

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



SIG Mfg. Co., Inc. new *King Kobra* for .60 size engines.

• You've asked for it . . . now it's here . . . the new .60-sized *King Kobra* from Sig Manufacturing Co., Inc., Montezuma, IA 50171. For years modelers have been asking Sig for a .60-sized *Kougar*, now Sig has done this idea one better and incorporated the newer lines of the popular little *Kobra* with all the great flying capabilities of the *Kougar*. With a spectacular roll rate, dazzling vertical climb, and forgiving low speed handling performance, this sleek new model can make an average Sunday flier look like an expert.

The kit features a precut from core wing with built-in washout for excellent flying characteristics, handy printed fuselage sides . . . build directly on the wood, formed plastic fuselage top, jet style canopy with molded framing, molded plastic cowling, sheet balsa wing covering, sheet balsa fin, built-up airfoil stabilizer, rugged, ready-bent landing gear, die-cut plywood parts, 32-page photo-instruction book with step-by-step instructions, fiberglass wing tape, and a full-size plan.

The hardware package includes molded control hinges, nylon control horns, nylon nose gear bearing, nylon nose gear steering arm, RC links, heavy-duty aluminum motor mounts, wire aileron horns, and nylon screws for bolt-on wing attachment.

You can see by the foregoing that the kit is rather complete. We feel that you will be pleasantly surprised to hear that this 58-inch span, 700 sq. in. area model is only $79.95. See the Sig ad in this issue for a dealer near you, or order direct, the above address is all you need!

★ ★ ★

Bryon Originals, P.O. Box 279, Ida Grove, IA 51445, has announced the release of its latest kit . . . the classic Staggerwing Beech G-175. Like the rest of the Byron line, this 1/5-scale biplane is designed and packaged in the traditional "complete kit concept." State-of-the-art assembly concepts and materials have reduced considerably the amount of time and money normally spent in building such a model. All items, except engine, radio, glue, and final covering (paint or Econokote) are included in the package.

Concern for scale realism is evident throughout the kit. A highly detailed fiberglass fuselage plus wings and control surfaces provide the kind of scale appointments that even the scale purists will appreciate. For example, even the fuselage and wing stringer detailing has been paintstakingly duplicated. A specially designed retract system, complete with sequencing doors, retractable tail wheel, and numerous scale details, is also available.

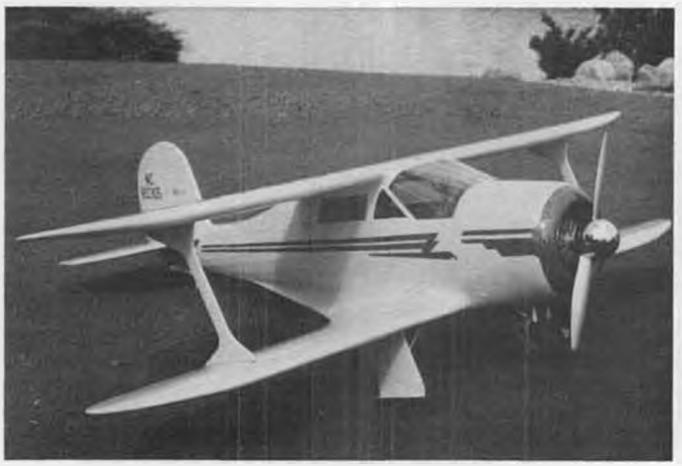
Other features include Byron Originals' exclusive Plug-In Wings and Aileron Linkage System. In a matter of seconds, a 77-inch wing span becomes 17-1/2 inches without ever having to disconnect the pneumatics or delicate servo linkages. A removable firewall allows easy access to the entire fuselage interior, including all radio gear, linkages, fuel systems, etc.

Like the full-scale version, this *Staggerwing* performs exceptionally well at both ends of the flight envelope. With a standard Quadra 35 or similar engine, the G-17 will land gently and predictably like a *Telemaster*, yet is fast and fully aerobatic enough to satisfy the seasoned pattern flyer.

For additional information, or to place an order, contact Byron Originals at the above address or call (712) 364-3165.

★ ★ ★

Associated Jaguar body for 1/12 R/C cars.



Byron Originals new Staggerwing Beech G-17S in 1/5-scale.

New Series 150 SR battery packs weigh 1.25 oz., 175 mah capacity.

Much improved Monocoupe 90A kit from Ikon N'wst.

New Porterfield *Flyabout* designed for Enya .90 4-cycle. Ikon N'wst.

Ikon N'wst *Sweet Bee* sport plane.

Coverite announces a breakthrough for all model painters. They have developed a revolutionary iron-on film that actually comes with its own factory prime coat. It's called PRE-PRIMED MICAFILM. The unique advantage of this re-inforcedd film is that now you can achieve a smooth surfaced finish without any filling, sanding or base coats. All that is required is that you iron it down, then apply only one or two coats of paint. The result is a quick, easy paint job equivalent to one that used to require hours of preparation before the color coats could be applied.

Compared to conventional painted finishes, a Pre-Primed Micafilm finish is less than 1/3rd the weight. That includes glasscloth, dacron, nylon, silk, tissue or silkspan.

Pre-Primed Micafilm is recommended for the majority of aircraft including pattern, scale, sport, glider, pylon, U/C, combat and trainers. In addition, as Pre-Primed has a flat gray color, it is perfect for various military aircraft (such as the Grumman *Hellcat* pictured). Used in this way, out-of-the box, it requires no protective coating whatsoever, and is totally fuel and weather resistant . . . more so than almost any other surface!

Like the rest of the Micafilm line, Pre-Primed is half the weight of other iron-ons, yet seven times the tear strength of any other film. And they all have the lowest heat requirements: less than 240°F. for attachment. Which means it can go on sheeted foam surfaces without any danger of disturbing the foam. In addition, all Micafilm coverings are 100% sagproof! Models covered 1-1/2 years ago are still as taut as the day they were ironed on. With the addition of new Pre-Primed, the Micafilm line now encompasses four translucents (red, blue, yellow and newly released orange), pearly white, and realistic aluminum. Micafilm comes in two sizes: 29 in. x 65 in. and 29 in. x 16.4 ft. Available from your favorite dealer.

★ ★ ★

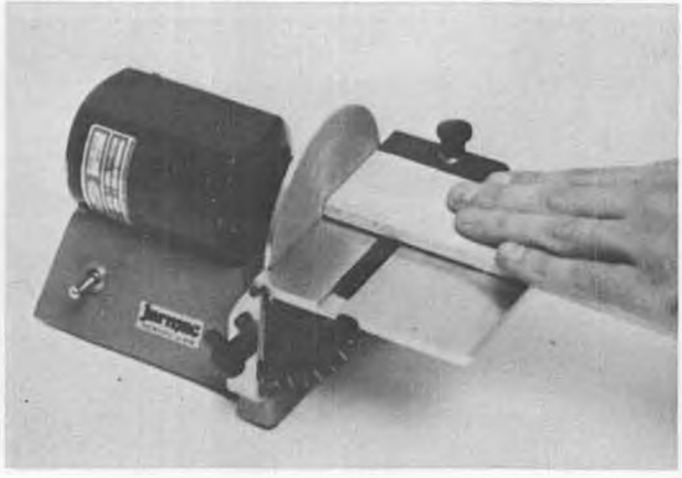
Sometimes, by virtue of significant improvements and/or major changes, an existing product can be considered new. Such is the case with two of Astro Flight's latest offerings in the world of electric powered R/C aircraft. Introducing the new (by virtue of improvements) Astro Challenger 40 cobalt motor, and the new (by virtue of major changes) Astro Rapid Charger.

The new high torque wind Astro Challenger 40 cobalt motor swings a 13-7 folding prop on direct drive and uses a 14-cell battery pack. Now the flier who wants to fly a larger sailplane on direct drive, wants the aerodynamic efficiency of a large folding prop, and wants to charge his batteries from his automobile in 15 minutes, can HAVE IT ALL! The new 10-turn wind for the Astro Challenger 40 cobalt motor will swing the 13-7 Geist folding prop with authority. It pulls the 100-inch *Gemini M.T.S.* model shown up to about 700 feet in one minute and gives four to five such climbs on one 15-minute charge . . . perfect for 100 to 120-inch span sailplanes. This winding can also be used in scale projects where the thrust of a larger prop may be needed.

And to go along with the new Challenger 40 and its 14-cell battery pack, Astro Flight announces its new Rapid Charger with dual output. It contains two charging circuits so it can charge TWO Ni-Cd batteries at the same time. The charger can charge single batteries of from four to seven cells and twin batteries from 10 to 14 cells. (When two

Aprons, T-shirts, and caps from Peck-Polymer.

Giant Standoff Scale Taube from Nick Ziroli Models.



Tilt-Table Disc Sander from Jarmac, Inc.

Replacement body from MRP.

New Lexan replacement bodies from MRP for the Outlaw Sprinter and Ford XLT150 truck.

batteries are charged at the same time, they must have the same size and number of cells, such as two six-cell packs of 1200 mah cells.) The charger also features automatic trickle charge, and voltage jacks on the front panel which allow the user to monitor battery voltage and to peak his batteries for maximum performance. An inexpensive voltmeter, such as the Radio Shack $50.00 model shown, can be used. Now you can build larger planes with 15 and 25-size motors and still charge the power pack from your auto in 15 minutes.

Order these and other Astro products from your local dealer, or order direct. Astro Flight, Inc., 13311 Beach Ave., Venice, CA 90291.

★ ★ ★

R/C sailplane fliers who are into F3B, scale, or cross country soaring and who are looking for a winch that will launch their sailplanes with extraordinary power will be glad to know that Davey Systems Corporation, One Wood Lane, Malvern, PA 19355, (215) 644-0692, has recently released its newest product in its line of quality, R/C sailplane launching and retrieving systems: the Pow'rzoom winch. The Pow'rzoom is also ideally suited for contest or sport flying, especially if crosswind or downwind launching is required.

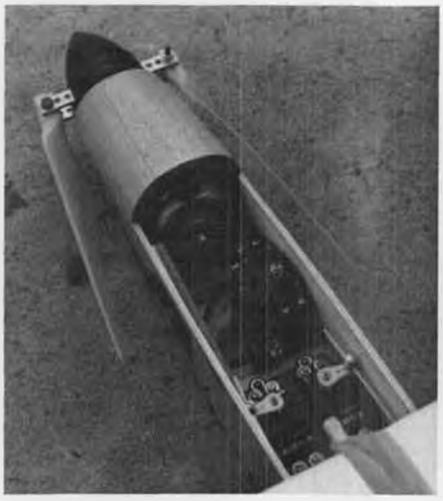
The Pow'rzoom achieves its high speed and powerful torque from a motor especially engineered and manufactured for DSC for this specific application. The Pow'rzoom features heavy duty, welded and painted steel frame construction with an adjustable motor mount plate to insure that proper drive tension is maintained on the belt drive. An endless variety of output speeds can be obtained by trying different combinations of pulleys on the motor and drum shafts to find the one best suited to your requirements.

The new Pow'rzoom winch features: 160-pound braided nylon winch line; a welded steel take-up spool with a three-inch hub; solenoid protected foot switch operation; anti-backlash, anti-kiting brake with easy diengage; ball bearing line swivel; large (18 in.), red and white nylon parachute; 24-inch high turnaround with ball bearing pulley; four-gauge battery cables with heavy duty clips for quick release; sealed ball bearing front plate on the motor; and much more! As options, DSC offers a four-inch hub take-up spool (add $20.00), and 2000 feet of 200-pound line (add $5.00).

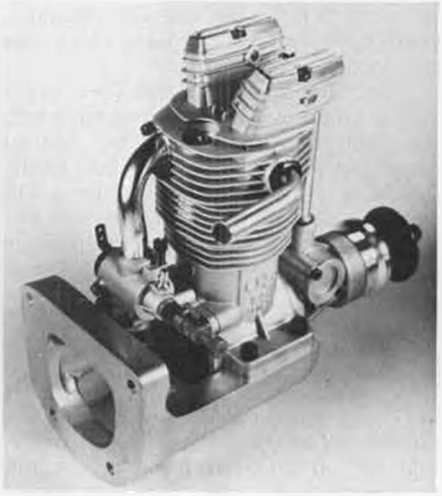
For those home-brew winch makers, or those who just wish they had a new or different take-up spool on their existing winch, DSC offers a new, competition class winch drum for launching F3B, scale, or cross country gliders. The new drum features nine gauge steel, welded and painted construction, with *two* collars and set screws to anchor the drum to the shaft. The drum has a 5/8-inch bore for use with long-shaft Ford starter motors, and a four-inch diameter hub with four-inch spacing between the eight-inch diameter end plates. The price is $50.00 plus $3.00 shipping, or it is available as an option when ordering the new Pow'rzoom winch.

★ ★ ★

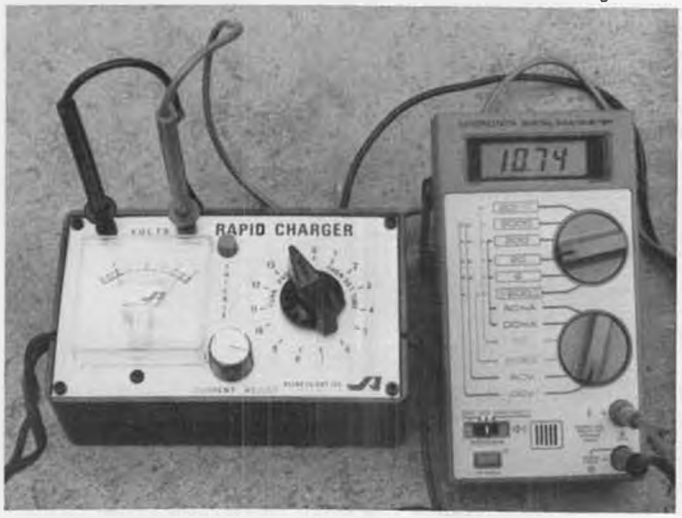
R/C car racers will take note of the beautiful, sleek, new Associated 1/12-scale Jaguar body . . . it's not only a



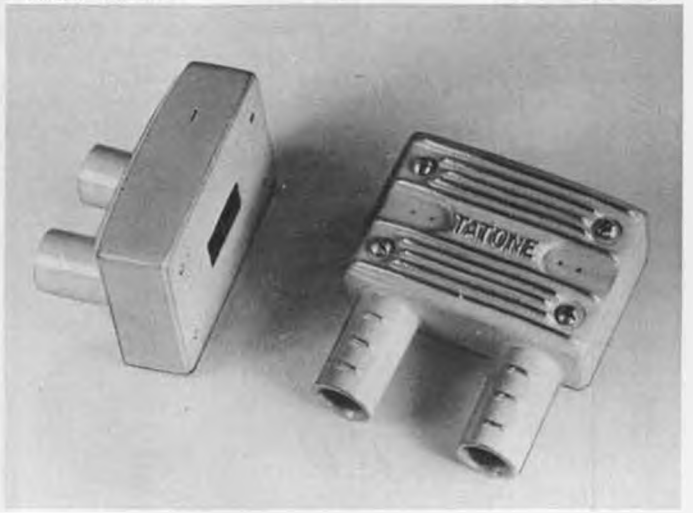
Astro Challenger 40 (cobalt) with new wind.



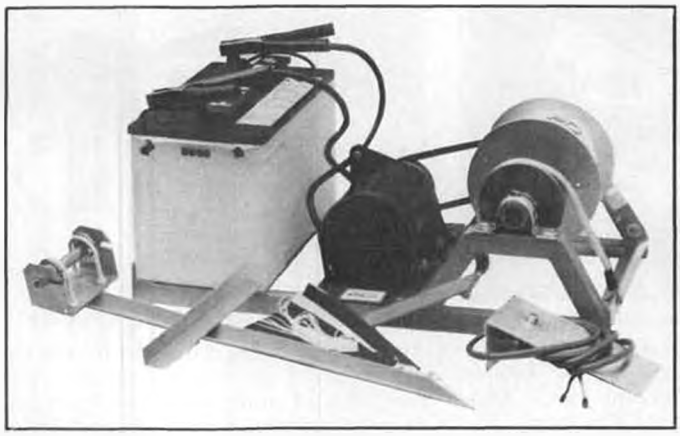
Tatone engine mount for O.S. Max 120.



Astro Flight Rapid Charger for dual output, up to 14 cells.

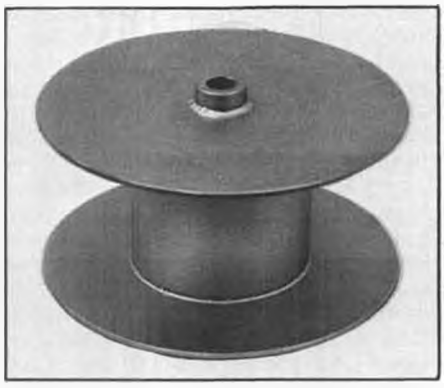


Tatone universal muffler for .60 to 1.3 engines. Fits tight spaces.



New Pow'rzoom winch for R/C soaring. Power to spare from DSC.

Peck-Polymers building boards for all modelers, three sizes.



Davey Systems replacement winch drums.

potential Concours winner, it's also a super handling body on the track. You'll like this one! Ask for part number 3169, the price is $11.00.

Also, Associated has a new type of rear racing rubber that gives more rear traction than ever before available. This rubber is available for 1/12 and 1/8-scales. The rubber is marked as follows: *red dot:* super high traction, super soft, ideal for dusty or slippery tracks, wears fast; *yellow dot:* very good traction, medium soft, use on average tracks, medium wear; *green dot:* good traction and medium firm, use on high traction tracks or long races, slow wearing.

Write to Associated for prices and free catalogs: Associated Electrics, 1928 E. Edinger, Santa Ana, CA 92705.

★ ★ ★

SR Batteries has been very busy coming up with new ideas for the serious R/C hobbyist.

For the small plane flier, there's a new 150 Series pack (pictured), that has a capacity of 175 mah and weighs less than 1.25 ounces. If you need more capacity, there's also a new 300 Series pack that has a capacity of 325 mah but weighs only 2 ounces. Both packs are $19.95 plus $3 for the connector of your choice.

If your transmitter needs a new pack or more capacity, SR can solve the problem. SR makes replacement packs for all R/C transmitters including Futaba G series, J series, and Circus JR transmitters. For Kraft transmitters, SR has a new 650 mah, 600 Series pack that will go right into the transmitter's battery box.

If electric powered planes and cars are your thing, SR's new 900 and 1200 Series EP Max Packs are what you've been looking for. Lower internal resistance and higher capacity make these new packs the ones to beat.

The many magazine reviewers, record setters, contest winners, and nationally recognized groups like the U.S. Soaring Team who use SR battery packs exclusively, are proof of the superior quality of SR packs. Top Flite is even recommending that they be used in their new *Antares* ultra high performance sailplane.

You can now use your Visa or Master Card to order from SR Batteries. Call SR at (516) 286-0079 or write them at 29 Maple Avenue, Bellport, New York 11713. Include a business size, self addressed envelope and 37 cents postage for full details on the entire SR line.

★ ★ ★

Ikon N'wst has been very busy this season improving and adding to its line of excellent scale and non-scale R/C aircraft.

Modelers have been asking when Ikon N'wst would create an airplane for the new four-cycle Enya .90 engine. Now it's here. Ikon feels that it has killed two birds with one stone so to speak. The Porterfield *Flyabout* has never before been kitted. It is such a pretty little plane! Ikon designed it to have an 80-inch wing span and weigh only ten pounds. You don't need heavy duty gear for this little cutie.

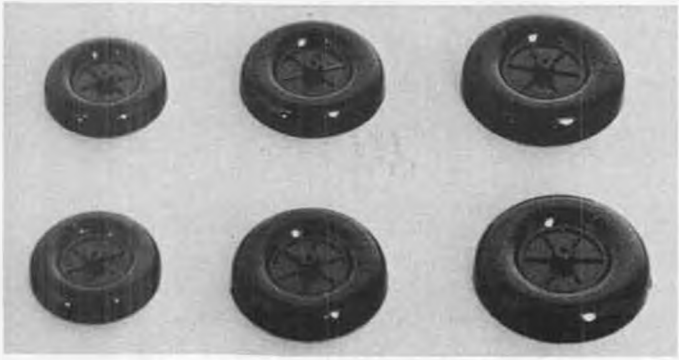
The kit has formed cowling (the ring cowl is formed also). All curved parts are hand cut. The hardware package is complete, and the gear is pre-bent. The replica *Flyabout* is designed to 2.5 inches to the foot scale. Cruising speed is achieved at 1/4 throttle, and the landing is very slow and realistic.

Ikon N'wst's popular Monocoupe 90A quarter-scale kit has been revised and the drawings improved, along with some production changes. The kit is much improved and results in probably the best value in the BIG Bird field.

Also available is a photo package for the plane which will aid the builder in achieving a really scale plane. For those who just want the best scale-like aerobatic plane on the market, then build the Monocoupe 90A straight from the kit.

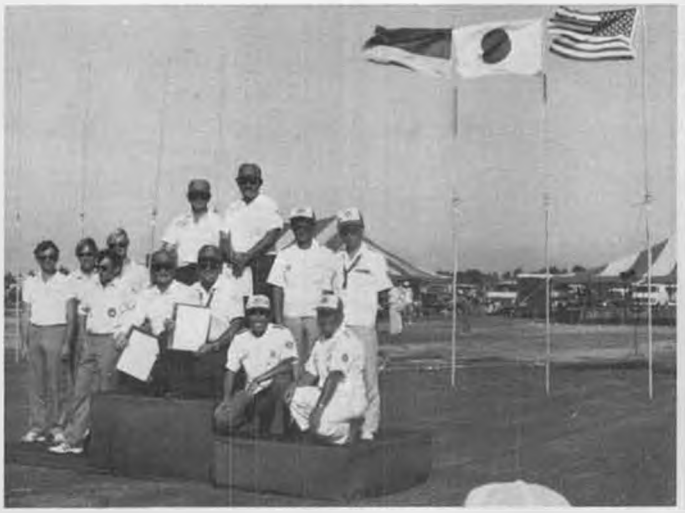
New from Ikon N'Wst is the superlative *Sweet Bee*. As the *Sweet Bee* weighs five pounds, has a 55-inch span, and is .540 powered, you know right now this is a performer. On takeoff, just go straight up, on landing, fly really slowly. The *Sweet bee* has a fully symmetrical wing with the well-known N5 airfoil, giving great maneuverability and slow speed for landings.

Continued on page 86



Lightweight wheels in 3/4, 7/8, and one-inch sizes from Peck-Poly.

Coverite Pre-Primed Micafilm for military scale and painting colors.



The German (3rd), American (1st), and Japanese (2nd) FAI teams on the victory platforms during awards ceremony in Pensacola, FL.

Dave Brown (3rd), Hanno Prettner (1st) shaking hands with Contest Director Ron Chidgey, and Bertram Lossen (2nd), individual winners

1983 R/C AEROBATIC WORLD CHAMPIONSHIPS

Pensacola, Florida

By BILL NORTHROP . . . *Model Builder's* Editor/Publisher covers the action at the 1983 WCs.

Photos by Anita and Bill Northrop

Hanno and constant companion, helper, father Hans, with Hanno's new radical "Calypso".

• Hanno Prettner, of Austria, and the U.S. Team have repeated their top rating performances to capture once again the individual and team first place positions respectively, at the 1983 World Championships for R/C Aerobatics in Pensacola, Florida, October 10 to 15. This made it the third time for Hanno, who also won in 1977 and 1981, and the ninth time for the U.S.A. team, which won in 1963, 1965, 1967, 1971, and then every W/C year from 1975 to the present.

Following Hanno in the individual placings were: Bertram Lossen (W. Germany), Dave Brown (U.S.A.), Ivan Kristensen (Canada), Wolfgang Matt (Liechtenstein), Yoichiro Akiba (Japan), and Steve Helms (U.S.A.). These were the positions of the first seven, after a two-round flyoff of the top ten percent (70 fliers competed). Originally, after the four rounds of regular competition, the

U.S. team (l to r) Steve Helms, Mngr Dick Penrod, Tony Frackowiak, and Dave Brown.

The radically uncomplicated *Calypso.* Hanno hopes to start a K.I.S.S. trend.

"Do I hear a 106?" Engine noise monitor boss Ed Izzo listens, with helper Ed Keck.

Tony Frackowiak, U.S.A., finished eighth, just missing the flyoff. Put team in first.

Jan Van Beek, Holland, one year ahead with "turnaround" ship, placed 44th.

Saito 120 four-cycle, turning 15x10 Zinger cut to 14 and thinned, 15% castro, 5% nitro.

Underside of Van Beek model, showing Cessna-type gear, exhaust in plug-in wing screws.

Jung Bok An, Korea, with helpers. Competed in Acapulco, 1981. Placed 65th this year.

Kevin Hayne, Mngr. John Brink, and Ivan Olivier, of South Africa. Ivan placed 34th.

Jorge Macedo, Brazil, placed 61st. He's 33, data processing manager for COFAP, Brazil.

Angel Maldonado, of Argentina, 58th. South American Go-Kart champ 1974, private pilot.

Jan Van Vliet, Holland, placed 43rd. His country will be next w/c host, in 1985.

placings were: Prettner, Lossen, Kristensen, Brown, Helms, Matt and Akiba. Continuing with the top 20, it was Tony Frackowiak of the U.S.A. in eighth, followed by Giichi Naruke (Japan), Tsugutaka Yoshioka (Japan), Giuseppe Bertolozzi (Italy), Pascal Ardonceau (France), Pascal Malfait (France), Franz Mayr (W. Germany), Greg Marsden (Canada), Werner Schweiker (W. Germany), Benito Bertolani (Italy), Gerard Werion (Belgium), Brian Brotherton (Great Britain), and Ken Binks (Great Britain). There were 70 contestants entered and flying this year, with a large turnout from the South American countries.

In the team competition, the U.S. was followed by Japan, West Germany, Canada, Austria, Italy, France, Belgium, Great Britain, and Switzerland, to take it through the first ten places. There were 28 countries represented in all.

Looking at it individually again, Bertram Lossen has once more demonstrated that he's the hottest prospect to come along in recent years. At his first World Champs in Acapulco '81, he

Second place winner Bertram Lossen, West Germany, not far behind Hanno Prettner.

Norbert Matt, also known as Wolfgang's brother, from Liechtenstein, placed 27th.

Luxembourg's Lucien Gerard, placed 47th. At 23, he has been National Champ four times.

Tore Jemtegaard, from Norway, 40th. Was Norwegian C/L Aerobatics champ in 1980, and R/C Champ in 1981. A TV technician.

Colin Taylor, Australia, placed 37th. Also Australian record holder in Cross-Country distance.

If our notes are correct, it's Mario Rodrigues, of Santiago, Chile, 54th.

Salvatore Pompei, Brazil, placed 66. Brazilian Champ, So. Am. Vice Champ, Sao Paulo Champ.

Phil Stevens, Great Britain, 30th, assisted by Brian Brotherton, who placed 19th.

Vibration mounting and intake silencer on Tom Prossers O.S., cut down on dBs.

Terje Eltvik, of Norway, placed 45th. Note single retract wheel and wing skids.

Italy's Ruggero Pasqualini, placed 21. An auto dealer for BMW Bologna, private pilot.

Hub. Dekkers, Holland, 42nd. Team members placed 42, 43, 44. That's sticking together!

Ricardo Gomez, Venezuela, placed 46th. Only 19, he won Venezuelan Champs this year.

Mike Lynch, the lone team member from New Zealand, Placed 62nd. N.Z. Champion.

Giichi Naruke, Japan, 9th, checks controls on his Cosmos. Helper and Team Mngr Kentaro Iioka stand by. Natl. Champ in '82 & '83.

Adolf Panz, Austria, waits in the ready box before flying. He placed 23rd, helping team to place 5th. He's a master electrician.

Wolfgang Matt, Liechtenstein, placed 6th in qualifying and 5th in the flyoff.

Alexandres DeGotte, of Belgium, placed 25 in spite of broken arm from motorcycle accident.

Wouldn't be a World Champs without Jim Clarke, Ireland and his derby. Placed 64th.

Real sharp looking model by Graham Stowell, Papua, New Guinea, who placed 28th.

Pascal Malfait, France, placed 13th, hands maneuver schedule to Mngr. Guy Brouquieres.

The symbol of fame, signing autographs. It's Hanno, and he's getting used to it!

Alberto Florez, Peru, placed 55th. Helper is team manager Tadashi Komoy.

Benjamin Castaneda, Mexico, placed 60th. A consulting engineer, he has competed in the U.S. and Switzerland.

MB's General Manager, Anita Northrop, with the Benito Bertolanis and the Giuseppe Bertolozzis. Benito 17th, Giuseppe 11th.

The winners and the workers! The N.W. Florida R/C Modelers, Pensacola Aeromodelers, R/C Modelers of Pensacola, and Eglin Aeromodelers.

Sally and Dave during the flyoff, in which Dave moved up from fourth to third.

Yoichiro Akiba and "Rocky" of Japan finished 7th, then moved up to 6th in the flyoff.

Canada's Ivan Kristensen (4th), Manager Larry Barrett, and Greg Marsden (15th).

Steve Helms, U.S.A., placed 7th after flyoff, helped put team in first place. Helper is his dad, pylon racing specialist Gale Helms.

Paul Behm, Luxembourg, 41st, flew beautiful exhibition to music, a la ice skating.

finished fourth, after putting in the highest and same flight score in both rounds of the flyoff (yes, higher than Prettner, but his backup score in the regular competition prevented a higher position). He was the West German Champion in 1981 and 1982, and although serving his required one-year time in the army, was able to maintain his skill level for this year's World Champs. Now beginning college as a medical student, we're not sure how much free time he will have to sharpen his flying (if it's really possible to make it sharper!).

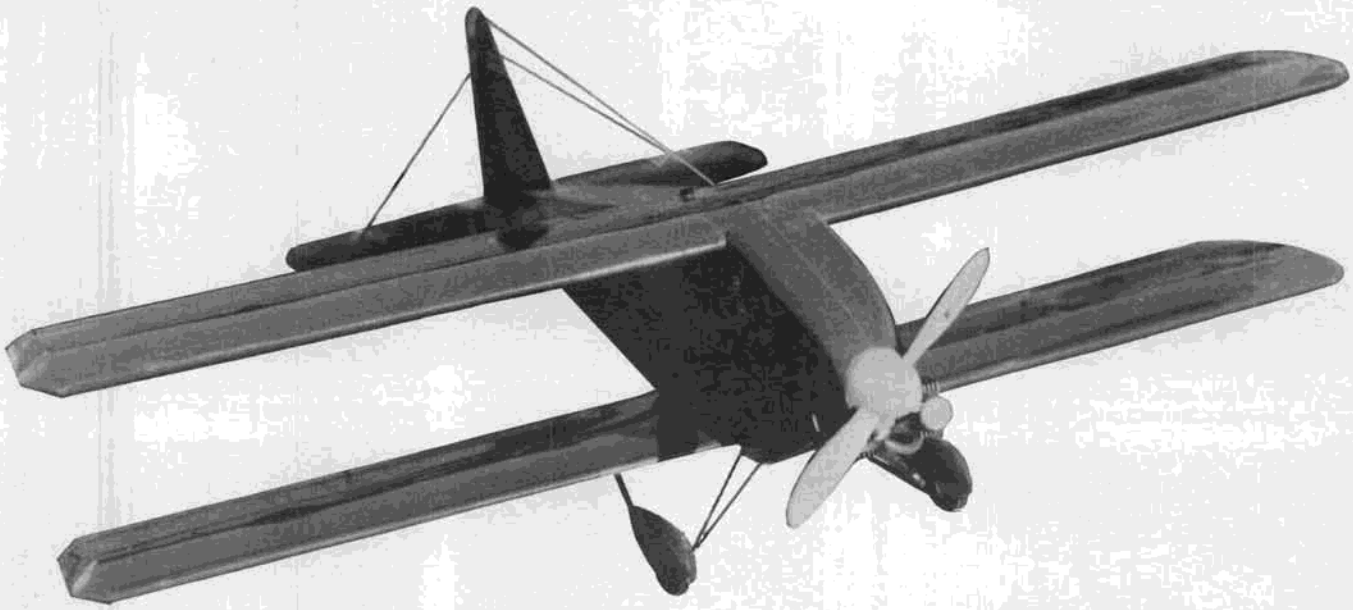
Lossen flies in the typical European style, with large, far out (no, not "far out" in the terms of John Denver!) maneuvers that may be just a little too large and too far away from the judges, but man, are they smooth, symmetrical, and consistent! Perhaps the judges are

Juan Hidalgo, Venezuela, 53rd, civil engineer with Electridad de Caracas.

already beginning to think in terms of the smaller, closer-in maneuvers of the coming turnaround pattern. It could have accounted for the small difference in scores between Prettner and Lossen . . . 2858 to 2804 at the end of four

Continued on page 68

A fitting climax to the championships, winner Hanno Prettner makes last official flight/landing.



The Bitty-Bipe

By JIM "DOC" EDWARDS . . . The *Bitty-Bipe* is a fun-fly or sport airplane. What makes it interesting is it's outstanding aerobatic performance on rather small glow engines and the fact that it can be built in one weekend. So, get out the cyanoacrylate and dust off the workbench, your going to want this plan!

• As a biplane lover, this ship came to my mind when the super-small servos came out. However, it was not practical for me to buy five of them at that time just for this type of fun-fly airplane.

I drew the working drawings and built the airplane over one weekend, but as it was cold weather, didn't fly it until after April. The wait was worth it as its performance surprised me. It will perform all the FAI aerobatic figures on an O.S. Max .10 very well, except vertical roll, although I'm not suggesting you build it for competition, but for fun.

CONSTRUCTION

Pick your balsa carefully! Any airplane will perform better if it is built lightly, and *Bitty-Bipe* is no exception. Do not add any structure, as the design has very sufficient strength.

Also, I feel that having an aileron servo in each wing is a smaller penalty to pay than struts and slave links between the wings. The drag is tremendous from these hardware items.

Start by cutting all parts, and then proceed to build. I start with the wings, then the fuselage, and finally, the tail feathers. Don't forget the tail's flying wires! Use super glues and you can build this model without getting up from your bench . . . if your back holds out!

If you wish to round the fuselage corners more, add soft 1/8 balsa to the fuselage sides behind the wings. The strengtheners in the rear of the fuselage are simply 3/32 x 1/4 strips added to the sides. Fire wall width is two inches. Fuselage width at the rear of the wing is also two inches. Bend the rear of the fuselage together for the 1/4 square tailpost. Make sure fuselage is straight! Fit the horizontal fuselage members. Measure them for the natural curve which the sides take when bent together.

The cowling is made right on the fuselage after you determine how your engine will be mounted. Be sure to coat the inside of the cowl with epoxy to fuelproof it.

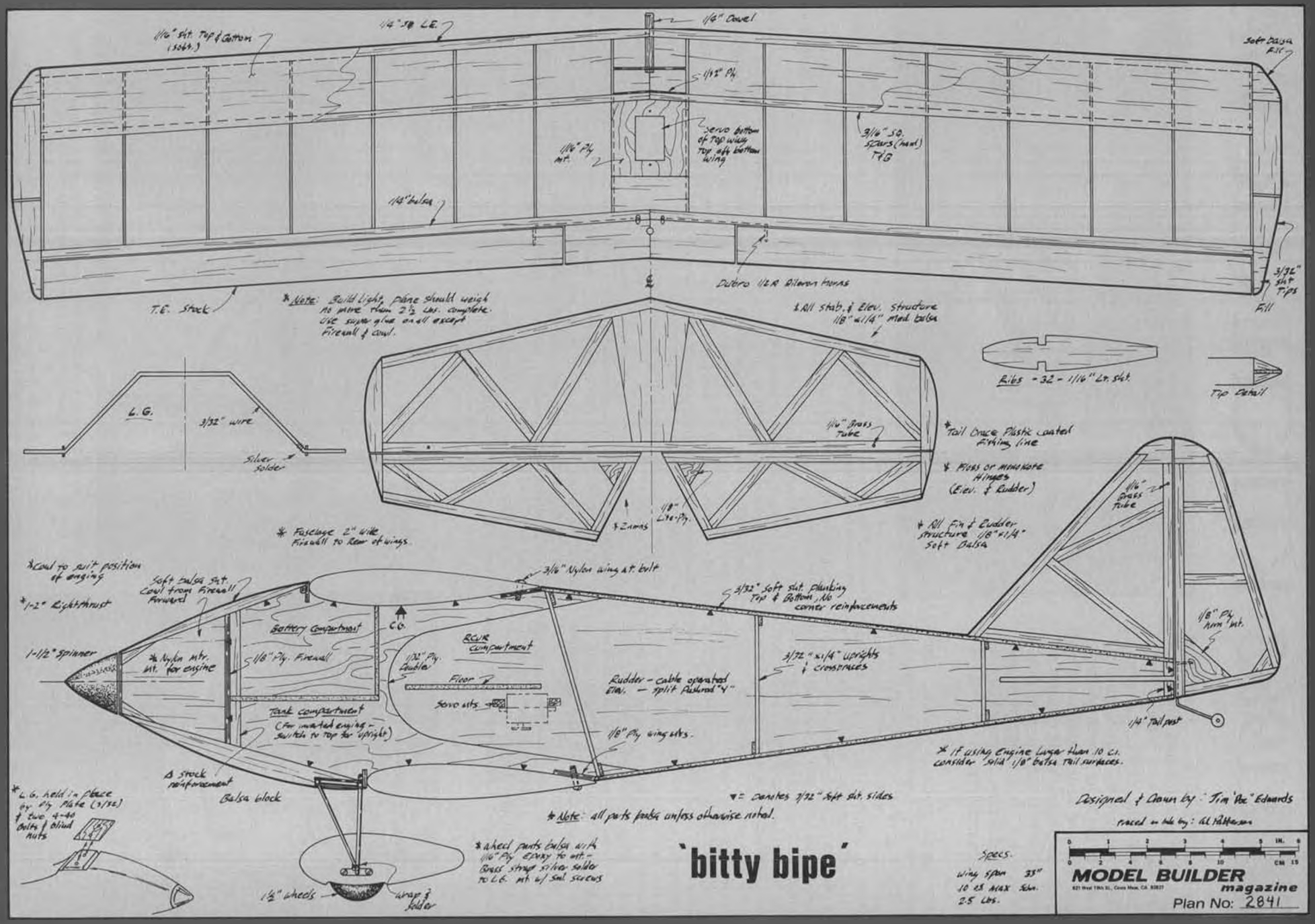
The wings are built flat on the plans, blocking up the T.E. of the ribs equally. Pin the bottom 3/16 hard balsa spar in position, make certain the butt joint is perfect. Add ribs, gluing as you proceed, then add the top 3/16 spar and 5/16 x 1/4 T.E. While still pinned to work table, cover the top of the wing forward of the spars with soft 1/16 sheet. Remove the wing from the plan and cover the bottom of wing as you did the top. Add the tips and ailerons (with aileron horns in place). You may beef up the aileron servo mount. If you wish, remembering that every piece you add adds weight.

Sand and cover the wings with your favorite heat-shrink film and hinge the ailerons. Now, build another wing exactly like the first, and the hardest parts are done.

The tail surfaces are built directly over the plan fron strip materials, and should be made warp-free.

Cover all parts and assemble the model so that everything is square and straight. Install the R/C equipment so that the balance point is where it is shown on the plans. You don't want to add nose weight to get the *Bitty-Bipe* to balance correcty.

The prototype flies well with an O.S. Max .10 Schneurle, as I stated . . . with a larger engine, who knows? Good luck with your *Bitty-Bipe*. •


1/16" Sht. Top & Bottom (3569.)
1/4" SQ. L.E.
1/4" Dowel
Soft Balsa R/C
1/16" Ply
Servo bottom of top wing, top of bottom wing
3/16" SQ. Spars (Hard) T&G
1/16" Ply mt.
1/16" Balsa
Dubro 1/2 A Aileron horns
T.E. Stock
*Note: Build light, plane should weigh no more than 2½ Lbs. complete. Use Sig. glue on all except Firewall & cowl.
3/32" Sht Tips
Fill
*All stab. & Elev. structure 1/8" x 1/4" Med. balsa
Ribs - 32 - 1/16" Lt. Sht.
Tip Detail
L.G.
3/32" wire
Silver Solder
1/16" Brass Tube
*Tail Once Plastic coated Fishing Line
* Pieces of Micro Kote Hinges (Elev. & Rudder)
* 2 mms
1/8" Lite-Ply
* Fuselage 2" wide Firewall to Rear of wings.
*All Fin & Rudder structure 1/8" x 1/4" Soft Balsa
1/16" Brass Tube
*Cowl to suit position of engine
Soft balsa Sht. Cowl from Firewall forward
*1-2° Right thrust
3/16" Nylon wing bolt
3/32" Soft sht. planking Top & Bottom, No corner reinforcements
1/8" Ply Arm mt.
1-1/2" Spinner
*Nylon Mtr. Mt. for engine
Battery Compartment
1/8" Ply. Firewall
C.G.
1/32" Ply. Doubler
R/C/R compartment
Floor
Servo cuts
Tank compartment (For inverted engine - switch to top for upright)
Rudder - cable operated Elev. - split Pushrod "Y"
3/32" x 1/4" uprights & crossbraces
1/8" Ply wing cuts.
1/4" Tail post
* If using Engine Larger than 10 c.i. consider 'solid' 1/8" balsa Tail surfaces.
* L.G. held in place by Ply Plate (3/32) & two 4-40 bolts & blind nuts
Δ stock reinforcement
Balsa block
▼= Doubles 3/32" Soft sht. sides
*Note: all parts balsa unless otherwise noted.
* wheel pants balsa w/ 1/4 1/16" Ply. Epoxy to mt. - Brass strap silver solder to L.G. mt w/ sml screws
1½" wheels
wrap & solder
Designed & Drawn by: Jim "Bo" Edwards
Traced on tube by: Al Patterson
Specs.
Wing span 33"
10 cu. max. Sch.
2.5 Lbs.
MODEL BUILDER magazine
821 West 19th St., Costa Mesa, CA 92627
Plan No: 2841

'bitty bipe'

1983 KITCHNER/ WAT

By CLIFF TACIE . . . Every year the Flying Dutchmen Radio Control Club puts on a scale rally in the twin cities of Kitchner and Waterloo in the Canadian province of Ontario. Because this gathering of scale modelers is not a contest, many scale models are seen here that are not seen anywhere else. A turnout of more than 136 models is proof of this rally's popularity.

A fine example of the quality craftsmanship regularly displayed by Kitchner's Steve Gray is this Bellanca WB2. The model is powered by a Quadra. Under Steve's expert guidance, this 20-pound model is an outstandingly realistic flier.

• Tradition. Habit. Addiction. Call it what you like, I plead guilty. My modeling year revolves around certain dates and events which I annually look forward to, and make an effort to attend.

My year starts out in early April at the Toledo R/C Exposition, the world's largest and most well-known display of radio control models and related R/C hardware. How could anyone involved in modeling *not* attend Toledo if it was only an hour and a half away?

Next comes spring and my annual late April trek to the rugged springtime beauty of Rough River Dam State Park in Kentucky and the popular Mint Julep Scale Meet. This is my first escape from the white stuff we're plagued with all winter long in Michigan, and provides my family with a mini vacation and me with some good stiff competition to whet my appetite for the upcoming scale year.

Summertime means the Nats, of course, and provided I have the available time off, and it's not too distant, it's become a tradition for me. It's an opportunity to view all aspects of our great hobby/sport, and again, usually provides pretty stiff competition in the scale arena.

What am I leading up to? *Autumn.*

Autumn in the Midwest means cool, sunny days emblazened with reds, yellows, and greens. It means relaxed, comfortable flying in the company of good friends and infrequently seen acquaintances. It means an opportunity to view in one place over 136 impressive examples of scale model aircraft on display and in the air.

Of course, it means the Kitchner-Waterloo Scale Rally, sponsored and run by the Flying Dutchmen Radio Control Club of Kitchner, Ontario. The "traditional" date of this annual gathering of scale R/C aircraft and modelers is the second weekend of September, this year it was the 10th and 11th. The site is the Kiwanis Park flying field located in the Kitchner-Waterloo, Ontario, area just an hour or so from London or Toronto, and draws fliers from Michigan, Wisconsin, Ohio, New York, and Pennsylvania as well as from across Canada.

The park features a paved runway in a triangular format and lots of closely cropped, smooth grass surrounded by low shrubs and absolutely splendid scenery. This is the kind of field every club dreams of having someday.

This year's event was the 14th annual rally, and as I mentioned earlier, more than 136 models were in attendance over Saturday and Sunday. It's strictly a "come and fly for fun" get-together. There is no entry fee, and no prizes are awarded. perhaps that's why this is the place where you'll see some precision quality models that you'll never see campaigned on the competition trail.

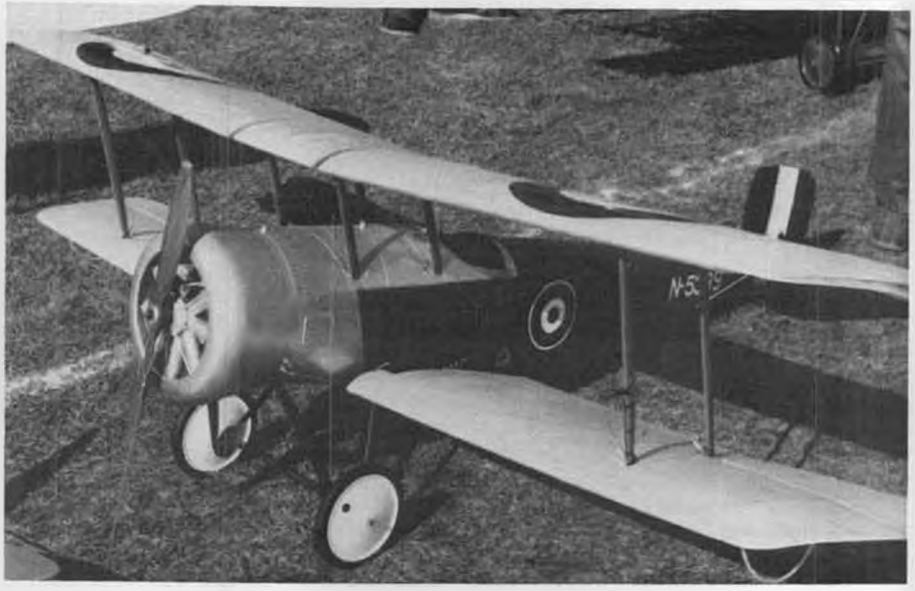
Scale models are not a single faction. Some of us thrive on competition and build our models to garner maximum static points within the rules. Some of us

ABOVE: The wing tank of the *Moth* is constructed of aluminum printing plate which has been corrugated in a simple jig. World championship quality is obvious.

LEFT: With its wings folded back, as per the full-size deHavilland *Moth*, Merritt Zimmerman's *Moth* model drew the attention of all. Minute detail was outstanding.

ERLOO SCALE RALLY

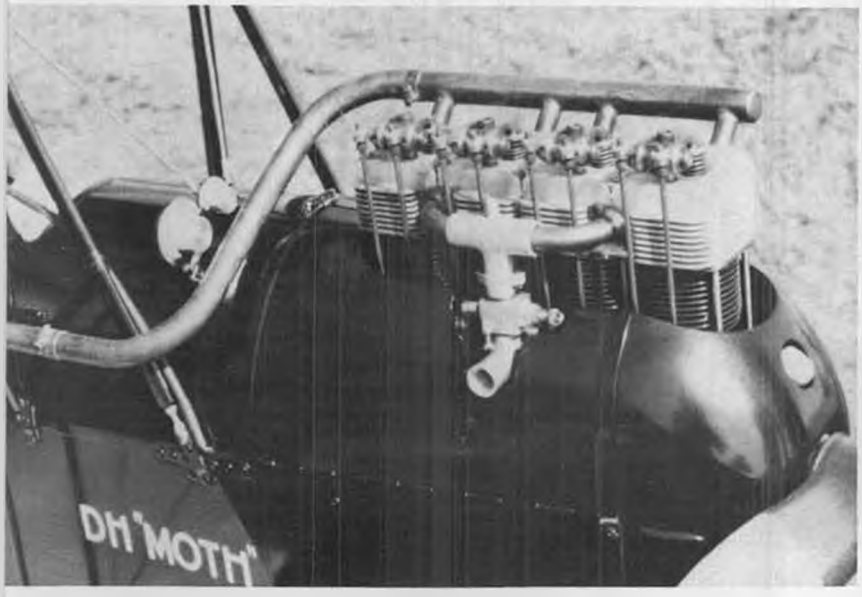
The dummy engine on Steve Gray's Bellanca WB2 conceals a Quadra. Note custom spinner and 6-bolt hub. Pilot looks real in the air!



This very nice Bristol *Scout* (Model D) by Jim Zufelt, of Ottawa, is covered with Coverite and finished with butyrate dope. The model weighs 11 pounds, and is powered by a Webra .91.

just like to build "sport scale" models that look somewhat scale in the air and are fun to fly. Still another faction among us is driven to build the "perfect" model, exactly duplicating the full-size prototype in every way possible, but not necessarily for competition purposes. These builders get their satisfaction in knowing they've done it right, and they don't need a subjective judge telling them they should have done it better! Kitchner is the perfect gathering place for all of these types of modelers.

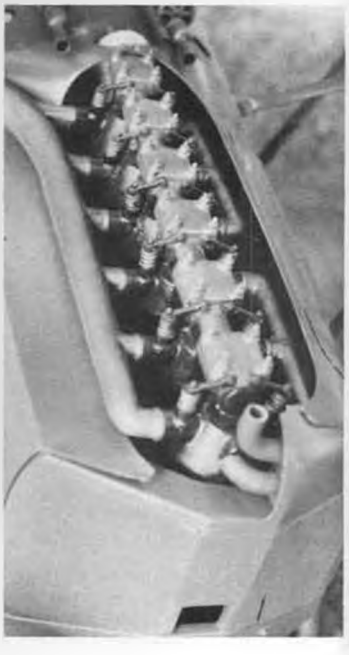
Probably a prime example of the perfectionist type modeler is Merritt Zimmerman, of Cleveland, Ohio. This year, Merritt was there with his de-Havilland DH60 *Moth*. Not the *Tiger Moth* nor the *Gypsy Moth*, this is the *original* 1925 *Moth* from which the later models were derived. Not satisfied with just building an absolutely beautiful model featuring prototypically folding



Zimmerman's DH60 *Moth* features a WORKING, four-cylinder, in-line, four-stroke, gasoline powered, Cirrus engine which puts out about 3 hp. Aluminum siding used on fuse.

ABOVE: A regular at Kitchner/Waterloo Scale Rallies, Bob Nelitz once more brought his highly detailed J-3 *Cub*. At 1/3-scale, and powered by a Quadra, the model has now logged many hours and rallies, but you would never know by looking at it!

RIGHT: Grahm Ireland's Fokker D-VII featured this beautifully hand crafted dummy engine. The working engine, a Quadra, resides below.



One of the precision quality models at the Kitchner was Mario Sabi's red and white Bucker *Jungmeister*. At 13 pounds, the model is powered by a Webra .91, and was built from Svenson plans. Just recently finished, and not yet flown, it looks like Mario hasn't yet made scale prop.

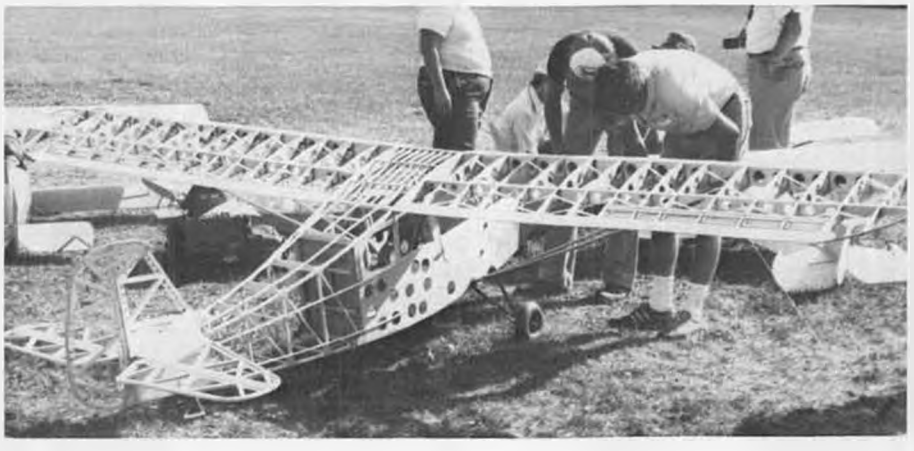
wings, corrugated aluminum wing tank, fuselage panels formed from house siding aluminum and a completely scale structure, Merritt has even machined his own, *working*, 4.5 cubic inch, three horse power, four-stroke, four-cylinder, gasoline powered, Cirrus engine to pull it! The engine swings a 20-14 Zinger prop, and the model tips the scales at about 22 lbs, eight of which are engine!

It's not unusual to see a project under construction at Kitchner. One such ambitious project is a 40% size Aeronca 7AC *Champ* by Peter Baab, of Hamilton, Ontario. The model has a 14-foot wingspan and is powered by a ten horsepower, air cooled, Chrysler/Southbend engine which turns a 24-12 prop at 8,000 rpm! Somehow, the large size of this model isn't quite so intimidating in the form of a *Champ*.

The trend over the past few years at Kitchner has been toward the larger "giant" models. This hasn't always been

Continued on page 68

A regular at the Scale Rally is Larry Pierce's Miles *Hawk Major*. A Quadra pulls the 23-pound model around convincingly. A bright orange paint job makes it stand out. The *Hawk* has seen many hours of flying, and was one of the first "giant" models at the Kitchner Scale Rallies.



Probably the largest model of the meet was this 7AC *Champ* being closely scrutinized here by spectators. Under construction by Peter Baab, of Hamilton, Ontario, the model is about 40 percent scale size. The 14-foot span model is powered by a 10 hp Chrysler/Southbend engine.

The elevator and fuselage (not shown) of the *Jungmeister* feature zippered inspection flaps with real zippers. Note trim tabs.

The cockpit of the *Jungmeister* is as finely crafted as the exterior. Note cockpit door and luggage compartment latches.

Cable controls drive the ailerons of Grahm Ireland's Fokker D-VII. A combination of torque tube and cables does the job.

FUEL LINES

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

• In the April '83 issue of **Model Builder**, I briefly reviewed the Cox TD .15 engines. At that time, I indicated that Cox had produced a couple of earlier .15 engines. The column this month features them together with another famous Cox engine. Now, if this all sounds kind of nostalgic, well, it may be, but if you're any kind of an engine buff, read on.

Undoubtedly, manufacturers have dreams for the future and reflect upon past great years. Certainly, 1959 was one such year for Cox. In the early spring of that year, Cox introduced the Sportsman .15, Olympic .15 and Space Hopper .049 engines.

As you might surmise, the first of these was intended for the sport flyer. That implies dependable performance and ease of operation. The Sportsman certainly provided it. Similar to earlier Cox engines, it employed a reed valve induction system. The venturi was an integral part of the backplate, and the triple jet carburetor was held onto it by a bell shaped venturi nut. As you can see in the first photograph, the extruded crankcase and cylinder are typical of Cox engines. Another common feature was the ball-and-socket attachment of the connecting rod to the piston. The glow head had a spherical combustion chamber for a modest compression ratio. That, combined with a single transfer, assured docile but dependable performance. The $7.98 price was a bargain.

For those who wanted higher performance in a .15 displacement engine, Cox offered the Olympic .15. It is shown in the second paragraph. At first glance, the photograph looks a lot like the Sportsman .15, but, in actuality, they are quite different in appearance. It's just that the two black and white photographs do not adequately display the dramatic anodized coloring of some parts of the Olympic. The backplate/carburetor assembly is anodized red, and the prop drive plate is blue. The rendering and shades of both colors are superb. If you mentally combine them with the silver-white color of the aluminum crankcase and the black cylinder, you'll have a good idea of the striking appearance of the Olympic .15. Truly a beautiful engine.

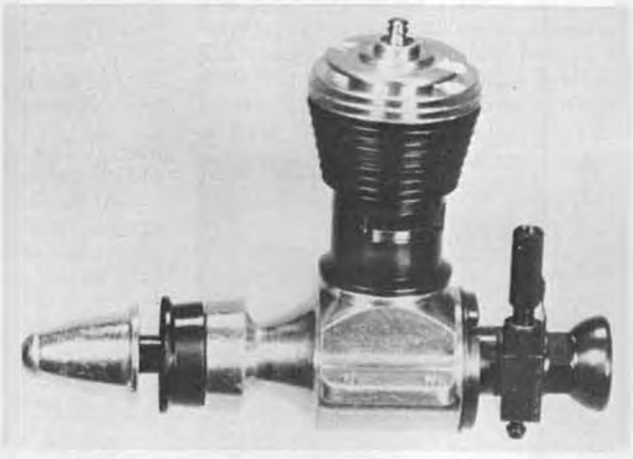
As for performance, the Cox product brochure for 1959 stated that the Olympic .15 was, "A super hot contest engine. Tests surpass any engine near its size. Equipped with precision ball bearings front and rear. Extra precise fitting of piston and cylinder to top contest requirements."

Certainly these features contributed to the superior performance. However, the twin mirror transfers and enlarged venturi throat were the major reasons for the increased power. The reed valve and glow head were the same as on the Sportsman .15. It is also interesting to note that although the Olympic cylinder and piston were tapered, thereby compounding the problem of a proper fit, it was possible to purchase them separately. That will give you a good idea of how closely tolerances were held in those days. Considering all these things, the price of $12.98 was quite reasonable.

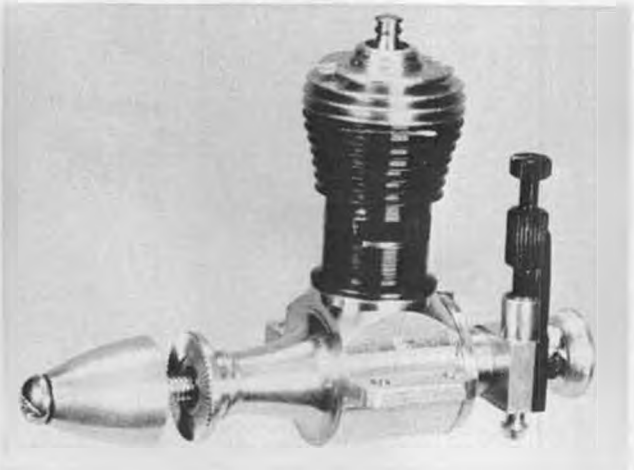
As mentioned, the third new 1959 Cox engine was the Space Hopper .049. It's shown in the last photograph. Again,

Continued on page 68

The 1959 Cox Sportsman .15 reed valve engine. Would you believe a $7.98 price tag?



The Olympic .15 reed valve engine featured twin transfer ports, front and rear ball bearings, and contest performance.



The Cox Space Hopper .049. A truly remarkable engine that dominated 1/2A competition for several years.

Electric Power

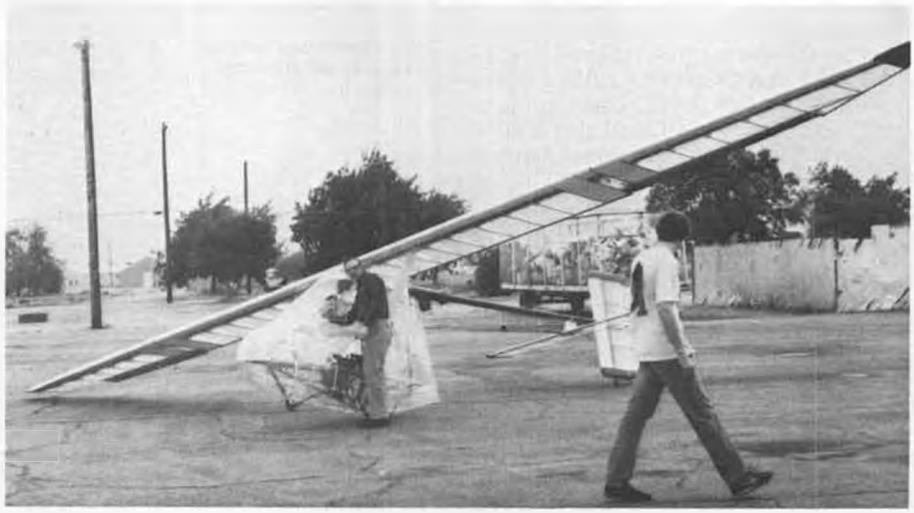
By MITCH POLING

Paul Mac Ready's *Bionic Bat* man-carrying, electric assist airplane has won the latest Kramer prize. Initial test flights were done at night by a full moon. Silent and invisible!

• Welcome to the wild and wonderful world of electrics! Bob Boucher and Paul MacCready have teamed up again (their last effort was the *Solar Challenger*, which flew from Paris to London on solar cells alone, with a pilot), to try for the latest Kramer prize.

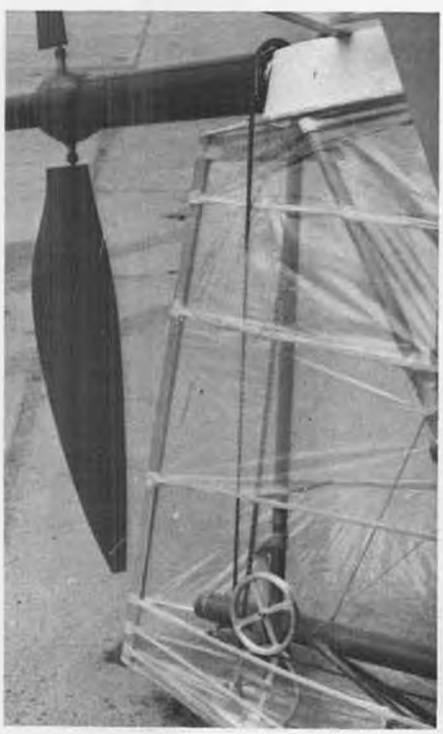
Kramer has been the inspiration for minimum powered flight with his generous prizes, and we owe him for that. Paul MacCready is the genius who always meets and beats the Kramer challenge, and Bob gets in there with his electric hardware that makes it go.

This time the prize was for the first to fly the mile course in less than three minutes using only the power of the pilot, but with a twist! The pilot was allowed to store up energy in any device he wished for ten minutes. Rumor has it that the Japanese were trying it with fifteen pounds of rubber bands! A team from MIT tried it with Geist electric motors and rechargeable Ni-Cds, but did not succeed.

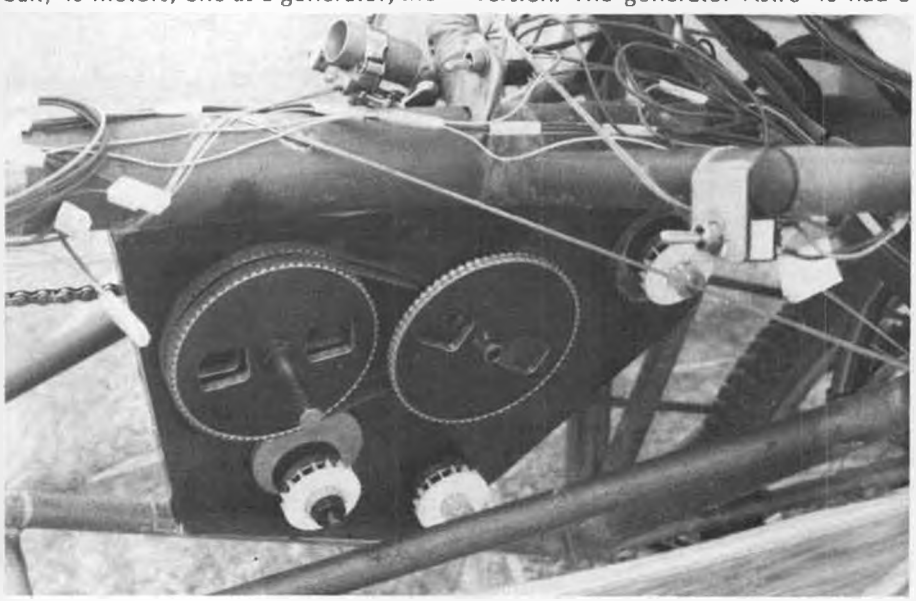


Dr. Paul Mac Ready inspects the *Bionic Bat*. The aircraft bears a striking resemblance to the *Solar Challenger*, except it is much smaller. All *Bionic Bat* photos by Bob Boucher.

And now for Bob's report on their success. He says that the MacCready team used three Astro Challenger (cobalt) 40 motors, one as a generator, the other two for propulsion. The photo shows the plate for the motor/generator mounting, with a belt drive for the system. The belt drive kept breaking, so a small chain was used in the final version. The generator Astro 40 had a



The *Bionic Bat's* propeller is concentric with the tail boom. The prop's six-foot diameter is driven by a bicycle chain, does 250 rpm.



Motor and generator mounting plate. Three Astro 40 cobalt motors were used, one as a generator, the other two as drive motors. The *Bionic Bat's* connectors reveal its size.

The new and the old . . . Astro 05s, that is! See text for description of the new Astro 05.

Tracy Keneagy admires Heinz Koerner's Udet *Flamingo*. A Keller 50/24 SL with Jomar Speed Controller and 20, 1.2 amp-hour cells powers this scale bipe. The prop used is an 11-7. The model weighs 7-1/2 pounds, has a 67-inch span, has a 1200 sq. in. wing. John Hickey pic.

special winding designed and built by Bob to deliver four to five amps to the 36-volt battery at 9000 rpm. This took a lot of muscle power, and Parker MacCready (Paul's son) trained for a couple of months to get to the point of being able to deliver about 1/3 horsepower for ten minutes during the charge cycle, and another 1/3 horsepower during the flight. Impressive!

Us ordinary humans who potter around in our daily tasks are generating about 1/10 horsepower, so Parker was cranking out 3-1/3 times the normal human output.

The battery pack was 24 Sanyo 1200 mah cells (I am sure they are the same ones supplied with the Astro 05XL) in four six-packs. The two power motors used the regular 40 winding, turning 10,500 rpm with a motor run of 2-1/2 minutes from this charged pack (about a 30-amp draw, 15 per motor). This turned a six-foot carbon fiber prop at 250 rpm. The prop was adjustable in pitch, so the pilot had fine-tuning control of the thrust. The prop is concentric with the tail boom and was driven by a bicycle chain.

Martin Calley and the Simi, California, crew (location of MacCready's plant) built the plane out of carbon fiber structure and mylar covering. The design is quite elegant, and weighs an incredibly light 60 pounds, ready to fly! This makes ultralights look like 747's! The span was originally 42 feet, but it was increased to 50 feet by adding wingtips. The landing gear is a single bicycle wheel with two small wheels front and rear for roll outs. The first flights were at night, with only a quarter moon for light, and the plane turned out to be quite graceful in flight and practically silent. You could not see or hear the plane coming until it was practically on top of you . . . so, what better name than the *Bionic Bat*?

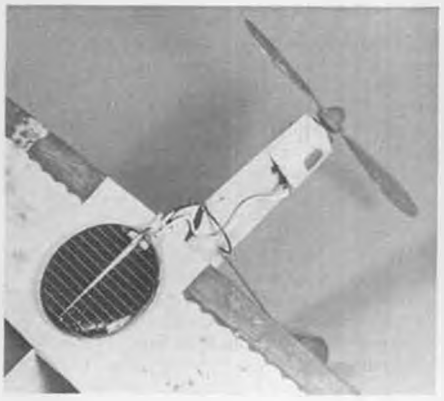
Bob went to Shafter (near Bakersfield, California) for four weekends in a row to witness the trials and help out, but missed the final winning flight . . . oh well. Thanks, Bob for the neat report on the latest Boucher-MacCready project.

By the way, the prize was 20,000 pounds Sterling, worth about $40,000 US. The effort probably didn't make a lot of profit, but the gain in knowledge is enormous. Can you visualize your own *Bionic Bat*, good for Sunday outings? It would be fun, and for us non-athletes, a larger battery pack (about 10-Ah) would be enough for half-hour flights. Dream on, but someday. . .

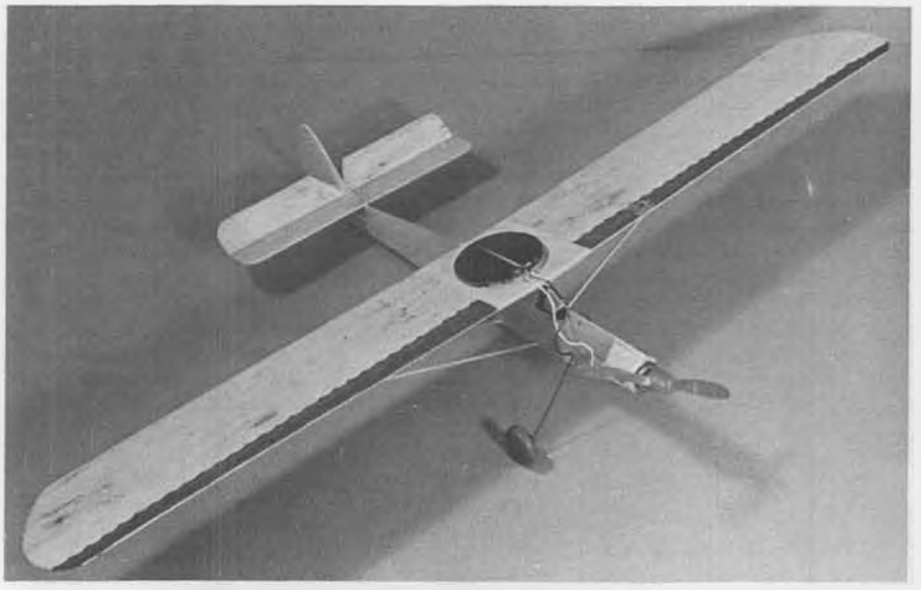
Bob also sends news of the latest developments at Astro. The Astro 05XL system has been upgraded with a new motor, the long frame motor that has been sold in the past as the Astro 075XL. I got a sample, and it turned a Top Flight 7-4 nylon prop at 10,400 rpm with a 12-ampere current draw from a six-cell GE pack. I have not flown it yet, but Bob says it will run on the ground for seven minutes, and that the fliers in California are getting very good flight times with it.

The new 05XL will turn a 7-4 prop at

Continued on page 66



Shawn Theiss, a 10 year old modeler from Florida, made this solar powered airplane.



The *Solar Pup*, as created by Shawn Theiss, flies on a single solar cell and electric motor scavenged from a Cape Canaveral souvenir. Span is 26 inches, length is 14-3/4 inches.

BIG BIRDS

By AL ALMAN

Dan Lutz of Kraft Systems really can build, as proved by this photo of his handiwork. The J-3 *Cub* was constructed from Sid Morgan plans, and

YOU GET WHAT YOU PAY FOR . . . OR DO YOU?

I'm all for the free enterprise system, and regard entrepreneurs with awe and admiration; they're certainly entitled to their fair share of the market and to make an honest profit. But, all too often, I get the feeling that I, we, have been had . . . severely shafted, if you will . . . and right now the purveyors of fuel are at the top of my "list."

Actually, this animosity started back in '73 during that fuel oil crisis. I still haven't figured out what synthetic and castor oils had in common with Arabian crude . . . but everybody jumped on the bandwagon and followed OPEC's lead in drastically raising all oil prices. I'd not forgotten about those unreasonably large profit margins, but had sort of mellowed a bit on the subject . . . till the latest unsavory practice: putting it to the four-stroke fraternity.

The basic difference between two-cycle and four-cycle glow fuel is the oil content. Without exception, these four-strokers run better and more efficiently on 10 percent (or less) oil instead of the "standard" 20 percent we've all come to know and love. So, the burning question is . . . if four-stroke fuel has at least 10 percent less oil than two-stroke fuel (assuming both have the same nitro content), why do the fuel people demand the same price for both? Surely, being able to use half the amount of oil in a four-stroke mix lowers their cost . . . and yet they refuse to pass that obvious savings on to us. Talk about your greedy people . . . wow! *(Could it be that the 10 percent increase in methanol makes up for the difference? wrf)*

A pox on them! I'll not pay that kind of price 'cause there are alternatives . . . and here is where you've got to decide whether or not you want to stay with glow fuel, or convert to ignition. If you're gonna go glow, it's simply a matter of adding straight methanol to regular glow fuel; in my case, I mix two gallons of methanol with one gallon of 15-20 percent nitro fuel as my Magnum .91S four-strokers seem to love six to seven percent oil and five to seven percent nitro . . . and I end up with three gallons of this blend at an easy-to-take $4 per. However, if your engine needs more oil, then only one gallon of alky should be added to the gallon of two-cycle. Because methanol is available at speed shops at $1 to $1.25 per gallon, your two gallons should also reflect an overall lower cost than if you bought four-cycle mix by the jug. *(There's my answer. wrf)*

The other option, converting to ignition (which I prefer), does carry an initially higher cost . . . but, if you fly a lot, the savings in fuel will easily pay for the ignition unit by the end of that first year. You'll also end up with an even quieter running engine and the ability to swing an even larger prop. And, of course, you won't be dependent on glow fuel people; a visit to your local chain saw or small engine shop on the way home from the gas station will get you all the makings . . . at really nice, affordable prices.

I guess it's only fair to mention that because of the four-stroker's ability to eke out its fuel supply, a ninety will average 16 minutes from an eight-ounce tank . . . so that you'll get a surprising amount of flying from your nine bucks-a-gallon four-stroke mix. But, if you really want to talk economy, wait until the ignition converted four-stroke does its thing; how about over thirty minutes from that same eight-ounce tank using $2.50 a gallon fuel? I really meant what I said earlier about the ignition conversion paying for itself within the first year . . . or after just one season.

I've been using the C.H. Electronics, Inc. unit on a variety of engines for two years now, and can highly recommend it; Bill Carpenter, 224 Shamrock, Riverton, WY 82501, (307) 857-6897, is the head man.

★ ★ ★

Fortunately, in most cases we do get our money's worth, and here are two prime examples. . . .

The first good guy, Doug Mac Brien (24 Truby Street, Granby, MA 01033, 413/467-7971), peddles Druine *Turbulent* and OS2U *Kingfisher* plans . . . but, oh, what a difference between Doug's stuff and most others. I haven't seen the *Kingfisher*, but his *"Turb"* plans and 16-page instruction book both have mucho G-O-O-D-N-E-S-S; they reflect care and attention to detail.

LEFT: Noal R. Hess built this super Waco YKS-6 from Bob Morse plans. At 35 pounds, it's kind of a heavyweight, which keeps the Kioritz 2.4 working hard all the time. Noal does nice work!

RIGHT: Doug Mac Brian sells a fantastic plan package for this Druine *Turbulent*. Unfortunately, the snow covered field and bright blue sky don't come with the purchase. . .

came out weighing 14-1/2 pounds with Quadra engine aboard. The model was covered with silk and finished with nitrate dope.

Clark Foy, of Ontario, Canada, cranked out this flawless, 27-pound *Super-Fli* from the Ohio Superstar kit. He used two-ounce fiberglass cloth and resin and acrylic enamel to get the finish he wanted. E.T. pilots the Quadra 50 powered model.

From Peculiar, Missouri, comes Bob Chanslor's great flying Great Lakes bipe . . . built from *Model Builder* plans, and Quadra powered. A bad Ni-Cd made the nice birdie go BOOM, but Bob somehow pieced her all together again. This time Chanslor said he's going to use the Ace R/C Redundant Battery System for safety. Good idea!

Now, I've never met Doug, but he earned a permanent place on my good guys list as soon as I looked at his plan package . . . because for thirty bucks you not only get these good plans and instructions shipped rolled, but Mac Brien has also included something that has never been done right the very few other times it's been attempted: a booklet of very clear, easy-to-read and informative photos. There are over forty of these first-rate halftones; most show different areas of construction, and a few are of the full-size bird, cockpit, and instrument panel. And Doug notes any changes or revisions on these pix.

Designed for the Quadra, this 86-inch, 17-pound BIG Bird is highly aerobatic . . . although if low and slow is your thing, you can throttle back and enjoy the *Turb's* great stability. According to Mr. Mac Brien, this design, with its fixed wing slots, is very close to scale . . . and he includes info on how to obtain documentation in case you just gotta go whole hog. This is a well-proven airplane; the original flew for a year, then the MK II was built in '81 . . . and to date has over 115 hours of flying time. I sure can't tell you that I've flown this one, 'cause I haven't . . . but I have seen a few of them fly extremely well in spite of being controlled by barely competent pilots.

By the way, Doug is adding a 1/4-scale Dalotel DM 165 to his lineup, and it should be ready by the time you read this. He's just starting to test fly the prototype, and so far she flies as good as she looks. This one also came out to 17 pounds and 86 inches, but has a Zenoah Quartz 2.3 for power.

Mac Brien's instruction book also includes good reminders and advice about safety, all of which come under, "Flight Testing and Safety Considerations." As mentioned earlier, he really does care!

★ ★ ★

The other good guy, SR Batteries' Larry Sribnick, usually goes around disguised as a mild-mannered contributing editor to *Popular Photography* magazine . . . but dons his "Super Batteryman" suit (in whatever phone booth happens to be available) whenever he hears a cry for help. And help is what he gives, 'cause SR batteries are different, simply because they're better.

I have to take Larry's word about all the technical stuff, like his cells being spotwelded internally for reliability, and using a vent system that's resealable, mainly because I don't have the time nor the inclination to start dissecting cells to see what makes them tick. But, I do know that I'm consistently getting a lot more capacity (about 20 percent) out of SR packs as compared to other brands of the same rating . . . and this is the kind of insurance I cannot do without. There's no argument that batteries are the weakest link in our system, so, obviously, the better the battery pack is, the better and more reliable the radio link is going to be.

Although I normally use 1200 mah receiver packs (my SR 1200 packs act

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RIGHT: Ikon N'wst Porterfield *Flyabout*. It handles well, both on the ground and in the air, and has that "different" look. Now all I have to do is get Neely to put pilots in his cockpits. Enya .90 four-stroke powers the model.

Pattern Flying

By DICK HANSON

Jim Eides, of Denver, Colorado, flew in the Masters Class at the annual Las Vegas event.

Dave Stuart, of Logan, Utah, placed fifth in Expert Class with this CAP 21.

• We had a ball this summer working with the new four-stroke engines. So far, we have only flown the O.S. 1.2 and the Enya .90 models, but we've learned a few more things that may interest you.

First off, the propellers available to the average modeler are designed for two-cycle engines, and don't offer the pitch or blade shape we found to work the best. After reworking a number of props, it appeared that the Enya .90 pulled best on a 12-10 narrow blade. Static rpm is about 9800.

The O.S. 1.2 was run on many sizes and shapes, but we have found a blade that seems "just right." It's the D.W. 13-10. It turns these props at a static rpm of 10,000. A glow plug that seems to work very well is the plain old K.B. Long. O.S. offers a nice plug that works well at speed, but oddly enough doesn't idle, transition, or "needle" as well.

We bought a number of these expensive beauties, and frankly, I can't find any reason for their special shape *or* price. The fuel we are presently using is a ten percent Dick McCoy oil, two percent castor, ten percent nitro blend that one of our pattern fliers put together for his O.S. V.F. 61. I am satisfied that this fuel runs better than any mixture I've ever tried, and repeated examination shows no increased wear. It also runs like crazy in the O.S. gearbox engine. The performance increase on all engines tested is very obvious. I can only assume that the friction or internal drag is greatly reduced when using the McCoy oil. If any of you lubrication specialists have any solid data on this stuff, please let me know!

Last month, we entered an 825 sq. in. *Dalotel* in the Las Vegas annual pattern contest. The engine used was the Enya .90. This was not an arrangement we thought best, but it was all we had together at the time due to an untimely radio failure on our V.F. powered bird.

Unfortunately for me, the engine simply didn't have enough poop to fly the larger maneuvers in a model that large. Nevertheless, many of the fliers took it for a spin (no pun), and the general impression was that the four-stroke works well!

I think we have "zeroed in" on the engine-to-plane size relationship now, and we are more convinced than ever that the four-strokers are here to stay.

While we were trying to decide what size model to try next, we found out O.S. was releasing a .90 four-stroker. Naturally, we had to have one. So . . . yesterday the UPS driver dropped one at the door. *(Not literally, we hope. wrf)*

The first thing we noticed was the weight: about 24 oz., not much more than a .60 two-cycle. After looking it over carefully, we noticed the intake port is almost 180° from the exhaust port. This reminded us of the head arrangement on the old Chrysler Hemi. A very straight path in and out of the combustion chamber.

O.S. says 11-7 or 11-8 props can be used. This is *very* different information than that furnished with earlier four-cycle engines. I can't wait to test it. In fact, I am whipping up a 750 sq. in., seven-pound model to test fly it.

World Engines recently published an ad which claimed the O.S. .90 turned an 11-7 at 12,600, but O.S. literature gives 11,000 rpm as desirable max speed. We will make up our own mind on this one.

While I was at the Vegas contest, I met one of the Australian FAI Pattern Team members who had stopped in to see the quarter-scale event. I can't remember his last name, but Tom and I spent some time comparing notes on four-strokers.

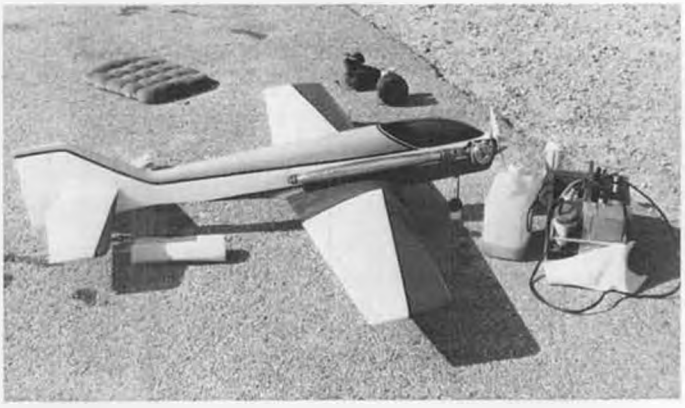
Apparently, the Japanese are actively using these engines, and have even found tuned exhaust lengths which add power. I *will* pursue this!

He also mentioned an interesting thing about rubber mounted .60 two-cycle engines he was using. His tests showed a three to five decibel noise reduction using a very soft mounting system. That's a very large reduction in sound level!

Merle Hyde showed me a rubber mounted engine in his son's model. It looked very unusual, but worked very well. The model was quiet as a mouse. If possible, I'll describe it in next month's article.

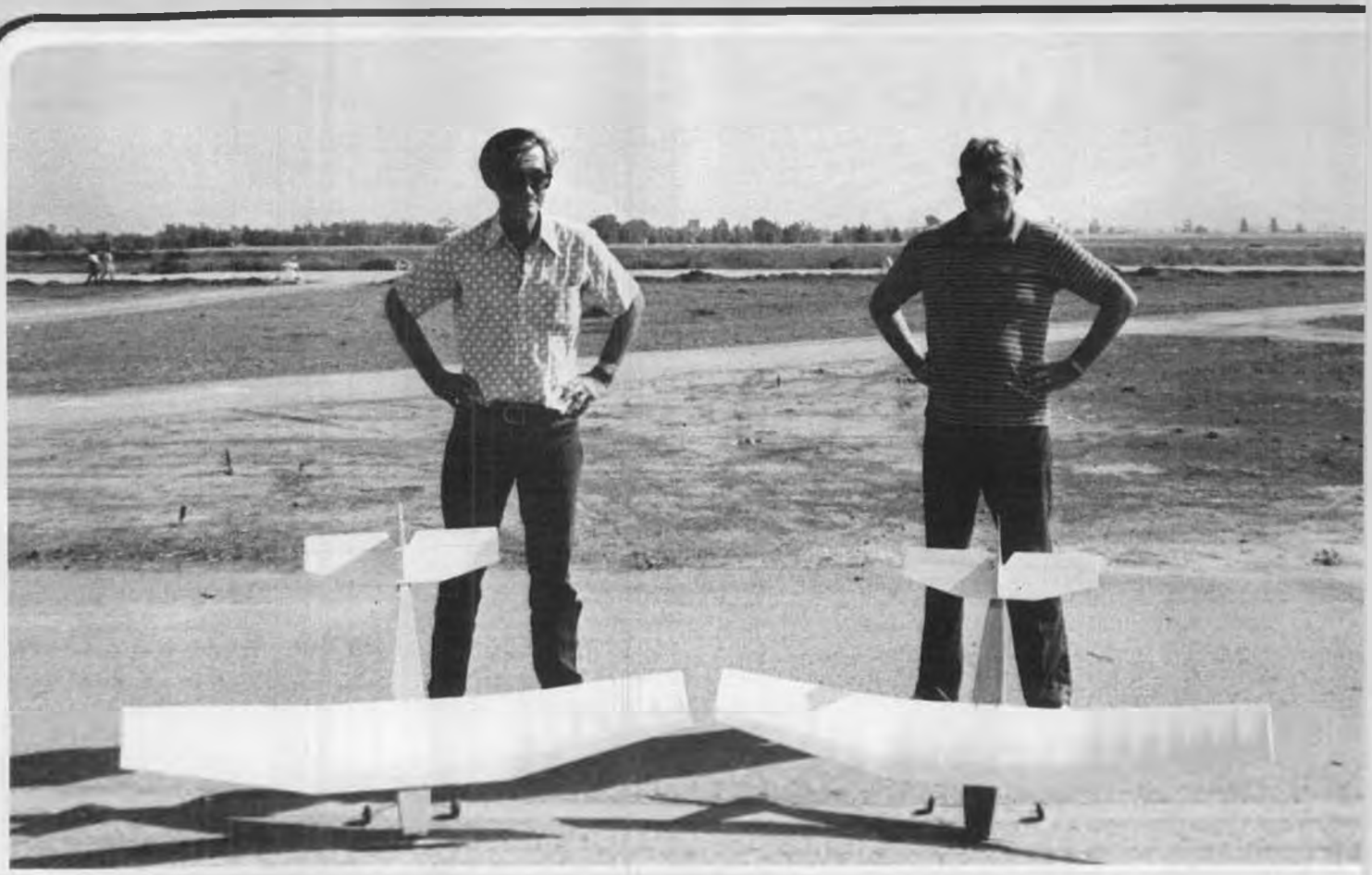
The pattern contest at Vegas is always excellent, well run, lots of fliers, super judges, the whole bit. This year we had contestants from Logan, Utah, Steamboat Springs and Denver, Colorado, Mudpuddle, Washington, and of course, all of Los Angeles. I've included some pix of these contestants and their models.

We will be back next month with more on the new engines and noise reduction techniques. •



Ron Loeber's *Hippo* flies with a huge, special Rossi head on a Rossi .60. Scene is the annual Las Vegas contest.

John Gayer, of Colorado, flew this sharp looking *Curare* at the Las Vegas aerobatic (Pattern) contest.



Jim Hall (left) and Woody Woodward pose for the camera at the Sepulveda Basin, California. Jim built his *Volts Wagon* in one week.

VOLTS WAGON

By WOODY WOODWARD . . . Electric powered R/C aircraft are clean, quiet, and simple to operate. The *Volts Wagon* is no exception. The following article is a "must read" for all potential electro-fliers!

• **WARNING: Electroflight has been determined to be habit forming. There are varified reports on file of R/Cers eliminating their noisy and oily glow engines and replacing them with electric propulsion units.**

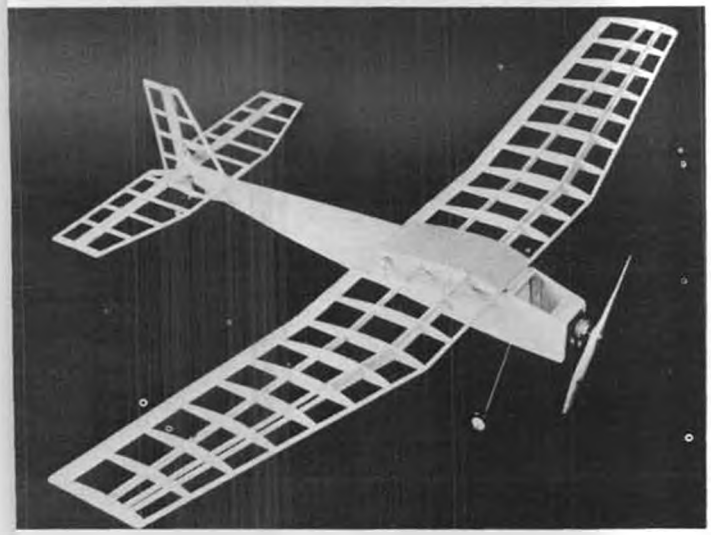
Shocking, isn't it?

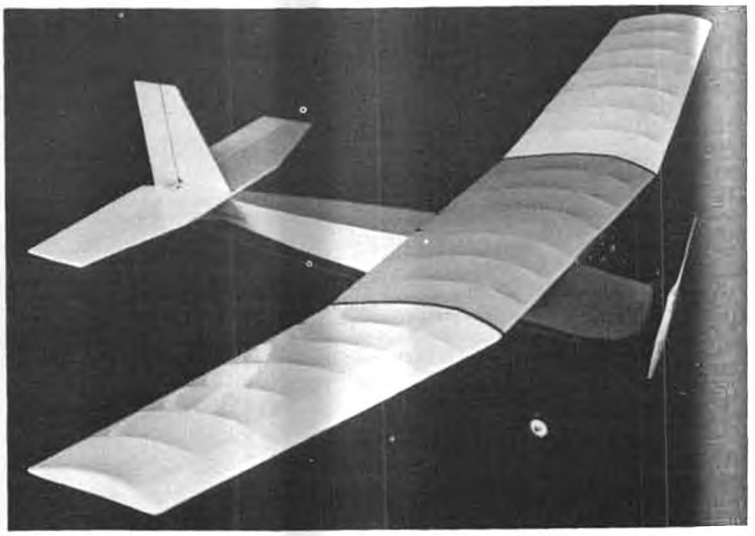
During the past few years, whenever I was asked how best to get into Electroflight, my advice was to get a good two-meter glider like the *Oly 650* or the *Gentle Lady* (there are many that work well . . . whatever you can shoehorn your equipment into), and to get one of the 05 electric motors from Astro or Leisure. While this was good advice, and does provide a workable starting point, the fact is that (1) sailplane designers do not allow space for the bulky electric propulsion batteries; (2) fitting the electric motors is not always a simple task; (3) the inclusion of landing gear and a steerable tail wheel is just not high on the list of desirable features in soaring circles; (4) unless you have an extremely small radio system, it gets terribly crowded inside those narrow glider fuselages; and (5) a two meter sailplane is a fairly ungainly sized airframe with its six-foot-plus wing. (Admittedly, item three is hardly a necessity, but it is very convenient for taxiing back to the pits after a rewarding flight). There must be a better way!

The "better way" should be at least as good a performer as a two-meter sailplane, but be less bulky, more compact, easier and quicker to build, cost less, and take into consideration the specialized needs of the electric powered airplane and its unique systems. Such needs would include adequate ventilation for the motor and battery pack, easy access to the battery pack for its replacement, the ability to accept a variety of different battery packs (i.e. 1200, 800, 550 mah cells), provision for fore and aft movements of the battery pack for ease of balancing; and the ability to change propulsion units (motors) from make to make and size to size without undue complications . . . hence, the *VOLTS WAGON*!

With a wingspan of 54 inches, a wing area of 432 square inches, and a flying weight of around 40 ounces, the super functional *Volts Wagon* achieves all of the aforementioned criteria. Note that, because of the way the front end is designed with its open bottom and removable hatch on top, virtually every available motor in the 05 to 10 range can be easily fitted. The motors are simply suspended from Former A, and it turns out that *all* the bolt patterns are the same! Even the new Astro Super Ferrite 10 and the Astro 15 Cobalt will fit, though I can hardly recommend such overkill.

The landing gear rides in a vertical slot that allows it to be removed in the event that you decide to fly from tall grass. The





Before and after covering. The *Volts Wagon* is a simple, easy to build, electric powered sport plane for 05 motors. The bare *VW* has the Astro belt drive unit, the other, a Leisure unit.

steerable tail wheel allows you to taxi back to the pits. And of course, the combination makes takeoffs a simple matter.

The *VW* has been tested with five motors, two battery combinations (six-cell and seven-cell), eight propellers, two speed reducers (gear drive and belt drive), and two wings. Both wings are the same except for thickness. The first wing (and the one which is included in the plans) has a fairly thin, nine percent airfoil section with a sharp leading edge, and the other one has a 12 percent section with a more rounded leading edge. The difference? The *VW* flew surprisingly well from the very first flight using the thinner wing, however, typical of this kind of wing, it does drop a wing (tip stall) rather quickly if you get careless and do not watch your airspeed.

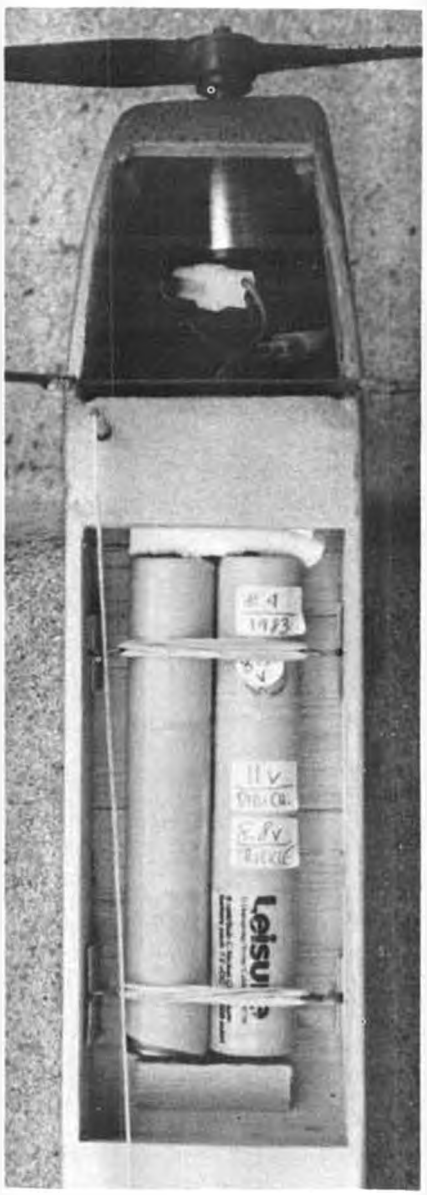
Out of curiousity, I built the thicker, 12% wing. It flew quite well. As a matter of fact, it was (if anything) easier to fly with a "softer" stall and no tendency to drop a wing . . . no doubt easier for a beginner to cope with. However, the *VW* was not designed for beginners . . . you'd better know how to fly *before* tackling this one. The *Volts Wagon* is an entry level electric plane . . . NOT a trainer.

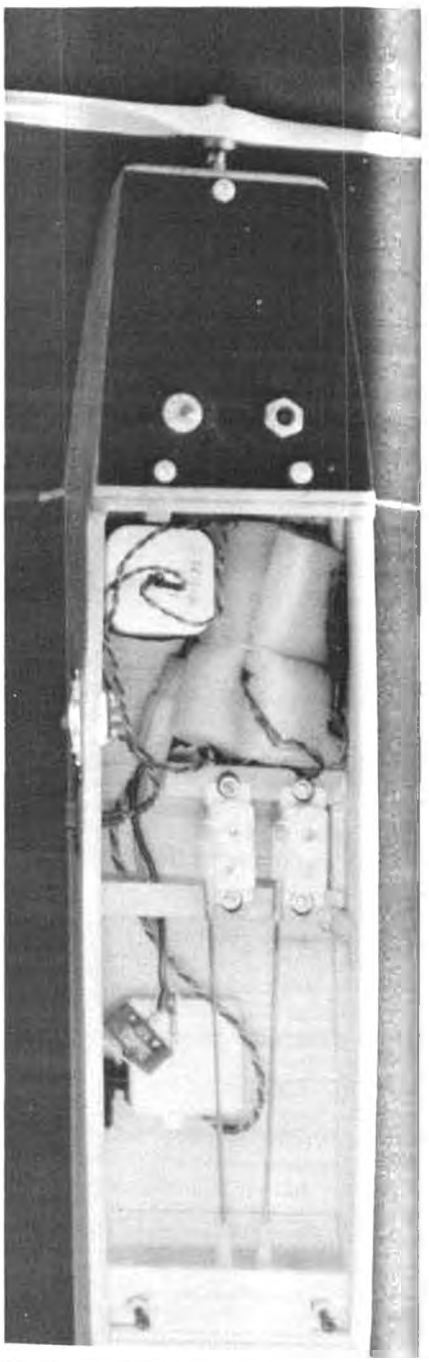
You may ask why I have saddled you with the "trickier" wing? The answer is thermal riding. The thinner wing is a superb thermal hunter. If there is any lift present, any rising air at all, the *VW* wobbles slightly and begins to rise. There is just no way to stop it! Oddly, the thicker wing displays little of this characteristic, and just bumbles its graceful way right on through the "bubble" and out the other side. I thought you'd like the wonderful ways of the thinner wing. If you're chicken, fatten the airfoil 1-1/8 inch at rib W1 and project the other ribs accordingly, then you'll have a nice, docile trainer . . . *Boo!*

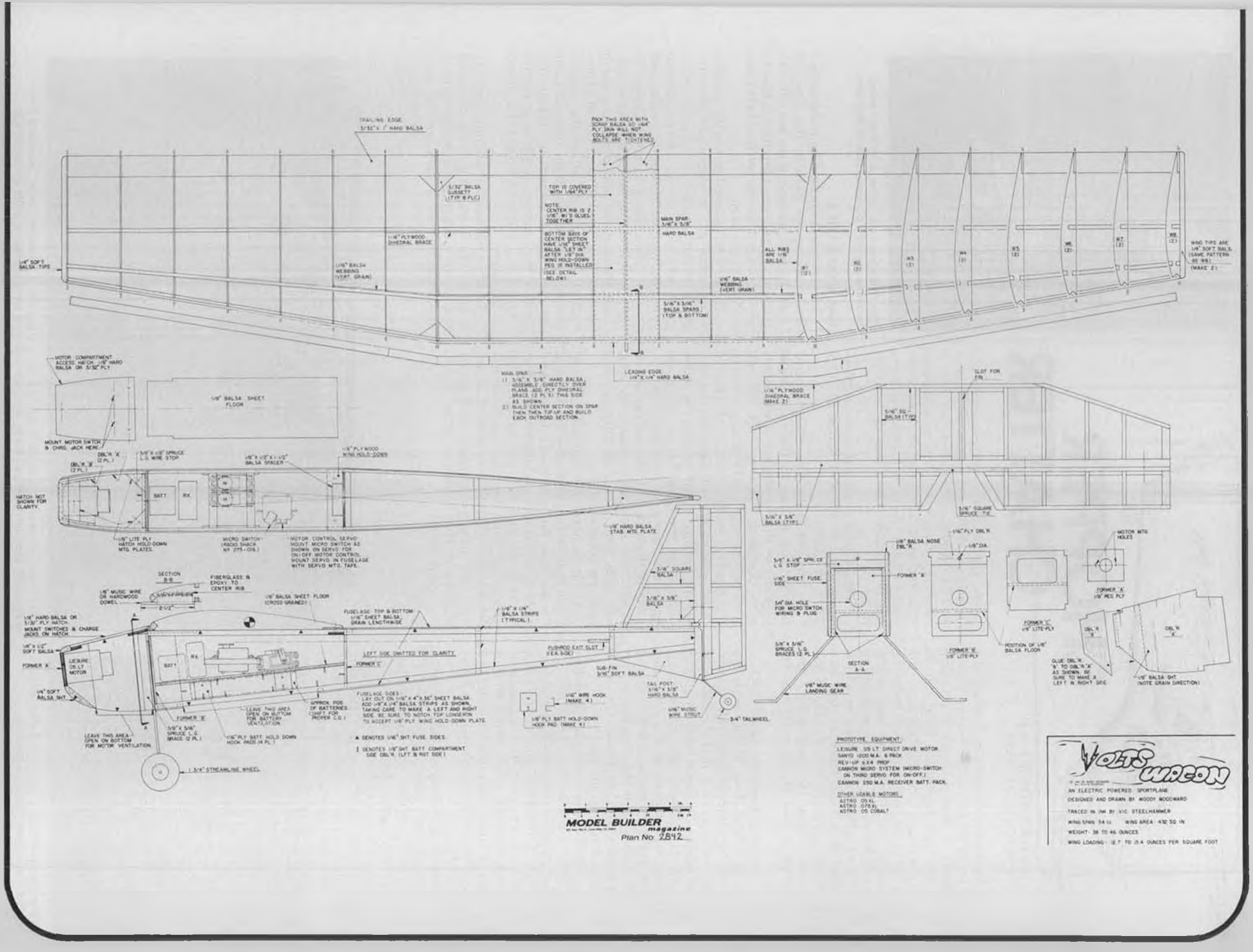
Now that you've decided to build this

Continued on page 87

BELOW & RIGHT: The *VW* has an ingenious radio and battery installation. The bottom compartment houses flight battery, the top one houses the receiver, servos, RX pack.






TRAILING EDGE 3/32" x 1" HARD BALSA
PACK THIS AREA WITH SCRAP BALSA SO 1/64" PLY SKIN WILL NOT COLLAPSE WHEN WING BOLTS ARE TIGHTENED
1/4" SOFT BALSA TIPS
1/16" BALSA WEBBING (VERT. GRAIN)
1/16" PLYWOOD DIHEDRAL BRACE
3/32" BALSA GUSSETT (TYP. 8 PLC)
TOP IS COVERED WITH 1/64" PLY
NOTE: CENTER RIB IS 2 1/16" RIB'S GLUED TOGETHER
BOTTOM SIDES OF CENTER SECTION HAVE 1/16" SHEET BALSA "LET IN" AFTER 1/8" DIA. WING HOLD-DOWN PEG IS INSTALLED (SEE DETAIL BELOW)
MAIN SPAR: 3/16" X 3/8" HARD BALSA
ALL RIBS ARE 1/16" BALSA
1/16" BALSA WEBBING (VERT. GRAIN)
3/16" X 3/16" BALSA SPARS (TOP & BOTTOM)
WING TIPS ARE 1/4" SOFT BALSA (SAME PATTERN AS RIB) (MAKE 2)
MOTOR COMPARTMENT ACCESS HATCH 1/16" HARD BALSA OR 3/32" PLY
1/16" BALSA SHEET FLOOR
MOUNT MOTOR SWITCH & CHRG. JACK HERE
DBL'R 'A' (2 PL.)
DBL'R 'B' (2 PL.)
3/8" X 1/2" SPRUCE L.G. WING STOP
1/8" X 1/2" X 1 1/2" BALSA SPACER
1/8" PLYWOOD WING HOLD-DOWNS
HATCH NOT SHOWN FOR CLARITY
BATT.
RX.
1/16" LITE PLY HATCH HOLD-DOWN MTG. PLATES.
MICRO SWITCH (RADIO SHACK NT 275-016)
MOTOR CONTROL SERVO MOUNT MICRO SWITCH AS SHOWN ON SERVO FOR ON/OFF MOTOR CONTROL. MOUNT SERVO IN FUSELAGE WITH SERVO MTG. TAPE.
1/8" HARD BALSA STAB. MTG. PLATE
SECTION B-B
FIBERGLASS & EPOXY TO CENTER RIB
1/8" MUSIC WIRE OR HARDWOOD DOWEL
2-1/2"
1/8" BALSA SHEET FLOOR (CROSS GRAINED)
FUSELAGE TOP & BOTTOM: 1/16" SHEET BALSA, GRAIN LENGTHWISE
1/8" X 1/4" BALSA STRIPS (TYPICAL)
3/16" SQUARE BALSA
3/16" X 3/8" BALSA
1/8" HARD BALSA OR 1/32" PLY HATCH MOUNT SWITCHES & CHARGE JACKS ON HATCH
1/4" X 1/2" SOFT BALSA
FORMER 'A'
LEISURE .05 LT MOTOR
1/4" SOFT BALSA SHT.
FORMER 'B'
5/8" X 5/8" SPRUCE L.G. BRACE (2 PL.)
LEAVE THIS AREA OPEN ON BOTTOM FOR MOTOR VENTILATION
LEAVE THIS AREA OPEN ON BOTTOM FOR BATTERY VENTILATION
1/16" PLY BATT HOLD DOWN HOOK PADS (4 PL.)
APPROX. POS OF BATTERIES (SHIFT FOR PROPER C.G.)
LEFT SIDE OMITTED FOR CLARITY
FORMER 'C'
PUSHROD EXIT SLOT (3 EA. SIDE)
SUB-FIN 3/16" SOFT BALSA
FUSELAGE SIDES: LAY OUT ON 1/16" x 4" x 36" SHEET BALSA. ADD 1/8" X 1/4" BALSA STRIPS AS SHOWN, TAKING CARE TO MAKE A LEFT AND RIGHT SIDE. BE SURE TO NOTCH TOP LONGERON TO ACCEPT 1/8" PLY WING HOLD-DOWN PLATE.
▲ DENOTES 1/16" SHT. FUSE. SIDES.
[DENOTES 1/8" SHT. BATT COMPARTMENT SIDE DBL'R. (LFT & RGT SIDE)
1/16" WIRE HOOK (MAKE 4)
1/8" PLY BATT HOLD-DOWN HOOK PAD (MAKE 4)
TAIL POST 1/16" X 3/8" HARD BALSA
1/16" MUSIC WIRE STRUT
3/4" TAILWHEEL
1 3/4" STREAMLINE WHEEL
MAIN SPAR: (1) 3/16" X 3/8" HARD BALSA ASSEMBLE DIRECTLY OVER PLANS. ADD PLY DIHEDRAL BRACE (2 PL'S) THIS SIDE AS SHOWN. (2) BUILD CENTER SECTION ON SPAR THEN THEN TIP UP AND BUILD EACH OUTBOAD SECTION.
LEADING EDGE 1/4" X 1/4" HARD BALSA
1/16" PLYWOOD DIHEDRAL BRACE (MAKE 2)
SLOT FOR FIN
5/16" SQ. BALSA (TYP.)
3/16" SQUARE SPRUCE TIE
5/16" X 5/8" BALSA (TYP.)
1/8" BALSA NOSE DBL'R
1/16" PLY DBL'R
1/8" DIA.
5/8" x 1/8" SPR. CE L.G. STOP
1/8" SHEET FUSE. SIDE
5/8" DIA. HOLE FOR MICRO SWTCH WIRING & PLUG
5/8" X 5/8" SPRUCE L.G. BRACES (2 PL.)
FORMER 'B'
FORMER 'B' 1/8" LITE-PLY
FORMER 'C' 1/8" LITE-PLY
POSITION OF 1/8" BALSA FLOOR
MOTOR MTG. HOLES
FORMER 'A' 1/8" MED PLY
SECTION A-A
1/8" MUSIC WIRE LANDING GEAR
GLUE DBL'R 'B' TO DBL'R 'A' AS SHOWN, BE SURE TO MAKE A LEFT & RIGHT SIDE.
DBL'R 'B'
DBL'R 'A'
1/16" BALSA SHT. (NOTE GRAIN DIRECTION)
PROTOTYPE EQUIPMENT:
LEISURE .05 LT DIRECT DRIVE MOTOR
SANYO 1200 M.A. 6 PACK
REV-UP 5 X 4 PROP
CANNON MICRO SYSTEM (MICRO-SWITCH ON THIRD SERVO FOR ON-OFF)
CANNON 150 M.A. RECEIVER BATT. PACK
OTHER USABLE MOTORS:
ASTRO .05 XL
ASTRO .070 XL
ASTRO .05 COBALT
MODEL BUILDER magazine
Plan No. 2842
VOLTS WAGON
AN ELECTRIC POWERED SPORTPLANE
DESIGNED AND DRAWN BY WOODY WOODWARD
TRACED IN INK BY VIC STEELHAMMER
WING SPAN: 54 in. WING AREA: 432 SQ. IN.
WEIGHT: 38 TO 46 OUNCES
WING LOADING: 12.7 TO 15.4 OUNCES PER SQUARE FOOT

CHOPPER CHATTER

By RAY HOSTETLER
PHOTOS BY AUTHOR

Ray Hostetler runs up his *JetRanger* using two wheels and a plywood board. See text.

• To lead off this month, I received a letter from Steve Snoen of Surrey, British Columbia, Canada. (I might mention here that you Canadians have sent as much correspondence as pilots in the U.S. Thanks for your support!) Steve has sent some excellent black and white photos of his club's training area, (more later) and also some photos of his modified *Baron 20*. Look at that nice stabilized inverted hover! Steve has obviously "done his homework" and produced a fine flying machine. He writes:

"*. . . Some comments about the Kalt* Baron 20. *I have flown it both with and without the optional Bell/Hiller mixer, and my experience is that the* Baron 20 *should always be flown with the mixer. Without it, it is very slow responding, like any helicopter with just Hiller control. With the mixer, it will loop and roll. It rolls reasonably clockwise, but really poorly anti-clockwise. Is there a simple way to explain this?*

"To improve the acrobatic capability, what changes do you recommend? Thinner paddles, longer/shorter flybar, more/less Bell mixing, shorten the rotor blades or more rpm? Any suggestions are most welcome. I have tried thinner paddles (Competitor), *but they did not do anything for it, except making it less stable in hover.*

"Some of the changes I have done to it: Moved the cyclic servos directly under the swashplate, thereby eliminating two bellcranks. After 10 gallons of fuel, the stock swashplate had developed excessive play in the bearing. A Heli-Boy *swashplate is now working really well. Also, the slide ring assembly (collective pitch change mechanism) developed a lot of play. A slider ring assembly from a Kalt* Baron 60 *was fitted, and now there is no play whatsoever. This modification required quite a bit of re-working to the frame plates. Also, ball bearings were put in to replace bushings in the rotor head.*

"Please find enclosed some pictures of myself and the Kalt Baron 20. *(O.S. 28-H, JR radio)."*

To answer Steve's question about rolling: This is due to the rotor head rotation of the helicopter. Helicopters with clockwise rotor systems will roll fine to the right (clockwise) while helicopters with counter-clockwise rotor systems will roll easier to the left. Rolling against rotor rotation is more difficult as the ship has to fight the gyroscopic force at the main rotor.

So for those of you who are just about to get into aerobatics, always do your first rolls with plenty of altitude, and *with* the rotor rotation.

As far as aerobatic capability, I told Steve that he had probably worked the *Baron 20* as far as it could be worked without going to a completely different rotor head. If you look closely, the photo will show the bearings Steve has fitted into the *Baron's* rotor head, along with the new swashplate and servo placement. Thanks for your input, Steve, it is appreciated.

BACK TO BASICS

Last month, I finished by publishing a letter asking for help in the Chicago area. To pick up where we left off with training, I'll give you a few tips on how to get in contact with proficient helicipter pilots in your area.

If you find yourself out in the middle of nowhere with little contact with other pilots, make up some nice five by seven cards with your name, address, phone number, type of helicopter, radio, and engine. State that you are looking for help with initial trimming and hovering. Take these cards and distribute them (probably by mail with a note of explanation enclosed) to all of the hobby shops within a four-hour drive of your location. Just ask them to display the card on the counter, or pin it up on the "For Sale" bulletin board that most shops have.

Another way to find helicopter activity is to go the fixed-wing flying sites and ask if they know of any helicopter activity in the area. Usually, you can get a

Steve Snoen flies his modified *Baron 20* inverted. Nice grass field is a luxury.

Steve Snoen shows us his group's helicopter run-up area. Obviously, these Canadians have put safety and convenience first as the wire cage and strap equipped table demonstrate.

name or two, or a general location and time where local heli-pilots fly. From my experience, it's pretty rare where airplanes and helicopters fly at the same field. The two just don't mix.

TRIMMING

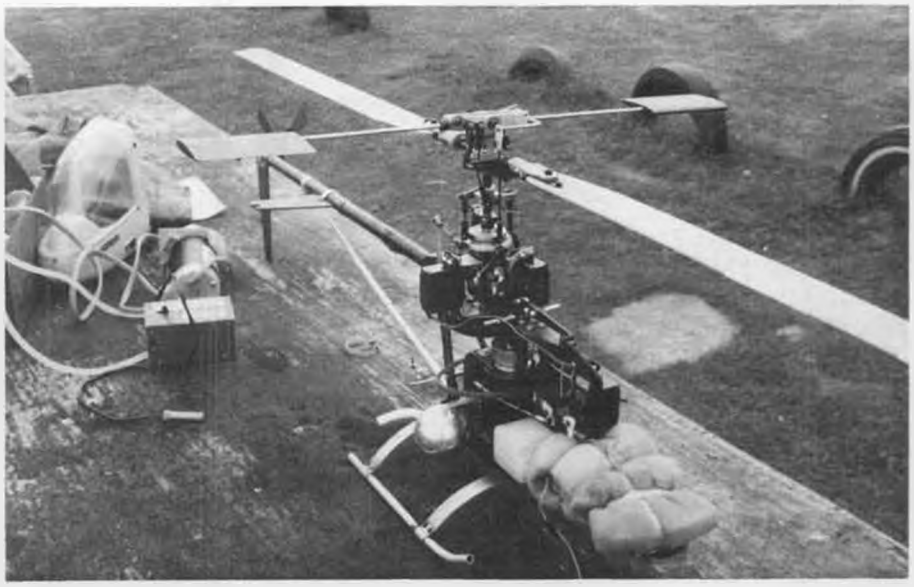
After two months of lead-in discussion, here we are. . . The actual trimming process is pretty straightforward. Take your ship (with training gear) out to a smooth parking lot in a secluded area on a calm morning or evening. Do a little pre-flight, that is: check all servo connections, servo throws, and major bolts such as those which hold on the blades and main rotor head. Also, check main and tail rotor blades for correct rotation, especially tail rotor blades, as they are smaller and harder to see than main rotor blades. Which reminds me of a little story. . .

Years ago, while Dad and I were still learning how to rotor, I had come home from college one weekend, and we were practicing together indoors in a local gym. All went well for the weekend, and I left to go back to school that Sunday afternoon. Later in the week, I had a chance to talk to Dad, and asked if he had a chance to do any more practicing since the past weekend. He said that he had, and all went well except for one minor problem. It seemed that on the initial flight, the helicopter had exhibited a severe vibration at anything above quarter throttle. It was run up to quarter throttle and back down a few times, until it was obvious that something was seriously wrong. Dad shut down the ship, and began to look it over to see what could possibly have happened to generate that much vibration since the last time out. In a few seconds the problem showed itself . . . one of the main rotor blades was on *backwards*! To transport the helicopter, one blade had to be removed to fit the ship into the trunk of the car. On that initial assembly, Dad had inadvertantly placed the blade on upside down, so that the leading edge was trailing, and the trailing edge was leading. Now this was not as stupid as you might think. As the helicopter was a Kavan *JetRanger*, it had symmetrical blades, so there was no difference in airfoil section top to bottom. And as the blades were painted with K&B Superpoxy, there was not the telltale line that sticky-backed covering materials leave where they overlap on the underside of the blade. It all ended up in a very funny episode that could have been caught with a preflight inspection.

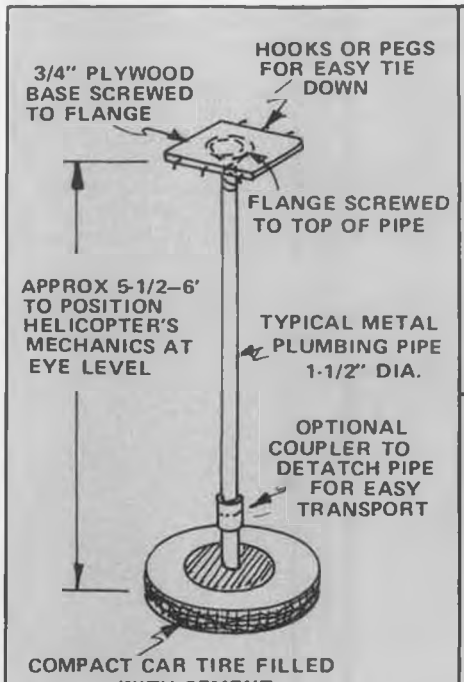
It is nice to have some sort of stand to tie the helicopter to for initial run-ups. I am speaking of the very first time out for any combination of helicopter or radio . . . an old radio in a new helicopter, or a new radio in an old helicopter. This is handy to check the entire system out so you are sure it runs glitch free, and also to set main rotor pitch and blade tracking.

What I usually do is start the helicopter, then place a piece of three-quarter inch thick plywood, four to six inches wide, and two to three feet long, between the ship's belly and on top of the skids. I let the plywood stick out to the left and right of the ship, and keep the ply piece as directly under the main shaft as I can get it. When the ply is

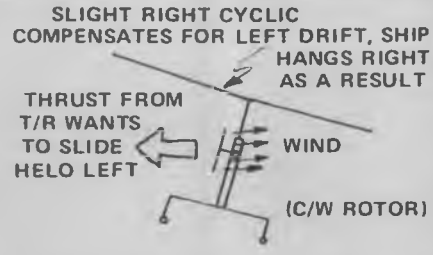
Continued on page 67



Steve Snoen's modified *Baron 20*. Receiver is well protected from vibration with foam rubber.

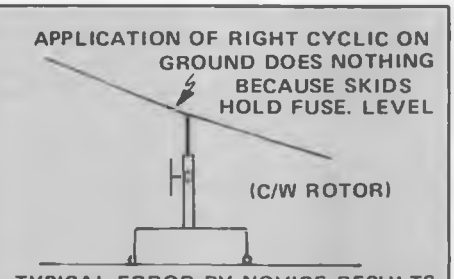


IDEAL RUN-UP STAND (TYPICAL LAYOUT)



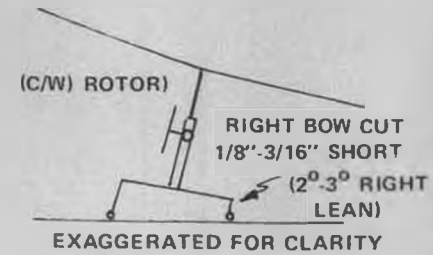
TYPICAL "RIGHT SKID LOW" HOVERING ATTITUDE

FIG. 1



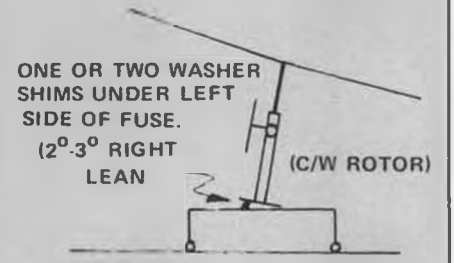
TYPICAL ERROR BY NOVICE RESULTS IN OVERCONTROLLING AS SHIP BREAKS GROUND

FIG. 2



EXAGGERATED FOR CLARITY SHIMMING THE GEAR (OPTION 1)

FIG. 3



EXAGGERATED FOR CLARITY SHIMMING THE GEAR (OPTION 2)

FIG. 4

Eloy's

BIG Bird PART TWO

By ELOY MAREZ . . . This is the second half of a story which began last month dealing with the safe, reliable, and effective use of available R/C hardware in assembling a large scale aircraft such as the German made CAP 20 you see to the right.

Eloy's BIG Bird is this 3/10-scale CAP 20. How he put it all together is detailed in the text.

The well-known Kraft 16-ounce fuel tank is seen here along with its new cousin, a 24-ounce version for bigger BIG Birds. The same quality and features are apparent.

CONTROLS

The control hardware is always important in an R/C airplane, and gets more critical as the size, weight, and speed increase. Again, this being my first such effort, it was a revelation to discover just how much large airplane hardware is available to the builder. To start with, for the very important hinges, I chose Du-Bro Products new Heavy Duty Scale Hinges, No. 257, a kind of king-sized version of the standard pinned hinges we've all used so successfully for so many years. This hinge is 3/4-inch wide by 1-13/32 inches long with both holes and raised letters which both help lock it in place with whatever adhesive is used. The hinges are furnished with a removable 3/64 cotter pin which allows complete assembly of the control surface and then separation for painting. After reassembly, the end of the cotter pin can be bent to prevent its falling out, or as in my case, one can use a single, long piece of 3/64 piano wire to run the entire length of the control surface.

In this case, I also used another Du-Bro product for pushrods, it's No. 144, 4-40 Threaded Rods. These pushrods were used for aileron actuation, and on the rear end of the arrowshaft elevator pushrods. Actually, Du-Bro makes a 4-40 pushrod, complete with clevis, but I was unable to obtain the whole assembly locally just when I was at that point in the construction process, and had to join two products.

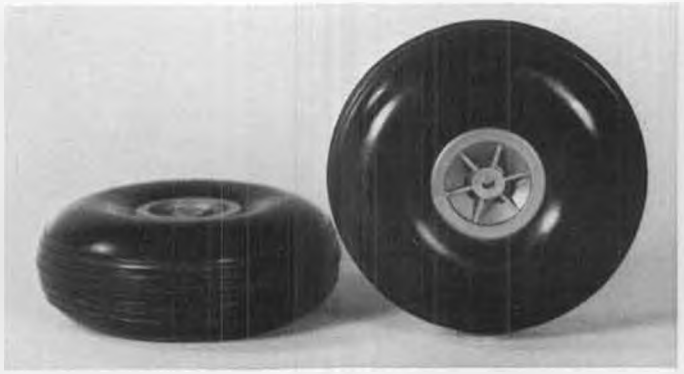
The clevis in this case, also used on the rudder cable assembly, is obtainable from International R/C Specialties, 2310 Cimarron Rd., Las Vegas, NV 89117, (702) 878-1305. It is part of a control cable assembly package, consisting of a multi-strand teflon coated steel cable, one end of which comes with a swaged ball in place. This end goes through a threaded ferrule, onto which the clevis is installed. The other end, after the cable is cut to size, is attached to an identical ferrule using Hot Stuff. Now this may not seem to you like the most secure of connections, but I have been on one end of a spring scale showing 55 pounds, and bottomed further, trying to pull one of these cables apart, with no success.

The ball on one end allows one to rotate the ferrule around it without removing the clevis for final adjustments. Called "Super Clevis," this neat control system is available in two lengths: a package of four 48-inch cables and eight clevises, for $10; and a package of four

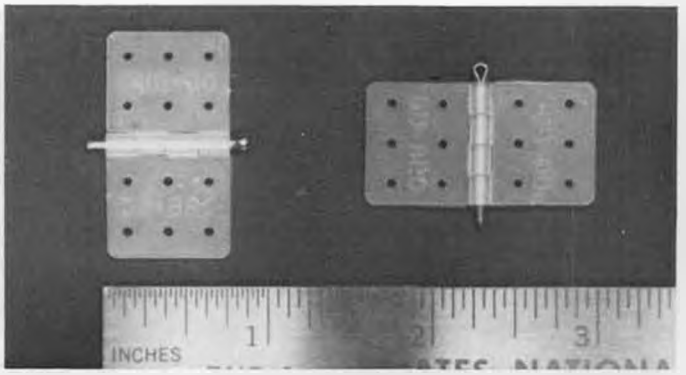
These nylon wing mounting bolt guides, installed into a length of dowel, provide neat, recessed fittings. From Sonic-Tronics.

Drill press cuts the round hole for the dowel. Neatness counts!

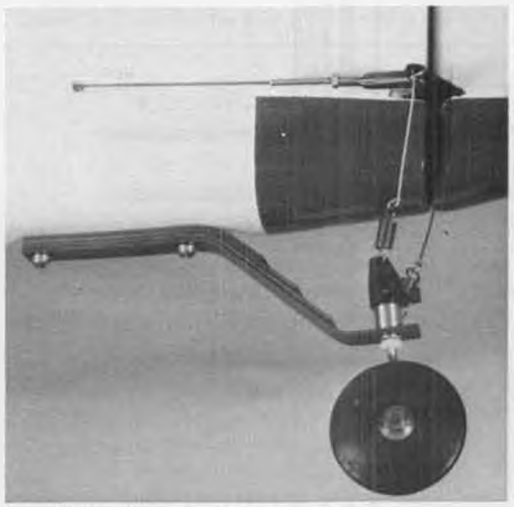
The nylon guide, in the wooden dowel, in the wing core. Use epoxy glue.



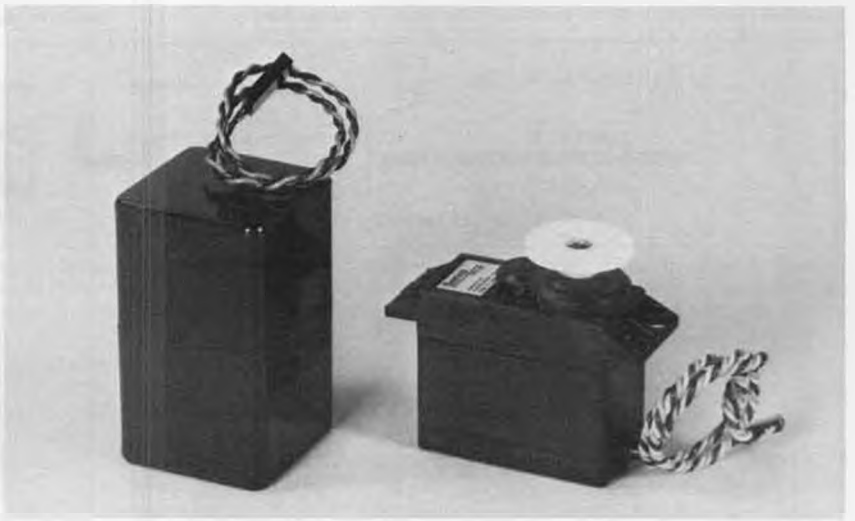
The lightest four-inch wheels we could find: Powermax wheels from England, available from the San Diego company (importer for US).



The all-important control surface hinges. Pin allows the surface to be removed for painting, etc. From Du-Bro Products: Heavy Duty!



A good tail wheel assembly is very important on a model of this size and weight. These CB Associates heavy duty parts fill the bill nicely. Spring loaded!



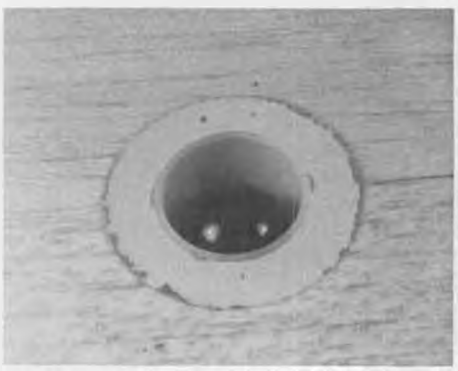
Small, lightweight, powerful servos are always welcome, and the Kraft Systems KPS-28 coreless servos were chosen because of those qualities. Size comparison with 550 pack.

82-inch cables and eight clevises for $11.50, with 50¢ postage in either case. The complete cable and clevis assembly was used on the rudder, which was a cause of some concern for me as those long metal cables are running parallel, and not far from, the receiver antennas, and could conceivably cause blanking at certain attitudes. Not so . . . ground range testing showed no such problems, and by now I've done enough flying with the bird to be convinced that the Kraft KPR-8D receivers are not letting themselves be bothered by such petty things!

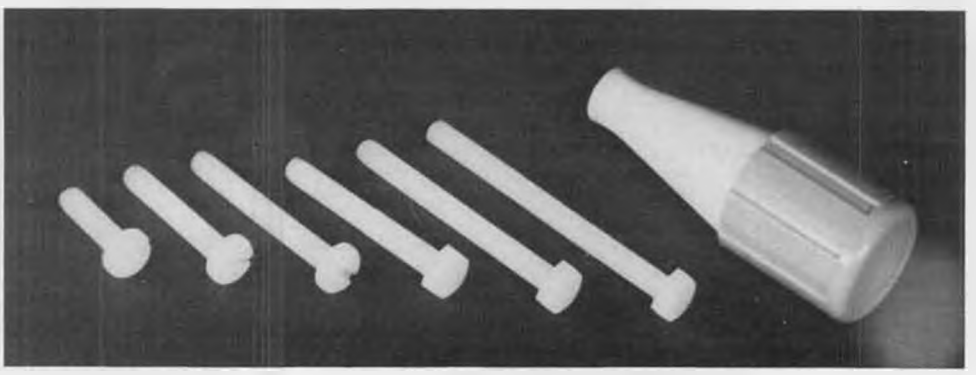
Anyway, as I wasn't able to get the 4-40 Du-Bro clevises in time,I substituted the R/C International Specialties clevis, which is 4mm. Some were tapped to 4-40 for the threaded ends of the rods, others were soldered in place on the other end, as I really don't see the need for a threaded adjustment on both ends of a pushrod. Now some of you may not agree with that business of soldering on clevises, as we've all seen disasters caused by just such an arrangement coming loose, but I can assure you that a properly made *silver solder* connection (see my article, **MB**, May '78. . . my, how time does fly!) will *not* come loose.

The pushrods are arrowshaft pushrods, with homemade wooden dowel plugs in the ends. These are very easy to make if you have a Unimat or similar small lathe, or could even be made on an electric drill with a file. The wire goes through the plug, takes a sharp right bend, and into a hole in the side of the shaft. See the enclosed sketch. A small shot of epoxy on the plug just before it is installed into the shaft seals the whole thing together forever and ever.

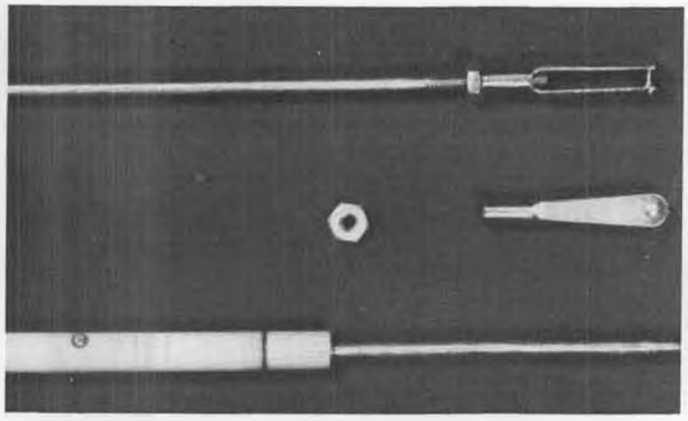
Now for the control horns. I chose and used another C.B. Associates product, Large Rudder Horn, No. 5546. These are extremely strong, 1/8 in. thick, reinforced nylon horns, that are 3/8 inches high from the base to the farthest hole. They even have a reinforcing web between the perpendicular surfaces and a brass bushing for the clevis pin to ride in. These were used on the ailerons and elevators, submounted onto a piece of 1/8 Lite Ply inlaid in the surface, and into which No. 6 blind nuts were inserted to hold the horn mounting screws. Upon



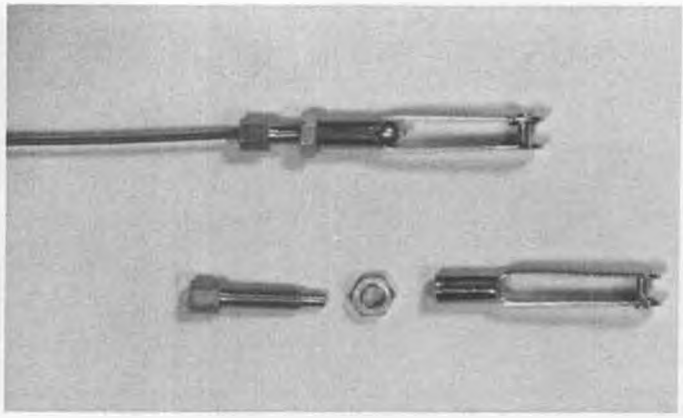
The finished fitting. Epoxy/microballoon mix is used to fill in around nylon guide, sanded off.



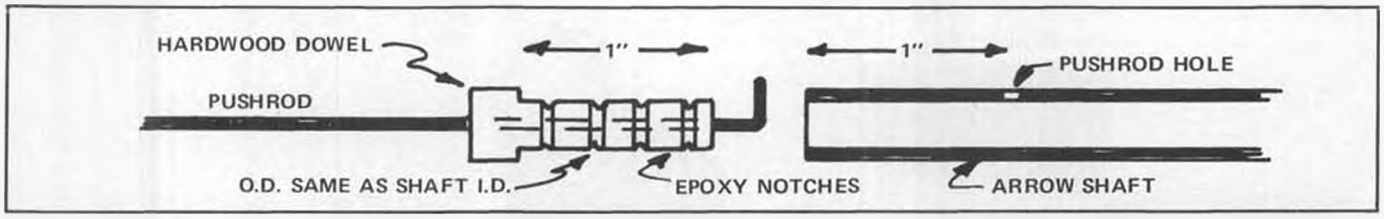
A variety of nylon wing screws are available in different lengths, sizes, and heads. Sonic-Tronics Driver aids in the assembly of wings, cowls, etc., without risk of slipping and scratching paint.



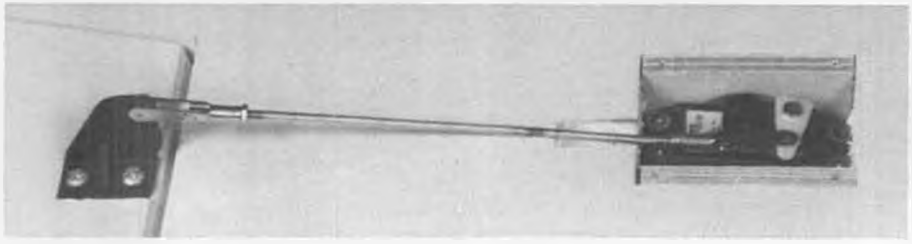
Fiberglass pushrods are solid and secure with Eloy's homemade wooden plugs and Du-Bro's metal rod and clevis combination.



For cable actuation, Eloy uses the newly introduced cable, ball, and clevis fittings from International R/C Specialities, Inc., Las Vegas.



Fiberglass pushrods can be made using arrow shafts. A wooden plug, made from dowel, is turned on a lathe or drill press to obtain the shape depicted here. To assemble, slide the dowel away from the bend, insert the bend in the shaft and into the hole, slide dowel into the shaft.



Control horns can't be overlooked as an important part of the surface control system. The CB Associates No. 5546 horn is used here. Du-Bro pushrod. Ply door covers servo.

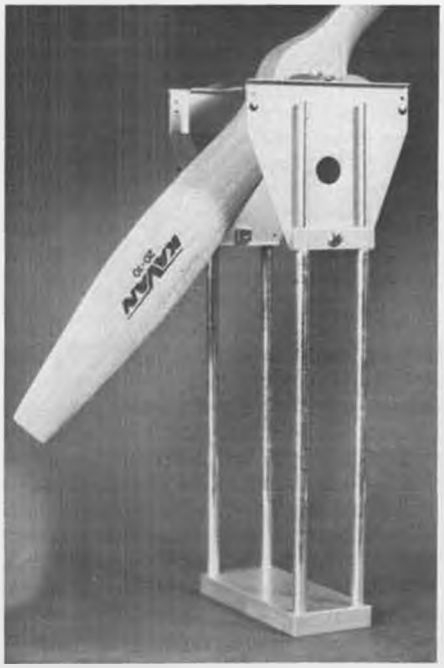
final assembly after painting, a drop of Locktite on each screw is a must.

The rudder and tailwheel are actuated via a C.B. Associates Double Rudder Horn, No. 5545, which as the name implies is a horn on each side of the control surface, just perfect for the cable pull-pull assembly. The C.B. Associates No. 5515HD Heavy Duty Tailwheel Assembly is also actuated via springs from this double horn. These tailwheel assemblies consist of multipole spring steel leaves, with prebent wire axle, horn, and actuating springs. Even with the rather high angle between the rudder and wheel horns, and with the extension required to the actuating coil springs, the steering action is positive enough for good ground handling, yet the coil springs dampen and stop shock from entering into the rudder control system and the servo. A highly recommended item.

TELE-TACHOMETER

Another item for which the wiring was installed, but which has not yet been

Continued on page 90



Large diameter props require extra care in balancing. This High Point Balancer is extremely sensitive. Extensions are used when working with large diameter propellers.

Dave Brown Products Mix-A-Matic epoxy is the best epoxy found for working on epoxy fiberglass fuselages.

The Digicon Tele Tachometer tells you the engine's rpm while the airplane is in the air! Also tells you the airspeed of the model.

1. Cliff Silva can't bend over to launch his model, so he has to depend on young helpers. This can be rough if the helpers lack experience.

2. Larry Clark prepares his *Foo-2-U-2*. This design was Dick Obarski's answer to the Goldberg *Zipper*.

PLUG SPARKS

By JOHN POND

• Another season of Old Timer flying is drawing to a close, and perhaps it is time to review those models (and modelers) that seem to win consistently. In between we will, of course, intersperse reports of interesting contests, meets, and get-togethers that have some interesting sidelights.

Probably the oldest active West Coast SAM chapter is the Southern California Ignition Flyers (SCIF), SAM 3, which recently held its 17th Annual Texaco Contest. Although due credit should be given to the Southern California Antique Model Plane Society (SCAMPS), SAM Chapter 13, for initiating the Texaco event, the SCIF club should receive kudos for making this event possible in the fall.

I have received several reports on this meet including one from Bruce Chandler, the contest director of the meet. Rather surprisingly, the CD did compete in the Flying Scale event, this time with a brand new *Taube* based on the concept that all old German flying machines are superior. As Bruce reports, "While cruising at 2000 feet, the unarmed machine was attacked by a formation of two, well-armed, red tailed hawks. The talons of one snapped the guy wires between the rudder kingpost and the trailing edge of the stabilizer effectively breaking the trim adjustment link. With the loss of all up warp trim, the result was a wire screaming dive into terra firma." *(And we mean firm!)*

Chandler reports the model is still intact, and with a few repairs will again fly the dawn patrol. This writer looks askance at this idea well knowing what the German name Taube means . . . "dove!" I'll give you one guess what the favorite hunting game of a hawk is . . . anyone for an all metal Junkers D-1?

SCAMPS Newsletter Editor Al Richardson reports that attendance by the SCAMPS was low because it was raining in the Los Angeles area. However, after getting over the L.A. hills, the weather started clearing, and got better and better and . . . Sunday was as pretty a flying day as you could find anywhere.

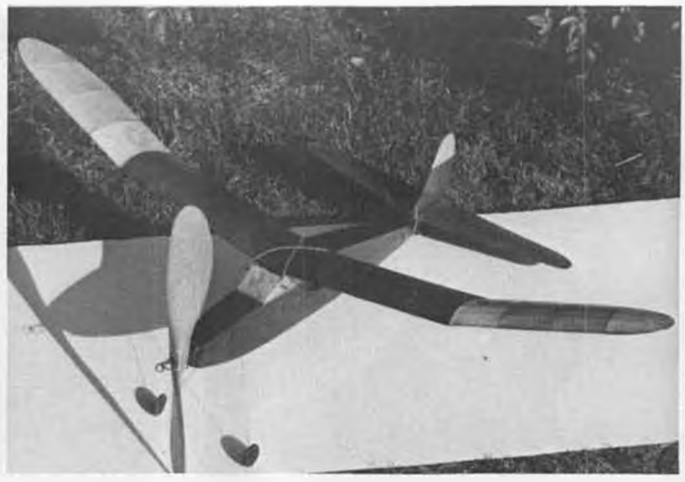
Matter of fact, Chandler commented that even tool boxes were getting "max" flights. He estimated if they could have bounced Lee Freeman's old Cadillac high enough, he would have gotten at least four minutes! As it was, four back-to-back maxes in a series of six flights was good only for fourth place!

Some of Bruce's observations con-

3. Even the best break models! Sal Taibi Hot Stuffs an *Aerbo* together.

4. Bill Cohen never lets the wheel chair bother his engine starting technique. Ross Thomas holds the *Anderson Pylon*.

5. Here's a nicely built Hank Cole *Smoothie* by Mike Moskow who is seen holding it up for the camera.



6. Not often seen at Old Timer events is this Cleveland *Norseman*, a perfect model for the 36-inch Commercial class. Builder unknown.

7. An exact replica of Albert Judge's 1936 Wakefield winner as built by Dave Baker, SAM 35, England.

8. Clyde Austin's *Commodore* in final stages of restoration by Gordon Codding, Kingman, Arizona. Thirty year old structure and covering is very dry and brittle.

cerned Cliff Silva using his old Corben *Ace* to place in Flying Scale after losing out in his favorite event, Texaco. He employed two models, a Petrides *Dolphin* and a Fiske *Hanley* to no avail.

Photo No. 1 shows what a real model addict looks like. Cliff Silva, permanently confined to a wheelchair, flies with the best of them. Most amazing is the way he handles a huge 14-foot model like the *Roll Berryloid* model. One thing for sure, if you have to depend on inexperienced help to launch your models (from the ground), you really learn the meaning of patience! So many times this writer has seen poor launches damage his models.

While we are at it, we might as well show Photo No. 2 of Larry Clark, former SCIF prexy, with his *Foo-2-U-2*. Like all of Larry's models, this one has taken a long time to adjust. As reported in earlier issues, this design by Dick Obarski was actually produced in 1939. Obarski, it will be remembered, worked with Goldberg in the development of the *Zipper* design, doing much of the test flying to "debug" the final kit design.

9. HELP! Art Suhr sent in this photo to get an identification. Anyone out there remember this one from 1937-'38, Los Angeles area?

10. Contestants gather for a group shot at Kearney Mesa contest, San Diego, California. Mel Anderson can be seen rubbing his eye. Photo courtesy of Bill Simpson.

11. Here are a couple of famous boys: Joe Elgin (of *Playboy* fame), and Chet Lanzo (right), with of all things . . . gliders!

12. Sid Sutherland, England, likes his Delong 30 powered Korda *Powerhouse*. He says it's the most stable model he's ever flown.

Any of you would-be competitors who say they don't have a chance against the "hot shots" would do well to take a look at Photo No. 3 showing one of the best competitors of all time, Sal Taibi, repairing a model on the field. This is simply the difference between winning and not winning: the determination to win. Actually, some luck enters into any form of competition, but it does boil down to one thing: *practice*. If your model is ready to go come the day of the contest, you will eventually get your share of the trophies!

The boys have really learned to make their engines run economically as witness the Cannon 35 used by Terry O'Meara in his Ray Heit *Scram*. With the engine fully choked down, engine just ticking over, some fellows claimed the motor was still running when it passed out of sight at 22 minutes!! Just to prove the flight was no fluke, Terry put up a second flight for 36 minutes!

1/2A Texaco
1. Bill Cohen 44:07
2. Carl Taylor 31:45
3. Sandy Chapin 29:26

O/T Cabin Gas
1. Jim Adams 18:17
2. Dick Lyons 17:47
3. Larry Clark 15:15

13. M.R. Kemp releases a replica of Arnes Blomgren's 1949 Wakefield. Scene is the Odiham Vintage Wakefield Event. (Miller)

O/T Pylon Gas
1. Al Richardson 25:00
2. Larry Clark 23:42
3. Dick Lyons 23:33

O/T Scale
1. Cliff Silva 23:22
2. Bruce Chandler 19:38
3. Carl Taylor 15:20

Texaco
1. Terry O'Meara 36:07
2. Cliff Silva 19:33
3. John Nogy 18:10

O/T Rubber
1. Andy Faykun 13:08
2. Dick Seifried 12:06
3. Dick Ellington 3:07

Commercial Rubber
1. Al Richardson 4:48
2. Carl Hatrak 2:05

SCAMPS TWIN PUSHER CONTEST

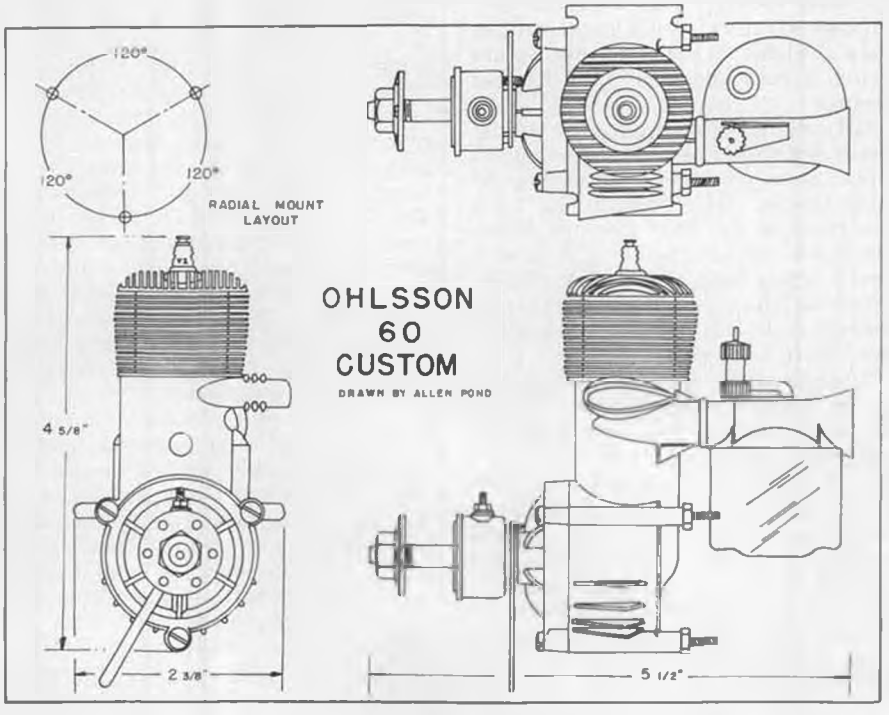
Wanna have some real fun and some laughs at the same time? The Twin Pusher Contest as pushed by the SCAMPS is just the greatest according to reports received from Gene Wallock, CD for that day.

Of course, there were other rubber events held in conjunction that day (O/T Rubber, Thirty-six Inch Commercial, Eight-ounce Wakefield, and Scale), but the big attraction was the Twin Pushers!

Wallock further reports that the team employed by Ed Wallenhorst to get his model wound and launched consisted of the following:

Holder ..... Bill Krecek
L.H. Winder ..... John Camp
R.H. Winder ..... Ed Wallenhorst
Lifter & Fuseman .... Gene Wallock
Laughing Clown ..... Carl Hatrak

Gene feels that all they needed was some music in the form of a singing dog, and they could have made it at the "Tonight" show. Gene's final thoughts: "Jim Adams provided some real style with a flight total of 0:07 seconds! That's a two-flight total!! Maybe we could get Jim Adams to write a few paragraphs for the column giving his expertise on how



15. Bob Moulton appears ready to launch his streamlined twin pusher. Site is Bong Field, site of 1984 SAM Champs.

14. Roy Biddle sends this photo of a lovely Scientific *Victory* which he built. This is another good flying Korda design.

to trim twin pushers (for precision duration)." Haw-w-w!

FUN FLY

We might as well give the rubber band boys their due as more darn fun is being had with the Thirty-six Inch Commercial Rubber event. This is simply an event limited to cabin type models not exceeding 36-inch wingspans.

Ed Wallenhorst, who recently joined the SCAMPS, has proven to be quite the competitor winning first in Commercial Rubber, first in O/T Rubber, and second in Eight-ounce Wakefield. Busy boy!!

The most interesting model on the field was the 1940 *Record Holder* by Wallenhorst. This model has been recently approved by the SAM Board of Directors. The model design could compete in the modern Unlimited Rubber event and do very well. The design looks quite advanced for its day.

Contest Director Jim Adams reports another nice day that required practically a max flight every time to win. As it was, two seconds separated the O/T Rubber winners! With good rubber again available, it is no wonder we are seeing a resurgence of O/T Rubber interest!

After all that plugging for the rubber events, we would be remiss if we didn't at least show a couple of shots of good flying rubber models. Photo No. 5 is a shot taken at the SAM Champs, Westover A.F.B., showing Mike Moskow with a very neatly built Henry Cole design, *Smoothie*. This is not one of the simpler models to build, but the streamline types do fly very well.

Photo No. 6 shows a *Norseman*, one of the series of commemorative models put out by Cleveland to recognize those countries overrun by Hitler's legions in 1940-41. To name a few: *Flemish Defiance, Polish Valor, Austrian Chivalry* . . . actually six of them. If you want to build any others, this is simplicity itself. Once you have built a set of wings and tails, the same lifting surfaces may be used for all of the designs. You can have a lot of fun flying different style models with very little work.

Photo No. 7 comes from England wherein Dave Baker (the SAM 35 spark plug) has faithfully recreated Albert Judge's 1936 Wakefield winner. To prove the model's authenticity, Dave copied this one from an original kit loaned by Bert. You can't ask for a more exact replica than that! Flies great too!

ENGINE OF THE MONTH

Having turned the engine manufacturing business literally on its ear in 1938 with his sensational Ohlsson 23, Irwin Ohlsson decided to come out with a big

Continued on page 80

OLD TIMER Model of the Month

Designed by: Roy Wriston
Drawn by: Al Patterson
Text by: Bill Northrop

• Somewhere in time between the disappearance of motor sticks and the arrival of folding props, the "diamond" fuselage rubber model came into existence. There doesn't seem to have been any logical, aerodynamic, or performance improving reason for rotating a square cross-sectioned fuselage 45 degrees before adding wings, landing gear, and tail surfaces, in fact it sorta complicated the process, but they always looked good to me, and also, I guess, to the many modelers who created them.

One of these models that caught my eye, that I kept going back to in my magazine collection, was appropriately named *"The Diamond."* Designed by Roy Wriston, of Tulsa, Oklahoma, it was one of the more competitively successful diamond fuselage models, and was featured in the October 1937 issue of *Air Trails*. With a 29-inch long fuselage and tapered 150 sq. in. wing, it was a terrific flying model, but was undersize for Wakefield competition.

Roy modified the 150 *Diamond* to 200 square inches, lengthened the fuselage to 36 inches, and qualified for the 1936 Wakefield contest with an O.O.S. 41 minutes, 10 seconds flight. Photos of the Wakefield version described in the article indicate that he increased the center wing panel to 27 inches (18 spaces at 1-1/2 inches each), and made untapered outer panels with five 1-1/2-inch spaces, plus rounded tips three inches long. The stab was the equivalent of two outer wing panels put together. As photos show the Wakefield version, it should be Old Timer legal to make these mods to the plan if you want to fly in O.T. Wakefield. Check with John "Daddy Warbucks" Pond.

The smaller ship seems prettier to me, so we've stuck with that original *Diamond* plan, just as *Air Trails'* Gordon Light chose to do. Change it if you wish. Original building instructions were very brief, and I see no need to expand on them. If you can't build this easy one without instructions, you shouldn't even tackle it. However, the balancing and flight adjustment technique is very well described, and is a system that is very useful for any similar model, so we'll quote it word-for-word.

Select a very calm evening for test flying. A grassy field will reduce damage to a minimum during the first few treacherous trial glides. If your model shows stalling tendencies during these glides, move the wing backward a trifle. If it dives, move it forward. However, don't move the wing too far away from the center of gravity. While this might produce a reasonably good glide, it is practically certain to cause a disastrous flight under power. If necessary, change

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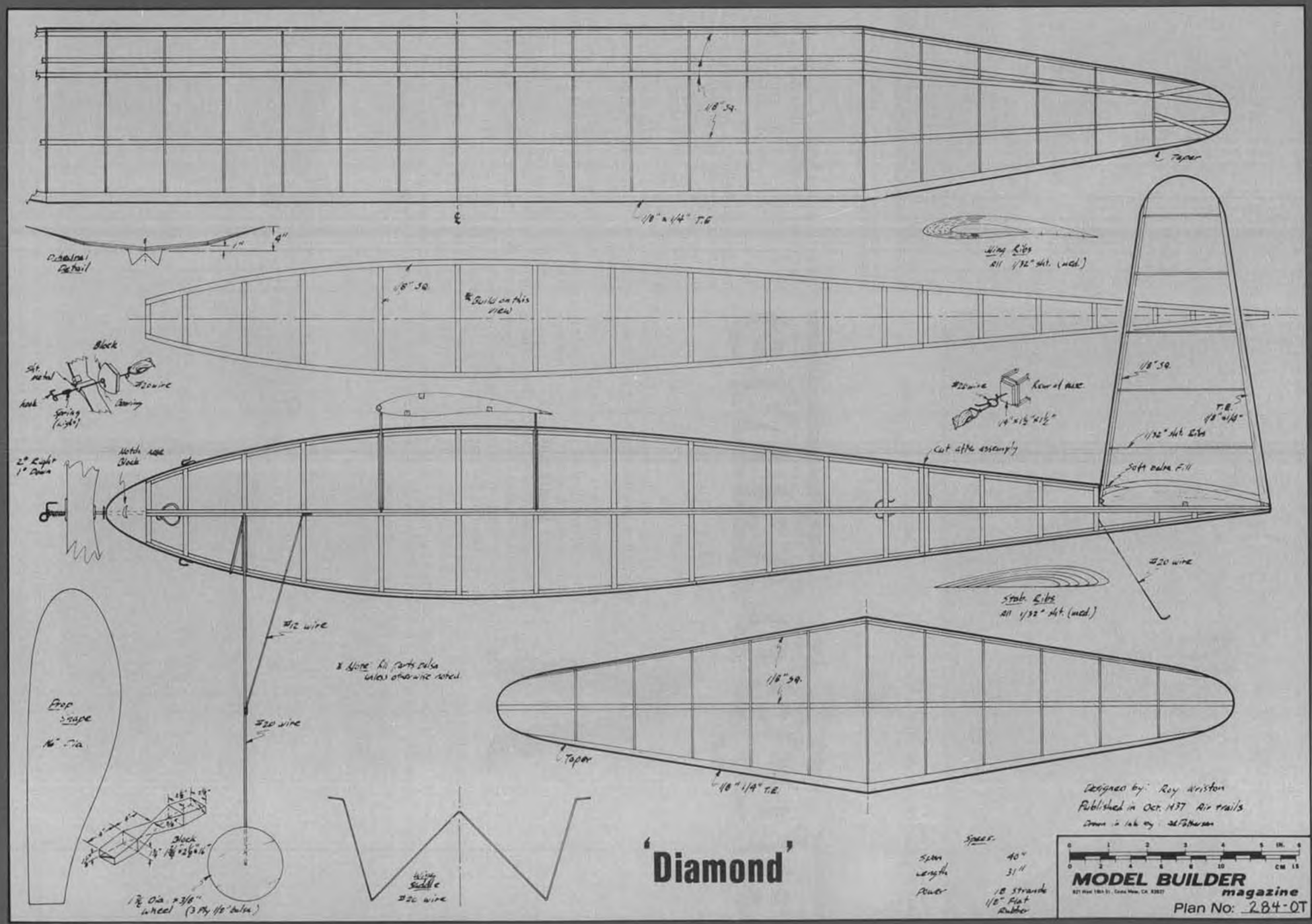
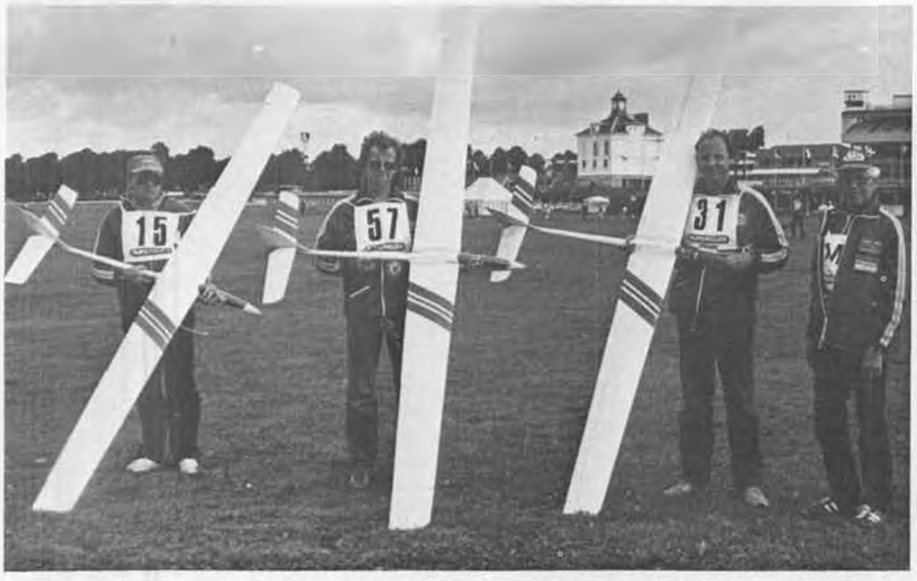


FULL SIZE PLANS AVAILABLE - SEE PAGE 96



The Norwegian F3B team of Ivar Kalleland (15), Thorbjoern Jespersen (57), Kåre Schanche (31), and Hans Peter Aaser (TM) at the 1983 World Championships in York, England.

Kåre Schanche loads ballast shot into the side of the *KITT-193.* Trap door provides access.

R/C SOARING

By BILL FORREY

PHOTOS BY THE AUTHOR

• I was fortunate enough to be able to attend the Fourth R/C Soaring World Championships in York last summer. As I walked around admiring some of the world's top F3B models, one model design in particular captured my attention above all the others. It was the *KITT-193* flown by the Norwegian team. You may recall that I mentioned this glider in my coverage of the WCs in the December **Model Builder.**

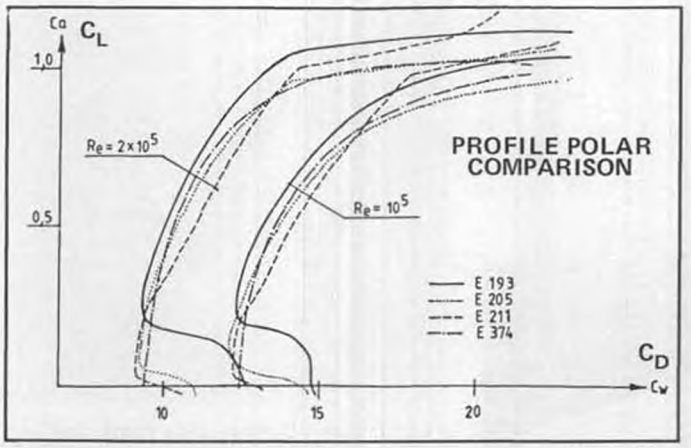
The reason that it captured my attention is that first of all, it was in my opinion the most aesthetically pleasing of all the gliders present. Secondly, it was a glider that I had the modeling skills to duplicate as there were no foam wing cores to order from my friend Mike Bame, who has until recently cut all of my cores for me. (I don't have the time or patience to construct an adequate foam cutting machine.) The wings are built up from balsa, spruce, plywood, and fiberglass . . . all of which require no specialized machinery or skills. And the fuselage is molded fiberglass, a technique that I mastered in my second year of R/C glider building. Thirdly, and some would say most importantly, the *KITT-193* flew very well.

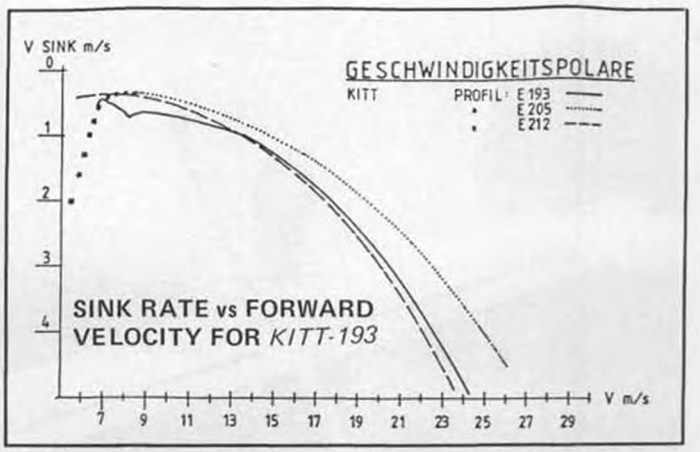
Lately, I have been corresponding with three gentlemen from Norway, two of which were in York for the WCs. As I spent quite a lot of time talking with these men about their F3B airplane, Hans Peter Aaser, the team manager, sent me some very detailed information about the *KITT-193* for which I am very grateful. I am sure that you will be interested in it as well, so I will reproduce it for you here.

"Reverting to our talks on several occasions during the World's in York, I take pleasure in sending you the drawing and specifications for the KITT-193,

Jespersen throws Kalleland's *KITT-193* as Aaser looks on. The *KITT-193* is a model that is within the intermediate builder's skills.

Kåre Schanche shows us the graceful, sweeping lines of the *KITT-193.* Author thought this design was the prettiest, most conventional.





Thorbjoern Jespersen worked out these two graphs to help him decide which airfoil section would be the best compromise for the three tasks of F3B flying. Inspite of a slight disadvantage in the speed task, the Eppler 193 was chosen. The E-193 was one of the most popular at York.

which was flown by all members of the Norwegian team. I am a bit late, but it took quite some effort to 'wring' this material out of Thorbjoern Jespersen, who is the 'chief' designer. . .

KITT-193, BY THORBJOERN JESPERSEN

"KITT's design is based upon experience gained during the Worlds in Belgium, 1979. At that time, the winning Austrian Dassel *was the main topic in F3B circles, as it was departing from the ordinary both in size, design, and materials used,* Dassel *was all epoxy, glass-fiber, and Kevlar made in molds, and all models therefore identical.*

"A similar goal was set up for the KITT *project. Designers were Thorbjoern Jespersen and Ivar Kalleland, but in order to take care of the multitude of work tasks required two (additional) club members . . . Kjell Nysaether and Tor Gressberg . . . were asked to participate. If you take the first letter of their first names, you will get K-I-T-T.*

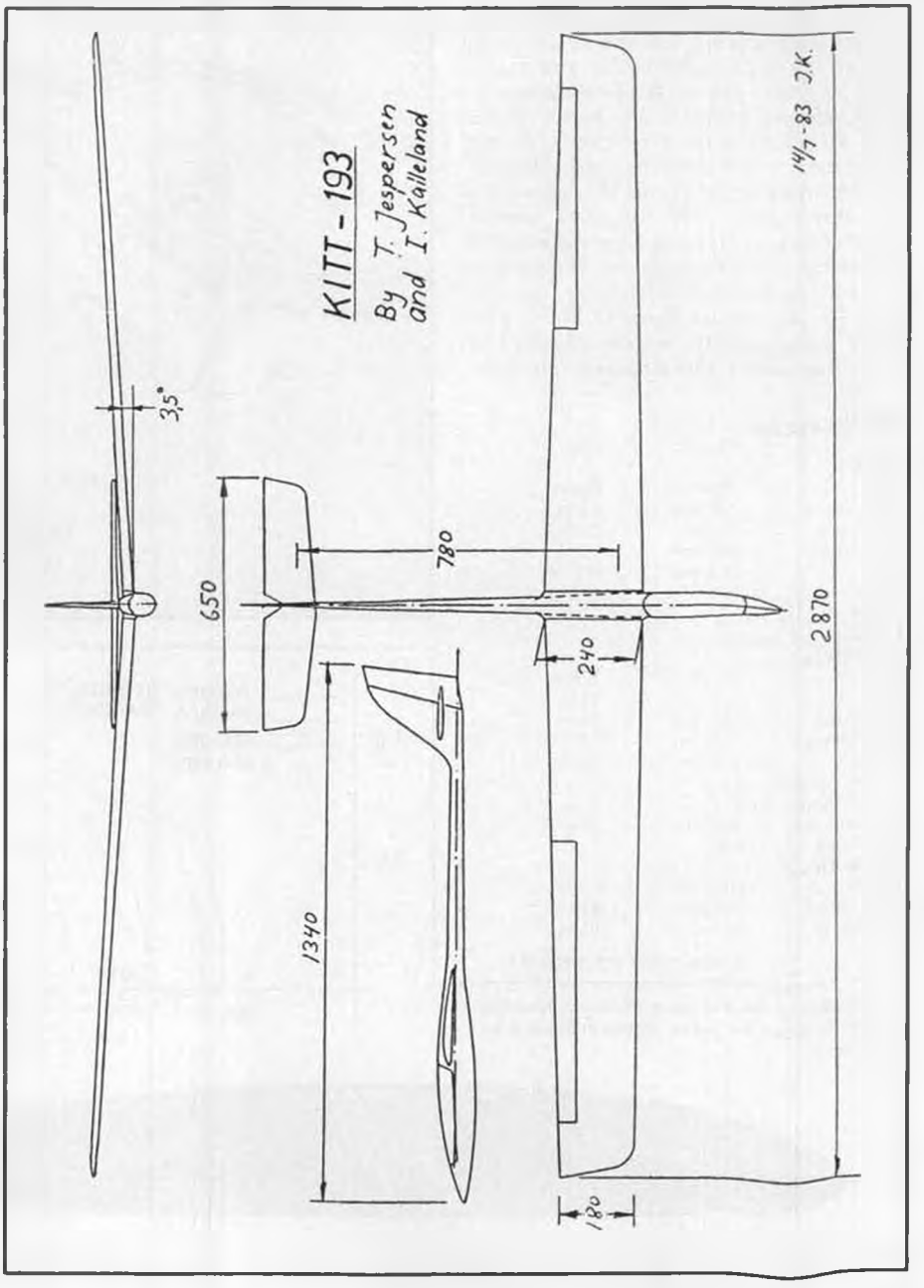
"The fuselage mold was finished in 1980, whereupon production of fuselages started, and naturally, also wings and empennage. Ordinary methods were used for the later with either spruce/balsa built-up or balsa sheeted blue foam with epoxy/glass or Solarfilm finish. Plugs for wings and elevators exist, but there was never sufficient time to make the molds.

"As of today, ten prototypes have flown. Seven of these were brought to York. Six are still flying. In local competitions the KITTs *have done very well, usually getting very high scores.*

"Coming back to the design, the Dassel *was considered too small, and it was finally agreed upon a wingspan slightly less than three meters. Thorbjoern and Ivar were also in agreement as to the usefulness of built-in stability. There is very little to gain with a small stab. The same applies to zero degrees dihedral. The use of moderate dihedral, in this case, 3-1/2 degrees, means less use of ailerons and rudder, and consequently, less drag.*

"With regard to aerofoil, various Eppler 'foils were discussed, namely, the 193, 211, 374, and 205. These were compared with respect to minimum sink (C_l 0.9 to 1.1), best gliding angle (C_l 0.6 to 0.7), and sinking velocity at C_l 0.2 to 0.4 for the speed task. The Eppler 193 was considered the better compromise, even if it was less than ideal for the speed task.

"It has already been mentioned that quite ordinary building methods were used. In order to strengthen the wing roots during speed tasks, and also to take care of the very high stresses during winch launches, a steel rod 8 x 12 x 900 mm is inserted through the fuselage and into the wings. This rod additionally acts



LEFT: Daryl Butcher, of La Habra, California, designed and built this multi-task model totally from scratch (including airfoils). Wing's built-up structure features transitioning airfoil sections from root to tip. ABOVE: Airborne shot of the *U4EA83*.

as ballast, weighing 650 grams (23 ounces). Two ballast compartments in the fuselage accept 1,600 grams of lead (56 ounces) giving a total ballast of 2,250 grams (79 ounces). The KITT *is very often flown with a wing loading of 60 to 65 g/dm² (19 to 21 oz/ft²) in the speed task, and 50 g/dm² (16 oz/ft²) in duration.*

"Ordinary ailerons are used. These are also acting as air brakes, being deflected to 60 degrees (up). This requires some planning of the geometry for servo arm, bellcrank, and aileron horn. The aileron servos are mounted in the wing roots. In addition, Thorbjoern has a three-point switch to give separate trim for the various flying tasks. He also uses a transmitter which adjusts the stabilizer when the airbrakes are activated."

SPECIFICATIONS

	Metric	U.S.
WINGS:		
Span	2800 mm	110 in
Root chord	240 mm	9.5 in
Tip chord	180 mm	7.0 in
Avg. chord	210 mm	8.3 in
Area	58.8 dm²	911 in²
Aspect ratio: 13.3 to 1		
Airfoil: Eppler 193		
Dihedral: 3.5 degrees		
STABILIZER:		
Span	650 mm	25.6 in
Root chord	130 mm	5.1 in
Tip chord	100 mm	3.9 in
Avg. chord	115 mm	4.5 in
Area	7.5 dm²	116 in²
Aspect ratio: 6.2 to 1		
Airfoil: NACA 0009		
Moment arm	780 mm	30 in
Stabilizing factor: 0.46		
FIN/RUDDER:		
Height	210 mm	8.3 in
Root chord	210 mm	8.3 in
Tip chord	80 mm	3.1 in

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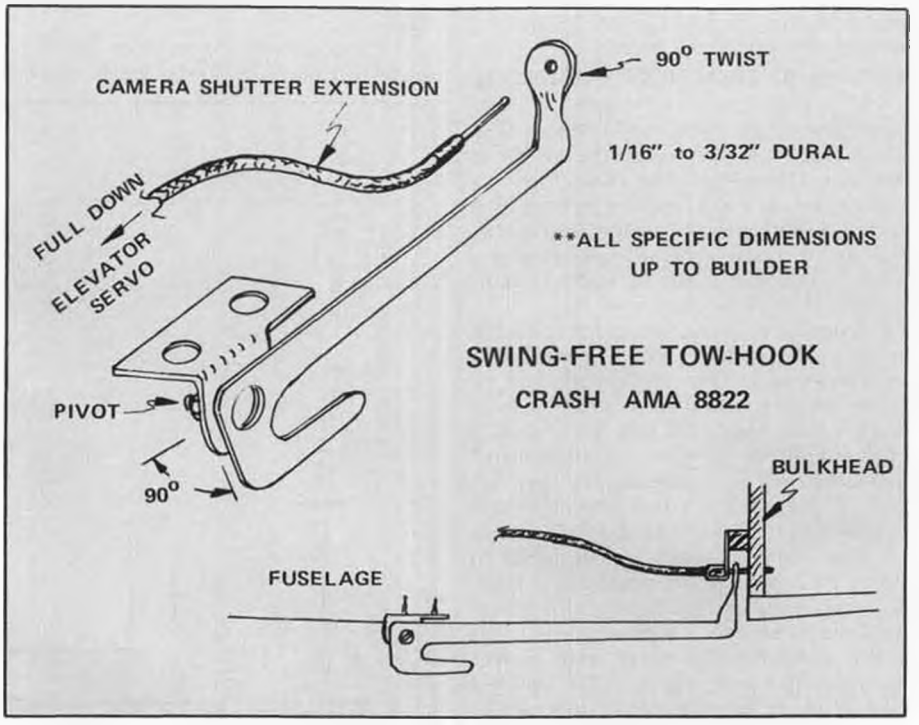
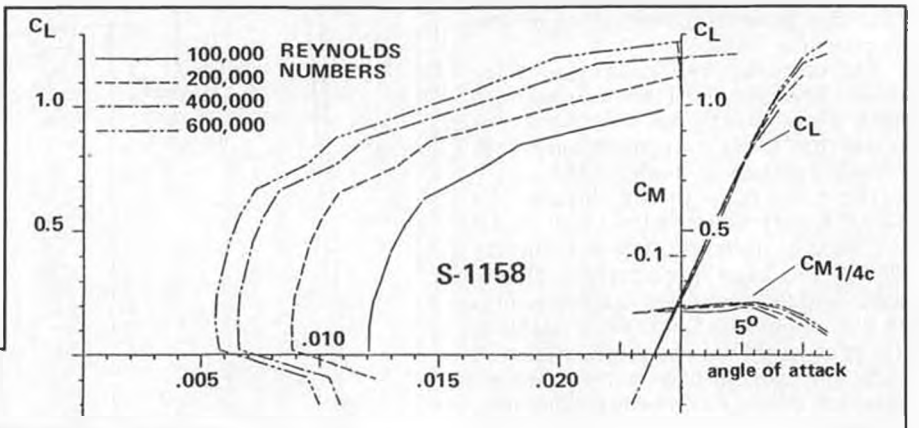
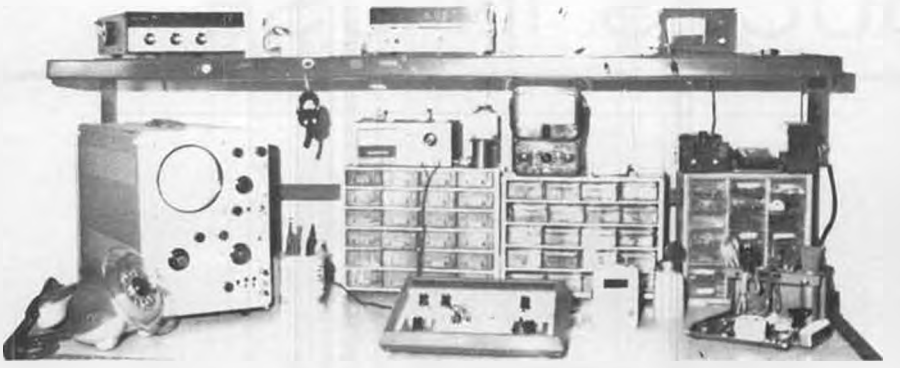


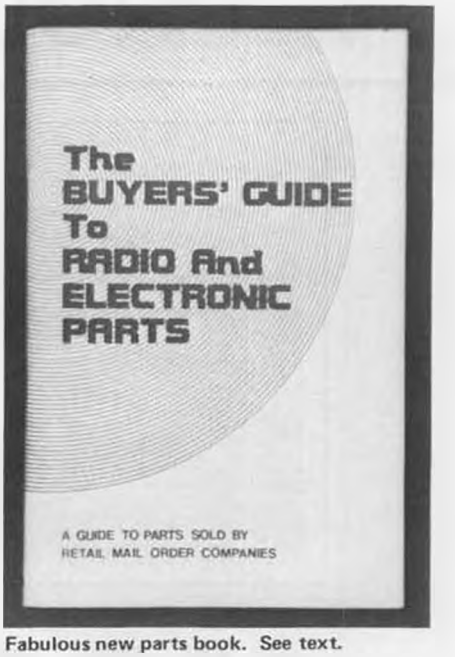


Coordinates for the Selig 1158 are available directly from Mr. Selig, whose address is in the text.



Electronics Corner

By ELOY MAREZ



Fabulous new parts book. See text.

THE M.E.N. C-50/4 CHARGER

From nearby Laguna Beach, California, a note from Jose Tellez reads:

"I enjoyed your October **MB** *column and want to take advantage of your offer of a copy of the LM3909 spec sheet. I am enclosing the SASE as you requested.*

"If you have a minute to spare and know anything about the M.E.N. charger, I would appreciate a comment. It appears to be of the same family as the BC824 Peak Detector charger you were glowing about in your article. I have had a M.E.N. charger stored for a while; I was enthused with their ads, and it is a pulse charger. I have, however, neither read nor heard from anyone who has used it, in spite of its having been on the market for several years!!! Is it a dog? Maybe I should not even bother putting on the connectors."

No, Joe, the M.E.N. (Model Engineering of Norwalk) charger is far from being a dog, and I would hurry to add some connectors and start using it. It is a pulse charger, similar to the one from Delta, however, there are some significant differences. The C-50/4, as the M.E.N. charger is designated, is basically an R/C system charger, designed to charge four and eight-cell packs either singly or simultaneously, and is powered by 110 volts AC out of the wall. The Delta BC824 is designed and intended more for electric powered model battery charging; R/C cars being Delta's primary products. It is designed to charge packs of from four to seven cells, and is powered by a 12-volt DC source. Though they both do the job, and do it well, neither will completely replace the other one in all situations.

I too have had, and have used a C-50/4 since soon after they became available. I was favorably impressed from the beginning, and had my data and photos all ready, but this is one on which I got scooped! The July 1980 issue of **MB** carried an excellent article by Chip Conklin (the "C" of C & D) about it, including the results of Chip's testing, he too was impressed. There is little need

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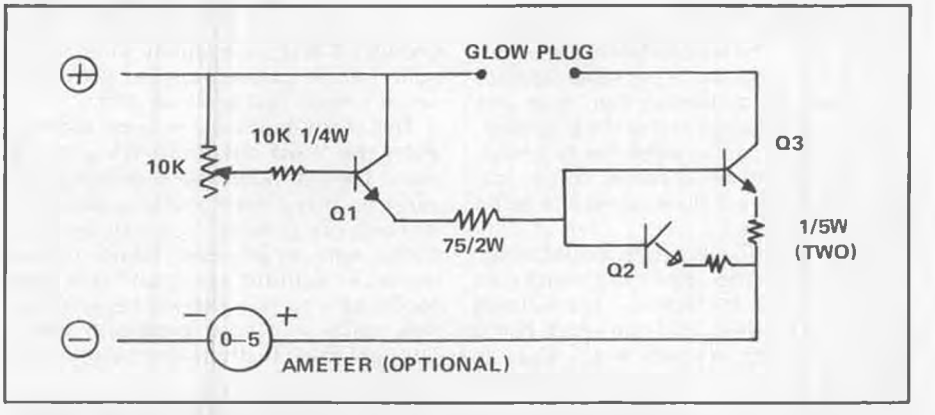
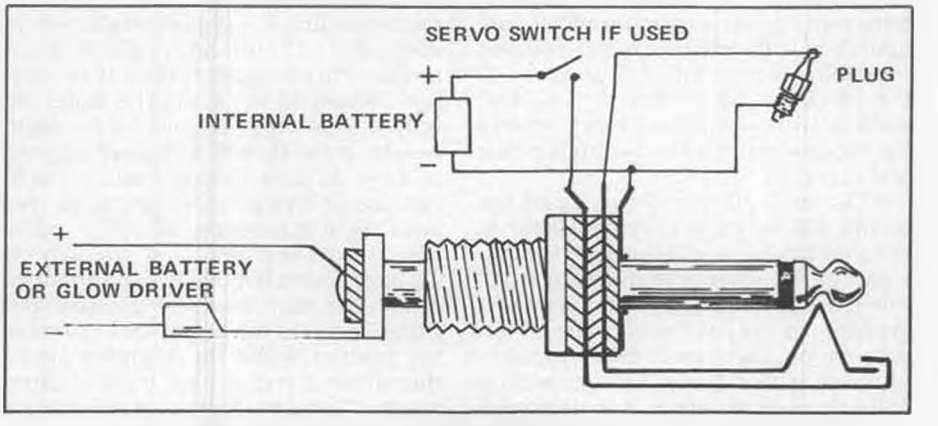


Suggested circuit used to light a glow plug directly from a 12-volt battery. Transistor Q-1 is a 2N3053, Q-2 and Q-3 are 2N3055s, preferably mounted on heat sinks.

Although it isn't new, the M.E.N. C-50/4 pulse type charger for RX & TX works well.



Here is a simple wiring diagram for an external/internal battery hookup as described in the text. Plug art and spark plug are obviously not to scale!

MRC Cessna Skyhawk

By ELOY MAREZ . . . The Model Rectifier Corporation (MRC) *Skyhawk II* is a ready-to-fly scale R/C airplane that is well within the beginner's ability to assemble, yet has enough performance to be really FUN! When you consider that the radio is the only thing needed to complete the model, it's a real bargain!

• Involving as many different skills, materials, and techniques as the R/C hobby does, the successful builder/flyer probably enjoys more personal satisfaction from his avocation than does any other type of hobbyist. For the beginner, though, the road to even the first step, solo flight, can be arduous, costly, and long, especially if he is advised to build his own trainer.

Model building is a part of our hobby. As it is in itself the source of a major part of the fun and satisfaction, it is a skill that should be learned, and one which I help my beginning friends with. But, as learning to build *and* then to fly can be time consuming, I usually recommend to a beginner that he acquire some sort of ready-built model to practice his flying with, to learn about radio installations with, and to learn radio and engine operation with, while he is also building something from a kit. This brings us to the RTFs, the "**R**eady **T**o **F**ly" models, with which the model industry has made great strides during the past few years.

RTFs don't fill every need, and the scratch builder generally sneers at them, but they have, and will continue to have, a part in the scheme of things. For one thing, not every R/C flyer has the time or facilities to create the airplane of his dreams. We come from different backgrounds, with differences in education and experiences, which is evident even within the hobby . . . not all R/Cers can repair an R/C system or hop-up a Formula One engine. As a bonus to all of us, I'm sure that the benefits of mass produced RTFs eventually filter down with the sale of every engine, prop, and set of wheels that goes on one.

The ready-builts have some uses for even the most devoted stick and silk man. They provide more relaxing and carefree flying than anything you ever worked on all year. You can let your friend, wife, *or whoever*, take a turn on the sticks without panic, and it is pure foolishness to put a newly repaired, or new radio into your expensive hand-wrought fire-breather. Just the place for an RTF!

MRC (Model Rectifier Corporation) has just recently introduced a new ARF with a decided advantage over many of the others currently available . . . it is *big*. Quite possibly, it is the largest (70.5-inch wingspan) RTF currently available. It is a molded foam model, thus it is very light. Ready to fly, it tilts the scales jat only 6.5 pounds. Because of its light weight, it can fly well on a small engine, an Enya .35 pulls it along smartly, and is capable of flying it through all of the basic flight maneuvers, all within plain view. I like the size!

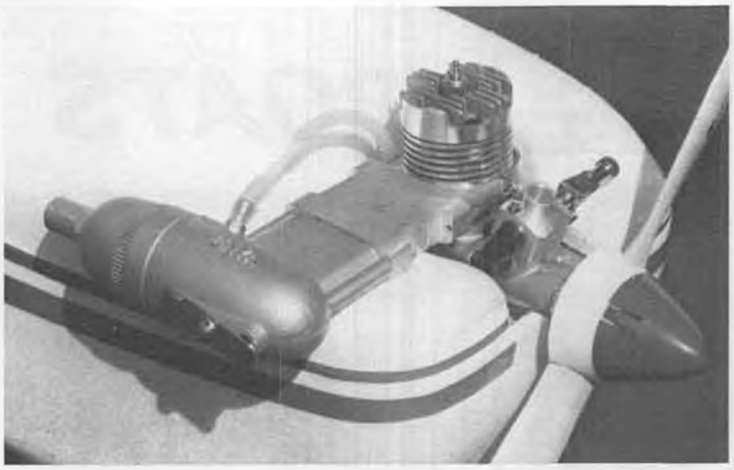
I have always felt that it is important to remember that those of us who are experienced in the hobby take so much for granted, while the beginner views the whole thing as one mystery after another. I had this fact brought home to me again during my first weekend with the MRC *Skyhawk*.

For the past four or five weekends, we've had a visitor to our fields. We've all seen the type, definitely interested, asking questions, looking for the best ways and means to break into R/C flying without expensive mistakes. That Saturday, I came to the field with my 3/10th scale CAP-20 (Kavan FK-50, dual Kraft FM airborne). We exchanged "Hi's," he asked "How much does something like that cost?" and went on down the flight line to look at the other models and to talk to their owners.

Sunday was a different story. He was there when I unloaded the Cessna, and started right in asking questions, some knowledgeable enough to show he has been doing his homework. His interest increased measurably after the test hop, and most of his time at the field that day was spent close to me, he was at my elbow every flight. It was obvious he had found something within his reach, technically and financially. The Cap-20 certainly wasn't, and neither were most of the other planes there, which ranged from pattern models to *Quickie 500's*. The Cessna was the answer; it is something he can fly soon after he purchases the model, it flies well, and as a bonus, it looks realistic.

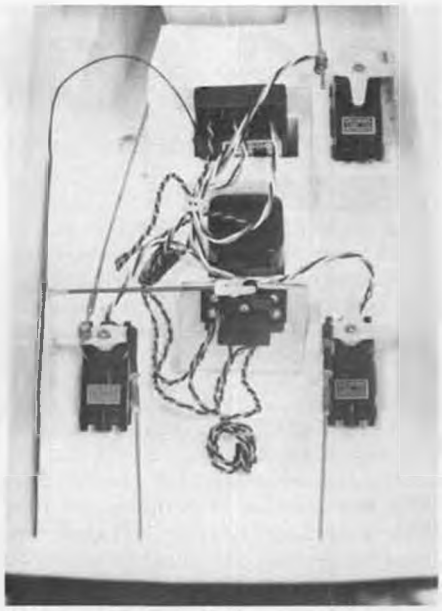
ASSEMBLY

The MRC Cessna comes to you in five major pieces; a fuselage, two wing halves, elevator, and rudder. All control surfaces are hinged, the engine and tank are mounted, and all control hardware, wheels, prop, muffler . . . everything is



LEFT: It's what's up front that counts! Enya .35 provides all the power necessary to fly this lightweight model realistically through all basic maneuvers.

LEFT: An ACOMS FM four-channel R/C system was used for test flying the *Skyhawk II*. Controls used are the four normal functions, plus nosewheel steering.



RIGHT: More than ample room exists in the fuselage for any radio system you may own. Cavities molded into the fuselage accept average sized components.

RIGHT: Internal switches are always best. Here's a close-up view of the D&D Bulkhead Switch Mount as used in the Cessna. Ace R/C has this part.

furnished except the radio. A four-channel system is required.

Wing assembly consists of joining the two wing halves together, and gluing in two plywood subspars to two main spars already molded into the wing. The vertical and horizontal tail surfaces are glued in, the main gear is added with four screws, and you are ready to install your radio.

Even the radio installation is simplified. The fuselage contains molded cavities for the receiver, battery, and three servos. The cavities are made for average sized sport system components, and with slight trimming or padding, will accommodate most R/C systems. The airborne components are held in place with a piece of double sided tape on the bottom, a practice which I generally don't believe in, but in this case, where each piece press fits into a cavity and is supported on five sides by foam, it is acceptable.

The switch can be mounted onto a piece of plywood and onto the side of the fuselage with enough material removed to allow the switch knob to protrude. I prefer internal switches, away from dirt and oil, and mounted mine on a piece of ply glued to the internal foam structure, actuated by a D&R Bulkhead Switch Mount (Ace R/C No. 103L27) and a short length of 1/16 wire. A short piece of nylon tubing was epoxied into the fuselage side for the wire to bear in.

The aileron servo is mounted on a side mount, in turn screwed onto a piece of plywood epoxied into a cutout in the center of the wing.

As I prefer internally installed antennas, a plastic tube was run along the inside of the fuselage, from a point even with the receiver cavity back to the tail. The antenna was threaded into this tube.

Now for the changes! Well, *you* don't build anything *exactly* according to the plans either, do you? Actually, nothing major was changed that involved either the design or integrity of the bird. I changed only some radio installation methods ... I don't use Z-bends, as furnished on all the control hardware. I know, they are simple, cheap, won't slip off, and are used in large quantities. They also don't align perpendicularly through the hole in the arm or horn, they distort whatever you install them in, and result in either a too tight, battery eating fit, or a too loose, slop and vibration inducing fit. I'm sure the Z-bend equipped control hardware furnished would control the airplane acceptably, as they do many others, and are probably adequate for slow flying models such as this one, but I changed them anyway.

I changed them to thread-on clevises where adjustments would be required, and to silver (only, please!) soldered clevises where adjustment wasn't required. I also used Goldberg Pushrod Connectors (PC-1) at the throttle and nosewheel servo connections. This last item is another idiosyncrasy of mine, I use this type of fitting whenever possible, it provides the features I mentioned, which I consider necessary (such as perfect alignment and low friction), but I only use them on those controls that will not do me in if a failure occurs, not on a heavily loaded primary flight control. Isn't it really too much to gamble your whole airplane on the pressure and friction fit of a 4-40 screw?

The high angle of the rudder pushrod requires a ball and socket for pushrod connection for best operation; one was acquired and installed.

Now the aileron fittings. The wing comes with flexible plastic pushrods already installed from the wing center cutout to the aileron horns. The ususal screw-on clevis fittings were furnished and used at the aileron horns. The center connector was changed. Instead of using the long Z-bend wires with threaded ends which are intended to be screwed into the pushrods, I used a Goldberg Aileron Coupler (No. AC-1) in a modified installation. The plastic piece was centered onto a one-inch length of threaded rod, and the pushrods were threaded on right up to it on both sides, securely locking it in place, the set screw adding one more safety. The nylon clevis was installed in the recommended manner, and attached to the servo arm.

Continued on page 84

R/C POWER BOATS

By JERRY DUNLAP

A LOOK AT THE K&B .67 INBOARD MARINE

After nearly four years of development and testing, the K&B .67 cubic inch (11 cc for you metric folks) is available to the big bore model boat enthusiasts. Since its introduction in late summer, the all new K&B .67 has already established a national record in oval racing and proven itself very potent as a model marine power source.

The individual who set a record using this new engine is certainly no newcomer to model boating. Ed Fisher, who now has set over one hundred records in the North American Model Power Boat Association, slipped the K&B .67 into his Fisher Boats canard hydroplane and turned in a 1:05 clocking in the 0.9 mile oval. That just happens to be the fastest anyone has ever gone on the 0.9 mile course.

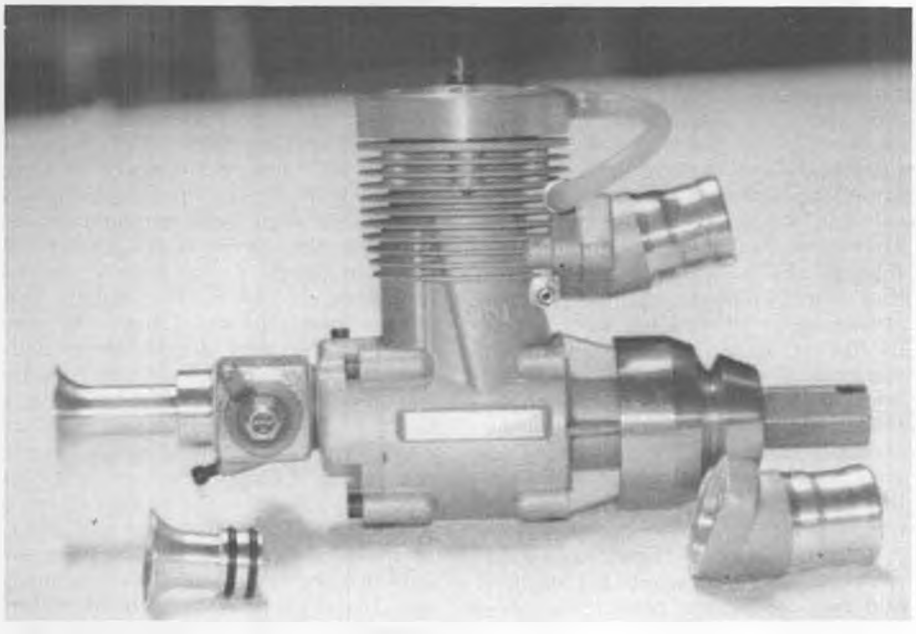
Sure, you say, guys like Fisher could set records by strapping the engine to a kickboard. How does the K&B .67 work for an ordinary model boater. What about the guy who will never set a record? What can this engine do for him?

Before going any further with this discussion on the K&B .67, I feel that it's important to bring up a couple of other factors that definitely need consideration. It is simply unrealistic to expect *any* engine to perform miracles in a boat that is not properly prepared and trimmed. Too often, model boaters (and possibly other model racers, be they involved in model airplanes or cars) have the mistaken idea that a new engine will cure all the problems they have experienced with their model. Such is simply not the case. Without a properly prepared chassis, airframe, or hull, all engines will not perform up to their potential. The engine is no more than a facet of a multifaceted endeavor to make something (car, boat, or airplane) achieve some level of performance. It's not just the engine, folks.

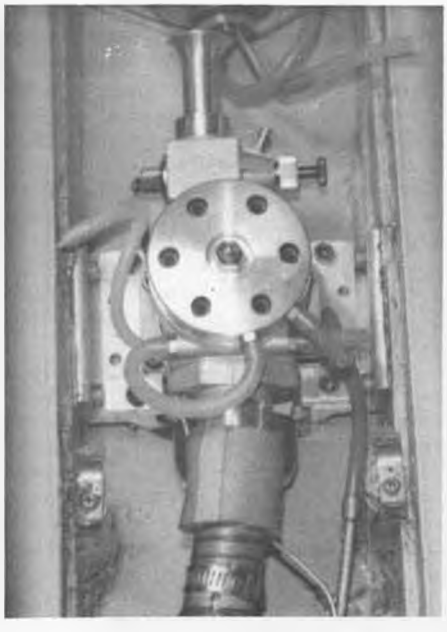
Dennis Caines, NAMBA District 8 Assistant Director, with the Pay-n-Pak *"Lil Buzzard"* used for testing the new K&B .67 engine. Dennis liked the engine.

That I should be reviewing the K&B .67 is somewhat unusual. Large displacement model engines have rarely been the focus of attention in my columns. It came as a complete surprise to me when the United Parcel delivery man handed me the package from K&B Manufacturing, and asked me to sign the receiving slip. You can best believe that I wasn't going to refuse delivery! The only problem was that I didn't have any type of boat to use with this big engine.

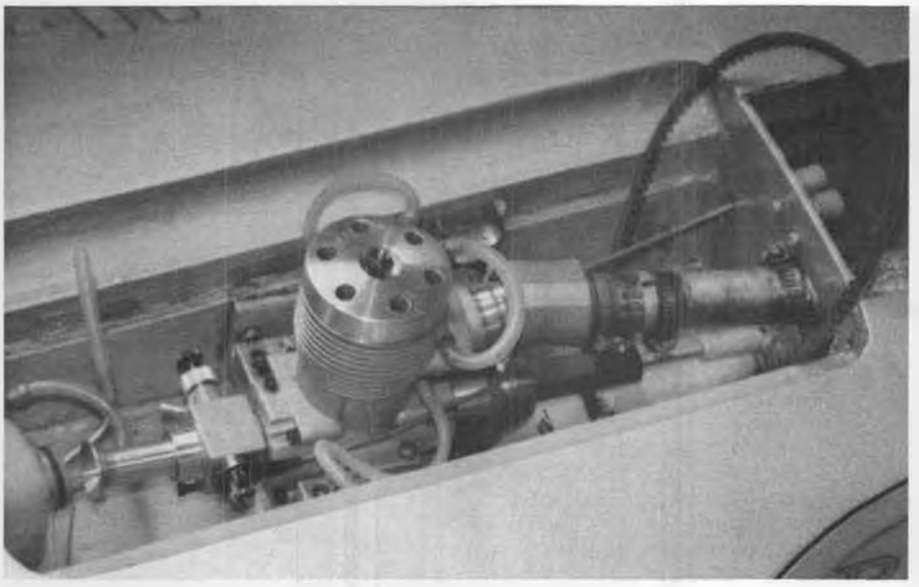
In order to get some type of review together, I decided to loan the K&B .67 to a good friend of mine in model boating, Dennis Caines. Dennis has served as commodore of the Puget Sound Model Boat Club for two years, is currently assistant director of NAMBA District 8, and he is an avid model tunnel



The K&B .67 Inboard Marine comes with two carb inserts and two different angled exhaust extensions. Castings and machine work are of top quality.



Top view of the K&B .67 installed in Dennis Caines' *"Lil Buzzard"*.



Left side view of the K&B .67 installation.

boat racer and R/C Unlimited contestant. Dennis is actually a much better Tunnel Hull competitor than R/C Unlimited driver. He is a former District 8 Tunnel champion, and he placed second in 3.5 Tunnel at the 1983 NAMBA Nationals. When it comes to racing his R/C Unlimited, Dennis is definitely a "low budget" boat racer. I don't think Dennis has ever won an R/C Unlimited race. I only mention this to let you readers know that I didn't give the engine to a "hot shoe." Dennis is a good mechanic and a careful driver. I knew his equipment ran pretty well. I also knew he wouldn't "grenade" my brand new engine by doing something foolish. What follows is Dennis' report about how the K&B .67 worked in his R/C Unlimited Hydroplane.

"The Tuesday before our final District 8 R/C Unlimited Hydroplane Race, Jerry Dunlap called and asked if I would like to try the new K&B .67 motor in my "Lil Buzzard" scale hydroplane. As I wanted one of them anyway, I was more than happy to try it.

The biggest problem I faced was that of time. I had to race the boat on Sunday, and I had to work on Saturday. That didn't leave much time to pick up the engine, get it installed in my boat, and test the engine prior to the race. I was very pleased that the installation went very easily. It was necessary to redrill the motor mounts as the mounting holes did not align with those of the previous engine. The throttle linkage needed to be redone, and a little work needed to be done to couple the tuned pipe. That was the extent of the work required to install the engine.

"I set the needle valve and idle valve according to the instructions provided with the motor. I thought the instructions were very good. It was time to head for the lake.

"The motor started right up with just a bump of the starter. It was fantastic! The boat has never run better. It was definitely faster than than I had ever gone with my "Pay-n-Pak" Lil Buzzard. *The throttle response was very positive and quick. Jerry was fishing on the lake and came over. He was also very impressed with the performance of my boat."* (I had no idea Dennis was going to run the boat that Friday evening. We just happened to be fishing at the time he came down. I got skunked. My son, Paul, caught an eight-pound salmon. jd)

"After a couple of test runs, I felt good about bringing the boat to the race on Sunday. I wish I could report that I had terrific success at the race. However, that was not the case. In my first heat I placed third. The boat ran well, and I was happy with that finish. I was running strong in the second heat when the boat just stopped. When I got the boat back I discovered a hole all the way through the glow plug. The stem of the plug had been blown away. *I had never seen that happen before. During the last heat I ran, I managed to get forced off the race course during the mill. The boat got caught in weeds along the shoreline, and I was done.*

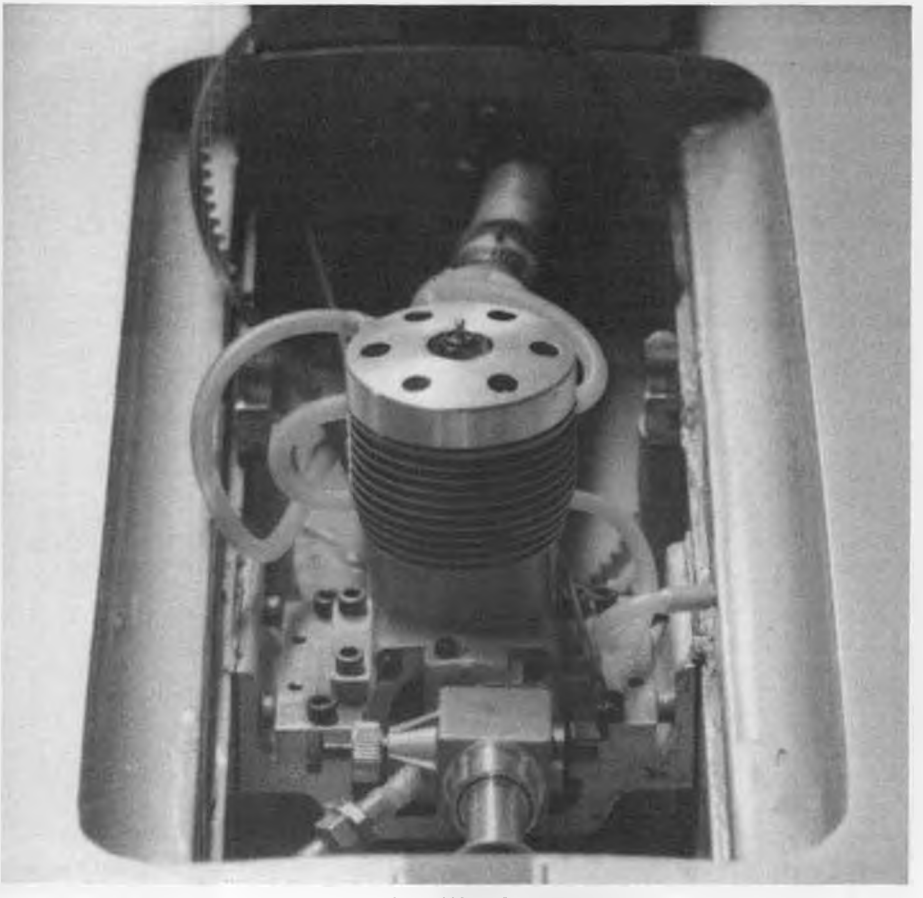
"I cannot blame my problems on the K&B .67. The one heat I finished showed me that the engine is very strong. Jerry has promised to let me use the K&B .67 during the 1984 District 8 R/C Unlimited season. I'm definitely looking forward to racing my Lil Buzzard *with this engine again."*

I certainly want to thank Dennis for testing out the K&B .67 in his boat. I am currently in the process of setting up a deep vee using this engine for the power source. This will be the topic in a future column. I also wish to thank K&B Manufacturing for allowing me to try out their new engine. I just might end up running a big bore boat this coming racing season.

IT AIN'T AS EASY AS IT LOOKS

During this past racing season, I had the opportunity to assist a father and son team during their first attempts at model boat racing. The experiences these two encountered as the season progressed made me realize how much

Continued on page 78



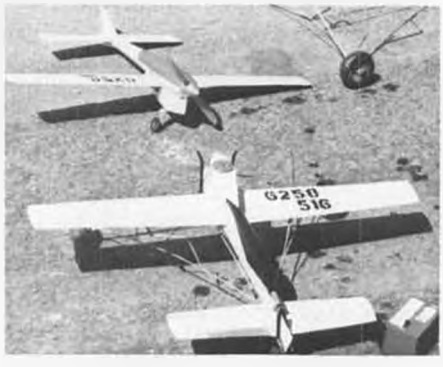
Front view of the K&B .67 installation.

Control Line

By MIKE HAZEL

PHOTOS BY THE AUTHOR

Randy Shultz, of Seattle, holds his Fancher designed *Excitation II*. Model is O.S. .40 powered. Randy has graduated from beginner to expert in two years. Don McClave pic.



Wisniewski Team. Entries seen at Merced, California, contest. Top model is Formula 40, bottom is Class B. K&B power, natch!

• I would like to start off this month by reporting that we have doubled the CL readership of this magazine. Thanks to both of you for your support. Our goal now is to double the readership for every column. In only 12 issues the readership would be in excess of 8,000. And after 24 issues, can you believe this . . . the total would be over three million. Nonsense aside, keep those letters and photos coming.

By the way, in response to questions regarding photographs, black and white 3 x 5s are the best. Color photos are more difficult to work with, and the larger sizes just cost more. A helpful hint regarding the accompanying caption information is to write it on a separate sheet of paper. Do not write on the back side of the photo. I thank you, and the editor thanks you.

★ ★ ★

The old timey speed job in the photograph was recently donated to the AMA aeromodeling museum by Vic Garner. The model was built and flown by the Mathews and Huth Team from Alameda, California. The engine is a McCoy .49, which put it in Class C. Back then, Class C was up to .49, and Class D was up to .65. The plane successfully competed in AMA and WAM contests, and also won its event at the 1949 nationals. The plane is mostly made of metal, with the fuselage formed by turning aluminum on a lathe. It is also interesting to note the use of a single-blade propeller, which points out that the concept is anything but contemporary. Also note the size of the plane, as compared with the mouse racer. The speed designs of the early days were not much more than an engine on a set of wires. This speedster features a 14-inch wingspan, and weighs in at 18 ounces. My, my, how things have changed!

WHAT'S IN A NAME (?) DEPARTMENT

In the September issue, Bill Northrop in his "Workbench" column asks the rhetorical questions, "Is it control line, or controline?" Additionally, "ukie" is a designation that is commonly used to label our mode of control.

Some of you historians may be able to help here, but from what I have read of ye olden days, it was first referred to as line control and tether flying, which are very concise descriptions.

As I understand it, the term U-Control was the trademark Jim Walker used for the control system he promoted. The old Berkeley company had the word "Controliner" on their kits and packages of flying wire, and it appeared to be a trademark. A present day use of the single word is made by the Sullivan company, referring to the braided flying wire that they market as Controline, though it is not a trademark.

Perhaps the term ukie, or U-Control, is not very good, as it seemed to be a

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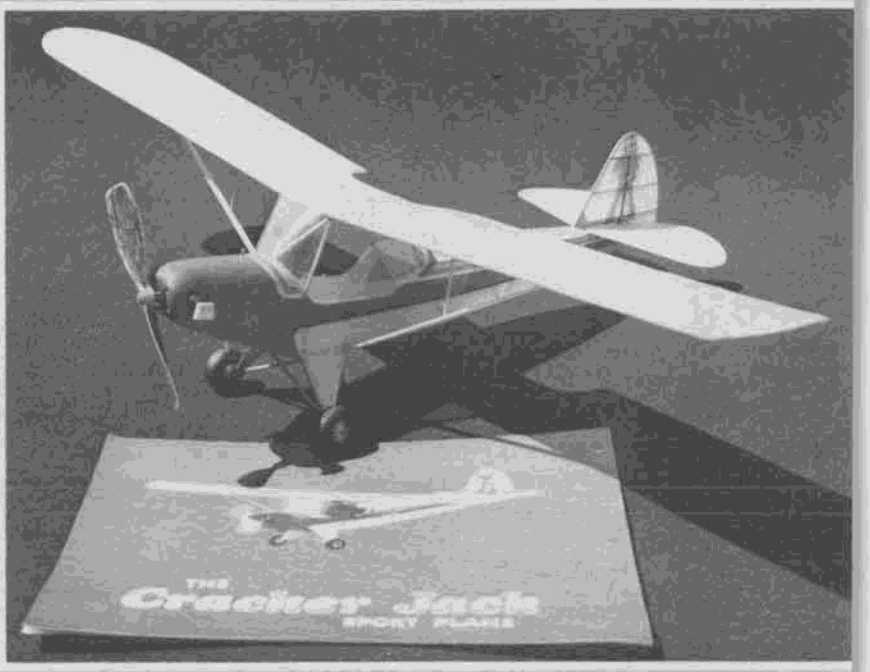
Business end of Paul Walker's *Bad News* stunt machine. Intricate details are achieved by cutting stencils from contact paper. This entry placed second at the Nationals. Don McClave photo.

The C/L plane on the left is Vic Garner's .049 powered racer, and the smaller plane on the right is an old time .49 powered speedster. See text for details. Bob Kampmann photo.

Jet Speed fleet belonging to Bill Nusz. The ship on the left is a Hoyt designed *Sidewinder*, the other two are variations of the *Super Burp*. Lots of noise! Mike Hazel photo.

PEANUT SCALE

THE CRACKER JACK



By WALT MOONEY . . . Here's another two-for-one Peanut or Rubber Scale airplane that will please the free flight modelers among us. The full-size *Cracker Jack* is a home-built . . . which just happens to scale down perfectly without any modifications.

• Occasionally, comments are made about what it was that inspired the building of a particular model. "It was interesting," "It was different;" "It was obscure;" etc. This one was built because the designer/builder of the real aircraft sent in a brochure and suggested that a Peanut scale be built. The brochure supplied by Pete Plumb has a three-view that is Peanut scale size. It has all the detail and color information needed to make a good scale presentation.

This brochure is available from Wood Wing Specialty, Building H-2 Fantasy Haven Airport, P.O. Box 1258, Tehachapi, California 93561. The brochure costs $5.00, and if you send him five dollars, Pete will send you one.

This model was drawn up by making a normal and a reverse copy of the three-view, and pasting it up into the Peanut scale format for the magazine. Then, it was blown up to twice-size on a XEROX 2080 machine. The model structure was then drawn in on the blown-up as near to the scale structural arrangement as possible. The model in the photographs is twice Peanut size, and is powered by Bill Brown's fabulous CO_2 twin cylinder engine. As it was built essentially over an original three-view, it has no intentional deviations from *exact* scale. The color scheme matches that of the prototype. It is all white with red trim and a blue upper stripe and a blue Cracker Jack sailor (and his dog) on the vertical tail. Luckily, the Sailor on the foil package of a Cracker Jack is exactly the right size for a pattern for the double Peanut size model.

As I said before, there are no intentional deviations from exact scale, including the rather thick airfoil section used on the real airplane. There are two thread turbulator strips which were added after initial glide tests showed the model with its smooth leading edge sheeting on the scale airfoil wing was suffering from a low Reynolds number laminar separation. Its glide was less than two to one, before turbulation, and is about five to one afterwards. Hence the alternate airfoils shown on the plan for those who want to avoid added thread turbulators. Note that the real airplane does not have this problem because it is flying so much faster than the model and is larger too.

While the original model was built for the Brown twin, the plan will be published as a Peanut in **Model Builder** magazine. For this reason and because there may be some who even want to build the larger version for rubber power, an alternate nose and a rear peg installation is shown on the plan. *(Full-size CO_2 or rubber power plans are available from* **Model Builder** *for $2.50. wrf)*

Construction of the model follows tried and true conventional procedures. Keep it light and it has a better chance of flying well.

Laminated wing tips and tail outlines are used. They look more realistic than sheet outlines, but sheet outlines will work OK if laminations seem difficult.

Obviously, the small model uses smaller dimensioned structural pieces than the large ones, so no sizes are called out on the plan. Just match your sticks to the size shown on the plan you select and the model will turn out OK. The cabane struts on the large model are made from 1/16 diameter birch dowel. On the smaller model, I would suggest using the thin bamboo dowel that is available from Peck-Polymers (see their ad).

The most critical area of a CO_2 powered model is the engine installation, and the most critical part of the engine installation in my experience is the support of the CO_2 filler valve. Make sure that the support blocks on each side of the filler are hard balsa and they reach clear down to the bottom fuselage planking. It takes considerable force to push the filler down over the valve, and this part of the installation must be strong enough to resist that force. Make all bends in the tubing with a fairly large

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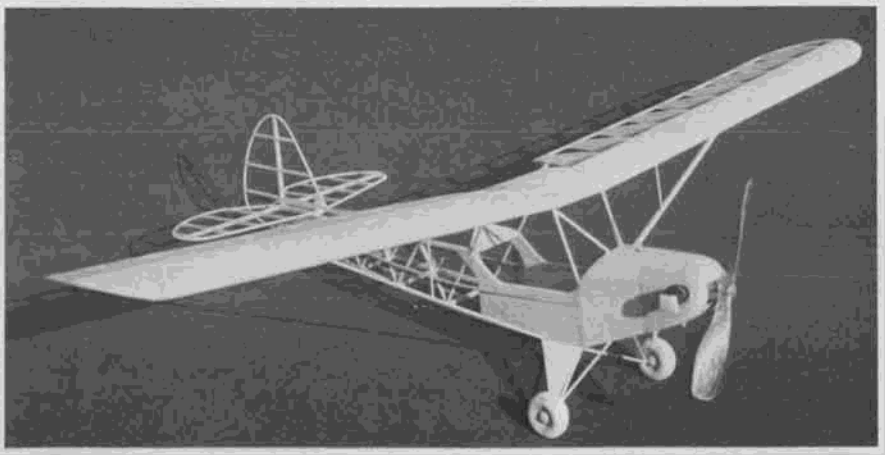
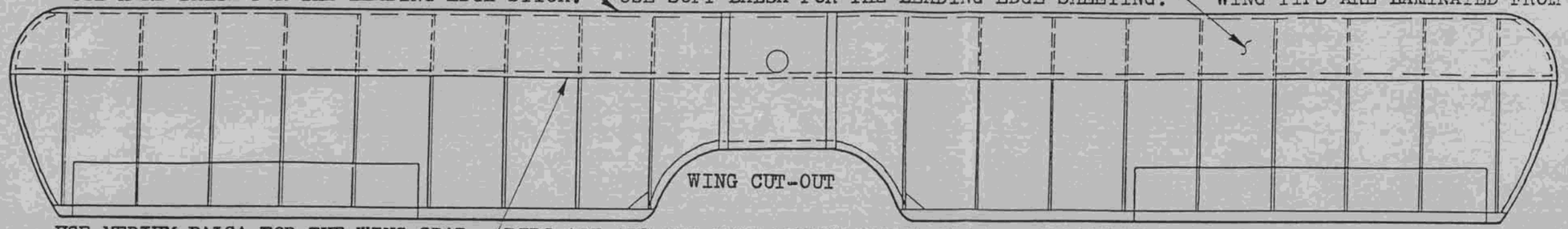


Just to give you an idea of what the *Cracker Jack* looks like without the tissue covering, we present this nude version of the model.

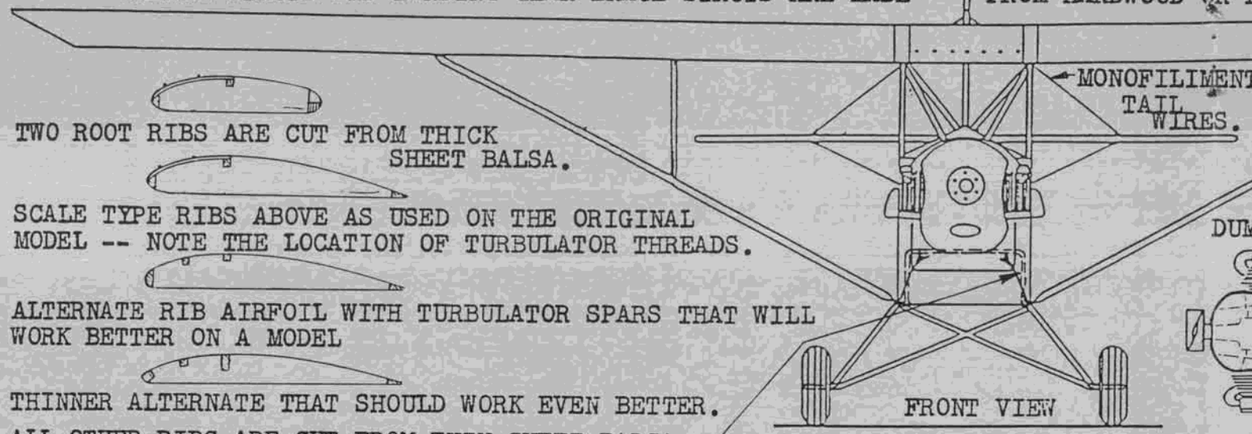
USE HARD BALSA FOR THE LEADING EDGE STICK. — USE SOFT BALSA FOR THE LEADING EDGE SHEETING. — WING TIPS ARE LAMINATED FROM THIN BASSWOOD STICKS. AS ARE THE TAIL OUTLINES AND THE WING CENTER CUT-OUT. MAKE FORMS FOR EACH OUTLINE FROM SHEET BALSA CUT TO MATCH THE INSIDE CONTOUR. WAX THE FORMS TO PREVENT THE LAMINATING ADHESIVE FROM STICKING TO THE FORM. THEN SELECT THREE OR FOUR THIN STICKS AND LAMINATE THEM AROUND THE FORMS USING WHITE GLUE AS ADHESIVE.



USE MEDIUM BALSA FOR THE WING SPAR. — RIBS ARE ALL CUT FROM MEDIUM SHEET BALSA. USE BLACK FELT PEN TO MAKE AILERON OUTLINE.

CABANE STRUTS AND LANDING GEAR BRACE STRUTS ARE MADE FROM HARDWOOD OR BAMBOO DOWEL (ROUND CROSS-SECTION).

DIHEDRAL TO TOP OF WING TIP



STRUTS ARE MADE FROM MODEL RAILROAD BASSWOOD SANDED TO A STREAMLINED CROSS-SECTION

TWO ROOT RIBS ARE CUT FROM THICK SHEET BALSA.

SCALE TYPE RIBS ABOVE AS USED ON THE ORIGINAL MODEL -- NOTE THE LOCATION OF TURBULATOR THREADS.

ALTERNATE RIB AIRFOIL WITH TURBULATOR SPARS THAT WILL WORK BETTER ON A MODEL

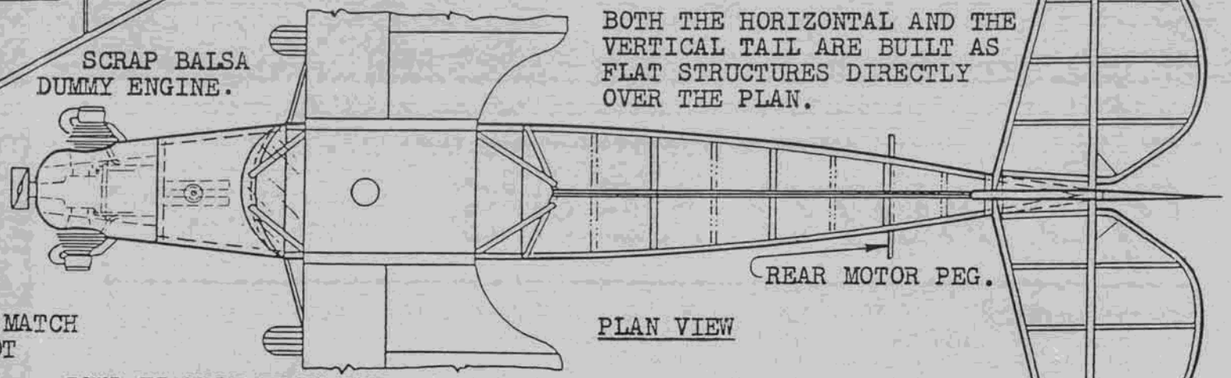
THINNER ALTERNATE THAT SHOULD WORK EVEN BETTER.

ALL OTHER RIBS ARE CUT FROM THIN SHEET BALSA

BEND THE LANDING GEAR WIRE TO MATCH THE FRONT VIEW. THE WIRE IS NOT CEMENTED TO THE GEAR FAIRINGS.

SCRAP BALSA DUMMY ENGINE.

BOTH THE HORIZONTAL AND THE VERTICAL TAIL ARE BUILT AS FLAT STRUCTURES DIRECTLY OVER THE PLAN.



PLAN VIEW

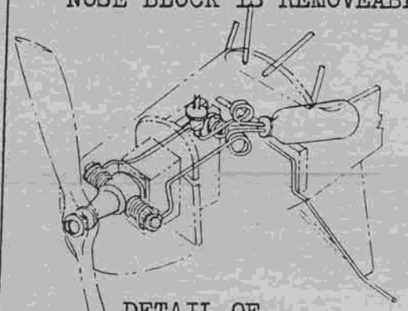
COWL IS MADE FROM FOUR PIECES OF BLOCK BALSA, CARVE TO SHAPE.

TXC

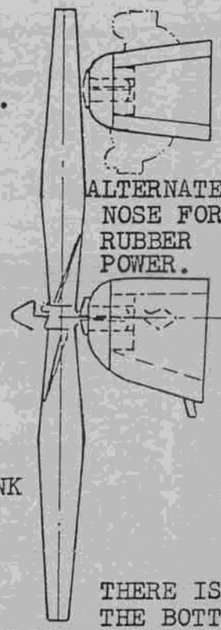
Cracker Jack Sport Plane

MODEL – 2D	ENGINE – DAF 85P	DESIGNER/BUILDER Pete Plumb
Span – 28 ft	Climb – 800 ft/m	
Chord – 3.75 ft	Cruise – 75 m/s	
Area – 105 sq/ft	Stall – 36 m/s	
Aspect Ratio – 7.46		
Airfoil – NACA 4415		
Stab Area – 17.6 sq/ft		
Length – 17 ft 5 in		
Empty Wt. – 335 lbs.		
Gross Wt. – 575 lbs.		
G-Rating – +6, -3		
Fuel Cap. – 5.5 cu		
Engine HP – 32 at 3600 ft/m		

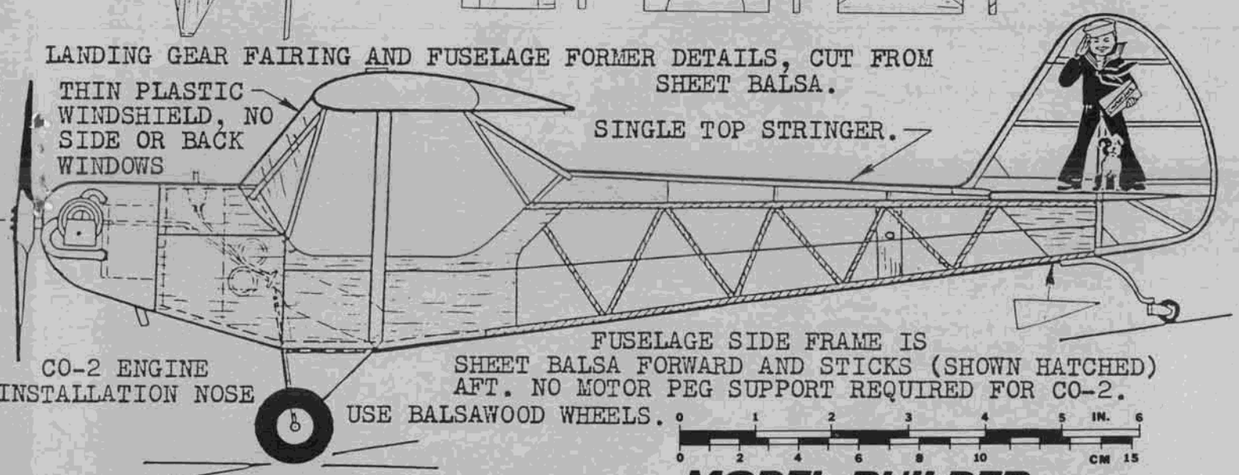
USE A COMMERCIAL PLASTIC PROPELLER AND A PLASTIC THRUST BUTTON. THE FRONT NOSE BLOCK IS REMOVEABLE.



DETAIL OF BROWN TWIN CYLINDER CO-2 ENGINE INSTALLATION. 3cc TANK SHOWN, BUT LARGER TANK WILL FIT EASILY.



LANDING GEAR FAIRING AND FUSELAGE FORMER DETAILS, CUT FROM SHEET BALSA.



FUSELAGE SIDE FRAME IS SHEET BALSA FORWARD AND STICKS (SHOWN HATCHED) AFT. NO MOTOR PEG SUPPORT REQUIRED FOR CO-2.

THERE IS A SINGLE STRINGER ON EACH SIDE AND ON THE BOTTOM CENTERLINE OF THE FUSELAGE.

THE REAL PLANE WAS DESIGNED AND BUILT BY PETE PLUMB.

the CRACKER JACK sport plane MODEL BY Walt Mooney 10-02-83

MODEL BUILDER magazine
821 West 19th St., Costa Mesa, CA 92627

Plan No: 2843

Associated's new Ligier-Maserati body in lightweight Lexan.

R/C AUTO NEWS

By DAN RUTHERFORD
PHOTOS BY AUTHOR

NEW AND IMPROVED. . .

Refinement of the suspension cars continues. While wholesale improvements that drastically improve the performance of the cars seems impossible or at least unlikely, both Associated and Delta keep working on those small improvements that add up.

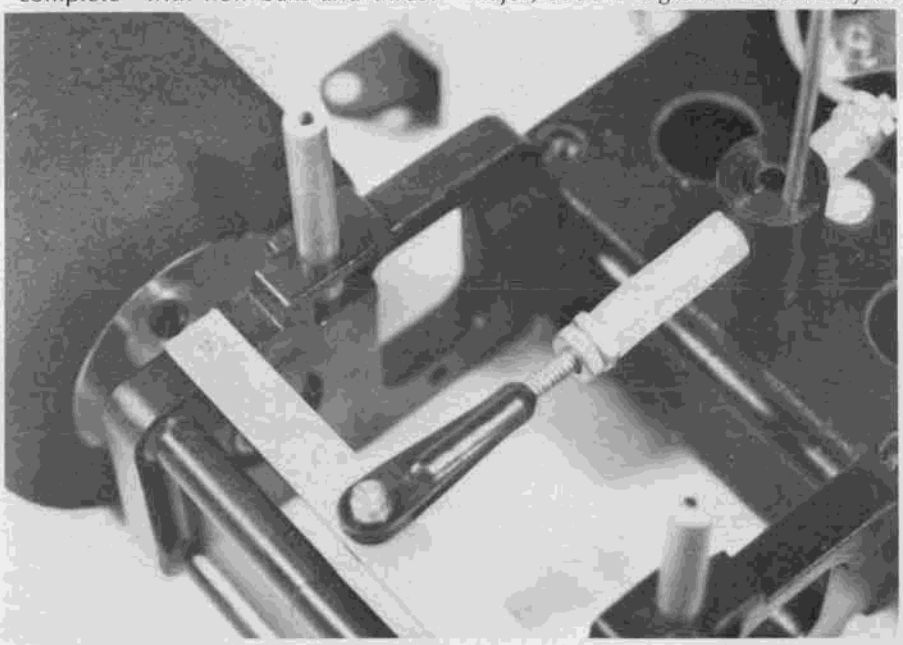
Delta, as of this writing, is shipping aluminum hub carriers for the year suspension of the *Eagle* and I hear they look terrific. Adjustable toe-in is incorporated in the design, which means that racers can more easily and consistently set the rear end up to that fine line between "just great" and "something's wrong." While it has never happened with my car, word is that a really hard impact to the rear end of the *Eagle* will sometimes drop the dog bone driveshaft out of one of its sockets, and the nearly flex-free aluminum piece will surely take care of that problem.

After a short pause for thought, I realized that I just lied . . . unintentionally. In the car's first outing, and during a practice heat, I did smack a wall and drop the right dog bone. That was the first and last time, however.

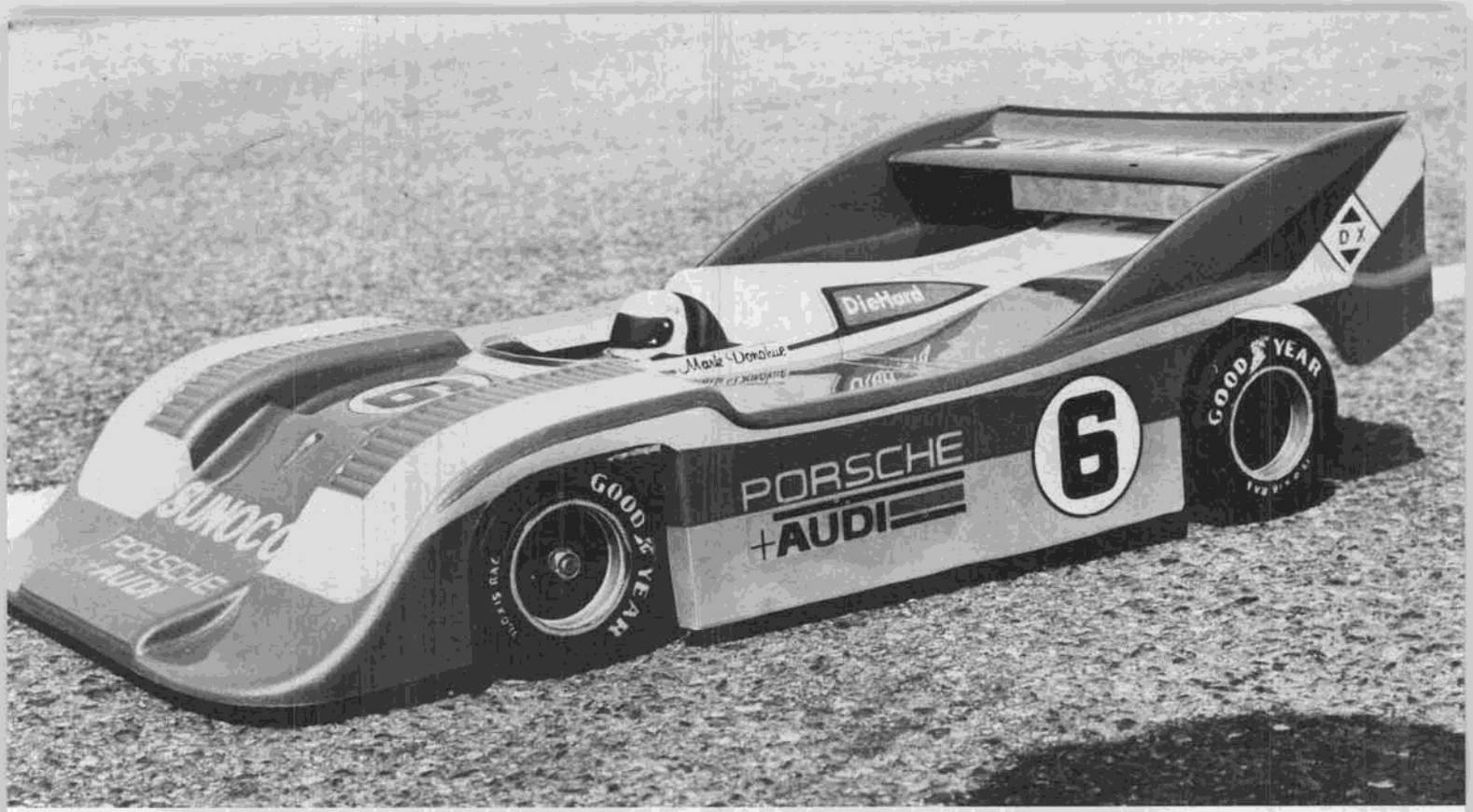
An item that very rarely affects performance of the *Eagle*, but is more of a maintenance nuisance, will be eliminated by diff thrust washers that are pregrooved. These pieces come with a flat face, and after some running the balls in the diff wear a groove in them. The problem comes when evidently the balls develop flat spots and the grooves get kinda ripply. What you feel is a slight notchiness in the diff after a couple of hours of running, and this condition just never goes away, instead, it gets worse. In my case, it has meant taking the diff apart at the mid-point of the season, and at least installing new balls. This past season, it meant doing a "complete" with new balls *and* thrust washers. Using the pregrooved thrust washers means these parts will last at least twice as long as before.

My, how 1/8 cars have changed! We are to the point of improving things that already work well in the interest of less maintenance!

A new radio tray and chassis pan are being developed for the *Eagle;* nothing major, but the *Eagle* is a little heavy on



Parma's new Shock Dampener for the 1/12 *Panther*. Get all the power to the ground. Gives maximum traction and a smooth ride.

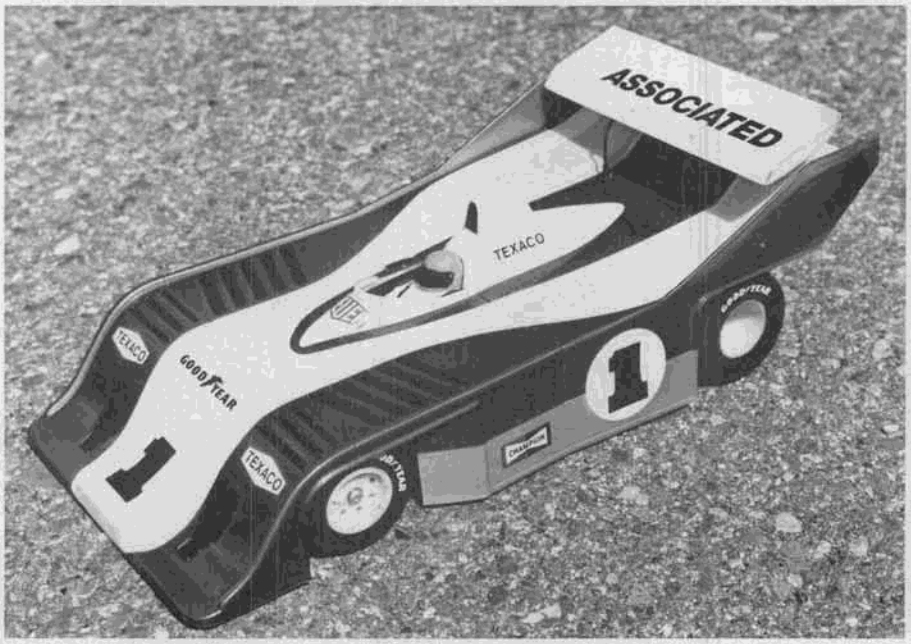


Associated's new lightweight Porsche 30 KL body.

the left side of the car and juggling components around improves that situation somewhat.

At the front of the car, a revised front suspension arrangement will be a production item shortly. The swing arm will be retained, but a linkage kit allows the camber of the front wheels to be adjusted. To be honest, this intrigues me. A new front end setup is on order, but I will be looking long and hard at it before actually putting it on the car. The stock front end is virutally bullet-proof and my desire for more steering on high bite tracks has been satisfied with the release of the 324 series of front tires. Put another way, if the new front end allows me to go from the relatively fast-wearing 324A front to the much longer wearing 324B tires, *and* if the front end proves stout, then I will try to ignore the extra complication of setting camber and the added unsprung weight.

In 1/12 size cars, Delta has finally released their all new gear diff. I've got one and all looks just super, but as it is installed in a chassis doing duty as our 1983 version of the *RC Dirty Pumpkin*, no meaningful performance tests have been carried out! Well, the *DP* did scare the tar out of many of those little candy-begging little Halloween blighters, but use of the Delta diff is presumed to have not been a factor. . .



Associated's new Elfin body, likewise in lightweight Lexan.

(**What?** You haven't heard about our RC pumpkins! Well, it has been at least a couple of years since I had that one picture of an early effort, based on a BoLink *Digger* chassis. This year, we dug out an old, but very tough, Associated RC12E chassis, slipped one of Delta's best and hottest modified motors in it, put really sticky rubber all around, and wired an automotive brake light bulb to the resistor so that as the power was cranked in, the light would go on. Strapped to the radio tray is one of those large plastic pumpkins you can get at the five and dime; the bottom is cut out to clear the stuff on the radio tray. We even left the handle on the pumpkin just to make it easier to carry around. *Now, we're talking high-perf pumpkin here, OK?* With a full charge in the pack, it will easily pull wheelies for 40 to 50 feet; even when not doing wheelies, it runs a bunch faster than any little rug-rat you ever saw, especially when the rug-rat is encumbered with that which mom thought would be a cute costume, and which the kid looks on as a necessary nuisance. Our act starts with the unsuspecting kids trundling to the front door, me hiding in the shadows of the garage with *Mr. Pumpkin* at the ready. Can you say, "anticipation?" About the time these little drips get to the end of the driveway, I punch for power. The kids hear a strange noise, turn around and all they can see is this brightly glowing pumpkin that is evidently magically suspended only inches above the ground . . . the chassis is virtually invisible in the dark . . . and they instantly realize that this apparition is already going faster than they will ever be able

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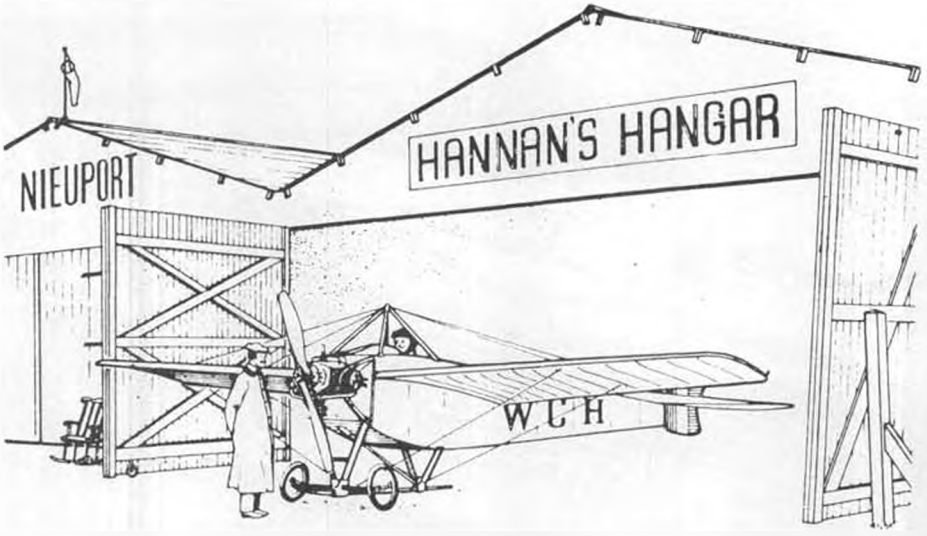


"Is not life a hundred times too short for us to bore ourselves?"

• The above lead-in line is by Friederich Wilhelm Nietzsche (1844-1900). Happily, very few model builders even suffer from boredom!

"LEARJET" NOW GENERIC TERM

A recent Associated Press release from Wichita, Kansas, has pointed out that the general public now considers any small civilian jet aircraft to be a "Learjet," in the same way that all lightplanes used to be considered "Piper Cubs." In fact, Learjet now celebrates its 20th anniversary, and is currently producing some 25% of all the world's supply of business jet aicraft. All told, some 1350 of them have been marketed; quite an accomplishment for the late Bill Lear's brainchild, which was originally greeted with extreme skepticism by the aviation community!

ATTENTION R/C LETTER-WRITERS

A newly issued series of United States 20-cent postage stamps honors inventors . . . two of whom contributed at least indirectly to the radio control of models. Foremost may have been Nikola Tesla, who not only invented the induction motor, but performed pioneering experiments with remotely controlled model boats.

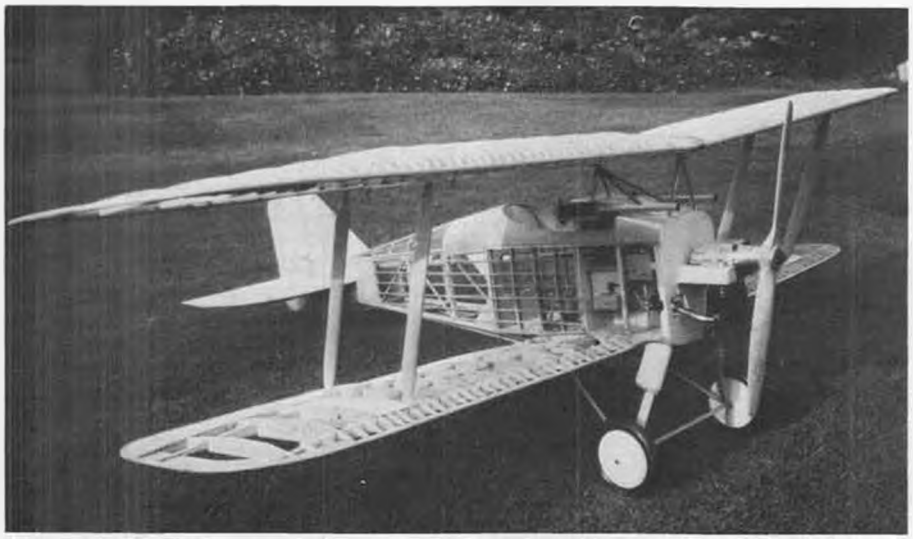
And with the recent accent on FM R/C, the appearance on a postage stamp of Edwin Armstrong, developer of Frequency Modulation, seems quite timely. A pleasant change from politicians!

ANOTHER INVENTOR

Both Ed Whitten and Charles O'Donnell sent us copies of an article from the *New York Times* dealing with the work of NASA aeronautical engineer Dale Reed. Reed favors the use of models in the exploration of his ideas, which have included remotely piloted vehicles, lifting bodies, and ground control systems for drone aircraft. He is presently working on tail actuation systems for full-size aircraft to permit controlled stall landings. Reed acknowledges that he "borrowed" the idea directly from free flight model dethermalizer techniques. Take a bow Carl Goldberg! (And apply for a share in the royalties?)

SERIOUS SCALE?

Frank Beatty, highly-skilled builder of scale models, commenting upon the lengthy search for documentation for his latest project: "Sometimes I think (know!) I had more fun when I knew less about airplanes; was less nit-picky, and was delighted to build a simple model like the rubber powered 25-inch Megow Waco."



Eric Coates, well-known FAI scale judge, is building this magnificent, 65-inch span, Gloster *Grebe* for R/C competition. The model is powered by a four-stroke Magnum engine.

This electric powered R/C Farman F 455 *Moustique* built by Andrew Uminski is a fine docile flier. Does this guy look pleased?

WHICH TIES IN NICELY WITH. . .

The latest from the Glue Guru. now revealed to be none other than Leon Bennett, of REALLY BIG rubber powered *Moth Minor* fame: ". . . we are engaged in this hobby for reasons having nothing to do with the practical, and a great deal to do with romance and fantasy. Thus, practical advice, no matter how sound, has its limits. Is it really useful to direct mountain climbers to stay with sand dunes, thereby reducing costs and possible injuries? I think not."

PECK-POLYMERS PRODUCTS PROLIFERATE

Bob and Sandy Peck have added numerous new items to their range. You may still think of them only in connection with small flying model kits, but be assured their interests extend far beyond!

Among the current offerings we find radio controlled blimps, tools, reference books, plans, building boards, work aprons, T-shirts, caps, CO_2 engines, electric motors, battery chargers, and dozens of kits and accessories. If you don't have their catalog, you're missing a good bet. For ordering information, please see their ad elsewhere in this issue.

ANOTHER NEW MUSEUM

Carl Hatrak gave us a copy of the *Lockheed Life* newsletter, announcing the opening of a small, but significant, museum in "beautiful downtown Burbank," Lockheed's early hometown. Part of the Burbank Historical Society, the Gordon R. Howard Museum includes many artifacts from Lockheed, such as paintings, photos and models. Located at 115 N. Lomita Avenue, the facility will operate on a part-time basis for the present, but hours will be extended as the staff increases.

PEANUT COMPUTERS?

Yes! According to an article in the

ABOVE: Linda and Shirley Stott tend John Stott's Cessna CR-3 racer during the 1983 Flying Aces Nats meet. Frank Scott photo.

RIGHT: Roger and Mireille Aime, France, prepare their Bucker *Jungmann* Peanut at the Flightmaster annual scale contest.

business section of the *Los Angeles Times*, the newest computer from IBM is code-named the "PEANUT," and is expected to revolutionize the industry. *But*, will it be as much fun as the flying kind?

GERMAN PEANUTS

Benno Sabel reports on a recent indoor contest held in a "Hugenottenhalle" near Frankfurt. The competition rules used were novel in several respects: For example, the dummy pilot was judged along with the other scale details, and bonus points were assigned for models of difficult or unusual configuration. Each contestant was permitted four hand launched flights and two takeoffs from the floor. Duration scores from the two best hand launched flights plus one ROG start were added for the flight score.

First place winner was Siegfried Glockner flying his *FRED*, as featured in **Model Builder** earlier in the year. *(Actually, it was December 1982. wrf)* Glockner also gained the 2nd place, flying a Santos-Dumont *Demoiselle*. Third went to Benno Sabel and his *Goupy I*, while 4th was awarded to J. Weil, who flew a *Waterman Racer*.

AND IN BELGIUM

We find some of the same news among the participants in the Flemall "International Contest For Reduced Models of Aeroplanes." Thanks to Director F.L. Van Hauwaert, we have an account of the August, 1983 proceedings. This event was truly international, with representation from Belgium, Denmark, France, Germany, Great Britain, Poland, Switzerland, and, by proxy, the U.S.A.

Six countries competed in class F1D (microfilm); three countries in Penny Plane; seven countries in Easy B; four countries in Sainte Formule (similar to U.S. Manhattan Cabin); and five countries in Peanut Scale, which attracted, by far, the most entries. The Peanut category was divided into two divisions: "Cacahuetes Duree" placed the accent on duration, while "Cacahuetes Maquettes" favored scale authenticity.

Americans Bill Noonan, of California, and Millard Wells, of Florida, sent models to be proxy flown, but both encountered problems: delays in the postal service caused Noonan's models to arrive too late to participate, and the Wells model, an ultralight *Wee Bee*, was declared ineligible to participate in the Peanut Class because its wings were covered only on the top side. But, in a

Continued on page 74

Jacques Delcroix, of France, with his winning Pottier Peanuts during the international indoor contest at Flamalle, Belgium. Photo by F.L. Van Hauwaert.

John Oldenkamp and Cynthia Sabransky, two of the best photographers in the hobby, are equally at home on the flying field in competition. Scene is Mile Square Park, California.

Free Flight

By BOB STALICK

Bob Stalick launches his *C-Quell*. Model is powered by a K&B .40. Is it overpowered? Read this month's "Free Flight" concerning the *Dim Wit 535*. (*C-Quell* is an MB plan.)

• The more things change, the more they stay the same. As I look through the old Nostalgia Era magazines, looking for potential Mystery Models, I come across gas models that have 400 square inch wings and are powered by K&B .32 engines. Early 1/2A models had 150 squares. All of the old texts seemed to be filled with the debate over whether to have high climbing, small models, or large, underpowered floaters. Also, engine runs were in the neighborhood of 20 seconds, maxes were five or six minutes.

I fly Notalgia with one of two models. I have a 1/2A *Spacer* that's powered by a Wen-Mac Rotomatic. The climb is enough to really remind one of the good old days . . . slow and steady. The other model is a *RamRod 432* powered by a K&B Greenhead .15. The climb is OK, not a scorcher mind you, but as long as I can keep the engine running, it goes up fine.

Well, just as a number of us here in the Northwest started talking up a D class event . . . remembering the good old days of really big models (at least 1000 square inches), Harry Murphy does all of us in with his *Dim Wit 535* . . . this month's three-view

I guess it's time to resurrect the old discussion about high climbing, over-powered models, vs. the floaters.

FEBRUARY THREE-VIEW,
THE DIM WIT 535, BY HARRY MURPHY
(FROM THE CIA INFORMER)

Here is the winner of the 1982 Lincoln Nats D Gas event, the *Dim Wit 535*. Harry describes his model as follows, *"I reckon it could be said that there are a few unique items in regard to this design . . . one of which was the all up weight of 25.5 ounces. This must be considered a bit unusual for a D Gas job even for Cat. III competition. Also, it seemed that I possessed the only gassie at the NATS that was covered with the relatively new Coverite Micafilm. This I surmised from a general interest of other contestants who persisted in pinching and thumping the flying surfaces. Anyhow, I found the stuff much, much tougher than other commercial 'miracle' plastic coverings, and I found that the clear variety was much lighter. I had used the heavier red color on the inner wing panels and stab center section, with the tips of both finished off with the light weight clear (looks like white Silkspan). The fuselage was silkspan covered, nitrate doped, and then sprayed with a thin coat of white K&B epoxy.*

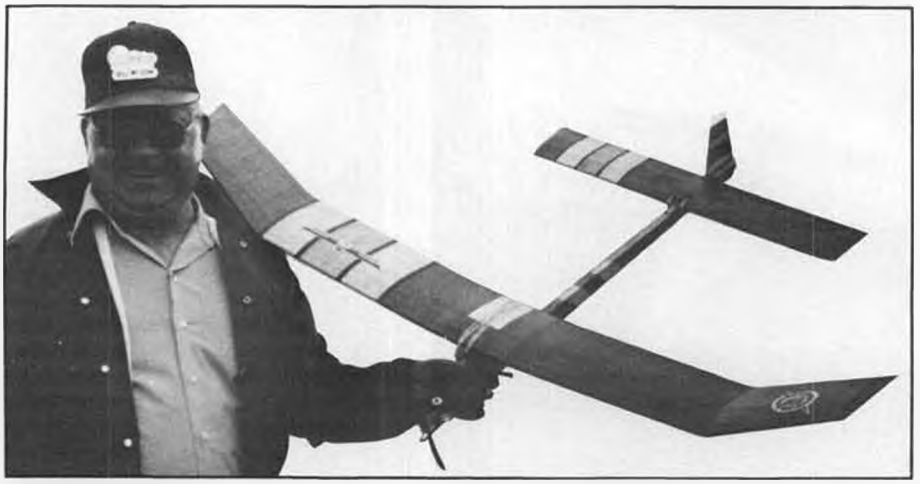
Of course, the engine was also a little unique, but not original, as Meredith Chamberlain had won the event with a sister engine mounted on the front of a Woodpecker *design at Seguin the previous year. Actually, it's a rather simple hybrid which is to be credited to Meredith for 'thinking it up.' The ingredients are firstly an old model OS MAX-H 40 RR or P from which you must extract the head, the cylinder and piston, and rod assembly. Then you must either snitch these similar parts from a current model OS 40 MAX-H series, or obtain them from your favorite OS parts source.*

The purpose is to stuff the new model parts into the old model case and use the old crank as well. OS shortened the stroke and increased the bore in bringing out the later model so that mixing the old stroke with the new bore begets a .42 . . . or for our purposes . . . a class D engine to swap with a comparable OS MAX-H 40 or ST G 21/40 for Class C. Neato, huh?

Some minor machining is a necessity as the old case has to be bored out to accept the new cylinder sleeve. The old and new rods are different on both ends, so it's multiple choice on which end or which rod (old or new) upon which you must 'operate'. The new rod is bushed on both ends, the old rod has no bushings on either end. Both holes in the ends of the new rod are smaller than its predecessor, so you have to press out the bearing in the upper end of the new rod and install it in the old rod to arrive at a .42 rod. There are other combos that are obvious, but this one worked best for me.

A word of caution before assembling the head . . . I found I had to add another OS aluminum head gasket to attain proper piston-to-head clearance, although Meredith did not. There are apparently some differences in tolerances, or in the lengths of the con rods. Well, I guess that's enough engine info to put you in business if you are interested.

Obviously, my 1/2A Lunar-Tic, *the* Nit Wit 372, *and the subject* Dim Wit 535 *are of the same family design with wing and stab planforms generally proportional. Wing and stab construction differ for varying weight to strength requirements, with fuselage/pylon combos tailored to*



Bill McDow, even though recovering from a serious knee operation, shows all of us how to smile . . . and why not? He has just finished winning 1/2 A Gas at the Autumn Thrash. Model is the *Honcho,* Bill's original. TD .049 powered, naturally!

Nostalgia at its most nostalgic . . . a *1/2A Spacer*, powered by a middling Wen Mac .049 Rotomatic. Bob Stalick holds.

power/engine, weight/engine mount requirements. This has been a series stretching 12 years with some bit of success in two of the three basic sizes garnering Nats wins, and with my greatest thrill being that of having my peers selecting the 1/2A Lunar-Tic *as their 1979 NFFS Model of the Year. Thanks, fellers!"*

Well, Harry, I was given some "lip" by the locals for my K&B .40 powered C-*Quell* (750 square inches). I would like to show up at the site with 535 square inches and a .42 engine. Thanks for the info.

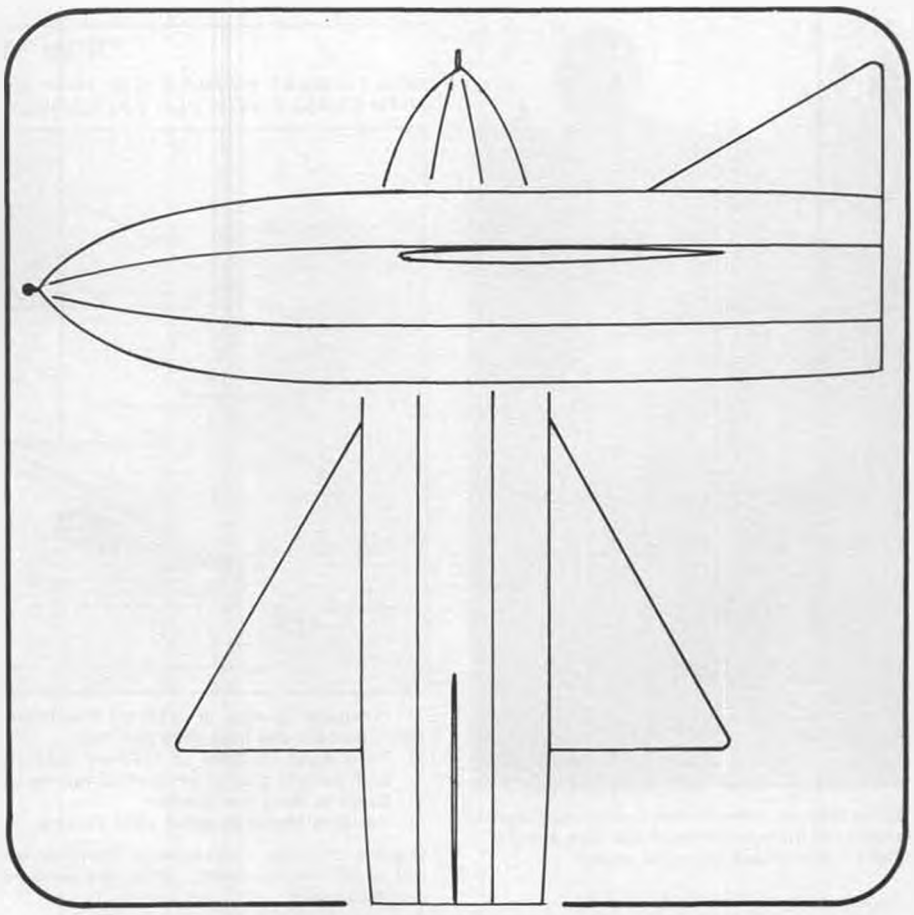
FEBRUARY MYSTERY MODEL

I mentioned early in the column that I spend some time looking for Nostalgia Era models of the free flight variety. One of the problems with the Mystery Model is to find one that is well-known enough to be identified, but not so well-known as to be immediately recognizable. In addition, the model must have enough distinguishing features so that it doesn't look like other designs of the same ilk.

Well, I think I've outdone myself for this month. This one is a free flight. It features an unusual power source . . . an inflated balloon. It was published in a national magazine.

Now, I grant you that it's not your run-of-the-mill duration model. So, I'll bet that a number of you "medium" old timers must have built this one as a fun type, spare time project. If so, you *must* know the name. Maybe you even have some stories about how yours flew.

Regardless, send your best guess as to this model's identity to Bill Northrop, c/o **Model Builder** magazine. The first one in line gets a free one-year subscription to the best model magazine on the market.



FEBRUARY MYSTERY MODEL

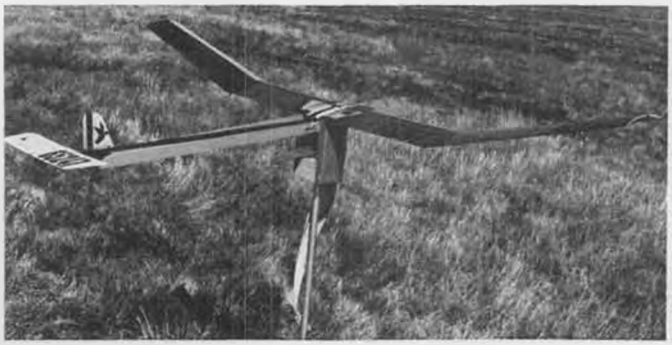
DARNED GOOD AIRFOIL: EPPLER 58

Over the years, I have featured three of the Eppler series of airfoils. This one follows the general trend of all of them in that it is laminar in nature. The 58 has a rather highly "flapped" trailing edge, which makes it less suitable for zoom-launch A-2 models. It should be an excellent selection for Coupes, Wakefields, and other similar models where a fast, but good gliding section is important. The construction of the trailing edge might prove tricky, but if you use a very narrow, but hard strip of balsa or basswood, it should do the trick.

Hope you try it!

VOL LIBRE . . .
AN EXCELLENT PUBLICATION

Over the years, if you have been following the free flight columns, you have undoubtedly read about the French magazine, *Vol Libre*. You may even subscribe to it. This is one large (40 pages or so) tabloid sized newsletter/magazine. Five issues come out every year, but each one is jam-crammed with only free flight related items. The cost is 60 francs for five issues. The editor, Andre Schandel, claims that the object is to provide the best possible coverage of free flight developments throughout the world, together with associated subjects of interest to free flight enthusiasts. Features are also included which are aimed at helping the young and less experienced in the areas of design, construction, and flying of competition free flight models. Contributions are solicted in the form of articles, plans, photographs, reports, etc., from around the world. Send to: Andre Schandel, editor, 16 Chemin de Beulenwoerth, 67000



Wayne Drake uses this launching stooge for his A-2 glider, the *Cold Duck No. 9*. The model is supported by thin rails mounted on a support that swivels to allow launch in any direction.

This close-up view of the stooge shows how wires are used to hold the model on the rails prior to launch.

Doug Hannay from British Columbia, Canada, shows off his international tool box and his *Pacific Ace* rubber powered model.

Strasbourg Robertsau, France.

As an example of the kind of article that you would find in *Vol Libre*, I have included a sketch of how to make extra rigid, glossy wing covering sheets which are reinforced with fiberglass cloth for FAI models.

If I didn't mention it, *Vol Libre* is published principally in the French language, but also contains articles in other languages as well . . . including English.

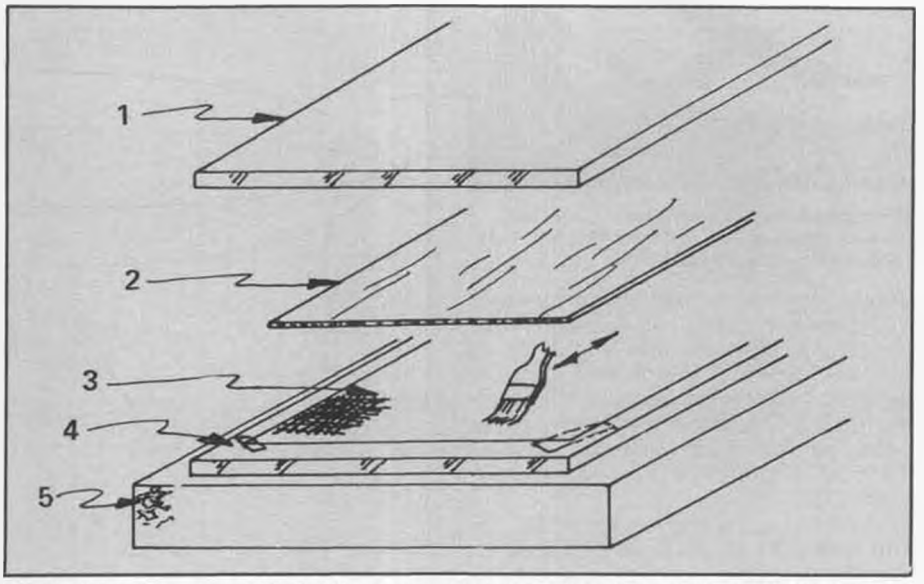
DT LINE MATERIAL . . . BOW STRING

It's a never-ending quest. To find a DT line (or VIT line) that doesn't break, doesn't kink, that goes around corners, and doesn't stretch. I may have found one you could find interesting. It's bow string.

Bow string is what hunters use for the string that fastens to the ends of their bows (as in bow and arrow . . . Tonto . . . Robin Hood). It's quite thin (.050 in.), has a tensile strength exceeding 50 pounds, and has a waxed finish. The sample I have has near nil stretch . . . in fact, once it is "broken in" it has no stretch that I could discern.

FROM "VOL LIBRE"

HOW TO MAKE EXTRA RIGID, HIGH GLOSS WING COVERING SHEETS REINFORCED WITH GLASS CLOTH FOR FAI MODELS.



1) Plexiglass (5 mm, or 3/16 in) free from scratches.* Do not use wax because there is no adhesion between plexiglass and resin.
2) Balsa sheet (1/20 in to 1/16 in) laminated with perfectly parallel sides sanded smooth.
3) Lightweight glass cloth soaked lightly with epoxy resin.
4) Same as item one above.
5) Building board or other solid surface.

Rigidity of wings covered with fiberglass laminated balsa sheet is similar to that of Dural foil of 03 mm thickness. After the wing covering sheets are completed, the wings are built conventionally.

* Plexiglass sheet should be as wide or wider than the balsa sheet. An 80 Kg weight is applied to the plexiglass for proper impregnation of the epoxy into the balsa sheet.

The sample I have is black and is purchased in 300 yard rolls for about $8. That should give the entire USA enough DT and VIT line to last a year. As it comes in rolls,it has a slight curvy set, which can be removed by cutting off the length needed and gliding it back and forth over a piece of rough leather until the set is gone. As it has a waxy finish, it will not get hung up on those little globs of glue or dope that creep into the best of tubing. However, the waxy finish is not so waxy that knots cannot be permeated by Hot Stuff. I wish I could take credit for discovering the stuff . . . I can't. Clarence Haught was using it on his FAI Power model at the Northwest semifinals. Must be good . . . he placed first.

THE END

I hope you are getting your building done . . . it's nearly time to prepare for the first contest of the year!

Thermals!!! •

Bill Gaiser appears to be biting off the end of the DT fuse on his Wakefield model at the annual Autumn Thrash, Rock Prairie, Wash.

DARNED GOOD AIRFOIL — EPPLER 58

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	1.5	2.4	3.6	4.3	5.2	6.3	7.3	7.8	8.3	8.8	8.9	8.5	7.7	6.2	3.7	2	0
LOWER	0	-0.05	-0.05	-0.4	-0.2	0.4	0.9	1	2.2	2.7	3.5	4	4.2	4.1	3.6	2.5	1.5	0

HARRY MURPHY'S

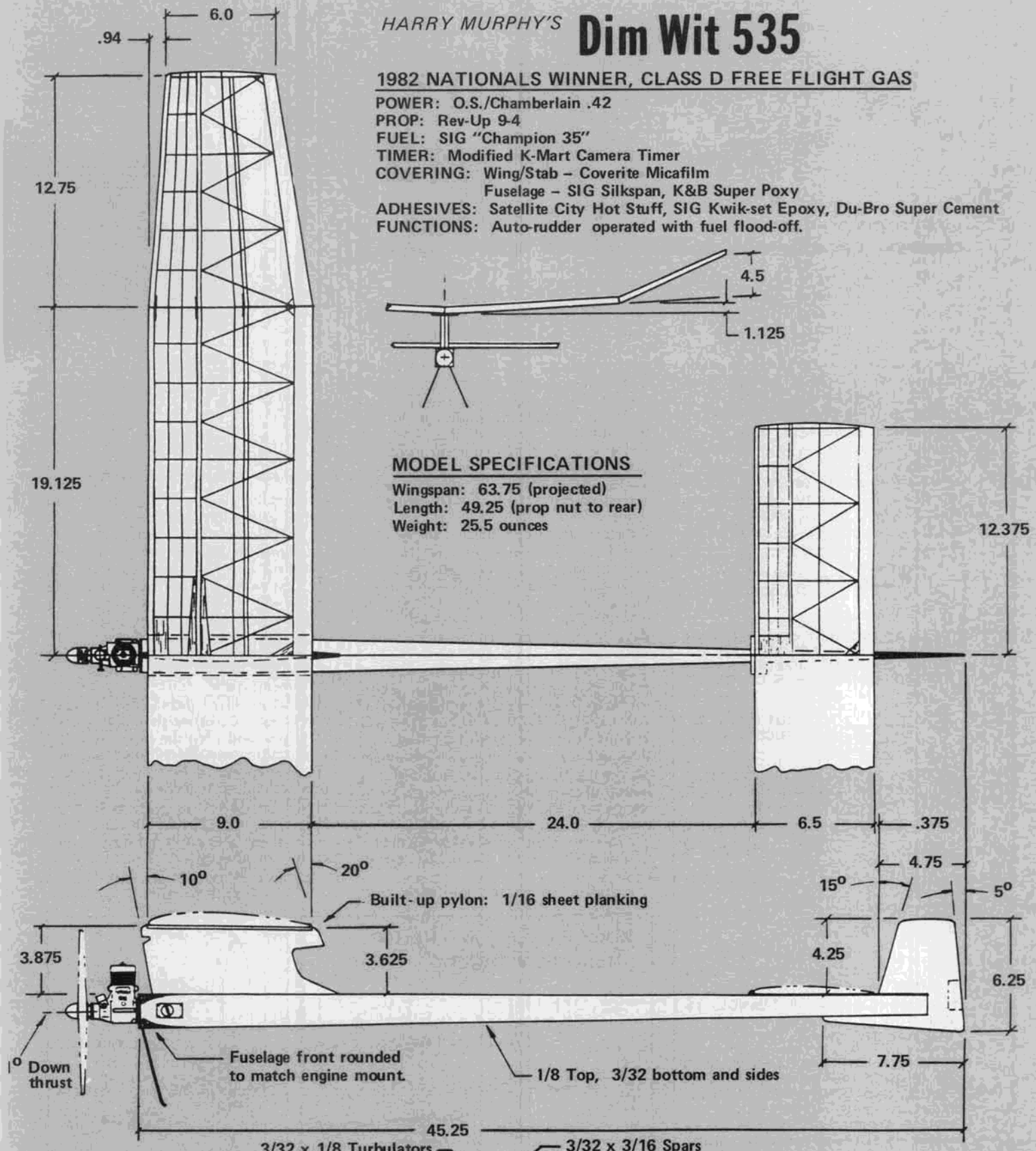
Dim Wit 535

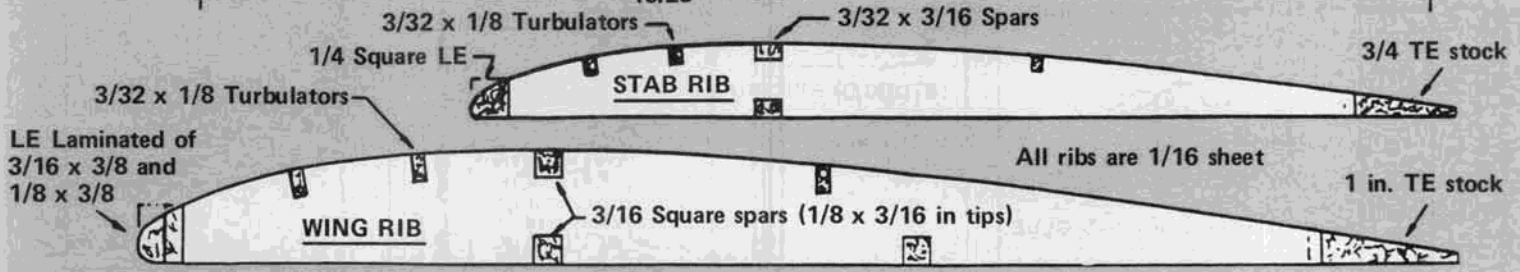
1982 NATIONALS WINNER, CLASS D FREE FLIGHT GAS

POWER: O.S./Chamberlain .42
PROP: Rev-Up 9-4
FUEL: SIG "Champion 35"
TIMER: Modified K-Mart Camera Timer
COVERING: Wing/Stab – Coverite Micafilm
Fuselage – SIG Silkspan, K&B Super Poxy
ADHESIVES: Satellite City Hot Stuff, SIG Kwik-set Epoxy, Du-Bro Super Cement
FUNCTIONS: Auto-rudder operated with fuel flood-off.

MODEL SPECIFICATIONS

Wingspan: 63.75 (projected)
Length: 49.25 (prop nut to rear)
Weight: 25.5 ounces





Free Flight Scale

By FERNANDO RAMOS

Mark Fineman's Seversky P-35 (Swedish EP-9).

• This month is kind of a "catch up" with a listing of several new items, and handy hints. To start off, I want to mention Bill Hannan's new book, entitled *Scrapbook of Scale, Three-Views & Nostalgia*. It covers a period of modeling between 1964 and 1983. There are several articles, scale three-views, and plans, but most of all, it is Bill Hannan. Those of you who have read Bill's first book, *Peanut Power*, will recognize his second effort the same easy going literary style. This new book should be part of your modeling library. It can be obtained from Peck-Polymers for a scant $8.95. In fact, *Peanut Power* is still available from Peck for the same price.

Speaking of Peck-Polymers, I have just received their latest catalog. It is simply amazing, there are 30 pages of modeling goodies that will make you drool! I can remember when all they had was a single sheet brochure with only a few items. They have everything you need to build successful flying models, including building boards made of fiber. I suspect Celotex, or, as I learned as a youngster, beaver board! They have three sizes, 12x18, 18x24, and 18x48. They range in price from $5.95, $7.95, and $9.95 respectively.

Peck is also headquarters for all CO_2 engines and accessories, and for the outstanding Hungerford wheels. Their catalog doesn't have a price on it, but I know that it can't be free . . . not the way printing costs and postage are these days. So, drop them a line at P.O. Box 2498, La Mesa, CA 92401.

As long as I'm mentioning CO_2, I would like to discuss with you Bob Davis' (of Davis Diesel Development) new CO_2 conversion kit for the Cox Pee Wee .020 engine. My understanding is that Bob designed the unit, and Brown engines is producing them. This has resulted in a beautiful compact unit that merely takes the place of the engine's glow plug. Take one off, and put the other one on!

After receiving this jewel in the mail, I immediately went out to my workshop to try it out.

I dusted off an old Pee Wee, and removed the glow plug but left the fine copper gasket in place. The conversion was then screwed into place. As Davis recommends an eight-inch prop, I bolted on an 8-3 and filled up the tank. The first thing I found out is that the engine will "backfire" and unscrew the prop if you don't flip the prop smartly. Once I "fingered" this out, the engine ran extremely well. Interestingly, it sounds just like all other CO_2 engines I've ever heard.

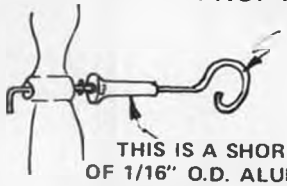
Unfortunately, I didn't have a larger source for CO_2 other than the seltzer cartridges, and with the tank provided the duration wasn't very long. However, a brass manifold is underway that will allow several tanks to be hooked up in parallel for added duration. As the neat little aluminum tanks do not weigh very much, there shouldn't be any weight penalty to speak of.

Ideally, the large CO_2 fire extinguisher type tanks are the best for filling, includ-

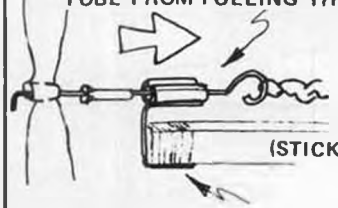
BEND A LENGTH OF .032 MUSIC WIRE INTO A U–SHAPE. SOLDER TO IT A SHORT LENGTH OF 3/32 OD BRASS TUBING (APPROX. 1/4 IN. LONG).

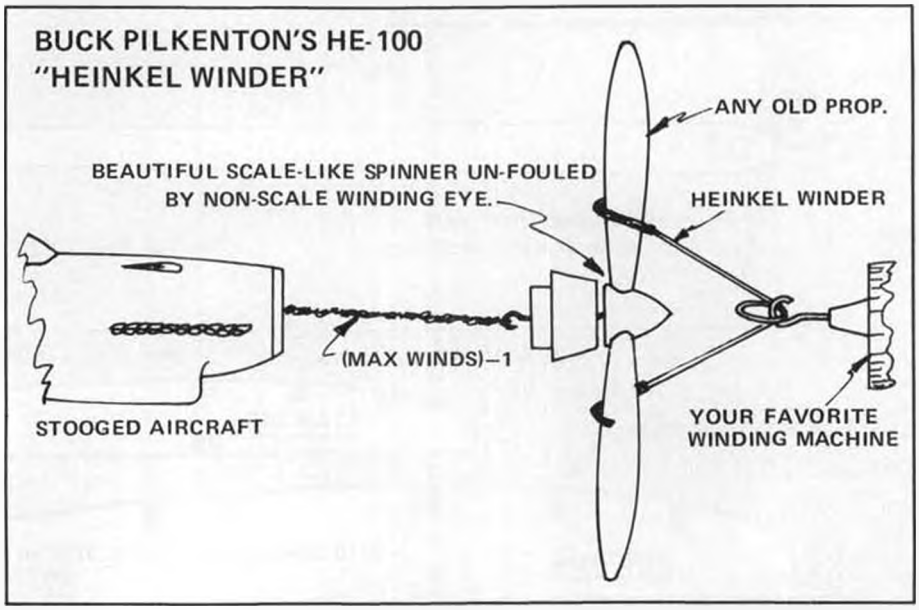
MAKE A CUT THE ENTIRE LENGTH OF THE TUBE. I USE A DREMEL CARBIDE WHEEL FOR THIS STEP.

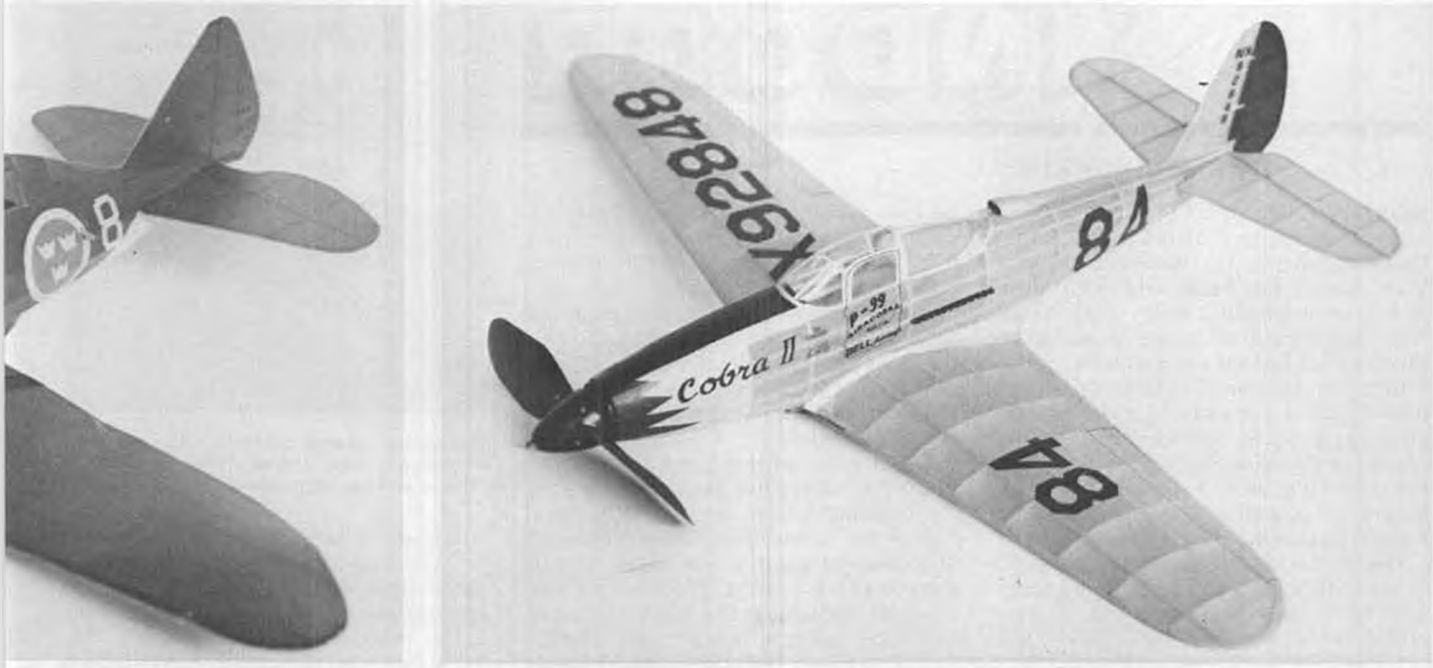
PROP ASSEMBLY: SUPER-DUPER PROP HANGER



THE PROP SHAFT WIRE SNAPS INTO THE GROOVE- MOVE THE ALUM. TUBE BACK, AND THE RUBBER TENSION KEEPS THE PROP ASSEMLY IN PLACE. THE FLANGE PREVENTS THE ALUM. TUBE FROM PULLING THROUGH.







Mark Fineman's Earl Stahl P-39 *Cobra II* racer.

ing the Brown engines. Naturally, these are pretty costly. Davis carries a couple of types that may interest you.

I have a Flyline *General Aristocrat*, that has been flying for years with a Pee Wee, and I'm going to put the conversion on that and give it a try. I'll keep you posted on that one.

By the way, Davis has a neat pin vise that contains a set of small drill bits in the handle. I bought one and I'm quite satisfied with it. The price for the complete set is $10.00. For further information write to: David Diesel Development Inc., P.O. Box 141, Milford, CT 06460.

Davis Diesel Development has been drawing model plans for quite some time now, and its latest efforts should appeal to most all of you rubber scale fans. One is the Bloch MB-152 in both Peanut Scale and Walnut Scale. This was a WW-II French fighter with a radial engine. The other is the North American O-47. This was a pre WW-II observation aircraft, and a real classic. This model is drawn at 1/24-scale and has a 23-1/8 inch wing span. It is a real beauty. Incidently, Planes of Fame, at Chino, California, had a flying O-47. (Notice the use of the word *had*.) They had flown it to Porterville, California, to a fly-in. The pilot landed it with the gear up (pilot error), it caught fire, and was demolished. Porterville has no firefighting equipment. If it had, this machine could have been saved. This was a sad ending to a great flying machine.

Dave presently has more than 30 model planes available, priced from $1.50 to $4.00, which is reasonable indeed. Most average two bucks a piece. You can't beat that. He also has an enlargement service for those of you who can't (or won't) blow up plans. To find out more, send Dave a self-addressed, stamped envelope for his No. 8 catalog sheet. His address is: David Diesels, P.O. Box 101, Woodville, OH 43469.

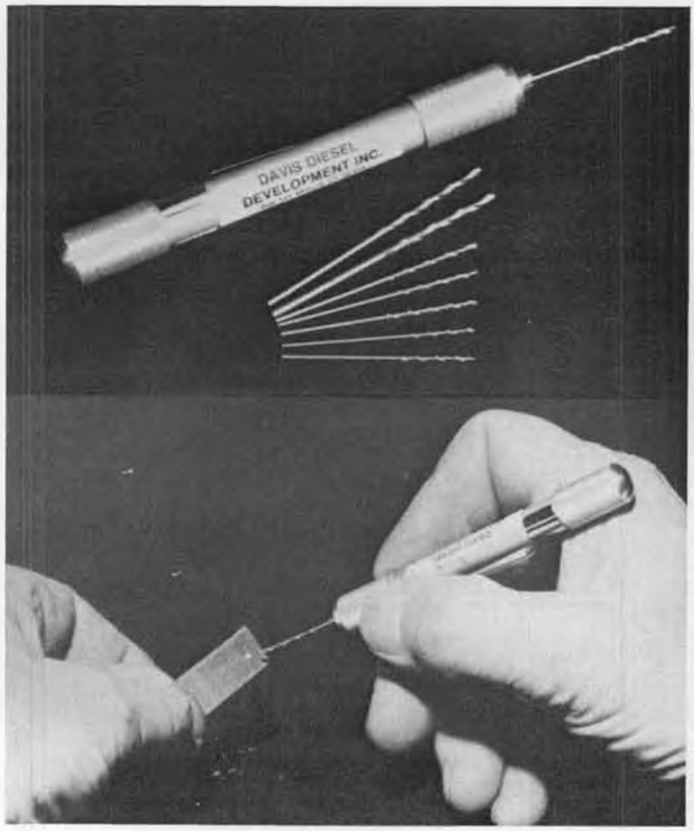
While on the subject of plans, I recently received several plans from Charles Neely. I certainly appreciate people who can draw plans, and Charles is no exception. He has scale drawings for the venerable P-51 B/C *Mustang*. These are excellent drawings of this aircraft, and are the result of many years spent in research. They are primarily reference drawings, but I can see a beautiful rubber model built from them using the scale outlines and the cross-sections provided. There are four large sheets in the set.

Another excellent plan is the JN-4 "*Canuck*." There are two sheets (24x36) scaled at 3/4-inch equals one foot scale. Amelia Earhart learned to fly in the aircraft featured. This would make an excellent Pee Wee .020 F/F scale model.

The third drawing is a 22-inch span Travel Air 2000, with accurate scale outlines, ideal for CO_2. The last drawing is a nifty 13-inch span profile model of an Ercoupe.

All of Charles' plans are first rate, and I'm certain you would want to include them in your plan file. Send Charles

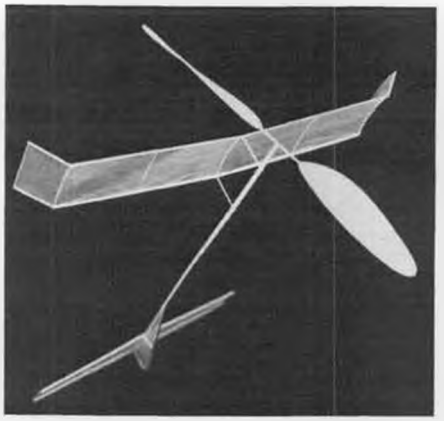
Continued on page 76



Davis Diesel Development has these handy pin vise sets with drill bits for drilling small holes in tight places.

INDOOR

By KEN JOHNSON



This month's plan is the *Honey B* indoor duration model (Easy B class). It has flown 21 minutes and has set a record for this class.

NORTHWOOD UPDATE

Latest word from Stan Chilton is that the Northwood Institute building at West Baden **has been sold**. Very little else is for publication at this time. We all hope there's still a chance of using the building for indoor competitions in the future. This building has been the site of many indoor contests in the past few years, and it was considered the ideal room for duration models such as: FAI Microfilm, Paper Stick, Pennyplane, Easy B duration as well as Peanut and full-size Indoor Scale and Hand Launch Gliders.

The last national indoor meet was held at West Baden in July, and the last team selection trials in September. It was feared at that time that the facility might be torn down or made unavailable for model flying forever. It would be super if the building was restored to its original condition as a luxury hotel or convention center, *and* could still be available as *THE* indoor site for modeling. This mecca is centrally located to most areas of the country, and it is so ideal because the sleeping rooms and restaurant are all under one roof.

Other areas of the United States are under consideration as alternative sites for national indoor meets. Santa Ana, California, is one area being reviewed. The ceiling height is one of the best in the country (about 140 feet to the catwalk). Obtaining the room for more than one day at a time is questionable, and housing facilities in the area would be scattered and more expensive. The travel time and distance from Florida and the east coast would be prohibitive.

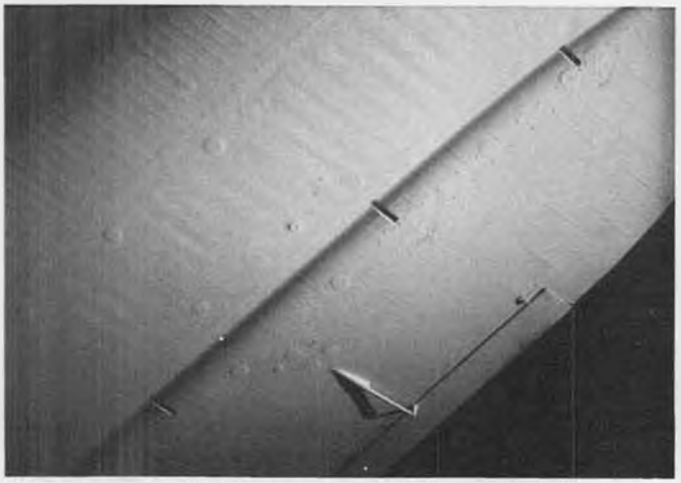
The Wingfoot Lake Hangar near Akron, Ohio is another choice. Availability for more than one day is doubtful. The location to all areas is good. The ceiling height is good. Your indoor editor set the first of several indoor flapper records in this room in 1968. Housing is questionable. Former U.S. Indoor Team member Bill Hulbert has been the contact for this building.

The other possibility is the Kibbee Feildhouse at Moscow, Idaho. Ceiling height is good. Locality is not so good. We here in California are closer to this site than most of the indoor flyers who might attend a multiple-day contest at Moscow. The travel time for us would be considerable. Being tucked up in the northwest corner of the country seems to dampen enthusiasm for this otherwise excellent room.

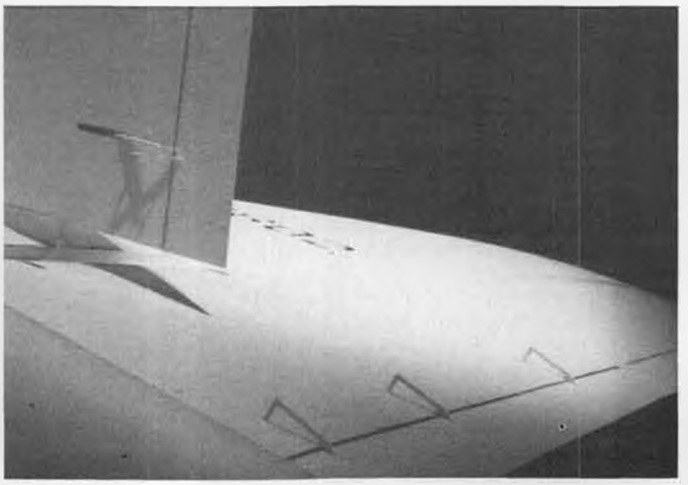
Let's face it, West Baden is by far the most centrally located and ideal indoor building in the U.S.

Keep your fingers crossed that the new owner will see fit to allow us the privilege of continuing to fly our exotic little creations in the atrium at West Baden.

Looking back through the world's largest indoor model, the Howard Hughes *Spruce Goose*. The wax figures are life-size. Don't miss this aircraft if you are ever in Long Beach, California.



Bottom side of the *Spruce Goose* stabilizer shows the sag of the skin. Author noted that the wing covering sagged even worse. This was considered normal by the attendants at the display. Johnson pic.



The stab (left) and the towering vertical tail of the *Goose*. As pointed out in the text, rudder travel is quite limited, but apparently adequate. Photo by author.

Young Darryl Stevens, at 20 years, has joined the 30 minute club while flying in the blimp hangars in Santa Ana. Mr. Stevens holds indoor and outdoor hand launch glider records.

Mr Bob Gibbs, of San Francisco area, prepares his microfilm model for launch at the FAI Indoor Trials. Note helicopter in the background . . . wonder if any models landed up there?

Speaking of flying sites, Stan Chilton relates that he has to fly his models in a 17-foot high building in Wichita, Kansas. He sometimes drives to the Boys Ranch at Bedford, Texas, to fly. The 350-mile drive is rather far considering that the low ceiling at Bedford requires frequent pole steering.

"My hometown site is only twice as high as my living room!" Stan says. We in L.A. complain about having to drive one hour to fly indoors. I think we are pretty lucky. How's the travel time from home to flying site in your area?

HONEY B CATEGORY II MODEL

Last June 16th at West Baden, the above mentioned Stan Chilton set the Category III record in Easy B with his *Honey B* model. The record time was 22 minutes, 01 second. A very excellent time for this class of model. Stan has long been known for his great flying Easy B ships. The extra effort he puts into designing and building these little gems is very evident. Each year at the atrium Mr. Chilton has been right up there with the highest times and the smoothest flying "B's."

The plan of the month, this time is the *Honey B*. I recommend this as an outstanding Easy B model. You may see some heads turn when they announce your winning time at the next indoor contest. I expect that if you build it very carefully, and select your wood well, hold down the weight, and cover nicely, you will come out on top. If you are just a casual builder, don't try this model. This aircraft is only for modelers who want to win contests. Pay great attention to the construction of the propeller. I cannot impress upon you strongly enough the importance of having a good prop on your model. If you don't have an excellent propeller, don't expect excellent times.

My thanks to Stan Chilton for allowing me to present this model to you. And don't forget, seek out the very lightest condenser paper available for the covering. It will make a considerable difference in your flight times. Let me know how your *Honey B* performs.

I plan to build the *Honey B* very soon, and will report to you on how *my* Chilton model flies.

TALK ABOUT BIG!

Recently, my son Chris and I got in to see the world's largest indoor model. I'm referring, of course, to the famed *Spruce Goose*.

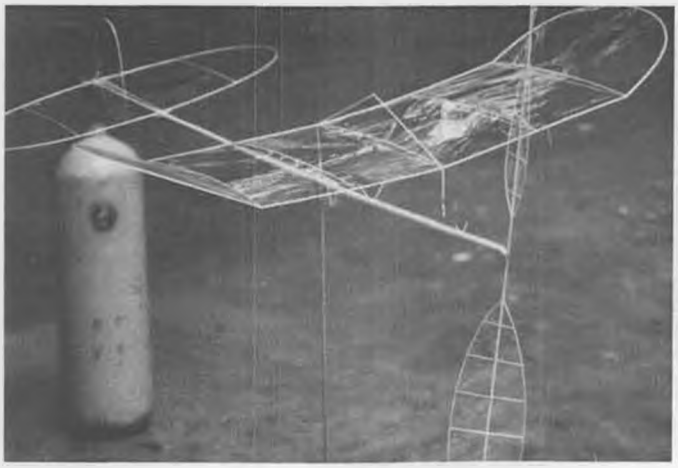
To set the record straight, the *Goose* was originally dubbed the HK-1. It was felt that a shipbuilder and an aeronautical designer were needed to dream up the troup-carrying behemoth. So the contract was awarded to Howard Hughes and Henry Kaiser. Mr. Kaiser was a leading military ship builder during World War II. As the project took shape, the HK-1 (Hughes/Kaiser 1) became the H-1. Kaiser knew nothing about airplanes, so Hughes took over the entire task.

After Mr. Hughes' death, the 33 year old plane was towed into Long Beach Harbor and lifted onto a temporary land perch nearby.

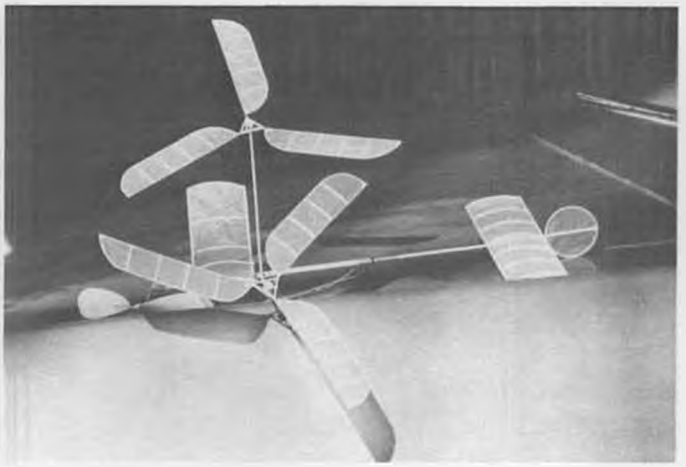
We drove to Long Beach to get a close-up view of the plane. After parking the car, we walked down a dirt road with the big tail fin in sight. Halfway there, an armed guard appeared in the road and warned us to go back. I didn't argue with this rifle totin' fellow. We drove away disappointed.

Later, during the construction of the dome over the seaplane, we tried again. We stopped at a guard shack and tried to impress the attendant with our importance. After several phone calls in our behalf, we were again turned away. Undaunted, I went over the the Queen Mary Hotel (nearby) and called some contacts to gain entry to view the bird. No luck!

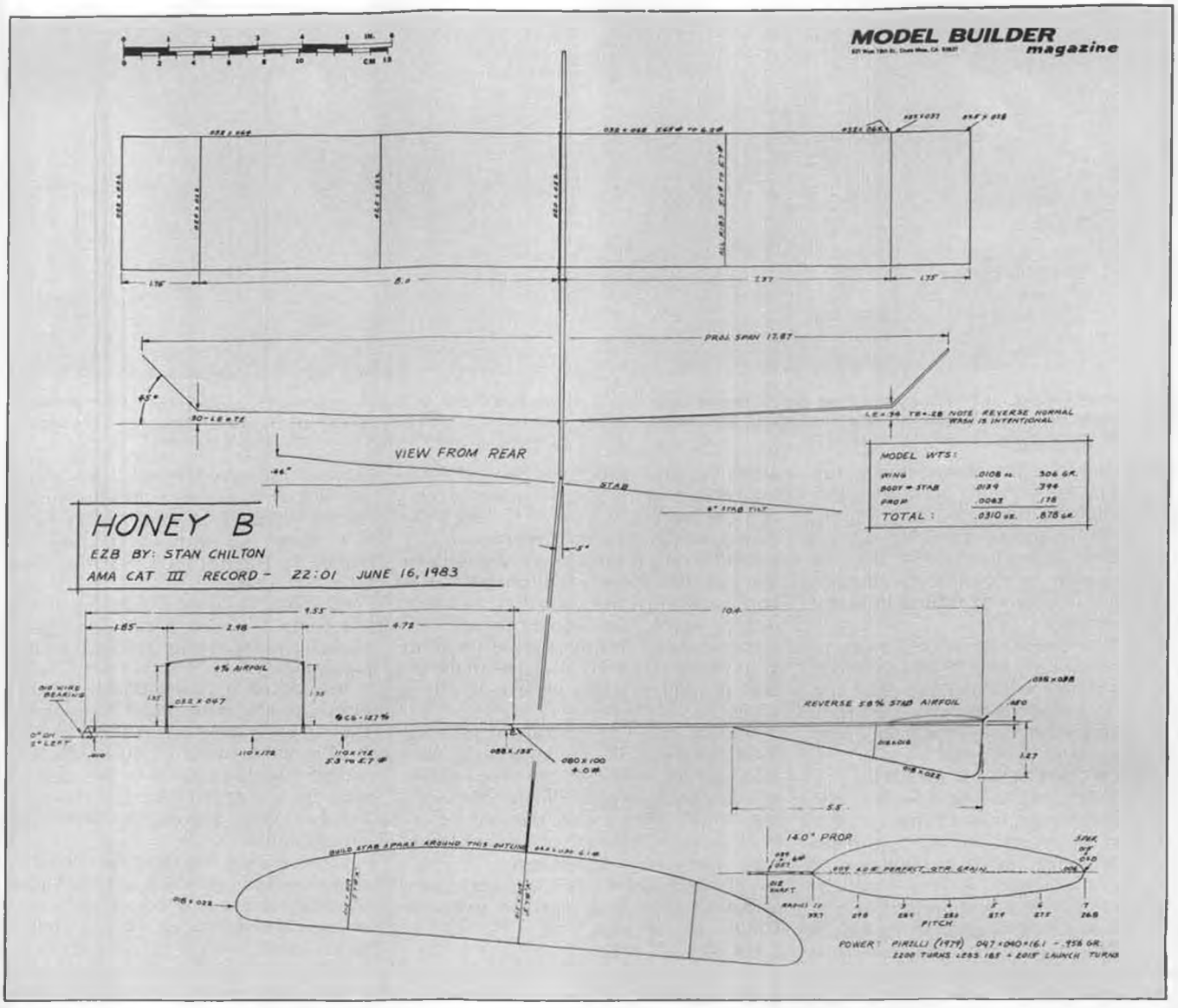
Later on, during a time when it looked like I might get a spot on "That's Incredible" with my ornithopters, I suggested filming them in the dome flying over the *Goose*, hoping that *finally* we might get to see the H-1. The deal fell through, and



Clarence Mather, of San Diego, Calif., built this FAI mic ship, and was preparing for a flight at the blimp hangar in Santa Ana, Calif. Note the the fine workmanship displayed in this duration model. Johnson pic.



Millard Wells, of Florida, built this twin rotor autogyro. This is an ambitious project for any indoor modeler. Millard is one of the better scale modelers in the Miami area. Bob Andrews pic.



I gave up hope.

About one month ago, we did get in to see the bird. We payed our $6.00 like every other tourist, and in we went. Believe me, it was worth all the trouble. It is fantastic in every way! If you come to California, don't miss the *Goose*.

We came away with several observations. The skin on the wings and stabilizer seems to be buckling. A definite sagging of the skin was apparent. An attendant stated that this is normal. This condition is more pronounced on the flying boat than on any other aircraft surface this writer has seen. The other thing I noticed was the very close tolerance of the vertical fin to the elevator. The *Goose* photos show just how little the rudder was allowed to travel from side to side. The attendant related that this 16 degrees of travel was quite adequate to steer the giant plane. It looked insufficient to me. Look at the photo and see how it looks to you.

Larry Cailliau has been called the best FAI flier on the west coast for the year 1983. Larry consistently had times in the 38 to 39 minute range (under a 100-foot ceiling). He also took first place in Microfilm at West Baden last June.

The steel dome that houses the plane is large enough at ground level to allow for many exhibits relating to Mr. Hughes and to the aircraft itself. The construction and assembly phases of the *Goose* are depicted, and other various aircraft triumphs of the designer are displayed as well as a full-size model of the *Hughes Racer*. A restaurant, souvenir shop, and restroom facilities are included. A ring of colored lights, halfway up the inside of the dome's wall goes on and off slowly which changes the color of the plane from white to red, then blue, and back to white. The H-1 sits on a beamed framework several feet over a lagoon which reflects its image in the water.

The line to board the plane is quite long. A very lifelike wax figure of pilot Hughes can be seen as visitors climb the stairs and enter the fuselage through a ten-foot square opening cut into the body. Once inside, the viewer makes a horseshoe turn and exits after looking back through the immense fuselage.

As Chris and I left the building, I wondered how it would be to hold an indoor contest in the dome. The big

LEFT: FAI team member, Cezar Banks, of San Diego, Calif., was second at the US Indoor Team Selection Trials at West Baden in September, 1983.

RIGHT: Earl Hoffman flies his FAI duration model. Earl's models often turn out underweight. Earl is famous for his Easy B record of 24 minutes. The prop was built-up and covered with very thin sheet wood.

problem would be how to retrieve the models from atop the giant stabilizer. Access to the top of the wings is no problem, but the stab; now, that's another thing. Well, I guess we will never know the thrill of flying our little models in the room with this biggest of indoor models.

PLYWOOD PROPS

What type of props are you using on your indoor Peanut and Grapenut models? Most likely they are the plastic type. Well, the word is out that some of these props are not being manufactured now.

Have you considered using propellers made of 1/64 of 1/32 sheet plywood? They work well. Balsa indoor props are all this author uses, but some modelers are afraid to try balsa because it is somewhat fragile. Sure, I break a lot of prop blades when my models fly into the walls. When flying in small rooms like gymnasiums this is unavoidable. Perhaps an open window will blow the little model into the far wall or the trim may have changed after the model was stored in a warm garage. A crash will definitely change the way it turns. *Bang!* Into the wall it goes. Most of my balsa props break near the hub where the wood is the thinnest in cross section. As a quick fix, a small amount of Testors green label cement can be applied to the break, and the two joined parts are soon dry and ready to fly.

You may have noticed that models using plastic propellers tend to be nose heavy. Not good. The limited area and the shallow pitch on this type of blade will bring the model down with less seconds on the clock, and the airplane will fly faster. Not my kind of flying. Perhaps a compromise is the plywood bladed prop. You can make any area and pitch you choose, and still have a rather light finished product.

Hubs of 1/8 sq. hard balsa can be fashioned with 45° angles cut at each end. Then different blades can be quickly cemented into place without changing the entire prop assembly. The 1/8-inch hubs can be about 3/4 of an inch long for Grapenut models and slightly longer for Peanuts. Soak the sheet plywood in warm water for a few minutes, and tape the precut blade around a small can and bake in a 300 degree oven for about a half hour. Remember to angle the blade at 15 degrees off vertical to get the right pitch angle.

These plywood wonders can bang against the walls all day without breaking. The glue joints may break but the blades will not. The blades can be fine sanded and the edges rounded smooth before spraying with a light coat of enamel. Of course, this type of propeller functions best on a lightly built model. The heavier the model, the faster it will fly.

I would like to repeat something that was mentioned in a previous column. If your model touches down with *no* winds left (dead stick) the motor is too short. The plane should power up and power down. Ideally, the rubber band should have one row of knots left in it when the flight is over. If it has more than one row, cut off about one inch and retie the knot and try it again.

How much rubber lube should you use on a Peanut? Very little is my rule of thumb. A dry motor will break sooner, but a motor that has too much lube will spatter the inside of the fuselage and weaken the wood structure. I place the rubber motor in my hand in a ball and squeeze out one or two drops onto the motor. Then, I rub the motor between both hands and remove the excess lube from my hands and the rubber knot.

10 A.M. – 6 P.M.
SATURDAY

10 A.M. – 5 P.M.
SUNDAY

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EVERYTHING'S GOING UP

Last time we ventured into the local hobby shop and purchased our list of needed supplies, I thought back to the prices of wood, cement, etc., some years ago. Only 10 years ago a small tube of Testors green label cement was 15¢. Now, in 1983, we are paying 59¢ for the same tube. The cement is no better, just more expensive. About the same time, 1/16 sq. balsa strip cost a penny for 5 pieces. Now the same wood is 10¢ for one piece. I have an original box that the Korda world record holder model came in, and the price was 50¢. All the old timers out there can remember the Megow 10¢ kits. Most of today's kits run $5.00 and up.

If we had been buying supplies and kits at today's prices, we could not have afforded to build model airplanes. Surely, there are youngsters out there, even today, who come up short at the cash register. Is it necessary to make so much profit from a kid who just wants to construct something beautiful with his hands that flies on a rubber band? Any comments?

BRAIDING MOTORS

Some scale models will fly a long time on a very long motor. The rubber can even be twice the length of the fuselage. This is ideal, but sometimes the rubber flopping around will cause the model to shake violently during cruise and descent. The rubber can even shift and cause the center of gravity to move aft and make the airplane stall. One way to remedy this is to braid the motor. Outdoor modelers have been using this technique for years, and it works well. Why not use it with Indoor Scale and Peanut?

Braiding only works when you use an even number of loops in the rubber. For instance: two loops or four or eight, but not five or seven. If your model flies on one loop of 1/8-inch rubber, then use two loops of 1/16 instead and braid it. Figure the motor twice as long as you need it. Drop the knot end over a peg or a friend's finger. Then wind the motor backwards for about 50 or so turns. Then fold the rubber over in half while it is still wound backwards, and let it wind up into a corkscrew. Insert the motor into the fuselage with a loading stick (or a motor loader, as one friend calls it), and you are all set. The motor should be snug. If it is too tight a fit, remove the rubber and take out some of the turns in the braiding. If it is too loose, add braided turns.

It is recommended that you remove the braided motor after each flying session and take the turns out of it.

WORD FROM GEORGIA

If any of you indoor builders live in or are visiting the Atlanta, Georgia, area and want to take part in the activities, contact Norm Purdy (404) 428-1390 for dates and locations. The local free flight club is The Thermal Thumbers of Metro Atlanta. (In the Chattanooga, Tennessee, area, contact Russ Timmons at (615) 886-5117.) The Atlanta group is flying indoor at the Garrett Middle School in Austell, Georgia.

INDOOR TEAM SELECTION

The scene was the West Baden, Indiana, atrium, and the event was the U.S. indoor team selection trials. Bob Randolph of Loma Linda, California, totalled 1109 points to lead the indoor flyers. Bob had flights of 36:48 and 37:30. In second place was another Californian; Cezar Banks, with flight of 37:08 and 36:39. In third was Jim Richmond with a total of 1099 points. Fourth place went to Larry Cailliau who totalled 1059 points.

We offer congratulations to these fine indoor duration flyers. This event took place over the Labor Day Weekend, September 3 through 5, 1983.

Tony Italiano of the National Free Flight Society has been busy lately conducting a survey by mail on an alternative to West Baden. If you would like to know more about this, contact Tony by writing to: 1655 Revere Dr., Brookfield, WI 53005.

Write comments and send black and white photos of your indoor activities to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. •

Electric . . . . . *Continued from page 23*

11,000 rpm using a six-cell Sanyo pack. Good news for glider fliers is that it will

take an 8-4 prop for better climb out (but shorter motor run). Physically, the major differences between the new and old 05s is: (1) the new motors have bigger and better commutators and brushes; (2) the new motors are 1/4-inch longer than the old; and (3) the new motors are one ounce heavier.

The new 05XL has a front ball bearing, and the system retails for $65 (No. 6005A). The motor alone is $28 (No. 6105A). The system is also available with a plain bearing motor for $55 (No. 2007A), or the motor alone for $18 (No. 2107A).

These prices look reasonable, and the advantage of a motor that swings a bigger prop is that it is more efficient for slower flying planes compared to a high revving small prop. This means that gliders, old timers, and sport planes will climb better and fly better. This is the type of plane that I generally fly, and I have always favored a larger, slower prop. In fact, one of the drawbacks for most 05s has been that they were designed for six-inch props and high revs, good for fast planes. This is changing, and I am glad to see other options.

By the way, the same motor on seven cells is "hot," so if you like the higher revs, order it as the Astro 075XL package which has seven cells (No. 6007, $70), and do your stuff! The Astro literature says it will turn a 7-4 at 12,000 rpm, lots of power.

Bob impressed me with all the technical information on what Astro does to the new line of super ferrite motors, so here goes! Astro now has its own magnetizer, which puts out 10,000 gauss and 10,000 oersteds, which thoroughly saturates the new M-8 magnets. The magnetizer has 4000 turns of wire over a mile long, and eats 15-amps from a 110-volt line, about 1200-watts (1-1/2 horsepower), so it is a real brute. Bob ruined a quartz watch (not a mechanical watch) while working with it, and is getting four percent more magnetic strength into the magnets than the commercial outfit where the motors were sent previously.

Anyway, I just got a super ferrite Astro 15, and it is beautiful with its gold anodized case. It looks like a cobalt motor, but is larger because of the ferrite magnets, and it uses the same silver graphite brushes as the cobalt motors. This is a great improvement over the older line of ferrite motors, and I'm looking forward to flying mine in my float plane. I haven't done any tests yet, but Astro says it will turn a 7-4 at 15,500 rpm on twelve Sanyo sub-C cells. The motor is $60, part number 6115. If the workmanship is any indication, this should be a winner.

Bob has been busy at Astro Flight, to say the least. He has a bunch of new products out besides the super ferrite motors. The big news is an improvement on the variable rate, rapid charger. It now can charge two battery packs at once, up to 14 cells total, up to sub-C size. The price is $49.95, part No. 4005D. This is really a handy item for those of us who have larger systems than the 05s, such as the Keller, Geist, and Astro 15, 25, and 40 systems. I really like variable rate chargers because I can tailor the charge to any size of battery pack, and I can shorten the charge time if I wish (by using digital monitoring). The Astro variable charger I have has proven to be very durable, and has withstood many charges at six amps, a tough test.

New items that will be out by the time this column is printed include super flexible wire like the Graupner wire sold by Wilshire Model Center, new gear boxes with all steel gears for long life, and red Sanyo 800 mah cells for the small models that use the 020 and 035 systems. The 800 mah Sanyos offer more rpm and duration than the GE cells that up till now have been supplied with the 020 and 035 systems. I have heard rumors of nearly a thousand rpm increase! That would be a real kick in the pants! The 020 and 035 planes do fly well, and this would make them even better. I have a pack of 800 mah Sanyos, but have not had a chance to test them yet, so hopefully I'll know soon how much difference they make.

Last but not least, Bob sent some technical tips that are much appreciated. Astro has switched to the smaller Molex plugs, so the photos I showed in earlier columns are now outdated. However, Bob has seen some problems with the smaller Deans plugs, which is why Astro doesn't use them. First, the Deans are easy to plug in with reverse polarity, so batteries can get shorted or reversed charged. The other problem is that the charger plug has to be the male plug, and that means exposed pins (the Molex is covered). If these pins contact bare metal they will short, and *zap*, there goes the charger resistor. Bob recommends sticking the pins into an eraser when not in use to avoid this.

I use Dean pins, and occasionally I have reversed them, but so far with no disasters. I color code one side of the pin with red or yellow vinyl tape stuck to the flat side of the pin block, so that it is pretty obvious when the plugs are matched up (i.e., red-to-red or black-to-black). So far, I have not shorted a charger pin. You might consider sliding a section of light plastic tubing around the charger plug that is wide enough to allow the plugs to mate, but long enough so the pins cannot touch metal (that is, a modification of the Molex idea).

Bob has been testing brush systems for six months, and has come up with new brushes that last much longer for the cobalt 05: 150 hours of operation or better. Bob says brush design is something of a black art, and not well understood. Much of it was sweat and try, as Edison said, "Ninety-nine percent perspiration, one percent inspiration!"

Apparently what has been happening is that vibration in the motor has been just enough, especially in the belt drive and gear drive systems, to cause the brush pig tails to swing and touch the loading springs. This shorts across the springs, which heat and lose their "spring," and the motor goes blah in its

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performance. The solution was a careful balance of pig tail length and spring strength. Subtle, who would have thought it! It just goes to show that Murphy's Law (whatever can go wrong, will go wrong) is as valid as ever.

Speaking of Edison, and MacCready, there are some young inventors around too! Shawn Theiss, 10-1/2 years old, taught his dad (an experienced modeler) how to pioneer solar electric free flight. Shawn had been given a solar powered toy consisting of a solar cell and a motor with a prop, not much for the price that was paid. Then Shawn asked his dad to get him some 1/16 sheet balsa so he could build a solar powered plane! His dad assured him that it couldn't be done, but Shawn went ahead, he lightened the solar cell by removing the heavy plastic case around it, and installed a rubber power, six-inch prop from a Comet *Meteor* kit. It took Shawn less than two hours to build the plane, and then test it from the bedroom balcony.

To the astonishment of his dad, it flew! Though it doesn't climb, in the midday Florida sun it just keeps going on and on and on . . . Dad says he guesses he'll never learn! Actually, he plans to build one himself.

Would you like to build one? The drawing that R.J. Theiss sent should give you a place to start. The wings and tail surfaces are 1/16 sheet (flat bottom). The fuselage is 1/8 sheet. The wing and stabilizer are zero-zero from looking at the photos, with lots of up elevator. The

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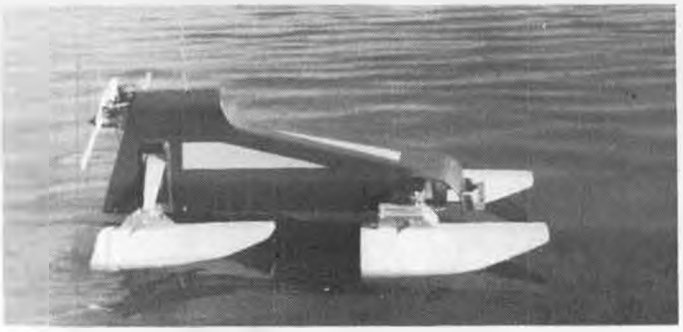

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wheels are from a North Pacific rubber power plane. The solar unit came from a gift shop at Cape Canaveral, and the brand is unknown. However, Radio Shack has a similar kit, number 277-1201, for $9.95. It looks interesting, maybe I should try it, though now with the winter sun, it might not sustain flight.

Congratulations, Shawn, for your ingenuity! Shawn has been building flying models for three years, and 90% are his own design without the benefit of plans. It looks like we have another Paul MacCready coming up!

I did get some more news about the KRC meet from Bob Kopski. It pulled 33 fliers both days, an increase of 11 times over the first KRC meet in 1980. Great! The heat was a problem, but a lot of good flying went on.

The Udet *Flamingo* biplane by Heinz Koerner is very attractive (and so is the girl!), this one flies with a Keller 50/24 SL cobalt motor, with twenty sub-C cells and an 11-7 prop. It weighs 7-1/2 lbs.; Heinz is very pleased with it, and reports that it flies well.

John Grigg (AMA president) had the most dramatic climb out of the meet with his 50/24 boosted *Gemini*.

There were electric seminars both days, and the interest in these was tremendous.

The best looking plane award went to Austin Gutman and Elis Grumer (separate awards each day); the most aerobatic plane award went to Bob Peiser on both days; and the longest flight award went to Charles Hampton and Brad Baylor. The most unusual plane award went to Nelson Whitman. Bob didn't say why, but I'll bet it was original, as Nelson designs his own electric seaplanes.

Thanks for the info, Bob.

By the way, for us west coasters, the Astro contest will tentatively be in the first week in February in Los Angeles. This will be two days, and last year was the best ever, so this year should be great. This is *the* electric meet to go to for maximum variety and inventiveness, plus state of the art developments. See you there! •

Fuel Lines . . . *Continued from page 21*

photographs can be a bit deceiving. The Space Hopper appears to be the same approximate size as the Sportsman and Olympic. In fact, it looks quite a bit like either one. Why? Simply because of photographic enlargement or presentation. You'll appreciate the size difference if you compare the needle valve assembly sizes of the engines. So much for photographs without an accompanying scale reference.

The Space Hopper was the most powerful 1/2A engine for the next several years. The design reflected improvements based upon the years of Cox experience with the earlier .049 Space Bug and Thermal Hopper engines. Indeed, it would be an understatement to say this was clearly the finest 1/2A engine to date. Obviously, it had rear induction, reed-valve, carburetion. It was also the first .049 specifically designed for beam mounting. Competition oriented modelers soon recognized its potential. It became *THE 1/2A ENGINE*. It was indeed powerful for its time, it only weighed 1.3 ounces, and it cost only $6.98.

Guys, as I said in the opening paragraph, this may be a bit nostalgic . . . But remember, even a recent car buff convert would be nostalgic about '55 Chevies . . . much less Model T Fords. So, there's some sort of precedent for a few words about 1959 Cox engines. I don't intend to make this an engine collector column, but maybe some months hence, another similar article may appear. I'd like to hear what you think about it. Good, bad or indifferent? More technical? Less technical? None of the above?

For now, guys, take care. . . •

Scale Rally . . . *Continued from page 20*

the case, however, and it should not be construed as a "BIG Bird" event. It's a *scale* event, be they big or little.

The weather cooperated with the Flying Dutchmen this year, and although the gusty winds on Saturday made it difficult to fly the smaller models (my Sig *Citabria* kept flipping over on it's back by itself!), Sunday's sunny skies, cool temperatures, and calmer breezes kept most of the crowd captured at the site until late into the afternoon.

The hosts didn't forget about the Saturday evening activities either. What's more appropriate in "corn country" than a corn roast? The day's activities were followed by a video presentation of those same activities on a six-foot outdoor screen! This was followed by an exclusive screening of the popular movie "Airplane II"!!

It's a weekend intended to be fun and relaxing for all who attend, and it hits its mark. Under the able chairmanship of Steve Gray (pilot and co-builder of the famous Canadian *Spruce Goose* model), it's well organized, well attended, and

most of all, safely run. They even provided fire extinguishers and 24-volt starters in the starting boxes!

If you're like me, and once in a while you want to get away from the heavy competition, and enjoy yourself in a scale atmosphere, try the Kitchner-Waterloo Scale Rally; you may find it habit forming! •

Choppers . . . . *Continued from page 31*

centered over the skids, I place a brick or two on each side of the plywood. This effectively pins the ship to the ground during initial run-up. (See photo.)

Keep in mind that this is without training gear. With training gear you may be able to place weights directly on top of the training gear to hold the helicopter down.

The photo shows another good way to set up for initial run-up. Steve has included a photo of his group's run-up area, complete with table and a wire cage. This surely adds to safety, and keeps everybody clear should a mechanical part fail, or if radio noise runs the helicopter to full throttle.

While Steve's way is surely the best for safety, and my way is the most practical for day-to-day operation, there is a better way yet.

In both of the above cases, their is one major problem. *And that is that the helicopter is in ground effect all the time.* While this is not critical for tracking blades, it becomes a distinct factor when running the ship at full throttle, full pitch, to set top end engine performance.

Let me explain. Under flying conditions, the helicopter is able to climb at full throttle, allowing the disk to displace air below it. This effectively "unloads" the disk while running at full throttle, when the helicopter is tied to the ground, or strapped to a table, *this large surface keeps the ship in ground effect, and this will bog down the rotor speed because there is nowhere for the displaced air to go except out, laterally.* For most accurate top end settings, the helicopter is best off at five to six feet off the ground, and strapped to an area no larger than the skids length and width.

The easiest way to do this is to have someone else hold the helicopter above his head after the initial strapped-down checks have proven OK. While he holds, you can tweak the needle valve and pitch for best performance. However, this can be very dangerous, and I won't personally recommend that you do it this way. It's easy, but not necessarily safe.

Taking safety's sake into account, the cleanest setup is to use an old tire filled with cement, and a five-foot to six-foot pipe sticking up from the center. The pipe should be one and a half to two inches in diameter, with the top inch or two threaded. It is then a simple matter to buy a flange fitting at the local hardware store, and screw an appropriately sized piece of wood to the flange.

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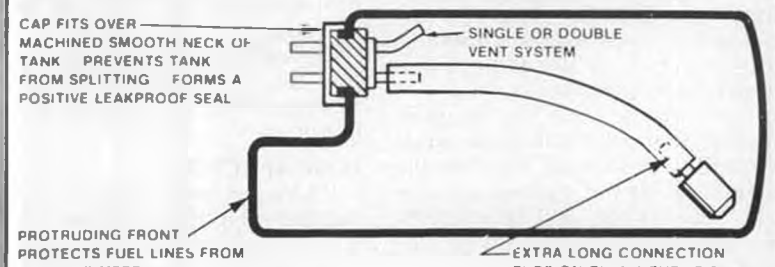

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This whole thing can be screwed tightly on to the top end of the pipe. You can use clamps or bungee cords to hold the helicopter's skids to the table, your preference here. (See sketch.)

Start the ship, and while it is still at an idle, place it on the top of the pole, strap it down, and clear the area. Then run up the engine, adjust the mixture and the pitch at full throttle, and spool back down to an idle before removing the ship from the stand.

This is a bit of trouble for one person to make and use, but if there are several helicopter pilots in your area, it becomes a most useful tool. Now that tracking, blade speed, and engine mixture are properly set, refuel the ship, and place it on the ground for trimming the flight controls.

TAIL ROTOR

All tail rotors should be set up to fly the nose of the helicopter, i.e., stick to the left, nose to the left. As the throttle is advanced, the tail rotor will be the first flight control to "come alive," especially if the tail rotor pitch is way out to start with.

Aim toward a trim that keeps the nose straight just as the helicopter starts to slide around on the training gear. By this I mean that the ship is "light on the skids," almost ready to fly. If you add or cut power quickly, the nose will *always* spin around on a fixed pitch ship with no tail rotor mixing, and *movement even with mechanical or electronic mixing is normal*. Always keep in mind that we're trying to trim for in the air, not on the ground.

If you can bring the throttle up very slowly to where the helicopter just breaks ground by an inch (if that), and the nose still stays straight, you are very close with tail rotor trim.

RIGHT-LEFT CYCLE

Things can start to get a little tricky here. Your best bet is to hold onto the tail boom very carefully *with your back to the wind*. This prevents the helicopter from blowing back over your head in the event of a gust of wind. Again, I would prefer that an accomplished pilot trim your ship while both of you stand clear. This is for the novice pilot in the middle of nowhere with no help. Make sure you can work the throttle with your free hand. Increase throttle so the helicopter comes up to a comfortable altitude. Two to two and a half feet is a good altitude, assuming you started from a position kneeling on one knee. You must give enough throttle for the helicopter to develop its own lift. Don't force the ship off the ground by lifting from the tail boom!

Once the helicopter is at approximately two feet and under its own lift, trim roll so you don't have to "twist" the tail boom to keep the ship over one spot. It should remain there by itself. If done properly, you should even be able to relax your grip slightly on the tail boom once trim is set.

FORE-AFT CYCLE

It is nearly impossible to trim pitch by holding on to the tail boom. The reason is that an aft cyclic control results in the same motion as increasing throttle. (The ship rises slightly above hand level, tilting back . . . the hand essentially becomes a pivot point for the whole helicopter . . .) If you do try it this way, let the ship "float" at the altitude it seeks, which will vary a good six inches to a foot. Then, relax your grip on the tail boom slightly, and try to sense if the helicopter tries to drift forward or rearward. Compensate with fore-aft trim accordingly, but expect to change it slightly once the ship is on the ground on its own. It is most likely that this method of trimming for pitch will get you "in the ballpark." The best way to trim pitch is to put the helicopter on the ground, advance throttle just to lift-off and note any fore-aft drifting. Compensate accordingly.

Now all trims have been roughed in. At this point, adjust the actual pushrod length to return all trims on the TX to neutral. There is only one more item to dial in before you can start practicing your hover, and that has to do with the landing gear (or training gear in this case).

TRIMMING THE LANDING GEAR

To be perfectly honest with you, this is one of the finer points of trimming, and very few people "trim the gear." For two reasons, I suppose: (1) It is a fine point as I mentioned, and (2) few people really understand how to do it! At least I'll explain how it's done, and then let you decide whether or not to do it.

This is another good example where the "Kiwi" novice who needs it the most is least capable of trimming it out. Hovering novices, intermediates, and experts have no real problem if the gear isn't trimmed because they can automatically compensate at the instant liftoff occurs. *OK*, you ask, "What causes it, and how do I correct for it?"

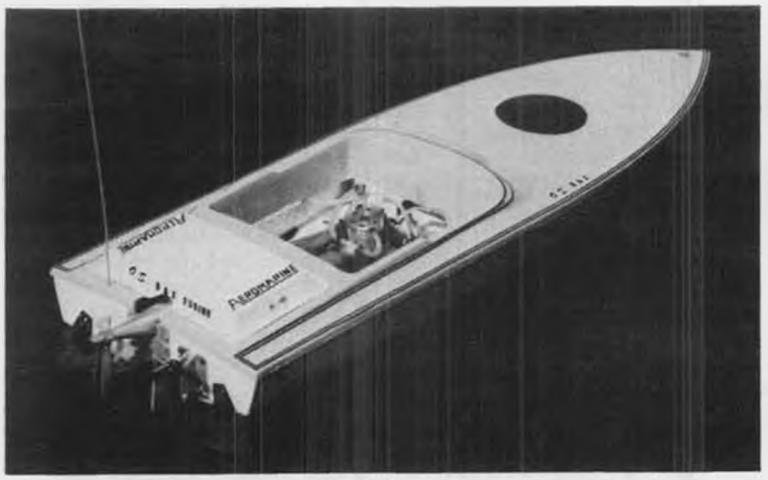
You might remember that several months ago I talked about translating tendency. (May '83 **MB**). Very quickly in review, this is where the tail rotor's thrust, as a *side effect* from correcting for main rotor torque, wants to slide the helicopter to the left *on a clockwise rotating rotor system*. To correct for this in a hover we give slight right cyclic. In the end the helicopter actually hovers over one spot as shown in Figure 1, looking from the tail forward. It hangs to the right, sometimes called "right skid low." (On a counter clockwise rotor system, the helicopter will hang to the left, or left skid low.)

Now consider Figure 2 where the same helicopter is sitting on the pavement, level, or perpendicular to the ground. As the rotor builds lift to break ground, the tail rotor's *side effect* wants to blow the helicopter to the left, causing it to slide left on the pavement. *The slight right cyclic normally trimmed in for hover does no good on the ground, as the skid's contact with the ground forces the ship to stay level. In essence, roll control is useless on the ground, because the rotor disk can't tilt the fuselage.*

So, the novice gives right cyclic to *try* to correct this sliding, but when the helicopter does break ground, this "extra" right cyclic (which isn't doing any good) is way too much, and *instantly* left-right cyclic over controlling sets in.

Now, you might think this is getting complicated, but it's not, because it can all be summed up very easily: *A helicopter that hangs right in hover must sit to the right on the ground.* (Clockwise rotor system.) Conversely, a ship that hangs left (counter clockwise rotor system) must lean to the left when it's on the ground. One or the other condition must be fulfilled on your helicopter if you ever expect it to break ground cleanly into a hover without using right-left cyclic. As I said before, anybody who has learned how to hover has also learned how to give the slightest roll correction just as the ship breaks ground.

Under normal conditions, most gear won't have to be shimmed too much, probably somewhere around two or three degrees. This will just be noticeable when the helicopter is on level



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You can shim two ways . . . see Figure 3. One example shows where the left gear has actually been shimmed up. (More realistically, the right landing gear bows have been cut short. . .). The angle between the gear and fuselage is still 90 degrees, but the helicopter leans to the right. The other example shows where the landing gear bows have been shimmed at the fuselage. The gear remains unchanged, but the fuselage still sits slightly right. Either way is fine, it just depends on which way is easier with your particular helicopter.

This fairly well concludes the articles on initial trimming. From here the subject would change to flying technique or flight trimming. Maybe we'll look at that in the months to come.

For the past week or two I have been starting construction on Kobe-Kiko's new *Robinson R-22*, imported by Dave Robertson of California Model Imports. This is an extremely cute ship, and the scale fidelity is very high. Kobe-Kiko has gone with a flybarless rotor head which really preserves the looks of the real thing, and from what I see, they have made this flybarless system exactly the way it has to be done to give good flight characteristics. Yes, it will be reviewed in time, so hold on.

In general, it looks like the next six months will be very busy, and I'm sure you'll enjoy what's coming up. I hope you'll follow along. Feel free to write: Ray Hostetler, c/o Model Builder Magazine, P.O. Box 10355, Costa Mesa, CA 92627. •

Electronics . . *Continued from page 43*

for me to repeat all of the results of said testing, but you will like the article, which even includes a schematic. The issue is still available from **MB** for two dollars (second class mail, postpaid).

I have only a couple of comments to add. One is that the instructions with the charger make mention of the fact that all Ni-Cds will not take to M.E.N. charging, and include some precautions to take on the first go around. I found this to be true when I started to use the charger, and lot of my initial tests were made on old batteries which I no longer intended to fly with, but were kept around for flashlights and testors. Since then, I have not run into any of the currently available Ni-Cds which did not accept the pulse charging from the C-50/4.

Another point to remember is that some of the Japanese import transmitters include a series diode in the circuit from the charge plug to the batteries, I've never learned exactly why. It does prevent the connection of such devices as Expanded Scale Voltmeters and battery cyclers to the transmitter, and might also affect the operation of this type of charger if connected in that manner. Before depending on pulse charging in this case, I would determine the current capacity of the transmitter's battery (making the necessary internal connections) when charged with the furnished charger, and then making a comparison test with the M.E.N. charger.

Last suggestion is that if you have more than one system, the versatility of the M.E.N. charger (as well as all other chargers and test equipment) can be improved by the addition of Dean's or audio type connectors to the leads, with properly equipped jumpers to make the connections directly to the equipment involved. A clip equipped jumper is a must for the charging and testing of all new packs before installation. Enjoy . . . but keep your hand out of the wall plug.

AIRTRONICS XL, AND MIXING

We get letters . . . one of which came to Bill Forrey, our in-house glider expert, and was passed on to me to comment on a part which falls more in the area I am attempting to cover. It came from Jack Cash, Walkersville, Maryland, who writes:

"I've got an Airtronics XL six-channel radio and would like to have electronic mixing inside the transmitter for: (1) elevator trim in response to flap setting changes, (2) spoiler/aileron coupling; and (3) rudder/aileron coupling. If you know of any modifications which I can make I'd appreciate the information."

Well Jack, as you probably know, Airtronics has some plug-in mixers, but the XL is not one of the transmitters for which they are made. But, all is not lost, and while I can not furnish you with any component-by-component modifications, it is possible that I can at least point you in the right direction.

First of all, the Airtronics XL is designed around the Signetics NE5044, the IC which is designed with mixing and programming in mind. Although there are bound to be physical changes from one transmitter to another among the different transmitters that use this chip, *electronically* they have to be very similar, the design of the chip makes certain requirements necessary. Thus, what will work in one NE5044 transmitter will work in another, requiring only the necessary interfacing.

In this case, I would start by obtaining copies of the XL schematics, which Airtronics will furnish on request. Then, a copy of Fred Mark's book *Getting the most from Radio Control Systems* (Kalmback Publications, available from Ace R/C) is in order. It covers the design and functions of a NE5044 transmitter encoder, and the many mixing and programming possibilities. The Ace Silver Seven transmitter instructions also contain a lot of useful information about the application of the NE5044 . . . which leads us to the bottom line . . . the marrying of an Ace Silver Seven Mixer into your XL. Not exactly your plug-in modification, but one which should work and should not be impossibly difficult once the idea, which Ace describes as "mind-blowing" and requiring some "diddling" around, is clear in one's mind. Should be interesting, good luck if you tackle it, and let us know the results.

GLOW PLUG POWER SUPPLY

A letter arrived from Robert Clark, La Mesa, California. He writes:

"Dear Eloy, Can you tell me what resistor to get, like from Radio Shack, so I can run my 1-1/2 volt glow plug from a 12 volt motorcycle battery? Your help is much appreciated!"

Well Bob, I'm afraid that you've come up with a seemingly simple question that cannot be answered in a simple manner. In theory, and using Ohms Law, we can arrive at some useful sounding values. For example, we can calculate the resistor value from the formula: Resistance equals Supply Voltage minus Desired Voltage divided by Current. Thus, we have 12 less 1.5 over 3, the latter being an average current for glow plugs. Working that out, we get a resistance of 3.5 ohms. As the resistor has to absorb power, we figure that with another formula: Power equals Current Squared times Resistance, which in this case (9 x 3.5) equals 31.5 watts. Thus, it begins to look like we need a 3.5-ohm, 31.5-watt resistor.

Now the catch . . . it seems there is always a catch, doesn't it? The above is based on the stated figures, and naturally, if any of them change, so will the results. In this case, we get many changes, starting with the 12 volt battery which will read higher just after being charged, and lower if loaded down with a starter. Neither do all glow plugs draw current at 3 amps, the figure varies somewhat for different brands and types, varies as the plug ages, and varies when the engine is flooded. If that isn't enough, at such high currents, the very resistance of the wire used to complete the hookup is enough to upset the calculations.

You can see that this is not a very practical method, but if for some reason you have to use it, I would start with five, one-ohm, ten-watt resistors in series (one after another). This will give you five ohms, at 50 watts. The extra resistance will compensate for some of the variations mentioned, you may have to use only four in some cases, maybe even three in others.

There have been a number of ways tried to simplify this particular problem, but, except for the relatively more complicated glow- or plug-drivers, none have survived. One method that appeared a few years ago which looked promising was the use of a heavy diode in series with the positive lead to the starter, and using the voltage drop across it to light the plug. In practice though, it was discovered that in addition to a lower voltage being delivered to the starter, a stalled starter would result in a blown plug. If you can live with a slightly more complicated circuit, though one which is adjustable to compensate for all those variables mentioned, you might try the enclosed circuit, which is a type of adjustable voltage regulator. It uses all readily available components, and is not critical as to layout, though I would not blame you at all if you resort to a simple four or seven amp Ni-Cd cell for the chore. In your area, try Industrial Liquidators on Convoy Street for one at an acceptable price.

AIRBORNE GLOW PLUG SUPPLY . . . ONE MORE TIME

Last month I was talking about my use of a two-volt gel cell for airborne heating of the two plugs in a twin. I'd like to expand on the subject a little bit, with some further recommendations about how to make the proper connections between the airborne supply and an outside one. The system will work as well for a single Ni-Cd cell lighting the one plug on a one cylinder engine, as it will with the twin previously discussed.

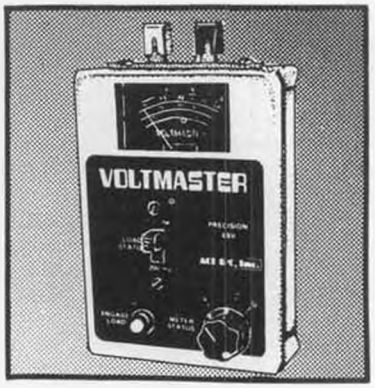
The hardware required is a two conductor phone plug, and a two conductor closed circuit phone jack, both available from Radio Shack and most electronic parts suppliers. Both are made in 1/4-inch to 1/8-inch miniature sizes, the larger one being recommended for ease of wiring and current handling capacity.

The phone jack is actually a type of two-way switch, which in one position connects the plug to the *internal* battery. When the plug is inserted, it breaks that connection, and connects the plug to the *external* battery or glow driver. If used, the servo operated switch works only on the internal battery circuit.

The simple sketch should be self explanatory, the polarity is not important though it should be maintained as a matter of habit. When the plug is partially inserted, there is a short circuit produced, until the tip emerges past the jack's body, so it is a good idea to turn the external power on *after* the connection is made, and turn it off *before* the plug is withdrawn.

BUYER'S GUIDE TO RADIO AND ELECTRONIC PARTS

There is bad news . . . and there is good news! Within days of each other, I received two new books. One was the 1984 Radio Shack catalog, which as usual is packed full of wonderful electronic things, including all those inexpensive components which we are able to buy there in single units (usually), or at most, by twos or threes. Though somewhat higher in price than what we might pay for the same brand and part number



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from other sources, Radio Shack has the advantage of being nearby when we need the part. The bad news this year is that though a few new components are cataloged, a larger number seem to have been dropped. No longer can you get a Hall Effect device, less power resistors are listed, as are less transistors, and a case which was to house one of my future article projects is no longer available.

The good news is that the other book which came my way more than offsets the loss of the availability of parts from Radio Shack, and helps the component procurement considerably. All of us know how frustrating it is to need a certain part, which we know is made in thousands or sometimes more, and not be able to buy one because the distributors only sell in quantity, or have a high minimum order. The book in question is entitled above, and is published by Hallward Products, 39 Sunset Court, St. Louis, MO 63121.

The *Guide* is written primarily to assist the small quantity buyer of electronic and associated mechanical parts in finding a supplier. Each supplier listed has been chosen because of its stated interest in selling to individuals by mail order.

The *Guide* has two sections: a "Directory," and a "Supplier Information" section. The "Directory" lists parts from over 85 companies alphabetically by generic name with a part number, description, and supplier. Further information includes the variety of parts carried by the supplier, and an indication of how complete the supplier's stock is for that part. The reader can then consult the "Supplier" section for the company's address, telephone number, catalog cost, minimum order information, and whether the offered parts are new or surplus.

Of interest to us R/C'ers, the *Guide* lists suppliers of batteries from alkalines, to gel-types, to Ni-Cds. Resistors, IC's, LED's, hardware, wire, it lists just about everything you might need for just about any electronic project. It will be useful to write off for all of the freebie catalogs listed!

For only $6.95 postage paid, this buyer's guide is definitely a bargain. Tell them where you read about it!

TESTING, ONE, TWO, THREE, FOUR . . .

A couple of situations have come up at the flying field very recently which have reminded me again that some things cannot be mentioned enough . . . there are those things that we forget, and then there are always beginners who may have never heard.

One has to do with radio range, starting with antenna-less or antenna-down testing before you fly, but what I really want to mention (again) is the value of an antenna-down test where the antenna is collapsed at least down to one antenna section while the aircraft is in the air. Naturally, you want to do this with plenty of altitude, and almost directly overhead, so that if you do lose control of your airplane, it will drop into radio range and not be a half-mile in horizontal range away from you when it starts.

Collapse the antenna a section or two at a time, preferably with a helper to do the collapsing, and to extend it in a hurry if things go wrong! You should be able to maintain solid control all the way down to a one-section antenna, and with some systems, those with an internally mounted antenna, to an even shorter length. This is assuming that everything is A-OK, the tuning of both receiver and transmitter, the batteries, etc. A system might operate normally under normal antenna out conditions,

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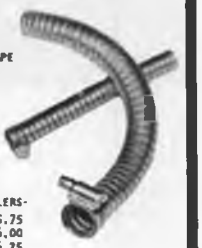

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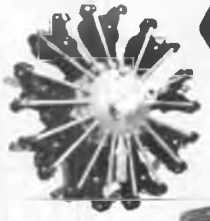

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but might have a small discrepancy to do you in. A test of this sort will not tell you *what* isn't right, but it will tell you *that* something isn't right, and point you towards the need for some expert tests and service.

I have not tested all R/C systems under these conditions, but I have tested many, with the help of my friends who own brands of radios which I don't, and I have not found any brand or type which does not consistently pass this airborne test. If yours doesn't, especially if it is a type that just recently became available, do some comparison tests with other similar radios at the field. Maybe it needs two antenna sections out. If they all do, that is your standard, and it should be used for future testing. Oh yes, don't do this once and forget it, it is a good test to make now and then, maybe even as much as once per flying session. Don't ever take it for granted that the airplane-eaters ever sleep . . . they don't.

And it seems that we cannot ever say too much about *batteries*, which are still the weakest link in our R/C chain. I was admiring a friend's new airplane, a unique and interesting, well-built deign. In answer to my question about whether or not it had yet flown, he told me that it had been in the air briefly, just once, and how lucky he had been with it. It seems that soon after lifting off, it started to get soft on the controls, and seconds after a successful landing, the radio had quit completely. Subsequent testing proved the recently charged airborne batteries to be completely down. The batteries had since been recharged, they "seemed" to be OK, and he was once again ready to take to the air. As my advice was not being solicited, I didn't offer it, other than to mention the availability of a number of battery back-up systems on the market, and my success with completely redundant airborne systems.

The airplane was again flown. Sad to say, it was not as lucky on that its second flight, and will probably not be rebuilt. I do not know if the batteries were the cause, nor did I feel that it was the proper time to ask, but as the crash was caused by loss of control, the odds are in that favor.

The point is that batteries are cheaper than airplanes. In this case, once assuring yourself that the charger and charger related components (such as the switch and switch harness) are not at fault, and that there was not a power failure in the house during the night preceding the first flight, thus shortening the charge time, even if the batteries subsequently accepted a charge and capacity tested successfully, it is still an unexplained failure, which having happened once, could happen again. Run them in your non-competition electric car, use them to power your calculator, but for the life of your airplane, don't fly with them! End of sermon, Amen!

LOCAL SERVICE

Sooner or later, your R/C system is going to need some attention, if for no other reason than that you've flown it a couple of seasons and want to be sure that it is ready for a third one. I have always felt that the technicians best qualified to service any given system are those found at the factory, or at that company's main US facility, in the case of foreign manufacturers. This is not to say that those technicians are basically any better than any other trained person, but they have the added advantage of having a greater volume of technical information and parts, and more systems to learn on than someone outside that particular company. A close second in this respect is the outside service center technician, if he is supported by the parent company with information and parts.

However, all radio service does not require a complete overhaul or proprietary parts, and there are many capable technicians around the country performing such service. Some are working on a variety of systems, others prefer to stick to one brand, usually the one of their choice, which they have learned enough about to feel confident with.

For basket cases, I will always recommend the factory or authorized service center. However, as most doctors, lawyers, and Indian chiefs usually cannot locate or correct a minor fault that one of these local techs can, and in the interest of time and money savings . . . I would like with your help, to get those guys out of the closet.

So, if you know of some local tech who is capable and willing to help out, *someone whom you would let work on your radio*, let me know who he is so I can list him here in the hope that he can help that guy across town, who doesn't know him, get his gear ready for that important contest next weekend.

For that, and of course for all related subjects of general interest, you can contact me through **MB**, or directly at: 231 Cottage Place, Costa Mesa, CA 92627. •

Hannan . . . . . *Continued from page 55*

most generous show of sportsmanship, Wells' model was simply entered in the Sainte Formule non-scale class, which

does permit single-surface wings, and the little *Wee Bee* gave a credible account of itself by placing 5th, which was good enough for a trophy. In the case of Bill Noonan's models, they are being kept in Belgium for participation in future contests.

The victorious Junior Peanuteers and their models were: Bohnert (Germany) flying a *FRED*; Sassi of Belgium with a *Lacey*, and Alvarez of Belgium, flying a *Cougar*. Placing first *and* second in Open Peanut Duration was Delcroix (France), using two different Pottiers (multiple entries were permitted); and third was Glockner (Germany) with his *FRED*. The remainder of the field included a variety of types such as a *Zippy Sport*, Scheibe *Falke*, Pilatus *Porter*, *Trempik*, *Ganagobie*, *Demoiselle*, *Goupy*, *Stahlwerk*, *Waterman*, *Libellule*, *Volksplane*, Farman *Moustique*, Petit *Brochet*, and the inevitable *Laceys* plus a *Fike*.

In the Maquettes class, the top three placers were Genther (Switzerland) with a Dufaux No. 4, Pham with a Bell *Airacobra*, also from Switzerland, and Genther with a Lockheed *Orion*. Others in the category included a Bleriot XIb, Fokker F VII, Douglas AD6, *Wibault*, *Tailwind*, *Waterman*, *Breguet*, Dornier DO 355, Stolp *White*, and a Farman *David*.

Seven special prizes for the various categories were also awarded, including F. Van Hauwaert's Maquette Peanut Cup, won by Genther of Switzerland; the Ceramique Nationale Peanut Duration prize, won by Delcroix of France; the Challenge Pottier, won by Genther of Swtizerland; the cup of the Maison Des Jeunes, awarded to Ciapala, of Poland; the Rene Jossien Sanite Formule cup for open age class, won by Defourney, of Belgium; the Rene Jossien Prix en Espece Junior Sainte Formule award, won by Serge Aulotte, of Belgium; and the cup of the Banque Bruxelles for Penny Plane, won by Desmet of Belgium. Another Ceramique Nationale prize went to D.T. Pham, of Switzerland, who placed first in F1D beginner.

We have gone into more than our usual coverage of this affair in an effort to generate more support for proxy entries, a most satisfying and relatively inexpensive way to participate in international competitions. The rewards are not only the unique trophies, but the chance to help support the spread of our hobby on a world-wide basis and enjoy the friendship of other people who share our interests. Announcements of forthcoming Flemalle contests are expected later in the year.

REMEMBER THESE?

Aviation artist/model builder Ken McDonough, of England, reminisces about toy aircraft: "I remember when we were kids, flying models made in Japan were sold in Woolworths. They looked rather like Bleriot monoplanes, although sold about 1936-37. The whole framework was of fine wire . . . the fuselage being of triangular section and left uncovered. All joints were soldered and the surfaces covered with green silk. As far as I can recollect, the propeller was of quite fine pitch, and the spoked wheels were pressed out of tinplates. The astonishing part is that they flew . . . not very far, but they did fly. However, when the soldered joints failed, we had to give up, as we didn't know then how to mend them." Your columnist also recalls these models were sold in the "dime stores" of Montana. Do any of you readers have one of these items? If so, we would be pleased to publish a photograph.

MORE GOOD OLDE DAYS

Sears McCorrison, of Stoughton, Massachusetts, shared a copy of a 1931 George D. Wanner model kit and supply catalog, and its prices make rather startling contrasts to those of today:

Flying model plan reprints (Twin Pusher, Mystery Tractor, high-climb R.O.G., Boeing P-12B, etc): Two cents each.

Balsa wood sheet: 1/16 x 6 x 8: 18 cents; 1/16 x 6 x 36: 40 cents.

The company slogan: "If you Wanner win, Wannerize!"

BORON AND BLADES

Jim Jones, 36631 Ledgestone Dr., Mt. Clemens, MI 48043, is marketing Boron filament, ideal for stiffening indoor model wing spars or tube fuselages as well as strengthening glue joints. The material is marketed on four-inch diameter spools holding approximately 250 feet, for 15 dollars, postpaid.

Jim has also discovered a supply of genuine, 1945 razor blades. These double-edge blades are only .006 thick, and are ideal for use in Little Giant razor planes, as well as tissue trimming chores. At only ten dollars per hundred, postpaid, these collectors' items are indeed a bargain.

STAINLESS STEEL WIRE

How about some non-rusting rigging for your scale models? W. Gehres, of AIRKNOCKER THINGS, Box 421, Buckeye Lake, Ohio 43008, is offering .004 diameter stainless steel wire in six-foot lengths for two dollars, postpaid (Ohio residents add 5½% tax). Greater lengths are available at proportionate prices.

Gehres sent in a couple of good aviation quotations, one of which is attributed to designer and model builder Bill Stout: "Never resort to

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mathematics until you have exhausted all the possibilities of two toothpicks and a piece of string." The second, from German woman pilot Hanna Reitch: "Carefulness is not cowardice, and carelessness is not courage." If anyone may doubt Ms. Reitch's bravery, they should be reminded that she was the first to fly a helicopter indoors, and later, test-flew a V-1 buzz bomb!

THEN AND NOW

Jim Thomas, of Denver, Colorado, favored us with a *Rocky Mountain News* interview with Reginald Sinclaire, who has been witness to most of aviation's 80-year history. He learned to fly in France using a single-seater Bleriot, then became a member of the Lafayette Flying Corps, where he developed a fondness for SPADS, but had the misfortune of shooting his own propeller when the synchronizer mechanism failed. Later, he barnstormed, participated in air races, and became an instructor during the second World War. Sinclaire, now 90-years-young, retains his enthusiasm for all matters aviation saying: "Terrific! Terrific what they do today."

THE WRIGHT STUFF

In June of 1903, quite some time before the most famous of the Wright brothers' flights, someone asked Wilbur's opinion of someone else's design: "It is very bad policy to ask one flying machine man about the experiments of another, because every flying machine man thinks his method is the only correct one."

CLOSING THOUGHT

From Terry Cole-Whittaker's *The Good News*: "life is a game to be lived . . . not a puzzle to be solved!" •

F/F Scale . . . . *Continued from page 61*

Neely an SASE for his list and prices. His address is 2703 E. Goshen Ave., Visalia, CA 93291.

Buck Pilkenton has come up with a clever aid in winding models which have spinners. As he had built a Flyline HE-100, he naturally called it a Heinkel Winder. It could just as easily be called a Corsair Cranker, or a Tupleu Twister or perhaps a Brewster Buffalo Braider. At any rate, you get the idea.

The device is really easy to use. Just slip the hooks over the prop blade (they tend to lock in place). Try to center the eye of the winter with the hub of the prop, and wind. Check the drawing for further clarification. Pretty clear, eh?

Mark Fineman has turned out to be an excellent model builder and flyer. I say *turned out* because I had first met Mark, and some of his models, at the first Flying Aces contest. His models were OK, but now they are outstanding. The pictures of his models will attest to that. He has sent in his version of a prop hanger called the Super-Duper Prop Hanger This is an ideal setup for those of you who enjoy ROG models, or Profile Scale models, or Cal Scale. The directions are self-explanatory.

While at the model shop the other day, I came across Monogram's 1/12-scale (one inch equals one foot) model Wright Whirlwind engine. This was originally issued sometime during the '50s, so this is a reissue. Collectors have been holding onto these kits hoping to make a killing on the Whirlwind somewhere down the road . . . *C'est la vie!* The cost of the engine is around twelve dollars.

Several months ago, I mentioned using dress snaps as an easy way to neatly hold down a cowl hatch in place. To review briefly, to make them work successfully, the female half has a tiny wire spring which cannot have any glue on it. If it has glue on it, the male half of the snap will not be able to snap in place.

On a recent project, I chose to use the dress snaps for a removeable cowl. In the past, I had trouble keeping the oozing glue from getting onto the little spring in the snap. I tried something that worked very well, so I thought I would pass it along.

The male half of the snap is simply "zapped" onto the firewall. On the cowl, shallow holes are made where the female half goes. This is necessary, of course, otherwise the cowl would not be tangent to the firewall. I mixed a small batch of epoxy glue and waited until it thickened up. I placed a small amount into each hole. At this point, the female half should be attached to the male half. As the epoxy becomes tacky, place the cowl in place and tape it down.

Once the epoxy has thoroughly dried, carefully unsnap the cowl. From here on, it should snap and unsnap at will. The key is to have the epoxy tacky enough that it will not ooze, yet not so tacky that it won't adhere.

It has been many years since I've seen anything about cutting out numbers or letters from tissue paper. For the old pros, this is old hat, but for the newer modelers, not necessarily so. The one advantage of building from a commercial plan is that the registration and license numbers are shown. That way, you don't have to draw your own.

I usually will take the plan and make a Xerox copy of the letter and numbers. I'll take some black tissue (assuming that they are black), and cut out as many pieces as there are numbers and letters. I do the same with wax paper. Next, I'll stack the tissue alternating with the wax paper, with the Xerox copy on top. I then tape the edges of the stack so they will not shift. Using an Uber Skiver knife with the No. 11 blade and a straight edge, the letters are cut out.

The wax paper in between keeps the tissue from shifting so that neat, crisp letters can be obtained.

I want to thank all of you who have written, and as usual, I'm way behind in my correspondence. Hang on, I'll get to you yet! •

For information send $3.00 to **TECHNOPOWER II Inc.** 610 North Street, Chagrin Falls, OH 44022

R/C Autos . . . *Continued from page 53*

to run. Can you say, "fear?" While we have never scared any of the kids to the point of tears, at least as far I know we haven't, we have had them dispose immediately of any hand-carried objects. It has always seemed odd to me that they would spend hours gathering sweets and stuff only to so quickly throw all to the ground in a useless escape attempt. They rarely are able to find it all, next morning we have all the candy we could want laying right there in the cul-de-sac. . .) *(That's the biggest, funniest parenthetical digression I've ever heard! Those poor kids . . . this is one Halloween they'll always remember! wrf)*

Lastly, the guys at Delta have been seen doin' it in the dirt. Several 1/8-scale, gas-powered, off-road cars are in their hands, one of them is even four-wheel drive with three differentials. (One diff unit is at each axle, plus there is one in the middle of the car to split the power between front and rear wheels, much like the Audi Quattro.)

They are seriously considering importing one of the higher-quality 1/8 off-roaders, if there is interest enough to justify development, they are so cranked on this type of racer they are ready to start designing one right now! Interested? Write to Delta Mfg., 27 Race Car Court, Lorimor, Iowa 50149, or call (515) 763-2220. Without taking anything away from the very popular 1/10-scale electric off-road racing scene, I personally am not yet too interested. But show me a mean 'n nasty 21-powered 1/8 off-road car, and I'll fight you for the transmitter!

Not all of the new stuff is coming from the Midwest, of course, out here on the west coast Associated is, as usual, working on new and better parts for their suspension car, the RC500. The first item is available right now, and that is a new compound front tire. It is no secret that these tires are coming from Delta. Yes, they are the new 324 series tires, I believe Associated prefers the "C" compound, although I don't know what designation they will give it, don't even have a part number yet. As is commonly known, the RC500 doesn't need super-sticky front tires to turn well, so they can use harder (read, *longer wearing*) front tires while still hugging the inside line on the track. As an example, I am sure that the "C" compound front tires on an RC500 would nearly go the full distance in a six-hour enduro. That's a lot of racing on one set of tires.

For the chassis, the most intriguing item is production versions of the two-speed transmissions used at the recent World Champs. Don't think gear box here, the two-speeds, as I understand their operation, are basically two clutches, one kicking in at speed. I talked to Gene prior to the World, and at that time they were setting the boxes to shift at 25,000 rpm . . . an engine speed easily obtainable on any straight of decent length. A shift at this speed ought to drop the revs right down into the fat part of the powerband for a good boot in the rear to wail the last part of the straight where one-speed cars go flat. Although it sounds like a great little widget to play with, actual effectiveness on the track will depend a lot on the layout of each club's race course. With a short straight, you might find the gear box shifting right at the braking point, even if adjusted to short-shift at, say, 21,000 rpm. Then again, if your track has super bite in the corners, possibly you can gear first with a stump-puller, and still make use of second on the straight. In any case, Joshua is pumped about trying a two-speed on the DRT's RC500, so we'll be letting you know how it works for us.

Still in the drive train, Associated is doing up conversion kits to switch the chain drive over to a toothed belt drive.

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To me the chain has always been one of the least attractive features of the RC500, and we just completed a full season of lugging a spare chain to all the races; I was absolutely convinced that sooner or later it would break. *Wrong*. It has stretched some, in fact is getting quite sloppy, but has never given us any problem at all. OK, it is a little heavy, and that is the primary reason for the switch; a belt drive is simply lighter. In addition, it is an efficient means of transmitting power, shouldn't stretch nearly as much as a chain (if at all), and needs only minimal maintenance. Still, it probably isn't a must-have item. My suggestion is to stick with the chain until it gets really loose, or until the sprockets develop a hook shape on the teeth . . . and then, instead of buying a new chain, pop for the belt conversion.

For bodies (and these are all presently available), Associated is now doing up lightweight versions of their most popular bodies, the Porsche 30KL and Elfin for Can-Am, and the Ligier Maserati for GT. The club I race with will in '84 require Can-Am bodies for the first half of the season, then Formula 1 bodies in the

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second half. So, we will probably be using a new Associated body, the Alfa-Romeo 179D, billed as fitting the RC500. (For those who don't know, it can be difficult to fit some bodies to the RC500, and I wouldn't be surprised to find the Alfa to be the only F1 body that can be draped over this chassis.) If your club is willing to accept any open-wheel body as legal in Formula racing, and your tastes run to Indy cars, the Longhorn Indy body is also a new one, and it too fits the RC500.

Last thing from Associated is news of the soon-to-be-released (as this is written) 1/10-scale off-road race car. I am looking for great things here; I was actively racing when Associated literally revolutionized 1/12 with their RC12E, and I see the opportunity for the same thing to happen in off-road. No, I have not seen the car or even any pics of rough prototypes. It is suspected that they will use some pieces from the RC500 as that chassis has been proven very reliable in high-speed 1/8 racing, and use of their state-of-the-art shocks from the 500 is almost assumed, although the travel will no doubt the greater. No matter what the car ends up looking like, or the components that go into it, if you want to see the latest in off-road, Associated will have it.

Dan Rutherford, 4705 237th Pl. S.E., Bothell, WA 98021. •

R/C Boats . . . . *Continued from page 21*

frustration model boat racing can generate. It was simply unbelievable all the misfortunes and problems these two wonderful individuals experienced. After observing their trials and tribulations, I hope the following suggestions might be of benefit to others who are still struggling to achieve success in model boating competition.

SUGGESTION NO. 1

Before you attempt to operate a radio controlled model boat be certain the radio equipment is not going to be rendered useless by exposure to water. The importance of preventing water from reaching the radio equipment cannot be overly stated. It is simply a given fact that model boat race boats are at one time or another going to blow over, spin out, or get knocked over while they are being operated. *It's going to happen.*

When I first started running model boats, I couldn't keep my radio equipment dry. My first R/C model boat was dubbed *"The Flying Sponge."* *"All Whet"* and *"Phew Drops"* were labels for other early model racing boats. It took me awhile to wake up to the fact that I'd be having a lot more fun if I wasn't spending so much time drying out my equipment. I solved my problems with wet radio equipment by copying what the fellows with dry equipment were doing. I discovered it was possible to make radio compartments that were waterproof. That was really a big achievement for me in this hobby.

A waterproof radio compartment will not assure you of victory. It will, however, allow you more opportunities to compete in and complete racing activities. It is a real challenge to win a race when your equipment is operating properly. It is impossible to win a race if your equipment isn't working.

SUGGESTION NO. 2

Starting a model engine within a certain time limit is a skill. It seems to me that some new model boaters need to spend more time learning how to start their engines than they do practicing on the water. With the technical advancements that have been made in starting equipment during the last few years, it is not difficult to get our model marine engines running within the normal two-minute time limit provided for most heat races.

Make certain your engine is properly prepared before your heat is called. Check the glow-plug and fuel supply prior to pit time. It is my practice to start my engine immediately once pit time has commenced. If there is a problem in starting I then have the whole pit time to attempt to get the problem cleared and the engine started. Take the time to develop procedures that will allow you to get your engine started. Work on your starting techniques until you can start your engine within seconds of applying electric starter. It can be done. If you're having problems, seek out help from someone who seems to have starting techniques mastered. Listen to what they say. Watch what they do.

SUGGESTION NO. 3

You do not learn how to drive a model boat around a race course by practicing on an open lake. If a person wishes to improve his or her driving skills, then it makes sense to me that practice should be done around a set of course markers. It is not necessary that the markers be set exactly like a regulation course. It is important, however, for the beginner to get the idea of running around a certain location. Simply running around a pond or lake without any markers does little to improve racing skills. (I could drive a high performance sports car around the K-Mart parking lot, but that would do nothing to prepare me to enter a sports car race.)

Learning to race a model boat does take practice. I happen to know some very excellent model boat racers who live in my corner of the country. Their names are documented in the record books for model boating achievements. Everyone of these excellent model boaters spends time practicing around a set of buoys. They are champions. Like champions of any sport, they spend time in training.

SUGGESTION NO. 4

The beginner needs to set realistic and obtainable goals. I have discussed goal setting in other columns. A reasonable goal for a new model boater would be to start and complete a heat. Notice I said *complete a heat* and did not mention the words *win a heat*. It has been my personal observation that beginners who become more concerned about winning than just finishing, end up doing neither. I feel it is safe to say that as often as not, we beat ourselves when we are racing. The new model boater needs to concentrate on elimination of those areas of self-defeat. Once you stop beating yourself you can focus your efforts on beating the other racers.

FLORIDA NEWS

Ed Ryder, of Coral Springs, Florida, provided me with the following information about model boating activities in that area.

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of the country, we have about 340 IMPBA members. It is estimated that about half of this number are active racers. Mr. Bud Swenson of our club, the Broward Model Boat Club, has just been elected to District Director. Bud is an excellent choice for this position, and we know will do much to advance R/C boating.

"Labor Day was highlighted by a great race hosted by the Jacksonville Gator Dodgers. All IMPBA classes were run with good growth in the O.B. classes. The boys from Georgia and Alabama were strongly represented in the latter classes, but it was evident that Florida is coming on strong in O.B. and will be heard from in the near future. The Jacksonville club is noted for their Saturday night buffet, and this race was no exception. There were over thirty different dishes plus smoked ham and turkey. Those Lady Gators are great hostesses and cooks.

"During the weekend of October 22 and 23, our club, the BMBC, held its annual Race of Champions. Over one hundred fifty entries competed during the two days for $1,500 worth of trophies donated by local sponsors. The highlight of the awards ceremony was the presentation by Bud Swenson and his family of the Junior Driver Award. This is an annual trophy given to a boater under fourteen who throughout the weekend displays the attributes of sportsmanship, good citizenship, and cooperation. The winner this year was Mark Sherfeld, a most deserving young driver. It is interesting to note that former winners have all continued as outstanding citizens and avid R/C boaters.

"The clubs in Florida are considering developing a Florida Racing Association with a district wide newsletter and annual point accumulation racing trophies. More on this later."

Thanks, Ed, for sharing with us news from your area. I encourage more readers to write down what's happening with model boating in your locality. Information, race results, and photos can be sent to: Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Plug Sparks . . *Continued from page 38*

brother based on the successful layout of the 23.

In March 1940, the Ohlsson 60 Custom made its debut in a more sensational manner. This sixty was at least two thousand rpm better than the Brown and other comparable motors. Here was an engine that started easily, had excellent power, was easy to disassemble and repair, and best of all, it lasted!

As with the Ohlsson 23, this new 60 brought out a rash of new models designed to accommodate the power. Even Carl Goldberg's *Sailplane* design was a direct effort to take advantage of the powerful new engine. Ohlsson had established another standard for all other engines to be compared against!

When the first advertisement appeared in the March 1940 issue of *Model Airplane News*, this new engine featured a diecast tank top (with a "Jiffy-Fill" tank) with an integral air intake tube flared for a venturi intake shape. A very neat setup!

The initial engine featured a 1/4-20 spark plug and 1/4-inch diameter crankshaft priced at $21.50. In 1941, the plug size was increased to 3/8 as was the crankshaft. Also during this time, the Custom engines were fitted with a gold eagle on the front of the case. According to Herb Wahl, noted Ohlsson expert, the eagle did not appear on the first models, being simply stamped "60" on the fusion plug of the crankcase front. (The *Flying Aces* Engine Review," December 1940, shows this.) However, most everyone remembers the Custom with that fancy eagle emblem.

On the specifications of the engine, a displacement of .617 cu. in. was listed in a *Model Airplane News* table of engines. This error in calculation, where the displacement should have been listed as .604 cu. in., has been perpetuated in subsequent publications with no corrections made.

Technically speaking, the new Ohlsson engine featued a die cast crankcase and manifold unit (including exhaust stack). The cylinder and head, machined from one piece of steel, was then spot welded to the crankcase unit. This was a system devised by Ohlsson that set it apart from all other engines.

The Custom model also featured roller bearings to support the crankshaft plus ball bearing thrust bearings to take up the horizontal play. Ohlsson, always one for making things last, provided oversize crankpins and wristpins for the engine. Very few Ohlsson engine owners ever complained about these items . . . even after extensive running!

The only way the modeler could get into the engine was through the removable front cover which, when removed, took the whole front end timer assembly and crankshaft off. The engine could be

inspected, but there was simply no way for the modeler to further disassemble the engine, a mixed blessing in that one could not tinker with the engine.

Specifications of the engine called for a bore of 15/16 in. and a stroke of 7/8 in., giving the displacement of .604. The weight was 10 ounces bare, and it was priced at $21.50, a competitive price to the Brown Jr. Performance figures as taken by the *Air Trails* strobatic tests, rate the engine at 1/4 h.p. with 6700 rpm using a 14 in. Flo-Torque propeller, 7000 with a high pitch, 12 in. prop; and 7,700 using a 10 in. dia., 10 in. pitch prop. In any case, the maximum power was stated to be at 7500 rpm.

Shortly after the introduction of the Ohlsson Custom 60, the Ohlsson 60 Special was advertised in the October 1941 *M.A.N.* issue with the attractive price of $18.50. There apparently was only a slight difference in power output and for the difference of $3, most modelers purchased the Special.

As time went on, the Ohlsson Custom production dropped, and the Ohlsson Special became the well-known Ohlsson 60. As pointed out before, the engine became the standard of the model manufacturing business. All subsequent engines either benefitted or suffered by comparison to the "Standard".

THIRTY YEARS AGO, I WAS . . .

In line with the general rambling tone of this column, Gordon Codding has sent us several letters, which, when excerpted, prove some fair nostalgia.

Photo No. 8 is a color shot of Clyde Austin's Scientific *Commodore* that Gordon has taken on the job of restoring. As Codding says:

"It is so old and dry, I figured to fly the model on electric power. I tried my Estes Skymax geared motor with a 14-8 folding plastic prop. Nice taxi, no flight! Hand launch, no help! Thought about the Astro 15, but the penalty of batteries makes the all-up weight a real problem for that old structure.

"Am reluctant to try an O&R 60 side-port . . . don't want to risk a backfire. Maybe, a front rotary valve version and a long exhaust stack will work better. Model is all recovered with lightweight silk, but needs more paint to toughen up the old covering. Removed the old 'Mickey Mouse' dethermalizer (didn't work anyway) and the model is back to its original form when last flown at Los Alamitos N.A.S. Nationals.

"To digress, speaking of timers, I have about 10,000 body shells and springs for several size timers. Also, a few covers, but no plungers or contacts. Price is right!" (Write to Gordon Codding, 3724 John L Avenue, Kingman, AZ 86401)

While this columnist was going through the Codding letters, he received Photo No. 9 from the late Arthur Suhr of the early days of Southern California flying at Rosecrans. The unidentified model has a 1937 Bunch Mighty Midget for power. The model appears to have been built and flown in the 1937-38 era as can be gleaned from the Ohlsson wheels. Anyone out there know this

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model?? No, it's not a *Powerhouse!* Maybe Codding can I.D. it??

To continue with the ramblings by Gordon, *"Talking about nostalgia gas models and the plans you are looking for, reminds me of the time I was in England in 1951-53. I amazed the locals with my Cub 09 powered* Mini-Hogan 45 *(used my famous split rudder dethermalizer. See* Aeromodeller Annual 1952. *My enlarged and modified Comet* Sailplane *(I called it the* "Big Bomb") *used a Hornet 60 on glow and was based on the Griffons Club design (Los Angeles).*

"Generally, it was a vertical climb in a cloud of smoke and dust from an Al Jolson 'Mammy' kneeling pose, and then that great California type floating buzzard glide. Guess I scared off the competition as I generally was informed that no one else was competing in that classification. Sorry! But thanks for the demonstration!

"The last year of my tour in the USAF, the boys managed to pool resources and stuffed a Rowell 60 car engine in the nose of an enlarged San de Hogan *type design. The usual English practice was observed of many parts being fastened together with rubber band and tape. The vibration soon separated the parts. Model flew well but erratically.*

"Really, it was no contest as the competition was only slight. Sometimes I simply won by default. I eventually gave the model to Ripmax Hobbies (less motor, of course!) when I left. Somebody made a glider out of it. They didn't know what else to do with it!"

Gordon concludes by saying he still has the plans and may build another. Look out!

MORE NOSTALGIA

If the emphasis seems to be on old photos, it is because this writer has a real interesting bunch to publish. Thanks to Bill Simpson we have Photo No. 10 to display!

This is a shot of the contestants attending the Kearney Mesa contest at San Diego in 1938 who were thoroughly trimmed by Mel Anderson flying a Baby Cyclone powered low wing. As can be seen in the photo, the model is rather simply made, fuselage being just wide enough to accommodate the Baby Cyclone engine.

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During the competition, Anderson had the Baby Cyclone get so lean, the engine ran for an unprecedented length of time, prompting many of the onlookers to comment that Mel's model had an auxiliary gas tank. The model actually won on the length of the motor run!

The main reason for showing Mel Anderson and his low wing (the third model from the left) is to encourage the construction of low wing models for the West Coast SAM Champs to be held next May 12-13 (tentatively at the Merwin Dicondra Ranch). All low wings will be given a 50% increase of their time up to a "max" flight. That ought to be incentive enough!

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WHAT ARE THEY DOING NOW??

With this opening, we hope to feature pictures and writeups of well-known and not-so-well-known modelers who have made this modeling game what it should be . . . real fun!!

Photo No. 11 shows a pair of famous modelers. On the left is Jose Elgin, well-known for his Cleveland *Playboy* design, while on the right is Chet Lanzo, holding his original *RC-1* radio model converted to a glider. Here are a couple of power boys enjoying themselves with R/C gliders. A look at the background will tell you why . . . not that much room!

Both Joe and Chet belong to SAM 39, the SAM Chapter in the Huron/Erie area. Some of the members, Ralph Turner, Bucky Walter, Jim Robinson, etc., have been making the annual trek to the SAM Champs with excellent results.

Chet won the Texaco Event in 1982 while Walter has been placing regularly every time. At the last champs at La Junta, Jim Robinson and Karl Emde took home two trophies each in free flight. One thing for sure, they are a versatile club!

READERS WRITE

"Who says we don't look at your photos?" says Dr. Phil Barber of 18th Lilac Dr., White Rock, B.C. Canada. In a recent letter to this columnist, Phil says he is not a hairsplitter (you be the judge), but he feels that Photo No. 11 in the November 1983 "Plug Sparks" showing Joe Konefes' *Buzzard Bombshell* as built by Stan Ohlsson of South Africa shows some deficiencies that he would like to point out.

"First, the wing is not a Bombshell *wing as the span appears too great, dihedral break of the inner panels is too acute, while the outer panels are just the reverse, too shallow.*

"Second, the outstanding error is that the outer panels seem to be a psuedo ellipse, something the Bombshell *wing never was with its constant chord and horizontal wing rib type tip (similar to a* Starduster).

"The tipoff to all of this is that the rubber bands holding down the wing do not fit properly as the wing appears to have a smaller chord than the original. The wing actually lists to the left, and it doesn't appear to fit the fuselage platform properly.

"Finally, a brief scrutiny underneath the magnifying glass (!) reveals that the workmanship in the wing is nowhere the equal of the neat fuselage." (How about that??)

"My theory (aha!) *is that Stan damaged his wing in some way. Someone, likely a relative or friend, insisted on taking a picture. So, a wing was borrowed, but unfortunately, there was no other* Bombshell *on the field, so this 'make-do' wing was used.*

"I'm sorry to be this way, but I feel it is more interesting, and does show that your efforts in the column don't go in vain. You are read, and the photographs examined."

Well, this isn't the first time this has happened. The writer can recall numerous times when the original was damaged. Check the *Sunduster* photo by Jerry Brofman in *Model Airplane News*. The model has a *Sailplane* wing on it!

Perhaps the most intriguing photos are those of the *Gladiator* with the original flying pictures showing a long wing somewhat on the order of a *Playboy Sr.*, while the plans show a *Rocketeer* type wing. Theory again, a last minute switch was made with the drawings modified to reflect the last wing used in the photos. We'll write more on that later!!

SAM 39 SALLIES

In the latest SAM 39 nwesletter, as edited by Ralph Turner, his report on the La Junta SAM Champs was pretty much as has been outlined in the previous issue, i.e., heat and rough clumps of grass, plus a recalcitrant wind that blew the wrong way for two days. However, what was really of interest was Ed's paragraph as follows:

"At this point, I would like to comment that I do not believe that SAM Champs or the AMA Nats either, should be a test of the competitors endurance. The meets should be a test of their flying skills and knowledge of the technology. I felt that this year there could have been much more enjoyable sites found which would have made the whole meet more enjoyable."

The first part is what concerns the writer. While it is great to be a winner, this columnist sometimes wonders why so many trophies have to be amassed by individuals and clubs. As Ralph points out, in the rush to acquire as many prizes as possible, the fun disappears under the tremendous pressure to win.

This writer knows of no pat answer to this problem, but eventually the meet will become another contest for the "hot dogs." We simply have to learn to enjoy ourselves with this wonderful O/T hobby of ours or surrender it to a few.

STAND CORRECTED!

Peter Michel, 56 Lynwood Grove, Orpington, Kent, England, membership secretary for SAM 35 (England) writes to

say the word "fetchimites" used in Australia may well be a contraction of "Fetch it, mate," but Pete says he suspects that it is an import from dear olde England.

"The term as used in England, is 'fetcher mites' and stems from post World War II days when we, as small boys, felt honored and privileged to retrieve for the great flyers of the time. We 'Mites' were mostly happy to do this, and in return, we picked up countless tips, some of which I use to this day."

MORE ENGLISH STUFF

For Photo No. 12, we are indebted to Sid Sutherland, 52 Broadwalk, South Woodford, London E18, showing his highly successful *Korda Powerhouse* with a Delong 30. Sid says after several years, it is such a stable design, he highly recommends this Korda model.

Sid also reports that although SAM 35 has been highly successful in promoting the use of aerodromes, the public attitude hasn't changed one bit on the noise problem. There has been a big swing to the four-cycle engines in hopes the pressure will ease. Same problem everywhere!

For Photo No. 13, that great SAM 35 spark plug, Dave Baker, is responsible for sending in an excellent shot by Keith Miller. Seen in the pic is an excellent version of Arne Blomgren's 1949 Wakefield at the Odiham Vintage Wakefield event. Looks like Kemp could use a few Swedish pointers as he only placed fifth!

Readers might be puzzled why this model is considered an Old Timer in England, but a quick look at *their* rules for the Old Timer cutoff date is 1952. This is primarily due to the dearth of English gas designs prior to World War II. Up to 1939, very few modelers had the capital, time, and open area to fly gas models.

About the only good engines to be had at that time were the imported American engines, Brown Jr. and Baby Cyclone. These were quite dear. The emergence of good English engines, notably their excellent diesel, was still in the wings ten years later.

The tremendous amount of those interested in Old Timers has resulted in a magnificent membership of over 700 in SAM 35, the official O/T body in England. Best part of it all, is that they are still growing!

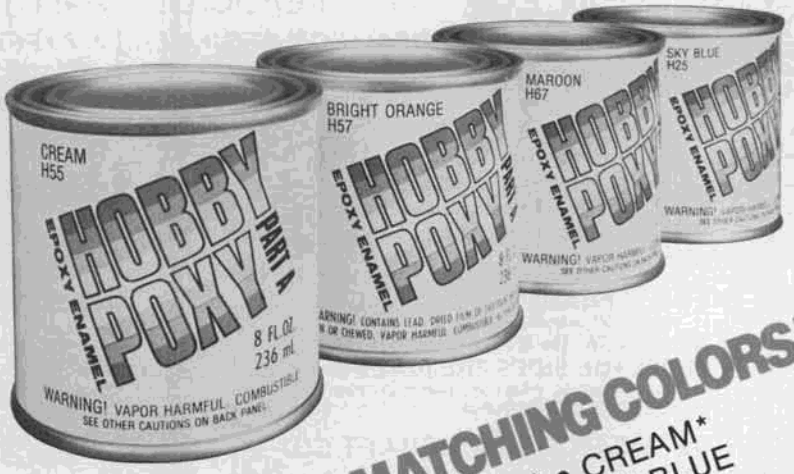
MORE RUBBER MODELS

Roy Biddle of R.R. 1, Box 517, Baden, PA 15005 is responsible for Photo No. 14 showing an extremely well built Scientific *Victory*. This model, designed by Dick Korda, flies like a dream according to Biddle.

The model is covered in orange tissue with black trim as was the original. The model flies great on six strands of 1/8 FAI rubber, and employs a free wheeling propeller to improve the glide.

Some of the readers might consider this model when and if staging the popular 36-Inch Commercial event originated by the SCAMPS of Southern California. The *Victory* flies just like its big brother, the *Korda Wakefield* . . . great!!

MORE COLOR!



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TRENTON TERROR STORY

Received a most interesting letter from Barney Onofri, 78 Harrison Ave., Morrisville, PA 19067, wherein he attempts to correct the record that credits Mickey DeAngelis with the design of the *Trenton Terror*.

Thanks in part to Carl Hatrak, Barney was able to substantiate his claim as the Hatrak album is a compilation of the activities of the Trenton modelers during that era.

On one page of the book, a list of contestants is given for a contest held on Oct. 1937. Under this listing is Barney Onofri, No. 24, with his six-foot original model. Barney placed seventh in that meet. In the February issue of *Flying Aces*, a photo appeared showing James Onofri and his original model that placed seventh.

In the April 1938 issue of *Flying Aces*, the plans to the *Trenton Terror* were published under the name of Mickey DeAngelis. The photo of the model and myself (Onofri), originally in my album, appeared as an accompaniment to the writeup of how to build and fly the model.

Barney goes on to say that DeAngelis was quite a good guy making space available to him in the rear of his hobby shop. Barney feels fortunate that Mickey did let him use that area.

Evidently, what has happened from the foregoing is that the *Flying Aces* Editor gave credit to the contributor,

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DeAngelis, when he submitted the Onofri design. Although this writer was aware of this problem, it is time to give Barney credit where credit is due.

NEW DETHERMALIZER?

Received a most interesting letter from Robert E. Stuhr, R.R. 1, Shelby, Iowa 51570, wherein he describes his "new type" dethermalizer that he recently ran across.

"On one of those hot, calm, summer days, I decided to sacrifice my old Mini-Maxer *for the thrill of an out of sight flight again. So, I launched into a thermal and after five minutes, the model was just a speck. Luckily, it fell out of the lift, but promptly caught another riser.*

"I was able to stay under the model all the time as the wind was very light with a resulting small drift. On the second thermal, I thought the model was a real goner this time. Now comes the strange part. After eleven minutes, the hot sun melted the adhesive of the masking tape, releasing the nose plug being held by the tape. About four inches of slack rubber fell out with the propeller dangling below.

"This caused the model to spiral all the way down with no damage being incurred upon hitting the ground. This, incidentally, all occurred not more than 100 feet from the original launching spot. Most days on the farm are not too exciting, but that day was one to remember!"

I know a lot of you readers have had this happen, but eleven minutes in only 100 feet? Wow!

SAM CHAMPS 1984

The following news may be good news to some SAM members and bad news to others as the site of the 1984 SAM Champs will now be Bong Field, Wisconsin, according to Contest Manager Karl Spielmaker.

This writer had high hopes the site would be Metcalf Field, the old municipal airport in Toledo. Don Belote, one of the mainstays of the Toledo Weak Signals Trade Show, was responsible for the initial contacts with the airport operator. Just when things had started to gel, the age old problem of the lone stranger coming in on his old Taylor Cub once a week would necessitate the opening of one of the runways. Never mind that the airport was publicized as closed during that week!!

If the wind were to change and blow crosswise to both runways, this would be an untenable situation for the free flighters. Scratch that field! Belote was then able to find another cow pasture serving as an airport that looked extremely promising. Same story again!! No matter how little the field is used, the free flight situation can not be tolerated. *Rats!* There must be a lightplane for every pasture in the Midwest!

The only field left that will contain all phases of Old Timer flying is Bong Field located in the vicinity of Racine, Wisconsin. Being under the jurisdiction of the Parks Commission, official permission had to be obtained for the last week of June. Of course, there is a daily entrance fee for the use of the "park".

Carl announces this meet will be a four day affair beginning on Tuesday, and concluding on Friday, June 26 to 29. Monday will be reserved for test flying, MECA Grand Collectogether, if staged, and, of course, the welcoming "Bean Feed" on Monday night.

The rest of the curricula will pretty well follow previous SAM Champs with the Annual SAM Business Meeting on Wednesday and the Victory Banquet on Friday. That should keep you boys busy!

Details will follow in SAM Speaks, the official SAM publication, as to events, days, accommodations, etc. Should be a great meet with one more day to fly!

THE WRAPUP

We couldn't resist printing Photo No. 15 as submitted by Mitch Post of Chicago, Illinois. The picture shows Bob Moulton with a streamlined twin pusher, that is to say, all the rubber motors are enclosed in teardrop-rolled sheet tubes. No information on performance, but it is the writer's recollection, having built a similar model, that the weight of the sticks, and the friction of the rubber as it unwinds actually detracts from the performance to the point where the open stick type twin pusher is a superior performer.

Main reason for showing this photo is to give the prospective contestant of the 1984 SAM Champs an idea of the terrain to be found at Bong Field. Bob is standing on one of the old unfinished runways that are gradually becoming overgrown with volunteer wheat, grass, what have you.

The area is covered with tall grass, so it would behoove the contestant to stay close to his model while chasing, and to get a good line on where it landed. No cycles allowed, but autos will be permitted on the field to retrieve models, so no excuses, fellows! I'll see you characters there!! •

Skyhawk . . . . *Continued from page 45*

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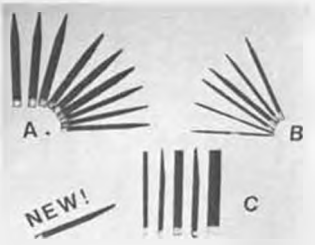

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they wouldn't pop loose at some inopportune time.

ENGINE

The extremely light weight of the model means that an expensive, high revving, fire snorting engine is not required. In fact, the MRC Cessna uses a rather humble, lapped piston Enya .35. This relatively small engine, swinging a 11-5 prop puls the Cessna with authority . . . no VTOs, but neither does it require that you dive to get up enough steam for a realistic loop or roll.

The Enya .35 comes with the MRC *Skyhawk II* and with instructions provided by the Enya company, plus some operating hints by MRC. It is somewhat reminiscent of the old Veco .45, which early R/Cers will remember as *the* engine. It also used sleeve bearings, no rings, and it took a week's production of K&B 500 to get it broken in, but once there, it ran its heart out for you, fast, slow, or in between. Break this Enya in as recommended, always treat it properly, and I doubt if you'll ever be able to wear it out, no matter how much flying you do.

CONSTRUCTION HINTS

The instructions are a happy combination . . . thorough, without being wordy. I can only add a couple of suggestions. First, the all important center wing joint. The procedure as outlined by MRC works, except that I believe a better foam-to-foam joint will result if the molded surfaces are sanded. Better glue penetration should result on the sanded porous surfaces than on the smooth molded surfaces. So, sand the wing centers, test for fit and dihedral, and follow the rest of the instructions.

After the wing is complete, don't forget the step that is important to all models, the lateral balance. If necessary, add weight to the light wing tip until the wing remains level when supported in the center (longitudinal axis). This will keep you from having to fly around with a lot of drag producing trim cranked in.

This is also a good time to check the model for its proper balance point, often called "CG." It is mentioned in the instructions as being at 33% of the wing chord. With everything in place, without fuel, mine came out about 1/2-inch forward, close enough on a model of this design and size. Unless your radio system is considerably different from the norm, yours should also balance within acceptable limits without the need of any weight anywhere. Should a small forward adjustment be necessary, I'd consider moving the battery pack out of its molded cavity and up under the tank rather than add dead weight (lead) up front.

No engine thrust adjustments are necessary, though it would be a good idea to check the side thrust. From a point on the rudder to the prop tips, there should be 1/8 to 1/4-inch less distance at the right tip, looking at the model from the rear. If necessary, loosen the engine screws and rotate the engine as far right as it will go. This is also a good time to install the muffler extension and muffler, per the instructions. A small drop of thread sealant on each screw (such as Pacer's Zap-Lock) will insure you against playing "bomber" with your muffler sometime during your flying.

Thread sealant should also be used on the main gear axle screws. A short length of 5/32 OD tubing for a bushing is needed on the nose wheel. A flat spot filed or ground on the wire axle there will keep the wheel collar screw from loosening.

FLYING

Light and big means a tendency to weathervane on takeoff if there is any breeze at all. Other than that, flying the MRC Cessna requires nothing other than a fine touch on the sticks. With the controls set up as recommended in the instructions, the model is agile enough to allow overcontrolling, without being unacceptably sensitive. It'll do the basic maneuvers with ease, and landings are a cinch, positive all the way to the ground, with no tendency to snap or stall.

That long wing is apparently stronger than it seems, but if you decide to increase the control throws for more violent maneuvers, a lengthwise strap of filament tape on the underside for added strength would not be a bad idea.

It'll take you longer to charge the batteries than it will to get the MRC Cessna *Skyhawk II* ready for flight. And flight is exactly what you will get out of it, and after all, that's what the hobby is all about, isn't it? •

Cracker Jack . . *Continued from page 49*

radius, kinks are a real "no-no". To prevent the tubing from fatiguing due to vibration, tie it down from place to place with silicone bathtub sealer. Tie the aft end of the tank to the fuselage bottom with sealer also. Don't forget to balance your propeller to reduce the level of engine vibration.

The cabane struts are pointed and

pushed into the balsa structure of the wing and fuselage. Do this carefully so that the wing is properly aligned.

The side and bottom fuselage stringers (for the large model) are 1/16 x 1/8 balsa sticks. They are mounted on edge, are full-depth at the location of the wing strut, and smoothly taper to nothing forward and aft of this point.

Covering follows standard procedures. Cover the entire model with white tissue, and after it has been water shrunk, give it about three coats of thin dope. The color trim is put on using colored tissue doped on over the base white tissue. The Sailor and his dog are an intricate pattern to cut out of tissue. Their dark parts are blue. Use a thin pen for the Cracker Jack box he is holding in his hand.

The following adjustments are made for flying the model. Make sure the model balances level when supported at the extreme wingtips. Mine needed some weight added at the tail end. Remove any gross warps in the wings or tail and make sure each wing has about an eighth of an inch of washout. Test glide the model to determine if some elevator and rudder adjustments are required. Try for a straight, smooth glide. Until the original model had the turbulator strips added, it glided very poorly. Adjust your engine for fairly low RPM and try a flight. The original model tended to spiral in to the left and required some right rudder to overcome this tendency. The right rudder will give you a right turn in the glide. If saving the model from a left spiral dive under power with the rudder results in a right spiral dive in the glide, you will have to resort to some right thrust adjustment.

Side windows (non-scale) or a profile pilot in the cockpit will probably reduce the model's tendency to spiral. Have fun with your Cracker Jack! •

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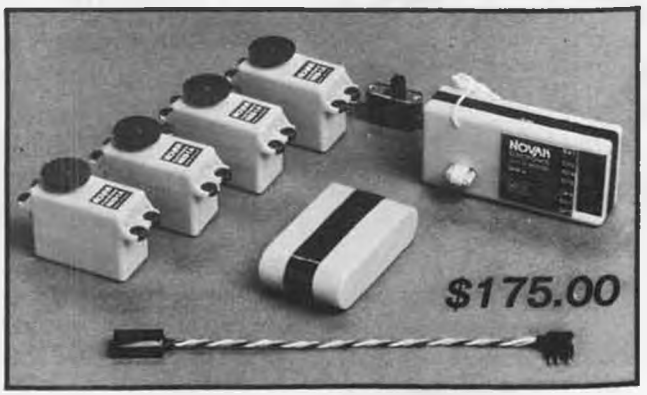

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Diamond . . . . *Continued from page 38*

the incidence of the wing rather than resort to any great change in the position of the wing. The usual incidence used is raising the leading edge 1/8-inch above the trailing edge. The center of gravity should be at the center of the wing.

Start the power flights only after the glide is satisfactory. Try about 100 turns for the first flight. Then increase the number of turns to about 250. Bad adjustments will be revealed during a flight under this amount of power. Correct any stalling tendency by increasing the negative thrust. This is conveniently done by changing the angle of the nose block. Insert small slivers of balsa between the top of the block and the first fuselage cross brace. Cement these blocks to the nosing as soon as you are satisfied with the adjustment.

About two degrees downthrust and one degree right thrust are used on the Diamond. *The rudder is given a slight turn to the right and the model flies in right circles. The model hops off in about three or four inches and pulls up into a fast, steep climb for about the first 40 seconds of flight. After this the model gradually levels off and a short time later goes into its glide. Immediately after the takeoff, the model starts a right circle and continues through the flight and glide. For maximum flights, about 650 turns can be stored in a motor with two inches slack.*

As usual, when researching one of these OT's, I start wandering through the other pages of the particular issue involved, and interesting things reappear. In this one, the 1937 Nationals were described, and the results posted (there were only 17 events altogether). Many familiar names were in the lists, but we'll mention a few who most everyone should recognize. F'rinstance, in Outdoor Open Class Cabin, Dick Korda was first with 54:13, the next closest being a C. Sholes at 2:39.8! Chet Lanzo and Frank Zaic appeared in 9th and 5th respectively. In Senior Mulvihill, There was Earl Stahl (6th), Dick Everett (7th), Wally (K&S) Simmers (8th), Mike Roll and Hewitt Phillips.

How about Indoor Stick Senior? Wally Simmers again, in first. Hewitt Phillips (6th), Sid Axelrod (12th). Indoor Stick Open? Carl Goldberg was second, and one Walt Good (!) was in 6th. Yes, and Walt was also 9th in Indoor Cabin. How about that!? In Gas Model Open, Maxwell Bassett was first, with Carl Goldberg in 2nd. In Gas Model Senior, we see Fisk Hanley in first, Sid Axelrod (Top Flite's leader for many years) in 7th place, Bob Long (Long Cabin), Chuck Tracy, current Sam President Mike Granier, Vern Krehbiel (VK Models), and Hewitt Phillips. And in Radio Control, from 1st to 6th place, it was Chet Lanzo, Pat Sweeney, E. Wasman, Walt Good, Leo Weiss, and B. Schiffman.

Hey, great idea! Why don't you build your wife or girlfriend (who may also be your wife) a *Diamond* for her next birthday. Just think of the fun she'll have retrieving it while you fly it for her! •

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Volts Wagon . . *Continued from page 28*

thing, send for the plans immediately before the rush commences. Even with the best of service, it'll take **Model Builder** a week or two to get them into your hands. *(Include First Class postage for the fastest return. wrf)* That's OK, because you have some homework to do: while you're waiting, go back through all your back issues of **MB** for 1983, starting with December, then November, etc., and read each of Mitch Poling's columns until you've read everything from 1983. When you're done with that, find everything you can by Larry Jolly (also in **MB**). You'll have to read his stuff twice, or however many times it takes you to understand it. His literary style is a bit quirky, but it is worth the effort . . . he knows what he's talking about!

If the plans still are not back, go back to 1982 and read Poling's columns for

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that year. Don't bother to dig back any further than that . . . you'll be more confused than enlightened by what you find. So much has changed (for the better) in the past two years that most of the opinions, equipment and attitudes of that period are grossly antiquated. You are *entering* the Golden Era of electric power!

Just what has changed to make our life as electro-fliers so wonderful? Primarily, it was the abandonment of the eight-cell/550 mah GE Ni-Cd battery pack which was the "standard" of the last decade. In its place emerged the key to *duration* and *successful charging*: the six-cell (and seven-cell) 1200 mah battery packs. These yellow marvels have simply given us dramatically improved duration (longer flights) because of their greater capacity and superior charge and discharge characteristics. Don't fool with anything else. If you've got some of those older GE eight-cell packs (white), they make terrific flight packs for your receiver and servos when broken down into two sets of four.

No less important is *the new generation of motors* beginning with Leisure's terrific LT-50 and Astro's very competitive 05XL and 07XL . . . both became generally available about two years ago. Since then, we have had access to the fantastic Astro Cobalts, and more recently, the imported German Kellers (cobalt) made available by Leisure. The lastest entries in this race for excellence are Astro's line of Super Ferrites (it is the first day of November, 1983, as I write this, and who knows what will have developed by the time you read this).

These new motors are more expensive than earlier ones; most of them were in the $12 to $15 range three years ago, with plain bearings and limited performance . . . a far cry from the new breed which cost from around $30 to $50 for the non-cobalts, to as much as $200 for the largest cobalts. As with everything else, you pay for performance.

CHARGERS AND CHARGING

We now know a lot more about this subject. For a long time we didn't understand that it was impossible to *fast charge* an eight-cell pack from a twelve-volt source . . . so 90% of the time we were trying to fly on 80% of a charge when 100% would have been barely enough with these old 550 mah packs we were using! The switch to six-packs (even seven-packs with special care) solved that. The availability of a variety of good chargers serves our needs nicely. At the top of my list of chargers is Astro's AC/DC Auto Charger ($70). It has, among other important features, voltmeter jacks so that you can plug in a $50 digital or $8 analog type voltmeter (both available from Radio Shack). Nearly as useful as Leisure's Digital Charger at $100. You can get by for as little as $25 (both Astro and Leisure have models in this price range), but do yourself a favor and go for the best in this department, you'll not regret it. I have both of these chargers. I use the Astro AC/DC unit mostly in the shop, and the Leisure Digital at the field. I don't know how I'd get by without them.

FIELD CHARGING BATTERIES

Most R/Cers are using field batteries of four and a half to six ampere-hour capacity for use with their power panels. These batteries are totally *inadequate* for our purposes. What is needed is a battery of not less than 14 ampere-hour capacity. They are available through motorcycle shops, and places that cater to recreational vehicles. Usually, they can be found for about $35.

How do you charge this battery? Run a line from your auto battery, and charge it as you drive to and from the field. What could be easier . . . and the price is right. By the way, this will not be a nice, clean, sealed, gel-cell type. It will be an old-fashioned wet cell battery that can and will leak acid. Nothing is perfect. Put the battery in a *wooden* box or container, and keep everything of value away from it. This is a minor inconvenience, considering the long lasting job this battery will do for you.

If you do not want to go to the expense and trouble of buying the above mentioned battery, nothing is better than the battery in the vehicle that transports you to and from the flying site . . . your car. An auto battery is usually 70 ampere hours or larger and is always charged up and ready to deliver. Please don't try to charge through the cigarette lighter receptacle. If anyone in the family smokes, you've got all kinds of resistance, and who knows how many feet of wire lie between the receptacle and the battery adding still more resistance. Just release the hood and clip the charger directly to the battery (following the manfaucturer's instructions) being very careful to observe correct polarity. I use this technique frequently enough to justify running a permanent plug from the battery exiting the engine compartment in a convenient place so that I don't even have to raise the hood.

PROPELLERS

The choice of props for electric powered aircraft is somewhat more critical than is the case with glow engines. I've done a considerable amount of bench testing, and while the results are useful for comparison, it isn't until you get into the air that you really KNOW what works best on what motor and what aircraft. This is because the engine/prop combinations "unload" once airborne. Much of this is caused by airspeed and load.

I can tell you one thing: Rev-Up props work best! I don't really know why. I've had good flights with Top Flights and Zingers but my most spectacular flights are always on Rev-Ups. I keep tight logs on all my flights so this is not just a gut feeling, it's clearly borne out in my written observations. With the circulation of **MB** being what it is, I've probably started a world-wide shortage of Rev-Ups. Please Mr. Rev-Up, make more 7-4s and 8-4s. Those are the two fans that I find most consistently useful. Start with the 7-4 then move up to the 8-4.

CONSTRUCTION

So, you thought this was going to be a

construction article? So far I've said nothing about construction. Have you ever built a rubber model or a sailplane? If you have you'll need few comments from me. If you haven't, I've probably wasted your time so far with all this stuff about electro-flight. However, I do have a couple of building tips before going back to the good stuff.

The fuselage sides are simply made from 1/16 balsa sheeting, four inches wide. With a ballpoint pen draw the fuselage outline on the balsa; all the lines are straight, except the bottom of the nose . . . you can eyeball that. The doublers, longerons, and vertical pieces are cemented to the sides (be sure to make a LEFT and RIGHT side). When dry, assemble the fuselage using Formers B and C for alignment. When the two sides (joined by the formers) are dry, draw the sides together at the tail, fill in the fuselage with the crosspieces, etc.

The tail is standard "free flight," you'll have no trouble there.

The wing construction is typical of all my designs in that the main spar is built over the plans, dihedral braces and all. When dry, position the spar over the plans, center section first. This leaves the two outboard spars sticking up in the air. When the center section is complete, tip it first to one side, built that panel, then tip it to the other side and build that panel. Simple isn't it . . . no panels to join later, and no chance of getting the dihedral wrong. I'm surprised more designers haven't discovered this trick. Oh well!

I covered the fuselage with medium weight silkspan, three coats of Sig clear dope, and shot some Sig Cub Yellow on it. The wing and tail group are covered with white and yellow Monokote. So much for construction.

FLYING

Normally, I hand launch my electrics as my flying is done at the Sepulveda Basin flying site in Van Nuys, California, where the majority of other aircraft are much faster than mine, and it is expeditious to quickly *get-the-hell-out-of-the-way* . . . or get run over!

The *VW* takes off quite nicely. Even though it's a taildragger, it sits at a very "flat" attitude, so that taking off is just a matter of rolling twenty-five to fifty feet (depending on the breeze) and easing back on the stick.

If you decide to hand launch, be sure to toss it at a perfectly flat attitude or even a tad nose down. Under no circumstances should you allow the nose to be raised . . . remember the warning about dropping a wing?

The *VW* has a very flat glide, so that landings may be made simply by steering down final with no need for a flare-out. However, you will have eased in full UP TRIM after shutting the motor down. If trimmed and balanced correctly, this produces optimum glide and the lowest sink rate.

ELECTRIC MOTOR TESTS: GEARS, BELTS, AND DIRECT-DRIVES

Before unleashing this subject on an unsuspecting world, we wanted to test as many motors as possible, including some gear-drives. We did quite a bit of testing with direct-drives, but had not gotten into the gear-drives as time was running out. For this reason, Jim Hall, who built the first *VW* from the final plans, modified the front end of his *VW* to take a Leisure LT-50 with a 2.5 to 1 gear-drive. We didn't do enough testing to completely satisfy me, however, I must say that the *VW* did so well on EVERY direct-drive motor we tested that it overshadowed the gear-drives. My impression is that in a plane of this SIZE, the gear-drive provides *no* clear advantage. The *VW* flew on a Rev-Up II-5, then a II-7, and finally a 12-5, with the II-7 being the best performer. Even with the very long landing gear legs, the gear-drive was very vulnerable to damage on a hard landing.

Conclusion: The added weight, expense and aggravation of the gear and belt-drives brought nothing of value in performance. I suspect if the *VW* was 20% larger, we would have done much better. So stick with the direct-drives and save that gear-drive for a bigger airframe.

Back to Jim Hall . . . I got a set of final plans on a Saturday morning (from Vic Steelhammer who drew them), and gave them to Jim so that he could tell me if there were any mistakes or parts that don't fit. Apparently everything was OK, as he simply showed up at the field the *following* Saturday . . . one week later . . . *ready to fly!* I must add that Jim is NOT retired, was not on vacation, and in fact, is a very busy person. So, obviously, the *VW* can be built very quickly.

On a project like this, data never stops coming in, but, you have to draw the line somewhere. So, as of Sunday, October 30th, 1983, we made the final tests (so far as this article is concerned). Thanks to Bob Boucher's (Astro Flight) interest in our flight tests, we were fortunate enough to have two new motors. So, the final tests were conducted using the Astro Super Ferrite 05 (six cells) and the Super Ferrite 075 (seven cells) which proved to be outstanding units which I recommend highly (also they're quite *inexpensive*).

The final flight test was made with Astro's sensational new Super Ferrite 10 (seven cells) which looks exactly like a Cobalt 15 minus the big "knobs." Though this motor weighs three ounces more than the others tested, it produced the most spectacular results! This jewel turns just over 14,000 rpm on a Rev-Up 7-4 on the bench tests . . . lord knows what it unloads to in the air! In any case, its performance is very close to that of a Cobalt, it weighs a little more than a Cobalt of similar output, however, it uses far fewer cells, and it costs less. There is a big future for this one!

While I'm on the subject of praising the people who make our success possible, I must say that Bill Cannon (Cannon R/C Systems) does NOT get enough credit for his pioneering of mini and micro systems. *All* of my electrics fly with Cannons on board. You may also have noticed that virtually all the record attempts have used Cannons. Until


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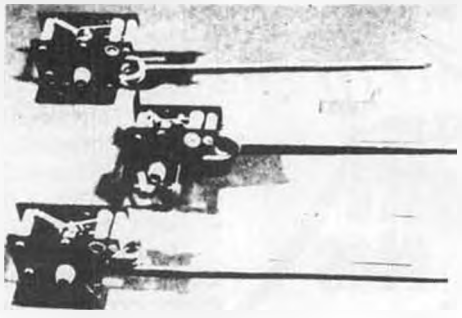

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recently, they were simply the ONLY radios light enough and RELIABLE enough for our needs. Though there are other choices available today, I still use Cannons.

By the way, I still have a couple of glow engines left and several dozen industrial grade oil rags . . . anybody interested? I have no further need of them. •

VOLTS WAGON List of Materials:

QTY.	DESCRIPTION (DIMENSIONS IN INCHES)
4	1/16x3x36 Medium balsa (ribs and fuselage top and bottom).
2	1/16x4x36 Medium balsa (fuse sides).
2	3/32x2x36 Hard balsa (wing trailing edge).
1	1/8x4x36 Medium balsa (doublers and misc.)
2	1/4x1/4x36 Hard balsa (wing leading edge).
10	3/16x3/16x36 (Spars and tail).
1	3/16x3/8x36 (Tail).
4	1/8x1/4x36 (Fuselage longerons).
2	3/16x3/8x36 Hard and *straight* (wing main spars).
1	3/16x3/8x36 Spruce.
	1/8 Lite Ply (formers).
	1/8 Regular ply (Former A).
1	1/8 Music wire (landing gear).
2	1-3/4 Wheels (as light as possible).

Eloy's . . . . . *Continued from page 34*

flown in this airplane, is a Tele-Tachometer as available from Condor Hobbies. This is a telemetry device, which gives you airborne engine speed up to 30,000, and airspeed up to 300 kilometers (180 MPH). It consists of a small, servo-sized transmitter, a pair of optical sensors, and a ground receiving unit which at first glance you would take to be a regular tachometer. You can read either of the mentioned information by plugging in the proper sensor, or if you prefer, you can switch from one to the other while airborne by installing a servo operated switch. I have no figures at this time on this airplane/engine combination, as I have not yet flown it with the Tele-Tach installed, but I have done extensive flying of the system with my old Telemaster which tears through the air at an unbelievable 32 mph. The system works well, requiring only the recalibration of your brain from mph to kph, and I believe it will be extremely interesting to know what my FK-50/CAP-20 is really doing up there.

WING HOLD-DOWNS

Naturally, the wing is bolted on as rubber bands went out with escapements. I used a neat new wing bolt system recently made available by Sonic-Tronics, called a "Nifty" Wing Mounting Kit. It consists of nylon bolts, brass threaded inserts, and some recessed nylon guides for the bolts. These guides are installed in lengths of one-inch outside diameter dowels, which in turn are glued into wing cores. The bottom of the dowel is flush with the underside of the wing, and the top of the nylon guide is down the proper distance to recess the head of the bolt being used. After the first epoxy sets, fill the cavity around the guide with some of Dave's epoxy and micro-balloons, and sand the whole thing flush. A couple of layers of heavy fiberglass cloth should be used as a reinforcement on the bottom side of the wing. The threaded inserts are screwed into some hardwood attached to the fuselage sides. The results are an accurate, strong, and clean appearing wing mount.

WHEELS

For something that is used for such a short percentage of the time, those wheels sure are important, aren't they? They are important in many respects . . . weight being one of them . . . and this is the primary reason for my choice of the Powermax wheels which I am using. They look not unlike many other wheels on the market, gray hubs, black tires, but it isn't until you have a pair in your hand that you realize there is something really different about them, they are *light*. A pair of 4-inch wheels (unfortunately the largest size now available) weigh a hair over four ounces. They are made in seven sizes from two to four inch, at from $2.25 to $6.50 per pair. You'll want to try them on some of your smaller birds. For information about them, and many other items of European origin, contact Powermax, 359 Trousdale Dr., Suite A, Chula Vista, CA 92010, (619) 691-0780.

PROP BALANCER

Balancing that piece of maple that we bolt on to the front ends of our engines is very important . . . even more so when they get to be the size of those used on models of this magnitude. Even spinners and backplates should get the treatment, which is all made easier and more accurate with the High Point Balancer. This one is different . . . it uses two freely moving metal discs as a pivot for each side of a shaft on which the item to be balanced is mounted. Little if any friction is present, and the heavy side immediately and definitely starts down. Whatever is being balanced is mounted onto the shaft with a centering cone which accommodates center diameters of from 1/8 to 3/8 in. To further ease the load of the large airplane fan, High Point also offers a set of extensions on which the balancer may be mounted to accept

those larger pieces of maple. If not available locally, check with High Point Products, 3013 Mary Kay Lane, Glenview, IL 60025, (312) 272-8684.

INSTRUMENTS

Well I didn't get to use them, but I also located a very nice set of scale instruments, available in 1/4 and 1/3-scale size. They come from the same friendly folks who brought us the control cable assemblies, International R/C Specialties. These instruments are not merely stick-ons, they have plastic covers, bezels, and accurate, realistic, and cleanly reproduced faces. A complete set, with your choice of 30 different instruments, is priced at $9.95, plus 50¢ postage.

I couldn't use them because the molded cockpit on the CAP-20 is too shallow, and doesn't have enough depth for a proper instrument panel. Modifying it would have resulted in more of a weight increase than I could accept . . . however, these instruments are definitely going into a future project.

MISCELLANEOUS

Like all files, all articles have to have a miscellaneous section! This one deals with nylon screws, which we all know about and which the more enlightened ones of us used to hold wings on with. What is not as well-known is that they come in all sizes, and in some variety of colors. On the CAP-20, I used them to hold the cowling and the canopy, in both cases being screwed into blind nuts set into small pieces of Lite Ply. I like them for a number of reasons, one of them being the lightness, and the other one being shear strength, which is more than enough for this application. Another reason is the visibility, or more accurately, the lack of it. To hold the canopy, I used black screws, all installed along the black painted canopy border. They are so invisible that I've had questions as to how the canopy is held on! To hold the yellow cowling, I used the off-white which is the natural color of nylon. Though not as invisible as black on black, they still do not stand out as much as shiny plated screws.

Another nice, related item is nylon washers, also available in all sizes. They are a must under metal screws (when you have to use them) which bear down on painted surfaces. These nylon washers completely eliminate the paint scratching that invariably takes place when the screw is first tightened, and which gets worse everytime it is removed and reinstalled. Both nylon screws and washers are standard items at electronic supply houses, in sizes from No. 2 to No. 10.

Transporting and handling a model the size of this one presents its own type of problems, especially to those of us without vans, RVs, or similar. In my case, I am limited to a Mercury Bobcat, better known as a Ford Pinto. It has more room inside than any other back-opening small car, but still not enough for this aircraft. However, the problem is easily solved by removing the co-pilot's seat, and putting in a light plywood shelf made just to fit that space. Removing the seat sounds like a terrible chore, I know, but actually, it takes longer to get mentally prepared to do it, than it does to actually remove the four, half-inch nuts and lift the seat out. I pass this along as a possible solution to those of you with similar problems and vehicles.

A two-way stand was also fabricated. In this case, it is a couple of L-shaped supports, with U-shaped cutouts in both legs, to fit and support the fuselage at the front and rear. The short leg of the L supports the fuselage during storage at home and while it is being transported, the longer L supports it upside down for wing installation and preflight. Mine is made of 3/4-inch chipboard, but any similar material will do, the dimensions being dictated by the shape of your model and the height necessary to provide clearance.

FLYING

Came the day of reckoning, getting the CAP-20 out to the field was a problem that could only be solved by taking the co-pilot's seat out of the Bobcat, and putting in the plywood platform. Then, at the field it was time to: check the controls, range check, run the engine, set the idle, range check, check the controls, taxi, high speed taxi, let's fly! Lots of torque, not enough rudder, over control, not straight but acceptable, lift-off, altitude, trim: needs no pitch correction, slight touch of left, breathe! The BIG Bird is in the air, the engine sounds good, it has good control response . . . what a sight . . . maneuvers . . . I'm rehooked.

I can get along without the 90-pound monsters, but piloting a large model such as this one definitely approaches full-scale flying more so than flying a little one. Who was it that first said, "Large models fly, small models flit"? Amen! •

Soaring . . . . . *Continued from page 42*

Avg. chord	145 mm	5.7 in
Area	3 dm²	46 in²
Airfoil: NACA 63A008		
Moment arm	800 mm	31 in

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Included with the information package that Hans Peter sent to me from Thorbjoern was a glide polar comparison for the *KITT* design using the Epplers 193, 205, and 212: the lift/drag profile polars of the Epplers 193, 205, 211, and 374 superimposed on each other; and a nice three-view of the *KITT-193*. With all of the foregoing data, which may seem a little overwhelming (it's not really), including the three-view on the second page of this article, and the photographs of the actual *KITT* models, we have enough information to make similar models, if not identical ones.

As I said in my December article on the Worlds, this model would make a *fantastic* AMA thermal duration glider or F3B/multi-task glider. When I get the time to build one . . . (sung to the tune of "Somewhere Over the Rainbow"), I'd like to build myself a *KITT-193!*

SPEAKING OF SAILPLANE DESIGN. . .

I received another letter of interest from somewhere a lot closer than Norway . . . A Mr. Daryl T. Butcher, of La Habra, California, wrote in back of May of last year (I've been waiting for an opportunity to run his letter, and it's taken this long!) describing how he has developed a rather unusual R/C sailplane. His letter is self-explanatory:

"I read the recent article describing Sean Bannister's Alegbra VIII *(May 1983* **MB***) with considerable interest as I have also designed and have been flying a glider with tapered airfoils based on the Eppler series. It seems that the Eppler numbered airfoils are nearly a religion in the soaring fraternity. The mysterious numbering system is part of the cult.*

"I call to your attention the article by Eric Lister, 'Do It Yourself Airfoil Design From the Eppler Series,' starting on page 62 of the February 1981 RC Modeler. *Lister provides data on the airfoil (thickness) and camber shape of the Eppler series, and relates these curves to the NACA numbering convention. Believe me, this approach results in airfoils which are as close to the coordinates which have been published in several magazines as can be built. In fact, any differences can be ascribed to the use of only three significant digits in the published coordinates! This means that computer generated tapered airfoils are easily generated with only the percentage thickness and camber as input parameters. One, or at most two normalized airfoil/chord-line tables are required. Further, if you calculate the difference between an elliptical curve and Eppler's thickness curve between the leading edge and the point of maximum thickness (for a symmetrical airfoil), they are very close . . . close enough for most builders.*

"My recent ship uses a 12% thick, two percent camber, 11-inch root chord wing with a nine percent thick, 4-1/2 percent camber, eight-inch tip . . . with Eppler shape.

"This differs from Bannister's approach as he relies on a thicker tip section to avoid tip stall, while I have used a thinner, but more heavily cambered tip section for the same reason, but with the advantage of reduced drag and lower weight, plus smaller axial moment of inertia by tapering the wing's weight per unit area toward the tip. I believe that my approach is technically far superior.

"However, as I am a duffer of a flier, I could never realize any advantage. I feel very fortunate to survive flights, let alone compete.

"I have written a routine for a Hewlett-Packard computer to generate airfoils. Do you and your associates have any interest?"

Daryl enclosed a computer-drawn set of "ribs" (airfoil shapes) for an elliptically tapered wing using the above mentioned transition of airfoils. As there are 14 of them, the set would be enough for a two-meter glider with 2-3/4-inch rib spacing . . . hmmmm.

It would seem to me (I speak not as an aerodynamicist here) that to minimize induced drag, you would want to get as close to an elliptical lift distribution as you could along the span of the wing. An elliptically shaped wing will accomplish this IF the airfoil remains the same along the span. If you increase the camber toward the tip, I would think this would be undesirable . . . unless you are prone to tip stalling an airplane. In that case, the increase in drag caused by the increase in camber near the tip will be more than offset by the airplane's resistance to tip stalling.

The bottom line is *how does it work for you?* In the case of the *U4EA83*, Daryl's new glider, it works great! He claims a very broad speed range, plenty of penetration, and overall good performance. Besides, he is experiencing the high that few kit builders ever see, that of taking of chance . . . a gamble of time and energy . . . designing something literally from the ground up, totally different, and *succeeding* with it! My hat is off to you, Daryl.

To wrap things up with this subject, I spoke with Daryl recently, and he agreed to furnish me with a hard copy of his H-P computer program. If anyone would like to have this program, he or she can send me an SASE and a 20¢ stamp (to cover the cost of the copying) to Bill Forrey, c/o **Model Builder**, P.O. Box 10335, Costa Mesa, CA 92627. What this program can do for you is generate and

draw airfoils for you (with the necessary equipment), any shape, any size, as well as any planform.

One last thing, the *U4EA83* is 113 inches in span, weighs 84 ounces, has a wing loading of 11.1 oz/ft², a wing area of 1090 in², and uses the following functions: (1) ailerons coupled to rudder; (2) independent rudder; (3) elevator; (4) flaps; (5) spoilers . . . mixed mechanically! Radio used is a Futaba six-channel.

AIRFOIL OF THE MONTH: SELIG 1158

First of all, I owe Michael Selig an apology. I don't know how it happened, but I managed to spell his last name with an extra *E* in the December and January issues. Perhaps it was because I once knew a Seelig family in Westwood, California, and their name was spelled with the double *E* . . . and perhaps it was merely a case of *brain-fade*. Oh well, take note of the correct spelling, *Selig*, and remember it!

As you may recall from the December column, Michael is a rather ingenious aerodynamic student at the University of Illinois. He has generated, with the help of a computer, a whole bunch of new airfoil sections, some of which look like something Eppler would come up with, some look like a cross between a Wortmann and an Eppler. A few look like Goettingen and Althaus sections. Most look really good on paper . . . and compare favorably with the well-known sections using the same program for comparison.

You'll notice that in all cases, there will not be any coordinates listed in this column for the Selig airfoils. This is because Michael will supply you with coordinates in exchange for a progress report when the model is finished and flown. This way, Michael can keep tabs on some "real world" data, something in short supply with the Selig airfoils because they are so new.

The section featured this month is a "super slick . . . laminar flow airfoil with a moderately wide drag bucket." This translates to a model which covers ground very well in search of lift, and thermals well once in the lift. As the drag bucket stays low all the way down to a C_l of practically zero, it should do very well in FAI type speed runs or slope races.

Contact Michael Selig at: 715 S. Randolph, Apt. 21, Champaign, IL 61820. He'll be glad to hear from you.

FROM THE ARCHIVES

In a recent clean-out of a certain dark and dusty corner of the **Model Builder** office, a somewhat old, but still very useful drawing was uncovered which dates back to September of 1976. It comes from Apple Valley, Minnesota, and a glider guider named Howard G. "Crash" Evanson. He writes:

"Dear Sirs: After watching two Olympic 99s *and a* Windfree *self-destruct, I thought that a way of disengaging from the hi-start was in order. The sketch is crude, the typing worse, but I feel that the idea has merit . . . I'm going to use it! Please feel free to use this idea in your finest of all magazines."*

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Yes, Crash, it is a good idea. For those of you looking for an inexpensive way to "disengage" the hi-start, this will work just fine. Watch out for situations where extreme tension is on the launch line, however, as the swing arm just might put too much pressure on the release cable and over power the servo. A protective ramp/skid in front of the tow hook would also be in order to prevent the Dural hook from becoming mangled on a hard landing.

Well, we have more goddies for you next month, but for now, th-th-that's all folks!

Write to Bill Forrey, c/o **Model Builder**, P.O. Box 10335, Costa Mesa, CA 92627. •

Champs . . . . . *Continued from page 15*

rounds. Lossen's highest was a 1411, backed up by a 1393, while Hanno's highest was 1442, backed up by a 1416. Final totals were determined in the same way as first used in Mexico. Each flier flew twice for each set of judges. The highest score from each judge set was selected and totalled for the final score. In this manner, both sets of judges were counted in the final tally.

Round Two was the worst for all but four fliers, and even at that two of these had engine cuts in Round Four, otherwise only two might have done better. It was a chilly and blustery day, with wind velocity in the 15 to 20 knot area. Low ceiling prevented the normal 0700 start, and by 1500, the sun moved into the flying area, necessitating shut-down.

Rounds Three and Four were the highest scoring for most everyone. In Round Four, all but four of the 70 fliers had a score that counted in the final tally. Either the fliers were steadily improving or the judges were getting a little mellower . . . or some of both! Friday afternoon and Saturday morning also happened to have some of the best weather.

The first three days of the contest were a very private affair, the only spectators being team family members who accompanied the fliers, and fliers and team managers who were observing the competition. However, local TV and radio publicity finally stirred up a fairly decent crowd on Saturday for the final qualifying flights, the the grand finale; the two-round flyoff of the top ten percent (seven) for the individual World Champion.

Incidentally, during the interval following the finish of regular flying and prior to the flyoff competition, there was a unique and first-time (at least for me) flying demonstration. Paul Behm, of Luxembourg, put on a free-style flight to the accompaniment of recorded music played over the PA system. It was something like watching Olympic figure skating competition on TV, and Paul had obviously practiced his routine for many hours. We forget the semi-classical piece that was being played, but the

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multi-pointed roll passes of the model followed the music rhythm to perfection. The idea certainly has competitive possibilities and should not be overlooked. It would call for some very special judging capabilities.

Speaking of judges, this year there were two last-minute no-shows, so a total of eight were used . . . four at each flight line. The two teams consisted of Alex Gossens (Belgium), Camille Gerard (Luxembourg), John McNichol (Canada), and Heine Freundt (Austria) in one set, and Geoff Franklin (Great Britain), Werner Groth (West Germany), Dave Lane (U.S.A.), and Don Mackenzie (South Africa) in the other set. Doctor Jim Edwards acted as Chief Judge.

Engine noise monitoring was headed up by District I VP Ed Izzo. DB readings were taken one meter away from the engines, with the model sitting on the ground. All engines qualified at 105 DB or under, though there were some close ones. The four-cycle engine of Jan Van Beek brought up an interesting point. Although the sound of the engine was much less irritating than that of the two-cycle engines, it still gave a moderately high DB reading of 101. It's obvious that the much lower-pitched sound of the four-cycle was proof enough that a DB rating alone doesn't tell the whole story. Now what do we do, Ed?

The next World Champs should be especially interesting for several reasons. First, the turnaround pattern rules will be in effect, and there should be a switch in design trend as a result. But how many will stick with the current state-of-the-art? We have two years to wait. Another interesting reason to look forward to the 1985 WC . . . it will be held in Holland, and the flying site, for the first time ever, will be below sea level! Bring along your little inflatable boat just in case there aren't enough fingers to plug all the holes in the dikes!

Perhaps the most significant item at this year's event was the hopefully trend setting design entered by Hanno Prettner. Aside from being the best precision R/C aerobatic pilot in the world, Hanno Prettner, of Klagenfurt, Austria, is an innovator and thinker . . . which is kinda redundant . . . to be an innovator, you have to be a thinker.

When the Circus Circus Tournament of Champions first called for scale aerobatic model aircraft to fly full-scale aerobatic maneuvers, Hanno came up with a large, lightweight scale model that flew at scale speeds, while the others flew pattern-size scale ships that flew like pattern planes. Two years later, the "followers" joined the "leader."

At this year's World Championships, the rules didn't call for any change in the aircraft from past years, although the dropping of takeoff and landing maneuvers did result in some two-wheel undercarriages and even a one-wheel retract with wing skids. But the aircraft were still variations of Fritz Bosch's 20 year old Delphin creation, the only exceptions being Jan Van Beek's (Holland) Zlin/Akrobat/CAP 21 design with wheel-pants on the flat aluminum gear (and Saito 1.2 four-stroke), and Hanno Prettner's "Calypso." It appeared that Jan was thinking ahead to the new turn-around pattern, and the engine captured everyone's interest, especially those who had not heard the pleasant sound of a smooth-running four-cycle. But Hanno, the innovator/thinker, had other things in mind when he created the "Calypso."

In Europe, according to Hanno, precision R/C aerobatic competition has fallen off drastically in recent years. Where 50 to 60 contestants used to sign up for a major contest, the numbers have dwindled to 15 or 20, and in most cases, those who enter are the same ones who have been competing for years. Prettner feels that the main cause of this problem is the complexity and cost of the models, the radio equipment, and the engines that have somehow appeared to become essential to have if a modeler wishes to be competitive. The models are exotic fiberglass, foam, and composite material machines with the normal four controls, plus mixture, flaps, spoilers, variable-pitch props, retracts, etc. The radios offer controls for all of those extras, plus variable rates, exponential travel, spin buttons, roll buttons, lots of "bells and whistles" as they say, and the engines are putting out enough power to pull the whole package straight up and at an accelerated rate. It's pretty obvious why a newcomer to R/C wouldn't give aerobatic competition a second glance!

In an attempt to do something about it, Hanno is heading a trend toward the simplified aerobatic machine, and his "Calypso" exemplifies this effort. As the photos show, it is an extremely simple, no frills design. Powered by a piped Super Tigre 60, the only gimmick is the spoiler plates attached to the landing gear legs. The retract servo is three-position; up, down, and partially down to provide a drag effect for attaining a more constant speed during the vertical down maneuvers. To further slow down the aircraft during these maneuvers, a 12 x 9 prop is used. This provides increased disc area for more drag. The plane almost seems slower going down than when going up! It goes without saying that the simple machine didn't handicap Hanno at the World Championships. Let's hope the Calypso succeeds in putting the flying back in the pilot's hands, where it should be.

The idea is not new. As long as ten years ago, I was discussing the problem with Phil Kraft. His point was much the same then, as auxiliary buttons were beginning to appear, retracts were a necessity, and engine horsepower was increasing. The average aerobatic flier could no longer relate with the exotic and costly competition aerobatic machine; either make a major investment or stay with the sport and fun-fly circuit.

With ground handling out of the picture, maybe our pattern ships could go with fixed gear and wheel pants, similar to C/L stunt models. Then comes the process of getting the judges used to the idea that a fixed gear aircraft does not automatically mean that the flier is a novice competitor! •

C/L . . . . . *Continued from page 48*

trademark. Plus it is not self-obvious as a description if used to communicate to a non-modeler.

A trademark name evolving into a generic term is certainly nothing new, however. I know many modelers who identify any brand of cyanoacrylate adhesive by one particular brand name. Outside of the modeling world is an example of the most generic designation ever, namely the term used for any brand of gelatin dessert.

An inaccuracy exists with using the term U-Control, in that it does not describe all control line flying. Remember that it refers to a *two* wire system of elevator control, and that there is a *single* wire system, namely Monoline. Oh boy, another can of worms. I think that this was a trademark too. The speed flying crowd distinctly divides control line flying into two modes: monoline, and "two-wire".

So, when it all comes down to it, I think that "control line" is the best designation and spelling. Almost everyone actively flying C/L, calls it that.

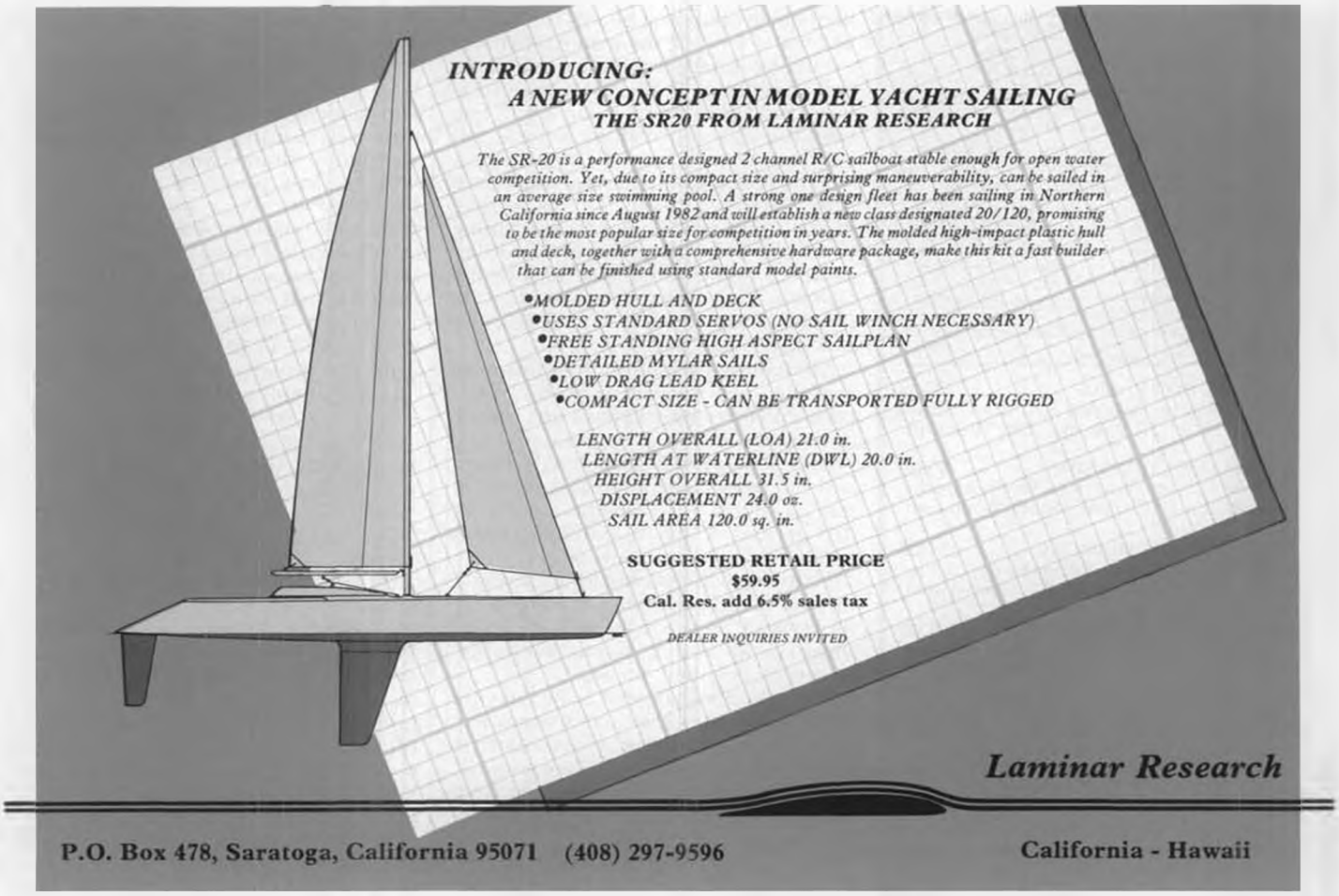
While we are sounding legalistic about labeling, let's take a quick look at the other modeling types. Does R/C really comply with truth in labeling laws? For all the times the R/C pilots say, "I ain't got it!" it could be called RCMOTT (which means radio controlled most of the time). And then the Better Business Bureau should make an inquiry of free flight. Have you ever priced one of those multi-function timers? That stuff isn't even cheap, let alone free!

PUYALLUP *(Pew-all-up)*

The third annual NW Model Exposition will take place on February 4 and 5 at the Western Washington Fairgrounds in Puyallup, Washington. I attended this show last year, and it was quite enjoyable. This show as most of its type, leans toward other modeling persuasions than our own, but there is still plenty to do and see. You may even want to enter your purtiest C/L plane in the, er, uh, "U-Control" category.

COLD WEATHER ENGINE STARTING

As you read this, most of the country is



now well into the cold season. Here are some tips for getting cold engines started.

Most starting problems are usually related to the battery and/or the glow plugs. Dry cells go into semi-hibernation in terms of output when subjected to refrigerator style temperatures. A wet cell battery of either the lead acid or ni-cad type *(Oops, another trade name! Should be Ni-Cd. wrf)* will be more reliable.

If you must use a dry cell, try to keep it warm until ready for use. The best solution with dry cells is to wire two or more together in parallel to get the amperage back up.

If the engine blubbers and quits, or loses speed when the battery is disconnected, then the glow plug is too cold. Try a hotter heat range, or another brand.

When it comes to fuel, I have had good luck just using my regular brew. The key to good starting is a hot glow plug, not hot fuel. Only in very cold weather would I suggest going to hotter fuel. One thing to keep in perspective is that a forty-degree drop may seem extreme to our 99-degree bodies, but it really isn't as significant to the engine which runs at several hundred degrees.

It often becomes necessary to use a juicier prime for starting, particularly for the first start. But be careful not to flood the engine, as this is no fun at all. The procedure that works for me is to get the prime where it really needs to be, right on top of the piston. Orient the engine so that the cylinder head is pointing down at the ground. Then turn the crankshaft so that the exhaust port is open, and squirt a few drops of fuel in. Sit the plane back down, allowing any excess fuel to run out. Hook up the battery and firmly holding the prop, turn it over once. It should give a healthy bump, indicating it is ready to go. A hard backwards hit is usually all that is necessary to get things going.

I have seen some desperate attempts made in the cold. One was to warm up the engine by using a blow torch! Another was to use a spray can of ether product for priming. I cannot recommend either method due to the possible hazards.

BUILDING TIPS DEPARTMENT

In the interest of control smoothness and mechanical longevity, it is beneficial to install some sort of bushing or bearing device on the control hookup points on your bellcrank. The stunt fraternity has devised several methods over the years. I will detail the method that I have used on my speed and racing models over the years, which can be used in most any application.

Assuming we are starting off with your basic aluminum bellcrank, the pushrod hole will wear larger after hours of use. My favorite remedy to this is to make a bearing surface with brass tubing. For a 1/16-inch size pushrod, use 3/32-inch OD brass tubing. Drill the pushrod hole with a 5/64 bit, and then open this up with a round jeweler's file so that the brass tube will be a press fit. Before insertion, roughen up the tubing and the pushrod arm of the bellcrank with a file or sandpaper. When the tube piece is inserted, apply some steel filled epoxy around the area. After the epoxy cures, then you can file the bearing surface down to the height you desire. I usually leave about 1/32 of an inch on both sides of the bellcrank arm.

Next comes the leadout attachment points. For these, I simply bolt a line and eyelet at each point. In the interest of strength and space, I thread the holes to accept a 4-40 bolt, and assemble all this with a thread-locking glue such as Pacer's Zap-Lock (blue label). Then both the bolt head and the nut can be filed down.

The next step is to wrap flexible leadout cable around the eyelets, and complete the termination using your preferred method. This system is very simple and long wearing.

This also is identical to the construction that I use for a "button" style line hookup bellcrank. The only difference is to leave off the leadouts.

★ ★ ★

Seen on a modeler's toolbox: "If God flew model airplanes, He would fly Stunt."

Until next time, keep it going 'round. Mike Hazel, 1040 Windemere, NW, Salem, Oregon 97304. •

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Sporty 05 electric Pylon racer. Wing area is 300 sq. in., span, 38 in. Dave Katagiri.

No. 184-OT 1/2A BRIGIDIER $5.00
An 1/2A Tex. version of the Berkeley kit scaled to 82% for R/C. By Jim Reynolds.

Counter . . . . . *Continued from page 11*

The kit is quite complete, and almost all parts are cut. Assembly time is about 10 hours.

You will discover the thrill of hassle-free flying with the *Sweet Bee*. After you are flying competently, or if you are beyond the trainer stage, then the next plane is the *Honey Bee*.

Write for the $1.00 catalog of these and the other planes in the Ikon N'wst line. The address is: Ikon N'wst, P.O. Box 566, Auburn, WA 98071.

★ ★ ★

Nick Ziroli Models has released its latest kit. A giant, 88-inch wingspan WW-1 Taube is now in production. The Taube was originally designed by Nick Ziroli, Sr. nearly ten years ago. The Taube has been refined and improved over the years and is now kitted in its final form. The Taube at nine pounds is a very docile Standoff Scale model which makes it great for beginners. A two-cycle .60 or a four-cycle .60 to .90 are ideal power. The kit contains balsa, plywood parts, pre-bent landing gear, full-size plans, and hardware. Order direct from Nick Ziroli Models, 29 Edgar Drive, Smithtown, NY 11787, or at your local hobby shop.

★ ★ ★

Peck Polymers is in the news with its latest offerings . . . and there are plenty!

Peck Polymers now has three sizes of high quality building boards for models and crafts. Finding the material to make a building surface is sometimes difficult, and sometimes requires that you buy more material than you need. The solution: buy your half-inch thick, soft building boards from Peck Polymers. Also included with your building board from Peck is a .03-inch thick styrene plastic sheet (6 x 12 inches) for cutting wood on, and a plan for a small, rubber powered model, the *P-Nut VTO* by Bill Hannan. The three sizes are: 12 x 18 (PA-10, $5.95); 18 x 24 (PA-11, $7.95); and 18 x 48 (PA-12, $9.95).

Modelers who build rubber powered airplanes will be glad to know about Peck Polymers new lightweight wheels in three sizes (3/4, 7/8, and one-inch). They come with 1/32-inch axle holes, and can be easily painted and glued for special effects. Their weights are .040 gr, .055 gr, and .075 gr respectively. Eight-wheel packages cost only 99 cents.

If you are in the market for a great gift for your favorite modeler, try the latest Bill Hannan book, *Scrapbook of Scale, Three-views and Notalgia*, available from Peck Polymers for $8.95.

"I'm nuts about Peanut Scale." If you can identify with that statement, or if you value your clothing (what on earth is the connection there?) . . . then you will desire the latest in T-shirts, aprons, and baseball caps from Peck Polymers with that message on the front!

Peck offers these hand made articles of clothing and protective clothing for modelers of all persuasions for very reasonable prices. The protective shop apron (in blue, light brown, and orange) is only $9.50. The T-shirts, available in men's sizes small, medium, large, and extra large, and in colors yellow or orange, cost only $8.50. One-size-fits-all caps are only $4.95. These items are available only from Peck Polymers, so you'd better remember this address: P.O. Box 2498, La Mesa, CA 92041.

While you are writing to Peck Polymers, you'd be smart to include an extra $1.50 for the complete Peck Polymers catalog. It's full of all kinds of modeling goodies!

★ ★ ★

Tatone Products Corporation, 1209 Geneva Ave., San Francisco, CA 94112, announces the release of its newest muffler. Many engines with side exhaust stacks are supplied with mufflers that are not suited for scale models or are too large to fit inside the cowling. Tatone now has a universal muffler that is designed for limited space installations. It will bolt on most engines ranging from .60 to 1.3 cu. in. such as Enya, Fox, Max, Super Tigre, Bully, Cobra, Tartan, and Zenoah to name a few. The size of this muffler-manifold is 3/4 x 1-3/4 x 2-1/2, It is made in two styles, one with vertical exhaust pipes for upright and inverted engines and one with side exhaust pipes for side, upright or inverted engines. Model No. 13075 is for upright or inverted engines at $19.95, and Model No. 13095 is for side, upright or inverted at $20.95. Tatone's new 60-1.3 Universal Muffler-Manifold is available at all leading hobby shops. If a hobby shop is not convenient, order direct from Tatone.

Four-cycle, OS Max 120 owners will be interested in the second new product announcement this month as Tatone now has available a cast, high tensile aluminum mount which is machined and brightly polished and specially designed for their engines. As the mounting holes are drilled and tapped, installation is a breeze. Four hardened steel cap screws are provided with the mount to make life easy for the modeler. The price is $19.95 at your local hobby dealer. Add $1.50 for shipping when ordering directly from Tatone (California residents add sales tax).

★ ★ ★

Jarmac, Inc., has just introduced what is probably the most useful tool for making small objects, its Tilt-Table Disc Sander. This professional quality sander is all metal, rugged, accurate, and versatile. It utilizes high quality, self-adhesive abrasive pads, capable of sanding wood, metal, and plastic, that are easily attached and removed from a four-inch diameter, solid aluminum disc. The four by five-inch table tilts up to 45° allowing the operator to sand perfect edges and joints at any angle. By loosening a knob, the table can be quickly tilted to a prescribed angle. When the knob is tightened, the table will hold that angle to the sanding disc. Long strips requiring compound angles can now be sanded with speed and accuracy. The sander has a 1/15 hp, 5,000 rpm motor, and comes equipped with the Jarmac standard, heavy duty, 360°, miter guide.

Contact Jarmac, Inc., P.O. Box 2785, Springfield, IL 62708, for further information on this sander, and other fine power tools designed for small work.

★ ★ ★

Last, but by no means least, we have three exciting new Lexan replacement bodies for R/C cars from MRP (Model Racing Products), 12702-D N.E. 124th St., Kirkland, WA 98033.

First we have the Ford XLT150 pickup truck. This is a super tough, .050 Lexan replacement body for the MRC/Tamiya 1/10 offroad kit. Like all MRP bodies, the Ford XLT150 is thermo-formed in super tough, crystal clear, genuine Lexan. These body shells are three times stronger than the originals, and are available clear No. 1106 and painted No. 1106P.

Next, we have the Outlaw Sprint Car, the only racing machine unique to the United States. The Outlaw Sprinter is a true racing machine in the American tradition. Huge air box and exhaust pipes enhance this exciting body style. The Outlaw Sprint car is molded in genuine Lexan and fits all 1/10 scale offroad cars. It comes in clear No. 1107 and painted No. 1107P.

Finally, from the California desert comes the winged Scorpion Sprint Buggy. Designed for fast, closed course racing, this tough body features both a roof air foil as well as a huge rear deck spolier. Made from crystal clear .050 thick Lexan, the Scorpion is available clear No. 1108 or painted No. 1108P.

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FIFTY CENTS brings list of new/used model motors, accessories, balsa kits. Motor trade-ins wanted. T. Crouss, 100 Smyrna, West Springfield, MA 01089.

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PAW DIESELS — England's most popular diesels now available, .049 to .29, throttled and standard, at low prices. Throw away those plugs and batteries. Use a self-contained diesel using half the fuel of an equivalent glow motor. Send $1 for list. Eric Clutton, 3816 De Soto Ave., Fort Meyers, FL 33905.

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FOR SALE — Radio Control Models and Electronics (British), from 1963 through 1975, $75. Radio Modeller (British), from 1970 through 1980, $50. Enrique A. Blandino, 549 Washington St., La Cumbre, Rio Piedras, PR 00926.

TOLEDO-WEST HOBBY SWAP MEET. Buy/sell your engines, airplanes, kits, race cars, or radios — $2 donation. La Palma Recreation Center, 7821 Walker St., La Palma, California. January 7, 1984 from 1:00 to 4:00 p.m.

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These and other MRP products are available from your local MRP dealer or directly from MRP.

★ ★ ★

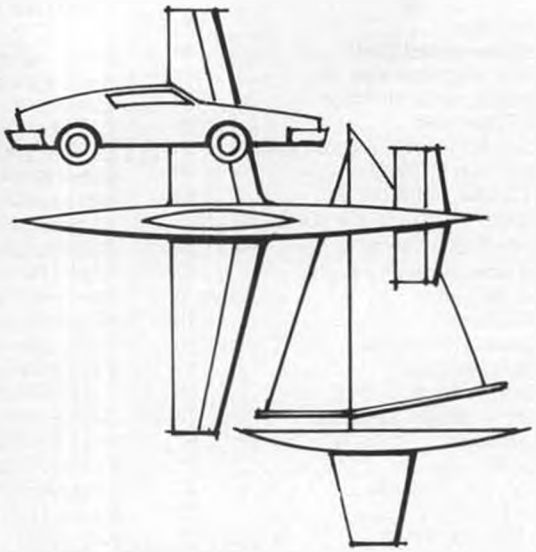
Tell 'em you saw it in Model Builder! •

BIG Birds . . . . *Continued from page 25*

your transmitter's "on" time. They will more like they're rated at 1800 mah), I've found that SR's 900 series cells are just the ticket for many installations. They are, for all practical purposes, the same size as 500 mah cells (although a tad heavier), but will damn near double also absolutely minimize installation problems in ships like Sig's Quarter-Scale *Cubs* where any amount of cockpit detail greatly reduces the space available for the radio gear. By using 900 mah packs you eliminate a lot of misery and still provide yourself with adequate battery protection.

If you're thinking that the SR battery packs cost more than the others, you're right . . . they do. However, I'm convinced that I'm getting my money's worth . . . that I am getting what I've paid for. Who else carefully checks all the cells going into a pack to make sure that they're all on a par with each other? And how about their guarantee to replace any pack that forms a memory within that first year of use. It's nice to know that someone really has confidence in his product and is willing to stand

WRAM SHOW '84



Don't miss the greatest Radio Control Show in the East at the Westchester County Center, White Plains, N.Y. It's our 16th annual show and it's sure to be the biggest and best ever!

This year's WRAM Show is going to be the largest yet. Well over 150 manufacturers and other exhibitors have already signed up to bring you everything that's new in the hobby ... kits, engines, radios, accessories and everything in between. And, our famous Swap Shop will be in full operation with thousands of items, including built-up planes, almost new radios, engines and on and on and on with something for just about everyone.

ADVANCED TICKET SALES

Save time ... avoid long ticket lines — contact Ed Alexis, 1587 Central Park Ave., Yonkers, N.Y. 10710. 914-337-6632.

STATIC COMPETITION

Make sure your latest creation is finished up and polished so you'll have a chance to take home one of the dozens of trophies to be offered in these events:

- WWI
- POST WWI (Military)
- POST WWI (Non-Military)
- PATTERN
- GIANT SCALE*
- OLD TIMERS
- SPORT
- GLIDERS
- HELICOPTERS
- SCALE RC BOATS, (Military)
- SCALE RC BOATS, (Non-Military)
- RACING R/C BOATS
- STAND-OFF SCALE
- JUNIOR EVENTS
- RC CARS up to 1/8" scale
- RC CARS over 1/8" scale
- BEST-IN-SHOW**

*Entries may be limited due to space availability
**Best in show will be awarded a VCR

Judging takes place Sunday afternoon. Entries accepted until 12 Noon Sunday.

Special admission area will be provided on both days for static display contestants with built-up models.

Registration of models will start at 8:30 a.m. each morning.

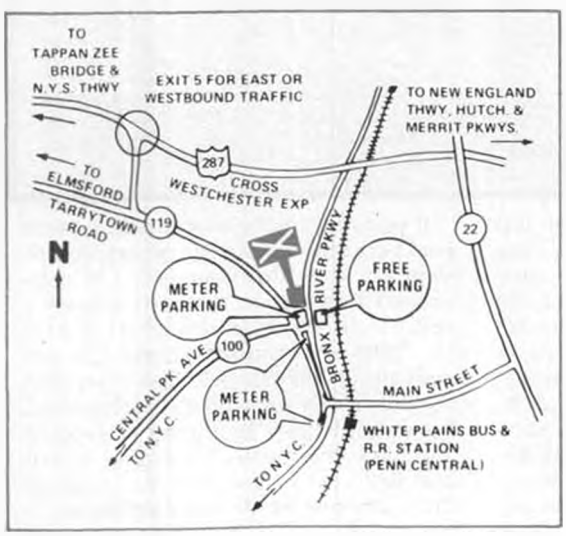
SWAP SHOP

The WRAM's Swap Shop has become one of the major show attractions with thousands of individual items changing hands. To help eliminate "registration crush," the Swap Shop will provide for preregistration forms. To receive these forms send a self-addressed stamped envelope to: John Isbister, 4 Devon Rd., Larchmont, N.Y. 10538.

SPECIAL NOTE

This year there will be no restrictions in the number of built-up models a registrant may place in the Swap Shop.

For further information, write or call: Ron Faanes, Route 4, Box 204, Poundridge, N.Y. 10576, 914-763-3986.



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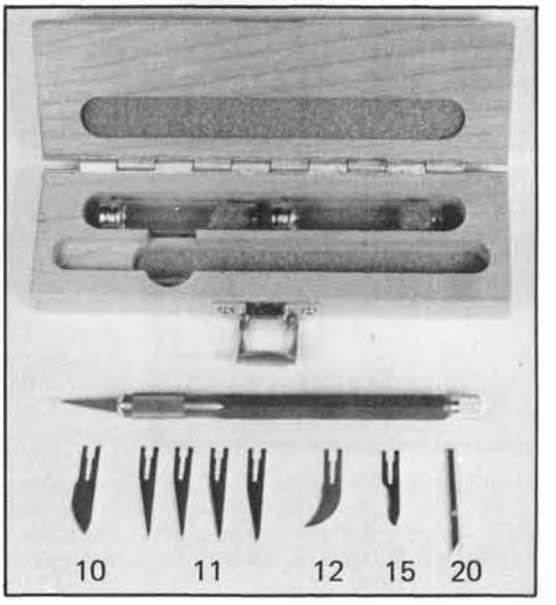

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behind it. Also, here comes that old peace of mind thing again, I feel better about committing my BIG Bird to the wild blue with something more substantial than an "El Cheapo Special" battery pack for power.

A self-addressed, stamped (business-size) envelope to SR Batteries, Inc., P.O. Box 287, Bellport, NY 11713, will get you all the details . . . and quite possibly will keep your bird from becoming an obituary notice in the very near future.

ADEQUATE CHARGERS . . . WHERE ARE THEY?

All indications are that most BIG Bird lovers have paid attention to the constant preaching about using 1000 mah, or bigger, airborne packs. The problem now is that few of these guys have a charger equal to the task of charging their heavy duty batteries, and many are crashing because they're trying to bring these packs up to snuff in 16 hours using their standard 50 mah chargers. *It can't be done!* Your 500 mah pack would be fully charged, but your 1000 or 1200 mah pack would be doing good to have a third of its potential restored.

Right now, I know of nothing commercially available that has more than a 120 mah output . . . which means that all the 1800 mah and 2000 mah packs out there are getting shortchanged, or that a lot of you guys are having to charge for long and impractical hours. Why haven't we seen variable chargers with a 200 mah output? It certainly can't be beyond our technology . . . or perhaps the people capable of making this kind of charger feel that there's no real market, and sales would be too limited. How about it, Ace, L.R. Taylor, Royal, RAM, or anyone else . . . can't you give us what we need? There are one helluva lot of us now, and we do have buying power.

HOW I SPENT MY SUMMER VACATION

Trying to track down some elusive vibration, that's how!

Even before I helped install, align, and balance turbines and generators for Pratt & Whitney, I knew it was important to mount engines properly. After doing the balancing act for P&W for seven years, I've become an absolute believer that there shouldn't be any compromise when installing and balancing engines and props. And that's why I shudder every time I read or hear about washers being used for adjusting thrust angles. That's no way to treat any engine! Shimming with washers is the best way I know to guarantee poor running, excessive vibration, and distortion. That engine must be solidly mounted or it, the airframe, or the radio will be short lived.

Which leads me to the shaking problem I had with my Magnum four-stroker. At first I thought I'd sloughed off on my prop balancing . . . and then I figured that either the plug or the fuel was at fault. From there I went directly to the engine, and blamed it for the shaking. However, I finally got some smarts, and realized that the nylon mount (it was the only thing left to blame) was terribly sympathetic to certain harmonics . . . which were amplified because the longer-than-normal four-cycle mount trying to support a heavier-than-normal (over half a pound more) engine.

As usual, once the problem was identified, the solution was easy; I discarded the nylon mount in favor of John Tatone's aluminum beauty . . . and was treated to a classic illustration of cause and effect. Tatone's brightly polished, cast aluminum mount (it's drilled and tapped, also) virtually eliminated the vibration in one fell swoop . . . or is it one *swell foop?* Anyhoooo, the message here is to persevere, and through the process of elimination, you, too, can become a great troubleshooter.

CUTE

That was my first impression of Ikon Northwest's *Porterfield Flyabout* as I pulled into the RAM's flying field parking lot. Emil Neely was having a most enjoyable time sorting out his prototype four-stroke design, so I stayed in the van for a while and watched the grown man play.

As Neely's competent thumbs put the *Flyabout* through all the maneuvers, I realized that we usually reserve "cute" for small and/or dainty things or people. But as I eyeballed this black and orange bird doin' her thing, it was apparent that she was a cutie . . . all 10 pounds and 80 inches of her. This particular Porterfield design looks like it might have been a model first, long before anyone even thought of scaling her up into a man-carrying version.

The Enya .90 four-stroke Emil used for power didn't have to work too hard. Even though it was brand new, running rich on two-cycle glow fuel, and under propped with a 15-6, the Enya started

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easily and ran well (in spite of all that excess oil . . . yuk). Because of the rush to get in some test flights before the rains came, we didn't have time to try other props, but I'm quite sure that a 16-6 or a 17-6 would have been a better match.

Mr. Neely knew I wanted desperately to try out his new birdie, but chose to ignore my plight . . . till I started to drool all over his Mode II elbows. Realizing there was no escape (I drool good, and, for a 250 pounder, I'm quick and nimble when I have to be), he passed the transmitter to me in self-defense . . . and became an observer for the next 15 minutes.

No wonder he'd been smiling from ear to ear; the plane was a delight to fly. Ground handling was good, and after thumbing in a tad of downthrust (I like to fly with just a hint of backpressure), she felt like an old friend. Some aileron differential would have helped the rolls a bit, but as this was only her second flight, I stopped nit-picking and enjoyed myself. Emil scaled down the airfoil that's done so well on his Monocoupe 90A (this plane only has a 12-inch chord), and this somewhat high-entry, flat-bottomed 'foil worked the same king of magic for the *Flyabout*.

Ikon Northwest hopes to have the Porterfield *Flyabout* ready by the beginning of '84. And just to whet your four-stroke appetite, the airplane-happy Mr. Neely has already got an 80-inch Corben *Super Ace* framed up. It should be available not too long after the Porterfield hits the market.

WHY DIDN'T I THINK OF THAT?

Back in the November "BIG Birds," I pointed out a very real hazard connected with P.K.'s new Super Starter . . . that even though the engine might be absolutely dead, anyone turning the prop clockwise was gonna wind up that spring and get one helluva boo-boo. There doesn't seem to be any way to disable the SS when the engine is dormant, but Jim Webb, San Antonio, Texas, came up with a great idea for warning folks about the hazard.

"You mentioned about the inherent danger of the spring starter in your November column, and I started doing a little brainstorming. As a result, my better half will shortly be sewing together a pair of prop blade covers, much like what you'd see on real props at the local airfield. My covers will have at least 1/2-inch thick foam sandwiched between the covering material . . . and in BIG red letters will read NO *on one blade, and* FLIP *on the other blade. If some dummy of reading age regards this as enticement, well . . . what can you do? If some dear little rascal below reading age grabs the prop, the blow should be cushioned enough not to be so damaging. What do you think?"*

Well, Jim, I think it's a step in the right direction, but we still can't shirk the responsibility that goes with having the SS installed. Either isolate your planes, or tie the kids up . . . or have an alert safety man there at all times . . . or (E) all of the above, because no matter how careful parents are, some tyke is gonna get away for a moment or two . . . and that's all it takes.

Of course, all this precaution probably won't preclude some of our BIG Bird brethren from doing the dumb deed on themselves, but BIG red letters on a contrasting white or yellow background should stand out and get the message across. Say, this might be something that can be mass produced by one of you clever people out there, along with chocks, pitot covers, windshield/canopy covers and . . . if you make me an offer I can't refuse, I may give the okay to also market Schnuerle Ported Windsocks. First come, first served!

TIP OF THE MONTH

"When locating the crash site, remember that a dog is just a dog, except when he's facing you . . . and then he's *Mr. Dog.*"

Al Alman, 605 168th Street, East, Box 95, Spanaway, WA 98387. Keep those cards, letters, and pix coming, guys. We're all involved, and that's good. Happy New Year!

FLYING SAFETY IS NO ACCIDENT!!•

Workbench. . . . *Continued from page 6*

flight to determine what should be done next to improve performance. As is proper, one adjustment/one flight, was the basic procedure . . . a little more rudder, a little less clay on the nose, a longer motor (braided to take up slack), moving off the runway to launch from the grass. . . "The air's too stable over the blacktop," says Jack, "launch it over the grass where it's starting to lift."

The three of us got so absorbed in this project that Jack and I missed the R/C part of the contest completely, our biggest kick being the flight that broke one minute. Bill only placed about fifth or sixth in the event, but in terms of fun, we, the committee, came way out on TOP. You can imagine the total cost of this model, and how long it took Bill to put it together.

Where am I going with this bit? Well, it's easy to sit here and make suggestions, as long as you don't have to be concerned with trying to carry them out. But I've seen cycles occur before, and I just wonder if it isn't about time for some existing . . . or maybe new kit manufacturers to pick up the marketing techniques used by outfits such as Comet and Megow back in the thirties, and scatter stick-n-tissue model kits into all sorts of outlets; department stores, hardware stores, drug stores, toy stores, even gas stations (a lot of them are now selling snack foods), and for that matter . . . just think if every 7-11 had a bunch of kits on one shelf . . . have you ever noticed how many kids stop by the local 7-11 on their bicycles to pick up some miscellaneous stuff? The proprietor hangs up the best model built from the available kits each week, the builder winning a gift certificate for buying 7-11 merchandise. . .

Get your feet off the barrel, Henry, the lady wants a pound of them coffee beans! •

MOVING?

Change of address notices must be received one month before date of issue that new address takes effect. For prompt service, old label must be included. Post office will not forward copies unless you pay extra postage. Duplicate issues cannot be sent.
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