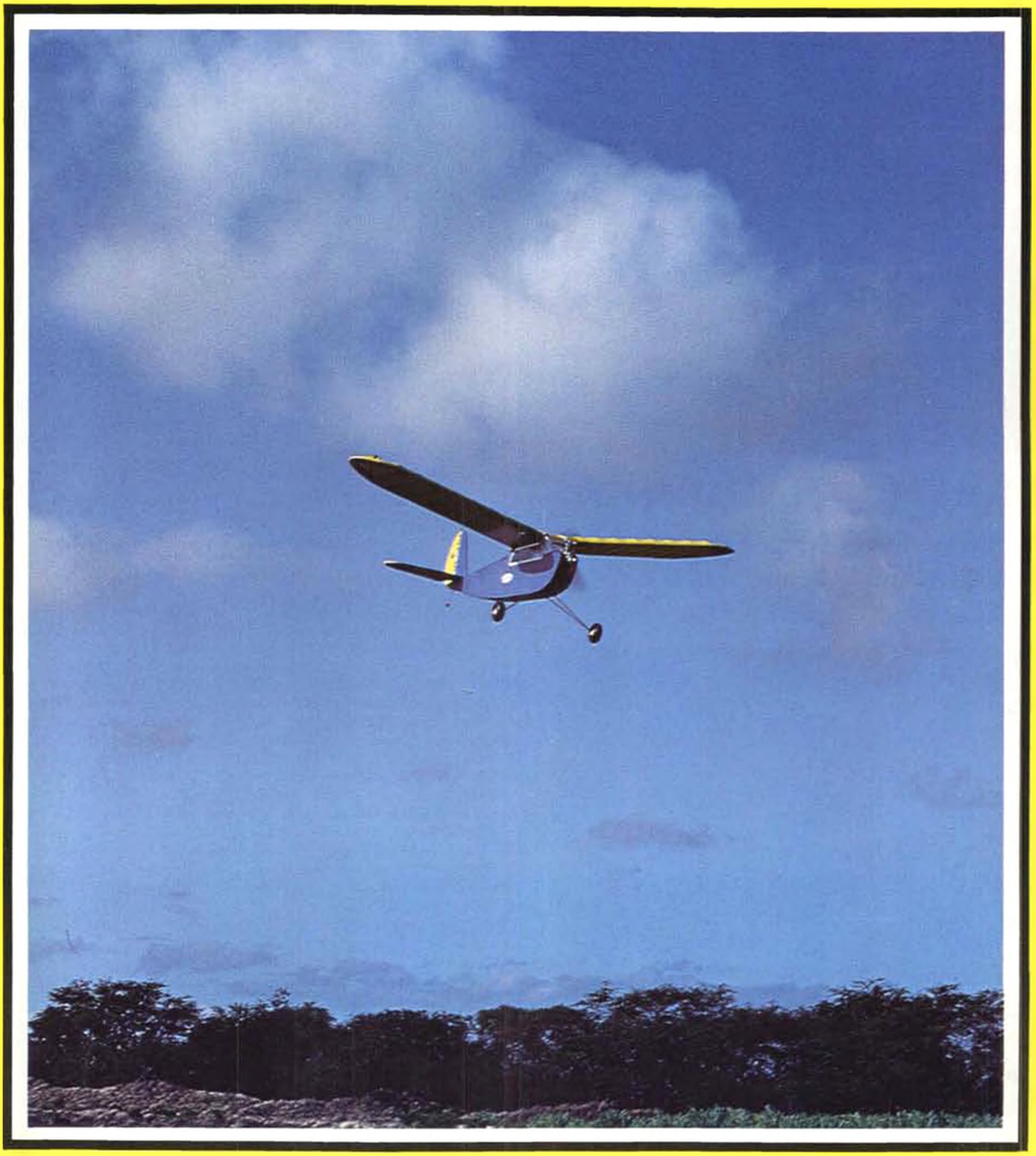
MODEL BUILDER

ICD 08545

OCTOBER 1983

$2.50

volume 13, number 141



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- Beehive R/C Model Aircraft's KLOUD KING in review
- Stan Wilson's semi-scale CITABRIA for electric power
- Walt Musciano's RUSSIAN MISSILE BOAT, Part 2
- Davey System's POW'RTOW and RETRIEVER in review
- Leon Shulman's Nats winning WEDGY old timer

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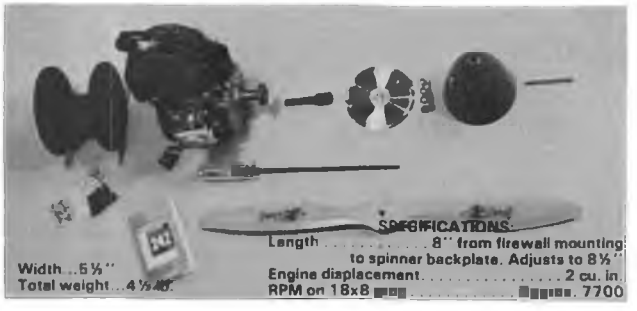

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Left to right: Tom Veloskey, Johny Davis, Jay Ward, Don Muddiman, and Tom Veloskey, Jr.

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COVER: Al Tuttle's *Kloud King* Old Timer (R/C assist) makes a majestic fly-by for the camera. The model is manufactured by Beehive R/C Model Aircraft Co., P.O. Box 744, Layton, Utah, and is featured this month as a "Products In Use", written, of course, by Mr. Tuttle. See page 27 for the whole story!

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The Clipped Wing Cub Story

The classic Piper J-3 Cub has been America's favorite light plane for over 40 years. More than 20,000 of them were built between 1937 and 1947. By 1980, the number of airworthy J-3's in the U.S. had declined to approximately 3,600. One of these bears registration N32629 and is recognized worldwide as Hazel Sig's Clipped Wing Cub.

N32629 was manufactured in 1941 at the Piper factory in Lock Haven, Pennsylvania as a standard Piper J-3C-65 Cub, serial number 5498. Not much is known about the first years of its life. Hazel purchased the J-3 in January of 1968 and flew it in its standard form through the spring and summer of that year.

In the fall, the Cub was flown to the Ottumwa, Iowa airport to be recovered. The airplane was completely disassembled and rebuilt. For better aerobatic performance 40" was clipped off the inboard (cabin) end of both the right and left wing panels. This was done in accordance with an FAA approved modification developed by aerobatic pilot Earl Reed in 1953 for his Cub. (Several other J-3 Cubs have also been modified using Earl's plans.) All the steel tubing framework in Hazel's Cub was sandblasted and primed with zinc chromate. The wooden parts were repaired or replaced as needed. The Continental A65-8F engine was completely overhauled and modified to produce 75 h.p. instead of its normal 65.

Hazel, assisted by her husband Glen and plant superintendent Maxey Hester, then trucked the Cub parts back to Montezuma and put them in a basement room of the SIG factory. Over the winter months they recovered the airplane with grade "A" cotton and developed a striking blue and white sunburst paint scheme.

In the spring of 1969, the Cub was trucked back to Ottumwa for reassembly. New cowlings, windshield, side windows, tailwheel, and metal prop were installed. Added touches like chromed cylinder heads and top shrouds, streamlined bungee covers, a personalized Cub bear emblem, radio gear, and a new interior made Hazel's Clipped Wing Cub one of a kind. The first test flight was made at the Ottumwa airport in the late summer of 1969 with Hazel at the controls. The Cub performed beautifully right from the start.

Over the years, Hazel graduated to snappier and more powerful aircraft for her aerobatic flying, but none ever captured the attention and affections of modelers worldwide, as has the blue and white Cub. It's a very special example of America's favorite airplane!

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OKLAHOMA CITY
Campbell's Hobby House
3500 N MacArthur
TULSA
House of Hobbies
6914 E Admiral Place
OREGON
CORVALLIS
Trump's (DJ's) Hobbies
1875 N W 9th St
PH 503-753-7540
PENNSYLVANIA
ARDMORE
Ardmore Hobbies
19 A Woodside Ave
BATH
Trach R/C Hobbies
RD 1 Box 262
BATH
Dick Wetzel s Hobbies
514 E Main St
PH 215 837 6681
LANCASTER
The Flight Box
Lancaster Shopping Center
LANSDALE
Penn Valley Hobby Ctr
837 W Main St
LEHIGHTON
Carpenter Hobbies
Rt 5 Box 337
MILTON
Kreb's Newsland
83 Broadway
PITTSBURGH
Bill & Walt s Hobby Shop
116 Smithfield St
READING
Iron Horse Hobby House
60 South 6th St
READING
Ott's Hobbies
536 N 10th St
SLATINGTON
Valley Hobbies & Collectibles
102 Main Street
WARMINSTER
J.C. R/C Hobbies
13 York Road
PH 215-672 5200
WAYNE
Hyatt Hobby House
Gateway Shopping Center
PH 215-687 2244
SOUTH CAROLINA
GREENVILLE
The Great Escape
Pleasantburg Shopping Center
1426 Laurens Road
PH 803 235 8320 or 242-4229
MYRTLE BEACH
Ed s Hobby Shop
Hwy 501 Next to Fanjoy
Sign Company
TENNESSEE
KNOXVILLE
Tennessee Model Hobbies
Rt 62 Oak Ridge Hwy 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 Kenniston Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Airline
DENTON
Yellowbird Hobbies
117 W Hickory
EL PASO
Hal's Hobby Shop
No 57 Sunrise Center
PH 915 755-1914
FORT WORTH
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
SULPHUR SPRINGS
Miller's Hobbies
624 Bellview St
UTAH
OREM
Miniature Aircraft Prod
811 W 400 N

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
KENT
Kent Hobby
1313 W Meeker
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
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
Cella- Dweller Hobby, Ltd
1354 Main St
PH 589-2037
WINNIPEG MANITOBA
Czech'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
ARVIDA, QUEBEC
LeModele Radurl Enr
118 Mathieu CP 341
PH 418 548-2136
HAUTERIVE QUEBEC
Le Centre Du Modelisme
Allarc 1223 Lepirat
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
Burmes
137 Pyrmont Street
PH (02) 692-0694
BRISBANE QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA S. AMERICA
Aeromodelos los Britannia Ltda
Apartado (P O Box) 52530
Bogot s 2 Columbia
PH 212 7309
NEW ZEALAND
INVERCARGILL
Model Shop
55 Arcade 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

• On June 4 of this year, an R/C scale model of a Bellanca Skyrocket was flown on a non-stop round trip totaling 454 miles. The flight started at St. Augustine Airport, Florida, and the turnaround point was the intersection of I-95 and Route 267. Total flight time was 8 hours, 13 minutes, producing an average flight speed of 56-3/4 mph.

The model was designed and built by Roland Spicer, of St. Augustine, Florida, and it was piloted on this flight by Rhett Radford and Dean McInnis. The Kawasaki 3.15 powered aircraft weighed 50 pounds dry, and on the distance flight, carried 6-1/2 gallons per fuel, consisting of Amoco white gas and Chevron two-cycle oil. It still had 1-1/8 gallons of fuel at completion of the flight. A Zinger 24 x 10 prop, CB wheels, and Coverite were the other known commercial products used.

Although an FAI record application was filed by Burnis Fields, Jacksonville, Florida hobby shop owner and CD, in behalf of Roland Spicer, it had to be turned down by AMA, as the aircraft was too heavy to qualify in any FAI, or for that matter, AMA model category. In fact, with the 6-1/2 gallons of fuel on board, the aircraft weighed 92-1/4 pounds at takeoff, considerably over the AMA Safety Code limit of 55 pounds!

As for the unofficial status of the "record" flight, we can feel for Roland Spicer, who by the way, is a mere youngster of 77 years. During our IMS Trade Show in Pasadena, California, several years ago, Tony Nacarrato also set an unofficial record, flying an electric powered (lithium cells) R/C model in the exhibition hall, over the heads of spectators, for 1-1/2 hours! Same problem . . . no official AMA or FAI category! However, Tony did not file, as he already knew there was no category. All categories are defined in the rulebooks. Oh yes, Tony's aircraft met the IMS specified wing loading limit of 1-1/2 ounces per square foot.

While we readily acknowledge the difficulties overcome in accomplishing the feat performed by Roland and his pilots, we cannot get any positive feelings about the potential hazards generated by this kind of flight attempt. Was the FAA contacted for permission to make the flight? Assuming the pilots were transported in a ground vehicle, did they have permission to exceed the maximum posted speed limit in order to keep up with the aircraft? Was there, perhaps, a police escort to clear the way for the ground vehicle? What did the aircraft have to fly over (traffic, pedestrians, populated areas) not normally protected by insurance, AMA or otherwise? Remember, it was carrying as much as 40 pounds of gasoline.

AMA's letter to Spicer explaining that the flight could not be officially recognized for a record also commented that, "The flight deserves recognition and it will no doubt receive much favorable publicity. (It) is an outstanding accomplishment."

While we go along with AMA's recognition of the flight as being an outstanding accomplishment, we cannot understand why those involved were not admonished for the illegal and potentially hazardous conditions involved. When the news media will unknowingly believe and publish the story that a 50-pound lawnmower could be flown by radio control, rather than the model it really was, imagine what they could have done with this one, had anything gone wrong. Model aircrafting would have received another, and possibly fatal black eye from the public when in actuality the Bellanca was not a model in any legal sense of the word, except that it did not carry a living human being (nor does any RPV or radio guided missile).

The primary motivation for establishing a national model airplane organization some 46 years ago was based on the fact that the nation was about to follow one state's decision (Connecticut) to limit the flying of gas powered model airplanes to licensed full-size aircraft pilots! Before our national government threatens to step into the picture again, our modeling organization had better show that it can handle its responsibilities with regard to the safety of the public. Favorable publicity for this "record" flight could encourage others less skilled than the Spicer group to try even more hazardous feats using larger and heavier aircraft which the public would mistakenly identify as being model airplanes.

LOOKING FOR

Harry Utgard, N-8720 Vikholmen, Norway, is looking for a fellow reader of **Model Builder** who may have detailed information on the Boeing XL15 Scout. This was a rather strange looking pod-and-boom fuselage aircraft, single engine, with outrigger flaps and an inverted flat-bottom stabilizer. Twin rudders hung down from the stab, making the whole tail section appear to be upside down.

Continued on page 100

ADVICE FOR THE PROPWORN
—By JAKE

Dear Jake:

My wife is constantly complaining that my hobby takes up all my time, stinks up the house, and makes a terrible mess. I just bought a brand new Phoenix 8 kit and a Webra Special 61. She says it's the last straw, and that if I build it, she's leaving me. Now I must choose between my hobby and my wife. What should I do?

—Breaking Up in the Bronx

Dear Breaking Up:

I'm not sure. How much did you pay for the kit?

—Jake

★ ★ ★

Dear Jake:

I don't understand the distinction between elevator and stabilizer and between rudder and fin. Which is which?

—Confused in Compton

Continued on page 94

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.

Indoor Model Supply's newest P-nut, the Alco Sport Home Built.

• Bryon Originals has just announced the release of its much improved, custom F-16 kit designed for the patented Byro-Jet ducted fan and the popular Rhom Air retracts.

Numerous additions and improvements are featured in this superb kit. Both the General Dynamics markings and a decal/template package to reproduce the new Air Force Thunderbird markings are now available. An improved flying stab control horn and linkage system provides added stabilizer rigidity. Convenient plug-in wings now include Bryon Originals' exclusive Plug-In Aileron Linkage system for added ease of wing removal and assembly. And last, but certainly not least, a truly functional, realistic, optional adapter kit for Rhom retracts is also available. It makes installing the Rhom belly mount system quick and easy.

All fuselages are now lighter and of superior quality. They also now include factory installed mounting bases that are predrilled and ready to accept the specially designed retract adapter kit for the Rhom Air retracts. A unique gravity feed fuel system that ensures a positive and uninterrupted fuel flow to the carburetor has also been added. As with all Byron Originals kits, the new F-16 is indeed a complete kit. The factory direct price for the kit is $264.98 plus $10.50 shipping. The optional retract adapter kit sells for $65.95 plus $2.50 shipping. For additional information, or to place an order, contact Bryon Originals, P.O. Box 279, Ida Grove, IA 51445, or call (712) 364-3165.

★ ★ ★

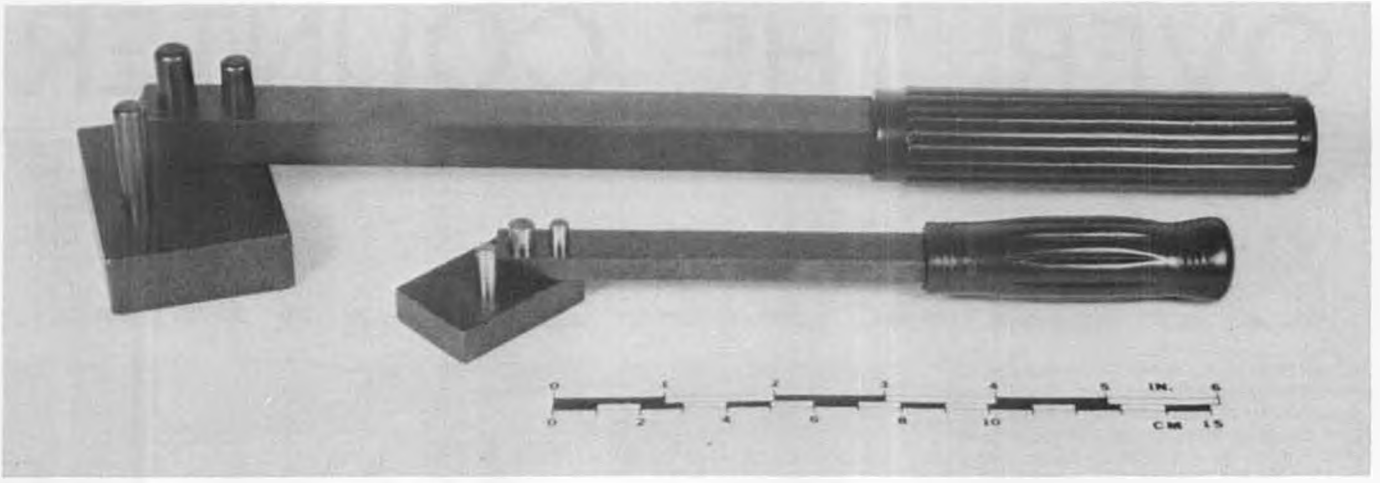
K&S Engineering now has a smaller version of the popular K&S Mighty Wire Bender. The Mini Wire Bender is just the right tool for bending music wire of 1/8-inch diameter or less. It is also capable of bending square and rectangular metal rods of 1/8-inch measurement. The Mini Wire Bender will make any wire bending job so easy that you will actually look forward to using this tool time and time again.

The Mini Wire Bender is designed to be clamped in a bench vice for easiest use, although with smaller wires, a pair of channel lock pliers will do the trick. The base has two incredibly strong metal pegs sticking out of its surface, one of which serves as a pivot axle for the handle. The third peg sticks out of the handle's upper surface and pulls the wire around the pivot peg insuring a bend that won't over stress the metal and cause cracking or failure. If you have a need to bend music wire, or any other kind of metal, you need this tool on your workbench. The most common application for this tool will undoubtedly be for forming landing gear, but it will also come in very handy for making clamps, hangers, brackets, and a host of other gadgets.

For those who need a wire bender for music wire or metal that's a little heavier than 1/8-inch, we recommend the Mighty Wire Bender (pictured with the Mini Wire Bender). With this larger version you can bend up to 1/4-inch metals. You definitely will need a bench vice for these operations as mere pliers will be ineffective.

Both tools are plated with a protec-

Byron Originals' much improved F-16 for Byro-Jet ducted fan.



K&S Mighty Wire Bender and Mini Wire Bender (above) and in use (left).

tive, black oxidized finish for long life and appearance. Both tools come with handle grips for ease of use. Look for these two great wire benders at your local hobby shop or order directly from K&S Engineering, 6917 West 59th St., Chicago, IL 60638, (312) 586-8503. Send 25 cents for price list and catalog. The Mini Wire Bender retails for $7.95.

★ ★ ★

Just when you thought Indoor Model Supply had released its last Peanut model for the season, out comes the new 1929 Alco Sport Home Built. This nifty little paper and stick model is the latest "Miniature Scale Aircraft" in a list of Peanuts from Lew Gitlow. The kit features two plastic cylinders and a drilled and turned nose block that is part of the engine.

All IMS kits in the "Miniature Aircraft" series have a historical data sheet with fine detail and three-views, and a history of the aircraft. Send for the new IMS catalog and include $1.50 (includes postage and handling). Kits sell for $6.95, and the book *Peanut Power* is available for $8.95 (postage FREE in the USA). Indoor Model Supply, Box C, Garberville, CA 95440-0039, (707) 923-3500.

★ ★ ★

News from California Model Imports has reached us that the new Kioritz Echo 20 GP is now available to the general public. The Echo 20 GP is a 21.2 cc (1.29 ci) displacement engine recommended for those airplanes too large for a standard .90 and yet not large enough for one of the extremely large engines now available.

The Kioritz Echo 20 is rated at 1.2 hp, and 9000 rpm maximum. It is a magneto equipped ignition engine, designed to run on an inexpensive gas and oil mixture, economically consuming only one-half ounce per minute at full throttle. It mounts directly to the firewall, eliminating the need for heavy expensive motor mounts, and facilitating thrust adjustments. Overall dimensions of the Echo 20 CP are 111 x 194 x 186 mm (4.3 x 7.6 x 7.3 in.) including muffler and air cleaner.

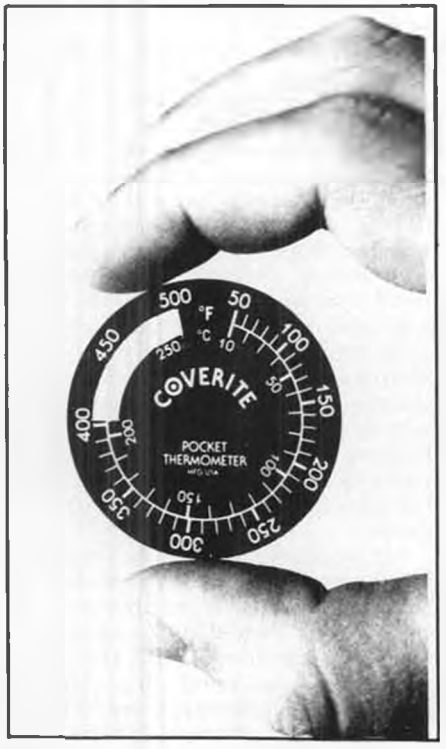
The Echo 20 comes complete, ready to run, with a factory adjusted Walbro diaphram-type carburetor with built-in choke and air cleaner: one of the most reliable and easily adjusted carbs ever made for this class of engine. Included also is an NGK resistor-type spark plug, long lasting, readily available and inexpensively replaced; plug lead; muffler; fuel mix pitcher; flywheel cover; plug and Allen wrenches; and operator's manual.

If your present .90 powered aircraft is underpowered, or if you are contemplating building one in that size range or slightly larger, 12 pounds or heavier, the Kioritz Echo 20 GP is the engine that will put sparkle into its flight.

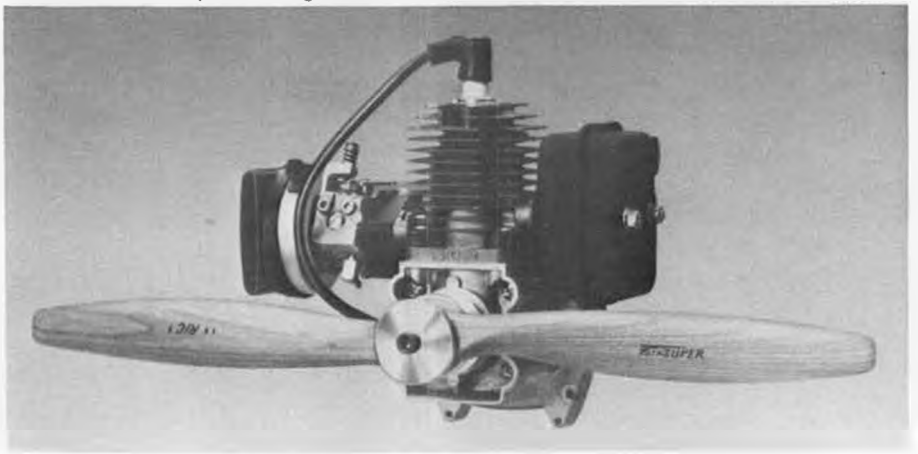
The Echo 20 is priced at $159.95; dealer inquiries are welcome and promptly answered. Contact California Model Imports, P.O. Box 1695, Garden Grove, CA 92642; telephone (714) 638-3372.

★ ★ ★

Coverite announces the introduction



Coverite Pocket Thermometer for irons.



California Model Imports Kioritz Echo 20 GP (1.29 ci).

Prather Products Fast Cat Tunnel.

of a much needed tool to help eliminate common covering problems, such as bubbles and sagging. They have developed a Pocket Thermometer that you put on the bottom of your tack iron for an instant reading of the exact temperature. This enables the modeler to adjust his iron so it works properly on wood or foam, film or fabric. A handy chart comes with the Pocket Thermometer and it shows the correct temperature range for every type of covering.

In many cases iron temperatures vary as much as 60°, without the modeler knowing about it. As a result, sections of the covering do not receive the correct amount of heat, resulting in bubbles and sags. With the Pocket Thermometer, this hidden problem is corrected.

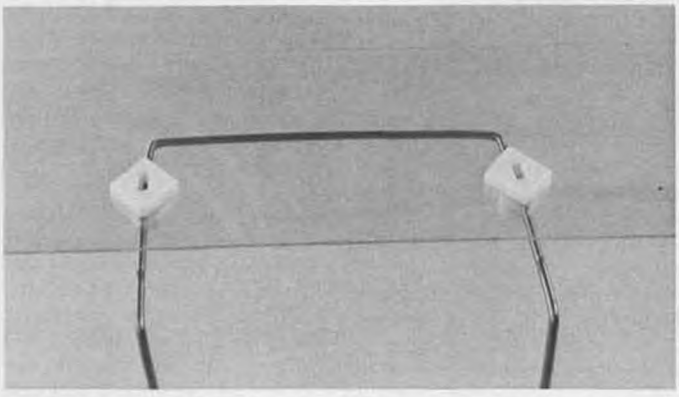
In addition, Pocket Thermometer is recommended for use on all engine to make sure you do not accidentally damage the engine by overheating due to a "too-lean" run. Many modelers rely on the sound of their engine . . . somewhat of a gamble; many others simply hope and pray the engine is set up properly. With a few seconds use of Pocket Thermometer, you will know positively that the engine is not running too hot.

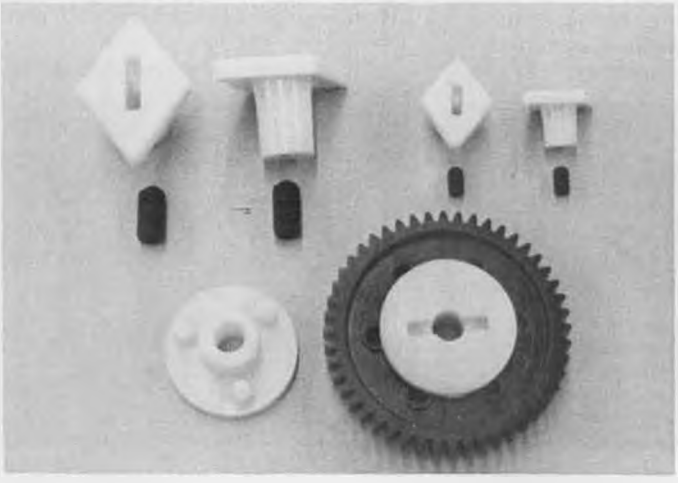
Pocket Thermometer comes with a

Continued on page 92

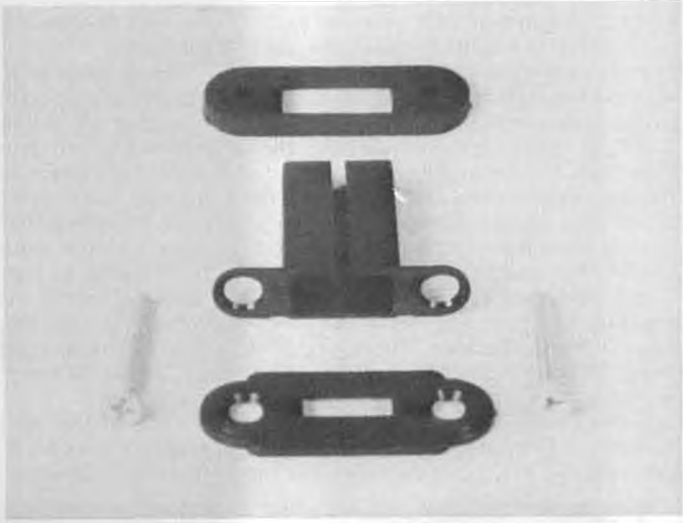
St. Croix of Park Falls PR pamphlet.

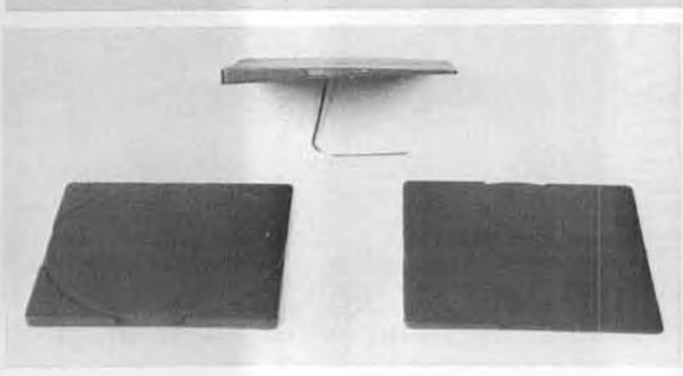
Pushrod Exits from Ernst Mfg.





Kimbrough Products Wingties (above) and Gear Adaptors for Tamiya.

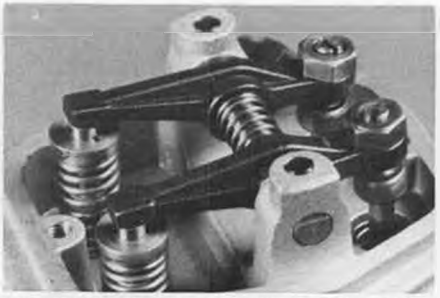




Ernst Mfg. Futaba Charge Receptacle (above) and Thrust Plates.

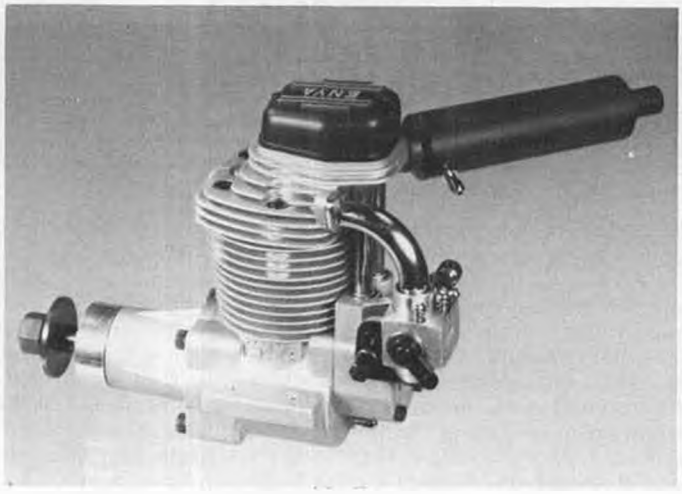
FUEL LINES

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



Rockers mean only one thing . . . 4-CYCLE! Enya's new .90 4C engine without cover.

This rear view shows two nice extras: needle valve extension (right); carb choke extension (left). You got cowls? NO PROBLEM!



Side view of the new Enya .90 Four-Cycle engine shows what it looks like with the muffler installed. Q-U-I-E-T . . .

• Have you ever been *fascinated* by an engine? Perhaps . . . but then again you may only have been *interested* in an engine or engines. Be that as it may, there is no question that, in recent years, the four-cycle engine has become quite popular amongst modelers. Ten years ago, who would have thought we'd be flying chain saw or lawn mower engines? A lot of modelers now do just that. However, it's nice to observe that several model engine manufacturers have reacted in a commendable way by producing sone four-cyclers designed specifically for modelers.

I recently had the pleasure of receiving one of these engines through the aegis of **Model Builder**. The engine? The Enya .90 Four-cycle. OK guys, let's let it all hang out. This is one of the finest engines I have ever had the pleasure of handling. Considering that I'm quite pro two-cycle, that's a considerable bit. Here's how things went upon opening the box. . .

It sure looks great. In fact, I seriously don't think anyone could ask for more in the way of appearance. Chalk up a "10" for looks.

There were other things in the box, notably tools peculiar to the engine. I'm referring to millimeter wrenches, etc. Although our nation has officially endorsed the change to the metric system, it's still quite difficult to obtain metric tools at the local hardware store. Frankly, there's almost nothing more frustrating than trying to use American Standard tools on metric nuts and bolts, or vice versa. Fortunately, Enya has foreseen this dilema and provided a mini tool kit . . . all you'll need to service the four-cycle .90.

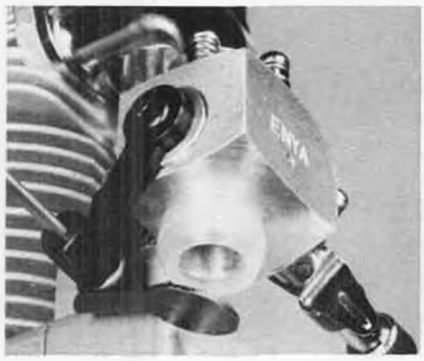
One of the accompanying photographs shows what I mean. As an engine tinkerer, this was a big plus to me. Chalk up another "10."

Next, I perused those other accompanying papers. You know, the ones you read when all else fails. They're called: *Instructions*. They were excellent as far as the general subjects of starting, break-in, etc. They were, unquestionably, outstanding with respect to peculiarities of four-cycle engines which require special attention to such things as valve clearances, timing, etc. Another "10."

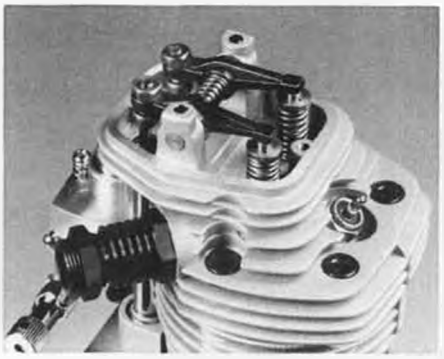
Of course, there was a parts list. Nice, but the great part was that they included a superb exploded view drawing of the engine. Without reservation, this is the best model engine part drawing that I have ever seen. Again a very *solid* "10."

At this point I was beginning to be suspicious. Don't ask me why. It was just a "wondering" about how so many

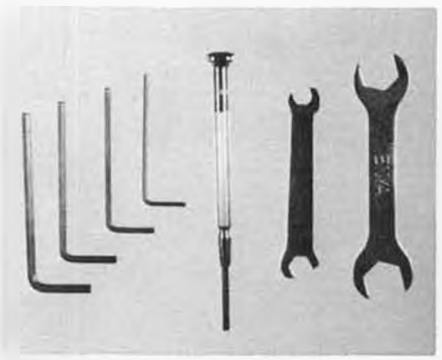
Continued on page 78



Here is a close-up shot of the carburetor and choke. Simple, effective, very nice.



Another view of the top of the Enya shows the exhaust adapter and lock nut. Any angle!



Thorough to the max, Enya provides a nice metric tool kit with each engine.

PART TWO

Russian OSA Missile Boats

By WALT MUSCIANO . . . Part Two of the Russian missile boat story delves into the actual construction of this fascinating, and little known, weapons system. This one features a live-firing missile, guys. It's HOT!

• The full-size Russian missile boat can launch up to four Styx cruise missiles from combined hangar/launchers. These Soviet boats revolutionized the existing concepts of naval warfare when an Egyptian operated missile boat sank an Israeli destoyer in just a few minutes with four direct hits. The Osa Fast Patrol Boats-Missile are the advanced state-of-the-art, and are the David in the "David and Goliath" contests envisioned by today's naval strategists. The Osa boat and Styx missile story appeared in last month's **Model Builder**, complete with rare photographs of the Osa boats and Styx missiles. Our model is built to a scale of 1/4-inch equals one foot.

Launch! Walt's OSA missile boat fires a model Styx cruise missile across the pond at an unknown target. It follows a low trajectory.

CONTROLS

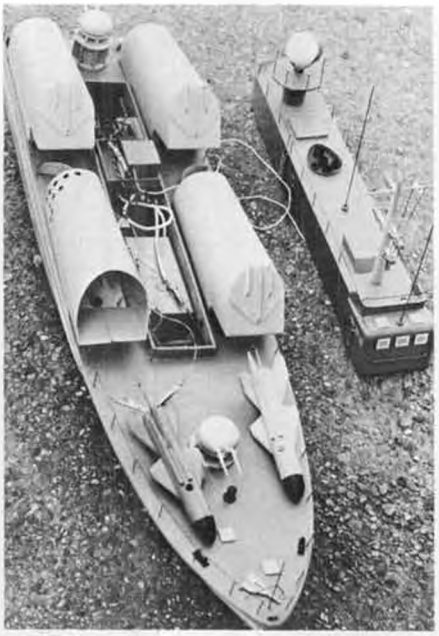
R/C operation of our model includes steering, proportional speed control (plus astern operation), and the launching of a model Styx missile from one or more of the hangar/launchers. This requires three channels; however, the missile launching is entirely optional, but it's great fun and creates a sensation every time you fire.

CONSTRUCTION

Construction of the Osa model is the epitome of simplicity using plywood and sheet balsa throughout with sheet aluminum and oak tag card for the hangars. There are no compound curves, and no planking is required. Power is by electric motor, so fuel proof liquids in construction are not mandatory. All metals in contact with water should be brass. Our model follows the full-size boat with three propellers and two rudders. If desired, one large motor driving a single propeller with one rudder can be successfully installed for simplicity.

The deck is the first component to be assembled. The wood grain should run athwartship (across from one side of the boat to the other) for added strength. Notice that the center of the deck is an open rectangle which runs between the coaming and deckhouse sides and the deck pieces should be assembled around this opening. It is necessary to edge join several 3/16-inch balsa sheets together to form the proper hull length because of the athwartship grain. When the cement is dry, check the deck outline and correct as necessary. Using sandpaper, smooth the joined sheeting, and note the rounded overhanging deck edge. Also notice that the deck tapers down toward the bow in the profile view. Lay the deck on a flat surface, cut the 1/8 x 3/4-inch balsa coaming strips to shape, and cement them to the inside edge of the deck opening and to the full depth (thickness) of the deck. Use plenty of cement and be sure to cement the coaming pieces to each other at the corners. The coaming is necessary to hold the superstructure in place as well as to prevent water from entering the hull should water inadvertently flow

Walt Musciano shows the two Styx missile versions used with the OSA boat . . . one is scale and the other is functional! See plans for both.



The OSA's innards are revealed when the superstructure is removed. Note antenna lead to hatch, large battery, and receiver.

over the bow and onto the deck.

The keel is 1/4-inch thick. It is made from two layers of 1/8-inch plywood. Cut enough pieces to make two keels, and assemble the keel pieces along the splice lines. Each keel half is assembled separately and not joined until the shaft tube is installed. Notice the extra cutting away of the keel for the universal joint and the motor. Of course the shape of this cut-out depends upon the equipment used. Cut the center propeller shaft tube to length. Very carefully mark the location of the shaft tube on both keel assemblies. Be certain the marks are on the inner surface of the keel halves. Using a routing tool, such as an X-acto, cut a groove into each keel half for the shaft tube. Cut a little at a time, placing the tube into the groove periodically to check the fit. When the keel halves can touch with the tube in place, the keels should be well cemented or epoxied to each other with the tube between them in its proper position. Be sure to apply plenty of adhesive to the tube installation as well. Place weights on the joined keel halves until the epoxy adhesive is thoroughly hardened.

The hull structure begins by cutting bulkheads "A" through "K" and the 1/8-inch chine pieces to shape. Note the grain direction. Although the plans show only one-half of the bulkheads, they should be cut in one piece from side to side. Of course, due to the limited balsa width, and the fact that the grain should run athwartship, a horizontal seam near the keel is necessary where the pieces must be edge-joined. Mark off the bulkhead locations on the assembled keel, then place the bulkheads on the plans, inverted, holding in place with pins driven diagonally through the bulkheads and into the workboard. Carefully place the keel into the bulkhead notches and check the alignment of all bulkheads. Apply plenty of cement to the bulkhead/keel joints and, when dry, recement all joints.

While these are drying, the chine pieces can be assembled at the splice lines and cemented into the bulkhead notches. Recement when the first application is dry. Using a sandpaper block, trim the chine flush with the bulkheads in preparation for the hull covering. Check all joints and recement as necessary.

The hull covering material is 1/8-inch sheet balsa. Note the grain direction which adds strength and facilitates the slight bending in the bow areas.

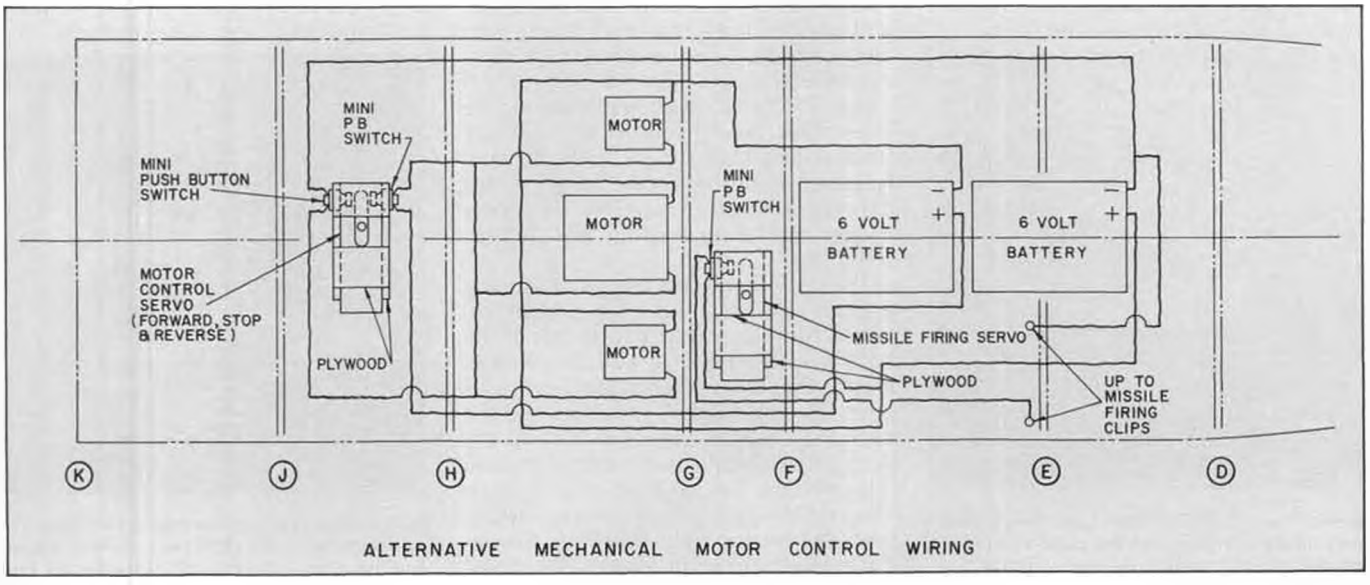
The bottom covering is applied first with the hull structure inverted. The only fitting required at this time is to bevel each piece of 1/8-inch sheet balsa to fit the keel as the sections illustrate. Begin covering the bottom amidships around bulkheads "E" and "F". Apply plenty of cement to the keel, chine, and bulkhead, then quickly press the first covering piece firmly in place, holding with straight pins until dry. The second piece should be the identical counterpart for the other side of the hull. Covering should progress forward and

The local pond can be a real gas if there are some ducks to race. When the OSA is armed, other R/C boaters will keep their distance!

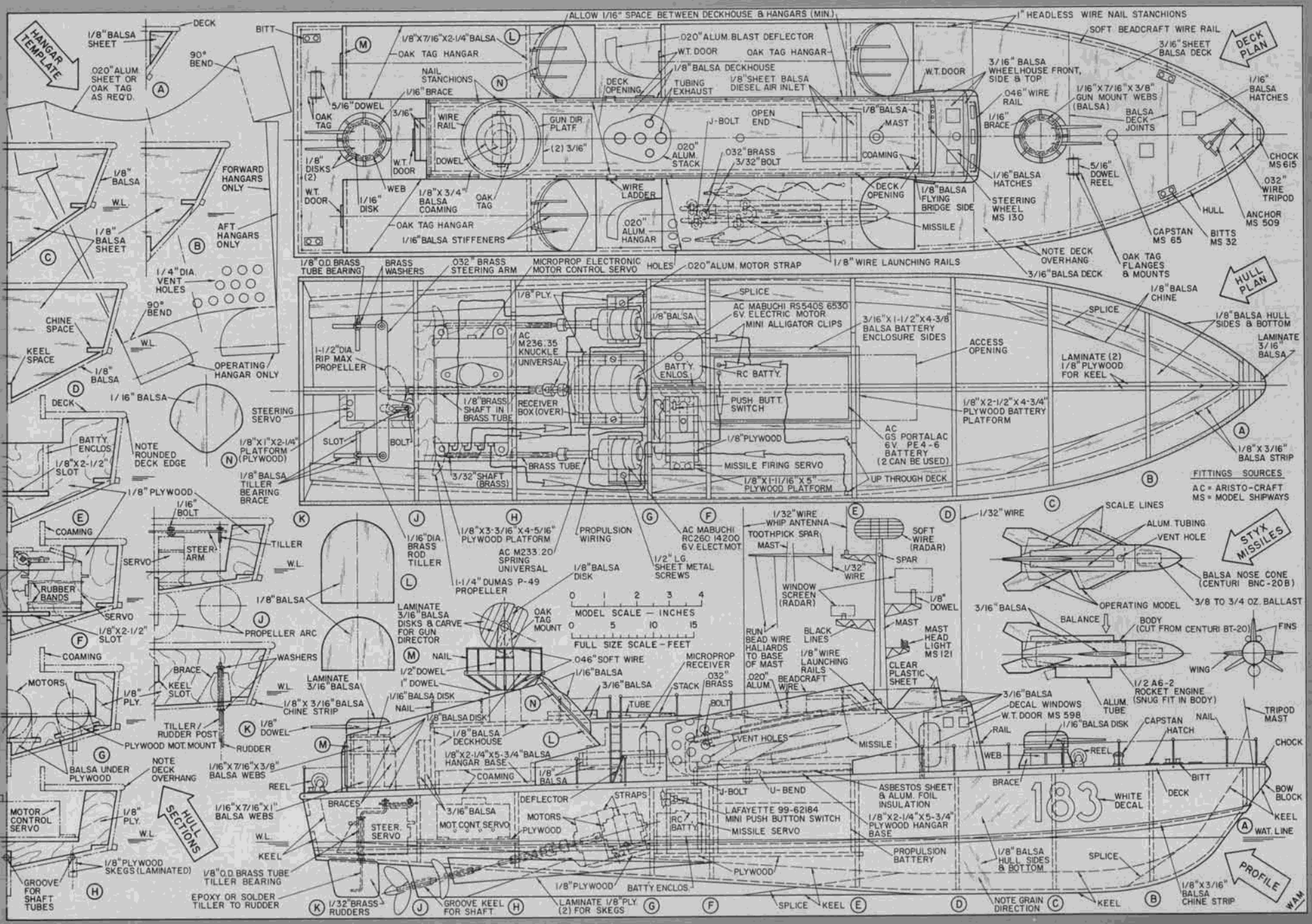
aft from the center pieces, on both sides of the hull, to prevent a possible bending or warping of the structure. Be sure to cement every adjoining piece to the previous covering piece as well as to the structure. All seams must be well cemented. When the entire bottom is covered, the edge of the covering at the chine should be sandpapered flush with the sides of the bulkheads to give the side covering a good surface for cementing.

The 1/8-inch sheet balsa hull side covering pieces are installed similarly to the bottom pieces starting at the middle of the hull and progressing fore and aft. Each piece should be cut at the proper angle so the edge of each covering piece rests evenly on the work board as it is cemented to the inverted hull. The edge at the chine should be cut slightly oversize for trimming after the cement

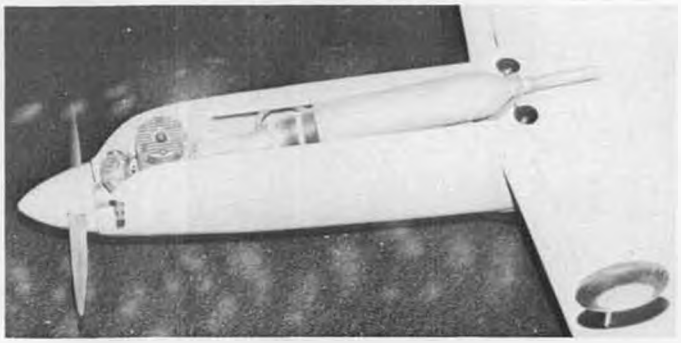
Continued on page 74



ALTERNATIVE MECHANICAL MOTOR CONTROL WIRING


HANGAR TEMPLATE
DECK PLAN
HULL PLAN
HULL SECTIONS
PROFILE
STYX MISSILES
ALLOW 1/16" SPACE BETWEEN DECKHOUSE & HANGARS (MIN.)
1" HEADLESS WIRE NAIL STANCHIONS
SOFT BEADCRAFT WIRE RAIL
3/16" SHEET BALSA DECK
1/16" BALSA HATCHES
CHOCK MS 615
.032" WIRE TRIPOD
ANCHOR MS 509
BITTS MS 32
CAPSTAN MS 65
HULL
5/16" DOWEL REEL
BALSA DECK JOINTS
1/16"X7/16"X3/8" GUN MOUNT WEBS (BALSA)
.046" WIRE RAIL
3/16" BALSA WHEELHOUSE FRONT, SIDE & TOP
W.T. DOOR
1/8" BALSA DECKHOUSE
1/8" SHEET BALSA DIESEL AIR INLET
.020" ALUM. BLAST DEFLECTOR
OAK TAG HANGAR
1/8"X7/16"X2-1/4" BALSA
NAIL STANCHIONS
1/16" BRACE
5/16" DOWEL
OAK TAG
3/16"
WIRE RAIL
GUN DIR. PLATF.
(2) 3/16"
DECK OPENING
TUBING EXHAUST
J-BOLT
OPEN END
1/8" BALSA MAST
COAMING
.020" ALUM. STACK
.032" BRASS 3/32" BOLT
1/8" DISKS (2)
W.T. DOOR
WEB
1/16" DISK
1/8"X3/4" BALSA COAMING
OAK TAG
OAK TAG HANGAR
1/16" BALSA STIFFENERS
WIRE LADDER
.020" ALUM. HANGAR
DECK OPENING
1/8" BALSA FLYING BRIDGE SIDE
MISSILE
STEERING WHEEL MS 130
1/16" BALSA HATCHES
1/8" WIRE LAUNCHING RAILS
NOTE DECK OVERHANG
3/16" BALSA DECK
OAK TAG FLANGES & MOUNTS
1/8" O.D. BRASS TUBE BEARING
BRASS WASHERS
.032" BRASS STEERING ARM
MICROPROP ELECTRONIC MOTOR CONTROL SERVO
HOLES
.020" ALUM. MOTOR STRAP
1/8" PLY.
SPLICE
1/8" BALSA
AC MABUCHI RS540S 6530 6V. ELECTRIC MOTOR
MINI ALLIGATOR CLIPS
3/16"X1-1/2"X4-3/8" BALSA BATTERY ENCLOSURE SIDES
ACCESS OPENING
1/8" BALSA CHINE
1/8" BALSA HULL SIDES & BOTTOM
LAMINATE 3/16" BALSA
LAMINATE (2) 1/8" PLYWOOD FOR KEEL
AC M236.35 KNUCKLE UNIVERSAL
1-1/2" DIA. RIP MAX PROPELLER
BATTY. ENLOS.
RC BATTY.
PUSH BUTT SWITCH
1/8"X2-1/2"X4-3/8" PLYWOOD BATTERY PLATFORM
1/8" BRASS SHAFT IN BRASS TUBE
RECEIVER BOX (OVER)
1/8" PLYWOOD
AC GS PORTALAC 6V. PE4-6 BATTERY (2 CAN BE USED)
BRASS TUBE
MISSILE FIRING SERVO
3/32" SHAFT (BRASS)
1/8"X1-11/16"X5" PLYWOOD PLATFORM
UP THROUGH DECK
1/8"X3/16" BALSA STRIP
FITTINGS SOURCES
AC = ARISTO-CRAFT
MS = MODEL SHIPWAYS
FORWARD HANGARS ONLY
AFT HANGARS ONLY
OPERATING HANGAR ONLY
1/8" BALSA SHEET
.020" ALUM. SHEET OR OAK TAG AS REQ'D.
DECK
BITT
90° BEND
W.L.
1/4" DIA. VENT HOLES
CHINE SPACE
KEEL SPACE
1/16" BALSA
STEERING SERVO
BATTY. ENCLOS.
NOTE ROUNDED DECK EDGE
1/8"X2-1/2" SLOT
1/8"X1"X2-1/4" PLATFORM (PLYWOOD)
1/8" BALSA TILLER BEARING BRACE
1/8" PLYWOOD
1/16" BOLT
COAMING
TILLER
SERVO
STEER. ARM
RUBBER BANDS
1/8"X2-1/2" SLOT
PROPELLER ARC
WASHERS
BRACE
KEEL SLOT
MOTORS
1/8" PLY.
1/8"X3/16" BALSA CHINE STRIP
TILLER/RUDDER POST
PLYWOOD MOT. MOUNT
RUDDER
1/8" DOWEL
BALSA UNDER PLYWOOD
NOTE DECK OVERHANG
1/16"X7/16"X3/8" BALSA WEBS
REEL
MOTOR CONTROL SERVO
1/16"X7/16"X1" BALSA WEBS
1/8" PLYWOOD SKEGS (LAMINATED)
GROOVE FOR SHAFT TUBES
1/8" O.D. BRASS TUBE TILLER BEARING
EPOXY OR SOLDER TILLER TO RUDDER
1/32" BRASS RUDDERS
GROOVE KEEL FOR SHAFT
LAMINATE 1/8" PLY (2) FOR SKEGS
1/8"X3-3/16"X4-5/16" PLYWOOD PLATFORM
PROPULSION WIRING
AC MABUCHI RC260 14200 6V. ELECT. MOT.
1/2" LG. SHEET METAL SCREWS
1/16" DIA. BRASS ROD TILLER
AC M233.20 SPRING UNIVERSAL
1-1/4" DUMAS P-49 PROPELLER
1/8" BALSA DISK
LAMINATE 3/16" BALSA DISKS & CARVE FOR GUN DIRECTOR
OAK TAG MOUNT
MODEL SCALE — INCHES
0 1 2 3 4
0 5 10 15
FULL SIZE SCALE — FEET
NAIL
1/2" DOWEL
1" DOWEL
1/16" BALSA DISK
1/8" BALSA DISK
1/8" BALSA DECKHOUSE
1/8"X2-1/4"X5-3/4" BALSA HANGAR BASE
COAMING
1/8" BALSA
.046" SOFT WIRE
1/16" BALSA
3/16" BALSA
TUBE
STACK
.032" BRASS
BOLT
MICROPROP RECEIVER
VENT HOLES
MISSILE
DEFLECTOR
STRAPS
MOTORS
PLYWOOD
3/16" BALSA MOT. CONT. SERVO
STEER. SERVO
RC BATTY.
J-BOLT
U-BEND
LAFAYETTE 99-62184 MINI PUSH BUTTON SWITCH
MISSILE SERVO
ASBESTOS SHEET & ALUM. FOIL INSULATION
1/8"X2-1/4"X5-3/4" PLYWOOD HANGAR BASE
PROPULSION BATTERY
1/8" PLYWOOD
BATTY. ENCLOS.
SPLICE
KEEL
NOTE GRAIN DIRECTION
1/8"X3/16" BALSA CHINE STRIP
1/32" WIRE WHIP ANTENNA
TOOTHPICK SPAR
MAST
SOFT WIRE (RADAR)
SPAR
1/32" WIRE
WINDOW SCREEN (RADAR)
1/8" DOWEL
MAST
MAST HEAD LIGHT MS 121
RUN BEAD WIRE HALIARDS TO BASE OF MAST
BLACK LINES
1/8" WIRE LAUNCHING RAILS
.020" ALUM.
BEADCRAFT WIRE
CLEAR PLASTIC SHEET
3/16" BALSA DECAL WINDOWS
W.T. DOOR MS 598
1/16" BALSA DISK
RAIL
WEB
REEL
ALUM. TUBE
CAPSTAN
HATCH
NAIL
TRIPOD MAST
CHOCK
BITT
DECK
BRACE
183
WHITE DECAL
BOW BLOCK
KEEL
WAT. LINE
1/8" BALSA HULL SIDES & BOTTOM
SPLICE
1/8"X3/16" BALSA CHINE STRIP
SCALE LINES
ALUM. TUBING
VENT HOLE
BALSA NOSE CONE (CENTURI BNC-20B)
3/8 TO 3/4 OZ. BALLAST
OPERATING MODEL
3/16" BALSA
BALANCE
BODY (CUT FROM CENTURI BT-20)
FINS
WING
1/2 A6-2 ROCKET ENGINE (SNUG FIT IN BODY)
WAM

Dick Hanson with Tiporare at local "small' flying site in Utah. You couldn't hit a tree here if you wanted to . . . nothin' for miles!



Here's a very lightweight engine and pipe set-up on a Cheap Trick. Engine is an OS VS .46. See text for some build-it-light tips.

Pattern Flying

By DICK HANSON

• How do you build a really light pattern bird? This is the most asked question I have received to date. I have tried to answer this question several times in the past, but the basics seem to require some clarification. I guess I should start by noting that the "average" pattern model used in AMA pattern by the "average" pattern enthusiast who flies Sportsman or Advanced class has approximately 700 square inches and weighs 8-1/2 to 9 pounds dry.

I know *you* are not average, but never the less that's an average profile. A light pattern model of 700 square inches weighs 7-1/2 pounds. Depending on your tastes, this may seem a trifle light, but it is a good combination for most people and many winners agree.

Oddly enough, the new FAI maneuvers for 1984 may require even lighter models. What we mean is the wing loadings may have to be lighter yet for the best performance.

How do you make the things lighter? Ribs, tissue, nitrate dope, etc., come to mind, but they are really not necessary.

Let's take a model from front to rear and look at the possibilities for weight reduction.

1) **The spinner.** The spinner can be eliminated, or a light plastic one can be used on slow turning (12,000 rpm) engines.

2) **The engine.** By using a lightweight tuned muffler, you can save about six ounces.

3) **The motor mount.** Use hardwood rails with an aluminum plate on top.

4) **The nose gear.** We suggest a tail-dragger set-up, so this is out . . . so is a thick firewall if the engine is on rails.

5) **The tank.** Not much to worry about here.

6) **The tank floor.** Design it out.

7) **Wing mount.** Use 1/4-inch plywood front and rear.

8) **Servo mounting.** Use 1/8-inch ply plate, no rails.

9) **Pushrods**. Use .047 wire in .062 I.D. plastic tubes.

10) **Tail surfaces.** Use 1/16 balsa over foam, cover with Monokote.

11) **Linkage hookups.** Use 4/40 threaded wire for elevator, rudder, and aileron horns. Bury these in discs or 1/2-inch dowel sunk into the foam surfaces.

12) **Wing.** Use 1/16 balsa over foam, cover with Monokote. Attach balsa to foam using epoxy.

13) **Landing gear.** Retract or fixed . . . the weight is really not much different if you analyze it. If the gear is mounted in the wing, the structure must be able to stand the same loads of landing. Therefore you will probably use the same amount of wood to *properly* locate either fixed or retract gear.

14) **Wheels.** They will be the same for either set-up so the weight stays the same.

15) **Gear wire.** You use less on a retract gear but the retract has a mechanism which weighs a couple of ounces. The net difference is very slight.

16) The **retract gear** weighs about two ounces including the mounting plate, so this is the real weight gain.

17) The **bare fuselage** can be made of glass and or wood for under 18 ounces on the typical .60 size model, so it is not impossible to arrive at a finished model weighing six pounds, give or take a little.

Is all of this really necessary? I think so, but I like a plane that can be accelerated or slowed down just by using the throttle. I don't like sleek models which drop like rocks when the nose is pointed down.

Another design trick which will result in less weight is the thin wing. Don't be afraid that it will make the model difficult to fly; that problem is directly related to a heavy model with a thin wing. Try flying a good Quickie 500 to satisfy yourself that thin wings can be very groovy.

I hope this has answered most questions about light construction. If you have any specific ones, let me know.

For the last month, we have been working on a two-cycle .60, and trying to get it to run well and produce power at about 12,000 rpm. Frankly, we are not convinced that it's the way to go because no matter how good the propeller is, the .60 two-cycle engine just won't produce high power at this rpm.

The loss is probably about 50 percent of what these engines are capable of producing, and that's just plain too darned much! We had hoped to have tests done on the new 1.2 O.S. four-cycle engine, but the engines were shipped later than planned.

The O.S. gear box engine still produces more usable thrust than anything we have seen or heard of at this point in time.

Depending on the size of the model, which can vary from 900 square inches to 1200 square inches, you can use the 1.4 gear box or the 1.9 gear box engine. A 14-8 prop on the 1.4 engine and a 16-10 on the 1.9 model seem to work well. The best 14-8 we have seen is the D.W. design; the best 16-10 we have tried is the Top Flite. The key design features to look for are stiffness and a thin tip.

You really have to rework for best performance, but I don't recommend this unless you fully accept the fact that propeller reworking can produce a dangerous propeller which may crack or break with serious results. This means you can be hurt or others can be hurt as a result of your attempts at whittling.

The reason I keep mentioning these engines is the fact that they produce the maximum *power* available from a box-stock engine that fits the AMA rules for a pattern engine. Note that I didn't say B.H.P. or net torque or any other specific ratings. They simply turn the most efficient propellers at the fastest speeds. The new four-cycle engines have not been tested against either model O.S., but I will be very surprised if they meet or exceed the power produced by these little buggers.

Next month we will have all the latest poop on the O.S. four-stroker and the S.T. 2000 . . . Till then . . . KEEP ON TRYING. •

Electric Powered AEROBATICS

By LARRY JOLLY . . . Do you seriously doubt that there could be such an animal as an *electric* pattern plane? You'd better read this!

• Clyde Der Taubin and his buddies in Texas won't be in this article because I'm very serious about this subject, and I hope you will read it and think about its message. This article deals with what I would consider a major breakthrough in radio controlled electric sport aerobatic models. The model in the spotlight is one of Pilot's new EZ-build series, the Chipmunk.

The Chipmunk is as close to an ARF as you can get. It is constructed from a hard plastic foam laminate with internal wood structure. There is no finishing. The scale color scheme is moulded on the hard outside shell. One merely joins the wing halves, bonds the tail surfaces in place, installs the motor and servos, and he is ready to go play Art Scholl with a model that really looks like the Chipmunk. The vital statistics are: wing span, 52 inches; wing area, 411 square inches; length, 38 inches; dry weight, 42 ounces; and it is designed to be operated with four channels of radio control and a .25-.28 glow or .40 four-stroke engine.

While in Toledo, I saw this new model and asked Paul Bender if I might have a shot at electrifying his new Chipmunk. Paul agreed, and I hurried back to California to assemble my new toy. Before I started assembly, I had to decide what electric motor I would put in the plane. I decided against the Keller or Geist 40 because they simply required too many cells to achieve the power level I would require. I went to see Astro Flight's Bob Boucher, and we bench-tested his new cobalt Challenger 40. The Astro 40 achieves maximum power on 18 cells. I had decided that I would need at least a 9-5 propeller to motivate the Chipmunk.

Bob placed a 9-5 Rev-Up prop in place and cranked his power supply to 18 volts, "taching" the 40 showed us we had 12,000 rpm, and a rather disappointing 27-amp draw. Remember, when utilizing 1.2-amp cells, 72 divided by 27 yields under three minutes of flying time even with the prop unloading. I asked Bob to turn down the voltage until we had a draw of 20 amps, this would give me at least 3-1/2 minutes of flying. Sure enough, 16 cells gave me enough power to fly the Chipmunk at a current rate that would yield reasonable flight times.

Back to the shop with a Challenger 40 in hand, I was off and running. I modified the engine mount that came with the Chipmunk into a motor mount for the Challenger, and installed an Airtronics radio for control. Sixteen, 1.2-amp, yellow Sanyo cells easily fit into the Chipmunk's fuselage.

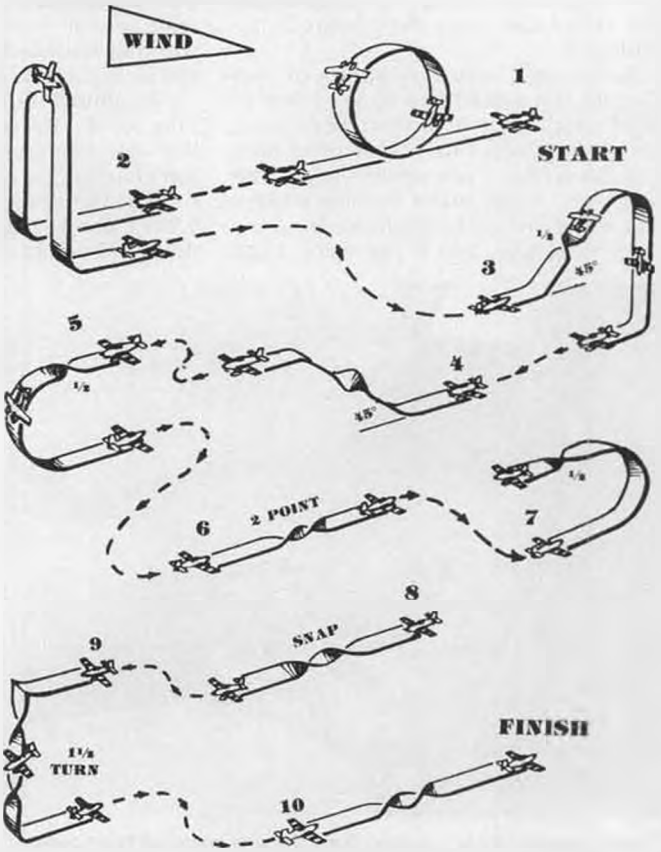
Before I go any further, a few words are in order. At no point in assembling the Chipmunk did I try to save weight. As the airplane is an ARF type, little weight could be saved in the airframe, I used large servos and a 450 mah airborne pack. This model was assembled exactly as an average R/C modeler would have assembled it. The Chipmunk, ready-to-fly with Astro 40 and 16 cells, is 96 ounces, or six pounds on the money. The Chipmunk wing loading is 33 ounces per square foot. The electric Chipmunk weighs a little over one pound more

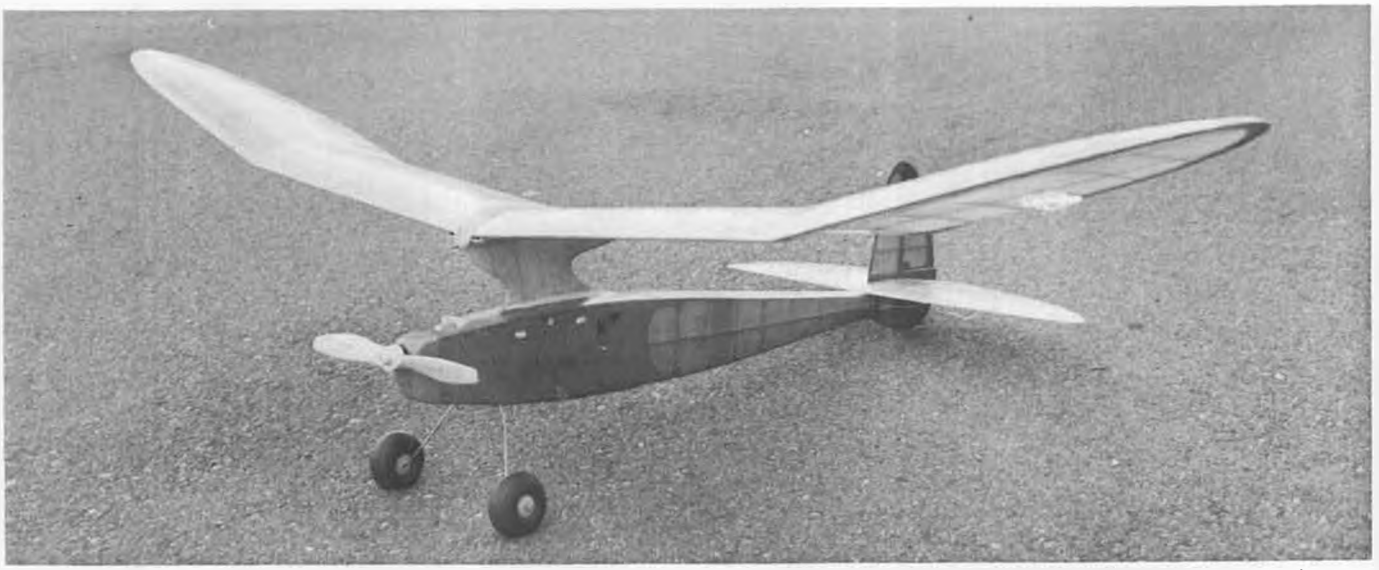
Continued on page 69

You can expect pattern performance from converted pattern planes when you use the Astro Cobalt 40 on 16, 1.2-amp Ni-Cd cells.

The Pilot Chipmunk holds everything you need right here: RX battery, receiver, aileron & elevator servos, power pack.

SPORTSMAN OPEN SEQUENCE





Are you looking for a perfect R/C trainer . . . electric style? Try the Leisure Playboy, it has hands-off stability, yet is the best thing going in electric Old Timer contests. As a trainer, if you get into trouble at altitude, just let go of the stick, the Playboy rights itself and flies straight.

ELECTRIC POWER

By MITCH POLING

• As the steady readers of this column know, I love seaplanes, both in model and full-scale form, and when Terry McGill sent me photos of his friend Jerry Holcomb's electric Widgeon, *I went bananas!* The photos were color prints, however, so I asked Terry to send the negatives so I could use the color negatives to do black and white prints. Terry was kind enough to do just that, and so we can enjoy the photos of the Widgeon.

By the way, if you have photos of your electric and would like to see them in print, don't hesitate to send them. Most people nowadays use color print film, and this is fine, if you would include the negatives. I can make excellent black and white prints of the photos from the color negatives, and if you want, I can send you some black and white photos back in return for your efforts. I do return the negatives promptly. I can make black and white prints from the color prints too, but it means I have to take a photo of a photo to get the black and white negative, so the quality isn't as good.

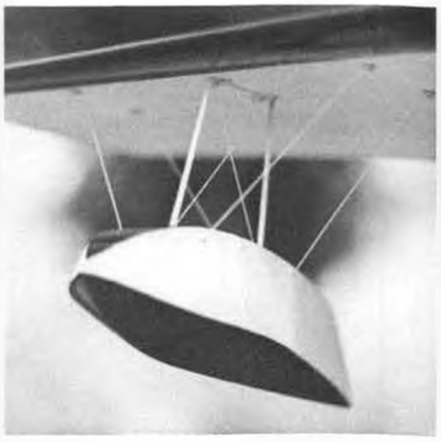
Anyhow, back to the plane . . . Jerry does immaculate work. (He is also a full-scale aircraft builder with an excellent working knowledge of composites and metal. Right now he is working full time on an almost-ultralight called the Ultra Imp, for the Recreational Pilot category that has been proposed to the FAA.) Jerry had to do a lot of experimenting to find the right prop for the Widgeon, the 5.25-3 props recommended for the Astro 035 would not allow the plane to ROW. Finally, after three years, he found that the Top Flite 6-4 cut to 5.25-4 did the job.

The plane is built entirely out of sheet balsa, including the wings. The motors are twin Astro 035s, with simple, on-off control, and run from a variety of packs, from a 900 mah SR pack, to a Kraft 600 mah pack, to a Sanyo sub-C pack, all six-cells. The Widgeon will ROW with all of these, and weighs 32 ounces with the Kraft pack. This is remarkably light.

I built a Widgeon three or four years back, in exactly the same way, all sheet, with twin Astro 020s, and was disappointed with an all-up weight of 39 ounces. My Widgeon will not ROW at that weight, and was marginal on hand launch. So, Jerry is doing something right!

Leonard Bedford pops the cover from the side-mounted flight pack of his Leisure Playboy. Note 360-bend in LG: keeps LG from bending.

Ah-cho-o-o! Leonard's Playboy didn't sneeze, what you are looking at is a Top Flite 11-7-1/2 prop, Astro belt drive, air scoop cooling.



Widgeon's tip floats are complete, even down to the wire bracing!

Jerry Holcomb's Grumman Widgeon model weighs only 32 ounces with a six-cell battery pack. All sheet construction is used. Astro 035s do the job of motivating with help from 5.25-4 props.

Leonard Bedford learned how to fly R/C with the Leisure Playboy, then taught his son, Ramsey. Both were "naturals" with the LP.

Jerry's Widgeon has a span of three feet, and a wing area of 250 square inches, so the wing loading is fairly high. This is not a beginner's plane as it flies pretty fast, but neither is the full-scale one!

The radio system consists of a Kraft receiver, 100 mah battery, and KPS 18 servos. Four channels handle all of the controls.

The finish is Silkspan over the sheet balsa, and K&B Superpoxy is used for the color.

Jerry found the drawings for the plane in the March 1967 issue of *American Modeler*. Unfortunately, this magazine has been out of business for many years. Paul Plecan had an excellent set of plans for the Widgeon in just this size. The plans are now available from John Pond Plans (order from the rubber power scale catalog).

One last item . . . Jerry made the motor cowls of fiberglass . . . they are a perfect job, and they sure make my model look crude! I am not sure what Jerry's color scheme is, mine was done in Coast Guard colors. Later, I found that Kurtzer, who is my instructor in float planes, has an immaculate, full-size Widgeon, and it is all white! That would be an easy one to do.

Probably the most-often-asked question in the letters I receive is "what plane do I start with." Usually, I have to qualify my answer, depending on the goals of the inquirer. There are a few planes, though, that I can and do recommend to everyone because they have outstanding qualities. One of these is the Olympic 650. I now have a new one to add to the list: the Leisure Electronics Playboy Senior.

The Leisure Playboy kit is not new, it has been out for a couple of years, and it has won every contest it has entered for old timers. It really startled me when I saw the Playboy's rate of climb this year at the Astro contest. At the time, I wrote that it made a joke out of the 90-second motor run, five-minute max rules. It does six or more minutes from a 1-1/2-minute motor run in still air.

However, I still thought of it as only a contest plane, it hadn't registered with me that it is also an excellent sport plane and a beginner's plane. This is a very rare combination. The only other planes I know of like that are the Olympic 650 and the Olympic II. Well, they'll have to make room for the Playboy!

What happened that changed my mind was Leonard (Larry) Bedford came up to me at the Boeing Hawks Electric

Continued on page 65

Leonard charges his flight packs from two motorcycle batteries which are kept in a wooden box to prevent acid spills. Leisure charger.

Jerry Holcomb molded these perfect fiberglass cowls for his electric Widgeon. Jerry also builds full-size aircraft.

The TOP TEN two-meter sailplane pilots as determined by this year's Two Meter World Cup held in Modesto, California, on June 11 & 12. See text for a complete description of planes.

Take note CIAM! *Organizer-supplied, identical winches WORK!!!* This is one of five winches which were used very successfully at the Two Meter World Cup. NO COMPLAINTS!

R/C SOARING

By BILL FORREY

PHOTOS BY THE AUTHOR

FOURTH ANNUAL TWO METER WORLD CUP

Looking back at this year's Two Meter World Cup (2MWC), I will have to conclude that it was the best of the four in most areas. Before I get into any of the details of what was flown by whom, or why I thought this 2MWC was the best, I would like to get a few words in about the site and the organizers.

The Modesto R/C Club of Modesto, California, in conjunction with the San Fernando Valley Silent Flyers of Los Angeles, California, were the two clubs responsible for the success of this event. Richard Hansen, the contest director, did a super job of running one of the most difficult contests there is to run. The Modesto R/C'ers made many sacrifices and went through a lot of work that I'm sure they didn't fully anticipate to make sure that this year's 2MWC was as classy as all of the previous ones. A big THANK YOU to all of the MRCC fliers who chose not to fly, but chose to help out instead. As a result, this 2MWC was one of the smoothest running 2MWC contests on record.

The contest was held in Modesto, of course, and for those who are wondering, "Where in the %#?! is Modesto?" I'll clue you in: Modesto is about 65 miles south of Sacramento, the capital of California. It is also the town where George Lucas, the creator of the *Star Wars* trilogy and the movie "American Graffiti", lived and grew up as a teenager. In fact, Modesto was the basis for the movie "American Graffiti," and Modesto celebrates that fact every year with a gigantic (people come from as far away as Canada), crazy, all-out "cruiser" parade featuring every kind of car imaginable with emphasis on the '50s variety. This year's "Graffiti Night" happened to be the Saturday night of the contest. It was wild! . . .I'm getting off the subject here, I know, but I just thought I'd throw that in for some local color.

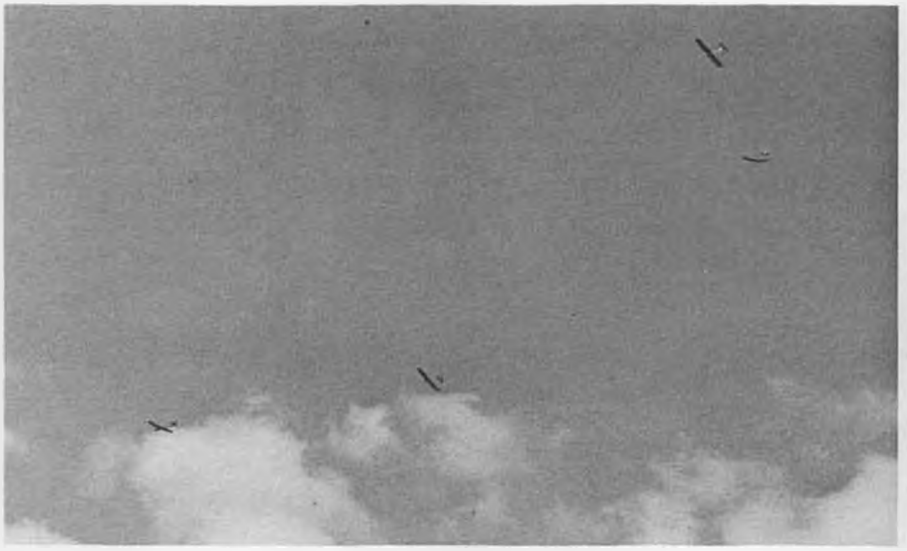
This year's 2MWC was different from previous World Cups in many ways, but the three that stick out in my mind like the Grand Tetons over the plains of Wyoming are the standardized winches, the time of year the contest was held (late spring vs. the dead of winter), and that all contestants were *required* to have back-up frequencies in the event of conflicts in that area.

The standardized winches were the most outstanding improvement noticed

Gary Ittner launches AMA Junior flier, Adam Peltz, into the blue. Adam is coming into his own as a competitive flier in multi-task.

Rich Spicer was the first to launch in the WC this year . . . and became the first crash statistic also. Plane is called Evolution.

Keith Kindrick pulls hard in final turn of his 10-lap distance task. If you finish the course, you had better do it quickly for best points.



Typical 2MWC scene. Those guys are racing each other and the clock. Weather conditions this year favored fast-paced action in the distance events. Exciting? YOU BET!

Ed Holder launches his Harrier. The plane was developed in the SBSS. E-374 thickened 1.5%.

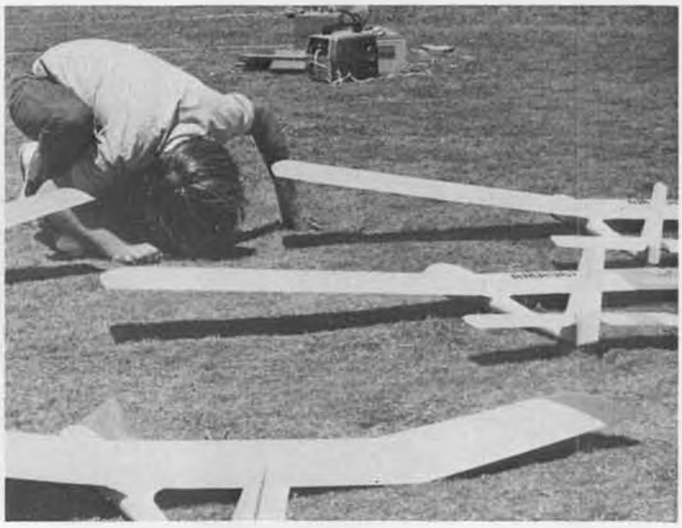
Mike Reagan heaves Larry Pettyjohn's Ospre. Model met its doom by hitting winch battery.

Fred China came from Canada to compete in this year's 2MWC. This is his second World Cup. The plane over his shoulders has: E-205 section, coupled rudder/ailerons, flaps, 17% stab area.

at the contest. NOBODY complained about them, there were only about four line breaks during the two day contest, they were strong enough to launch the heaviest two-meters, each winch had two, *brand-new*, deep-cycle marine batteries which were rotated to assure strong launches and equality of power, in short, they did the job they were supposed to do, and they did it flawlessly! A big *thank you* must go to Buddy Fox who constructed them, and the rest of the SFVSF group who donated the necessary funds. They were: Carl Goldberg, Ed Slobod, Dick Odle, Larry Pettyjohn, Mrs. Dicie Bower, Dick Peltz, Richard Hautzenroeder, and Knute Johnson. If you come to next year's 2MWC, you too will fly from these winches as they are being set aside just for future 2MWCs. HEY WORLD, **WAKE UP!** The concept of standardizing winches *WORKS!*

I thought that I would run photos of all five winches just to show you how identical they are, but decided against it for two reasons: firstly, five photos take up a lot of space that would be better use used for aircraft; secondly, except for

Don Edberg assembles his Solution on a tripod stand *a la* the Swiss Spartacus. Model is almost all fiberglass and foam. Smooth wings.

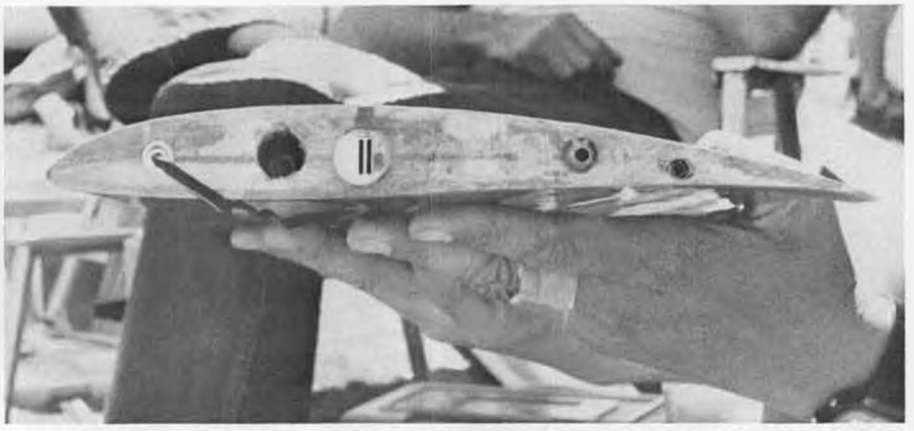


So, that's how they do it! Unidentified spectator checks out a thick winged model belonging to Dave Peltz (MB-303515).

Robert Regalado IDs Marion Crowder's Interceptor prior to unlimited distance task. E-193 section with higher camber mod. F/A/C-R/E.

Gary Ittner IDs Mike Reagan's Lyre Bird 2-m. Mike won the contest on the first day's flights: 3,000 points. MB-303515 section, R/E only.

Lee Hodgdon (SBSS) poses with his Harrier. Features: F/A/C-R/E, E-374 + 1.5% section.



Brian Chan's Heavy Solution used a molded fiberglass skinned wing with E-214 section. Front hole is for aileron leads, next hole is ballast tube, double-blade steel joiners, pin, F torque tube.

the donor tags on the front, you couldn't tell if I had printed the same negative five times! Yes, they were *that* identical!

The other two differences in this year's 2MWC probably had a negative effect on the number of contestants who entered the event. There were (I think) 55 people who sent in their entry forms of which four did not actually show up for the contest. Why were the entries down this year (by about 15 to 20)? Well, in previous 2MWCs there were no conflicting events taking place as most of the country was in its "building season" . . . mid-winter. This year there was one major event scheduled for the same time period: The Great Race in Joliet, Illinois. There were probably many other events (soaring and non-soaring) being planned by possible entrants from all over the U.S. and abroad which may have conflicted with the 2MWC . . . so who really knows? Maybe it's the economy?

Another possible contributing factor may have been the requirement for contestants to have back-up frequencies. I don't see how this would have stopped any of the "serious" fliers from attending . . . it really is an advantage for all concerned as it streamlines the running of the event (theoretically). Personally, I had to buy an extra Silver Seven receiver and transmitter module in order to comply with the new rule . . . perhaps others didn't want to bother?

Enough of this kind of reporting! The 51 contestants who came to this World Cup were richly rewarded with some of the best contest conditions I've ever seen for a multi-task event such as this one. Besides, it didn't *seem* like there were fewer fliers this year because there were probably three times the spectators!

DAY ONE

The contest began with a **bang** . . .

Winch victim. Thick winged aircraft had glue joint failure at joiner blade. Also, joiner ended abruptly, causing stress-riser.

Mid-air victim. Dick Harty no sooner finished his ten-lap course, turned around to land, then BANG! Didn't see it coming!

Base A action got intense in the last two rounds of the 2MWC. Keith Kindrick sights for himself and gets a much better turn than other guy.

Without prep time or working time, the 2MWC moves a lot faster than F3B. You'd better be ready to go when your name's called!

Last flight of the contest. Sometimes if the lift quits, 10-lap distance can be a battle of the quarter-laps. Here we see Pettyjohn about to pick up Mike Reagan's plane outside LZ.

The Fresno Soaring Society was represented by Marion Crowder and Robert Regalado who flew Interceptors, and Mike Stroup who flew his Vivace: F/A/R/E, E-193 section.

literally! Rich Spicer, flying his latest Evolution two-meter (see photo), was the first flier to launch in the first round . . . speed. His launch was a warning to all who were to follow: near the apex of his launch, Rich's wing folded with a *snap*, and his airplane streaked off minus one of its wing panels toward a house bordering the field. It hit the roof of the house and lodged its nose (up to the wing root) in the wooden shake roof. All was well with the owner who actually felt sorry for Rich losing his plane and wasn't too concerned with her roof. She actually came over to the field on Sunday and *cheered* for Rich from the sidelines! Incredible. There could have been a big scene, too, had she wanted to make one, as her next door neighbor was a local policeman . . . who witnessed the entire incident from outside his house . . . with *another* police officer!

The very next flier was Keith Finkenbiner with his Askant. Keith had the misfortune of spinning out on the ground at the end of his speed run . . . demolishing his plane. It appeared that this was going to be an interesting first round: two-for-two casualties!

Don Edberg was next with his all-fiberglass ship, the Solution. It featured the rather thin Eppler 182 airfoil and molded fiberglass skins (see photo). I didn't record his time as I was too busy with my own flight preparations (I was after Don), but I seem to remember that it was in the high 20s . . . very respectable.

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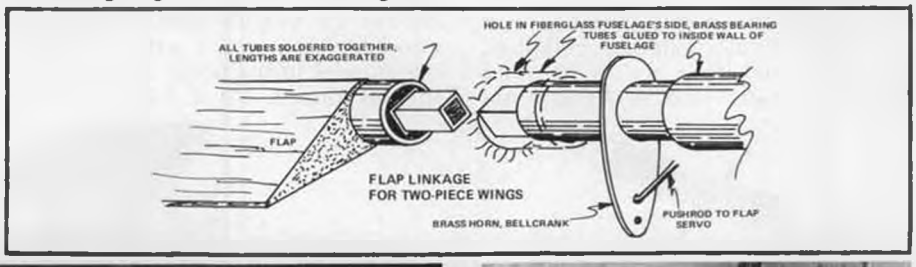


Two Meter World Cup trophies were displayed on a table on the second day . . . as usual . . . to get the troops into a more competitive spirit! The big-un is the perpetual *M.A.N.* World Cup.

Goodies and more goodies. A prize for everybody who competed. Radios, kits, more!

DSC ships its Pow'rtow in two separate boxes because of UPS weight limits. Small box contains winch motor, large one has Retriever.

Harry Middleton and Baron Mludek eagerly helped out with the assembly of the Pow'rtow which took all of about 15 minutes. Motor comes mounted to plate, you bolt plate to frame.

DAVEY SYSTEMS
POW'RTOW AND RETRIEVER

By BILL FORREY . . . Our R/C Soaring columnist journeys into the realm of product evaluation with his review of the Davey Systems Corp. Pow'rtow and Retriever. So you want all the whistles and bells?

• In the course of the testing and evaluation of the Davey Systems Corporation Pow'rtow winch and Retriever system, two questions were almost always asked by interested glider guiders right away. They were: "Does it work?" and, "How much does it cost?" It seems that most people were more interested in the *how* and the *how much* than they were in the fine points of what the individual components were that made up the system. I wish this review could be a simple as two easy answers: yes it works, and it costs X amount of dollars, but that would leave a score of other questions unanswered, and that is not the purpose of a product review.

Actually, this is a review of two separate products. It just so happens that they work very well together and are made by the same company. Very briefly, the Pow'rtow is a 12-volt, multi-feature winch with a low current drain, industrial motor. The Retriever is also a 12-volt device, and as its name tells you, it retrieves the winch line by means of a large, fiberglass-nylon, five-spoke BMX wheel used as a take-up drum. Both devices are well designed, functional, good-looking, come with complete operational instructions, and are reasonably priced. What follows in this review is a more detailed description of each and an evaluation of the performance of each.

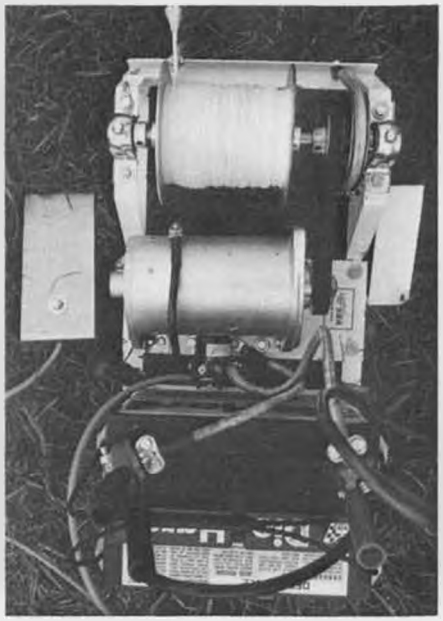
POW'RTOW WINCH

I'm going to describe this product to you as if we were both in my garage looking at the thing. Take a good look at the pictures of the Pow'rtow. As this article continues, you may wish to refer back to them, so fold over the corner of this page of the magazine to enable you to get back to this page easily.

Okay . . . the first thing you'll notice about the Pow'rtow is the elevated take-up drum. The dimensions of the drum are: width between flanges, four inches

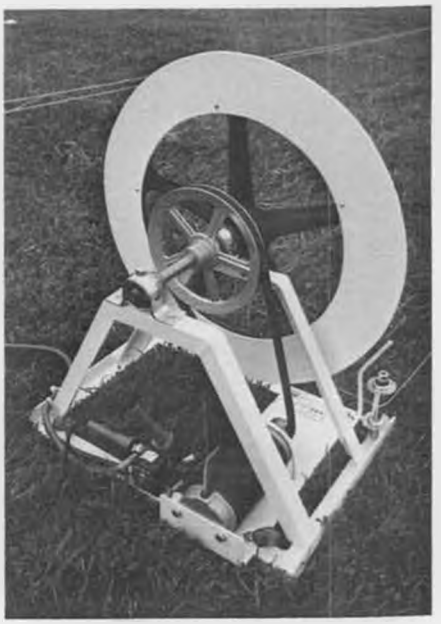
Typical launch with Pow'rtow and Retriever in place. Pilot controls winch during launch. Helper operates the Retriever.

Admittedly posed shot of Howard Doering shows how you would operate Retriever hand switch and Pow'rtow foot brake in retrieve.



Bird's eye view of Pow'rtow. Note single cable to motor, bearings on both sides of drum shaft.

Turnaround is elevated. Bicycle hub is used as pulley. Insert in ground like a shovel, easy!



Rear view of Retriever. Framework is light and strong. Hand switch is removable.

The Retriever may be used with other winches; it adds no noticeable drag to launch;high weeds need to be removed in front of Retriever.

Pow'rtow winch pedal. Borg-Warner heavy duty starter switch is intended for use with solenoids. Had a few problems, however.

or 10.2 cm (FAI minimum is 7.5 cm); spool diameter, three inches; flange diameter, six and a half inches. The Pow'rtow winch comes with 1800 feet of 115-pound, low-stretch, braided nylon tow line. This line is more than adequate for any glider you are going to launch off of this winch. Never once during the course of testing did anyone break this line. That's not to say that under the right conditions it *wouldn't* break . . . given a good wind (10 mph or greater), a large sailplane (1000 or more sq. in. wing area), and a pilot wishing to strength-test his spars, it might just break, but under normal, everyday launching on a grass field, I don't see it breaking very often. As an option, you can order your Pow'r-tow with 160-pound, braided nylon line if you feel like it, but it'll cost you $5.00 extra. Perhaps if you have a rough field the extra abrasion resistance of the thicker line will interest you . . . it's something to consider. One last thing about the winch drum and line: you get a large-size parachute (18-inch diameter) as standard equipment. This parachute is large enough to allow the winch line to drift down wind to the winch and shorten your retrieval walk.

As you can see, the take-up spool is

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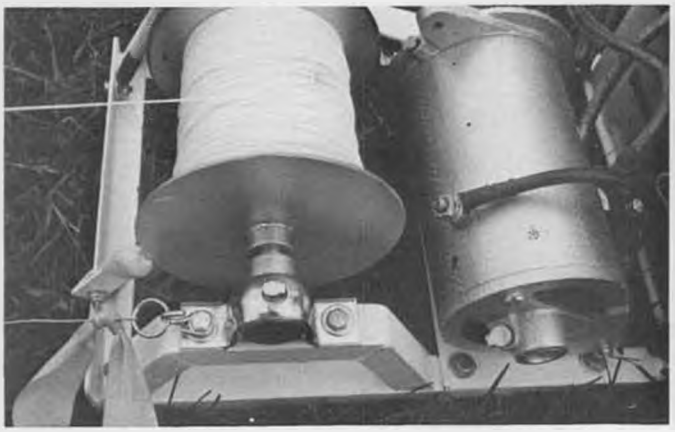


Two really nice features of the Pow'rtow are the tow ring hook (for holding the line when not in use), and the anti-backlash brake.

Pulleys are interchangable between drum shaft and motor shaft to allow variable speed/torque. Comes with extra 2" and 3" pulleys.

Electric Powered CITABRIA

By STAN WILSON . . . Here is a simple, semi-scale, electric powered Citabria for you that's easy to build, lightweight, and a good performer on six cells. Clean, quiet, inexpensive fun, that's what it's all about.

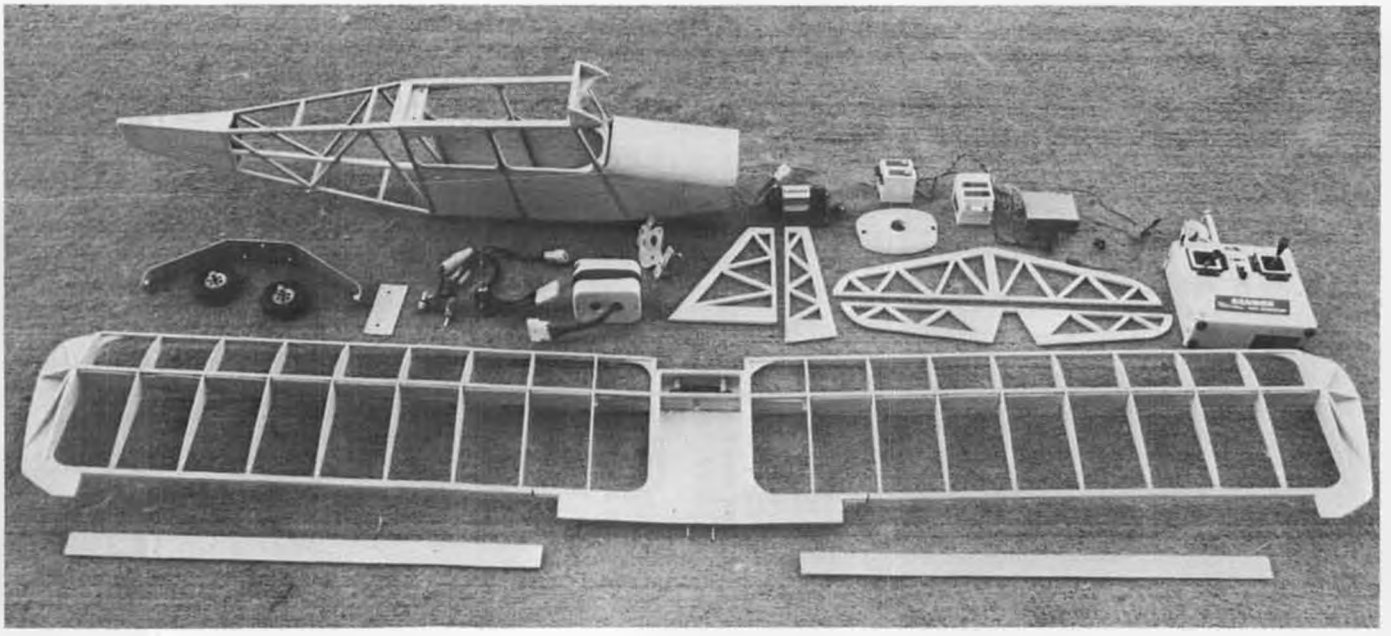
• I like my R/C planes to have the look of real airplanes, and the Citabria has always been a favorite of mine. The Leisure LT50 Gear Motor electric system offers some excellent characteristics which lend themselves quite well to scale flight and appearance. As the Citabria I had in mind was a rather large model, the climbing power generated by the 11-6 prop seemed perfect for achieving scale speed, while not falling out of the sky. With this in mind, I proceeded to design the model from three-views, using "free flight rubber construction" for a light weight model. I omitted the wing struts as they only added drag, and no real support was needed by the wing. You may wish to add them for a more scale look, it's up to you.

FUSELAGE CONSTRUCTION

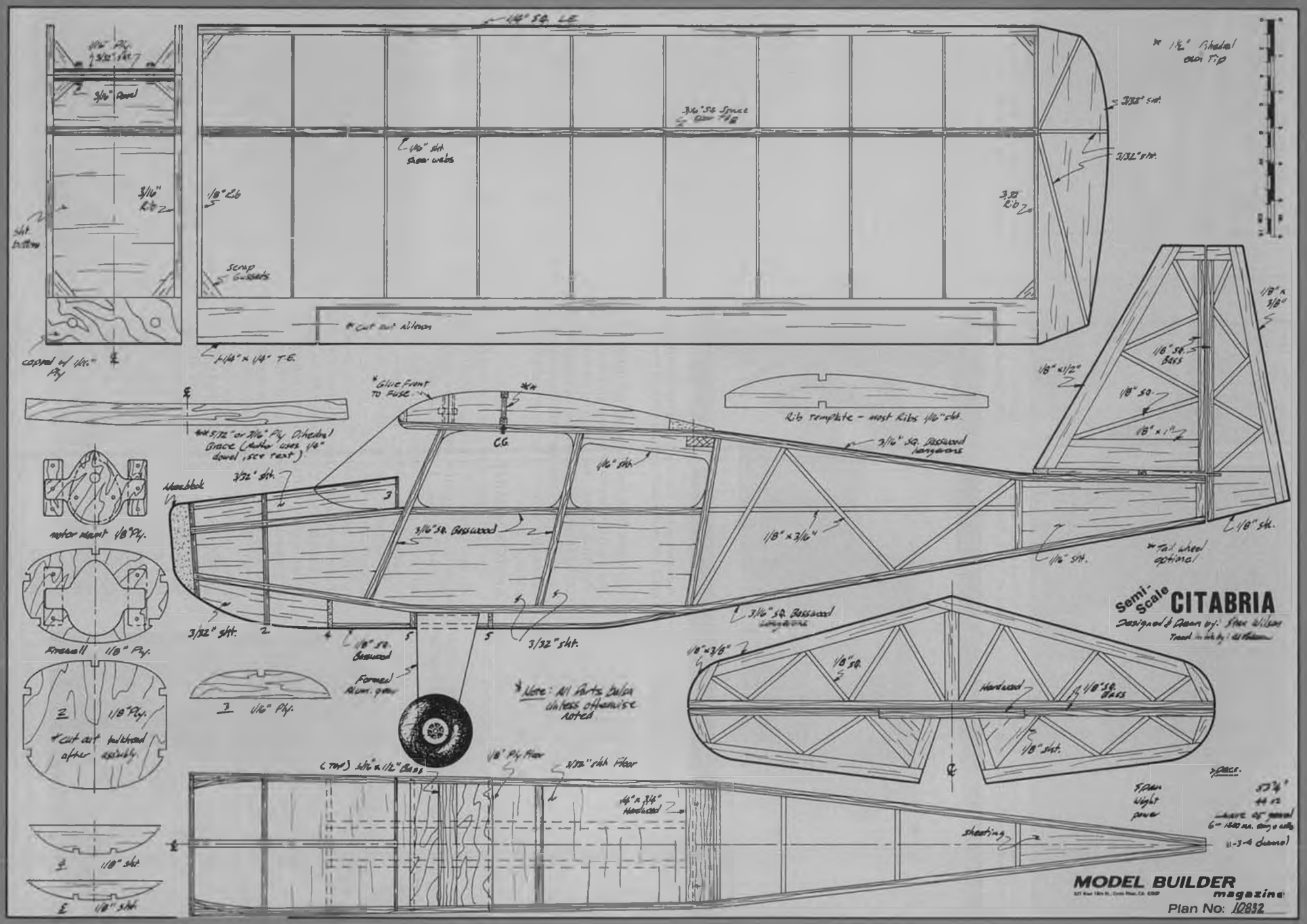
Begin by soaking the basswood longerons in water to enable them to make the correct bends. After they are sufficiently soft, pin the longerons and uprights on the fuselage side plans. The longerons will still be a little wet when you drop Hot Stuff on the joints, so you will get excellent bonding. I use Super 'T' Hot Stuff on all joints as filets.

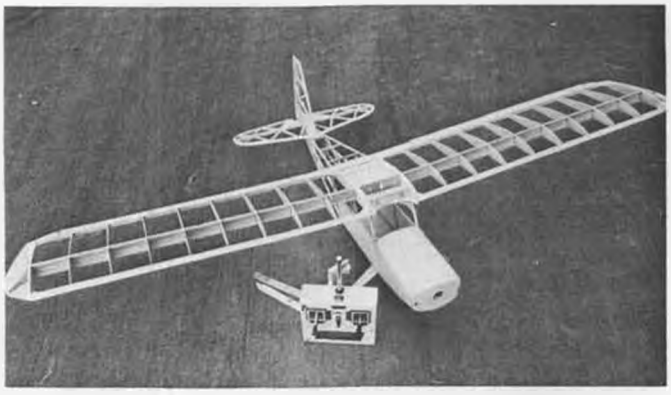
Repeat this process after the first side has dried to make two fuselage sides. I then glue the 3/32 sheeting along the nose and cabin sides as indicated. Be sure to make a left and a right fuselage side. After the sides are dry, place them upside down, and install the fuselage crosspieces. I start by making the cabin area square and firm. Next, I add the cabin floor. This will enable you to draw the tail posts and nose together without having a banana-shaped fuselage.

Score the longerons (slightly) behind the cabin before pulling the tail post together. Install the remaining cross members at this time. Be sure to go back and fill in the score with Hot Stuff Super 'T' and Hot Shot. You should install the hardwood wing mounting block at this time. You will drill and tap it later to accept the nylon wing bolts.



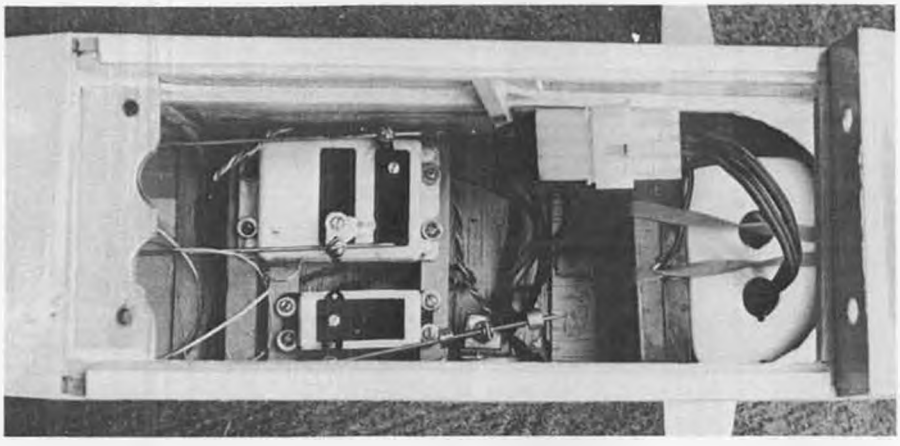
Stick and tissue type construction allows for a very light airframe. Shown are all components of the Citabria ready for covering. Note Cannon radio system, Leisure geared electric motor, 6-cell motor battery (1.2-amp cells), preformed landing gear, and wiring harness with switches.


Semi-Scale CITABRIA
MODEL BUILDER magazine
Plan No: 10832



All framed-up and ready for covering, the Citabria looks a bit naked. Cover radio with thumb and you could be looking at F/F rubber job.

Kids love airplanes! Scotty Stone (left) and the author's son, Stanley Ray Wilson are all smiles . . . I wonder what they're up to?



The Citabria's cabin area is occupied by a Cannon receiver/servos ("brick") and the on-off-low motor switch (to the right of single servo). Power pack for motor and receiver pack in front .

Next, score the longerons in front of the cabin and install bulkheads two, three, four and five. Be sure to reglue the score. Now score the longerons and pull together to install the preassembled (see below) firewall/motor mount. Drill the plywood landing gear mount to accept the aluminum landing gear. I use T-nuts on the inside, epoxied to the plywood.

Now is the time to install the bottom longerons. Cover the top of the fuselage between bulkheads one and three, and the bottom between one and four with sheeting. Soak the sheeting in water to make it pliable. You will now need to cut or grind out the second bulkhead to allow the motor to be inserted from the cabin.

MOTOR MOUNT

The weak point of electric motors has always been the small armature shafts which sometimes bend on even the slightest blow. I designed this motor mount to allow the motor to slide in on impact, and to absorb the shock.

First, shape the outside of the motor mount, and then cut out the center section (see photo). You may need to make a separate inner section as it may be accidentally destroyed when cutting it out from the main motor mount piece. The gearbox will be bolted to this center section. Cut and glue two uprights as shown in the photo to the center section. Place the center section (with uprights) into the firewall and drill four holes through the firewall and uprights. Solder a T-nut to each of the four springs and glue them to the back of the uprights. This is your shock-absorber. This center section with the gearbox and motor mounted to it will be installed from the rear through the cabin. For thrust adjustment, Hot Stuff washers to the front of the uprights as needed.

WING

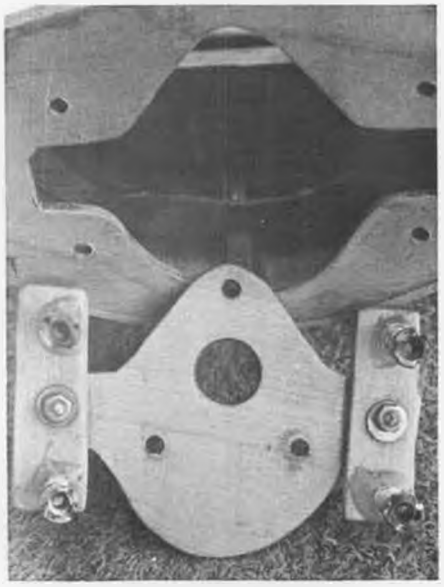
The wing can be built for aileron control or without it. Pin the leading edge, trailing edge, and bottom spar to the plans, and glue the ribs, top spar, and wing tip. Allow this assembly to dry thoroughly. Add the braces to the wingtip and the sheer webbing. When completed, build the other wing in the same manner. After this is completed, block up each wingtip (at the last rib) 1-1/2 inches and sand in dihedral to the root rib.

The center section is constructed by pinning the bottom sheeting, bottom spar, and trailing edge to the plans. Add the ribs and top spar. Precut the plywood and balsa sandwiches which will make the front mounting assembly. Glue the front plywood and balsa together, and the rear plywood and balsa together. Drill two holes in the front balsa/ply mount as shown on the plan. Glue these assembles to the center section ribs, but not together. Add gussets as shown.

Sand the leading edges of the wings to the proper airfoil shape, and lightly sand the ribs, spars, and wing tips. Fit the wings to the center section to assure a good fit, but do not glue at this time. Slice the front part of the center section between the balsa/ply sandwich. The front part will be glued securely to the top of the fuselage. Glue the wings to

Continued on page 77

Shock-absorbing mount allows nose impact without damage to motor or gears. Unit is suspended by small springs. See text.



Flip side of motor mount. Springs and blind nuts clearly seen. This side front, from inside.

Beehive R/C Model Aircraft's Kloud King rests on the deck of an abandoned, WW-II airstrip (left) on the island of Maui. Al Tuttle, who lives and works on this island paradise in the state of Hawaii, uses this field on lunch breaks to fly his Kloud King . . . eat a sandwich, fly a model, FUN!

PRODUCT$ IN U$E

Beehive R/C Model Aircraft Co.

KLOUD KING

By AL TUTTLE . . . The Kloud King is an Old Timer that is available in two forms from Beehive R/C Models. You can buy it all framed up and ready for covering, or as a partially assembled "kit" as you see here.

• The Kloud King is an Old Timer model, circa 1938, for free flight or R/C assist. It is available either fully-framed and uncovered, or in kit form with the fuselage sides prebuilt. This review concerns the latter. (Guess who is doing the review on the fully-framed one?)

The kit is packed in a box fifty one inches long, by eleven inches wide, by four and one half inches deep.

Hardware includes formed, 1/8-inch diameter steel wire landing gear, tail wheel assembly with a 3/4-inch diameter Perfect wheel, Robart hinges, nylon control horns, formed windshield, and side window material.

All individual assemblies such as the rudder, vertical stab, horizontal stab, wing, etc., are precut and packaged separately which makes for easy identification. The holes for the control surface hinges are even drilled! In addition to the prebuilt sides, there are two preconstructed crutches, which when installed, form the top and bottom rear crosspieces that automatically shape the fuse when pulling the aft fuse sides together.

Plans are of the blue line Ozalid variety, and are used during the construction of the wings, wing center section, and empennage. There are seven pages of printed step-by-step instructions, plus twenty-three assembly detail sketches.

The fuselage is assembled by installing the front cabin former and firewall to one of the fuselage sides, installing the opposite fuse side, and then adding the rear cabin former and the prebuilt top crutch.

The tailposts are brought together, and while being held by clamps, fuselage alignment is checked. After alignment, the tailposts are glued together, and the top crutch is glued to the fuselage sides.

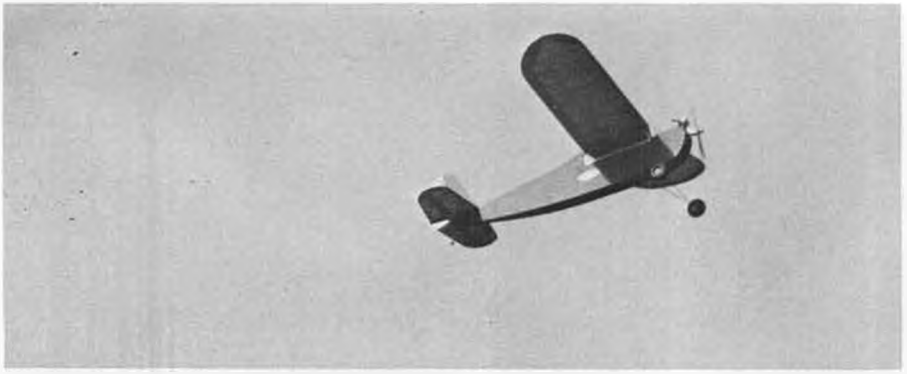
The fuselage is then turned bottom side up, and the prebuilt rear bottom crutch is installed. With the help of Hot Stuff, the preceding took me approximately one hour to complete. Triangular braces, landing gear platforms, etc., and rear top formers were installed.

The top rear stringers are 1/8-inch by 1/4-inch spruce. Because of the sharp curve on the top corner stringers that run up to the cabin, these stringers are laminated from 1/8-inch square spruce. This was a nice touch, and made what could have been a tough job, very easy.

Instructions call for a removable hatch, but I chose to make mine an integral part of the fuse. However, before installing it, I built a floor to hold the fuel tank. The tank is easily accessible from the cabin.

The wings and center section were built next. Here, one has a choice of three options: solid, one-piece wing; both wing panels removable; or, one wing panel only removeable. Being lazy, I chose to build a one-piece wing. The wing panels are built first, and then used

Al's Kloud King makes a sweeping low pass over the runway before pulling up to play near the clouds. With a setting like this, you would be tempted to fly every day!



The Kloud King flies well on a four-stroke .45 with an 11-6 prop. Using a 10-ounce tank will give you loads of flying time between fill-ups . . . would you believe 45 minutes worth?

during construction of center section.

Empennage construction is straightforward, and as mentioned earlier, holes for the Robart hinges are predrilled. Even so, check for alignment prior to assembly. Mine happened to align almost perfectly. The empennage can also be made removeable. Here again, I chose to attach it permanently to the fuse.

I covered the airframe with one of the new low heat fabrics. The fuselage is blue, and the wings and empennage are yellow. Nothing fancy, but it does look quite nice.

A four stroke .45 engine swinging an 11-6 prop provides the motivation. Radio is a Kraft Series 74, KP-7Z with KPS-24 servos (Mode 1, of course).

The Kloud King's dry weight, ready-to-fly, is 5 lbs even. I am using a Kraft 10 oz. tank, which results in approximately 45 minutes of flying time. A six-ounce tank would be perfectly adequate.

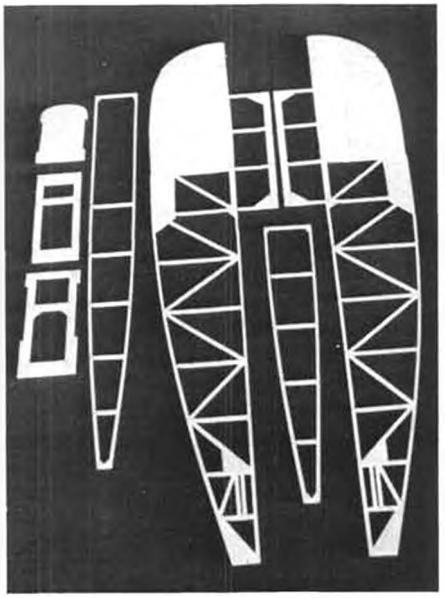
Flying this thing is an absolute gas (no pun intended)! Actually, it flies by itself, and an occasional nudge of the rudder and or elevator, keeps it within range. In fact, what with the gentle purr of the four stroke, and the plane just ghosting around the sky, it is difficult to stay awake. Talk about laid back flying . . . ridiculous!!! Even though this is an extremely easy aircraft to fly, I hesitate to recommend it for a first airplane, as it is fairly "tender," i.e., the empennage/aft fuselage area is weak, and can be easily broken in a cartwheel. Of course, if there is a qualified instructor to help the beginner until he can land with no problems, then by all means, build this for a first airplane. The instructions and sketches are well done, and easily followed. On this particular kit, all parts fit well, and the quality of wood was good.

I have only two criticisms, and these are meant to be constructive: the fuselage sides and crutch balsa cross and vertical members were too soft, and I was continually breaking them during the course of construction. The landing gear should be made of 5/32-inch diameter steel wire rather than the 1/8 inch diameter wire furnished, which splays out violently during landing, and takes a permanent set. I realize that my ship is a bit on the heavy side, and with the 1/8 wire gear, the airplane hops down the runway during landing like a drunken kangaroo on a pogo stick.

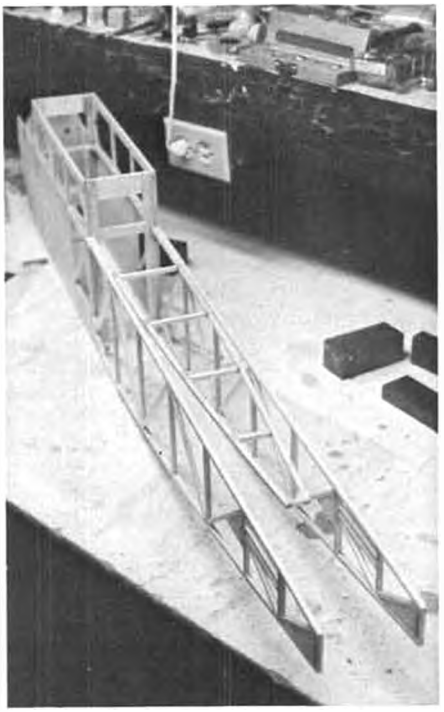
If you want a fun ship that is quick to build, this is the way to go. It took me only two weekends from the time I started construction, to the day I flew it. Construction time was approximately 32 hours including covering. Hot Stuff adhesives were used throughout, which contributed greatly to the fast construction time. (Fast for me that is.)

Our flying field is two miles from where I work, and as I have an hour for lunch, I manage to get in a 30 to 40-minute flight several times during the week. The thermals are booming at that time, so I actually do more soaring with it than anything else. Try one, you'll like it!

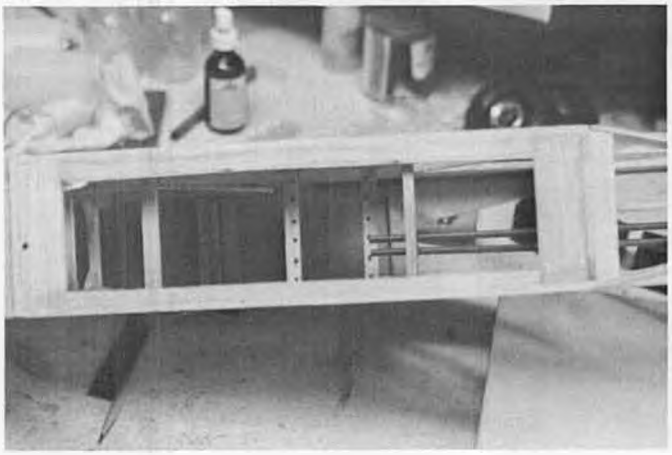
Aloha, Al Tuttle, Maui, Hawaii. •



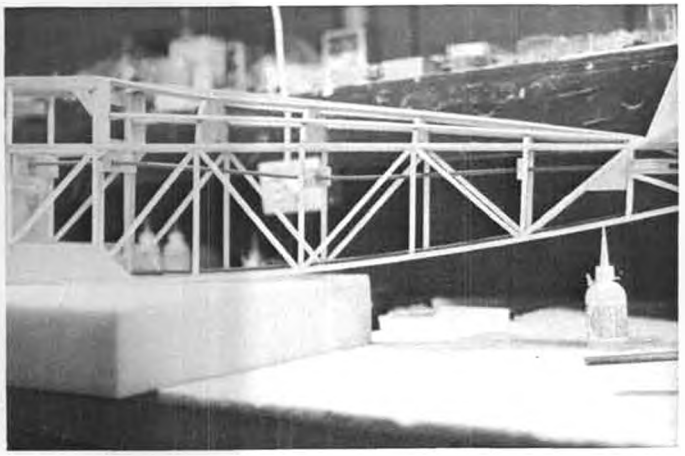
The Kloud King in its "kit" version comes partially assembled, as you see here.



Joining the fuselage sides together at the tailpost is a snap using Hot Stuff.



There's plenty of room in there for your servo installation, fuel tank, radio receiver, etc.



The top corner stringers which you see curving up to the cabin are laminated from two 1/8-inch square spruce sticks each. Easy!

1. This group photo was taken at the annual Salinas Area Modelers Old Timer contest. For a complete description of all the models and pilots, see the text. Original photo reveals just how brightly colored these O/T models really are! Looks like there was good flyin' weather!

PLUG SPARKS

By JOHN POND

• West coast old timer contests are undergoing considerable changes as the contests themselves are becoming ever more competitive with each other! With at least six major SAM Chapters hosting contests, all of them devoted to O/T R/C flying, contests are coming at such as rate that the average competitor is becoming overwhelmed.

2. Frank Swaney, Jim Kyncy, and Speed Hughes admire Lanzo Record Breaker.

3. Tragedy! Frank Swaney rekitted his Lanzo after it flew out of his range of vision.

Hence, contests (like the contestants) are improving immeasurably from the standpoint of organization, operational efficiency, and of late, highlights such as barbecues, luncheons, and victory banquets. The latter, of course, was first instituted at the John Pond Commemorative held annually in the San Luis Obispo/Santa Maria area. This proved so popular that most contests are now two-day affairs with the Saturday evening generally reserved for a semi-formal banquet.

This has led various chapters such as SAM 49 and SAM 30 to put on lunches devoted to hamburgers, hot dogs, and beans. The Salinas Area Modelers (SAM) have gone them all one better *by offering breakfast and lunch on the field* at very nominal prices! Imagine getting up late, yet having enough time in the early morning to get a plate of bacon and eggs! Of course, there is always the quickie breakfast, coffee and doughnuts, but the custom set by Jack Jella of the SAM generally offers these goodies at the field all through the morning. In short, you have your cake and eat it too!

Probably the most enterprising offer yet made is the two-day event being put on by SAM 27 (Don Bekins, CD) at the Olive Ridge Tennis and Racquet Club located at Black Point, Marin County. This contest will be held September 17th and 18th, and will feature only two gas events per day.

In collaboration with this meet, the Marin MAC division of SAM 27 will offer two rubber events per day. Sunday will see the "PACIFIC ACE WORLD CHAMPS-II" and .020 Old Time Replica (gas). The opening day, Saturday, will be devoted to flying scale models designed by Joe Ott. Incidentally, Ott is putting up the trophies for this most interesting meet.

To round things off for the rubber fanatics, a CO_2 Old Time Replica event will also be held on Saturday.

Naturally, with such a prestigious location, dinner on Saturday night will feature French cuisine! Man! Is this meet ever going to be fancy!

Talking about gimmicks, the Salinas Area Modelers have a group picture taken at 12 noon on the field every year. At the Saturday Awards Banquet, every contestant is given a large 8 x 10 color photo as a memento of the meet. Photo No. 1 shows exactly what we mean. Rather than give a description of the meet, we will show all the contestants in

4. Jim Parsons flew a brand new Ehling 4-1/2 Hour Flyer. Powered by Merco 49.

5. Side view of Parson's Ehling 4-1/2 Hour Flyer. Administrators appear comfortable!

6. Jack Alten is ready to grab hold of Jim Kyncy's reduced scale, Class C Anderson Pylon O/T just as soon as Jim gets her going.

7. Don Bekins' new Hornet 60 powered Valkyrie is the model to beat! John Pond holds.

the photo and what they were holding at the time.

At the very left is an unknown SAM helper with Walt Parker, the Chef, Chief Cook and Bottle Washer, etc., etc. Kneeling in front is Ed Solenberger with a scaled Playboy Jr. utilizing a McCoy 60 for power. Ed eventually won the fly-off against Doc Patterson.

Continuing to the right is Jack Albrecht with his double-size Kerswap powered by a McCoy 60. Does this model ever perform with a McCoy 60 that sounds like a glow engine on ignition! Jack is a real threat at any time to win Class C. The hot performance is no doubt due to the cross-section rule being dropped in 1941 thus allowing much sleeker designs to compete. As Harry Murphy, newsletter editor of the C.I.A. "Informer" so astutely pointed out, the cross section is what holds the performance on a more equal basis. Anybody out there care to expound on a scientific basis?

Directly in front of Jack is Jim Adams, the most successful newsletter editor SAM has ever had. Jim showed up with a brand new Playboy powered by a Super Cyclone. Lest we miss him, the Contest Manager and CD, Jack Jella, stands next to Ray Van de Walker holding a Shereshaw Cumulus originally powered by an Ohlsson 60.

10. Old time engine manufacturers, Dan Bunch and "Bud" Warren have fun at one of their hydro meets. Aircraft were Scorpion Majors. High rudders aided hydro stability.

Directly to the right, in the back, is another Cumulus being held aloft by Paul Forrette. Paul is the modeler who flies the Peerless Panther, a low wing design, in the 1/2A Texaco event, and never fails to place. At those altitudes, you can't tell the difference between a high wing or a low wing!

Down in front is another unknown SAM member with his Scientific Commodore. Up and to the right of him is Jim Parson with an Ehling 4-1/2 Hour Flyer powered by a Merco 49. For a newcomer, Jim has been doing very well.

Next we have the old man, John Pond, with his equally-old, white and red Dallaire. This meet was a particularly bad one for the old master as he ruined four models in four events. You won't see that Dallaire again as it lost a half-wing at 1,000 feet altitude. There were no pieces longer than six inches left! *(I would take this to mean that the half-wing went OOS . . . right John? . . . It happens to the best of 'em. wrf)*

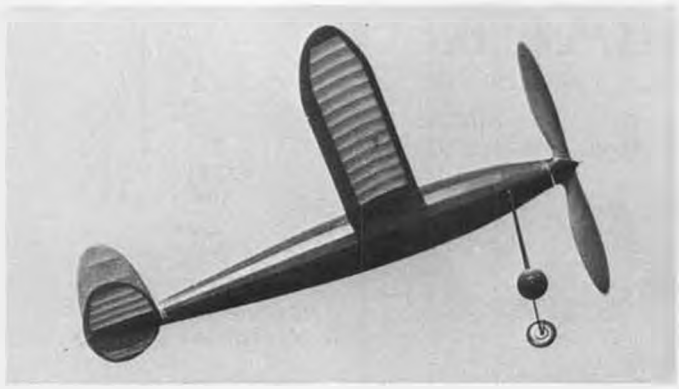
Holding a Hornet powered Sailplane is Don Bekins with his new recruit on his right (name unknown). This is the infamous model that hit the outhouse at Marysville. Don has since continued this practice, and is rapidly earning an unenviable name.

Next to Pond, kneeling, is the "King", Otto Bernhardt, with his old, rebuilt Lanzo Record Breaker. This model also won the Beauty Award. Truly a shame the model cannot be seen in plan form.

Behind Otto is Nick Nicholau, the spark plug of SAM 30. Nick has built most all the models presently being used by SAM 30 members, and a few outsiders. For a change, "Old Weak-eyes Nicholau" was able to keep his Miss

8. Bob Nichols cranks up the Turner Special belonging to Judith Anderson (background) who appears to be doing a preflight check.

9. Cedric Galloway's first original design control line model. Flew with Ohlsson Gold Seal engine. The year was 1943.



12. Reg Parham's 1939 Wakefield design took second place in a recent Odiham Vintage Wakefield event in England. Keith Miller photo.

11. Kelso Barnet, of Universal City, Texas, built this neat 1/2A Texaco version of Pete Bower's *Flybaby*.

America in sight and gain a second place in Texaco.

Kneeling to Otto's left is Don Carrl who loves to fly the smaller models. His Gas Bird or "Diamond Zipper" as Carl Goldberg calls it, is a combination Class A-B utilizing ignition McCoy 19 and 29 engines. Don has been successful in lightening the model to the point where the glide is halfway presentable.

Standing in the rear is "Old Fence Buster," Al Staben, with an O.S. 60 four-cycle powered Dallaire Sportster. Al finds this is one of his better flyers.

Kneeling in front are Bill Bowen, Doc Patterson, and Loren Schmidt. Bowen has a scale Baby Playboy with a Schneurle Torpedo 19 that suffered from engine run problems. Doc Patterson is holding his favorite, a Spitfire powered Anderson Pylon that is always a threat to win the Antique Event. Alongside of Doc is Loren Schmidt with one of the wildest (and overpowered) Rangers this writer has ever seen. It is amazing he hasn't stuck it in the ground more!

To wrap up the photo, Jim Kyncy is holding a scaled down (for a change) Anderson Pylon with a Hornet 60 that just paralyzes the competition in Class C. Hopefully, next year the 55-second motor run will be reduced to the point where you can see the models!

WEST COAST CHAMPS

Along with all the gimmicks to attract the contestants, SAM 21, with John Pond as contest director, offers you the West Coast Champs at the Dichondra Ranch as an inducement to fly off of the finest flying field in the world. Imagine, *200 acres* of nothing but dichrondra grass!!

In keeping with the status of the West Coast Champs, over 21 trophies will be awarded with 40 merchandise awards! This should make the boys turn out!

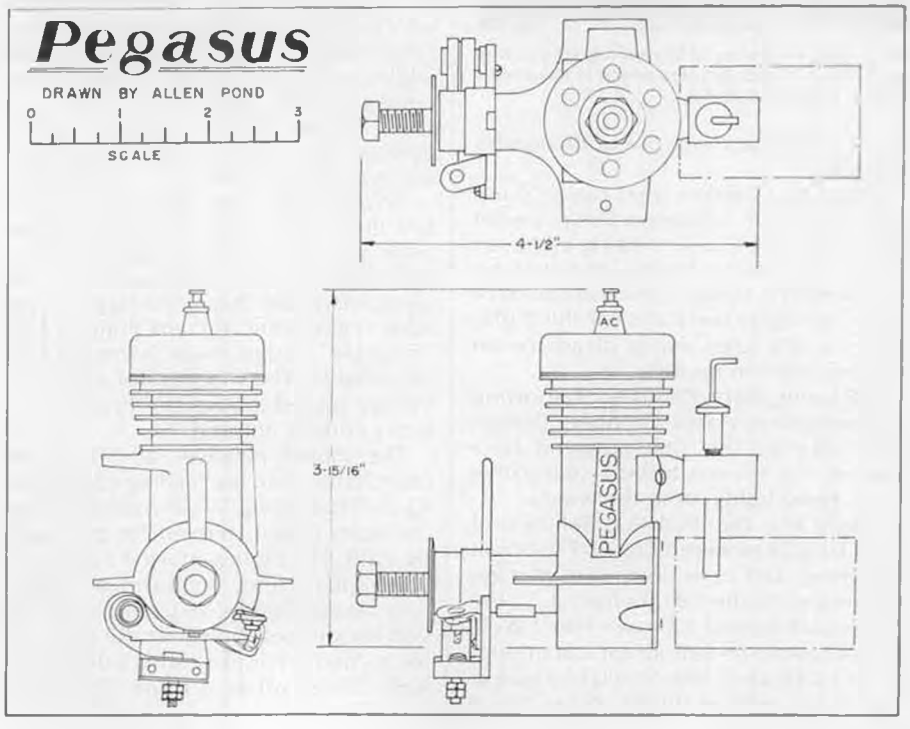
Also, of special note, is the announcement by the SAM 21 boys that next year's meet will feature low-wings. In this meet, all types are eligible, but any low-wing design will receive a 50 percent bonus in time up to a "max" flight. This low-wing event is something that Gene Wallock of the SCAMPS has been after this writer to do for a long time. With one year's notice, we'll see how they turn out! *(Contest details are discussed at the end of this article. wrf)* There won't be any shortage of trophies as Wallock is donating the perpetual!

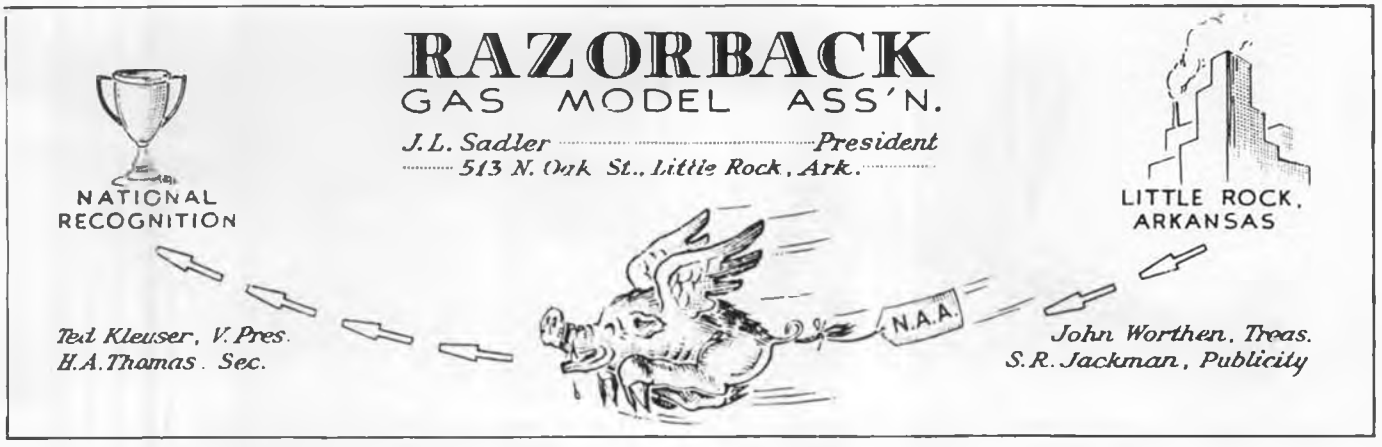
Getting on with the contest report, we might sneak in a plug for Frank Swaney, shown in Photo No. 2, for his "Fly-For-Bucks" contest as sponsored by the editor and publisher of the *Colusa Daily*, Henry Johnson. To publicize the meet, Frank, along with Neva Nicholau, was giving out bent (or crooked) ball-point pens with the slogan, "Straighten Up and Fly Right with Frank Swaney" inscribed on them. Ya gotta have a gimmick(s) these days! (As if the $500 prize money isn't enough! The other gimmick is only $1.00 entry fee for all events!)

Photo No. 2 shows Jim Kyncy and Speed Hughes assisting Frank Swaney with his Lanzo Record Breaker. Unfortunately someone forgot to tell the timer that Swaney's eyes were bad, and the model would go out of sight in short order.

Photo No. 3 shows the results! *(See, Pond? You're in good company. Our*

13. Dave Baker took this remarkable photograph of Mario Gandolphi with his Shereshaw Cloud Cruiser under an English sky which actually cooperated with a little sunlight!





15. How about this letterhead for a bit of nostalgia? Note who's president . . . old "Kingfish" himself!

condolences, Frank, wrl) By the time the timer looked up, the model was in a dive (unkwown to Swaney). Too late! Truly a shame as this could have been easily avoided!

For the first time out, Jim Parsons (Photo No. 4) did really well with his Frank Ehling "Four-and-a-half-hour Flyer" powered by a Merco 49. Although the model came out heavy, the design glides well. Looks like we have another competitor!

Although we are again showing the Ehling model, the main reason for Photo No. 5 is to show part of the crew in the background, Sandy Alten, Maryann Pond, and Robert Pond. Will you look at

14. Chuck Provance, of Wyoming, sent in this shot of his Plecan Simplex which is powered by a P.A.W. 2.46 diesel.

that tremendous expanse of dichondra grass!!?

Photo No. 6 shows what can be done by scaling the Anderson Pylon model down to Class C size utilizing a Hornet motor for power. This has proven to be an excellent flying combination. Jack Alten, acting as mechanic for this flight, offers a few sage words of advice on starting ignition motors.

Following that is Photo No. 7, showing that gorgeous, classic Goldberg design, the Valkyrie. This one powered by a Hornet has proven to be a superlative flyer. Pond holds on to the wing.

Might also mention that Bekins tore up a Torp 29 powered Class B Playboy at this meet, and in its downward plunge, the model hit the tree sheltering . . . *the outhouse!* Missed it by two feet!! Well, we all have to be famous for something!

Let's shift gears here and take a look at the distaff side of things. Photo No. 8 shows Bob Nicols starting up the engine of Judith Anderson's Turner Special. It's really great to see teams like this!

A lot of the readers have been asking if we would list the model and motor used by the winners. We'll try to do our best with the following results:

CLASS A	TIME
1. Loren Schmidt (Ranger/Torp 19)	13:09
2. Don Carrll (Gas Bird/McCoy 19)	9:36

CLASS B	TIME
1. Ed Solenberger (Playboy Jr/Torp 29)	20:33
2. Nick Sanford (Playboy Jr/McCoy 29)	19:30
3. Don Bekins (Alert/Torpedo 29)	11:19

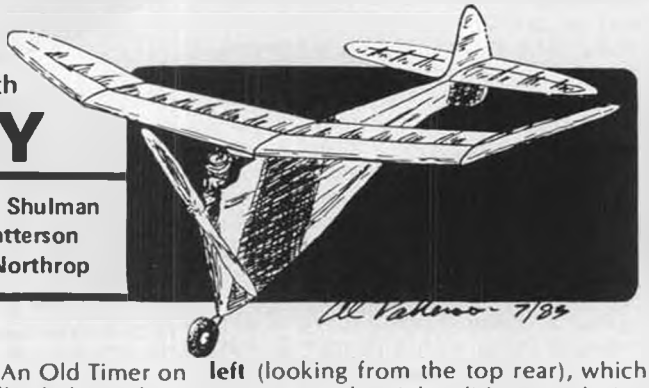
CLASS C	TIME
1. Jim Kyncy (Anderson Pylon/Hornet)	30:57
2. Ed Solenberger (Playboy Jr/ McCoy 60)	30:45
3. Don Bekins (Sailplane/Hornet)	30:04

Continued on page 94

OLD TIMER
Model of the Month

WEDGY

Designed by: Leon Shulman
Drawn by: Al Patterson
Text by: Bill Northrop



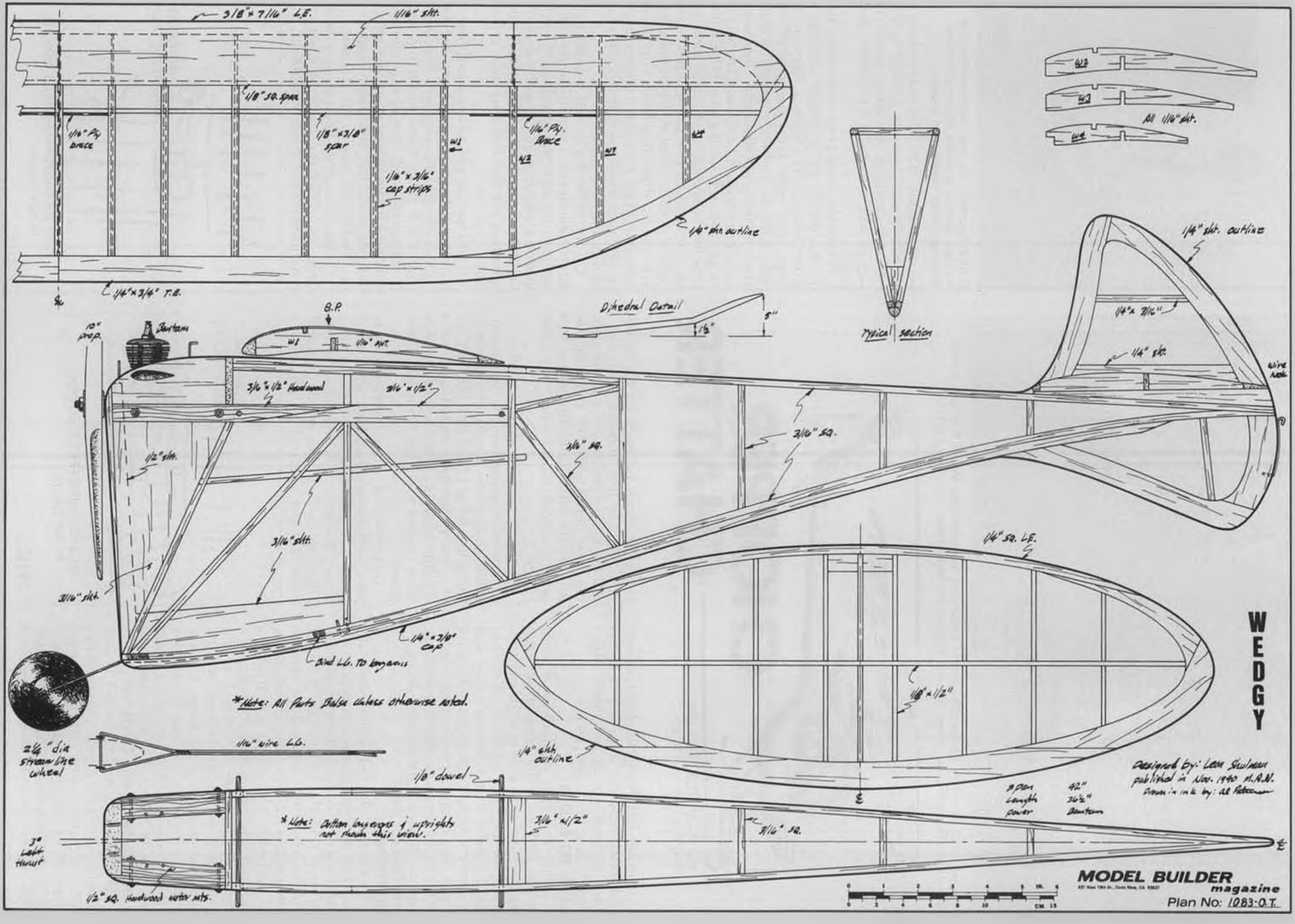
• Can you believe it? An Old Timer on which it's easy to install a dethermalizer ('scuse me . . . DT)! With the simple addition of a stab platform and a leading edge guide, the stab on Leon Shulman's Class A 1940 Nationals winner can be popped up to the usual DT angle without gross modifications to the model.

"Wedgy" was featured in the November 1940 issue of *Model Airplane News*, fresh after its record setting 22 minutes plus flight at the 1940 Nationals. The deep, triangular shaped fuselage, somewhat reminiscent of Frank Ehling's 1938 "Triangle" design, made it immediately identifiable. The win was not a fluke, as Wedgy placed among the first three in every contest entered.

The model balances at 1/3 of the chord back from the leading edge of the 42-inch span wing. Wash-out is built into the outer panels, preventing unwanted tip stalls. The flight pattern is a tight left-hand spiral climb, followed by a right turn floating glide. With the wing and stab incidences shown on the plans, try for a smooth flat glide with a slight right turn. Thrust offset is three (3) degrees **left** (looking from the top rear), which overcomes the right glide turn during powered flight. Note that the motor mounts bolt in separately, allowing for ease of engine changes and thrust adjustments.

All flying surface construction is basic. As for the wedge-shaped fuselage, begin by building two sides, including the hardwood and balsa engine bearers and the 3/16 sheet side cowls. To assemble, lightly clamp the sides together at the bottom longerons, spread the top longerons apart the required amount, and glue in the cross-pieces. Taper the cross-piece ends carefully for a snug and solid fit. Now glue the bottom longerons together, install the landing gear, sand the bottom longerons to a flat outside section, and add the 1/4 x 3/8 cap strip. (Original text says 1/8 x 3/8, but the drawing showed and called for 1/4 x 3/8).

The original model weighed around 17 oz. with silkspan or double-tissue covering and two coats of dope. A glow-powered model should be even lighter. Wing area is about 285 sq. in. •


3/8" x 7/16" L.E.
1/16" sht.
1/8" sq. spar
1/16" Ply brace
1/8" x 3/8" spar
1/16" x 3/16" cap strips
1/16" Ply. Brace
W1
W2
1/16" thin outline
1/4" x 3/4" T.E.
W3
W2
W1
All 1/16" sht.
Dihedral Detail
1/2"
8"
Typical section
B.P.
10" prop.
Bantam
W1
1/16" ant.
3/16" x 1/2" Hardwood
3/16" x 1/2"
1/2" sht.
3/16" sht.
3/16" sq.
3/16" sq.
1/4" sht. outline
1/4" x 3/16"
1/4" sht.
wire hook
3/16" sht.
1/4" x 3/16" cap
Bind L.G. to longeron
1/4" sq. L.E.
1/8" x 1/2"
1/4" sht. outline
*Note: All Parts Balsa Unless otherwise noted.
2 1/2" dia streamline wheel
1/16" wire L.G.
1/8" dowel
*Note: Bottom longerons & uprights not shown this view.
3/16" x 1/2"
3/16" sq.
3° Left thrust
1/2" sq. Hardwood motor mts.
WEDGY
Designed by: Leon Shulman
published in Nov. 1940 M.A.N.
Drawing inked by: Al Peterson
Span 42"
Length 36 1/2"
power Bantam
MODEL BUILDER magazine
Plan No: 1083-O.T.

Now the product review on the Competitor helicopter from Gorham Model Products is complete. If you want to know more, see the August and September "Chopper Chatter."

Walt Schoonard, the man behind Miniature Aircraft Supply, proudly displays the new Superior. More details next month . . . .

CHOPPER CHATTER

By RAY HOSTETLER
PHOTOS BY AUTHOR

• After the last three months of reviews and flying different ships, a few things have jumped out at me that I feel I should pass on to you, so it's. . .

BACK TO BASICS

Earlier this year we looked at rotor heads, Bell vs. Hiller, degree of head rigidity, and how it affects the controllability of the helicopter, etc. A part of head rigidity that I did not cover was how the different heads act in forward flight. So I'm going to take a helicopter at hover and explain what happens as it hovers, departs from a hover, and goes into forward flight.

HOVERING

In a hover, the helicopter essentially sucks in air from above and displaces it downward. In order to hover, sufficient air must be induced through the rotor disk to equal the helicopter's weight, otherwise it would not be able to hover to start with. This is why a helicopter's induced flow (air sucked down through the disk) increases in velocity as the helicopter gets larger. More weight, more air. In some of the larger full-size ships the induced flow reaches 100-150 mph! *(You could really get a good "dusting" in that kind of hurricane! wrf)*

A HOVER NEAR THE GROUND

When a helicopter (model or full-size) hovers close to the ground, it is called an IGE (in ground effect) hover. Ground effect comes from the ground restricting the induced flow through the rotor disk. As the ground slows the induced flow, each rotor blade has a little bit longer to work on each air molecule, (and there is less induced drag, but I want to keep it practical . . .) so the rotor becomes more efficient and requires less blade pitch (and therefore less power) to hover close to the ground. See Figure 1.

Many of you think of ground effect as a cushion of air under the helicopter. While an engineer would tell you something like what I have described in the last few paragraphs, thinking about a cushion of air is a good way to visualize what's happening from a practical standpoint.

Ground effect is *most* noticeable up to one-half rotor diameter above the ground. If you have a 56-inch diameter rotor, the rotor disk will be most efficient up to 28 inches off the ground. Subtract the vertical height of the helicopter (say 15 inches) and you have a 13-inch hover from the ground to the helicopter's skids. Anything above 13 inches will require more power and pitch.

This is why fixed-pitch helicopters are more difficult to land than collective pitch helicopters. With a fixed-pitch ship, rotor rpm must be reduced to reduce lift. As the helicopter gets within a foot off the ground the effect increases so rotor rpm must be reduced more yet to get the ship on the ground. By the time the helicopter lands, rotor rpm can be decayed to the point where the control system is not nearly as effective as it was at a three-foot hover. Tip-overs are more likely to happen during landig because control effectiveness is significantly reduced.

On the other hand, with a collective pitch helicopter, lift can be directly reduced through the lowering of each blade's (collective) pitch, without sacrificing rotor rpm. Therefore controlliability is greater and a tip-over is less likely to occur.

If you want to play with ground effect, hover at three to five feet and reduce collective/throttle slightly. The helicopter will drop down lower but will continue to hover because of the increased ground effect. If ground effect did not exist, the helicopter ought to descend all the way to the ground.

Ground effect has been given a lot of flack, i.e., "Get the helicopter out of ground effect and it will fly smoother. . ."

IN GROUND EFFECT HOVER, WIND CALM

FIG.1

OUT OF GROUND EFFECT HOVER, WIND CALM

FIG.2

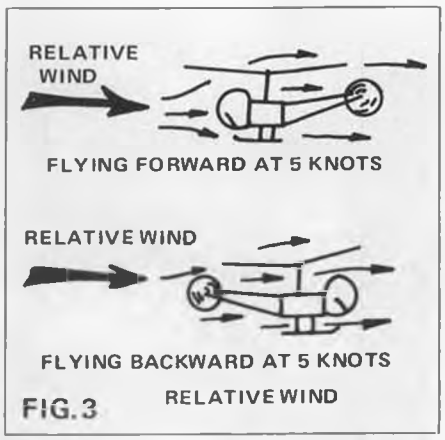
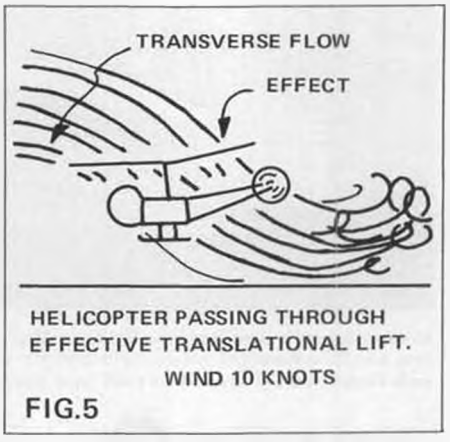


FIG.3


GROUND EFFECT DISRUPTED; HELICOPTER NOT YET IN EFFECTIVE TRANSLATIONAL LIFT. GIVES "DISH OUT" DURING TAKEOFFS.
FIG.4 WIND 5 KNOTS OR LESS



HELICOPTER PASSING THROUGH EFFECTIVE TRANSLATIONAL LIFT.
WIND 10 KNOTS
FIG.5

or, "Ground effect crashed my helicopter because of bumpy air..."

For the most part, I wouldn't believe those excuses. Yes, you can get low-level turbulence close to the ground in some cases, but it is mainly the pilot *overcontrolling the helicopter* because he fears the ground itself to start with.

My advice to beginners is "keep it in ground effect." If the helicopter starts to get away, smoothly reduce throttle and let it settle back in, and try again. It is much harder to "reduce throttle and let it settle back in" from a three-foot hover!

A HIGH HOVER

Out of ground effect (OGE) is essentially anything above a 13-inch hover. It will take more power and more pitch because there is nothing to restrict the airflow as it passes through the rotor disk. In other words, the air passes through the disk faster with decreased efficiency because each rotor blade has less time to work on each air molecule. See Figure 2.

In all full-size helicopter flight manuals, hover ceiling is given in IGE and OGE. If you take any helicopter it will hover (at sea level) at three feet or thirty feet. However, take the machine up to 7,000 feet and it may *barely* hover at three feet and *will not* hover any higher. My point is, the different in the power required between IGE and OGE means the difference between flying and not flying in some areas. For instance, last summer at the Grand Canyon, my SuperMantis would only hover at six inches to a foot above the ground. It had to depend on ground effect to fly at all.

In all of the preceding paragraphs I have assumed a calm wind. Let's see what happens when the wind is not calm.

THE RELATIVE WIND

Einstein would have made a good helicopter pilot. I'm sure he could understand the relatively of one thing to another.

If your helicopter is hovering and a five-knot wind is blowing, the five-knot wind can be called the *relative wind.*

Relative wind is the incoming airflow to the helicopter itself or to the helicopter's blades, which ever example we care to look at. First, let's consider the incoming airflow to the helicopter itself.

Relative wind to the helicopter can also be described as being opposite to the helicopter's direction of flight. If the helicopter is flying forward, the relative wind comes from the windshield back over the entire ship. If the helicopter is flying backwards the relative wind comes at the tail first and then passes over the rest of the helicopter. See Figure 3.

Once there is a headwind, the incoming air starts to distort or disturb the flow pattern of the rotor's induced flow of air. See Figure 4. Let's say this is typical in a hover with five knots of wind, or in slow forward flight with the wind calm (same relative wind). Notice how the smooth airflow pattern is disrupted. The turbulence from the front of the disk works its way back through to the tail rotor. Because the tail rotor now has to work in turbulated air, tail control may be inconsistent or jerky. Also, the larger the canopy is, the more this air may be turbulated. Notice, too, how the incoming air is starting to come from forward of the helicopter.

This is also the point where the helicopter is not in ground effect anymore, however, the helicopter has not yet picked up effective translational lift (which will be discussed in a moment). This situation requires more power to fly than hover, and more power than in forward flight. It is characterizied by the helicopter dropping down slightly or "dishing out" as I prefer to call it. To play with this, try taking off sometime without adding any additional throttle/collective. If the air is dead calm it will be difficult to do as there is such a long delay between losing ground effect and picking up effective translational lift (or ETL for short). If there is just the slightest breeze the gap is minimal and the dishout will hardly be noticeable.

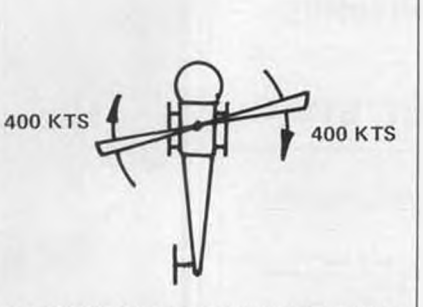
In Figure 5, I have given a 10-knot wind. Notice how the air is being sucked in from above the rotor disk, and that the tail rotor is out of the turbulated air.

EFFECTIVE TRANSLATIONAL LIFT, OR ETL

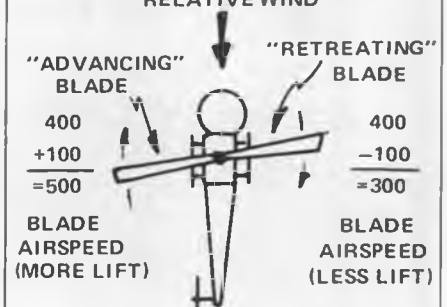
With the condition shown in Figure 5, the helicopter is said to be in, or passing through, *effective translational lift.* Notice that the incoming air at the front

Continued on page 71


IN FORWARD FLIGHT AIR IS RELATIVELY UNDISTURBED AS IT PASSES THROUGH THE ROTOR DISK
WIND 20 KNOTS OR MORE
FIG.6



NO WIND HOVER AIRFLOW OF EACH BLADE IS EQUAL
FIG.7



200 KTS DIFFERENCE CAUSES DISSYMETRY OF LIFT
FIG.8

Roland Spicer's record setting Bellanca Skyrocket, built along with a sister ship in five months. Has a built-in nine gallon tank, although she took off with only 6-1/4 gallons. After the 454 mile flight, the Bellanca had a little over a gallon left. Roland has plans available.

This is the Type 5 ignition module as described in the text. It does wonders for any engine that uses magneto ignition systems with points and condensers. It eliminates the points and condensers and adds spark advance. Just nail it to the firewall and connect two wires . . . get ready for some fantastic flying!

BIG BIRDS

By AL ALMAN

IS MY TUSH FACING THE WRONG WAY?

That's the big question. According to a number of folks, my tush is most definitely out of alignment. As they couldn't possibly be referring to my own personal, still youthfully slim, supple, and sinewy body, their comments must be aimed at the logo on our (Puget Sound Rocs) newsletter . . . which is aptly named, "The Roc's Droppings."

I was expecting some kind of feedback about the newsletter: you know, like, "It's really good" . . . or, "It's really lousy?" . . . or whatever. But instead, most everyone seems to be up tight about the direction the Roc's tush is now facing; these same people insist that I goofed and should have the BIG Bird turned around.

May I direct your eyeballs to the photo of the newsletter masthead. Now I know that very few of us are experts, or even knowledgable, about a bird's tush . . . any bird's tush . . . and I also know that whatever is in the logo normally does face the center of the page. However, in my defense, let me point out that in keeping with the true spirit of the name of the newsletter, the Roc *is* perfectly positioned. Consider how he'd look if I were to turn him around; he'd no longer be able to contribute heartily to the newsletter pages, and without this humongous legendary bird doing his thing, "The Roc's Droppings" would have to be renamed.

Whadyathink?

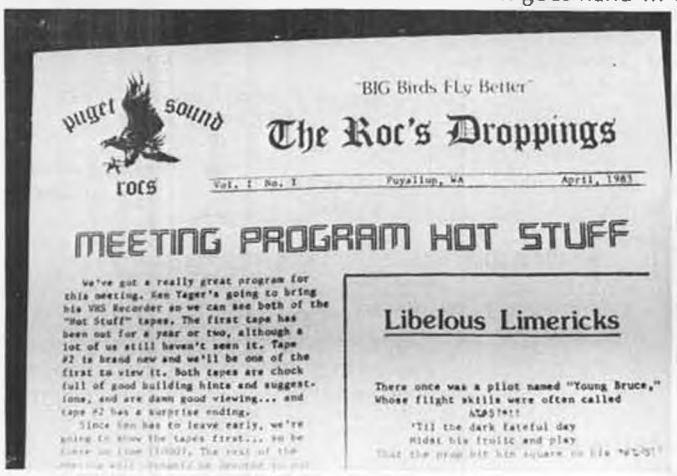
RELIABILITY

It goes hand-in-hand with safety; you can't have one without the other, and I just found a way to make that gas burner of yours a lot more reliable.

It's kinda hard not to be skeptical about anything touted to make our engines run better because there have been too many "things" . . . mechanical, electrical and liquid . . . that have come down the pike and have been made to sound like THE only salvation for BIG Bird Lovers. Unfortunately, their ideas as to what's good rarely stands up to the acid test . . . flying.

So when Jim Hursh, a new "kid" in the neighborhood, began extolling the virtues of a 1 in. x 3/4 in. electronic module that eliminates the points, is ridiculously easy to install, and enhances performance, I immediately asked for a demonstration (while trying to hide my excitement). And demonstrate it he did, using a 1.9 Roper. Now I have never seen an anywhere-near-stock Roper run worth a damn; they've all been hard to start, rough running, and in general, cantankerous . . . and always fell short power-wise.

However, after seeing and hearing Jim's Roper before and after this com-



"BIG Birds Fly Better"

puget sound rocs

The Roc's Droppings

Vol. 1 No. 1 Puyallup, WA April, 1981

MEETING PROGRAM HOT STUFF

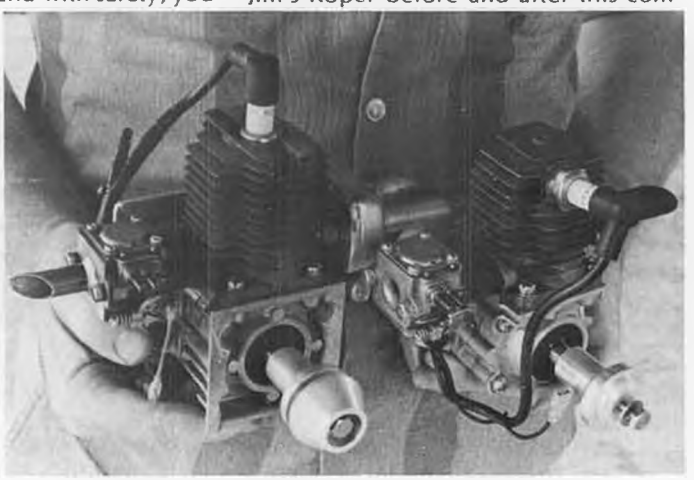
we've got a really great program for this meeting. Ken Yager's going to bring his VHS Recorder so we can see both of the "Hot Stuff" tapes. The first tape has been out for a year or two, although a lot of us still haven't seen it. Tape #2 is brand new and we'll be one of the first to view it. Both tapes are chock full of good building hints and suggestions, and are damn good viewing... and tape #2 has a surprise ending.

Since Ken has to leave early, we're going to show the tapes first... so be there on time (10:00?). The rest of the

Libelous Limericks

There once was a pilot named "Young Bruce,"
Whose flight skills were often called
ASS!!!!!
'Til the dark fateful day
Midst his frolic and play
That the prop bit him square on his

Here's the tush that caused all of the controversy. There really is no other way for the Roc to face; if his tush were facing the other way, "The Roc's Droppings" would have to be renamed!



On the right is a stock Mag-Aero, on the left is a Mag with the high performance head. There is a big difference in power between the two. Another contributing factor is the "velocity stack" on carb.

Steve Stephans, of Roy, Washington, cranks up his new Balsa USA Flybaby. The subsequent test flight was uneventful . . . Steve not only turns out fine looking birds, but he also pays attention to details . . . like balancing, checking thrust and incidence angles, etc.

puter ignition chip was installed, I had to have one also . . . because, guys, it's like a miracle; the engine looks the same, but runs and sounds like you just had some very expensive rework done. Jim says he's seen a bunch of different engines with and without this chip installed, and that every engine ran better and smoother with it. It couldn't be more simple to hook up (the instructions are complete and easy to follow): just connect two wires, one to the coil, and one to ground. This tiny piece of electronics simply bypasses the points (which can be removed) and automatically advances the spark when the throttle is advanced.

I have no idea how this circuit works, or how much the spark advance is . . . but it does work and allows the engine to more closely approach its full potential. In every case, as with the Roper, engines idle better, run smoother, have a more crisp and positive throttle response *without mid-range hesitation*, and better top-end performance. Probably best of all is the reliability you'll get from eliminating those pesky points; no more pitting or burning or fusing or floating in oil . . . and hallelujah, no more gap to guess at.

These modules (by the way, they're made down under in Sydney, Australia) replace the breaker points and condenser in magneto ignition engines and are available in two configurations: Type 5 (green), or Type 7 (blue). Both are the same physical size; it's just a matter of determining whether your engine has a two (green module) or a three (blue module) leg coil. Typically, engines like the 35cc Quadra, the 1.9 Roper, and the Mag-Aero have only two coil connections and use the Type 5 (green) computer ignition chip.

You don't have to baby these modules; they're made to mount directly to a chainsaw and to stand up to all kinds of vibration. As you can see from the pic, Jim Hursh mounted his smack dab on and against the firewall, and made the two connections using the twist caps that are included. Soldered connections might give some of us additional peace of mind, although these caps really do lock on, and Jim's had nothing loosen up in well over two dozen flights on his most-modified Da Giant Stick.

By now you've noticed that I haven't said anything about the price, so you're probably getting ready to either sit down or brace yourself before I lower the boom. Are ya ready? Okay, how does $14.95, plus shipping, sound? That's right! It is a paltry sum, isn't it? Hey guys, even if engine performance remained unchanged, just being able to swap those all-to-often fussy and troublesome points for a reliable electronic system with spark advance is well worth the asking price.

You might be able to get these modules at your local chainsaw or small engine shop, although experience indicates that many dealers don't carry them because the chip makes your engine too reliable and dependable . . . The best and fastest way to get yours is to write to Jim Hursh at 22909 41st Avenue, Ct, East, Spanaway, WA 98387. Postage is $1.50, although Jim mentioned large orders might be free of postage. THESE DO WORK!

AUTOLITE NO. 85

Shortly after moving up here to "God's Country," I mentioned that some of the natives were using Autolite 85s in their Quadras with good results. I finally got around to trying one, and my Quad seemed to run as well with the No. 85 as it did with the RCJ-7Y. A few flights proved to me that this Autolite matched the 7Y's capability for more power without detonation . . . which was unexpected because the 85 is supposed to have the same heat range number as the RJ-13Y and, in fact, is supposed to be a replacement for this Champion plug.

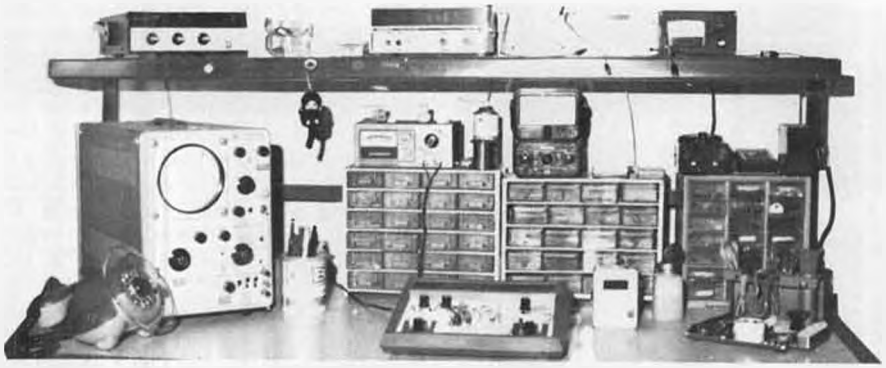
The price for the Autolite 85 is right . . . about a buck-and-a-quarter, and they are readily available. The only "bad" part about this plus is its physical size; like the 13Y, it sticks out 2-1/4 inches, while there's only 1-5/8 inches of the 7Y that protrudes from the head. This certainly could be a problem for those who have to cope with a small cowl.

Bruce Edwards, one of the guys who's been using the No. 85, has put many hours on his big Fleet since switching to Autolite . . . and still hasn't found anything to grump about. So, if something over a half-inch more plug sticking out won't ruin your day, you might try spending a little less money for a change.

CLEANING PLUGS

Continued on page 67

This very impressive and well detailed P-51 was seen at the First Annual Budweiser Fly-In. The event was held in Petit Jean State Park, Morrilton, Arkansas. The owner's name was not recorded, but he is obviously an excellent scale modeler. Don Langer photo.



Electronics Corner

By ELOY MAREZ

CHARGING ADAPTERS FOR SMALL AIRBORNE BATTERIES

It is all Jordan Flakser's fault! In answer to his letter, back in the July column, I mentioned that I had previously written an article which I felt thoroughly covered the above subject, and offered copies to those that had missed it and were interested. Well, we sure sold a lot of those who had missed it and were stamps that the post office has seen fit to bless us with, I'm sure modelers the country over have snapped them up.

Anyway, that and a criticism that I read in another model publication about the lack of a charge indicator for a 100 milliamp airborne battery as furnished with a certain R/C system, has led me back to the subject to see if there was something I might have missed, or if there are some new developments that we might make use of. Sure enough, my research brought to light a National Semiconductor integrated circuit with many possible uses in this and other R/C applications. It is the LM3909 LED Flasher/Oscillator, available from most mail order electronics suppliers, and from Radio Shack (RS No. 276-1705 for $1.09).

National Semiconductor describes its LM3909, which comes in an eight pin DIP package, as: ". . .a monolithic oscillator designed to flash light emitting diodes (LEDs). By using the timing capacitor for voltage boost, it delivers pulses of two or more volts to the LED while operating on a supply of 1.5 volts or less". Also, it does this at miniscule current drains. The basic 3909 circuit (Figure 1) uses only 0.32 ma of current, which most of us can't even measure. At that rate, a new, alkaline D cell will keep that little red blinker going for 5.2 *years*.

We can put this little baby to work for us as a charge indicator for those small batteries whose charge current is too low to light a series LED, as is used for the larger cells. First, let's take a look at the basic charge adapter, or rate reducer, as often furnished by the R/C manufacturer. It is simply a resistor of the proper value to reduce the current flow down to the required amount, with the proper connectors for marrying it into the system. Now, Ohm's Law tells us that a resistor in a circuit will cause a certain voltage drop across it, determined by the applied voltage, and by the current through it. I'm sure you begin to get the picture . . . it is this voltage drop that we are going to use to power an LM3909 circuit, and thus get an indication of charging current flow. As that voltage is already there, and is dissipated as heat, using it for something useful is as close as we can come to getting something for nothing!

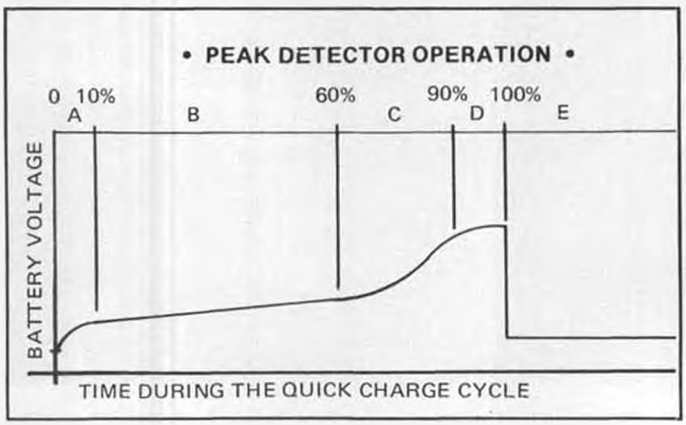
In my test circuit, which involved a 50 ma charger, with which we intend to charge a 100 ma battery, at the recommended 10 hour rate of 10 mils, I had to install a 150 ohm series resistor to obtain that rate. By a happy coincidence, this resistor under this condition creates a voltage drop of exactly 1.5 volts across it (see Figure 2), and when the LM3909 is connected to it, with the proper polarity, the LED flashes merrily away, at about a one-second rate. As with your normal LED charge indicator, if the battery is unplugged or the connection is broken in any manner, the LED ceases to flash.

The circuit as shown will operate with voltages up to three volts, which is probably as high as you will ever run into with a 50 ma charger as a beginning. But there are so many chargers and so many battery sizes now, there are some combinations that might result in a higher voltage being developed across the dropping resistor. If so, simply divide the total resistance into smaller individual units, to obtain a lower voltage across just one resistor. Using arbitrary values to keep the calculations simple, assuming a five-volt drop across a 500 ohm resistor; you would find one volt across every 100 ohms. Using a 150 and a 350 resistor in series to obtain the desired total, we would be able to draw out 1.5 volts from across the former.

This simple solution works in this case due to the very small current drain of the 3909 circuit. If we attempted to draw a higher current from across the series resistor, all of the currents would change, causing all voltages to change, etc. But it works in this case, and leads us to another possible use for this IC, as a. . .

TRANSMITTER "ON" INDICATOR

Some time ago, another model publication showed a simple LED "on" indicator for the transmitter, it was recommended as an added reminder that you had left it on and were running down your batteries. The idea is not without merit, except that in that case (a simple LED with a series resistor across the transmitter's 9.6-volt NiCd) you are running the battery down at as much as a 25 percent higher rate. Here comes the LM3909 LED flasher to the rescue again!



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

Delta Manufacturing BC824 Peak Detector Charger. See text for a description of its operation.

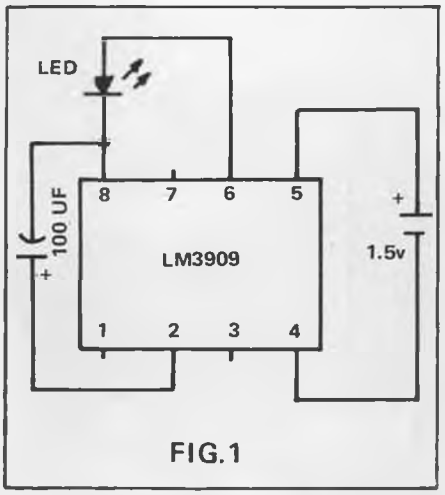


FIG.1

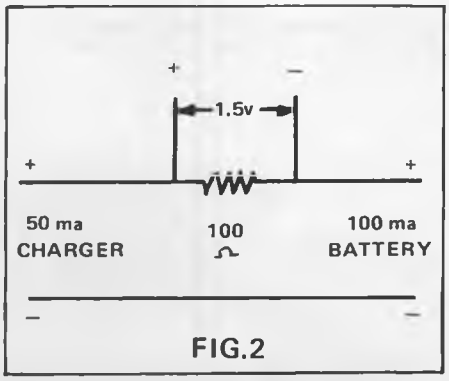


FIG.2

National Semiconductor LM3909 LED Flasher/Oscillator IC circuitry for use as a "Charger ON" light (left), or a "Transmitter ON" light (right). Above: 1.5v from charger leads is accomplished through 100 ohms.

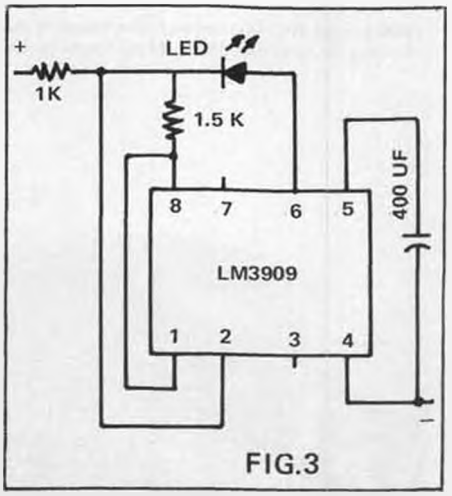


FIG.3

It will consume such a small amount of current that it can be disregarded, and the possibility certainly exists that the little flashing red light will catch your eye at the right time. For this application, I can recommend the circuit in Figure 3, driving an LED mounted in a reflecting chrome holder, such as the Radio Shack 276-068.

There are bound to be other uses for such a handy IC device, and for those of you who wish to do your own experimenting, I have a National Semiconductor, specs and application sheet which I will gladly share with you for the usual SASE, and your promise that you will share the results of your thinking with the rest of us.

EXPANDED SCALE VOLTMETERS, CYCLERS, AND SUCH!

I had a note from Earl K. Purkey, of Morristown, Tennessee, who relates his experiences in trying to connect a Tower Hobbies ESV to his Circus IV (JR) transmitter. It doesn't work, and neither does connecting a cycler through the charge jack, due to an internal diode that permits the charge current to flow in, but nothing to flow back out.

This diode is common in a number of the Japanese radios. To my knowledge, it is found in not only JRs, but also in Futabas, Tower System 500s, old Cox/Sanwas, and the SR Series Airtronics, possibly others that I don't know about. Unfortunately, I am not sure what it's intended purpose is, and can only surmise that it is in there to protect the battery in case the charger is plugged in with reversed polarity. Though if a charger is furnished (which it is), and a non-reversible plug is used (which they are), the chance of a backwards connection is almost non-existent. If the charger was not already providing the DC necessary to the battery, the diode would then have a purpose, to rectify, but that is not the purpose either. Who knows?

Earl further writes that he has been told to just let the transmitter stay on till it stops working, and then recharge, in an effort to cycle the batteries. This I certainly don't recommend, as another problem might occur, that of reverse charging. NiCds don't like to go down below 1.1 volt per cell, 8.8 volts in the case of the normal eight-cell transmitter battery. Sometimes, for another *who knows* why, when they are recharged in that condition, they go into reverse polarity, which is not good for the life of your airplane.

Actually, I feel that cycling, for the sake of cycling, is really important only to those who fly once or twice every other month, and during the winter for those who are unfortunate enough to be grounded for long periods of time. The active flier, who uses his equipment an hour or so two or three times a month seldom has battery problems. A cycler, the type that tells you elapsed time, is more valuable because it tells you the condition of your battery, in a way that really matters, the actual capacity. This will allow you to catch that sneaky cell that has less capacity than it should and is sitting around waiting for you to take that "one more flight" before it zaps you.

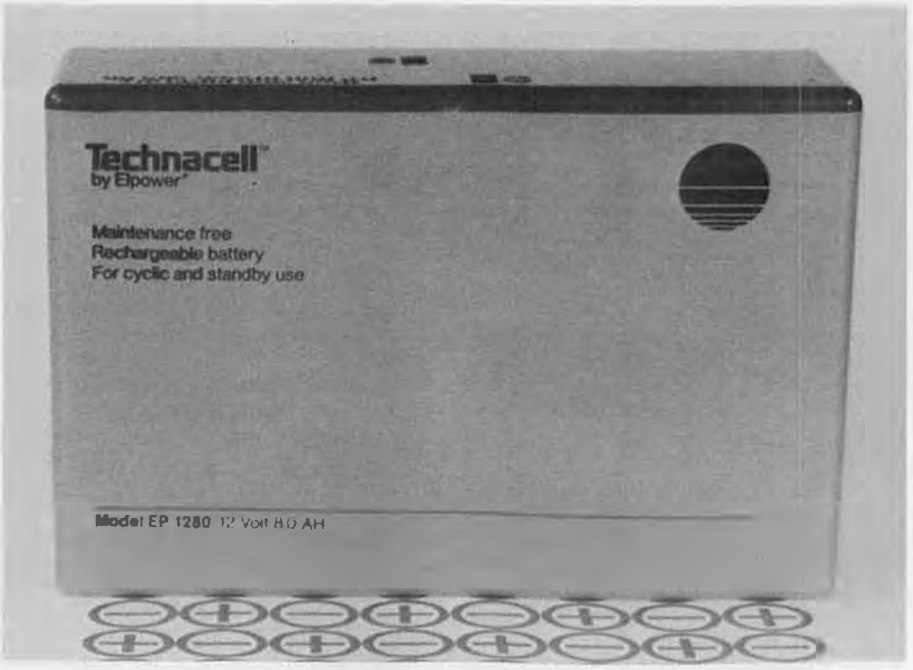
In the meantime Earl, it really isn't all that difficult to connect a battery test plug to any transmitter without one. Use one of the small power connectors from Radio Shack (such as No. 274-1759, or No. 274-1551, plus-to-plus, negative-to-negative) and you are in business. Do *not* use a phone jack for this, as a momentary short is created every time the plug is inserted in the jack.

NEW FREQUENCIES, ET AL!

You are probably bored to death with stuff about the new frequencies and their related problems by now. Unfortunately, on some subjects, such as that one, there is unavoidably some repetition from publication to publication, as none of us knows what the other one is doing. Quite often two or more of us wind up saying the same thing at about the same time. Well, bear with me, I have to touch on the subject one more time, though it is on a point that I don't believe has been mentioned in print before.

The subject has to do with plug-in crystals, which have been with us for some time, but which with the advent of

Continued on page 80



Technacell 12-volt rechargable, "Solid-Gel" battery for just about any 12-volt field use. This battery is sealed so it can't make a mess of itself or you . . . weighs 8.2 pounds.

Associated RC150 chassis hides beneath Associated's Ligier Maserati GT body. Would you believe this car had a half-dozen races to its credit when this picture was taken? It did!

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR

• Last month we went off on a tangent, talking about the proper approach to club racing and car setup, this month it is back to business, dealing specifically with Associated's club racer, the RC150.

We left off with the motor/carb setup. As mentioned, the K&B .21 is an obvious, and very good choice. Back when a car like the RC150 was the "in thing," we did have some reliability problems with K&Bs; we had to build our own full-complement rear ball bearings, replace broken center blocks, replace broken cranks, and so on. *No more*, K&B has *fixed* all of the problems I know of, and the motor now has the power that made it the number one race motor a few years ago, plus the reliability to easily go a season at a time between look-sees at the internals.

The motor that Snyder is using in this particular RC150 is the 8800 series K&B .21, current at the time, now replaced by a later version that has a chromed back door, stronger mounting flanges for the header, a square heat sink head, and the best internal machining yet with the finish on the liner being super. The Dirty Racing Team just finished installing one of these motors in our RC500, so you know you'll hear more about it as we get some racing time in.

In any case, your club race motor has to be reliable, it has to put out decent power (no "Killer Motors" required), parts and accessories have to be easy to get . . . *and* it has to be fresh. Needle settings are really no problem if you pay attention to what the motor is telling you, but worn out motors don't always tell the truth. Make it easy on yourself, start with a new motor.

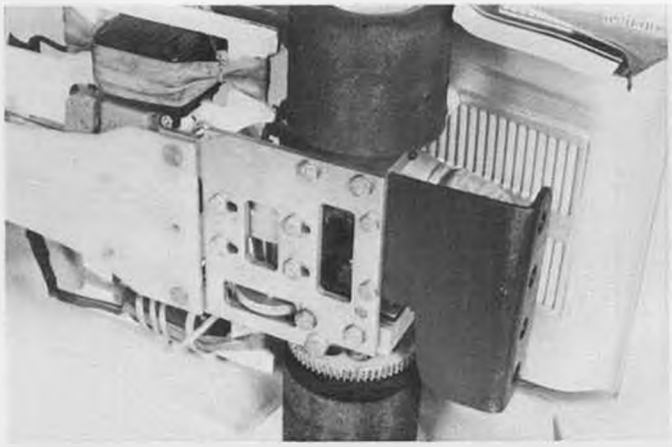
John is using an older version of Delta's slide valve carb on his K&B, this is the one with a flat plate slide, and I believe they are an out-of-production item. If you can find a used one, pick it up. They are very reliable and easy to work with, plus carb tops with different bore sizes were also made, allowing the knowledgeable racer to tune the power to the track. If all you can find is a Delta carb with one top, and it measures anything over .200 bore, forget it. However, it is possible to fabricate a part which looks like a washer, slipping it *under* the slide, and you can whittle out several of these with bore diameters ranging from .125 to .200.

If you are serious about 1/8 racing and just know your next car will be one of those hot-tip suspension numbers, best choice for a carb is again from Delta, this time their current slide valve carb, the SVC800 series. There simply is not a better carb available . . . which is a good thing considering the $60.00 price tag on them! One of the nicer features of this carb is the easily replaced nylon insert that allows you to change the bore size of the carb by switching to an insert of a larger or smaller bore. I still use this feature; lately I have found myself driving too much on the edge, once in awhile overshooting a corner, and for this weekend's race am actually going from my usual .200 insert back to a .161 that I drilled over-size from a .125. If that gets me back to driving the close line, then there are a couple .187 inserts in the box, or if things are going really well and the car is just perf, the .200 insert will go back in. Matching the power to the track and your style of driving is *very important*. Don't ever forget it!

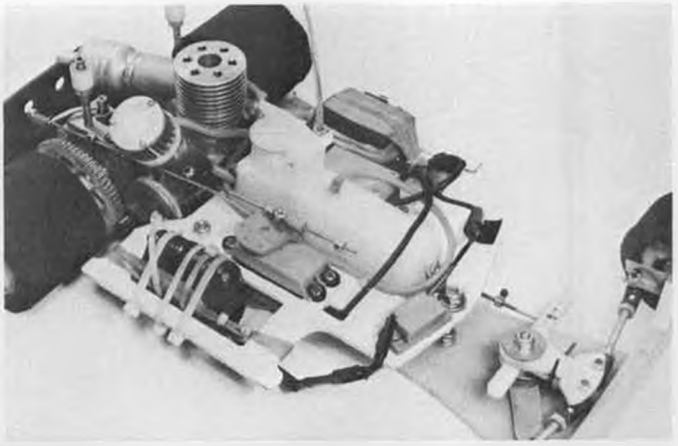
Don't mistake my use of the smaller bore inserts for an inability to drive the car in a tidy manner. I already do pretty well in our club races, but the super-smooth line is where it's at. With a teeny choked area in the carb, such as you get with a .161 insert, you are forced to drive right on the line and to be smooth. You can't jerk the car around because you have to *maintain* momentum, not having the brute power to *regain* it. Lap times are the bottom line; I fully expect to be slightly quicker with the .161 insert. Then, when the natural rythm of smoothly getting though our infield comes back, going up in bore size should result in even lower lap times with the car squirting from corner to corner a bit quicker. *However*, even for experienced racers, the first order of business is getting the twisty stuff figured out to the max, even if doing so means having to sacrifice the straightaway.

Back to carbs, Dick McCoy offers a pretty close copy of the Delta number, and his is less money at around $40.00, including the changeable inserts. The DRT used an early example of the McCoy carb on the K&B 8800 in the RC500 for almost a year, although with the recent change in engines, we also went back to a Delta carb. Late word via Gary Kyes is that Dick has made some detail refinements to his carb, so it is worth checking into.

For a low-bucks approach, there are literally tons of brand-new Perry small bore carbs laying around the workshops of racers with several year's experience



Bottom view of the RC150. Note huge, homemade Kydex bumper, strong engine pod and bolts, and ground-flush Phillips head screws.



Top view RC150. Car is currently being raced as you see it, with: 5-cell batt.; RX on left; old-style Thorp muffler; MRP clutch; K&B .21.

behind them. You see, K&B used to sell their car motors fitted with Perry carbs, but very few racers used them, instead throwing them in with the pile of spares. These carbs work OK and can be had for little money. They are extremely sensitive to junk in the fuel, however, and even a very fine hair can clog the idle passage, causing untold frustration.

The usual mesh fuel filter *will not* trap all of the stuff that can mess up a Perry carb, you must use the most efficient filter available, which is the FF770 from Delta. If you are using either an Associated or a Delta molded nylon tank, virtually the same thing is used as the fuel pickup, this eliminating the need for in-line fuel filters.

When fed only clean fuel, the Perry actually works pretty well if you adjust the idle mixture on the rich side (when set properly, the motor should load up and die rich within 15-20 seconds when allowed to idle without blipping the throttle). The only other problem with the Perry is that it simply wasn't designed to be cycled constantly, as we do with race cars. So they will wear out; carry a spare with you.

No matter what kind of carb you use, an efficient air filter has to be part of the package. When I started racing, the air cleaners were a real joke; most were just the open-cell plastic variety that kept the big chunks out but let fine dirt right in. It wasn't uncommon to tear down an engine and find a build-up of caked-on dirt in the bore of the crank. In fact, I always figured the crank, operating as a centrifuge, probably captured at least as much dirt as the crude air cleaners did!

The first real air cleaners I used are referred to as "thumb" air cleaners, and MRP imported them from Japan. They are still available from MRP and Associated, and I think that McCoy is also stocking them. If they fit your choice of carb, use them. With a Perry carb, they don't like to stay attached of their own accord, so a stay of some kind is required. I used to bolt a piece of 1/16 wire to the head of the engine, the other end terminating in a loop that fits the head of the cleaner. A little bent-in tension on the wire will retain the cleaner satisfactorily. On some carbs we have removed the thumb element from the base and then zip-tied it to the top of the carb. I can recall doing this with OPS and Supertigre carbs. Most recently, we used this trick on a McCoy carb, using seating tape to build up the outer diameter enough to accept the element.

With Delta carbs, use only Delta air cleaners; they are efficient, rebuildable, and stay on through the most vicious crashes. Adapting Delta air cleaners to other make carbs can be tough but worth a try if you're not satisfied with the stock setup.

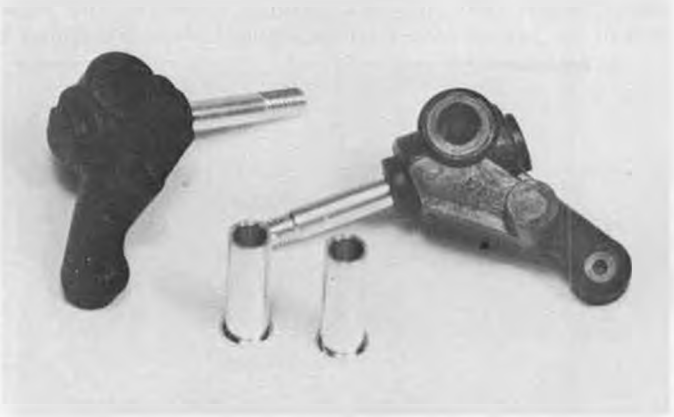
For an exhaust system, most anything sold within the past four or five years is probably OK. Lots of "can" mufflers are out there, as most guys switched from them to the front-mount pipes a couple years ago. If you're buying new stuff, you might as well go with a pipe, but keep in mind that it will run up the left side of the radio tray, which means relocating the receiver. A rear-mount can muffler really makes the most sense on an RC150, however. Just bolt it on a homemade extension to the rear chassis plate. This extension can even function as the rear bumper.

Muffler/pipe pressure to the fuel tank is common practice; it tends to give a more consistent run from a full to nearly empty tank. Be careful of leaks, and use lots of fuel line for the pressure line. Many times racers will simply take a short wrap of pressure line around the tank; what they are doing is decreasing their fuel mileage. At the end of the straights, pressure has built up in the tank, and while the throttle is chopped, this pressure will actually force fuel out of the pressure line and into the header, from there it goes out the exhaust. By using a long pressure line, before the fuel can reach the header, you're back on the throttle. Simple, no?

Transmitting all of this carefully massaged horsepower to the rear wheels is the clutch, and here we made some changes. The first thing to get tossed was the supplied clutch bell. It is too big (15-tooth, as I recall), plus it has a (gag, choke) simple oilite bushing bearing.

Continued on page 79

Delta's latest update kit for the Super Phaser. The Delta steering blocks feature improved wear characteristics. Threaded axles: 4-40.



How badly did you say you wanted to save weight on your Delta Eagle suspension car? Steering blocks with alum. bushings, axles!

This may look like a Hotshot 45, but it is really a reduced size version called a Hotshot IV. This month, Jerry describes how he arrived at his final design, and all of the best mods.

Beautiful. 10 year-old, Denise Dunlap models her dad's Hotshot IV. "Buy this boat mister?"

R/C POWER BOATS

By JERRY DUNLAP

• We'll begin this month's column with a letter I received from Ed Ryder, president of the Broward Model Boat Club of Coral Springs, Florida. I wish to thank Ed for the informative letter and photos.

Wanted to drop you a line and compliment you on the excellent articles you present in **Model Builder.** *My associate, Luis Pinasco and I own the Hawk Boat Company and use much of your information in our work. I have noticed that much of your reader information is supplied by R/C boaters from the western part of the country. Florida and the Southeast are very active areas, and I thought I might provide some information about our end of the world.*

Our year-round balmy climate gives us twelve months of racing, and anyone not minding some traveling can participate almost every month. The winter winds often add another dimension, other than just speed.

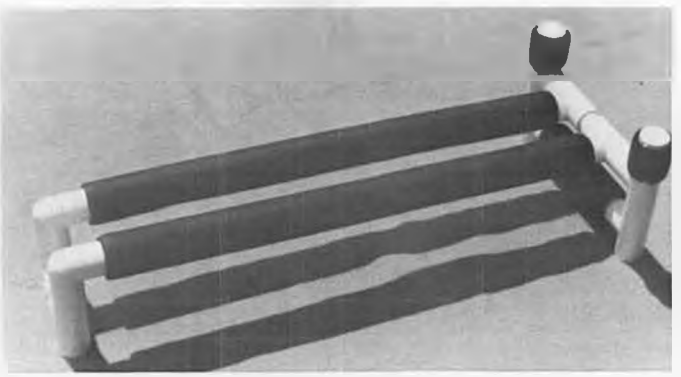
Hull popularity seems equally distributed between outriggers and deep vees. There is a fair share of scale boats, and in the past two years, tunnels have gained popularity quickly. Most of the credit for this can be given to the Georgia and Alabama members. At the last regatta in Atlanta, Georgia, there were thirty-three 3.5 and thirty-one 7.5 tunnels. That was almost one-third of the total entries.

We consider our club the largest IMPBA organization in the country with over one hundred members. (That would also make it the largest model boat club in either IMPBA or NAMBA, jd) *We race at Mission Lake, a city park, with the permission and support of the City of Lauderhill. Twice a year we hold state races in all the classes, hosting over two hundred model boats. We also run monthly races awarding trophies each time and accumulating points for annual awards.*

This past year we added two new races to our schedule. They were run at the Boca Raton Golf and Racquet Club. Boca Raton, Florida and the Woodmont Country Club, Tamarac, Florida. At both affairs, the host donated over one thousand dollars for trophies, a fantastic race site with fairways for surroundings, and a first class cocktail award's party. Racers joined us from all over the state and were supported by hundreds of spectators. At the Woodmont race, we added pari-mutuel betting for the benefit of the Lukemia Society with the bettors receiving donated prizes. Over two thousand dollars was raised for this charity. The races proved interesting enough that we have been requested by other country clubs to hold similar contests at their facilities. Should any of your readers want more detailed information about setting up one of these affairs, please have them contact me. My address is 4401 NW 102 Terrace, Coral Springs, FL 33065.

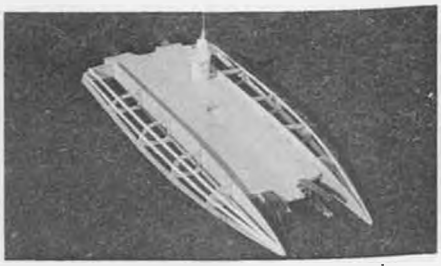
I've included photographs of the various products we manufacture. Of special interest is our new "El Tiburon" (the shark). The picture is of a 3.5 wood hull but we are in the process of developing a fiberglass version. It will also be available as a 7.5. Both sizes are outstanding performers as inboards as well as outboards. Somewhat of a hybrid

Ed Ryder, of Coral Springs, Florida, sends this photo of his Hawk. Twin .90 powered, watch out!



Hawk Boat Co. sells this Boat Caddy for outrigger and tunnel boats. Downward slope of front end prevents engine flooding.

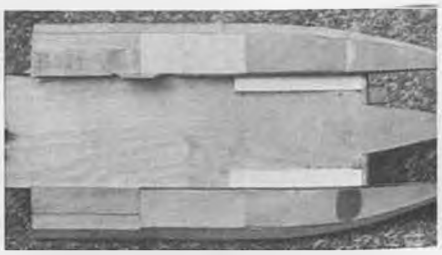
Hotshot IV framework features eggcrate construction. Use building fixture for straightness.



Use Hot Stuff Super 'T' to glue bottom in place. Wooden kits go together FAST!

Clamps are useful to hold sponson sides in place while you work.

Clamps, pins, and masking tape are all used to keep top deck sheeting in place.



Tunnel wedges (light colored strips) are very useful to improve cornering. Simple mod!

Bow wing keeps the boat down on the water while running into the wind. Try it!

design, it incorporates the stability and speed of a four point suspension outrigger with the cornering and aerodynamics of a tunnel hull. The modified tunnel gives it quick planing ability and it tiptoes across the water surface. The scale-like appearance has attracted a good deal of attention. Our main problem seems to be getting other boaters to race against it. It is much quicker than other tunnel hulls, and we do not feel it should be classed as an outrigger. More information about our boats and our "Boat Caddy" can be obtained by writing me at the address given above.

Ed's group and many other boat clubs are doing excellent public relations with their benefit races. This type of event provides a positive image for our modelling activities. I encourage others to share with us some of their promotional or charitable events.

LORD LOVE A DUCK

I'm sure the Lord does love the ducks and all the creatures here on earth. However, I know that most of the model boaters who race at my club's local running site don't share that same feeling. During the last few years, the duck population at our running site, which once served as the location for the 1980 NAMBA Nationals, has increased tremendously. We have a real problem with our floating, fine feathered friends. One would think that the noise of our engines would cause them to go to some other area of the lake. Such is not the case. At one recent race, at least ten ducks were struck and killed.

We have tried the usual things to get them away from our racing activities. Racers' wives and children have gone to the other side of the lake to feed the ducks and have attempted to get them off our race course. The problem still remains. The boaters are getting discouraged because they spend more time dodging ducks than racing. Even though a racer is disqualified when he hits a duck that has been called to his attention, this doesn't help in eliminating the problem.

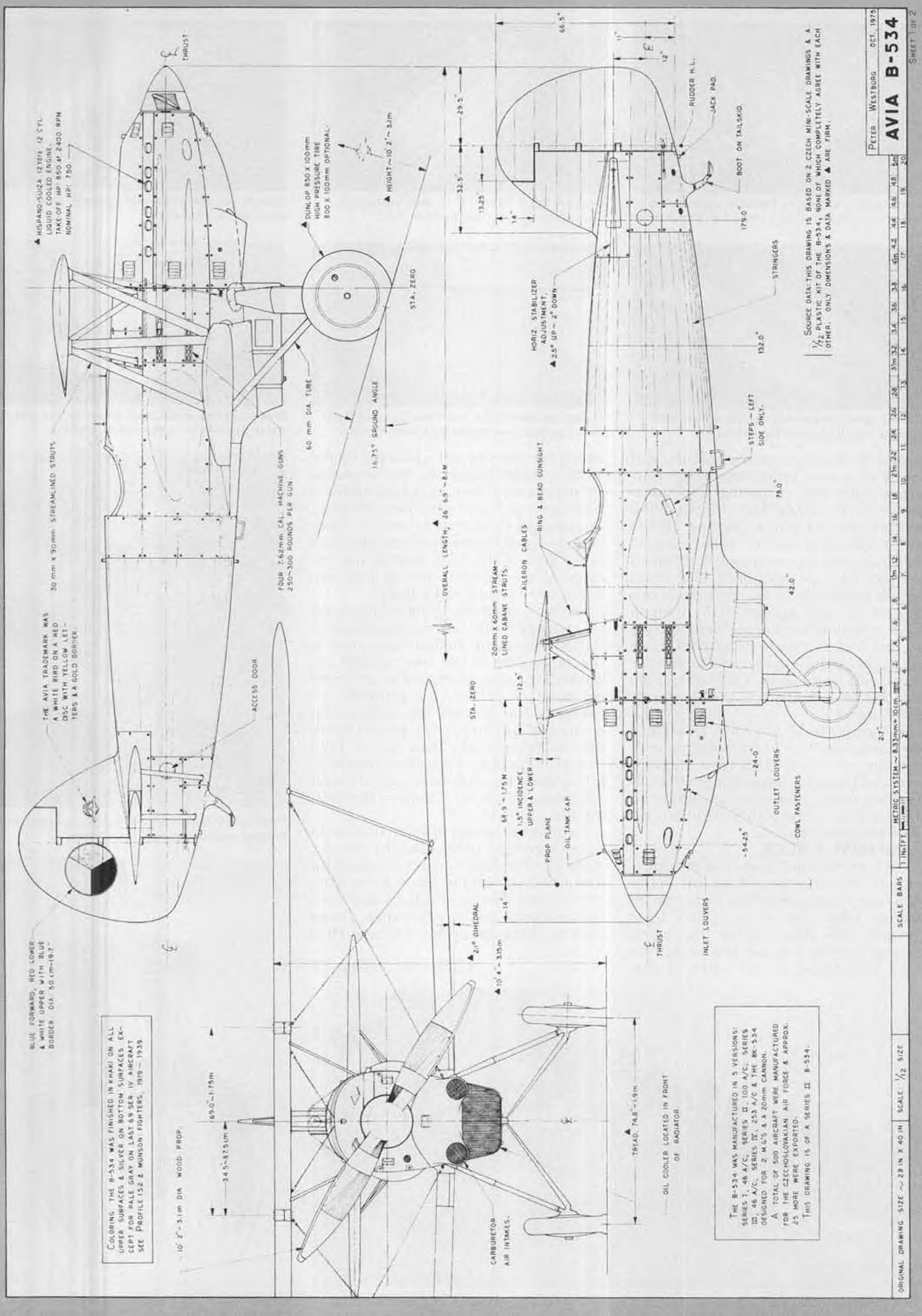
I would be the first to admit that ducks have more right to the lake than we do. After all, it is their home. I'm asking for ideas or suggestions from those who might have similar problems and have found a solution . . . other than a mass duck hunt the day prior to the race. How

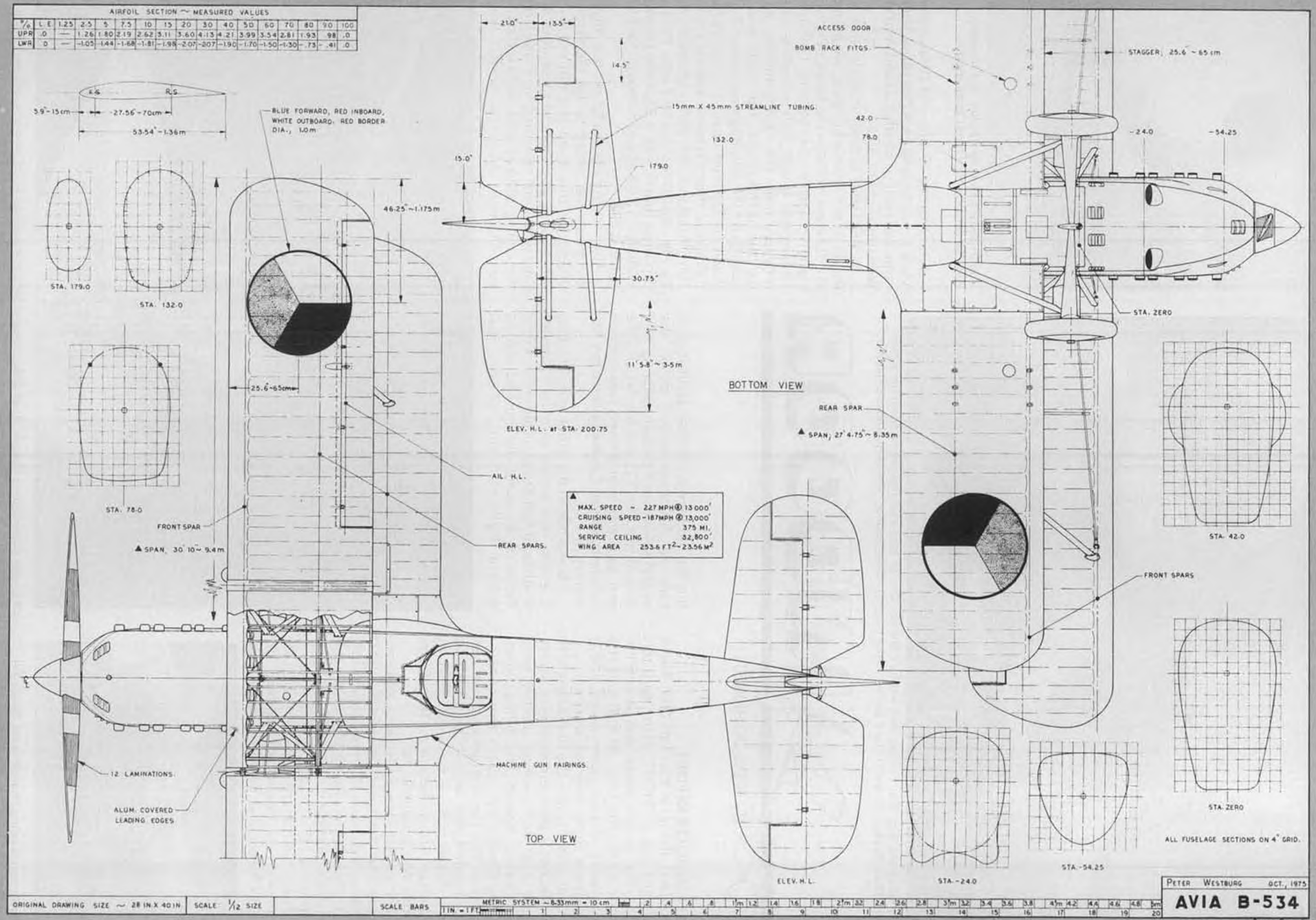
Continued on page 72

Hotshot IV business end: K&B 3.5 outboard; Prather mount; Octura X-442 prop.

The Woodmont Country Club hosted "Race Against Lukemia" in Tamarac, Florida recently, and donated over 1,000 dollars for trophies, awards party, more! Over $2,000 to the charity!

Hawk Boat's "El Tiburon" combines best of outrigger and tunnel design. Very, very FAST!


AVIA B-534
PETER WESTBURG OCT. 1975
SOURCE DATA: THIS DRAWING IS BASED ON 2 CZECH MINI-SCALE DRAWINGS & A 1/72 PLASTIC KIT OF THE B-534; NONE OF WHICH COMPLETELY AGREE WITH EACH OTHER. ONLY DIMENSIONS & DATA MARKED ▲ ARE FIRM.
COLORING: THE B-534 WAS FINISHED IN KHAKI ON ALL UPPER SURFACES & SILVER ON BOTTOM SURFACES EXCEPT FOR PALE GRAY ON LAST 69 SER IV AIRCRAFT SEE PROFILE 152 & MUNSON FIGHTERS, 1919–1939
THE B-534 WAS MANUFACTURED IN 5 VERSIONS: SERIES I, 48 A/C, SERIES II, 100 A/C, SERIES III, 46 A/C, SERIES IV, 253 A/C & THE BK-534 DESIGNED FOR 2 M 6.5 & A 20mm CANNON. A TOTAL OF 500 AIRCRAFT WERE MANUFACTURED FOR THE CZECHOSLOVAKIAN AIR FORCE & APPROX. 25 MORE WERE EXPORTED. THIS DRAWING IS OF A SERIES II B-534.
THRUST
▲HISPANO-SUIZA 12YDRS 12 CYL. LIQUID COOLED ENGINE. TAKE-OFF HP 860 AT 2400 RPM NOMINAL HP: 750
THE AVIA TRADEMARK WAS A WHITE BIRD ON A RED OVAL WITH YELLOW LETTERS & A GOLD BORDER.
30 mm X 90 mm STREAMLINED STRUTS
ACCESS DOOR
FOUR 7.62mm CAL. MACHINE GUNS 250–300 ROUNDS PER GUN.
60 mm DIA. TUBE
DUNLOP 850 X 100mm HIGH PRESSURE TIRE 800 X 100mm OPTIONAL
▲HEIGHT ~ 10' 2" ~ 3.1m
STA. ZERO
16.75° GROUND ANGLE
▲OVERALL LENGTH, 26' 6.9" ~ 8.1M
BLUE FORWARD, RED LOWER & WHITE UPPER WITH BLUE BORDER DIA. 50 cm–19.7"
10' 2" ~ 3.1m DIA WOOD PROP.
69.0" ~ 1.75m
34.5" ~ 87.5cm
CARBURETOR AIR INTAKES.
▲10' 4" ~ 3.15m
2.1° DIHEDRAL
▲TREAD, 7'4.8" ~ 1.9m
OIL COOLER LOCATED IN FRONT OF RADIATOR
20mm X 60mm STREAM-LINED CABANE STRUTS.
AILERON CABLES
RING & BEAD GUNSIGHT
12.5"
68.9 ~ 1.75 M
▲1.5° INCIDENCE, UPPER & LOWER
PROP PLANE
OIL TANK CAP
14"
THRUST
INLET LOUVERS
STA. ZERO
HORIZ. STABILIZER ADJUSTMENT, ▲2.5° UP ~ 2° DOWN
STEPS — LEFT SIDE ONLY.
78.0"
132.0"
42.0"
24.0"
54.25"
OUTLET LOUVERS
COWL FASTENERS
2.7"
66.5"
32.5"
29.5"
13.25"
14"
12"
17"
RUDDER H.L.
JACK PAD.
BOOT ON TAILSKID
179.0"
STRINGERS
ORIGINAL DRAWING SIZE ~ 28 IN X 40 IN
SCALE 1/2 SIZE
SCALE BARS
METRIC SYSTEM ~ 8.33mm = 10cm
SHEET 1 OF 2



To order full-size prints of these drawings, see ad on page 89.

Who says the girls don't enjoy this hobby? Shirley Baxter gets a helping hand from her other half, Dick Baxter. Model is the Feather Plane (No. 5) Ornithopter. Good beginner's flapper.

Flightmasters West sparkplug and founder, Bill Warner launches P-nut scale model.

INDOOR

By KEN JOHNSON

TAFT INDOOR REPORT

Indoor flying at the Taft Free Flight Champs was a "HOT" affair again this year. The temperature was a definite factor, to say the least. At 6:30 p.m. the gyms were already quite warm, and it got wrose as the evening wore on.

Your editor was in the building where the Peanut Scale event was being flown. Many new and exciting models were seen being wound and being flown. Carlo Godel was again the contest director. The Los Angeles area was well represented with indoor flyers such as: Dick Baxter, Chuck Conover, Barnaby Wainfsan, Tony Naccrato, Tom Comparet, Von Whitlock, etc.

The winners were: 1st, Ken Johnson, flying the previously mentioned 1911 Cessna; 2nd, Frank Godel and his Bede 4; 3rd, Dick Baxter, flying his LET (Flightmaster's president, Farrell Papic, also entered a LET).

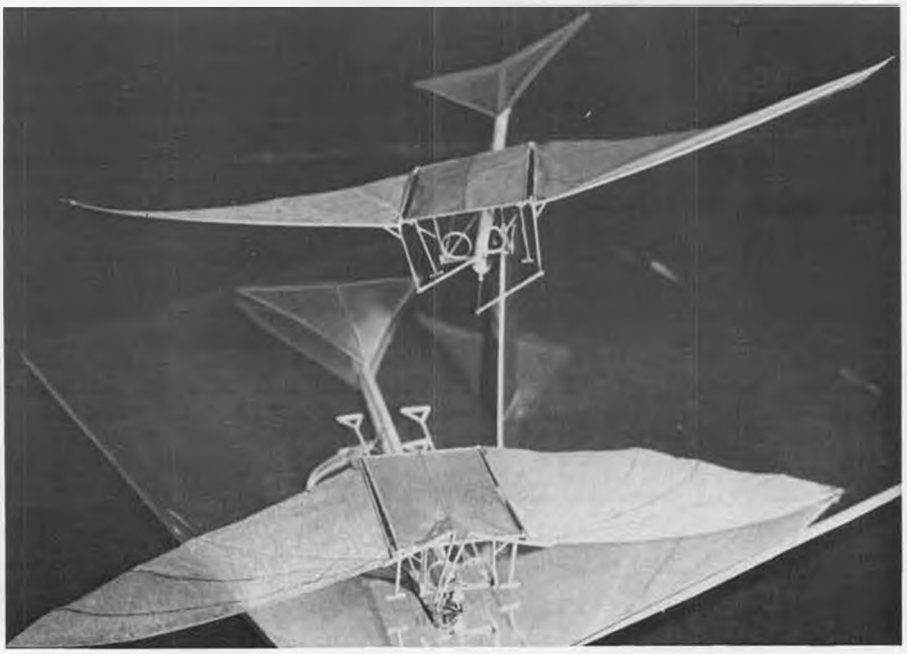
Tony Naccarato flew one of Lew Gitlow's new Peanut kit models. The 1909 Clerget was flown by yours truly, but the model was somewhat difficult to trim. As the turns wound down, the model settled as if dethermalizing. As it turned out, the CG was too far aft (The rear peg was later moved two stations forward), so the Cessna became my No. 1 entry.

Meanwhile in the other gym, The Easy B event was being won by Clarence Mather of San Diego, California. Cezar Banks of the same city finished second with a flight of 7 min. 53 sec., just behind Mather's 9 min. and 20 sec. time. Mark Levoe logged a 6:42 for third. Then came Earl Hoffman with 5:23 and Warren Williams flight of 5:18.

As the Hand Launch models took to the air in the Peanut building, we joined the duration flyers for the Novice Pennyplane event in the second building. There was much pole steering and recovery from the ceiling heating apparatus in this event. The room was a sweatbox! The winning times were: 7:50 flown by Earl Hoffman of Carpenteria, California, then Clarence Mather's 6:43. Third went to Cezar Banks (proxy flown by Mr. Bill Booth) and Fudo Takagi captured fourth with 4:53, while Warren Williams' 5:18 was good enough for fifth place.

After seeing my model on test flight, the prop was noted to be the wrong design for this room and did not warrant putting in an official flight. Half my time was spent retreiving my plane from the ceiling obstructions. Earl Hoffman's and Clarence Mather's models were

Waterman Gosling Peanut racer, beautiful. Builder: Eric Erickson, Pasadena, Calif.



For the experienced flapper flyer only, these scale Leonardo da Vinci ornithopters were both built by the author. Double bellcrank model flies best (top). This was Leo's first airplane.

Dick Ganslen flies his EZB at Bedford Boy's Ranch rec center, Bedford, Texas. Dick is world authority on pole vaulting! Randolph pic.

Chambermaid racer won Peanut for Von Whitlock at Los Angeles Indoor Annual. Two-minute flights common with this one.

most impressive. Perhaps a canard pennyplane entry for next year would be my choice.

THE DANGER OF FLYING WITH TORQUE

Most indoor duration models turn to the left. For this reason, the left wing panel is somewhat larger. This makes the model turn left as the larger left wing is heavier. As the torque force on a duration model is less (the rpm is much less than that on a scale model) the aircraft can turn the same direction as the torque. The lesser pull of torque will not make the model spin in to the left. It is still advisable to add about 1/8-inch of washin in the left wing. If you trim your duration entry to fly to the right, you may be in trouble. Sure, the airplane may fly beautifully in a right circle, but it will be opposite to the other models in the air. The chances for a midair collison are much greater when you are heading directly toward the other models.

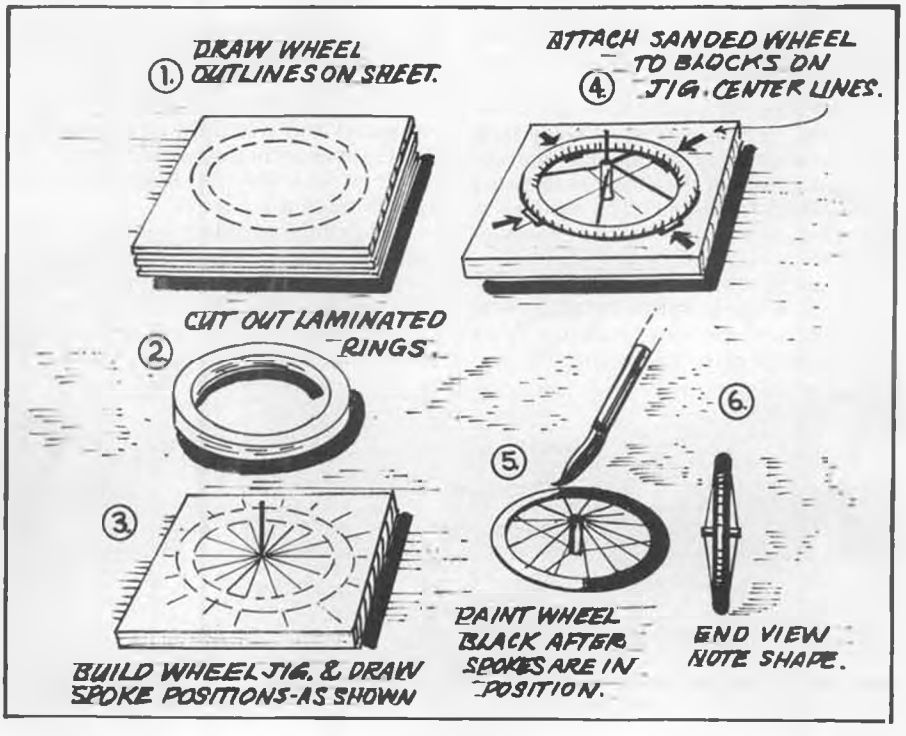
Now, let's consider what happens to a scale or Peanut scale model when it turns to the right or left. The most normal way for this type of craft to turn is to the right. Rudder and/or thrust adjustment will cause the plane to turn right. If this doesn't work, a small amount of clay on the right wing tip will bring it around.

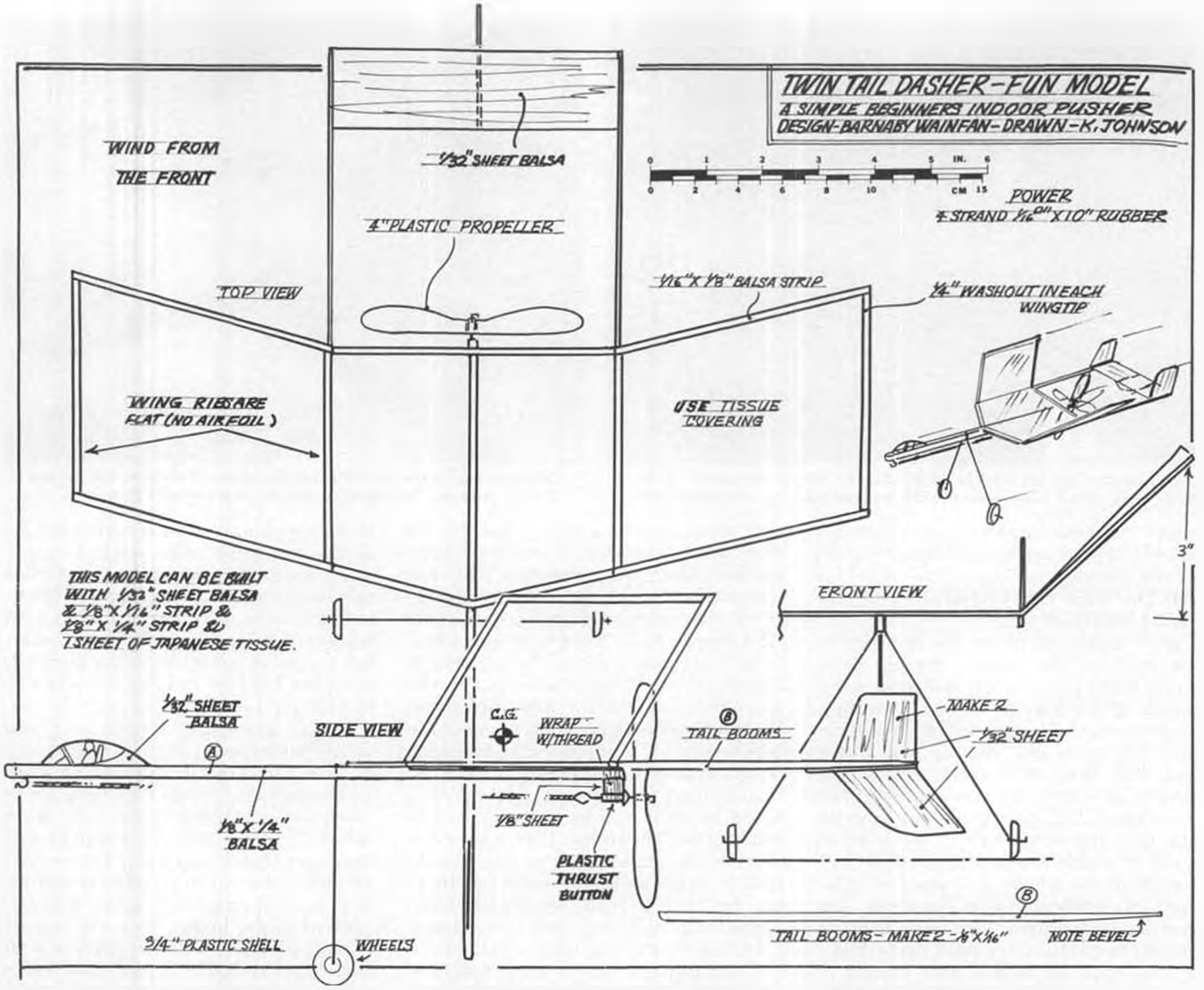
A left turning Peanut is dangerous because of the increased torque. The model may spin in on the power burst and then cruise nicely as the torque dissipates. Chances are the turn will open and your little flying machine will head straight for the nearest wall. I remember an incident at the indoor portion of the '68 Chicago Nats. My little Piper Vagabond was flying great to the left on .035 rubber. The first flights were put in with only about half the turns on the motor. My times were higher than those of the other entries. If I had continued with the same turns on the last flights, the contest would have been won. However, I opted to up the turns to the max. The results were disastrous. Each time more turns were added, the model would spin in to the left. The result was that I lost the contest. If the model had been correctly trimed for a right turn pattern . . . Oh well, more spilled milk!

A comment from the latest Taft contest mentioned above: the room was so very hot and moist that my 1911 Cessna changed its trim by warping. The first flights worked well with right turns, but as the moisture-laden wings began to twist, the pattern was changed to left. In this instance, the plane flew well to the left and won the meet. The extreme washin that developed in the Cessna's left wing was beneficial to the flight. The wing was held up and could tolerate the left torque turn.

If you are flying a high-wing scale model with struts, the strut length can be trimmed to build in a degree of washin in the inboard wing. Breathing on the wing while twisting it may help somewhat. Usually this only works on a structure that is very light. The best way to obtain the correct washin or washout is to build it into the structure when it is pinned to the board. To build in washout on a Peanut scale wing, place a 1/8-inch block near the tip under the trailing edge. The benefit of washout in both wingtips is that this controls tip stall. In other words, the airplane can climb at a

Chris Johnson's P-47 Peanut is covered with condenser paper, painted silver. Johnson pic.





higher angle of attack without stalling.

INDOOR ROW REMEMBERED

Can you imagine flying duration models inside, *and off water?* Well, this was in fact, an indoor event. As late as 1964 I remember going to an indoor meet in a suburb of Cleveland, Ohio, and watching my buddy Ron Ganser set a national record in ROW. A small tank (usually with only about 1/2-inch of water) was set on the floor in the area deemed best for takeoff. The model was set on top of this 18 in. x 12 in. body of water.

The airplane was usually microfilm covered. A stick/cabin fuselage was required, and the tiny, built-up floats were covered with cellophane. This was in the days before Microlite. Ideally, the seaplane would jump right off the water and climb to the ceiling for a flight of about five minutes. The tiny, one-half by one-inch pontoons were mounted on the ends of long balsa struts. If the model nosed over into the water (which happened more often than not), it became saturated and was finished for the day. Many times someone would step in the water or kick the tray across the floor, which made a big mess.

Apparently, people lost interest in this event, and it was later discontinued. It sure was unusual to see a mic covered ship lifting off the water. Needless to say, more power was needed to fly a seaplane than the other types. I'm sorry I never got around to building one of these airplanes.

CONSTRUCTING WHEELS

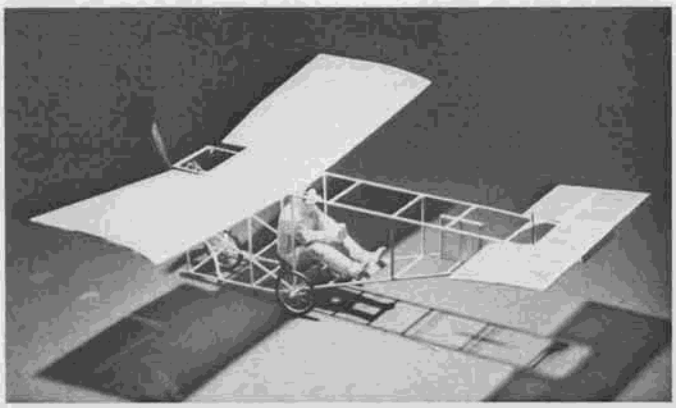
Many builders have shied away from building early airplanes because of the spoked wheels. Many times first place in a contest can be determined by the look of the wheels on the plane.

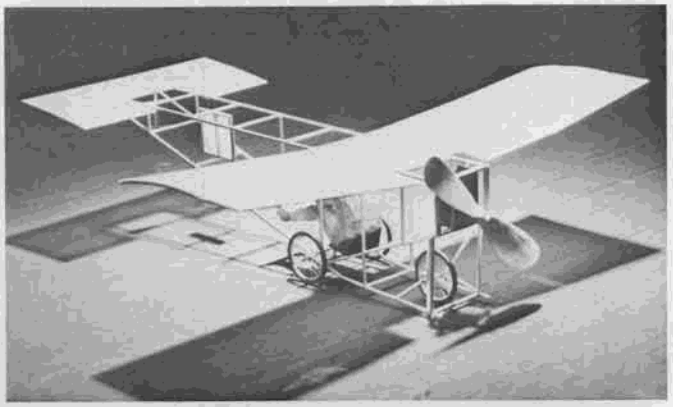
For many years, balsa wheels were available in the rough-cut fashion. They needed to be sanded and painted. Before this, hardwood sanded wheels were used by many modelers. The model airplanes of this age were rather heavy by my standards, partly because of the wheels. World War One wheels

Continued on page 78

Pfaltz Biplane Peanut scale model built by Eric Erickson was perfect from every angle! Ken Johnson photo.

WHOTAPROPELLER! Dick Baxter's LET monoplane flew very well at the Flightmasters West Indoor Annual. Not hard to see why!





WHITE MONOPLANE

By DON ASSEL . . . Here is a really lightweight Peanut that's really different-looking. It's a canard, it has an open framework fuselage, and it flies really well! Give it a try, you won't be disappointed.

• Scale model canards are gaining popularity these days, due in no small part to Flying Ace club rules and the efforts of Burt Rutan. But canards have been with us for a great many years. The White Monoplane canard was discovered in a 1917 issue of *Aerial Age Weekly*. A small ad invited readers to try it, and I decided to do just that . . . but as a Peanut scale model.

A plan of the original plane was acquired from Gordon Codding, of Kingman, Arizona, and as it was studied, some interesting things appeared. Over the years, a number of canards had taken shape on my building boards, but the White was slightly different from the others. It became obvious that the zero degrees incidence in the canard wing and the nine or ten degree incidence in the main wing separated the plane from others encountered. Previous models had been marked by high canard incidence. Further, these models featured a good deal of area in the fin, which was located as far back on the fuselage as possible. The White's fin, by comparison, is small, and is located up front, just behind the canard wing. There were enough contradictions here to create the challenge, and the first White peanut was constructed. It provided a learning experience.

Mini-flights on the first model showed promise . . . until full turns were applied. A nano-second prior to launch there was a sudden and dramatic fore-shortening of the fuselage. It had failed because it has no covering and few uprights to provide strength. The second model was built with spruce longerons, and it is strongly suggested that you use spruce or basswood to provide the strength required.

Construction is simple, generally, but a few points deserve mention.

The wing spar and leading edge are raised to fit the airfoil during construction through the use of thin wedges. When the glue has dried, the leading edge is placed off the edge of the building board, and the aft part of the wing is constructed. Note that both the canard and main wing have movable surfaces. These have been trouble-free, and it is suggested that they be incorporated in your model for the ease in trimming they provide.

Aileron detail. Author's White Monoplane flew best with a touch of "left" aileron.

Wing dihedral is accomplished by simply cracking and gluing, but note that the spar has 1/4-inch more dihedral than does the leading edge. This provides built-in wash out on both wings (both sides of the main wing, that is).

The original plane had spoked wheels, and Hungerford wheels were used on the model. They blend perfectly with the overall appearance of the model, as do the two Williams Bros. engine cylinders.

The main wheels are on an axle under the pilot's seat. The axle is held in place with wrapped rubber, as on the original plane. The aft wheel arrangement is somewhat more difficult, but can be

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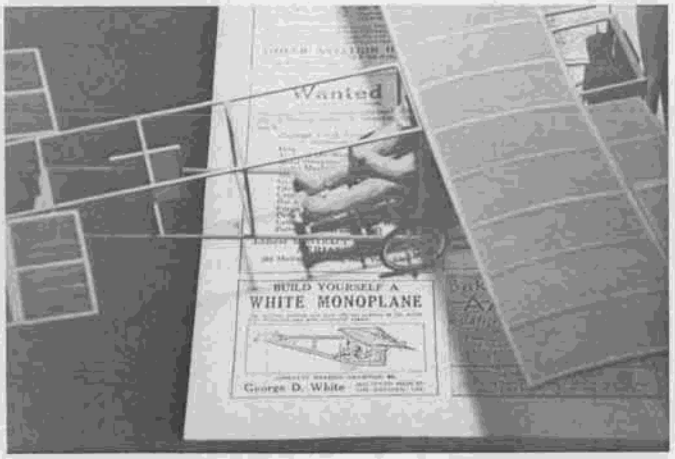
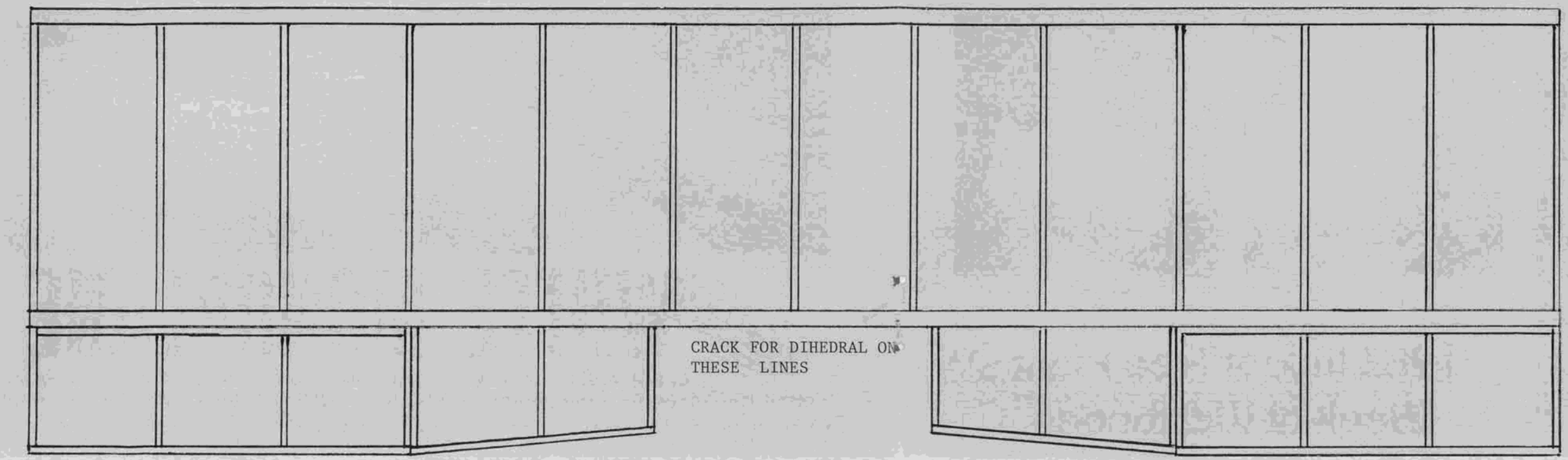


These photos reveal simple framework design and carved pilot used in static display only. Small fin in front of plane is a friction fit in frame to allow it to slide to the right when rubber motor is in place. Note rear wheel framework in left photo, dummy motor in right photo.



DIH.
3/8"

DIH.
5/8"

REAR PROP
PLUG

ALL WOOD SIZES
1/16X1/16 OR 1/16X1/8

ONLY ADJUSTMENT
1/8" LEFT AILERON

FUSELAGE IS SAME
WIDTH THE ENTIRE
LENGTH

FRONT RUBBER ANCHOR
PIN IS VERTICAL

RUDDER BETWEEN THESE
TWO CROSSPIECES

BALANCE
POINT

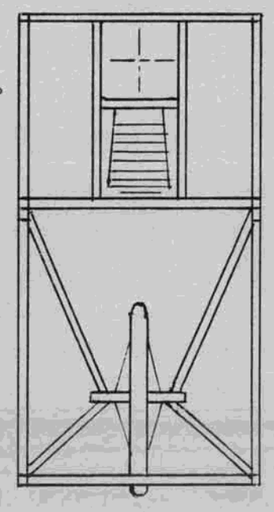
1/16 X 1/8 UNDER
LEADING EDGE

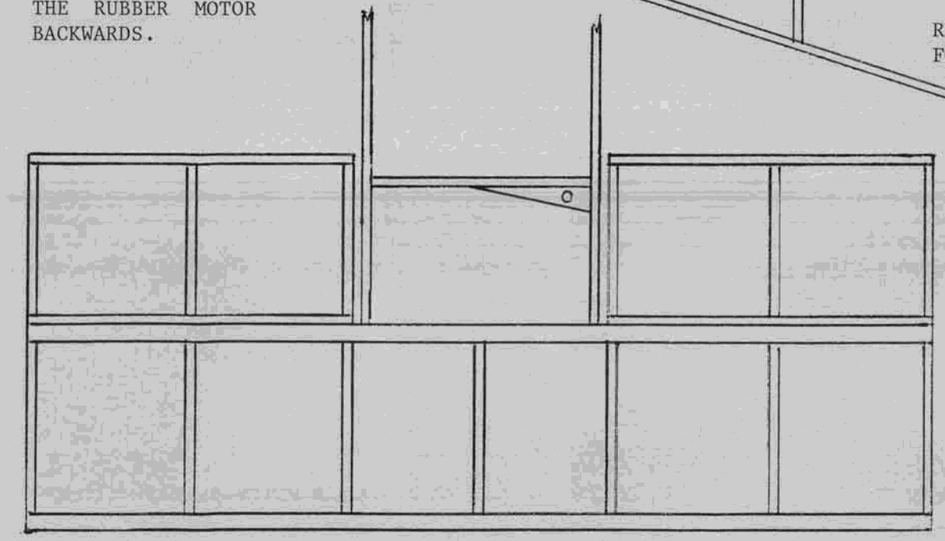
THRUST 0°-0°

REMEMBER TO WIND
THE RUBBER MOTOR
BACKWARDS.

CONTROL
STICK

RUDDER
FOOTBAR

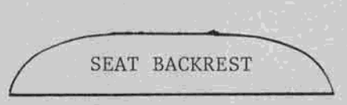




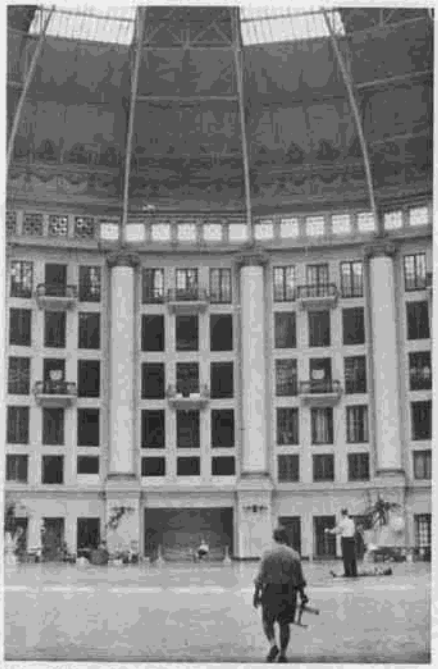
3 HUNGERFORD WHEELS
1 1/4 X 1/8

SEAT

SEAT BACKREST

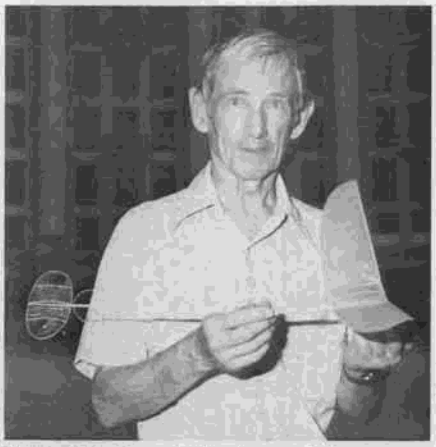


by WIZ



The flying site. Northwood Institute "Atrium" where contestants eat, sleep, and FLY!

NFFS President Tony Italiano was CD for the event . . . even got a chance to compete!



Walter Erbach established an ornithopter record with this model. Note long fuselage!

1983 Indoor Free Flight Week at Westbaden

By JOSE TELLEZ . . . The week of June 12 through 18 was the NFFS's second indoor championship *and* the National Indoor Model Airplane Society's eighth record trials and Peanut Grand Prix at Westbaden.

• And, what a week we had! Attendance, weather, quality of flying, all in one choice site where you could rub elbows with the very best competitors this country has produced.

Fliers arrived from throughout the eastern seaboard, from Florida to New York, the Midwest, Texas, and California. Great Britain was well represented by one of their most enthusiastic fliers and a great ambassador, Butch Hadland. Butch not only competed successfully, but also took on the task of judging the Peanut Grand Prix entrants and was one of the speakers at the NIMAS banquet, giving us an eloquent description of indoor activities in Britain.

Canada was well represented by a half-dozen flyers. Canadian Jack McGillivary was also a NIMAS banquet spokesman and told us about flying inside an empty steel water tank during the Canadian winter. The temperature in the tank was low enough to render the rubber motors useless and to cool their enthusiasm.

Butch Hadland told us how in Britain the two big hangars at Cardington had been declared national monuments to be used for a museum and other such activities including indoor flying. Looks like Great Britain will thus have an indoor site in the foreseeable future. During the winter, the modellers have to pay the heating bill when they fly (about £ 90 or U.S. $150) but this is a small penalty for the knowledge that the site is available.

Butch also commented on having obtained permission to fly at a monastery. All went well between models and angels until a devout procession of chanting monks marched through the main hall creating drafts and mass destruction of the non-celestial fleet. End of monastery flying.

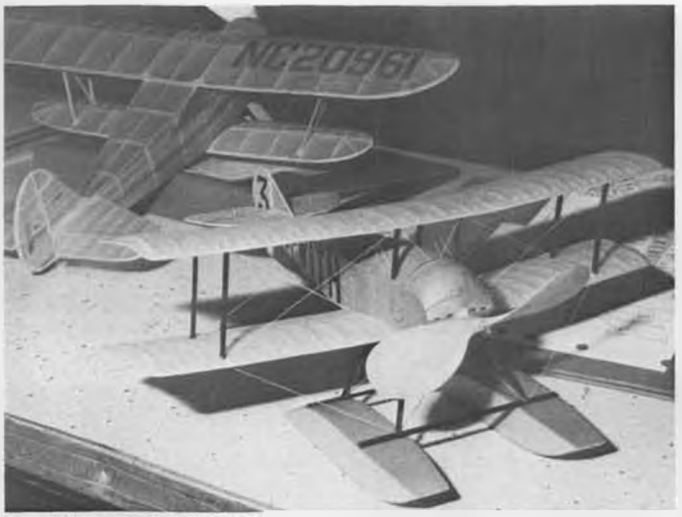
During the World Championships two years ago (see November 1980 **Model Builder**) we told you about the variable pitch propellers being used by British flyers, Dave Pym and Bernard Hunt. Butch Hadland tells us that they have developed a much improved version which will be unveiled at the next World Championship to be held next year in Nagoya, Japan. Butch feels, as I do, that the day of the fixed pitch prop for indoor FAI is soon to end. It is surprising to me that not many of the U.S. fliers have gone to that trouble yet. The only U.S. flier using a variable pitch prop during this Westbaden week was Jeff Annis, who had problems with mid-air collisions and failed to place.

For those interested, the detailed placings through third place are pre-

Remember the Steeb servo? Geared, twin engined, Bostonian by Don Steeb.

Phil Cox built this outstanding J-3 Cub from *Model Builder* plan No. 782 C.P.

Aaron Markos shows off his Lacey M-10. This youngster won many events, see results.



Lloyd Wood built this beautiful 1913 Schneider Trophy winner, the Sopwith Tabloid.

F1D second place winner, Cezar Banks, carefully weighs his model on the electronic scale during processing.

Tony Bough is all smiles after a flight with Burr Stanton's all-foam "Bostonian."

NFFS Executive Director Hardy Broderson assists Ed Courtright, a local R/C flier.

Father/daughter team, Dennis and Jeni Jaecks prepare an SE5 built from *MB* plans.

sented at the end of this article, so we will try here to give you some of the highlights.

The first half of the week was the NFFS meet with Tony Italiano acting as CD, and ably assisted by Hardy Broderson, Charlie Sotich, and Gordon Wisniewski. Tony and crew did a superb job; the contest was so well run that these gents even had time to do some flying. Tony should run a course on how to prepare for, and then run a contest. No complaints, protests, or confusion with the largest turnout Westbaden has seen to date. Saturday was reserved for test and hangar flying. Official events commenced Sunday afternoon with Easy B and Paper Stick. These categories attract beginners and experts alike, and at Westbaden, the air above your head looks like a summer evening around the swamplands! A computer model of the air picture would have predicted abundant mid-air collisions, and that was the order of the day.

The list of winners for these events is truly a who's who of indoor modelling: Richmond, Chilton, Obarski, Van Gorder, Markos, Banks, Skrjanc, Norell . . . just what one might expect, and a fact that points to a suggestion I first heard from Stan Stoy a few years back. Stan feels that instead of the current Jr., Sr., Open classification of contestants in accordance to their age, we should have Novice, Sportsman, Expert classfications

Dave Erbach (Canada) flew one of the few remaining indoor cabin models in captivity.

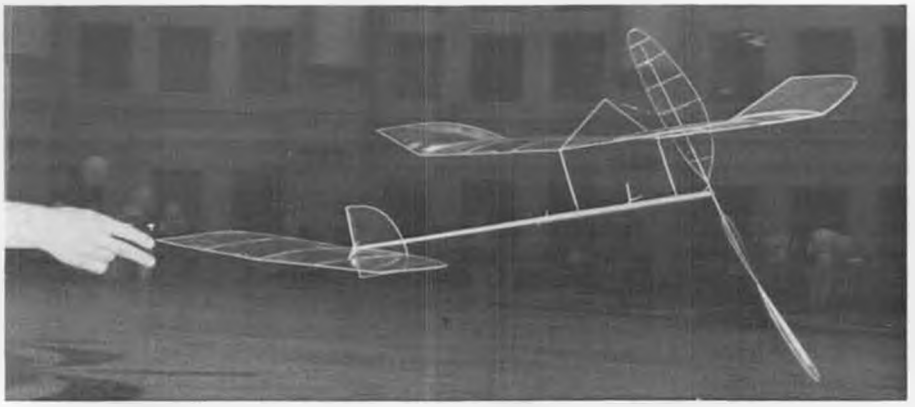
Stan Chilton (Kansas) processes paper and stick model; took 2nd with 24:46 flight.

Butch Hadland (Gr. Britain) judged scale entries. Phil Cox's J-3 Cub, again.

Bob Clemens (New York) entered this Luton Minor in the AMA scale event.

Bob Siedentopf's fantastic Stinson Voyager placed 2nd in AMA scale.

EZB rules say wood structure only. Richard Obarski complies fully with this model which uses fine balsa strips for "wires."



Rich Doig (Mich.) releases his F1D indoor model. It came down 31 minutes later!

as is done in R/C Pattern. This would surely encourage some newcomers who are not necessarily minors. The way things are today, it takes many years before a newcomer stands a chance to see his name on a winner's list. More about rules later, now let me continue with the contest.

As Easy B and Paper Stick models swarmed overhead, a friendly gent from Lincoln, Nebraska, Walter Erbach, was systematically working with a small fleet of Ornithopters. These differed from most that have been built to date in that they had high aspect ratio wings and very long tail moments. Within a couple of hours, Walter managed to crack the existing record with a flight of 3:41. If you have ever watched these non-living flappers, you know that this flight is an accomplishment that will be tough to match.

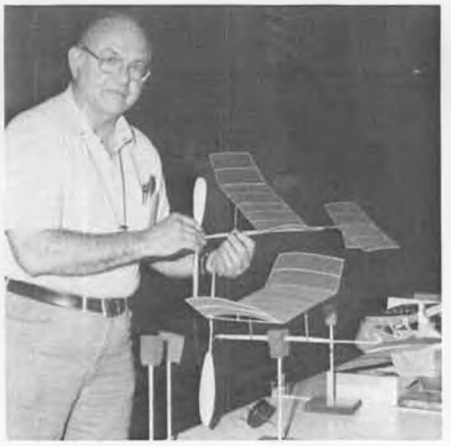
Ron Ganser from Pittsburgh has been playing with Ornithopters for several years, and he pulled from a box his new secret handiwork. This bird was a twin-motor, double-boom flapper with one motor driving each wing. Unfortunately, in spite of the terrific workmanship, the bird was a total failure. The wings were beating alternately, and it just seemed to beat the air with no results. Next time, Ron will stick to the way the breeze-flapping daddys from the old school do it, rather than come up with new inventions. Walter Erbach's new record thus stands, and we congratulate him.

During the meet, a fine gent by the name of C.F. Shultz displayed an impressive collection of old-time plans, mostly rubber scale. These are full-scale copies from old-time kits like Comet, Joe Ott, Megow, Stanzel, Peerless, Ideal, and many others. The price was most reasonable at $1.50 each. He has a price list with about one hundred plans. If you're interested, drop him a SASE at 910 Broadfields Drive, Louisville, KY 40207. He had with him two Foker D VII Cleveland kits which I promptly snapped up, along with plans for an XS-1 Cox Klemin seaplane which was a small biplane hydro meant to be carried aboard submarines.

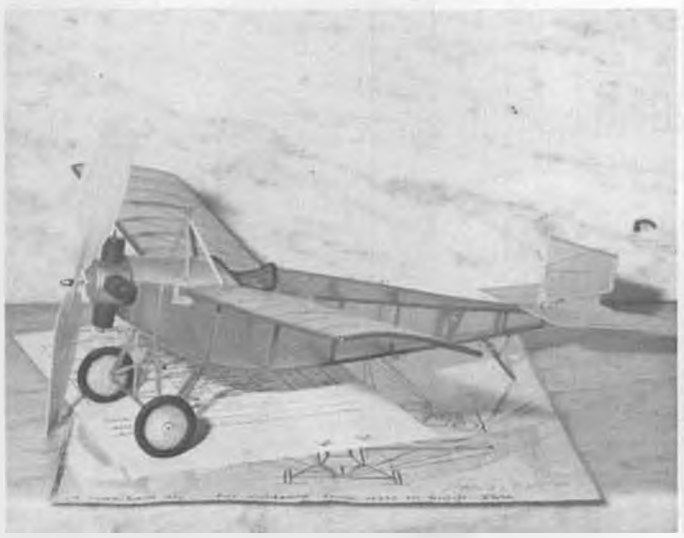
Back again to the Paper Stick event . . . worthwhile noting was the advanced state-of-the-art of these models once intended for beginning modelers. The winning models are now extremely delicate . . . possibly just as delicate as the microfilm ships. Stan Chilton, who is one of the more advanced fliers, was using boron fibers to reinforce the motor stick, and he also was using the highest aspect ratio wings. In the end, first place in the event went to the most calm and cool flier, Jim Richmond with 26:57. Chilton placed second with 24:46,

Richard Doig poses with the ultimate (?) AMA stick model: 300 sq. in., 1.3 gr., 26 in. prop.

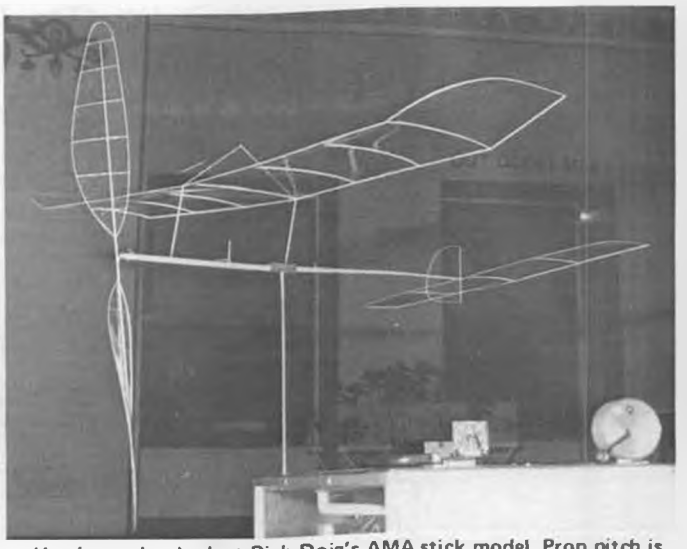
Dave Erbach (Canada) earned a second place with this Bostonian model.



John Voorhees (Ohio) is an R/C flier who is just getting started in indoor. EZB models.



Paul McIlrath entered this fantastic 1911 Caudron monoplane in the NIMAS Peanut Grand Prix.



Here's another look at Rich Doig's AMA stick model. Prop pitch is a steep 45, and with its 26-inch diam., it turns about 40 rpm!

Californian Larry Cailliau took 1st place in FAI with this model. Times: 37:51, 35:32.

and Obarski was right at his heels with 24:40. Think of these times . . . almost one-half hour with a paper covered, all wood prop, rubber powered model with no thermals to help!

Easy B events also were won by the experts, and they had superb times: Markos, Van Gorder, and Banks all topped 18 minutes. As good as these times were, later in the week during the NIMAS record trials, they were exceeded by a substantial margin when

Jack McGillivray (Canada) prepares his 1st place winning Bostonian.

Ron Ganser (Penn.) flew this twin engine, biplane flapper. Twin engine bird???

Stan Chilton, the scientific flier from Wichita, Kansas, established a new record of 22 minutes and one second. This flight brought the house applause upon landing.

Tuesday morning was reserved for Indoor Hand Launched Gliders (IHLG).

Jack Carter checks the heavy traffic above prior to releasing his AMA stick model.

Former world champ, Jim Richmond, winds his F1D. Took 3rd in this NFFS meet.

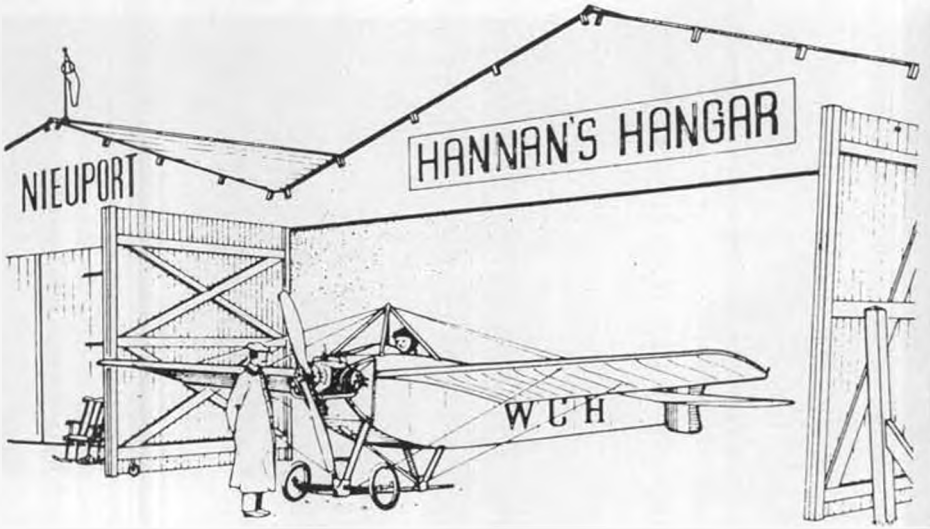
One of several entries in the P-nut Grand Prix by Mike Arak. Piper Vagabond here.

One flier, Bernie Boehm, had the meet won from the start. He has the best catapult arm I have ever seen and it is consistent. After launch, his first flight hit a wall and was short, but from then on, every flight exceeded one minute. One hundred thirty-six seconds for two flights was his winning time; 116 seconds was his closest follower, Bob Larsh.

I truly missed seeing Stan Stoy who has in the past several years shown up for the IHLG event with his sophisticated "Folder". With this folding wing Glider, Stan shows how to compensate for the fact that he does not have the strongest arm in the U.S.A.

Tuesday afternoon was the class event of the contest, or at least for me it was. Watching the slow, majestic flight of large microfilm models, is what indoor is all about. The first four rounds of the FAI event were scheduled from 1 p.m. to

Continued on page 62



**"You gotta have enthusiasm . . .
If you don't have anything to look forward to, you'll just stop."**

• This month's lead-in line is a direct quote from master scale model builder, Lou Proctor, explaining why he still eagerly anticipates each new project.

LONGEVITY RECORD?

Our mention of Clarence Mather's 24-year-old-and-still-flying, rubber powered Stormovik, in the July **Model Builder**, brought this response from Dan Lutz, of Kraft Systems: "Bob Holland (of 1/2A Hornet engine fame) has a rubber model of the Skyfarer that Lew Mahieu and I used to chase on the playground at Echo Park, the meeting place of the Los Angeles Aeromodelers. This took place in the very early 1940s. He recently flew the same model at a gathering of old timers, and it flew great as I always remembered it.

"Now, one who might top that record is Ced Galloway. I hear he has models that go back to the thirties. . ."

BOO-BOO DEPARTMENT

In our review of the beautiful *Koolhoven* book from Holland, a gremlin struck: Although the heading was correct, Koolhoven's name was misspelled no fewer that five times in the text . . . surely some sort of record. Apologies all around.

AND SPEAKING OF RECORDS

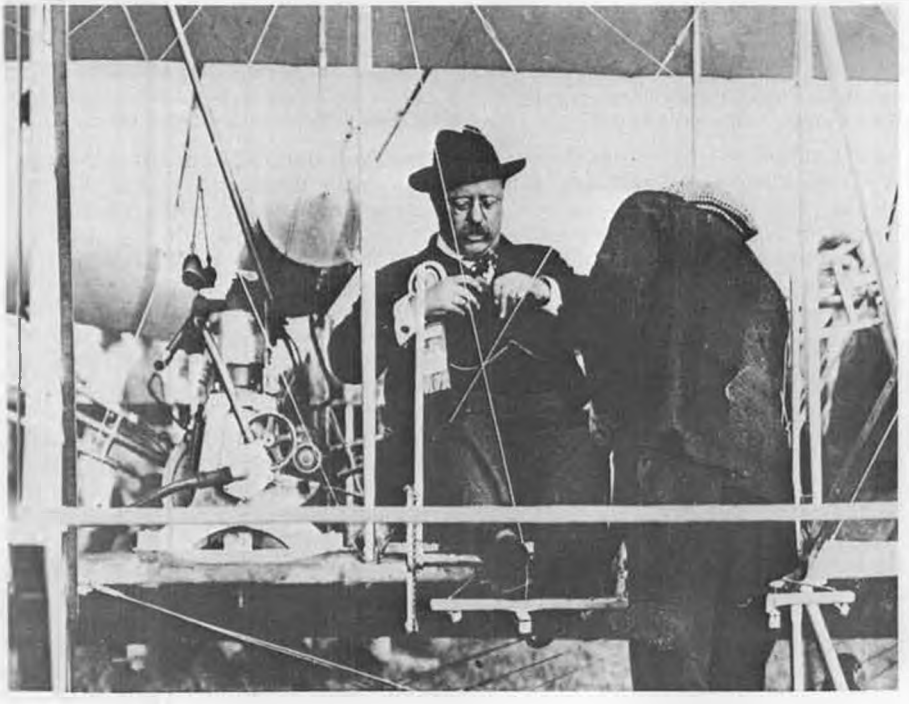
According to Dave Linstrum, writing from the West Baden, Indiana indoor meet, Walt Erbach established a new AMA indoor ornithopter record of four minutes and twenty-one seconds . . . thats a lot of flapping! And what do some of the indoor flyers really think of R/C? During this contest, one was overheard to say "R/C Pattern is just aerial Pac-Man!" Ah well, to each his own . . .

HEATH HISTORY

Readers who recall Walt Mooney's fine three-view of the 1918 Heath biplane and Hoby Clay's charming Peanut model of same, may be interested in obtaining a copy of *WW-I AERO* for April, 1983. Featured is an excellent history of Edward Bayard Heath, the man, as well as his early, lesser-known products constructed from 1909 through 1918. These laid the foundations for his more famous parasols and racer of the Golden Age era. The author of the piece is Owen Billman, himself a highly regarded builder of a full-size aircraft, the "Little Pink Cloud".

In the same issue is comprehensive information about the infamous Christmas Bullet (including photos and a three-view), Benoist aircraft (ditto) and Fokker triplanes. Of special relevance to

Smilin' George Meyers of the Philadelphia SOTS club with his highly detailed 1924 Farman Avionette. Tom Schmitt photo.



President "Teddy" Roosevelt prepares to go aloft in a Wright biplane piloted by Arch Hoxey. The year was 1910. Photo from Edward Petit collection, via Georges Chaulet, of France.

Chip off the old block. Carl Linstrum eyeballs his EZP-30, a P-30 Class model. Photo was taken by Carl's father, Dave Linstrum.

Bill Winter, author of *The World of Model Airplanes*, admires Allan Schanzle's Jumbo Scale PT-19. Tom Schmitt photo.

Elmo Yard Special, by Gerald Myers, is an imaginary vintage home-built. Power is furnished by a Brown Jr. CO_2 engine. Myers photo.

model builders should be the story of Alphonse Penaud, by Nigel Mills, of England. Penaud experimented with model helicopters, "planophores", twin-prop designs, kite balloons, and envisioned a remarkably advanced amphibian, all of which are described.

This issue is available for $4.00 from: Leonard E. Opdycke, 15 Crescent Rd., Poughkeepsie, NY 12601. Please tell him **Model Builder** sent you.

WET WOOD WORDS

Joe Wagner, of Wilmington, Pennsylvania, the designer of many models such as the Dakota biplane, expresses his opinion about softening balsa: "My experiments seem to show that ammonia has no 'wood-softening' effect at all. What it does do is act as a detergent, sort of, allowing water to penetrate the wood fibers faster. Most modelers are unaware of how long it takes for balsa wood to become truly saturated with water. The surface soaks up moisture quickly, and gives the impression that the wood is wet all the way through. However, I found out, when pioneering the wet die-cutting process at Veco, that it takes at least an overnight soaking for wood as thin as 3/32 of an inch to get really saturated. I'm talking about plain water, of course. We did experiments with various "wetting agents" to reduce soaking time, and they worked (as I believe ammonia does) . . . but they also seemed to accelerate mildew problems. Anyway, I have found that using household amonia to wet balsa for forming purposes does absolutely nothing that plain water won't do, given enough soaking time. And plain water never curdles glue!"

PAPER PLANES PLANES PAY OFF

Almost everyone is aware of the valuable awards available to the world's top R/C pattern fliers in the annual Nevada contest . . . but a high-stakes paper-plane competition? Yep. According to Florence Bakken, who sent a clipping from the Eugene, Oregon *Register-Guard*, there was such a happening, offering a prize valued at $16,674. Here's how it worked: A fund-raising benefit was conducted in a large auditorium on the University of Oregon campus. For one dollar, entrants were invited to fold and fly a paper glider from the balcony into the open sun-roof of an automobile located on the floor below, a considerable distance away.

Some 1,000 attempts were made, with 20 gliders actually entering the car. From this group, a drawing was held to determine the winner, student Abbas Sayah. Sayah invested a total of 90 dollars in the attempt, and credited his paper airplane experience as a youngster, living in Iran, for his accomplishment in winning the 1983 Datsun 280-Z.

ALL SCALE MEET

A forthcoming contest being conducted in Lexington, Kentucky by the X-Cell Team, features both R/C and C/L categories. We applaud the concept of encouraging various facets of modeling, which in this case will include precision scale, sport scale, giant scale, helicopter scale, and C/L aerobatics, as well as a fly-just-for-fun option, and a swap-shop. Details are available from CD Lew McFarland, 3404 Keithshire Way, Lexington KY 40503. How about including a Free Flight Scale class next year fellas . . . even if only Peanuts?

SOVIET SAUCER?

According to an Associated Press report from Moscow, a Ukranian home-built aircraft designer has developed an aircraft with the configuration of a 16-foot diameter shallow dish, which can also serve as an automobile. Additionally, it may be adapted for use on snow or water. As if that wasn't enough, the craft is also designed to descend like a parachute in case of an aerial emergency!

DAVID DIELS DRAWINGS

Additional stick-n-tissue scale model plans have recently been released by David Diels, P.O. Box 101, Woodville,

Continued on page 70

Here's a close-up of one of Emmanuel Fillon's rubber-powered turbine planes. Misleading markings: "F-OLIE". G. Chaulet photo.

Emmanuel Fillon holds up his Gossamer Albatross indoor model for us to see. Note turbine plane on table. Photo by R. G. Moulton.

Nat Comfort, of Richmond, Virginia, recently visited new Dayton resident, Dale Mateer, and brought his 480 Shocer with a 3.5 . . . took second at the CIA Fall Meet in Class B. H. Murphy photo.

Gib Robbins, of Anderson, Indiana, is a real live wire competitor in Harry Murphy's CIA. Scene is the September '82 meet at Lawrenceville, Illinois. Satellite 450 being sheltered from wind. Fries photo.

Free Flight

by Bob Stalik

THE NAMING OF NAMES

I have long been intrigued with the names that we modelers use to christen our designs. I think that our naming of names may connote more about ourselves than the models we fly. As I get older, I tend to reminisce more about such things . . . sort of an Andy Rooney for free flighters. I have, however, never understood how we can take ourselves too seriously, or how we can take our hobby too seriously, when we fly models with such names as the Zeek, the Flying Burrito Brother, or the Geef. On the other hand, there are many names which inspire the observer. I tend to find agreeable such names as these:

Sailplane: It should sail the skies forever!

Cumulus: There it is again, playing tag with the clouds.

Satellite: Like its namesake, it is circling the earth.

Cloudhopper: Hops about on the clouds, a really nice image.

Max Maker (and most others with *Max* in the name): Such an obviously appealing free flight name.

Starduster (and most others with *Star* in the name): Way up there, in the air, so high it "dusts the stars."

Floater: Conjures up images of flying forever, just drifting on the wind.

Continental: Suave and sophisticated. Obviously made to fly in Europe.

Time Machine: Such a great name that the clock seems to stop and watch.

I wonder about other models. Those that have names that are flying puns. Those plays on words that burden otherwise perfectly good airplanes with "cutesy" titles. Some examples:

Finnegan's Wake: A literary allusion. Who was Finnegan anyhow? Does he know he lives on as a rubber band powered airplane?

Driftwould: It's made of wood. It drifts? If only it would?

Canned Heat: Is it a Jetex model, or a box of sterno?

Simplex: Is it simple? Is it complex? Usually, it's neither.

GYSOB: Why should a model be tagged with "Go You Son Of A B. . . . .?"

Chicken Coupe: Have you ever been around a real chicken coop? Does the model smell, look, or fly like a chicken?

No Non Cents: Cutesy. A Pennyplane,

Steve Riley sends this picture of Dan and Adam Tracy, of Maple Valley, Washington, as Adam is about to launch Wakefield model.

Jerry Fowler, of Reynoldsburg, Ohio and COFFC, tries starting his Cox .09 powered, enlarged Maverick. Harry Murphy photo.

hence the *cents* part. No non is a double nagative.

Dixielander: Jazz music on the free flight field? Or does it mean someone from the deep South? Neither. It's an English design.

Mini Pearl: A country singer? A can of beer . . . small size? Why is it a gas model?

Happy Hooker: Hooks thermals with a smile. Well, it's more descriptive than *Streetwalker*, another definition that's synonymous.

To close off this discussion, I guess the names that are the most descriptive and least inspirational are those that get to me the most. It's really difficult to go bonkers over such as these:

A.L.29: I pressume that this is Andres Lepp's 29th Nordic.

FIC Power: So. . . . . .?

Indoor '70 Champ: What happened to '71, '72, or later?

Twin Fin: Here's a clue . . . it has two fins. Surprise?

Modell No. 2 bis: Exciting? What does *bis* mean? Reminds me of an incomplete Bison.

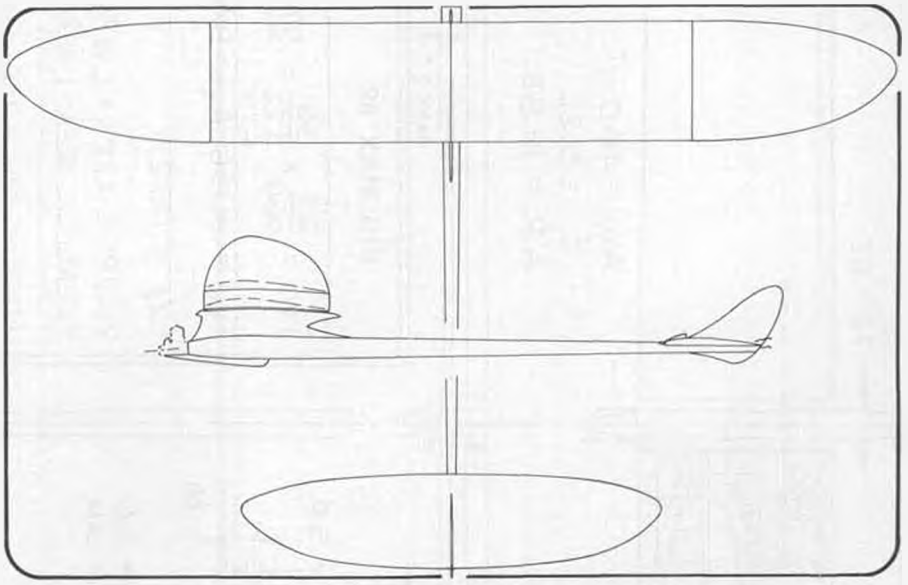
North Korean Wake: Descriptive. Only one Wakefield in Korea?

Folder IHLG: It's a hand launch glider for indoor. It folds. Now that is descriptive!

So, now you know my biases. So, now you ask if this is the same guy who named some of his ships as follows: *Simple FAIman, C-Quell,* and *A-Wonder?* Yep, you are correct. I also did *Good Times, Northwind,* and *Hot Lumber.* I claim journalistic immunity. However, if you have some favorite names, drop them in an envelope and send them in. I think we are in need of some new brainwork in the names department.

OCTOBER MYSTERY MODEL

Here's one that would fit into the good names category. I liked this model when it first appeared in *American Modeler* magazine, and I still do. I got as far as cutting out a full set of ribs for it. I loaned out my full-sized plans to a guy who was hot to build it, then he moved out of town. The original was meant to fly with a Holland Hornet . . . the hot setup of the time. Name the model and claim the prize. Send your correct name to Bill Northrop, be first in line, and you get a free one year subscription to **Model Builder.** *(Don't forget the* model's *correct name. (wrf)*



OCTOBER MYSTERY MODEL

DARNED GOOD AIRFOIL B 8556b

One of the Benedek sections intended for A-2 or Wakefield. Some people would overlook this one due to the undercamber close to the trailing edge . . . leading to some lack of control in the circle tow mode. With the trailing edge as it is, the glide on this section should be excellent, particularly in calmer conditions. Build it using a sheeted trailing edge, or use cap strips to keep the airoilf's shape.

OCTOBER THREE-VIEW: BIG MAX 88, BY LEE HINES

Now *here* is a name: 88-inch wingspan; it has *Max* in the name; it ought to be a real performer. As you know that Lee Hines has designed and flown it, you also know that it *is* a performer.

Several features of the model stand out when you study the plan. Among them: (1) the fin is an "all-flying" type, which means that the whole thing moves and allegedly improves the effectiveness of this surface; (2) the wing tips and stabilizer are constructed with laminated balsa strips, which means that they should be very light, and should contribute to the overall thermal sensitvity of the model; and (3) the boom is constructed from carbon fiber, which means that the tail end should be light as well.

In all, this ship looks like it is designed to fly well in calm air, but also set up to be very thermal sensitive. It should be a good all-around competitive model

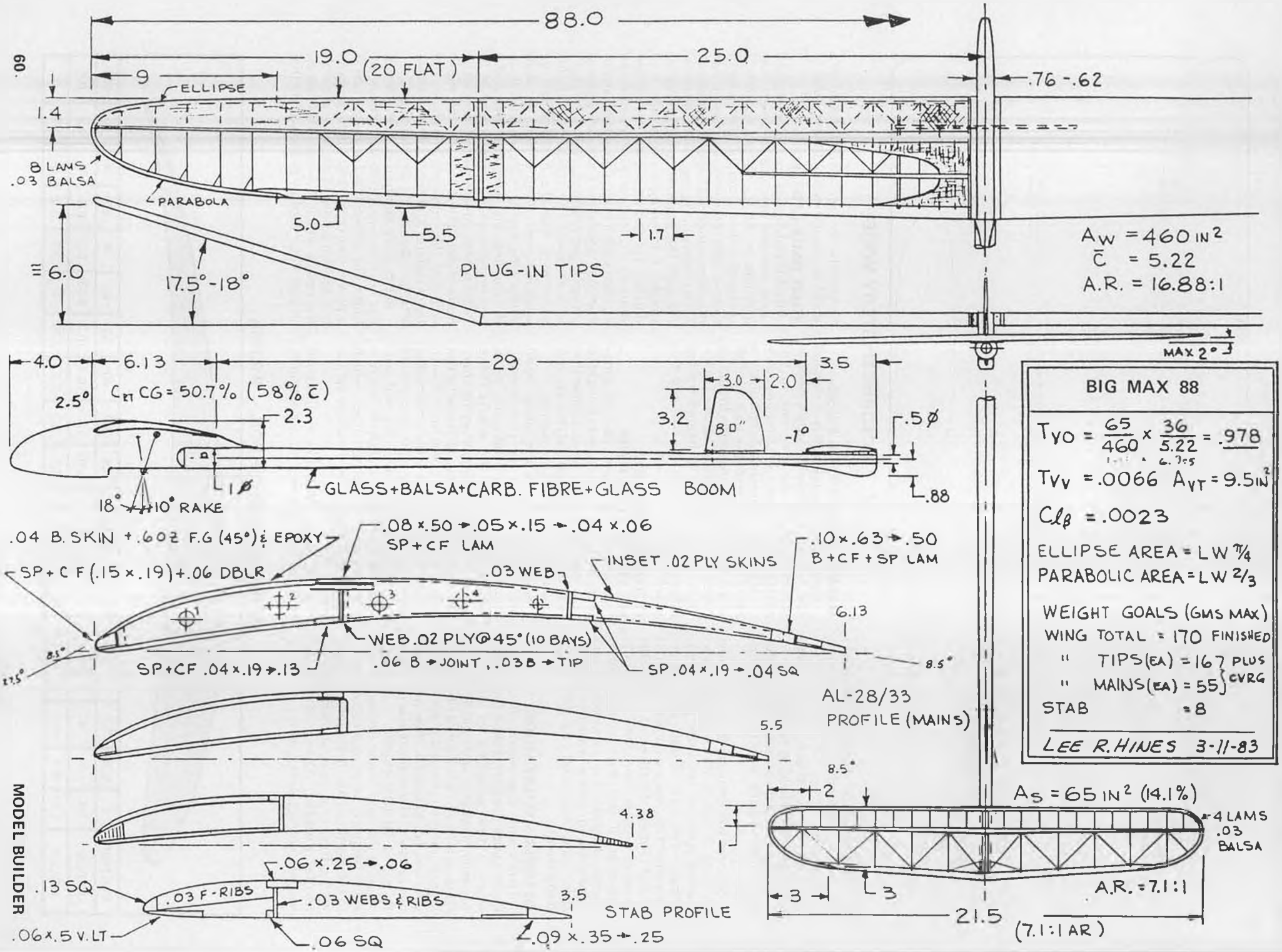
TOMY TIMER UPDATE

Back in the August issue, I commented upon the new and smaller timers now available in the toy shops. Recently, I received a letter from Bill Gieskieng of Denver with some info as to how he uses this little wonder. Bill uses his as a timer in HLG models. He says, *"I am not messing with the governor pawl by adding weight, I am using a plastic disc with notches cut out on the perimeter (see sketch). These notches receive the knotted end of a very fine monofilament line (one pound test). The rubber band power is not wrapped around the shaft, it is remote. The advantage of this variation is that the fine line can be wrapped many times around the shaft without increasing in size and fouling up the running rate. Ten turns give about two minutes with a single strand of .06 Pirelli rubber. Also, multiple lines can be hooked onto the disc. Auto stab works well with the dethermalizer phase. The timer will run a bit faster with extra lines attached, but that is an advantage."*

Bill doesn't mention it in the letter, but he does remove the spring from the timer. The rubber band in the line acts as a power source to keep the timer moving, while the pawl in the timer controls the rate at which it moves. This newer, smaller timer is of a size and weight that

DARNED GOOD AIRFOIL – B 8556b

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	1.4	3	4	5.3	6.3	7	8.25	9.15	9.75	10.2	10.5	10.2	9.35	8.2	6.4	4	2.5	0.6
LOWER	1.4	0.3	0.1	0	0.2	0.4	1	1.5	2.1	2.5	3.2	3.75	4	3.9	3.2	2	1.1	0



BIG MAX 88

$T_{VO} = \frac{65}{460} \times \frac{36}{5.22} = .978$

T_{VV} = .0066 A_{VT} = 9.5 IN²

$C_{l\beta}$ = .0023

ELLIPSE AREA = LW π/4

PARABOLIC AREA = LW 2/3

WEIGHT GOALS (GMS MAX)

WING TOTAL = 170 FINISHED

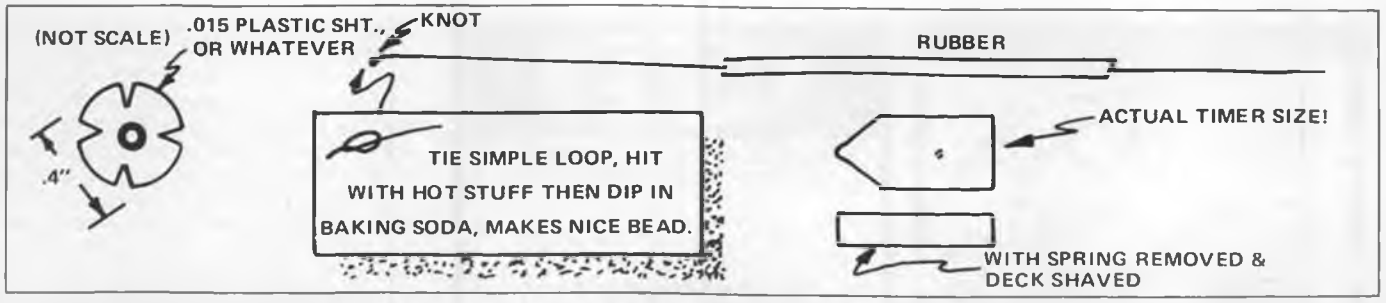
" TIPS (EA) = 167 PLUS

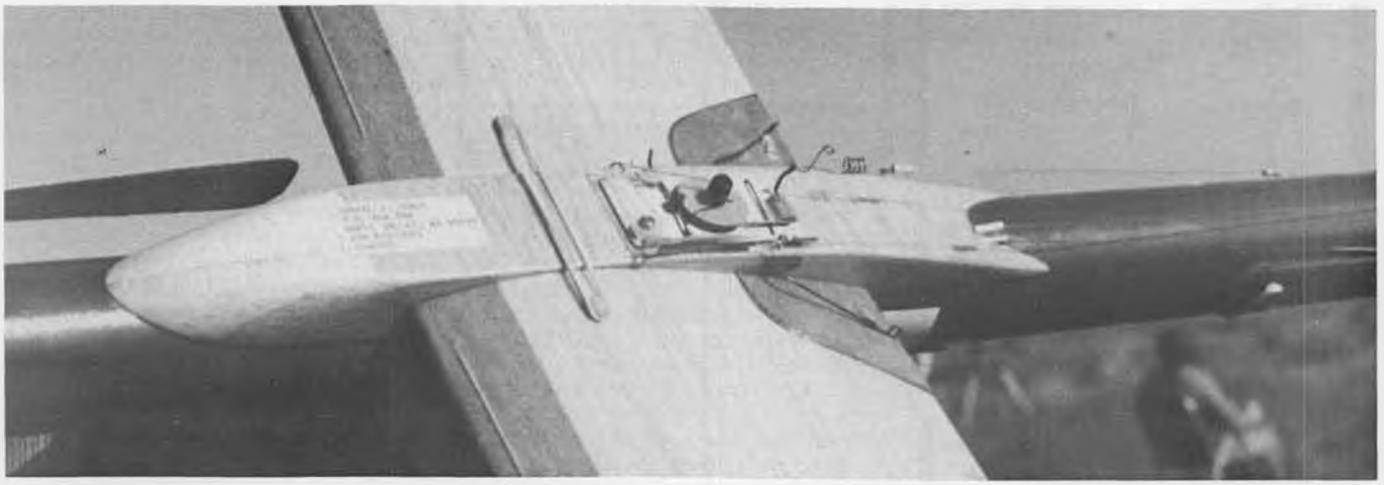
" MAINS (EA) = 55 } CVRG

STAB = 8

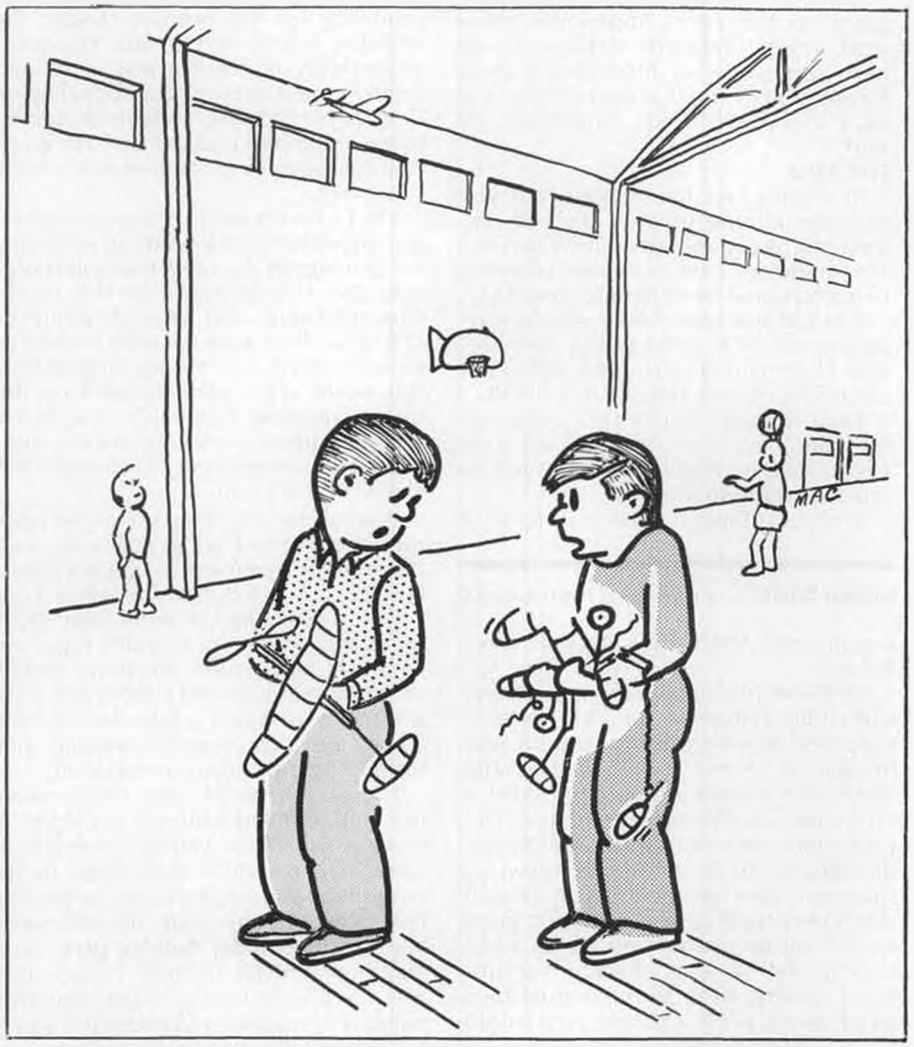
LEE R. HINES 3-11-83

MODEL BUILDER





Here's a close-up shot of Dan Tracy's Wakefield model which shows the Tomy timer installed on top of the wing center section. Device serves as both DT and VIT. His name, address, phone number, and "Reward!!" are just in case . . . .



"Look out for that badminton game on the other side of the gym."

makes it possible to use it on indoor and outdoor rubber scale models to change rudder and stab settings. It is so small, that it will fit into the wing of nearly any outdoor hand launch glider without adding unnecessary weight, and it can be used to control many items from DT to autostab. Let me know what your uses are for this nifty little gadget.

COMMENTS ON THE BUNT SYSTEM

In July, I concluded a series on building and flying power models using VIT. Included was a short bit about bunt systems. Bill Gieskieng, who has explored the bunt system and flappers extensively, passed the following comments along for the curious. *"I am a bit miffed at you referring to the 'bunt' as something new. Heck, I read about some English flier flying a high thrust FAI ship using a bunt in '63 or '64. I remember well because I had been working on such a technique and felt he'd stolen my thunder.*

"I used a bunt on my first FAI ship in '64. It worked beautifully, sometimes, but the design was so weird that I could seldom get it to go in a straight line. I used it again in '67 on my first flapper (flapper auto-stabs are made for bunts). The bunt finally did it in. Koster used the bunt on his early flappers. Weird things kept happening.

"I am now very reluctant to use the bunt. It is dangerous. It is not simply a question of whether or not the auto gimmicks do their job. I used to think it was a foul up on the gimmicks, but they were working. Something happens aerodynamically that we are not prepared for. A shift in airflow on the wing can result in a new trim balance . . . except the darn plane is upside down.

"In using the bunt, I would opt for a very conservative CG (say around 50 percent or so). The stab would be dropped early, and for a small distance, rather than shooting for a violent maneuver at the last moment. There must be a very strong return force on the stab to glide position. More than most simple DT tensions give. Anyway, the bunt is not as straightforward as it first appears."

Well, Bill . . . Excu-u-u-se me! Seriously, I appreciate the information and tips from one of the most innovative experts in the field. And, surprise, surprise, it should be *no surprise* that someone like Bill was one of the forerunners in experimenting with this latest development . . . 1963, that's a far piece ago!

THE ZEEK

The *CIA Informer* has been doing some research on this Nostalgia model. Editor Harry Murphy has solicited comments from those folks who had experiences building and flying this classic ship. He quotes Russ Hansen's experiences as to the best of the Zeeks. So, if you are interested in building one for the Nostalgia contests this year, here are Russ' ratings: *The 277 sq. in. .09 powered models were probably the best flyers of all sizes. The 575 was second best, the A/B kit job was third, with the 1/2A a poor fourth. Both the .09 and the 575 had to be "shot down" as their glides were fantastic. The .09 handled power better (Cub .09) and I used a hot K&B .29 or .32 in my 575. I did have some problems with the high power for which I think a little more rudder area would have helped, but warping the right wing panel to hold it up under power also helped. When they were flying right they were something.*

Harry is collecting such info and old plans for the Zeek. Apparently, there were several different versions. If you have some new or little-known Zeek memorabilia, send it to Harry Murphy at 3824 Oakwood Blvd., Anderson, IN 46011.

THE END

In closing, let me suggest that you consider joining up with the only all-free-flight organization now serving U.S. modelers. I am, of course, referring to the National Free Flight Society. Dues are $15.00 per year. Make checks payable to the NFFS and send to membership chairman, Don Hughes, 8383 Zancanaro Ct., Citrus Heights, CA 95610.

Take it from your editor, Charter Member No. 1 of the National Free Flight Society, it's *the* organization to join. So, **do it now!**

Until next time . . . Thermals to all. •

Indoor Week . . . *Continued from page 55*

6 p.m. and AMA Stick models after 6 p.m.

For those of you who are not familiar with indoor models, an FAI model is supposed to weigh over one gram, and its span is limited to 25.6 inches. The AMA Stick models are the largest with a limitation of 300 square inches. The propellers used on these models have a diameter of about two-thirds the wingspan, and very steep pitches. A 25 inch diameter propeller and a 40-inch pitch would not be uncommon for an AMA Stick model. The propellers turn at sub-Rossi speeds: 40 to 50 rpm would be a good speed, while a 60 rpm prop would be considered too fast to produce a winning flight.

During the flight, it is permissible for a contestant to steer his model if a collision is imminent either with the building structure or with another model. This steering is accomplished by means of a string which is pulled up by a helium filled balloon. This steering is a tricky task and very frequently ends up with an aborted flight or with a damaged model. The problem is how to accurately use a string to gently engage and move around a super delicate model that may be 50 or 100 feet above, and although slow, is in constant motion. My observation is that 25 percent of all balloon steers end up in disaster. One of the most frequent problems during a steer is the propeller wrapping itself up in the steering line.

One modeller from Southern California, Larry Cailliau (an airline pilot) showed up with a clever improvement on the usual steering rig. Larry had the usual helium filled balloon, but instead of the usual nylon line attached to the balloon, Larry used a very light tubing about 3/4-inch diameter and made of a material only a fraction of a mil thick. This vinyl tube was inflated along with the balloon with helium and was 20 or 30 feet in length followed thereafter with the usual nylon line. Steering with this relatively rigid and large diameter tube proved clearly successful. There was no tendency for the prop to tangle; the visibility was excellent and the maneuverability of the rig was a definite improvement over the traditional nylon line. Larry used several steers during his flying and in the end, it may have given him the edge to place him first during this event.

The FAI event was of particular interest as competitors are beginning to qualify for placings in the team that will represent the U.S. in Japan at the World Championship next year. A group of U.S. modellers were recently invited to Japan to check out the intended site for the world event and reported on the great Japanese hospitality and flying site. This news is creating great excitement and competition to represent the U.S.A. in the event.

Wednesday was reserved for the scale entries and speed flying. Scale was a well represented event and judges Jim Jones, Frank Scott, and Bob Wilder were kept very busy judging the wide field. Both Jones and Wilder are specialty suppliers to the Indoor world. Jim Jones makes very reasonably priced rubber strippers and balsa strippers while Bob Wilder makes the most beautiful winders and torque meters known to mankind.

The speed events were flown using two helium filled balloons as pylons. It was surprising how well many modellers were able to adjust their ships to fly around the pattern. It was also surprising how many of the scale models were based upon **Model Builder** plans and magazine articles in both Peanut and AMA scale. It was evident that the models brought to Westbaden have been gradually improving. For instance, Ed Stoll's Corben this time had a Model

A Ford engine on the nose that looked so good you would have expected it to run. Not only did the model look great, it flew just as well. Not surprisingly, it came in first in AMA Scale. Phil Cox from Highland, Indiana, had a J-3 which was a show stopper based on *Model Builder* plan No. 782 C.P. It was detailed down to the stabilizer trim slot covers and was beautifully built. With as many Cubs as we see, you would expect to just walk past, but Phil's Cub made you stop, admire and dream. The **Model Builder** plan is based on official Piper Aircraft Corporation documentation giving you all the verification you would ever want.

During the evening of the 13th, a workshop was convened to give the attendants an understanding of the various rule changes that are currently under discussion at the AMA Contest Board. This understanding will allow the modelers to go back to their own district representatives and voice their support, or disapproval, for these changes. For those who may be interested, I will quickly summarize. The first is a rule addition breaking down HLG into two major classes: one would be the traditional wooden HLG, and the other would be the "high technology" HLG with exotic materials and gadgetry like folding wings. (I suppose we will no longer see the battle of brain vs brawn or the Stoy Folder vs the strong arm flyer.)

Another proposal calls for the creation of a series of stepping stone events aimed at encouraging the starting youngsters. The consensus was that though good, this idea should not be a part of the rule book.

A series of changes to the Manhattan Cabin event such as stab limitations and allowance for film covering (but not microfilm) were also discussed.

One important discussion was held suggesting the purge of old and obsolete events. Richard Doig pointed out that it has been 14 years since an event was dropped from the Indoor repertoire. He feels that Cabin for instance is a dinosaur with possibly no more than a dozen flyers in the whole country building for the event.

Another change proposal under the General Rules which was discussed would close a loophole in the rubber powered events. Currently, a statement is made which permits the use of "commercially available" balsa wood or plastic props. Under this wording, one modeler could buy from another a highly sophisticated microfilm structured propeller. The rule is not intended for Indoor, and thus it is recommended that this limitation be excluded from the Indoor rules.

Tuesday evening, the NFFS held a banquet which was served at the Northwood Institute building as it has all the required facilities adjoining the flying field (Atrium). The guest speaker for the evening was Bob Champine. Bob is a retired NACA and NASA test pilot who has flown some of the most exotic aircraft in the development of modern aviation. Bob is also an avid modeler,

mostly interested today in R/C gliders. He showed us many interesting slides and gave us an account of many thrilling flights.

The organizers and managers of the contest received a well deserved and spontaneous round of applause for a meet to be remembered by all.

The very next morning commenced the NIMAS Record Trials. The idea during this Meet is to give each flyer an opportunity to fly against the records existing at the time. The flyer who beats the existing record by the widest margin becomes the winner of the NIMAS Meet. Larry Loucka became the NIMAS number one man by improving by 24 percent the then existing Open, Indoor Autogiro record with a time of 9:03. The second place winner was Mike Van Gorder flying Novice Penny Plane and by posting a time of 11:41 Mike improved the Senior PP record by almost 12 percent.

All in all, there were seven new records established during this event which shows the soundness of the idea, and the value of the meet. These records are shown at the end of this writeup.

During the NIMAS Meet, we saw some very interesting Manhattan Cabin and Bostonian flying. There were some very creative models. Don Steeb from Rochester, New York, showed up with his model called "Boston Gears" where he uses two motors in the fuselage geared together at the rear to drive a single prop. Don was not a winner this time, coming in sixth, but he gets our congratulations for creativity and workmanship. In Bostonian, the winner was our Canadian friend Jack McGillivary, followed by Bob Clemens out of Rochester, and Ken Groves, another Canadian walking away with third.

Friday the 17th was the beginning of the Peanut Grand Prix with flying starting at 7 p.m. and ending 24 hours later. Even with as well a populated entry as we had on this occasion, there is no way you can complain about lack of time to take your official flights. Eighty-four models were entered in the scale event with the monumental task of judging this event going to Butch Hadland, Bob Andrews, and Phil Cox.

After one week of full-time modelling activities, this reporter had to get back to the West Coast, so he cannot report first hand on how the flying went. It suffices to say that I spent several hours examining the superb workmanship and detail of the numerous entries.

Before closing, we should mention that the contest next year is in jeopardy at this time. The building and surroundings which have served so well for the past several years is up for sale. It is unknown whether the next owner or tenant will be favorable to modelling activities. Some very dedicated modelling leaders are doing what they can to stay in touch and encourage an arrangement favorable towards Indoor flying, but at this time any forecasts are premature. We will try to stay abreast of the developments and keep you informed. We hope we will be able to meet again at Westbaden next year for the biggest and best meet yet. Cheers, Jose Tellez, P.O. Box 733, Laguna Beach, CA 92652.

NATIONAL FREE FLIGHT SOCIETY CONTEST

EASY B OPEN
1. Chuck Markos 18:46
2. Walt Van Gorder 18:20
3. Cezar Banks 18:08

EASY B JR./SR.
1. Mike Van Gorder 16:23
2. Aaron Markos 12:45
3. Tom Norell 12:43

PAPER STICK OPEN
1. Jim Richmond 26:57
2. Stan Chilton 24:46
3. Dick Obarski 24:40

PAPER STICK JR./SR.
1. Paul Loucka 19:04
2. Mike Van Gorder 17:42
3. Bob Skrjanc 12:38

HAND LAUNCHED GLIDER OPEN
1. Bernie Boehm 136
2. Bob Larsh 116
3. Dick Pivitt 94.6

HAND LAUNCHED GLIDER SENIOR
1. Bryan Fulmer 114

HAND LAUNCHED GLIDER JUNIOR
1. Paul Loucka 88
2. Aaron Markos 85
3. Dave Brown 52

BOSTONIAN OPEN
1. Jack McGillivray 566.4
2. Dave Erbach 489.5
3. Ken Groves 477.6

MANHATTAN CABIN OPEN
1. Walt VanGorder 9:50
2. Chuck Markos 8:56
3. Hardy Broderson 7:21

PENNY PLANE OPEN
1. Dennis Jaeks 16:00
2. Gordy Wisniewski 13:16
3. Walt Van Gorder 12:24

PENNY PLANE SENIOR
1. Mike Van Gorder 11:12
2. Tom Norell 10:39

PENNY PLANE JUNIOR
1. Jeni Jaeks 12:36
2. Paul Loucka 10:26
3. Dave Brown 8:35

NOVICE PENNY PLANE OPEN
1. Chuck Markos 12:05
2. Jim Clem 11:51
3. Cezar Banks 11:50

NOVICE PENNY PLANE SENIOR
1. Mike Van Gorder 11:17
2. Bryan Fulmer 6:40

NOVICE PENNY PLANE JUNIOR
1. Paul Loucka 10:11
2. Bryan Varney 7:52
3. Dave Brown 6:22

UNLIMITED RUBBER SPEED
1. Mike Arak ..... 8.21 sec.
2. Frank Kieser ..... 10:78 sec.
3. Chuck Markos ..... 10:93 sec.

PEANUT SPEED
1. Martin Varney ..... 9.87 sec.
2. Butch Hadland ..... 10:98 sec.

R.O.G. CABIN OPEN
1. Richard Doig 25:12
2. Rob Ganser 24:21
3. Dan Belief 23:38

PEANUT SCALE OPEN
1. Jack McGillivray (Volksplane) .. 211.4 pts.
2. Les Garber (Lacey) ..... 183 pts.
3. Ken Groves (Fike) 182

PEANUT SCALE JR./SR.
1. Bryan Fulmer (Lacey) 132
2. Aaron Markos (Lacey) 118
3. Dave Brown (Lacey) 117

AMA SCALE OPEN
1. Ed Stoll (Corben) 176.5
2. Bob Siedentopf (Russian Ambulance plane) 172.5
3. Tony Sutter (14 Bis) 171

AMA SCALE JR./SR.
1. Dave Brown (Lacey) 143.5

F1D (Time shown is sum of best two flights)
1. Larry Cailliau 73:23
2. Cezar Banks 69:26
3. Jim Richmond 68:37

BOSTONIAN
1. Jack McGillivray 3.06
2. Bob Clemens 2.61
3. Ken Groves 2.51

MANHATTAN CABIN
1. Larry Loucka 10:04
2. Chuck Markos 8:57
3. Walt Van Gorder 8:37

PENNY PLANE
1. Walt Vangorder 12:15

NOVICE PENNY PLANE OPEN

1. Chuck Markos 11:55
2. Walt Van Gorder 11:44
3. Jim Clem 11:40

NOVICE PENNY PLANE SENIOR

1. Mike Van Gorder 11:41

NOVICE PENNY PLANE JUNIOR

1. Aaron Markos 12:24
2. Paul Loucka 11:31

RECORD TRIALS OVERALL INDEX COMPETITION

1. Larry Loucka Autogiro ..... 9:03 sec.
   1.248 Index — Open*
2. Mike Van Gorder Nov P.P. .... 11:41 sec.
   1.118 Index — Senior*
3. Aaron Markos Nov. P.P. ..... 12:24 sec.
   1.107 Index — Junior*
4. Mike Van Gorder EZB ..... 16:27 sec.
   1.067 Index — Senior*
5. Stan Chilton EZB ..... 22:01 sec.
   1.06 Index — Open*

*Indicates a new record in this category. ●

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

Clinic a few months ago and asked the old "which plane" question. He had seen me fly my Astro 020 Request a few years back while he was flying his Wakefield, and he was very impressed by it. That Request must have something going for it as at least one other fellow started flying electrics after he saw it perform. (It is available as a kit from Midway Models, and it makes a fine single-channel 020 electric.) Anyhow, Larry mentioned that he was building the Leisure Playboy, and I encouraged him strongly, as I had been impressed with its contest performance.

A few weeks later, Larry called to find out if I would give him flying lessons. I like to teach flying, so it didn't take any persuasion. We met early in the morning at the University of Washington's big soccer field.

Larry had done an immaculate job of building the Playboy. The plane was covered in Micafilm, which looks just like silkspan, and everything checked out perfectly. Larry installed the Astro 05 cobalt motor with its gear unit, and a Rev Up 11-7 prop. As usual, the climb was startling; the plane was up to 800 feet or so in a minute. Larry's mouth was hanging open! He said, "I had no idea electrics could do that!" I then handed the transmitter over to Larry and started him on his first R/C flight.

Larry had no problems at all and was flying it immediately. There are some very specific things I do to make flying easier for beginners if they are using old timers or gliders. The first rule is: no elevator whatever. Old timers and gliders, unless the turn is a steep one, don't need elevator, and use of the elevator only makes for one more thing for beginners to get mixed-up on. Confusion and panic usually lead to roller coaster stalls, and a crash.

Larry had the rudder and elevator on the same stick, as is common practice. Rudder and elevator on separate sticks is probably easier for the beginner as elevator cannot be fed in accidentally (I know, the "old pros" will say that's terrible for many reasons, but let's keep this for beginners). My advice to beginners with rudder and elevator on the same stick is to nudge the stick with the thumb (or a finger) from the *side* of the stick. This keeps accidental elevator out. The worst way is to grasp the stick. This feeds in all kinds of wobble, and elevator, and jumping, and jerking around the sky! The other piece of advice I give is: keep the antenna pointed the same direction the plane is traveling. This eliminates the problem of orientation, even when the plane is coming toward you. If you do this, the turns will be correct. The antenna may be over your shoulder, and it may not look "cool", but it works. Again, if you are a beginner, the "old pros" will say this is awkward, *but*, it is surefire, and there is no memory work involved (I never did get that bit about lifting the wing up. . .), it's all automatic.

So, with this advice, Leonard flew all of the first flight, including the landing! All he had to do was line the plane up on final, and let it glide in. The Playboy does a beautiful job of landing itself, no elevator needed. In fact, I would say that the Playboy knows more about flying than most R/C pilots! *If you leave it alone, it will take care of itself.*

This is the perfect criterion for a beginner's plane, by the way. My feeling about beginner's planes is that they should be able to fly with no commands at all, and should be able to recover from stalls and mild turns with no R/C commands at all (i.e., "Let go of the stick!"). This is an incredibly difficult job for a designer, most fail, and that is why so many "trainers," that are advertised as trainers, require an instructor for several hours. If you are a loner and want to teach yourself, most trainers will crash on your first flight without an instructor. If you are a loner, I recommend the Playboy to learn on, I think you will have an excellent chance of learning R/C without help.

Do follow the advice I gave earlier about elevator and antenna direction, and you will be able to fly the Playboy. On the second flight, Leonard was doing ROG takeoffs. On the third flight, hand

launch takeoffs. At that point, I graduated him! Leonard was all smiles, he really couldn't believe how easy it was, and how well the Playboy performed.

The story goes further. . . A few weeks later, we got together for the photo session that these photos are from, and Leonard's boy, Ramsey, was flying the plane! Ramsey is 10 years old, and he was flying with all the aplomb of an expert! It was a classic case of "Show One. Do one. Teach one." Leonard had taught Ramsey to fly, and Ramsey was having a blast. Ramsey does the landings too, and is now working on takeoffs.

Again, I cannot think of a higher recommendation for the Leisure Playboy as a beginner's plane. Add this to the fact that it is a *highly* competitive contest plane, and you have a combination that is impossible to beat!

Leonard is a machinist by trade, and is a proficient free flight modeler, so he had no problems in building the plane. He did make some modifications that are well worth describing. First, though, I should say that the kit is very well done, and all the pieces are cleanly cut, no die smashing! The instructions are all written however, and an inexperienced builder will find it will take slow and careful work, as this is a "stick and tissue" type design. That is the one criticism I have, the plane is fairly complicated to build, and with no drawings or photos to guide you, the first-time builder will find it a real challenge. If you are a new builder, be prepared to take your time and to put in lots of it, this is not a one-week-to-build model. Have patience, keep at it, and you will be rewarded with a high performance plane.

Anyhow, Leonard has used the Astro cobalt 05 with gear drive, the Leisure pattern wind with gear drive, and the Leisure pattern wind with the Astro belt drive. Leonard prefers the last combination best, the belt drive is very smooth, and he did have some problems with gears on the gear drives. The Astro cobalt motor has an incredible rate of climb, but the Leisure pattern wind gives the maximum flight time. With the pattern wind, Leonard routinely gets 20 to 30 minutes of flight time with no thermal assists. This consists of about four climbs to 800 feet or so, then glides with the motor off. The best battery pack has been the seven-cell Sanyo pack (sub-C). An 11-7.5 Top Flite prop gives the best climb with the Leisure pattern wind motor, Astro belt drive, and seven cells.

The plans show a hatch on the bottom for the battery installation, Leonard uses a side hatch which is very neat and easy to use. The batteries are rubberbanded to a plywood plate that slides in and out on rails which form a slot. I like this arrangement and recommend it. The plans do not show motor cooling, Leonard uses a removable top hatch with a corner of a plastic bottle as an air scoop. There are a couple of holes in the bottom of the nose planking to serve as air exits; this works quite well. Leonard bent in a shock absorbing loop in the landing gear legs so he wouldn't have to keep straightening out the legs, this solved the problem of bent legs completely. He also sheeted farther back on the sides than the kit does (this is not clear on the plans), to just past the rear of the pylon, so it is easier to mount radio gear.

The radio is small, and consists of an Airtronics receiver, S22 World Engines servos, and a 250 mah battery pack. All-up weight is 46 ounces, with a span of 67-1/2 inches, and 582 square inches of wing area. The plans say the usual weight is between 28 to 38 ounces, but I think weights in the 40-ounce range will be the more usual ones. At any rate, the glide is excellent, slow, floating, with a very low rate of sink. The usual rule for time under power to time in glide seems to be very close to six or seven to one in favor of the glide. This makes it easy to get those 20 to 30 minute flights with sub-C cells.

Leonard carries his motorcycle charging batteries in a wooden box with a carrying strap, separate from the rest of his equipment. This is an excellent idea, as the motorcycle batteries will always spill some acid, and wood is ideal for absorbing the acid, neutralizing it, and keeping things out of harm's way. I used to carry motorcycle batteries in a field box with the rest of my equipment, but after a few acid spills . . . never again! Plastic boxes will hold spills, but will not absorb them, so the acid is just waiting to do damage. I agree with Leonard, wood is best. Anyhow, try the Leisure Playboy, you'll like it!

Another item now carried by Leisure Electronics is a partial kit (ribs, formers, plans) of the Ultra, a high-performance glider featured in January 1983 **MB**. Price of the partial kit is $16.

Last month I talked about charging, and as a result of those tests, I started wondering how much comes out compared to what goes in. I ran discharge tests using the Leisure pattern wind motor turning a 6-4 prop, static. Most runs on a Sanyo sub-C, six-cell pack started at 12,600 rpm or so and were stopped at 10,000 rpm after six minutes. The current had to run through an ammeter so that I could keep track of the total amperes that went through. The ammeter dropped the rpms about 500, so the motor was capable of a true rpm of 10,500 or so at the end of the run. I wrote down the amperes at the end of each minute. A typical run was like this: 14,13,13,13,12,12,9, for a total of 75 ampere-minutes. Most packs are rated at 1.2 ah (which equals 72 ampere-minutes), so it looks like the Sanyos are capable of more time than 100 percent of the manufacturer's rating! This is excellent, as the cells are cranking out a 10-times capacity rate, which I'm sure Sanyo didn't ever plan on! However, the cells also accept a lot more than 72 am too, this particular run I put in 81 am before the cells peaked, 13 percent more than the manufacturer's rating! Sanyo has been very conservative about the rating of their cells, they really are capable of more than advertised performance. Anyhow, 81 am in, 75 am out, comes to 93 percent efficiency, which is much more than I would have expected. It goes to show that NiCds can be very good indeed.

I have also run some tests with a new GE pack which show the same numbers (83 am in, 72 am out) so the Sanyos are not alone. I guess the next question is: could you save time in charging by putting in just the maximum efficiency number of ampere-minutes? Perhaps the packs would have given almost 100 percent? Was that extra six ampere-minutes just a waste of time? I may take a look at these questions too, as it did take 18 minutes to get 81 am in, and I put 75 am in at 16 minutes. The more you try,

the more you learn!

Last, and most likely least, I've dreamed up a theory that explains things like memory, and why fast charged batteries show more capacity. So, here's where I make my claim to fame! First, rechargeable batteries have to have solid material in their plates at all times. Throw-away batteries do not, their plates dissolve, and once dissolved, like Humpty Dumpty, they cannot be put together again (i.e., charged). In a NiCd cell, the solids are cadmium and cadmium hydroxide for one plate, nickel oxide and nickel hydroxide for the other plate. The more finely divided the material, the better the reactions go that charge or discharge the cell, as a fine powder has a lot more surface area than large blocks. The reactions are on the surface. Reactions that go fast produce fine powder (actually, micro crystals), reactions that go slowly produce large particles (large crystals). This just may be the cause of "memory", and why batteries that are fast charged and fast discharged can yield more power. Everything is happening so fast that the plate material is in a very fine powder form, and so has the surface area for efficient current delivery. A cell that is slow charged and slow discharged, on the other hand, will have time to build up the particle size in the plates, the surface area goes down, and the cell becomes less efficient. It also will take longer to break up the larger particles, thus "memory" problems.

Now, all I have to do is find someone willing to do all the work to check this out! Till next time, remember, electrics are the most fun! •

BIG Birds . . . . *Continued from page 37*

My trusted and faithful Royal receivers have sort of lulled me into a false sense of security. I've enjoyed so much absolutely glitch-free flying using both my two-converted-to-four-channel and my six-channel Royals that I was beginning to think I was untouchable . . . that I could fly through anything as long as I had those loyal Royals aboard.

Of course I was headed for trouble, but lucked out by not finding out the hard way that even Royal electronics have their limitations. Because I've been testing a variety of props and oils (and some "hand massaging" I felt obliged to try), one of my engines built up a lot of time, and the other day the inevitable finally happened . . . my whole world went to pieces during some taxi and range tests when my rock steady, four-channel Royal all of a sudden wasn't so rock steady. In fact it turned just plain flakey on me, and after hysterically checking everything else I could think of and coming up with nothing, I checked the plug as a "last resort" . . . and found I should have looked there in the first place. I usually keep close tabs on running time and clean my plugs every two to two and a half hours using a K-Mart Spark Plug Cleaner (BIG Birds, May '83). However, this time I allowed myself to get so engrossed in what I was doing that I lost track of the time and never even thought to check or clean the new resident plug, an Autolite 85.

It was plain old dumb luck that the fouled plug didn't start to mess things up till after takeoff. I cleaned the offensive plug, got rid of the nasty carbon build-up . . . and once again had a dependable airborne system. I figure that if a dirty plug will affect my Royal, it'll do its dirty deed on virtually any other receiver . . . in spades. Make that frequent plug check a very important part of your preventative maintenance schedule and enjoy top engine performance and interference-free radio control. Can you afford to have a less safe and unpredictable flying machine?

MAG-AERO K-21 REVISITED

Here's an update to the Mag-Aero bit presented in the May "BIG Birds." Bruce Edwards won't admit it, but he really likes to tinker (he would have been in hog-heaven messing around with Galloping Ghost back in the mid-fifties), and he has found yet another way to better the 21cc Mag-Aero.

"I couldn't resist getting one of those high performance heads pictured in some recent ads. Switching to this new head worked even better than I hoped it would; although I've never considered the forward-facing plug to be a real problem, I do like the way the plug installs vertically in this new head . . . and I'm tickled pink about the K-21's increase in performance.

"On the ground, I tached an increase of 700-800 rpm using the same 16-8 . . . and in the air, the new head really proved its worth. My Aero-Fly had more 'snap' and vertical performance, which before hadn't been bad, but it is now most impressive."

Bruce isn't exaggerating! This new high performance head has really turned the Mag on. If you're hankerin' to get more out of your K-21, this head might be a wise choice (unless your engine is hardly run. You should also get new rings and gaskets along with the new head.). According to Bruce, the head part number is 101011-0096 0, and he obtained his from Whidbey City Saw & Cycle, Rt. 1, Box 664, Clinton, Whidbey City, WA 98236, (206) 321-6258 . . . although I'm sure that Roush Manufacturing and probably Echo Chain Saw Dealers could get this head for you, also. Whether you want to spring for the $45 will depend on how much you really need or want the extra power; Bruce feels it was money well spent, especially since he'd picked up his engine for a song.

MORE ON FILTERS

Like most others doing a monthly column, I'm continually amazed as to what generates the most mail (and phone calls). The latest deluge came from what I thought was an almost innocuous statement about on-board fuel filters (also May '83 "Big Birds"). It was a mixed bag's worth of communi-

cations, some for and some against my double-filtering fuel from the can, and not using an onboard filter. Monti Farrell, a San Luis Obispo, California resident, sent a dispatch that did contain some interesting information.

"Reference: your comments on filters in the 24 ounce report. I agree with you about on-board filters . . . with one exception. For years, the sport flyer with glow engines has pressurized his fuel tank with exhaust pressure. This slight positive pressure is tapped from the muffler or exhaust manifolds and is conducted to the tank through the normal vent connection.

"In my early BIG Bird days, we flew some camera missions with a ten-footer using a gallon header tank feeding a four or six ounce engine service tank . . . and pressurized by exhaust pressure to the header tank. We found that the Profi .76 ran great on clean fuel by double-filtering the ground fuel supply and filtering the exhaust pressure line to keep clinkers and carbon from the muffler from entering the on-board tank. Later, when I did some RPV work for Cal Poly State University's Aero Engineering Department, we did the same kind of thing very successfully.

"Our camera bird was good for three to four-hour orbits to get just the right set of pictures, and as the RPV used large engines (up to 30 hp), it burned between two to three gallons per flight. Even if you try crankcase pressure through a check valve, I still recommend a filter on the line to the tank to keep "stuff" out of the tank and permit a non-filtered fuel system. I had some interesting times flying a few of the 130-pound RPVs on research projects at Cal Poly.

"I'm now involved in developing a new RPV approach to some civilian problems with success. Can't discuss the particulars right now, but it's a fun job with my own company."

Sound like you're having a great time, Monti. Whenever anyone can use the words "fun" and "job" together, he's got to evoke a little envy from most of us.

A number of people have asked about using a large header tank to feed a much smaller engine tank . . . so Monti's comments should be an incentive to go ahead. However you go about filtering your petrol, don't feed it to your engine till it has been cleaned; dirty fuel will not only shorten your engine's lifespan, but it'll probably cause a crash on takeoff, or any other time a sudden and full demand is put on your engine.

A NEW UNOFFICIAL RECORD

Every year a new distance-in-a-straight-line record seems to be set. First it was over 100 miles; then over 200 miles; last year it was a Mr. Mulligan going 338 miles; and now Roland Spicer's beautiful Bellanca Skyrocket took eight hours and thirteen minutes to fly an almost unbelievable 454 miles non-stop.

Friend Spicer's creation weighed fifty pounds dry, and took off with a payload of 42.25 pounds of fuel . . . giving him an initial wing loading of 111 ounces per square foot. *Wow!* Yet Roland (who by the way is only 77) insists that accurately and painstakingly plotting the true Bellanca airfoil gave him an edge. "We were terribly efficient, and even with that takeoff gross weight, were airborne in less than seven seconds," he said.

At that weight and wing loading, seven seconds really isn't much time, although we're talking about hundreds of feet; I wouldn't have been surprised to hear him say it took *seventeen* seconds to get off the runway. Can you believe that, a 3.15 Kawasaki, turning a 23-20 prop, managed to get this bird airborne without developing a severe hernia? By the way, she spanned eleven feet and six inches, with an overall area of 1909 square inches, and took off and landed back at the St. Augustine Airport in St. Augustine, Florida. Although Spicer designed and built this magnificent flying machine, the piloting duties during the record-setting flight were handled by Rhett Radford and Dean McInnis. Roland called me the same day of the flight to let me know how well everything had gone (he was riding one helluva high after being up for over 24 hours), and that I'd helped him in achieving that 454 miles; he'd used the same prop and aileron control hook-up I'd recommended.

If you've got the yearning to build a great BIG Bird, drop a line to Roland Spicer, 107 Menedez Road, St. Augustine, FL 32084, and ask for a set of plans for the Bellanca Skyrocket: they are available.

Please keep in mind that even though HIGH wing loadings are gonna be associated with record-breaking aircraft like the Skyrocket, 111 ounces per square foot *is not* the kind of loading for our everyday type of BIG Bird. Thirty five to forty ounces per square foot have proven to be really good ball-park figures, and IMAA's recommended max of forty eight ounces per square foot is based on lots of experience and sound judgement. A lead sled won't do anything but get you into a heap of trouble

. . . so keep those birds l-i-g-h-t.

TIP OF THE MONTH

"Time flies like the wind, but fruit flies like bananas."

WHERE TO WRITE

Al Alman, 605 18th Street, East, Box 95, Spanaway, WA 98387. Keep sending those written goodies and pix in, gang. The name of this game is . . . sharing.

FLYING SAFETY IS NO ACCIDENT. •

Aerobatic . . . . *Continued from page 15*

than the conventional gas version, not enough to adversely effect the flight characteristics.

The next morning found us at nearby Angel Stadium for the test flights. With the Chipmunk all charged up and pictures taken, I had no choice but to point the Chipmunk into the wind and push the throttle stick forward.

The Chipmunk shot off like a rocket. With tail up, and acceptable airspeed at hand, I eased her off the runway and let her climb out. The Chipmunk required no trim, I immediately checked out the control responses. I soon realized that this Chipmunk *flew just like Da Big One*: loops and rolls are good, snaps are even better. After three minutes of terrorizing southern Anaheim, I put the Chipmunk on a standard downwind pattern, turned the motor off, turned the Chipmunk back into the wind, and accomplished a picture-perfect, wheels-on landing and roll-out in front of me. I was amazed, true history in the making.

The flight was a little under four minutes, and I still had plenty of power to taxi back. Subsequent flights showed the Chipmunk was still a little overpropped. Starting to work on a Rev-Up 9-6, I found the best size to be 8-5/8 diameter. The cut-down propeller lets the Astro 40 spin 14,000 rpm on the ground. Flight times are now up to five minutes with the current draw down to 15 amps. The Chipmunk is fully aerobatic, including my poorly executed lamcevaks, "Executed is a good description." Estimates put the Chipmunk in the 60 to 70 mph bracket. When I demonstrated the Chipmunk at Mile Square, there were several other sport planes in the air. No one knew the Chipmunk was electric until they saw me taxi it back, turning the motor on and off to achieve taxi. As a matter of fact, that day the Chipmunk was the fastest plane in the air.

I have included a diagram of the pattern we use at the Astro Flight Champs. Note that it is a fly through pattern, adapted from the AMA rule book. The Chipmunk completes the Astro pattern in two minutes. I am confident that the Chipmunk, or a model of this size, will win the 1984 Astro contest. While the 05s have ruled the electric aerobatic competitions of the past, the larger model is so much more smooth and precise that it easily overshadows the 05 planes.

So what is so important about an aerobatic model of this size? It's real simple Mr. Power Flyer. There are dozens of .25-.40 size stand-off scale and sport ships that are about the same size as the Chipmunk. Most are wood construction that could take an additional pound of weight out of the airframe. Taking weight out is the same as putting performance in. I am using a simple relay switch to control the motor. There are several new transistorized speed controls available that could do two things for you: first, they achieve a perfectly proportional throttle control; second, they pulse the electricity to the motor allowing for up to a 20 percent increase in duration. An additional 20 percent is a minute more air time.

The fact is, gentlemen, that many of use are in danger of losing our flying fields due to noise. If you convert to electric power you will benefit in more ways than you realize at this point. Sure there's no noise, but what about fuel. How much money are you pouring through that .40's carburetor? Think about it; my NiCds in the Chipmunk will last an average of two thousand charge/discharge cycles. At an average of 10 flights a week, I'll still be flying the cells in my Chipmunk in 1987. How much alcohol and oil are you going to go through in four years?

Unless I lose my Chipmunk to a thumb or radio glitch, it will still be here in 1987 too. You see, there is no fuel residue eating away at the innards of my model. The only cleaning my Chipmunk requires is an occasional dusting off because of the runway dirt that the prop kicks up on take-off. Combine all the above benefits with the instant on/off capabilities of an electric model . . . and doesn't it make sense to fly electric?

I've read several articles on electric that end up saying, "Electric power is on the verge of happening, an idea whose time has come." Gentlemen, I say there is no time like the present. Electric isn't about to happen, *it has happened!* Electric power is waiting for you; are you up to the challenge? Until next time, get a charge out of flying electrically. •

Hannan . . . . . *Continued from page 57*

Ohio 43469. These are the French Bloch MB-151, available in both Peanut and Walnut scale, and a 23-inch span North American O-47A. Included are building instructions, markings information, and a reference list. Diels' line now consists of some 24 Peanuts, 10 Walnuts, and a twin-engine Westland Whirlwind adaptable to either rubber or CO_2 power. Why not send Dave a stamped, pre-addressed envelope for the complete list?

AND ON A LARGER SCALE

If your interest runs to Quarter Scale, you may wish to investigate the Golden Age racing plane drawings being marketed by Burt Thompson (Thompson racers . . . of course!).

Burt is a cartographer in real life, and thus is quite accustomed to working on large projects, although his experience also includes a line of small solid model aircraft kits a few years ago.

Present plans for Giant Scale are: Benny Howard's *Ike*, Art Chester's *Goon* and *Jeep;* Hughes' 1-B. In the works is the Crosby CR-4, surely one of the most attractive racers of all time. A stamped, pre-addressed envelope will bring you a complete description from: Thompson's Vintage Era Race Plane Classics, 219 White City Blvd., Springfield, IL 62703. As usual, we ask you to mention **Model Builder.**

ANOTHER HUGHES PRODUCT

Evidently the public reaction to the Hughes flying boat exhibit in Long Beach, California has been favorable. The machine is housed in an enormous dome adjacent to the ocean liner *Queen Mary*, and the current advertisements suggest which may be attracting the most attention: "See the plane, but don't miss the boat."

Actor Jimmy Stewart (who is also a model builder) was on hand for the ribbon-cutting ceremonies. As a friend of Howard Hughes, he had been present during the flying boat's one-and-only flight. According to an Associated Press report, Jimmy quipped: "My bet was that he was going to take off, fly across the country, land in the Potomac, and turn the plane over to the government."

SKY SPY

Carl Hatrak favored us with the January 27, 1983, *Lockheed Star* newsletter, which announced that Kelly Johnson, designer of the U-2, has been listed as ". . .one of the ten greatest spies of all time."

MINI-MODEL

Also mentioned in the *Lockheed Star* was William Yates, who carved a model Lockheed L-1011 out of a kitchen match, spanning a mere four-tenths of an inch!

PROGRESS?

From Herb Kelley, of Yucca Valley, California: ". . . Early designers did very well with what they had to work with, and much less knowledge of what was going on than the designers of today have at hand . . . They did have, by and large, good solutions to the problems they faced . . . it does seem to me that the basics, as found out over the years, have not been given enough attention, and gadgetry has become the fad."

FLYING WING STABILITY CURE?

Joe Bickinella offers this slightly tongue-in-cheek suggestion for improving the flight of scale model flying wings. After noting problems encountered during the recent Northrop contest, he suggests: "Get four lengths of knitting yarn about six to eight inches long. Tape or spot-glue the ends, one each, to the top and bottom of the rudder; the other two, one each side of the fuselage, just aft of the cockpit. Get the picture? Let them stream out in flight under power. Should act as a stabilizer in effect. Not scale you say? Can you prove some dashing pilots didn't add streamers? Ever see storks in flight with their long legs hanging way out past their empennage? Same idea . . . nature's aid to a short moment arm!"

THE WAY IT WAS

Gerald E. Myers, who recently designed the Zippy Sport, Alco, and Waterman racer kits for Indoor Model Supply, is also an aviation history buff. He encountered a fascinating data chart in a *Chilton Aero Directory and Catalog*, and was kind enough to share it with us. Published during 1931, it offered an interesting insight in its introductory paragraph; it referred to aviation as "this branch of the automotive industry"!

From the detailed state-by-state information for the year 1930, we abstracted the following selections:

	Number of registered aircraft	Licensed pilots	Aircraft factories
Alabama	45	64	1
California	1,175	2,852	32
Florida	135	196	0
Georgia	74	71	2
Iowa	176	265	6
Kansas	312	273	19
Montana	70	75	0
New Jersey	301	404	8
New York	1,193	1,641	31
Ohio	582	802	10

Although this is an arbitrary sampling, we found it intriguing. Note, for instance, how similar the figures are for California and New York, at opposite ends of the continent.

THE WORLD OF MODEL AIRPLANES

Brand-new this month from Charles Scribner's Sons, New York publishers, is William Winter's long-awaited book. Bill is, of course, well-known as the former editor of *Air Trails, Model Airplane News, American Modeler, Junior Modeler, Sport Modeler* and other periodicals. His previous books have included *The Model Aircraft Handbook, War Planes of All Nations, Handbook of Model Planes, Cars and Boats, How to Build Radio Control Models, Radio Control Handbook, Radio Control for Model Builders,* and in conjunction with Walt Schroder, *Gas Models and Engines* . . . and more. Earning a living by writing about model aircraft is quite an accomplishment under any circumstances, but to raise nine children at the same time is truly heroic. So much for accolades to the man, but what about his new book?

Physically, the hardbound volume measures 7-1/2 x 9-3/8 inches, contains 294 pages, hundreds of photographs, plus an almost countless number of line illustrations. The latter, by H.A. Thomas, Hank Clark, and Herb Clukey, should be an inspiration to budding illustrators. As an example, in place of the usual photograph of a workbench covered with tools of the model building trade, Hank Clark has, instead, carefully drawn ink sketches of everything from basic hand tools through drafting supplies! One can only imagine the man-hours invested.

Presented in the book are chapters on history; the three "families" of models (F/F, C/L, R/C); materials; tools; construction; power sources (gas, glow,

diesel, CO_2, compressed air, rubber, electric); covering and painting; flying techniques; a glossary of terminology; and an index.

Clarity of communication is a Bill Winter trademark, as he has amply demonstrated in his latest publication. Further, he has gained the cooperation of some of the most proficient model builders and photographers in the hobby, including such acknowledged "names" as Don Srull, Bill Noonan, John Oldenkamp, Cynthia Sabransky, John Preston, and Doug Pratt.

In short, if you needed a single book to explain the attractions of model aircraft building, it would be difficult to top this one. You've earned a rest, Bill Winter!

SIGN-OFF WORDS OF WISDOM:

The fewer functions any device is required to perform, the more perfectly it can perform." (Author unknown.) •

Choppers . . . . *Continued from page 35*

of the rotor disk comes directly in, while the air at the rear of the disk is sucked down from way above as it is accelerated through the disk. This differential of inflowing air is called *transverse flow effect*, the major factor involved as the helicopter accelerates into forward flight (or at a hover with a 10-knot headwind).

To keep it in practical terms, the air in the front of the disk stays on each rotor blade for a longer period of time, while the air in the back of the disk is accelerated through in an instant. The important point is that in this condition *the front of the disk develops more lift than the rear of the disk*. This sets up an *aerodynamic imbalance* that will make the helicopter vibrate.

Have you ever noticed that under some conditions the helicopter is smoother than others, yet nothing has been changed? Most of this is due to transverse flow in the rotor disk, causing the *aerodynamics* to shake the helicopter.

Under transverse flow, the disk will also have a tendency to "blow back," as more lift is being produced at the front of the disk and less at the back. This is why you have to give a distinct amount of forward cyclic fairly quickly as the helicopter starts moving forward. The same thing happens when you hover in a 10-knot headwind, you have to give forward cyclic to hold the helicopter over one spot and at the same time counter the blow back of the rotor disk.

The point I'd like to get across to you is do the fine tuning of your helicopter in a no-wind condition, where any changes can be noticed directly. Trying to track a helicopter in a gusty wind is fruitless; one instant transverse flow is aerodynamically shaking the helicopter, the next instant it is not.

One last distinction I should probably make concerns *when* the helicopter will reach effective translational lift. It depends directly on the chopper's size. Small helicopters, such as our models, go through ETL at less than 10 knots, and probably between three and five knots is a more realistic number. Smaller full-size ships hit ETL between 10 and 15 knots, while larger helicopters find effective closer to 20 knots of airspeed. The reason is fairly simple, it takes a brisker wind to blow through a 50 foot rotor disk at the same speed as a much smaller five-foot rotor disk. . .

IN FORWARD FLIGHT

In Figure 6, the helicopter has passed completely through ETL. The helicopter can be flying forward at 20 knots, or hovering over one spot with a 20-knot headwind. No difference. The incoming air is smoothly accelerated down through the rotor disk and the tail rotor is working in clean air. Because there is now a *greater volume of air* for the rotor disk to use, the *power required is less than at a hover*. And as the airflow over the tail rotor is smooth, it works more efficiently too, requiring less pitch to produce the same amount of anti-torque. (The tail rotor also goes through its own ETL.) The forward speed tends to weathervane the helicopter, automatically keeping the tail in line with the forward flight path.

Several years ago, Westport International's Variant radio came with a dual trim switch; one setting for hover and one for forward flight. They recognized the differences in trim between hover and forward flight. The only thing was (and still is) that you could only keep track of so many things at one time, and it was too much trouble to flip from hover trim to flight trim during the transition between the two. This is especially true now with helicopter radios being equipped with dual rates.

DISSYMMETRY OF LIFT

Finally, we're in forward flight. The current aerodynamic influence on the rotor disk is called *dissymmetry of lift*. To regress for a minute, in a no-wind hover, the airspeed of each blade is equal. (The rotational velocity of the rotating blades as a disk.) See Figure 7.

As the helicopter goes into forward flight, one blade becomes the "advancing blade" and the other the "retreating blade". See Figure 8 for an example of this. Here I'm using a full-size example with a forward airspeed of 100 knots, and each blade's rotational airspeed of 400 knots. *The rotor rotation is in a clockwise direction.* The blade on the left is advancing, and it's airspeed is rotational velocity (400) *plus* forward airspeed (100). The right blade is retreating, with it's airspeed rotational velocity (400) *minus* forward airspeed (100). The difference between the two blade's airspeeds (200 knots) is dissymmetry of lift, which wants to roll the helicopter to the right.

The helicopter in slow forward flight has very little dissymmetry of lift, so it doesn't roll much, and little correction is

needed. But as the airspeed builds, the tendency to roll is more pronounced, so more correction is needed. There are two ways to compensate for dissymmetry of lift, by blade flapping and blade feathering.

BLADE FLAPPING

Because the advancing blade is gaining lift as it comes around, it has a tendency to climb, or flap up. As it flaps up, the angle of attack changes causing less lift to be produced. Conversely, on the retreating blade lift is lost and it descends, or flaps down. As it flaps down, the angle of attack changes again causing more lift to be produced. In this way, the rotor disk automatically tries to level itself and correct for dissymmetry of lift. As one blade flaps up, the other blade is flapping down, so the whole rotor *flaps as a disk* about the main shaft.

BLADE FEATHERING

Here the pilot manually makes a cyclic change which directly controls the pitch of the blades. Due to gyroscopic precession the max blade pitch is put in 90 degrees *before* max flapping. (See the Dec. '82 and Aug. '83 issues of **MB** for a review of the gyroscopic precession.) If we go into forward flight, giving forward cyclic reduces the pitch on the advancing blade, which flaps down over the nose of the helicopter. This same forward cyclic also increases the pitch of the retreating blade, which flaps up over the tail. This does two things. It causes the helicopter to move forward, and it *takes lift out of the advancing blade and puts pitch into the retreating blade, automatically compensating for dissymmetry of lift!*

What flapping and feathering do not take care of is a rolling tendency (to the right) for which we actually give slight left cyclic to correct. Now, read the next few paragraphs carefully because it's all going to fall together.

The degree of rigidity in the rotor head determines how much flapping or feathering takes place. In the Heli-Baby or Revolution 40, the free-teetering heads flaps a great deal, so very little cyclic feathering is needed in forward flight. In the SuperMantis, half of the compensation for dissymmetry of lift is done by the disk flapping, and half is done by cyclic feathering. In the Competitor, with a nearly rigid head, the disk flaps very little and nearly all compensation for dissymmetry of lift is done by the disk flapping, and half is done by cyclic feathering. In the Competitor, with a nearly rigid head, the disk flaps very little and nearly all compensation for dissymmetry of lift is done by blade feathering. In the Horizon (a flybarless, rigid rotor) there is literally no flapping, it's all feathering.

As the rigidity of the head increases, the transmitter stick will have to be moved more and more forward (and slightly left) to compensate for dissymmetry of lift as the forward speed increases. Each helicopter design will have different movements. *This is normal and necessary.*

This is one reason why a Cricket will feel different than a Competitor in forward flight. Yes, they are different helicopters, but in the end the rotor design dictates how much the tx stick will have to feather the blades in forward flight.

Full-scale examples would be a Jet-Ranger, which has lots of flapping and relatively little feathering, to an A-Star, which has some flapping and some feathering, to a rigid rotor Boelkow BO 105, which has little flapping and nearly all feathering.

I've covered an awful lot of ground this month, I hope its helps you to understand a little bit better how the rotor system changes as the helicopter is pushed from a stable hover into forward flight. Hope to see you next month. •

R/C Boats . . . . *Continued from page 43*

about it? Has anyone out there come across a method of attracting ducks away from racing activities? My address is at the end of this article, and I would appreciate your ideas.

DISQUALIFIED

In model boat racing, "disqualified" is about the most serious penalty that can be levied against a competitor. Basically, it means "you really goofed," bring your boat off the race course. In the last couple of contests I've attended, I've managed to get myself disqualified twice. The reasons for the disqualifications were different each time, but the end result was the same: I received no points for that heat.

The most common reason for a disqualification that I seem to notice is for striking a dead boat or hitting ducks. It was for hitting a dead boat on the backstretch with my 7.5 tunnel that I received one of my disqualifications. Dead boats and sitting ducks are not easy to see when you're attempting to race a model boat. Keeping an eye out for such objects is really an important job for your pit person or driver's assistant. It is the driver assistant's responsibility to keep the racer informed about what is happening around the race course. It always amazes me how with all the space there usually is around a boat that is dead on the race course we still manage to smack stalled boats as often as we do. It would seem that stalled boats have some type of magnetic attraction to those boats still running. *(Ah ha, another corollary to Murphy's Law! wrf)*

It's been my experience that disqualifications resulting from racing action between two or more boats is not called all that often. In NAMBA, a driving violation can result in disqualification if it causes the other boat to quit. If the violation does not cause the boat to quit it is a one-lap penalty.

However, some of the things our boats do during the action of a race are not what we intend for them to do. While attempting to keep the lead in a race with my 3.5 tunnel, my boat hooked and smacked into the boat trying to pass me. My boat kept running, but my opposition was knocked out of the race.

I was disqualified. It was the correct call under the circumstances. Even though I didn't mean to have the boat hook, I had to assume the responsibility for what the boat did.

The point I'm attempting to make here is just being sorry for something your boat did is not grounds for having a disqualification call being dropped. I have been to contests where a racer who has been disqualified has tried to avoid the decision by pleading he didn't mean for his boat to hook, side, veer, or whatever it did to cause the infraction. Under all circumstances, the racer must assume responsibility for the actions of his model. Just because the boat is momentarily out of control does not mean the driver is relieved of the responsibility of the actions of the model during that time.

One more thing while we're on this topic. Should your model be the cause of an accident, don't assume that the others involved know you feel sorry for causing the problem. No one will think of you as being "less macho" because you tell someone you're sorry for what happened. There's no doubt it wasn't what you planned to have happen. I do not believe anyone goes out with the intention of causing an accident. However, as long as we continue to race our model boats, we will continue to have accidents. Be mature enough to assume your responsibilities and don't be too proud to say you're sorry.

DUMAS HOTSHOT IV

What happens when you take the Dumas Hotshot 45 and reduce it down for the 3.5 K&B Outboard? You get the new Dumas Boats "Hotshot IV." After designing the boat that would become the Hotshot 45 in the summer of 1981, I got to thinking that the design might work well for the 3.5 outboard engine. I reduced the plans for the 7.5 down to what seemed to be a reasonable size for the 3.5, and the results proved to be very competitive. I have raced prototypes of the new Dumas Hotshot IV for almost two years and have done extremely well. When I mentioned to Jay Brandon, president of Dumas Products, that I had designed a 3.5 tunnel based on the larger Hotshot 45, he expressed an interest in offering it as a wooden kit. The Hotshot IV is now available as a kit featuring plywood and spruce for materials.

The construction techniques used on the Hotshot IV are identical to those used on the Hotshot 45 and most other wooden tunnel hulls. The basic framework features egg crate construction. The use of instant glues like Hot Stuff, Zap, Jet, or whatever, really speed up the building process required for a wooden kit. I have found that by inviting a friend over to help in the assembly of a wooden model, I can almost hand clamp most parts while I wait for the instant glue to kick off. Using the new accelerators, like Hot Shot, helps make the glues that are thicker, like a Super 'T', set up almost as soon as the accelerator is applied.

I haven't yet built the kit version of the Hotshot IV. During the first part of this year's racing season, I had the opportunity to race a pre-production version built by Carl Atherton of Dumas Products. I was supposed to test the boat and then send it back down to Carl. However, I liked the way the boat ran, and was able to talk Carl out of the boat until I had a chance to build one from the kit.

Of course, I wasn't able to just leave the boat alone, even though it did run very well. The first thing I added was the front bow wing. A photo of this addition appears in this article. I found that the boat would stay down better when running into the wind with the addition of the front wing.

The other addition I made isn't apparent unless you look underneath the boat. What you would see are two wedge-like devices, one inside the tunnel and one located at the front of the tunnel. The idea of using these wedges is to eliminate spinning and hooking while cornering. Rod Geraghty, an excellent model builder from Seattle, developed this idea. I created my wedges by simply Hot Stuffing strips of 1/16-inch plywood inside the tunnel. I'm currently using three wedges on my 3.5 and 7.5 tunnels.

What purpose do they serve? Basically the wedges assist in keeping the boat riding up through a turn. This prevents the sponsons from catching too much water and causing the boat to hook or spin. They do nothing to increase the top end speed of the boat. However, I have turned faster times on the course because I've been able to corner wide open without worrying about hooking in the corner.

Finding the correct depth for the rear edge of the wedge is mostly a matter of trial and error. The wedges on my 3.5 tunnel are 7/8-inch in width, eight inches log, and 1/2-inch at the back edge. The 7.5 wedges are 1-1/4 inches wide, 11 inches long, and 1-1/8 inches deep. Running the wedges deeper caused the boats to slide out in the corners. This modification is being used by lots of the tunnel racers in my area. It seems to work on a variety of tunnel designs.

The sponson bottoms of the Hotshot IV are stepped, another idea I can't take credit for developing. These steps assist in breaking up the water and reducing the wetted surface on the sponsons. The result is better hull speed in both the turns and straightaways.

To the best of my knowledge, the Hotshot IV is the only 3.5 wooden tunnel kit to be released in the past few years. It is an attempt to incorporate the best of what I've found in model tunnel designs. The two additions, the bow wing and wedges, will be available in the second production run. However, I will gladly provide anyone with full-size drawings of the modifications I made. All I ask is that you provide a stamped, self-addressed envelope. My address is: Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Missile Boat . . . *Continued from page 12*

has dried. These are then cemented to the chine, bulkheads, and the edge of the bottom covering as well as to each other, using plenty of cement. The bow pieces must be bent slightly with the grain to follow the hull contours to bulkhead "A". Let the hull assembly dry thoroughly.

Remove the hull from the worktable and add the bow blocks to each side of the keel and bulkhead "A". We laminated the bow, but single piece blocks can be used. Sand the hull thoroughly with a sandpaper block. The chine strap is added next.

The hull interior consists mainly of supports and boxes for equipment such as the servos, batteries, receiver, etc. Before any work is done on the interior, all hull covering joints should be re-cemented.

It is a fact that all propeller shaft tubes fill with water, in full-size ships as well as models. If the point where the tube ends inside the hull is below the waterline, water will seep into the hull at a very slow rate . . . a matter of drops now and then on the average model. If water seeps into unprotected wood it will ruin a beautiful model by swelling and warping the wood, causing the exterior paint to crack and peel. In order to prevent this, the entire motor compartment, between bulkheads "G" and "H", should be well sealed with several coats of sealer and at least two applications of paint.

Plywood and balsa supports, boxes, and platforms are added now. These should be adapted to the equipment used and will not necessarily be identical to that shown on the plans if different equipment is installed. The supports can be painted if desired.

Skegs are made now if a triple screw model is desired. Cut four skegs from 1/8-inch plywood, mark off the shaft tube location, and cut grooves for the shaft tubes as was done with the keel. Sandwich the tubes between the plywood using plenty of cement, and set aside to dry. Mark off the skeg locations on the hull, make a hole for the shaft tube, and cement the skegs to the hull bottom. Note that the skegs are parallel to the keel in section view as well as the plan view. They are *not* perpendicular to the hull bottom, and therefore the top surface must be beveled to compensate for the sloping hull bottom.

The rudders are located directly behind the outboard propellers and are cut from brass following the outline in the profile. Make the bottom 90-degree bend of the four-inch long brass rod rtiller/rudder posts, and solder to the inner surface of the rudder as shown in the profile. Epoxy can be used instead of solder if desired, but this must then cover a much larger area of the rudder, completely covering the rudder post.

Cut the tiller bearing tube and the balsa bearing braces. Make holes in the bottom for the bearing tubes and insert the tubes, allowing about 1/8-inch to protrude from the hull bottom. The fit through the hull should be snug so the tubes will remain erect when so placed. Cement the inboard brace to the tube bearings and hull bottom.

While this is drying, gently slip the tiller/rudder post into the tube using it as a guide to ensure that the bearing tube is vertical. When the cement is dry, recheck the tube position and then add the remaining braces. This installation must be recemented several times and reinforced with cloth (or silk) and cement.

Place a brass washer on the tiller at the top of the rudder and slip the brass rod of the rudder assembly into the bearing tube. Hold the rudder up against the tube with a length of tape bridging the rudder to the hull. Pierce a small piece (1/2-inch square) of sandpaper on the tiller and slide it down to the tube and place a brass washer on top of the sandpaper. Very quickly, solder the washer to the tiller rod without excessive heating of the brass rod so as not to affect the solder or epoxy at the rudder. The sandpaper retained a space between the washer and tiller during soldering; remove it now.

Using small needlenose pliers, very carefully bend the tiller forward and then gently upward as shown on the profile. The tillers are connected to each other with a sheet brass steering arm or tie-rod. Notice the 1/6 x 3/8-inch slot for the servo arm pin. We used a 1/16-inch bolt, threaded into the servo arm hole from the bottom, and with the loosely fitted nut secured to the bolt with epoxy.

The propulsion drive train consists of electric motors, propellers, shafts, and universal joints. Our model used one large motor on the center shaft and two smaller motors on the outboard shafts. The motors we used have no integral mounts, so aluminum strips are used to strap the cylindrical motors to plywood mounts prior to installation.

After the universal joint is attached to the motor, and the propeller to the shaft, the shaft is inserted into the tube and the universal connected to it. With the entire drive train connected from motor to propeller, the motor is maneuvered into position so that the universal is at its straightest and the propeller is about 1/16-inch from the end of the shaft tube. At this point, the plywood motor mount can be cemented to the hull structure, keel, and chine.

When the cement is dry, rotate the propeller by hand to be certain the shaft doesn't bind, then connect a battery to ensure good operation.

The space between the motor mount and the hull bottom is filled in with balsa wedges and firmly cemented. Check the shaft again and then apply cement around the motor installation. There is virtually no vibration with electric power, and therefore the rugged mounts used for reciprocating engines are not necessary.

Apply several layers of cement around the shaft tube at the point of hull penetration. Our propellers are epoxied to the shafts. If the hole in the propeller is too large, epoxy an aluminum or brass tube bushing between the prop and shaft.

The servos can be installed now. We held our servos in place with a dab of G.E. Clear Silicone Glue and Seal. This dries to a rubbery consistency, absorbs vibration, holds broad surfaces together very well, and does not affect plastic. The servos can be removed when desired with a slight twist and lifting motion. Of course, the servos can be screwed or bolted into place as desired.

The missile servo arm presses a spring-

loaded push-button switch to close the circuit and ignite the missile. This servo is located between plywood pieces. The switch is mounted into the plywood in line with the servo arm. Rubber bands or tape can be used to hold the servo in place, or a dab of silicone will do. Check the operation of the missile firing servo to be certain it presses the switch.

Propulsion wiring should be multi-strand, insulated, and of a much heavier gauge than electronic wiring . . . almost like that used for electrical items in the home, such as lamps. We used mini-alligator clips here and there to enable equipment such as the batteries and the propulsion servo to be easily removed and used in other models. This is, of course, entirely optional.

The missile ignition wire can be thin because it must be flexible in the hangar.

Deck installation is started by fitting the deck to the hull and, when the location is correct with equal overhang on the sides and stern, the bottom of the deck is marked with the hull location as a guide for final cementing. We also marked off the bulkhead locations on the bottom of the deck. Place the deck, inverted, on the worktable, propped up with books or other flat objects to raise the coaming off the table and evenly support the deck. Use a relatively slow drying adhesive (we used Ambroid) and apply it to the inverted deck along the marks denoting the structure locations. Also apply cement to the upper edges of the bulkheads and hull sides. Quickly place the inverted hull atop the inverted deck in its proper location, pressing down gently to make a firm contact. When thoroughly dry (at least three hours), additional cement can be wiped into the external hull/deck joint for both strength and appearance. The deck should fair into the bow block with no overhang.

The deckhouse is a simple 1/8-inch sheet balsa box. Cut the sides, ends, and top to size. Notice that the house front is 3/16-inch balsa, and that the house extends beyond the deck opening. A 1/8 x 1-3/4 x 2-1/4-inch balsa house bulkhead is necessary to make the deckhouse fit the coaming properly, and it will act as a substitute house front. Pin this bulkhead and the house sides and rear to the sides of the coaming with the bottom edge of the house sides, rear, and bulkhead touching the deck. Cement these four pieces together *but do not cement them to the coaming or the deck*. Cement the house front to the sides followed by the deckhouse top.

When thoroughly dry, remove the assembled house and recement all interior corners. Sand with a sandpaper block, and then add the 3/16-inch balsa wheelhouse top and sides. Notice the shape of the wheelhouse sides, tapering into the deckhouse side; however, the tops of the sides are flat and not rounded off at all. Round off the house front as shown on the plans, and then add the sides and front of the flying bridge. Round off the bridge front when the cement is dry.

Next, you must seal the hull and deckhouse after both have received a thorough final sanding. We applied a coat of sealer to each, and then set them aside to dry thoroughly while the various details were assembled. The hull should receive at least 10 or 12 liberal brush coats of sealer, preferably more. The deckhouse should have about a half-dozen coats. Sand after each coat is thoroughly dry. As an alternative, the entire hull can be covered with light-weight fiberglass cloth and resin, to both seal the wood grain and at the same time add strength to the hull.

Details, such as guns, gun director, gun director platform, and mast assembly, can be fabricated while the hull's coat of sealer is drying. Each item is made as a sub-assembly and finished completely before it is mounted on the boat later. The mast is carved from balsa to a tapered, circular cross-section, and the spar is a round toothpick which is cemented in a hole drilled through the mast. We simplified the mast radar antennae and light supports: instead of fabricating an intricate scale structure, we cut the supports from 3/16-inch balsa, and (after painting) the structure was simulated with strips of black Sig Stripe-Rite. The balsa hatches and diesel air intake should all be fabricated, sealed and painted along with the other details and cemented in place later.

A wide choice of national flags can be flown on your Osa boat because the Soviet Union supplied many to its allies and military hardware clients. See last month's **Model Builder** for the complete list of nations operating the Osa boats. We used a double flag . . . Indian on one side and Iraqi on the other!

The missile hangar/launchers on this model are of two types: operational and scale. This model has one operational and three scale hangar/launchers. The forward, starboard (right side looking forward) launcher is operational. Hangars are completed first and then installed on the deck.

The scale hangars are made from 1/8-inch balsa and a hard, smooth construction card sometimes called oak tag. Cut the 1/8-inch balsa hangar base rectangle and cement piece "M" and the 1/8 x 7/16 x 2-1/4 balsa piece to it. Cut the hangar top in one piece from oak tag using the pattern on the plans. Bend 90 degrees where shown. Notice that the scale hangar pattern omits the back pieces because of piece "M". Also note that the forward and aft hangar templates differ in the angle to the deck (the aft hangars are positioned at a greater angle). Trace and cut the templates accordingly. Cement the oak tag to the base and back of the hangar, bending it around the top and following the back piece "M". Hold with pins until dry, then cement front piece "L" in place and cement the bent bottom flaps together. The scale door, piece "N", is sanded and sealed before the 1/16-inch balsa stiffeners are added. The door is added to the hangar after the hangar has been sealed.

The operational hangar/launcher is made from sheet aluminum, bent 90 degrees where noted on the plans, with a plywood base. Drill holes in the base for the J-Bolts and missile ignition wire. Vent holes should be punched or drilled at the rear of the hangar on the outboard side only. The floor of the hangar is covered with a layer of asbestos gasket material under a layer of heavy cooking aluminum foil (with the dull side down) as insulation against the heat of the missile blast. These can be held in place with small carpet tacks or thumb tacks. This insulation should curve upward slightly against the back of the hangar.

The launching rail is bent from 1/8-inch diameter wire and installed before the sheet aluminum hangar is mounted on the base. The rail need not be music wire . . . it can be any other wire which is more easily bent and adjusted. We found a clothes hanger made of soft, 1/8-inch wire, and bent our launcher rail from it. Brass rod can also be used for this purpose.

The rails must be perfectly parallel and carefully matched to the tubes on the missile. We wrapped the rails with sheet brass, drilled a hole through the brass and inserted a bolt and nut. This was used to hold the rails in adjustment. Once the rails fit the missile perfectly, they are held to the base with J-bolts. Recheck the rails and then prepare the aluminum hangar for the base.

After bending the overlapping back flaps 90 degrees, gently and carefully bend the sheet aluminum to shape with the fingers. The top is rounded with the sides vertical and in line with the sides of the base. Before the hangar is permanently attached to the base, it should be temporarily taped in place and the missile installed on the launching rails. Be certain that the missile fins and wing clear the hangar by at least 1/8-inch for the entire run on the rails. The hangar is held to the base with thin, headless brads, or short model pins driven through the sides of the aluminum and into the base. No door was fitted to the hangar and the overlapping back pieces need not be joined in any way except to make physical contact with each other.

The Styx missiles used with our model were assembled using standard Centuri rocket components such as balsa nose cones, and body tubes. The fins and wings are balsa sheet. The missiles can be made by modifying Estes Industries Astron Scout or Centuri Moonraker kits, but we used available, standard model rocket parts.

The plans illustrate the configuration of both the scale Styx and the operational Styx. In addition to the difference in body shape due to the rocket tube, the operational model has the wings moved aft, and much larger fins also moved aft. This was necessary in order to place the center of fin area as far behind the center of gravity as possible. We also added from 3/8 to 3/4 ounces of lead ballast in the nose cones of our missiles to move the center of gravity forward.

Although the flights are of very short duration and distance, the objective is to have a straight and level run without tumbling or erratic trajectory. Actually this missile doesn't "fly" in the sense of duplicating the Styx cruise missile which actually flies to its target. The model missile blasts out of its hangar at a very low angle and therefore scribes a very low trajectory before striking the water or land about 25 to 50 feet away depending on wind and speed of the boat.

The aluminum tubing should be a very thin-walled type, and the two rail riding tubes must be aligned with the rails before the cement has dried. All attachments to the rocket should be reinforced with gauze, crinoline, or silk and cement. A little bit of lightweight fiberglass cloth and resin can be used, if desired, at the joints.

It is not necessary to install the rocket motor retaining wire nor the engine catch hook, as is done for vertically launched model rockets. We found that, if the rocket engine is allowed to eject itself, the missile will float in the water. If the rocket engine is such a loose fit in the body that it could fall out while in the hangar, bind the rocket engine with a band of tape to increase its diameter, until the fit is snug but not tight. The scale color of the full-size Styx is not known. Ours are painted bright yellow or orange, with a black nose to simulate a radar dome.

Painting should not be started until all wood is well sealed. The hull sides, gun assemblies, hangars, mast assembly, anchor, hatches, and reels are painted light gray. The remainder of the model is dark gray, except for the gun director array dome which is white, the bitts and the entire area within the exhaust stack which is black, and the hull below the waterline which is red.

Final assembly is accomplished after all pieces are painted. The wire nail stanchions and soft wire railing are installed last. The hangars should be located about 1/16-inch away from the deckhouse. Holes must be drilled into the deck for the operating hangar J-bolt nuts and for the missile ignition wires which should be passed through the deck and hangar base as the hangar is cemented to the deck.

The boat is propelled by a six-volt propulsion system. A 12-volt system can be used if desired; however, it is important that the proper equipment is selected. The three motors draw considerable current, and more power and a higher speed can be achieved by using two six-volt batteries connected in parallel so as to retain the six-volt system. Two Portalac batteries will fit in the hull if stood on end. However, in this case, bulkhead "E" must be cut open in order to fit the two batteries.

Our missile is ignited with a six-volt circuit. Once the missile is loaded with the rocket engine, and the rocket engine igniter wire inserted, the mini-alligator clips are gently attached to the two ends of the igniter wire. Extreme care must be taken when the missile is placed on the rails and pushed into the hangar in order not to dislodge the clips or wire. The system can be tested beforehand by connecting the clips to a mini-bulb and activating the ignition servo. When the bulb lights, the system works, and is ready to go. Launch with care and always be certain your missile will not endanger anyone's safety.

OSA MISSILE BOAT LIST OF MATERIALS

(All material is balsa unless noted otherwise)

(6) 1/8' x 3" x 36" for bulkheads, coaming, hull covering, platforms, and deckhouses; (1) 1/8" x 12" x 24" plywood for bulkheads, equipment mounts, keel,

and skegs; (3) 3/16" x 3" x 36" for deck, missile wings and fins, gun turrets, gun director, and deckhouse front; (1) 1/16" x 3" x 12" for hatches, gun turrets, and scale hangar doors and stiffeners; (3) 8-1/2" x 14" sheets oak tag for scale hangars; (1) .020" x 12" x 12" sheet aluminum for operational hangar, motor straps, and smokestack; (1) .032" x 3" x 6" brass for rudders, steering arm tie-rod, and launching clamp; (1) 1/8" dia. x 24" lg. brass rod for center propeller shaft, and missile launching rails; (2) 1/8" x 3/16" x 36" for chine strap; (1) 1/16" dia. x 18" lg. brass rod for tiller/rudder post; (1) 1/8" inside dia. x 4" lg. brass tubing for center prop shaft tube; (1) 1/8" O.D. x 6" lg. brass tubing for tiller bearing; (1) 3/32" dia. x 2-1/2" brass rod for outboard propeller shafts; (1) 3/32" inside dia. x 8" lg. brass tubing for outboard propeller shaft tubes; (1) 1/32" dia. x 36" lg. music wire for whip antennae and tripod mast; (1) .046" dia. x 12" lg. soft baling wire for wheelhouse rail, and gun director platform rail and braces.

MISCELLANEOUS

You will need screws, nuts, bolts, straight pins, wire nails, beadcraft wire or coil winding wire, assorted dowel, yellow or white decal for windows, white decal for boat number, sanding sealer, light gray dope, dark gray dope, red dope, black dope, sandpaper, cement, epoxy glue, wiring, mini-alligator clips, J-bolts, asbestos sheet, aluminum foil, propellers, deck fittings, motors, and at least one six-volt battery.

Note the following equipment source addresses for propellers, Aristo Craft, Mabuchi, and Portalac products:

Polks ModelCraft Hobbies
314 Fifth Ave.
New York, NY

For brass rod, scale model fittings, brass tube and sheet:

Model Shipways Co. Inc.
39 W. Fort Lee Rd.
Bogota, NJ 07603

Happy boating! •

Citabria . . . . . *Continued from page 24*

the rear part of the center section, making sure that you have 1-1/2 inches of dihedral in each wing. Glue the dowel pegs in the predrilled holes of the front of the rear part of the center section. I then add a three-inch piece of one-quarter-inch dowel between the spars on each wing as a dihedral brace.

Lightly sand the entire wing, center it over the fuselage, and drill the holes for the nylon wing bolts which will go through the trailing edge. Glue a small piece of plywood to the trailing edge to prevent the bolts from going through it when tightened down. If you plan to use ailerons, cut them out at this time, install the torque rods, and mark and cut the hinge locations.

TAIL ASSEMBLIES

Tail construction is quite simple. Glue the appropriate balsa or basswood over the plans, remove, and sand. I use basswood for the spar in the stabilizer to provide extra strength. Cutting hinge slots in the basswood is more difficult, but it is worth the extra effort.

FINAL ASSEMBLY

The entire fuselage, wings, and tail surfaces should be sanded lightly and vacuumed to remove any dust. Cut all slots for the hinges and exits for the pushrods. You may either tap the hardwood block for the nylon wing bolts, or use a T-nuts on the underside of the block.

Mounting the landing gear is somewhat tricky as the formed aluminum gear must be slid under the bottom longerons and bolted to the plywood mount. I then glue a piece of 1/4-inch square between the No. 5s just where the gear exits. Sand these to the shape of the No. 5s.

Covering is conventional with your choice of coverings. Silk would be more appropriate with a vintage model. The two pieces glued between the No. 5s will allow the entire bottom to be covered.

After covering, glue the tailpieces to the fuselage, install the hinges and bellcranks, and install the motor and radio. The radio compartment is large enough to accept almost any radio and your choice of throttles or off/on switches. I use the high/off/low switch which I described in the construction article for the Pleaser (see the May 1983 **Model Builder**).

FLYING

The first hand-launch was almost a picture perfect flight. The flying speed

was very scale-like. The 11-6 prop pulled her up very well. I climbed out to a sufficiently safe altitude and made the first turn. (I fly with the rudder/aileron coupled.) After about two minutes, I had enough altitude to switch to the low speed and enjoyed a very relaxed flight. The low speed was perhaps a little too low as she did begin a slow descent. I then switched back to high and climbed up again.

I get consistent seven to nine-minute flights using the Leisure geared motor with six cells of 1.2 ah capacity. If one wants a little more power without the hi/low features, seven cells would give more altitude.

After disconnecting the rudder/aileron couple, the Citabria will perform slow rolls. The glide is very gentle, and with a little planning, plus the use of low power, she will drift in for a very smooth landing right at your feet. •

White . . . . . . *Continued from page 49*

accomplished with patience, fortitude, and temporary uprights, which hold the axle in place while the angled pieces are fitted and glued. The axle is then trimmed, and the temporary uprights are removed.

Both sides of the wings are covered in white or "antique" tissue, and are not shrunk. A spray coat of Deft clear wood finish will set the tissue. Don't worry about less than taut covering. It is SCALE!

Adjustments were a trial, to say the least, but the movable surface helped greatly. As the original incidence angles proved extremely critical, and impossible to work with, use the angles shown on the plan. A bit of left aileron made Model No. 2 a very stable flying machine.

Weight is 14 grams, and with a 26-inch loop if 1/8-inch rubber and a six-inch plastic prop, the White canard has done 38 seconds in dead evening air. The potential is there for better times yet.

Oh, about that tiny fin located just behind the canard wing, it was not glued in place. Instead it was held in place by a force-fit between the crosspieces. Prior to flight, it was slid to the right to clear the rubber motor. What effect does this have on flight? None. In fact, there were no detectable changes in flight when the fin was *removed!*

If the White appeals to you, build the fuselage as strong as possible. Pre-glue, glue, and reglue, and use hardwood longerons. The wing has sufficient area to support strong construction.

You will enjoy this canard, an old concept which keeps backing its way into the present . . . and the future.

SOURCES MENTIONED IN TEXT

F. Hungerford Wheels
1770 Lilac Circle
Titusville, FL 32780

William Bros.
Dept, MB
181 Pawnee St.
San Marcos, CA 92069 •

Fuel Lines . . . *Continued from page 10*

things could be commendable. To compensate, the mind might even suggest, "It'll probably be a lousy runner." It wasn't. The literature suggested that a good half-an-hour of running might be necessary before smooth operation could be obtained, and maybe two hours of operation would be necessary for premium performance. Maybe so, but I thought that it ran remarkably well on the first tank. The prop was a Rev-Up 15-5 and the fuel was five percent nitro. After about two minutes of mildly-rich running, the engine tacked 9500 without a muffler and without being leaned to its very peak. The idle, with no adjustments to the factory settings, was 3000 rpm. Later, when the muffler was installed, there was a 350 rpm power loss.

Guys, as you've very probably summized, I really like this engine. So much so that I intend to put it together with an R/C biplane. Would you believe a Big John? That's for the future. For here, there are several accompanying photographs that show some very nice aspects of the engine.

Overall, if four-cycle engines intrigue you, I suggest you give this one a lot of consideration.

Take care. . .

ENGINE SPECIFICATIONS

Bore	29.0 mm
Stroke	22.6 mm
Weight	795 grams
Cylinder	Steel
Piston	Aluminum with ring
Horsepower	1.2 at 11,500 rpm
Aircraft weight	3.5 to 6.5 kg •

Indoor . . . . . . *Continued from page 55*

were mostly solid and heavy.

Now things are considerably different. Balsa wheel blanks are available from many sources. New materials, such as: beadboard foam and other plastics are now widely used. The Dremel hobby tool is being employed to spin wood and plastic wheels.

Perhaps the most significant new product on the scale wheel scene is the Hungerford spoked wheel. Since Fulton Hungerford began making and selling wheels, many modelers have enjoyed building those early flying machines that catch the judges eye at awards time. At the outset, these wire beauties sold for about $6.00 per set. They were well worth the money. The price is now over $8.00 . . . still worth the price . . . if you have the money. However, sometimes the hobby shop doesn't have the style and diameter you need for a particular airplane, and you have no choice but to build your own. Some builders *prefer* to construct their own spoked wheels. Some folks (like youngsters) can't afford to buy, so they build their own out of necessity.

Solid scale wheels can be turned down on the Dremel, or simply cut and sanded to shape. In this case, a plastic circle guide (from your local art supply store) is used to trace an accurate circle outline on the foam or balsa to be cut. Then the excess material is cut away outside the outline and the circle shape is sanded to finality. The disc's corners are then sanded and contoured to shape.

Spoke wheels can be built on a simple jig. The circle outlines are drawn on 1/16 sheet balsa (several cross-grain laminations) and the tire is cut out and sanded to shape. The same outlines are scribed

onto a square sheet of 3/8 balsa for the construction jig. The spoke positions are drawn onto the jig surface (see sketch). Red for one side and blue for the other. Small flat blocks are positioned on the jig to elevate the tire slightly so that the hub will protrude from either side when viewed from the front. The spoke material can be thin strips of round bamboo or basswood (from the hobbyshop). For ultralite indoor wheels, I recommend using the stems from straw flowers (usually found at the florist shop or local department store). The spokes are cemented at the hub position and then trimmed and glued at the inside center edge of the rim. The hub must be drilled and positioned over a wire spindle which is embedded vertically into the jig center. The wheel is cemented to the four blocks before the spokes are fitted in position. The spokes are set in on one side, and the wheel is cut away from the blocks and turned over. The remaining spokes are affixed after recementing the wheel to the blocks. After again releasing the wheel from the blocks, it is then fine sanded and painted black, with the spokes being painted silver.

NEW SCALE REFERENCE BOOK

A new source book for scale builders is coming off the presses very soon. Included in the book are a dozen three-view drawings of aircraft suitable for scale modeling, including obscure monoplanes, a golden age racer, a biplane, a triplane, and two canards. Also featured are three different Farman Mosquitoes and an Autogiro.

This new work is 8-1/2 x 11 and has over 60 photos in its 56 pages. The special prepublication price is now $6.95, while the regular price will be $8.95. Write to W.C. Hannan, Graphics, P.O. Box A, Escondido, CA 92025, USA. Yes, the author is our own Bill Hannan!

BRACING MATERIALS

If you are contemplating getting into indoor duration flying, you must consider how the surfaces are braced. Super-lightweight models must be supported by thin wires or other materials. The wing and tail structures must be held in position in flight. To log long flights, the wood must be light and delicate. The bracing wires hold the model together and insure straight, warp-free surfaces.

The standard material used in duration models is Nichrome wire. This means nickel-chromium steel which is drawn down to an incredible .001 in. diameter (the average human hair measures .004). This wire is also available in an even smaller size. However, this .0005 in. wire curls very tightly when removed from the spool and is hard to work with, not to mention *hard to see*. The covered wing is cemented to a jig and then strung with the Nichrome wire. Completing this delicate task is essential to a superior duration model.

Scale type models are also seen with braced surfaces. In many instances, the airplane being modeled had flying wires. Most every early aircraft depended greatly on the support given by bracing wires. Even in most modern planes, such as: the Piper Cub, Wacos, Taylorcraft, etc. The tail surfaces were supported in this manner.

Many builders of scale models use sewing thread for this task. This is not ideal, because the fine hairs that stick out of sewing thread increase the drag on the airplane greatly. The smarter modelers use silk thread. Recently, my Gossamer Albatross, nine-inch fuselage, Peanut scale model was stored in my garage. Even though it was inside a cardboard box, the heat and moisture acted on the silk thread rigging and warped the model substantially. The entire model had to be restrung and stored elsewhere.

I recommend Danville's Fly Tying Thread, available at selected fishing equipment stores. Monofilament clear plastic thread is sometimes substituted, but it does not have a scale-like appearance.

A MASSIVE CONCERN

A closing thought might be about weight in indoor models. It is far better to try to remove weight to balance your model than just to add clay to the nose. Consider relocating the wing to shift the center of gravity if the model does not balance at the appropriate point. It doesn't make sense to take all those pains to build the model light, then stick a big glob of clay under the nose to balance it. Plan where you want the center of balance to be, as you are constructing it. Keep the tail very light, even if it means moving the rear peg forward a little. As Jim Jones says, "Keep your WEIGHTS DOWN, and your TIMES UP!". Believe me, they go together!

Write those questions and comments to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. Send me a picture of your club members. I especially want to print pics of those youngsters in the column. See you-all next time! •

R/C Autos . . . . *Continued from page 41*

Even though I have never cared for or had satisfactory luck with ball bearing clutches, we decided to give it a try with an Associated 13-tooth vented clutch bell, Associated's teflon clutch shoes, and a set of ball bearings, also a stock Associated part. Before the engine even started, just the bumping from the electric starter was enough for the outer bearing to shed a wire retainer, followed closely be a seal. We did run the car that day, but later in the evening when John pulled the bell off, bits of bearing tumbled out. Assuming this would be a recurring problem, we switched. MRP supplied a 12-tooth bell, a new union nut and a needle bearing assembnly for the bell. The smaller bell gave us the lower gearing we wanted anyway, and the needle bearings are pretty reliable. You do have to lube them prior to each race day with MRP's Solution Lube, and

another shot prior to the main event is good practice, as is having an extra bell/bearing assembly on hand, but this is definitely the way to go for a reliable, low maintenance clutch.

We stayed with the Associated teflon shoes even though MRP's work well, mainly because they were already cut the way we wanted them. Ah, yes, cutting the clutch shoes, that old black magic art. Nothing to it, really. First off, regard the stock shoes as huge, and realize that nobody runs them successfully at that weight and area. The first cuts are simply to get the shoes to fit easily inside the clutch bell; the shoes will no doubt foul the union nut, simply trim them to clear. Next, slip some washers on the pivot pins for the shoes, trying to space them away from the flywheel and to get them fully inside the installed clutch bell. If another washer or two are required to eliminate excessive play of the bell on the union nut, do that as well.

The actual cut shape of the shoes can vary from racer to racer. I just whack them off until they are about 5/8-inch long, measured from the pivot hole to the end of the shoe. This will probably be too much clutch, but you will have to run the car to find out. You *want* to be able to hear the motor zing coming out of corners . . . it will if the clutch is slipping. If, however, the clutch is locking up just off the corner, you can hear the motor load a little, and as it passes along the power, the car is guaranteed to get real loose!

Back in the pits, you can lighten the clutch action by reducing contact area which also makes the shoes lighter, reducing centrifugal force. Or you can undercut the shoes which leaves the contact area the same, but the lighter shoe will still give less clutch. The trick here is to keep whittling on the shoes until you go one knife cut too far, losing too much drive off the corners, plus zinging the motor down the straights. Now pull out that spare set of shoes and don't go too far when cutting them.

Carefully watching other race cars will help a lot with the clutch, just be aware of the fact that with a car like the RC150 (with its solid axle), you will no doubt need more clutch slip than those running diffs and/or suspension cars. A properly setup clutch is a big factor in racing success.

Work with it until you get it right!! •

Electronics . . . *Continued from page 39*

our new closely spaced frequencies are beginning to cause us some problems. Unfortunately, some of these problems are being blamed solely on the fact that we have new frequencies.

To begin with, it is not legal, by the strictest interpretation of the law, for anyone but a licensed technician to change the crystal, and therefore the operating frequency, of an R/C transmitter. Such frequency changes may only be made by replacing a module which includes not only the crystal but all of the other frequency determining components, and which has been pretuned to the *exact* crystal frequency. *That is the law* . . . but then there is the reality that the crystals are available, easy to change, etc., etc. The other part of the reality is that the law exists for a good reason, that being that with the present equipment, it is just not possible to design and build a system that will tolerate (without retuning) frequency changes much further than the adjacent channel and still operate to its design parameters.

The receiver, when moved too far off the tuned frequency, will lose sensitivity and selectivity, i.e., it will lose range and be more prone to interference. A transmitter in this situation will normally lose some power output, and also transmit a broader signal than it did on its original frequency. There is no way to establish how much, but there is little doubt in my mind that some of the reported cases of adjacent channel interference have happened because one or the other of the offending systems had had the frequency changed by a simple crystal change.

Think about it . . . haven't you ever known, or currently know, of a case where John and Cynthia (equal rights, you know!) couldn't fly together, though they were on different frequencies, yet John could fly along with anyone else on the same frequency as Cynthia without problems. Mistuning can cause this.

There are some tests that we can all make to check out our own equipment. I have one system with plug-in crystals which I used to satisfy my curiosity, even though I knew what to expect. However, I like to present figures when I can, and what I got was this: changing from Channel 40 to 52 caused an indicated 10 percent power loss on a field strength meter, and about a 20 percent reduction in antenna-down range. OK, one system is certainly not indicative of every make and model, but it does prove what can happen. If you are changing frequency, wouldn't you also like to know that the performance of your radio has not

deteriorated?

And if possible, if you have systems available to you on the adjacent channels, make a check for interference before any of you fly. Don't assume that just because your radio was clean on the original frequency, it will still be so after you've jumped clear across the band.

I am sure in time, all of these small problems will be ironed out and technology will come to our rescue. After all, there was a time when we *all* flew on 27.255, and look where we are today. In the meantime, let's not eat each other's airplanes up unnecessarily.

A 12-VOLT BATTERY FOR EVERYTHING

No doubt about it, that 12-volt "starter" battery that most of us lug around has gotten to be a prime piece of ground support equipment. Originally intended to turn over a starter motor for a second or two, we now ask it to pump our fuel, light our glow plug, charge our radios, etc., etc., and now the poor old things have come to the point where they can't always hack it through a long day of flying, and certainly not for a weekend of hot competition activity.

I have found one with a little bit more spark, but don't let my poor puns drive you away from it, as it does have a lot of the features we active fliers have been looking for in a 12-volt battery. To start with, it is an eight-amp unit, enough to last all weekend no matter how hard to start your engines are, and that added capacity means that your starter is actually working with a higher voltage as the voltage drop under heavy loads will not be as much. It is a sealed, maintenance free battery which you won't have to remember to check or add water to, and which you can install and carry in any conceivable position you care to. It is unbreakable under normal use, and is claimed to be capable of 1000 charge cycles when properly cared for.

It is the Elpower Solid-Gel EP1280, 8.2 pounds in weight, and its dimensions are 8.38 inches long by 2.75 inches wide by 5.5 inches high. I have used this battery singly, and in a pair to power a Sullivan 24-volt starter for my larger engines, and have found it to be a dependable source of adequate power at all times.

I don't know of any normal model equipment supplier for this battery, though they are readily available through electronics houses. If you are in a large city, try the Yellow Pages for Electronics and Batteries, or check with one of the following:

El Com, Inc.
13854 Bently Place
Cerritos, CA 90701
(213) 404-2961

Telecommunications Devices
2320 Wisconsin
Downers Grove, IL 60615
(312) 971-3460

A-1 Alarms
8921 Northern Blvd.
Jackson Heights, MI 11372

If worse comes to worse, check directly with Elpower Corp., 2117 S. Anne St., Santa Ana, CA 92704, (714) 540-6155, for the name of the nearest supplier. The battery is priced at around $32 . . . but we are worth it!

The Elpower EP1280 would also be a perfect power source for electrics, which mostly depend on 12-volters to charge drive batteries. As such, it will be a perfect companion for the. . .

THE DELTA MFG. BC824 PEAK DETECTOR CHARGER

A couple of months ago, in answer to a query from a reader, I commented that the development and manufacture of more sophisticated battery chargers than the simple transformer/diode overnight charger we all use had not come to pass not because the technology was not available, but that the cost would be prohibitive. I was only partly right . . . I do know of a couple of such projects that were cancelled when it became obvious that the selling price of the unit when completed would lead to a very small quantity of sales. However, such a unit has become available, at a price that is acceptable; I've just had the opportunity to inspect and test a Delta Mfg. DC824 NiCd battery charger which it calls a "Peak Detector Charger."

The gospel according to Delta tells us that the voltage of a NiCd battery under charge will rise in a series of steps, as per the enclosed graph; the percentages shown are approximate. During the different periods, the following action takes place:

A. The battery voltage will rise quite rapidly for the first minute.

B. The battery voltage will rise very slowly for the next several minutes.

C. The battery voltage will start to rise very rapidly again.

D. The battery voltage will start to level off, and at the end of the period, it will start to drop at which time the peak detector switches the charge rate to trickle charge.

E. Charging continues at a trickle rate until you disconnect the battery.

The Delta BC824 charger comes in a relatively small package, only 4 x 1.5 x 4-1/4 inches, including that device on top, which is a heat sink for a power transistor. Is it designed to charge four to six 250 or 500 mah batteries at one amp in 15 to 30 minutes, or four to six 1200 mah batteries in 20 to 30 minutes when powered by a 12-volt battery. It will also fast charge a seven-cell battery when powered by an AC battery charger capable of four to six-amp output. After fast charge is completed, the rate automatically drops down to trickle. More about the latter two remarks later.

My tests of the unit revealed that it does everything it is claimed to do. I especially liked the built-in safety features, and the fact that it is a pulse charger. This means that the batteries will not heat internally as much as they would under a steady, heavy current, and the system conserves input power. Following the instructions, which are com-

plete (including information about the choice of batteries and cell equalizing), I charged a number of test packs, which all discharged very closely to the capacity obtained from them during normal overnight charging. I like the charger, and it has become a permanent part of my support equipment.

There are two points which I must mention, one a correction, and one an addition to Delta's information. One is their use of the word "trickle", which in electric R/C car parlance has apparently come to mean any charge rate less than "punch it!" In actuality, the battery industry has established different charge rates, they describe "trickle" as between .04 and .01 percent of the battery capacity. This rate is normally applied to an unused battery, such as those used in alarm systems, merely to keep it from self discharging. The next higher rate, which most R/C system chargers work at, the .1 rate, is called a "Slow," or "Overnight" rate. For most R/C system batteries, this rate is 50 ma, and this is the rate that the Delta charger drops to after having completed its fast charge cycle.

Just for review, the other two established rates are "Quick," or "Rapid," at .3 to .2 percent, and "Fast" at one to 10 times capacity.

The other point which I wish to mention is the necessity for an AC powered supply when charging seven-cell batteries. To clarify this, when a heavy load is applied to a battery, the voltage will drop. Just how much depends on the capacity and type of battery and exactly what the load current is. I don't doubt that when used with a motorcycle type, wet cell, 4.5-amp battery, the voltage drop is too high, thus the available voltage too low, for proper seven-cell charging. Obviously, what is needed is a *better* voltage source. My tests with the Elpower EP1280 battery previously mentioned proved this to be so. When connected to a freshly charged EP1280, at "trickle", the measured battery voltage was 12.87. At one amp, it dropped down to 12.64, and to only 12.3 at the three-amp rate . . . all with seven cells on the business end of the BC 824. Though I didn't try it, I would imagine that a full-size automotive battery would also do the job, but who wants all that acid and weight around, these two items seem made for each other.

The BC824 Peak Detector Charger is manufactured by Delta Mfg., 27 Racecar Ct., Lorimor, IA 50149, (515) 763-2220. Its price is $75.

MODE I . . . R.I.P.

I wasn't going to say another thing about the wonders of Mode I flying. After all, those of us who use it are aware of its superiority, and we are perfectly willing to allow others their opinion. However, I ran into something that is too good not to share with you, and after that I promise we'll let the subject rest.

One of the reasons Mode II fliers always give you for preferring that method of controlling pitch and roll with a single stick is that "that is the way *real* airplanes are flown." Disregarding, or forgetting, the fact that except for military fighters and aerobatic airplanes, all civil and airline aircraft are flown with a wheel and yoke.

I don't agree with that term "real" airplanes either. *my models are real*, some of them for how much they cost, if for no other reason. But we're not about to start another controversy.

Anyway, back to the subject at hand: "That is the way they fly real airplanes." The February and March issues of *Radio-Electronics* magazine has a most interesting article about the electronic marvels of the new Boeing 757-767 wide-bodied airliner. Generally referred to as being computer-controlled (and what isn't anymore), it is really referred to as having an automatic flight control system (AFC) which does just about everything (from monitoring the engines to navigating) while blissfully flying the plane. The AFC probably makes the 757-767 wide-bodies as popular with the airline pilots as the Mercury capsules must have been to the early astronauts who had to watch the *first* astronaut . . . a monkey . . . go into space and test out their equipment for them.

As an electronic achievement, nobody can dispute its advances and level of technology, regardless of what a pilot's personal feelings might be. And right in the middle of all those switches, lights, and clocks in the cockpit, is something called a mode control panel (MCP), which in an older airplane is simply the automatic pilot. And in the middle of *that*, for making course and altitude changes while under automatic pilot, you'll find not a two-axis gimbal, but two separate controls. One is a knob, for bank and heading corrections, and the other is a vertical control marked "DN" and "UP" for altitude changes; just like in Mode I R/C flying.

So you can relax . . . the next time you have the opportunity to fly in a 767, do so secure in the knowledge that you are going there with a Mode I robot in control, and try not to remember that it was all built by the lowest bidder!

It's all in fun . . . the important thing is not how or what we fly, but *that* we do so, and are able to share the hobby with so many wonderful friends. •

Winch . . . . . *Continued from page 23*

elevated above the main frame of the winch. What you're seeing is a three-piece, Mexican pyramid-shaped, frame extension made of steel "angle iron" (as is the rest of the frame). This extension raises the shaft of the take-up drum 4-1/2 inches above the frame. Because it is higher than the rest of the frame, the line is kept off the ground for a longer distance (which saves a little bit of line wear), and it allows for a neat, foot pedal style, friction brake to be placed under the spool. (More about that later.)

The take-up spool is mounted on a 5/8-inch, oil-tempered, drill rod shaft, and is secured by two allen key set screws (one on each side of the spool). That hefty shaft is supported by a phosphor-bronze plain bearing (or bushing) on each end. The bushings are mounted in self-centering "pillow blocks" and are basically foolproof to remove and replace. There is a small, hinged, spring loaded, metal cap on the top of each pillow block which covers the oiling point for each bushing. According to Ted Davey, president of Davey Systems Corp., the phosphor-bronze bushings seldom (if ever) need oil. When they do need it, they will "chirp" a little, which is easily remedied by two or three

drops of a light machine oil (like 3-in-1 Oil).

The foot brake I mentioned above is a simple device made up of a V-belt pulley, a braided rope, a foot pedal, and a return spring. Its operation is also simple: to stop the drum from spinning, step on the pedal. This causes the rope to tighten against the pulley and therefore create the friction necessary to stop the drum. Why do you want such a brake, you ask? If you are using the Retriever without it you'll find out why. The Retriever pulls the line back so fast that when you get near the end of the retrieve, the line is flying off that winch drum fast enough to "bird's nest" on you if you don't brake it. You could use your shoe's sole to brake the drum, but this is much more effective . . . and civilized!

One last item before we move on from the winch drum area . . . and that is the drive pulley. The drive pulley is another V-belt type pulley of 2-1/2-inch diameter. It is secured to the shaft by an Allen head set screw. During the course of the testing, no slippage was noticed.

The winch drum is driven by a V-belt from the winch motor's pulley. This pulley is secured to the motor shaft by an Allen head set screw *and* a metal tang which fits into a slot on both the motor shaft and the pulley. This whole arrangement is secured further by a nut which screws onto the threaded end of the motor's shaft. This pulley isn't going anywhere!

THE MOTOR

Ah yes, the motor! This is the part which makes or breaks a good winch design. Fortunately for Davey Systems Corp., this one "makes" his winch.

The Pow'rtow winch is actually Davey Systems' *second* winch design. It was preceded by the Pow'rwinch which used the same motor as the Fab-Tek winch currently uses, as well as DSC's own Retriever. It had enough power to launch small to medium-sized sailplanes, but was inadequate to launch the larger, cross-country type sailplanes. So, the search was on for a stronger motor.

What Ted Davey found was a large (7-1/2 in. long by 4-1/2 in. diameter), simple (only one wire hook-up), low current drain (75 amp vs. 220 amp peak drain for Ford starter motor), 12-volt motor that was just perfect for what he wanted. It was a readily available, industrial motor that was (and is) used in electric carts for transporting people from one end of large industrial complexes to the other. You've seen them, I'm sure, they're like small golf carts.

This motor's low current drain would allow extended use of the winch and/or Retriever. In practice, on a launch-a-minute basis, a normal auto battery (12v) lasts for three hours . . . that's a lot of launches *and retrievals!*

The price you pay for all of these launches is a small one. The power that the Pow'rtow winch puts out is about on par with a standard, direct drive, six-volt starter motor winch with a six-volt battery . . . a good six-volt winch, mind you, but it doesn't quite have the power of a 12-volt starter motor with a 12-volt battery. The bottom line difference is that with the Pow'rtow, you end up "pulsing" the motor less (in some cases, not at all) with the average R/C glider. Now, for all you F3B guys out there who are looking to approach Earth's escape velocity during your zoom tow, this winch probably isn't for you (although it could be modified, I suppose, by going to a different motor/pulley arrangement). However, for the Sunday flier who wants to have fun with his Wanderer, Paragon, Sailaire, or Sagitta X-C, without fear of accidentially ripping his wings off at the top of the tow, and for the club looking for the most launches per winch dollar (and retrievals too!), the Pow'rtow will fill the bill nicely. Yes, the winch/retriever combo is *great* as a club winch because you can get a lot of sailplanes in the air in a very short time, and nobody has to "go pull winch lines!" You really can't appreciate the ease of flying with both the Retriever and Pow'rtow, launch after effortless launch, hour after hour, until you've tried it. It's like having three winches in one.

A very nice feature of the Pow'rtow winch system is the variable speed/torque capability. The Pow'rtow comes with two extra V-belt pulleys, one two-inch and one three-inch. With these two extra pulleys you have a choice of line speed or tension. Actually, you have seven possible combinations with the four pulleys (the two pulleys which come already mounted in place are 2-1/2-inch). As the total *power* available from the winch is not variable, the pulleys can only allow you to tailor that power to match different sailplanes and/or wind conditions. For example: the wind is blowing a steady five mph and the turnaround is directly upwind, you are flying your "gas-bag floater" with a pound or two of lead, and you realize that with this wind, line speed becomes less important than torque, or the ability to pull strongly (if need be) against the wind without bogging down the winch (that increases current draw you see, which isn't good). So what do you do? You switch the pulleys around so that a smaller one is on the motor than

is on the drum. As the pulley on the motor is easiest to change, you remove the 2-1/2-inch pulley from the motor and put on the two-incher. If the wind gets stronger, put the three-incher on the drum and have at it, you'll have the torque you need for a good launch. Conversely, if the wind isn't blowing and line speed becomes more important to you than pure grunt, put a larger pulley, the three-incher, on the motor and leave the 2-1/2-incher on the drum.

This last configuration worked out the best for us as it allowed enough torque to launch a 12-foot, foam core winged cross-country ship (fiberglass fuselage, spoiler system, et al) in a light breeze (2-4 mph) with no problem at all, yet had enough line speed to give my Goat Hill Special two-meter a moderate zoom.

Between the motor and the battery lies the automotive type solenoid switch. This is completely normal in every respect as everyone uses them in sailplane winches as far as I know. You will notice that there is only one heavy gauge power line running to the motor. This puts to rest any comments about it actually being a generator instead of a bonafide electric motor. The solenoid has a label on it telling you where to install the foot switch wires; it is really simple folks. Also, the battery and motor are both grounded to the frame; the negative battery lead uses the solenoid mounting bolt to ground it to the frame, this is done at the factory as are all of the other wiring connections with the exception of the foot pedal switch. The battery cables are ready to hook up to the battery . . . all just as neat and easy as you could want it to be.

The foot pedal switch is a Borg Warner, heavy duty, pushbutton starter switch.

The foot pedal switch is a Borg Warner, heavy duty, pushbutton starter switch.

Unlike some commercial winches which come with micro switches, the Pow'rtow comes with a switch *designed* to work with a solenoid, and one that is capable of handling the current load placed on it indefinitely. The infamous Gorilla winch of the SFVSF uses a similar pushbutton switch that is made of brass, not chrome plated aluminum. In all honesty, however, the brass pushbutton switch is better. In the course of testing the Pow'rtow on the Gorilla's home field, the aluminum switch became jammed with the fine, powdery soil of this particular field, and got stuck in the *on* position while Mike Reagan was launching a Gentle Lady. (This has never happened with the brass switches.) By the time Mike realized what was happening, he started yelling for someone to stop the winch for him while he gave "down stick" to the airplane. Not understanding *what* was causing the winch to continue launching once Mike's foot was removed from the switch, I did the first thing that came to my mind: yank off the foot switch wires from the solenoid. That stopped the winch and saved the Gentle Lady, but pulled the wires out of the solderless, crimp connectors.

This switch was actually the second switch that was sent to me for the product test. The first switch had a dead spot (electrically) when you stepped down all the way. If the Pow'rtow has one flaw, I would say that it is the foot switch. (According to Ted Davey, nobody else has reported any problems with these switches . . . perhaps these two were flukes?)

As you can see by the photos, the battery sits on top of the frame behind the solenoid. Under normal conditions, the combined weights of the winch, motor, and battery are sufficient to keep the whole unit from sliding around while launching. It's nice not to have to use stakes to anchor things down. The winch (without battery) and motor weigh 41 pounds by my bathroom scale. This is not too heavy to carry across the flying field, but it isn't exactly fun, so bring something with wheels, like your kid's red wagon or the trash can dolly, and don't sweat it!

The last thing that I want to call your attention to is the mounting plate for the motor. It was observed by quite a few glider guiders to flex under the load of launching. I don't know if this has any detrimental effect on the launch of the sailplanes, *I really doubt that it did*, but if you were to hold on to the winch line and stall-test the motor, you could see about 1/8-inch of flex in the back of the plate as the line tension built up, and soon after that the belt slipped on the motor's pulley. I must say here that at no time during launch testing did this slipping occur, so I don't think it's important. (This flexing has since been eliminated by the manufacturer through the addition of a stiffener.)

Oops, here's another "one last thing." The Pow'rtow has an anti-kiting brake feature. If you look at the photos, you will find this little goodie right in front of the winch drum. It works by resting against the side plate of the drum when the line is coming into the drum, and then jamming tight against the side plate if the line starts going back out. I must admit that this device wasn't used by anybody, and is only there in case you happen to be using it in a contest that requires such a brake (like F3B), or you

are letting an inexperienced pilot launch who might just backlash the winch. I doubt any pilot would actually try and "kite" this winch line with the Retriever's line dangling about his empennage just waiting to get tangled up on the stab, but I suppose *without* the Retriever someone might try to kite his plane. It is probably a lot easier just to say during the pilot's meeting at a contest: "No kiting allowed," and leave it at that. Anyhow, it is still a good idea as an anti-backlash device.

In use, the anti-backlash brake didn't actually work all the time. What would happen is that the little rubber-tipped arm would start bouncing on the revolving drum during launch and eventually bounce all the way over to the "off" position. Now, to be entirely fair to all concerned, the fix for this is actually quite simple: get yourself a rubber band that will fit between the tow ring hook on the frame and the brake arm with a gentle stretching. This will keep the arm from swinging over and won't add any noticeable friction to the system. Problem solved.

To sum it up the Pow'rtow winch, I will say that it is a nicely finished, quality product. It has adequate power for launching *most* sailplanes (I wouldn't put a ballasted F3B model on this winch, for example). It is very quiet while operating; it uses a lot less current than most electric winches which enables you to launch three times as many planes off of it as compared to a starter motor winch. And, I think it would be a good club winch, especially when used with the Retriever. The Pow'rtow winch shows that a lot of care and thought went into its design. The fact that research and development continue to be done on this winch, as evidenced by the recent addition of a fine-tune tension adjuster for the motor/pulley system (which will be standard with all future Pow'rtows), tells me that Ted Davey really cares about the quality and operation of his products. The $300.00 price tag on the Pow'rtow is what you would expect to pay for a winch of this caliber. I think it's worth it.

DSC RETRIEVER

The Davey Systems Corp. Retriever is an incredible device. For anyone not used to seeing a retrieval device like this on the field, it looks very intriguing, and it always draws the curious. Looking at the pictures, you can see why. The most outstanding part of the Retriever is its black five-spoke bicycle wheel spool and white, masonite backing. The Retriever literally stands out in a crowd of winches.

Working from the top down, then front to back, we're going to go over this device to see what it's all about. As I just mentioned, the spool is a bicycle wheel. It's made of fiberglass-nylon, it's very light weight, and as it was meant for bicycle motocross (BMX), you can bet it's strong! Wrapped on the spool is 1,200 feet of 30-pound braided nylon line. You would think that 1,200 feet of *any* kind of braided nylon line would fill the wheel rim to overflowing, but such is not the case. There is still another 3/8ths of an inch to go before it even gets close to that point.

The white backing plate behind the wheel rim is there to keep the line from getting behind the rim and tangling up in the pulley or shaft. It works well. Not once did the line get past it.

The wheel is mounted so that it *won't* revolve about the shaft as it would on a bicycle's axle. The shaft is the same 5/8ths drill rod as is used in the winch. This shaft drives the wheel/spool and is mounted in two pillow blocks with phosphor-bronze bushings as is the winch's shaft.

Driving the shaft is a seven-inch diameter V-belt pulley which is securely fastened to the shaft by an Allen head set screw. This pulley is driven by the V-belt which is in turn driven by the motor's pulley (1-1/2-inch diameter).

The Retriever's motor is a four-pole, permanent magnet, 12-volt motor. Again, it is an industrial motor that is used for a variety of things including 12-volt bicycle motors, and model sailplane winch motors (the Pow'rwinch, forerunner of the Pow'rtow, used this motor, as does the Fab-Tek winch today). It has plenty of power for retrieving the winch line and only draws between 25 to 55 amps in use. The motor comes

mounted to the Retriever and wired to the solenoid . . . no muss, no fuss. In fact, the Retriever is ready to use right out of the box, just attach the removable hand operated switch to the indicated terminals on the solenoid, and set up the line guide as indicated in the layout sketch.

Both the Pow'rtow winch motor and the Retriever motor are mounted to moveable mounting plates. These plates are the primary method of adjusting V-belt tension. The plate on the Retriever did not flex like the winch's did.

The bicycle hub you see mounted vertically in the frame to the side of the spool is the line-centering device used in the retrieval mode. When launching, you want to make sure the Retriever's line is not routed around this hub or else it will pull the towline right off the glider about 20 feet into the launch . . . this happened once, much to my embarrassment.

The white wire you see next to the hub is a line guide designed to keep the line from accidentially looping over the hub while launching. This device only failed its job once during the test, and it was primarily my own fault as I had allowed it to get too close to the wheel. I pulled it over to the hub again, and everything worked just fine from then on. Be careful not to get any loops of line caught in the spool as they can sometimes catch this wire.

The Retriever connects with the same 12-volt, lead-acid battery as the Pow'rtow winch by means of its heavy duty, spring loaded clamps. If you have a set of jumper cables in your car, you know what the Retriever's clamps look like. They work just fine and gave us trouble free usage.

The framework of the Retriever is the same steel "angle iron" as is found on the Pow'rtow; it is light and strong. The weight of the device is 26 pounds. It measures 18 in. x 12 in. x 21 in. high.

In use, the Retriever is amazing. When launching, the line is left in a spin casting mode. There is *very* little drag on the sailplane as it climbs into the sky. We flew two different gliders off of two different winches (the DSC Pow'rtow and the SFVSF Orangutan winch) both with and without the Retriever, and there was no noticeable difference in launch heighth. Each winch performed equally well whether it had the Retriever attached or not. Only once was the drag noticeable: one guy had a new airplane at the field that had a tow hook on the ragged edge of pop-off land, it was so far back. Without the Retriever, it launched OK, but with the Retriever it popped-off repeatedly. Normally, this is not a problem at all, but get your tow hook in the right place!

The Retriever works best on a grass field such as a school athletic field. If you use it on a rough field with lots of tall weeds (chest height or higher), you will have to be fast on the retrieve and get that line back to the winch before it hits the ground and gets wrapped up in the weeds. Sometimes the motor has the oats to bring back the line inspite of the weeds, but not always. If you are a good operator, which you will be after a dozen launches and retrieves, rough fields are no problem.

The launch sequence goes something like this: first, you make sure that the line is not still around the retrieval hub. Next, you make sure that there are no weeds for the line to catch on as it "casts" out (if there are weeds, pull 'em out or place the Retriever on a stand). Let the pilot know you are ready. At this point you are kneeling down next to the winch and retriever with the Retriever switch in your hand. You instruct the pilot to merely step away from the winch when he finishes his launch, he must not try to wind down the line himself. Just when the parachute drops off, you stick your hand out and catch the outgoing retriever line (don't worry, you won't get hurt). Quickly, you put the line around the line-centering hub and hit the Retriever's switch. In comes the line like magic! Within about 15 seconds the line will be almost back, so now you take a step or two to the Pow'rtow's drum brake and get ready to arrest its motion. That's it, you're ready for the next pilot! Just walk over and pick up the tow ring.

In conclusion, the Retriever really works well. It does the job of retrieving the winch line quickly, quietly, and effortlessly. It saves you the long walk to the turnaround and the frustration of not being able to communicate problems of open or closed frequencies, line tangles, or sandbagging . . . because you are right there with everyone else, not 200 yards away. No more screaming your lungs out, "Hey, release the winch!" because the winch and backlash brake are right there with you the whole time.

When the literature says, "Launch-a-minute performance", it's not kidding. You can literally launch a whole club (for example: 20 fliers, ready to fly) in 20 minutes if you know what you're doing. Of course, if you knew what you were doing, you wouldn't do that or there would be radio interference all over the place, but I think you know what I mean! This one device coupled with the Pow'rtow can replace three or four winches and launch 'em as fast as they come for literally hours on end (four with a regular battery, six with a deep cycle marine battery, 92 amp-hour). I'm sure you will like the Retriever. At $250 (plus shipping), the Retriever is a good deal.

For any additional information on the Pow'rtow or the Retriever, write to Davey Systems Corp., One Wood Lane, Malvern, PA 19355, or phone (215) 644-0692. •

Soaring . . . . . *Continued from page 21*

As I said, I was next up with my Goat Hill Special (or just plain ol' *Goat* for short), and I managed a decent (for me) 32.7-second run. Not too shabby for a first speed run with a new plane!

The eventual fifth place winner, Den-

nis Brandt, was next, and he smoked a 29.3 with his E-205, built-up winged, high aspect ratio, aileron two-meter. A few pop-offs later, Mike Reagan thrilled the troops with his spectacular speed run. Mike's plane is a fully-sheeted foam core, polyhedral (rudder-elevator, period!), thick wing (MB-303515), fiberglass fuselaged, two-meter that carries around three pounds of ballast for speed runs. Mike's first three laps were really, *really, fast!* However, in the last turn, Mike over-anticipated the turn, banked up much too early, began to over-bank, then started to over-correct for his mistake, almost pulled it into the ground when he finally got the flag, almost cut the center line, roller-coastered out of the turn, and finally regained control (all in about three seconds!), and then screamed through the last gate for an incredible 24.7 . . . the fastest time of the meet by about three seconds! He probably could have knocked off three seconds or more had he not lost his sense of timing the way he did . . . as it was, he depressed everyone's scores so badly that he was way out in front at the end of round one. (Interesting to note that he never lost his first place standing clear to the end of the contest.)

Halfway through the speed runs, the wind shifted to almost 90 degrees to the course, and shifted back and forth to about 45 degrees where it was most of the time anyway. With the wind's speed averaging about 10 mph, and with lift occasionally passing through, speed times were inconsistent. The fast guys went fast (high 20s) when the air was good, but otherwise averaged in the mid-30s.

Duration was likewise interesting in the wind. For a max flight, you need to stay up for 10 long minutes. If you were lucky, you launched high, headed up wind, and hoped for the intermittent thermal or wave lift. More often than not, however, it was the guy who launched higher than the others who stayed up the longest. Yes, in spite of the equal winches, some still launched higher than others . . . mainly because of skill and experience . . . and that's the way it should be. A guy who designs, builds, and flies better than somebody else should have the opportunity to exercise his skills to his best advantage. Pay attention CIAM!

Duration was scored man-on-man for fairness (are you listening CIAM?). If it hadn't been, there would have been some very unhappy fliers. A 10-minute max is impossible without one very good thermal at least, and those kind of thermals weren't all too common in the five to 15 mile per hour gusty wind. Scoring was handled like this: there were 900 points possible for your flight which was normalized against all the fliers of your group; your landing points (up to 100) were then added to your normalized flight score; finally, the score totals were *again* normalized to 1000 points for the best score.

This event can be very unforgiving of pilot/helper misjudgments. I found out the hard way when me an' the Goat only did 4-1/2 minutes while one other guy (out of five) did over eight minutes. I got buried. It was my own fault though, I was in the same thermal as the winner . . . he climbed out, I didn't. Considering this was only my first serious thermal attempt with the Goat, I don't feel too bad. Most people in my round did far worse.

Mike Reagan, flying his chopped-off F3B ship at an empty wing loading of 14 ounces per square foot, managed 1000 points again and remained in first place.

Probably the worst case of burying was seen in Jerry Krainock's round, and was done by Big Jerr himself. The wind was its usual gusty, windy self, and in most previous rounds the pilots had been launching and flying almost straight upwind to find their lift. Not so with Jerry. He turned left (downwind), found lift over the neighboring high school buildings and followed that lifted downwind for a flight that was at least twice as long as anyone else's. By the time he was ready to leave the thermal and "come home", his airplane was little more than a speck. Afterwards, Jerry confided that he really wondered if he was going to be able to make it back to the field. Well, he did make it back, and had altitude to spare.

The third round of the day was man-on-man distance. This event could very well be renamed unlimited distance as the idea is to fly as many 150 meter laps as possible in a four-minute time period. Unlike F3B flying where the idea is to fly 12 laps in a four-minute time period once you enter the course, *and* if you don't like your first run, you can relaunch and try again, the 2MWC only gives you one shot at it. The nice thing about 2MWC rules is the speed at which the contest runs compared to F3B (four to five minutes per heat vs. 12). The fact that the scores are normalized within each heat makes it a lot more equitable than F3B where one heat can have lift and *everyone* makes 12 laps, and the next heat has the sink blow through and *nobody* makes 12 laps or any significant points as a result.

Never in any previous 2MWC were there as many flights of 12 or more laps recorded as this one. When the lift came through, it was strong, and the pilots raced their ships through the course like crazy. Some pilots were getting 16 and 17 laps! I know, I was in a round where that happened, but I only managed nine laps.

At this point, the leader of the contest, Mike Reagan, was pulling ahead strongly as he scored a perfect 3000 for the first day.

The Saturday night banquet was hosted by the Modesto club at the Knights of Columbus meeting hall just outside of town. There was beer, wine, soft drinks, punch, potato salad, pickles, potato chips, olives . . . the works! This year saw the return of the two-meter sandwich (actually there were three

sandwiches), a tradition which was started at the first 2MWC in 1980. Richard Hansen presented the 2MWC cake to all, and everyone basically stuffed themselves. Good times!

DAY TWO

Day two is three rounds of simulated cross-country. The intent of this event is to emulate full-size cross-country flying. As in full-size practice, non-finishers of the declared task (10 laps on a 150 meter course in the 2MWC) are heavily penalized. This means that strategy is even more important in this event than in the other three.

The weather conditions on the second day were somewhat less severe than the first day. Winds were gentler, lift was stronger, and the sky was clearer.

Day two turned into one big RACE! About half the time, it seemed that the lift was somewhere on the course and the pilots were clicking off the laps in it. Excitement ran high among the competitors as good pilots were pitted against good pilots (intentionally) to see who really was good and who was just lucky. If you were in, say 20th place at the beginning of day two, you were by no means "out of it." (I came from about 20th last year to take 2nd place). Because of the way this event is scored, places change rapidly. You have to be very good to keep your place when you are at the top, one slip-up and it can cost you, dearly.

Probably the worst "slip-up" was committed by Larry Jolly who was in about third place at the start of round six, but popped off tow and only managed two laps. Lucky for him nobody completed the course or he might not have gotten 80 points! As it was he dropped to ninth place. Next time he'll let someone else throw his Pantera for him, you can bet on it!

Mike Reagan steadily lost points in the last three rounds, but never enough to surrender his first place standing.

WHAT THEY FLEW

First place: Mike Reagan flew a polyhedral ship. It had a foam core, 1/16 balsa fully sheeted, one piece, 15 percent thick (MB-303515) wing with a Gorilla-proof spar system. Originally, this was Mike's 85-inch F3B ship which he flew in Joliet, Illinois, in the U.S. Team Selection Finals. It wasn't as good a flier in F3B at 85 inches as it is now at 78 inches against other two-meters. Mike recently completed his LSF eight-hour slope flight with this aircraft. It features the Mike Bame Two-Meter fuselage: no canopy; molded epoxy/glass; 40.75 inches long; 7-1/4 ounces. The stabilizer is all-moving, and the rudder is close-loop, pull-pull wire controlled. Futaba FP-7FGK radio system was used. At 14 ounces per square foot empty, Mike's plane was on the heavy side.

Second place: Mike Bame flew an aileron ship. With his Ace Silver Seven radio system, he was able to fly with coupled or uncoupled rudder and with adjustable differential throw in the ailerons (requires two servos in wings). Mike's plane had three degrees of dihedral under each wing panel. The wings were foam core, 1/16 balsa fully sheeted, thick section (his own MB-303515), one piece, Gorilla-proof spar system, and tapered from about nine inches to about 6-1/2 inches. Of course, Mike flew his own fiberglass Two-Meter fuselage (also canopyless for strength). Mike's plane featured an all-moving stab.

Third place: Casey Goeller flew what he called a "Camita." As you can probably guess, that's a contraction of both Camero and Sagitta. The wings were from his F3B ship, a Camero from West Germany, and the fuselage and stab were from a Sagitta 900. Casey cut down the Camero's wings, eliminated the flaps, turned the ailerons into flaperons, and redid the spar tubes. The Camero uses the Wortmann FX60-100 section. The Sagitta fuselage was stock as far as I know. Overall, Casey and his Camita were both very competitive.

Fourth place: Gary Ittner flew his Lesser Tern, which is a second generation Tern (a plane that Alex Bower flew last year). Gary's plane was a double-dihedral, flat center panel design. Again, it was a foam core model, MB-303515 section, fully balsa sheeted (1/16), 10-inch root chord, eight-inch tip, one piece construction, and I believe 18 degrees dihedral under each tip. Gary used the Mike Bame Two-Meter fuselage also, and didn't use a canopy in the design. The Lesser Tern uses an all-moving stab.

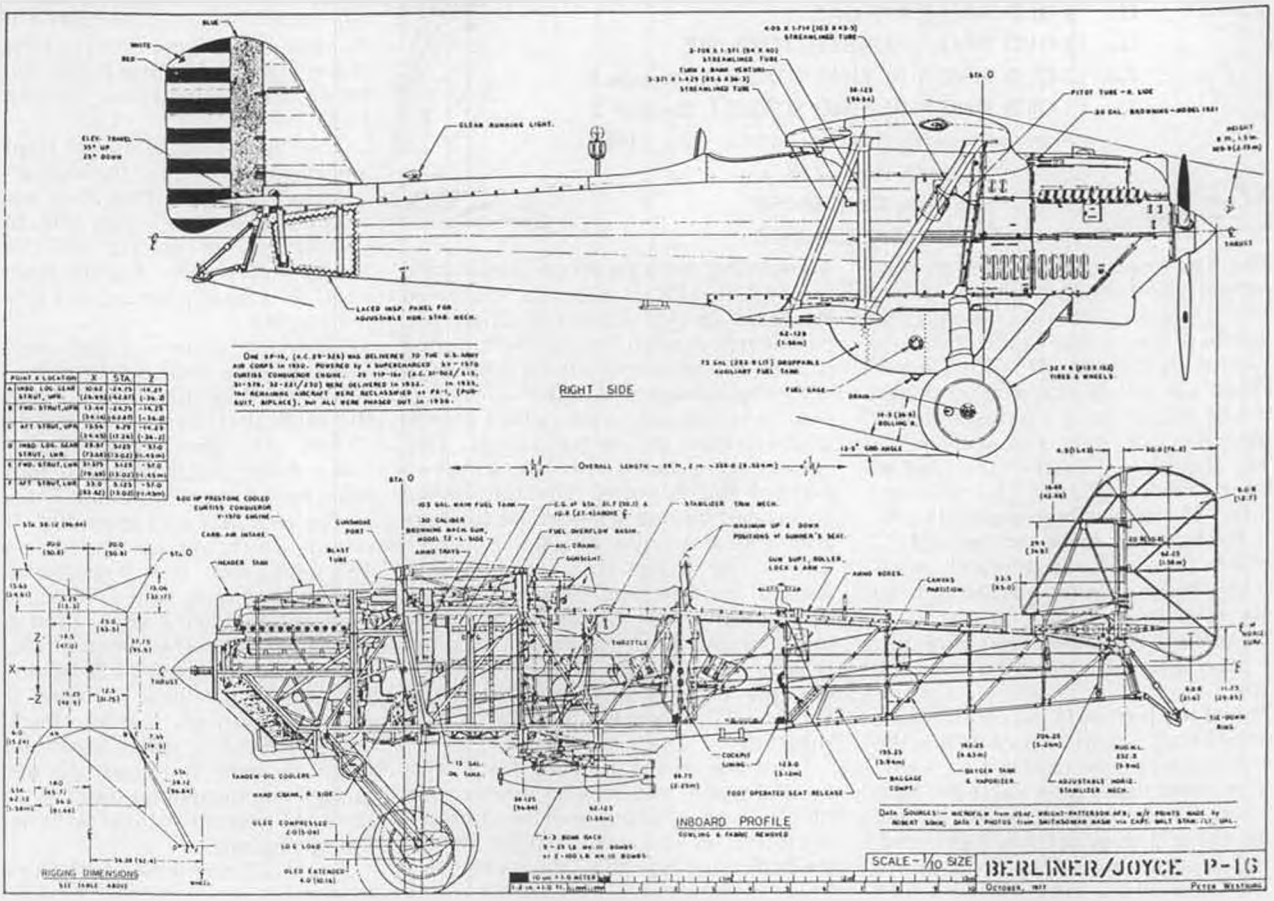
Fifth place: Dennis Brandt flew an original design aileron ship (name?). It has a one piece, built-up wing using the Eppler 205. Dennis' plane has a higher aspect ratio than most at about 11 to one. His fuselage was also built-up out of light ply. His stab was also all-moving. This plane/pilot combination was practically new at the 2MWC and did very well.

Sixth place: Jim Wichert flew what he called a High Anxiety. The High Anxiety is a nine-inch constant chord, foam core winged, aileron plane featuring coupled aileron/rudder, thick section (MB-303515), one piece wing, and canopyless Mike Bame fuselage. The stab is all-moving.

Seventh place: Rick Schranieck (US F3B team manager) flew his trusty, two-year-old Whisper Speed which he purchased from a guy (I think his name was Romanie Sfredda) who flew the plane in the 1981 world champs in Sacramento. It's obviously still going strong in competition. The wing is sparless. Not in its self a big deal, but considering it is one-pound density foam *and* a rather thin section (Eppler 182, eight percent thick), it's a minor miracle that it survived the 2MWC winches. These wings bent *a lot* when Rick launched the Whisper off the Orangutans. Rick is the first one to marvel at these fully sheeted wings, as he told me something to the effect that every time he launches, he's prepared for the wings to fold. Well, Rick, so far so good!

The Whisper features flaps, ailerons, all-moving horizontal stabilizer, and

Peter Westburg's
SCALE VIEWS



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1/24th scale: ½" = 1 ft.	Shts	$
Douglas O-35/B-7	1	4
Douglas XO-36-XB-7	1	4
1/12th scale: 1" = 1 ft.		
Boeing F4B-4/-3	4	16
Boeing P-12E	3	12
Curtiss A-8 Shrike	3	12
Curtiss Gulfhawk IA	2	8
Curtiss N2C-2 Fledgling	4	16
Curtiss O-1B/A-3 Falcon	3	12
Curtiss P-1B Hawk	3	12
Curtiss XP/YP-23	3	12
Curtiss SBC-4 Helldiver	4	16
Czech Avia B-534	2	8
Davis D-1K	2	8
Douglas O-25C	3	12
Douglas O-31A/O-31B	3	12
Douglas O-38/O-38B	2	8
Douglas O-43A	3	12
Douglas O-31C/Y1O-43	3	12
Douglas O-46A	3	12
Fokker D-17	3	12
General Western Meteor	1	4
Grumman F2F-1	3	12
Grumman F3F-2	3	12
Stearman 4E Mailplane	2	8
Travel Air 2000	2	8
Waco ATO Taperwing	2	8
1/10 scale: 1.2" = 1 ft.	Shts	$
Berliner/Joyce P-16	4	16
Curtiss BFC-2 Goshawk	4	16
Curtiss F9C-2 Sparrowhawk	4	16
Curtiss P-6E Hawk	4	16
Fiat CR-32	3	12
Great Lakes Trainer	4	16
Hawker Fury Mk I	4	16
Hawker High Speed Fury	3	12
Hawker Persian Fury	3	12
Monocoupe 90A	2	8
Swedish Sparmann P-1	2	8

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rudder. The fuselage is longer than most two-meters and shows a definite Dassel influence (as does the rest of the plane).

Eighth place: Keith Kindrick flew a clipped wing Gemini MTS. The Gemini is a built-up, polyhedral winged design kitted by Pierce Aero Co. Keith flew it rudder/elevator only (no spoilers or flaps). The section used in the Gemini MTS is the MB-253515 (2.5 percent camber, 35 percent high point, 15 percent thick). What more can be said . . . the Gem's is an all-wood, readily available kit airplane, and it was the only kit airplane in the top 20 or so places . . . come to think of it, there were probably less than a half-dozen kit airplanes, period.

One of the funniest (and probably the most satirical) remarks heard during the two day event was credited to Keith. Bear in mind that I didn't actually hear this first hand. Anyway, when kidded about flying a thick section, Keith said, "Thick sections are only a problem for people with thick minds." To which various members of the SFVSF laughed heartily . . . they've been saying that for years!

Ninth place: Larry Jolly, as mentioned earlier, flew a variation of his Pantera which he called El Pantera Rosa, or The Pink Panther, if you prefer. Yes, it was Circus Circus pink, and yes, with a color like that, you can bet it *had* to be good! (Remember the song about a boy named Sue?) The EPR is a much modified Pantera: center panels clipped (tip panels not cipped), tip panels flattened to zero dihedral, and center panels built with three degrees dihedral each side. Flaps were added to the center panels, and ailerons to the tip panels. Two servos were buried in the wings to control the ailerons. The flaps were controlled by one servo in the fuselage and a neat torque rod set-up which allows the wings to plug in or out without any fasteners. Closer inspection revealed the trick: square brass tubing inside round brass tubing, an old, but reliable system. (See sketch.) The EPR, like the polyhedral Pantera, uses the Eppler 205, however, the EPR is fully sheeted.

Larry was in the running for first or second place, and had he not popped off tow, he might have won the contest. I say this to let you know that the EPR is a lot better airplane than the ninth place finish demonstrates. Larry came to the contest with only one day's practice on the ship, and NO sleep the night before the contest. I'd say he did rather well.

Tenth place: Don Edberg flew the aforementioned, all fiberglass Solution. I believe the wing's structure goes like this: two-pound density, "blue foam" core; carbon fiber stringers; ballast tubes which double as spars; and multi-layer fiberglass skins. I could be wrong about the carbon because I'm basing my info on Brian Chan's Half-Fast Solution which was very similar to Don's airplane. Don used the E-182 section in his design while Brian chose the E-214. Anyway, Don was very impressive in one of his 10-lap heats on the second day when he literally blew away his competition. I wish I had the raw data on this flight group because I'd say he probably beat everyone else (who completed 10 laps) by close to a full minute! Looking at the plane finish the course made you think he was completing a four-lap speed run. FAST!

The Solution features flaps and ailerons, all-moving horizontal stabilizer, and rudder. Don flies with uncoupled rudder, a more difficult, but precise way of getting just the right amount of rudder exactly when you need it. It takes practice, but Don feels it's worth it.

Eleventh place: Angel Sanchez-Figueras took time out from his heavy study schedule in dentistry (finals were the week after) to compete in this year's 2MWC. He flew a two-meter with a Mike Bame fuselage and a Bame-cut foam core wing aileron ship. The section at the root was an Eppler 193 (10-inch chord) which transitioned to an Eppler 182 (eight-inch chord) at the tip. He sheeted the wing with 1/16 balsa, leading edge to trailing edge, then glassed the wings with 3/4-ounce cloth. Spars were standard-size 1/8 x 3/8 spruce caps with full-width shear webbing (balsa), and full-width ply joiners. He calls his ship the Mugen, which means without limits in some unknown (to me) language. The horizontal stab has a rather thick, 14 percent section, with negative lifting camber.

Angel was so pleased with the events that make up the 2MWC, the way it was organized, the way his Mugen flew and the way he himself flew, that during his finals he had a hard time NOT thinking of the contest. He was high on excitement both during and after the contest!

Twelfth place: Joe Newland flew an airplane developed in the South Bay Soaring Society club of the San Francisco/San Jose area of California. Lee Hodgdon, Ed Holder, and one or two others also flew this design called the Harrier. Basically, it is a foam core winger with flaps and ailerons, the rudder is coupled to the ailerons, and it has an all-moving, T-tail stab *a la* Sean Bannister's Algebra. The wing section used was a modified Eppler 374 (1-1/2 percent thicker). The fuselage was molded fiberglass.

Thirteenth place: Bill Forrey (hooray!) flew his soon-to-be infamous Goat Hill Special (ugh, what a name!). I gave a detailed description of this bird (flying mammal?) last month. Briefly, it is a foam core, fully sheeted (1/16 balsa), E-205 sectioned, aileron design with coupled rudder. The all-moving stab is a chopped-off Gemini MTS part. The fuselage is my own design, molded in epoxy and fiberglass. My trusty, new Ace

Silver Seven does its job well . . . and as I gain familiarity with the GHS, so will I (hopefully!).

I think I'll end this section of my report right here. Next, I want to make some interesting design observations based on the top thirteen places.

TRENDS IN WINNING TWO-METER DESIGN

Starting with the wings, I must say that the most obvious trend in design is toward composite structure. This trend has been gaining popularity for years, and is now to the point where the majority of fliers chose foam core wings over the built-up variety. Seven of the top 10 flew foamies, and so did 15 of the top 20. Eppler sections are still the most popular with numbers such as 205, 182, 193, and 374 popping up most often. The Mike Bame sections were second most popular with the MB-303515 and MB-253515 claiming first place, second place, fourth place, sixth place, and eighth place (five of the top eight), or at least 13 aircraft in the contest. I won't get into a thick-versus-thin argument over the contest results . . . but I will say that what the thickies gave up in L/D (which is probably only a point of L/D), they made up in launching height, as they were usually about 20 to 50 feet higher than most others at the top of the zoom, and at the start of the course. Speed and thermal duration are the MB's strong areas, and need no further description. Third place was taken by the only Wortmann section at the 2MWC . . . Casey Goeller's Camita . . . which, as mentioned earlier, uses the FX60-100. If there were other significant sections present, I failed to note them.

Fiberglass fuselages were all over the place, and it seemed that 50 percent of the fliers used them. The reasons for their popularity have to be many: strength without undue weight; ease of manufacture and/or availability from "backyard" manufacturers; speed of construction; typically excellent drag characteristics from smooth, round, cross-sectional shapes; and probably more. Of the top 10 fliers, seven used molded F/G fuses.

Getting back to wings for a moment, it is interesting to note that one-piece wings are gaining in popularity. Most builders are realizing that one-piece wings can be made stronger and lighter than two-piece wings. The 78-inch span of the two-meter class sailplane allows this type of design without causing undue hardships of shipment or storage. Eight of the top 10 used one-piece wings.

The almost unanimous choice of stabilizer design was the all-moving stab. Most were mid-fin locations, but T-tails were a very strong second. Most stabs were of built-up construction. Notable exceptions were the Whisper and the Solution (foam core).

On the electronic side of things, there is a definite trend toward "high-zoot", everything-on-it-please radios. At least six (for sure) and possible as many as eight of the top 10 used new-generation radios: Ace, Futuba, Kraft, and Airtronics being the most popular. There were a couple of JRs present also.

The trend toward aileron ships is continuing, as expected, but the winner of this year's competition, Mike Reagan, flew a very nice poly ship. Three of the top 10 flew polys. Conclusion? If you're good . . . it don't matter *what* you fly! Guess we've known that all along.

One final trend . . . and it has to do with wings again . . . people are finally learning the importance of adequate spar structure. The Orangutan winches (actually spelled Orangoutang) weeded out the inferior designs right quickly. The first day saw an incredible number of spar failures (around six, I'd say), one of which was a thick section . . . with a poor glue joint between the joiner (which ended abruptly) and the spar caps . . . a double-no-no. If you are building a multi-task, two-meter airplane, don't use anything less than a 1/8 x 3/8 spruce spar capped I-beam design with full-width shear webbing at the root (plywood, tapering out to I-beam balsa webbing at about 1/3 of the half-span).

To sum it all up, this was the best 2MWC yet, and if you missed it, you really missed some exciting flying, and some outstanding fellowship . . . glider style!

F3B WINCH RESPONSE

Last month, I wrote a piece about the current state of affairs as regards to the

winch mess in F3B. Reaction to my solution has been unanimous,strong,and *very positive.* Almost without exception, F3B pilots are thanking me for getting things out in the open, and for suggesting publicly what has to be the ultimate solution to the F3B winch problem. Three of these F3B pilots who were the most outspoken were Dick Everett (who's probably been a modeler longer than I've been alive on this planet), Scott Christensen of Top Flite, and Don Chancey (designer of the LJMP Pantera) of Texas.

Dick called by telephone and was noticeably fired-up. He demanded that I send a copy of my column to John Worth at AMA HQ right away. He was very upset at the entire *history* of the CIAM's last-minute, rules changing "shenanigans," but especially the latest one. Dick's point was that there should be more stability and more responsibility on the F3B committee than there currently is.

Scott called by telephone to say that he'd help support (financially) any move to sponsor a set of winches for national use (F3B or AMA), and said that organizer-supplied winches for major F3B contests are what he's been saying we've needed for years.

Don wrote me a letter, and rather than try to explain it to you (I'm actually tired of writing at this point in the column), I'm going to let him speak for himself. *Dear Bill,*

I read your column in the August issue of "Muscle Builder." I was especially interested because both main topics follow right along with two phases of the hobby that I'm involved in.

1) The fun-fly contest as set-up was an interesting concept. Apparently, Curt Stevens and crew put forth a tremendous effort. I do hope that it pays off in the future! We have set up our regular monthly contest with three skill levels, i.e., novice, sportsman, and expert. In an effort to attract less experienced glider pilots to participate. This concept is of course, not new. The E.S.L. has done this for years. I'm sure many others have also. As part of the soaring steering committee formed by John Grigg at the '82 Nats, I have "suggested" that we take a look at some similar system on a national basis. I fully believe this would attract more flyers than separating by age groups. Having been event director at the '81 and '82 Nats, I can tell you that entries in Junior and Senior have been alarmingly low. In fact, the majority of trophies for those classes went unclaimed. I would never, ever want to do anything to discourage, or make it harder for any younger flyer. (I have a 10 year old son who is learning to fly.) I do feel, however, that a separation by skill level would benefit and attract more people. It has worked for years in "Pattern"! It's something to consider.

2) As you are probably aware, I am the district VIII rep. on the newly formed FAI/F3B committee. I must say your column on FAI rules was excellent! This is exactly what I've been saying. You just said it better. I'm glad to see this sort of thinking going out to the masses. Although I'm sure he's read it, I forwarded a copy to Herk Stokely, committee chairman, with my complete endorsement. Organizer supplied winches is the main thing I'm pulling for. I, personally, have qualified for the last two finals, but do not attend because I did not have a "support team" to take with me. In my area, there is a very limited supply of FAI fliers. Even fewer are enthusiastic enough to travel cross-country as helpers. There are a few of us who would participate without the "winch hassel."

Many problems have to be solved yet, but at least we are thinking in the right direction.

Keep up the good work and the excellent column. Good lift, Don.

SIGN-OFF

That's about it for this month. Next month we'll have all kinds of good stuff for you . . . including a separate report on the World Championships (I hope), as I *should* be back from England in time for the November deadline. See ya then.

Counter . . . . . . *Continued from page 9*

protective carrying case so you can take it with you to the field. This new device is available at your favorite dealer, or write Coverite, 420 Babylon Rd., Horsham, PA 19044, USA.

★ ★ ★

From the people who brought you Zap, Zip Kicker, Slo-Zap, and a lot of other fine adhesive products comes another Z products . . . Z-Magnum. Unlike Pacer Technology's line of cyanoacrylate adhesives, Z-Magnum is a two-part, no-mix, structural acrylic adhesive *system*.

The Z-MAGNUM system consists of primer and base resin components. The primer is applied as a very thin coating to the least porous surface to be bonded. The base resin is applied as a very thin coating to the mating surface. Cure begins upon mating the two surfaces. No mixing of the component materials is required as with epoxy products, and the Z-MAGNUM system is correspondingly cleaner, more economical, and stronger than epoxies. The Z-MAGNUM will work on oily surfaces, whereas the epoxies will not.

The Z-MAGNUM system will develop cure-to-handling strength in approximately one minute, with significant strength development in about four hours.

The Z-MAGNUM chemistry provides the best strength for bonding glass, metals and plastics either to themselves or in combination.

Z-MAGNUM is easily cleaned off of parts or hands with acetone. Acetone can be used as a debonding agent for disassembly of parts if necessary, but Z-Magnum remains unaffected by gasoline, alcohols, and paints.

Also new from Pacer are Plasti-Zap and Z-7 Debonder. Plasti-Zap is specially formulated to be used on all styrene plastics. Plastic kit models can now be assembled in a fraction of the time with this new adhesive which "tacks" together parts in 10 to 15 seconds and permanently bonds them in just a few minutes. Each bottle comes with a Z-Ends applicator tip and a "tip-top" closure. For faster bonds, Zip-Kicker may be used with Plastic-Zap.

Z-7 Debonder is a water-based, patented product that will remove cured cyanoacrylates from any surface, including your hands. Z-7 will not attack styrene plastics, but can be used to remove model paints. This process is a slow one, and can be used to weather or highlight surfaces for more scale effect.

Plastic canopies on model aircraft can be adhered to their respective surfaces by applying Zip-Kicker with a cotton swab to the gluing surface of the canopy, and Plastic-Zap to the mating surface. Seconds after assembly, the canopy is solidly mounted.

All Pacer products can be purchased through your local hobby shop. For further information, write or call Pacer Technology and Resources, Inc., 1600 Dell Ave., Campbell, CA 95008, (408) 379-9701.

★ ★ ★

St. Croix of Park Falls, Ltd., P.O. Box 279, Park Falls, WI 54552, has a handy little booklet for sale to individuals or clubs that answers 14 of the most commonly asked questions by those who are interested in getting into modelling and aren't quite sure how to go about it. As a PR tool, this booklet entitled "Building and Flying Radio Controlled Airplanes" should be quite handy for bringing in possible new club members. It'll keep the newcomer busy for 10 minutes or so . . . while you finish your flight . . . and then the two of you should be able to communicate intelligently about all of the little details. At the end of the pamphlet, St. Croix recommends its own beginner's plane, the Golden Falcon, as a good first plane.

If you feel that you or your club could use a little help in recruiting, or if you are a beginner yourself and just want a few basic questions answered, you can pick up this booklet at the above address for a mere two bucks. Sucha deal!

★ ★ ★

Kimbrough Products has just released its newest products into the R/C car accessories market: first, the Gear Adaptor which allows Tamiya offroad racers the opportunity to benefit from Kimbrough Products wide range of gears (for only $1.25 each); and second, the Wingties which allow the R/C car racer to easily and quickly mount or remove wings from already bent support wires ($2.50 a pair).

For additional info on these or other Kimbrough Products write to 1430 East St Andrews Place, Unit E, Santa Ana, CA 92705. (Minimum order $10.00)

★ ★ ★

How would you like to have a bumper sticker witha little adult humor on it that relates to our hobby? Curious to know what it says? How does *"R/C Modelers Do It With Frequency"* hit you?

B&R Hobbies, P.O. Box 192, Oscoda, MI 48750, will sell you (or deal you) one or more of these vinyl bumper stickers for $1.75 each. Just write and say you want one, or look for one in your local hobby shop.

★ ★ ★

Ernst Mfg. Inc., P.O. Box 248, Brightwood, OR 97011, has three new products that it would like you to know about.

New product number one is a Charge Receptacle (No. 101) which fits Futaba radio system charge plugs/jacks for instant charge access or inspection of NiCd voltage from the exterior of the model . . . all without takin' the fool thing apart! It's handy to use and made of fuel proof nylon. It will fit fuselages up to 1/2-inch thick.

New product number two is a set of Thrust Plates in three different sizes for .20 size engines (No. 102), .40 size engines (No. 103), and for .60 size engines (No. 104, pictured). Each set contains three different shims for mounting between the engine mount and the firewall of the aircraft. Each shim is made of molded nylon and has markings for either round or square engine mounts. Shim I is a one-degree shim, Shim II is a two-degree shim, and Shim III is a three-degree shim. Don't mess around with washers or flimsy wood shims . . . go solid, go with Ernst Thrust Plates.

New product number three is a pair of molded nylon Pushrod Exits available in two sizes. Number 105 is intended for the large Sullivan Gold n' Rod (which is actually blue), and No. 106 for the smaller red rods. Hot Stuff is the only adhesive you'll need to install these Pushrod Exits. Try 'em, you'll like 'em.

Look for these and other Ernst products at your local hobby shop. For more information write to Ernst at the above address.

★ ★ ★

The new Prather "Fast Cat" Tunnel, from Prather Products, 1600 Ravenna

Ave., Wilmington, CA 90744, (213) 835-4764, is an improved version of Prather's own record-setting 29 inch Tunnel for the K&B 3.5cc outboard engine. The new 28 inch "Fast Cat" Tunnel features a six inch tunnel with an improved, stepped bottom which allows outstanding straightaway speed, yet holds firm in the turns. The Fast Cats excellent turning ability without spin-outs is what sets it apart from most tunnel boats.

The kit features a factory molded cockpit area with plywood transom plate and turn fin plate factory installed. These features speed construction time tremendously, making the "Fast Cat" one of the fastest building boats on the market. A complete instruction book is included with step-by-step photos along with an update sheet which lists all other accessories needed to complete the kit.

The factory joined epoxy fiberglass hull comes with a removable epoxy fiberglass cowl, foam flotation and aluminum turn fin. For more information, write to Prather Products at the above address. •

Dear Jake . . . . . *Continued from page 6*

Dear Confused:

Stabilizer and rudder are parts of your airplane. An elevator goes up and down in a building, and a fin is part of a '59 Cadillac.

—Jake

★ ★ ★

Dear Jake:

Why don't you ever call, or maybe drop me a line once in a while? I'm not dead you know.

—Your Mother

Dear Mom:

A good silicone tubing works best with high nitro fuels.

Love, Jake

★ ★ ★

Dear Jake:

Please excuse this letter being written on my lunch bag, but I had a great idea while I was eating my tuna fish sandwich this afternoon, and I just had to share it with you. Why don't we hold the Nationals at a neutral site every year, like Newfoundland? Everybody would have to travel a long way, so nobody could complain about the lucky locals. Also, there wouldn't be any biased judging . . . Wait a minute! Those Canadians probably only know how to judge in the metric system. Well, forget that idea, but don't worry, I'll keep trying.

—Still Thinking in San Mateo

★ ★ ★

Dear Jake:

My ROW Satellite 1000 ran over a mallard duck, and now I'm in trouble with the ASPCA. What should I do?

—Fowled in Florida

Dear Fowled:

Tell them it was an accident, just like any other quack up.

—Jake

★ ★ ★

Dear Jake:

Last November I finally finished my quarter-scale R/C model of the Grumman Duck. It was too cold for amphibious operations, so I took it to our club field for test flying from solid ground. Our runway runs north and south and we sometimes have a crosswind problem, but on this day conditions were perfect. The wind was straight out of the north and right down the runway. I taxiied the big model out and roared into the wind. But the dumb thing wouldn't fly. I tried again and again, but it just wouldn't lift off. It seemed to have plenty of power and adequate flying speed. The CG was correct and all the controls were working and moving in the right directions. Do you have any idea what might have been wrong?

—At Wit's End in Whitfield

Dear At Wit's End:

You should've taken off downwind. Everybody knows ducks only fly south in the winter.

—Jake •

Plug Sparks . . . *Continued from page 32*

CLASS ANTIQUE	TIME
1. Jack Alten (Dallaire/HB 60)	41:00
2. Jim Kyncy (Dallaire/Rossi)	39:00
3. Don bekins (Valkyrie/Hornet)	25:30
TEXACO	**TIME**
1. George Steiner (Miss America/S.T.)	60:00
2. Don Bekins (Gas Bird/OS 60)	51:04
3. Jim Parsons (Ehling/Merco)	28:25
1/2A TEXACO	**TIME**
1. Don Bekins (M-G)	28:12
2. Paul Forrette (Panther)	27:50
3. Stan Lane (Playboy)	26:34
ELECTRIC	**TIME**
1. Jim Ogg (Mike)	10:53
2. Al Fabian (Playboy)	9:59
3. Jack Alten (Interceptor)	9:31
SWEEPSTAKES	**POINTS**
1. Don Bekins	51
2. Jim Kyncy	32
3. Ed Solenberger	25

ENGINE OF THE MONTH

This month's engine is another product of the San Francisco Bay Area that failed to get off the ground, the Roll "Pegasus" 40.

Jack Roll and his son flew Ohlsson products, a Pacemaker with an Ohlsson Gold Seal Engine. They formed a partnership in flying that was good enough to win the Junior Class at the 1938 State Fair.

An aviation machinist by trade, Roll worked at the Alameda Naval Air Station. Jack was always experimenting with ways to gain more rpm, more thrust, and a better flying model. Hence, it was no great surprise to this writer when his method of mounting an Ohlsson motor was featured in the June 1938 *Model Airplane News* in the "Gas Lines" Column. As noted from the writeup:

"The gas tank serves as a motor mount, made from dural plate stamping cut to the size of the crankshaft and riveted in place. The whole unit is then mounted on a vertical dural firewall which in turn is fastened to an easily

removed plywood bulkhead."

Also shown in the photo is a unique propeller, an adaptation of the Maynard Di Cesare propeller. Actual measurements indicated this staggered arrangement gave more thrust when compared to the standard prop.

Furthermore, Roll claimed that the air is drawn toward the hub and the motor runs cooler because of this. The nearest item is that the pitch of the propeller can be easily changed.

With such an inquiring mind, it was no great surprise when Jack decided to turn out an engine looking somewhat like a cross between a Gwin Aero and a Baby Cyclone. The original castings were unnumbered and unidentified. Later castings came with the name, "PEGASUS" on the by-pass.

Also, apparently because of crankshaft tempering and machining problems, the rotary valve was dropped and the updraft venturi was not drilled in the rough casting. In its place, the standard rear three port intake (resembling the Bunch engine) was installed. There is no record or photos that indicate the type tank used with this model, but it is a safe bet to assume a float or round type tank was employed.

The timer was rather massive looking, but quite practical with all parts mounted on an aluminum plate "hogged out" from solid stock. Timer points and spring arrangement were automotive type (part not identified but does look like General Motors) that could be easily adjusted for proper gap.

The engine came complete with an AC brand plug. No performance figures are available, nor is there a recommended propeller size.

In breaking down the engine, the following measurements were taken: bore, .8125 in. (13/16); stroke, .781 in. (25/32), giving a displacement of .40 cu. in. This is larger than the Baby Cyclone of .37 cu. in., and slightly smaller than the Gwin Aero.

The engine has a one-piece cast aluminum cylinder and crankcase. The crankcase rear plate was a machined piece bolted to the rear with four 3-48 screws. A machined steel head was provided, as was a cylinder liner and piston. All in all, it was not a bad looking engine.

Like a lot of the would-be engine manufacturers of that early era of gas modeling, the company was under capitalized and was unfortunately unable to advertise the product. The engine has since become a curiosity and definitely a rare engine for the collector.

As project No. 165.3, Karl Carlson indicates he will machine up a few of the castings he has in stock and complete several engines to augment several collections. That should make the collectors scramble!

C.I.E. REVISITED

Every so often, one will accept hearsay as fact and never question it for many years. Such is the case of the C.I.E. recently featured in our "Engine of the Month". When the motor first came out, the rumor was that Bill Brown of Brown Jr. fame was involved.

Nothing could have been further from the truth. In a telephone conversation (and later backup material) with William A. Ruff of Route 2, Box 396A, Cottonwood, CA 96022, Bill stated he and Barney Snyder formed a partnership to manufacture and sell the C.I.E. engine under the name of Compression Ignition Engines, Division of Modelcraft, 11921 South Western Ave., Los Angeles, CA.

To prove his point, Bill says he still has the original casting made in a plaster of paris mold in his backyard. Bill also claims his engine is the first American diesel.

Some of the early literature on the C.I.E. bragged about how his six-year-old son, Douglas Ruff, could easily start the engine. For those who would want to see what Daymon Adcock's son-in-law looks like (Ruff married Adcock's daughter), photos of Damon's models with Doug Ruff in the picture can be seen in the July and August 1982 "Plug Sparks" column.

Anyway, we are pleased to set the record straight and hope you, the reader, will benefit by it.

THIRTY YEARS AGO, I WAS. . .

I received a most interesting letter from Cedric Galloway of 14624 Willow Street, Hesperia, CA 92345, describing his early control line attempts. He submits Photo No. 9 showing an original design with Ohlsson 60 for power. As

Ced sez:

Let me tell you about it. First off, I bought an early Ohlsson Gold Seal engine and a set of blueprints for an early free flight model from Clyde Austin who ran a model shop on Victory Blvd. in Burbank, California, in 1983. I never did get around to building the F/F model, and with the war on, I became interested in controlline models.

During the war, balsa and model supplies were rather hard to come by so I used 1/16 in. plywood and pine for framing. I drew up the plans myself knowing very little about control line models. The model was covered with silk and nitrate dope; it had a dark blue fuselage and rudder, with international orange wing, stab, and elevators. Probably the only unusual thing about the model was the cowling which looks like metal, but it isn't!

I made a form block out of pine blocks and carved upper and lower halves separately. I then gave them four heavy coats of wax. I cut up newspapers in strips and applied them to the form blocks with nitrate dope. I laid down three or four layers of paper with several coats of clear dope over the last layer. Cheese cloth was then overlaid and doped with coat after coat of clear dope until most of the weave was covered. It took plenty of sanding between coats to get that coarse weave filled in. About three coats of blue dope, sanding between the first and second coats, gave a fairly smooth finish. After removing the form blocks, I gave the inside a coat of blue dope. You might say this was a poor man's version of a fiberglass cowling, something we didn't have then.

In the photo can be seen an early SNAFU plastic prop. With that, my brother and I went out to the old National Guard airport near Griffith Park to test hop the model one fine Saturday morning. The first flight consisted of three complete circles on the ground finally rising about six inches into the wind and landing on the downwind leg. After several tanks of gas, we concluded that was all the model was ever going to do. This combination of a weak motor, overweight model, and insufficient wing area was enough to make us give up on this model.

Soon after that, I joined the Lockheed Model Club, bought a Super Cyclone, built the club trainer, and with that, I was able to learn to fly control line. Those were the days!

MORE NOSTALGIA

I've been looking for a spot to use some of the photos received from the late Art Suhr of the early flying days in Southern California. Photo No. 10 shows Danner Bunch and "Bud" Warren on the right with their hydro models they so enjoyed every Sunday at the lake.

The reader will note that the models are all of the Scorpion Major, a design by Danner Bunch. With their high rudders, they were extremely touchy. What most of use didn't realize in those days was that the hydro model needed a large rudder. The Scorpion Major became a very happy combination when coupled with floats. The model held numerous seaplane records.

Later on, the design was simplified by removing the cabin and bringing the top longeron down to form a simple square fuselage. This was also used extensively in contests between 1938 and 1940.

SAM ACTIVITIES

Kelso Barnet, 107 DeGama Dr., Universal City, TX 78148, reports the San Antonio Chapter 1836 has been flying 1/2A Texaco so much they have been able to entice at least one or two new members in the club.

To demonstrate the popularity of 1/2A Texaco models, a monthly contest is held every month starting at 9 a.m. and closing at 12 noon . . . just in time to go get a ham-on-rye and a cold beer. *Hot dog!*

The newsletter produced is called "1/2A Texaco Newsletter," and it is devoted strictly to that event. The best part of this unique idea is that it is succeeding! This writer can remember when 1/2A free flight became the rage in the late fifties with entries totaling over 350 in 1/2A at the Nationals. Perhaps another renaissance is coming for the small models, only with R/C in them this time?

To show how popular 1/2A Texaco has become, Kelso Barnet sent us Photo No. 11 depicting his Bowers "Flybaby". A real cutie!

SAM ABROAD:
SAM 35 — ENGLAND

Just received a ninety minute tape from Dave Baker, the devoted SAM 35 newsletter editor, wherein he brings this writer up to date on the old timer happenings in Merrie Olde England.

First off, the organization has undergone several changes with Ray Alban stepping down as chairman and Vic Dubery taking his place. Vic appears to be eminently qualified for paperwork as retirement allows him more time.

The former treasurer, Pete Michelle, has been replaced by Tony Holcomb whose background is infamous. In each case, the changeover in offices has hardly been noticed, so smoothly has it gone.

There are others that make SAM 35 go too: Allen Wiggs, a real propagandist for the Juniors providing an event and prizes; Don Knight who has set up a bulk buying arrangement for SAM 35 members. One of the best benefits is the excellent insurance coverage developed by Steven Payne who himself is in an upper bracket insurance company. It is so good the SMAE boys are looking to join SAM.

Of course, despite his deprecation to the contrary, the dedicated man that really makes things go is Dave Baker. As Dave says about the newsletter, "It has improved to the point where you don't need a 500-watt lamp to read it".

SAM 35 through the auspices of Dave Baker has a library of plans with copies being made available at nominal cost. This is another SAM 35 benefit that is being constantly enlarged by many volunteer draftsmen; the most prominent being Terry King, Brian Yearly, John Havis, Derek Ridley, etc. Just tremendous!

At present, the "hot dogs" haven't gotten to the English SAM contests yet. The old timer events at the SMAE Nationals are still fun with literally a tent city being erected overnight. During this time a barbecue is put on which is quite similar to the SAM "Bean Feed." Of course, all of this went on at the recent F/F Nats on May 28, 29 and 30.

In that line, many old timers like Bob Copland and Reg Parkham have been brought back in the fold. Photo No. 12 shows Reg Parkham's original 1939 Wakefield design on an official flight. Placed second after all these years!

We would also be remiss if we didn't run a shot of Mario Gandolphi as seen in Photo No. 13 depicting his latest fine flyer, a Shereshaw Cloud Cruiser. Mario has been one of the main contributors to perpetual trophies for SAM 35 events. One can't say he don't try to win them back!

One notable thing about the English competitions is the variety of models. This is no doubt due to the lack of serious competitors intent on *winning only*. At present, the English get-togethers are a sheer joy for nostalgia and appreciation of the other fellow's model.

As mentioned before, Baker has been successful in getting Bob Copland, former chief designer of the Harrier, back to models. Copland and his cronies were well known after WW-II for their

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RAZOR BLADES, single edge industrial first quality — extra sharp. 100/$4.25, 200/$8.00, 300/$11.75, 500/$19.25, 1000/$37.50, postpaid in U.S. Cobbie's Gifts, Postbox 2, Deal, NJ 07223; (201) 531-6842.

TISSUE PAPER (Domestic) 20"x30" sheets, nineteen colors, 20¢ sheet. S.A.S.E. brings sample of all colors. Contact Bill Wilson, Box 8489, Lumberton, TX 77711, (713) 246-4177.

WANTED: Spark ignition model airplane motors, parts, race cars. Circa 1930-1950. Russell Stokes, Rt. 1 Box 520, Keller, TX 76248.

WANTED — OLD MODEL ignition engines, cars, etc. Paying top dollar. Bill Simpson, 7413 Via Lorado, Rancho Palos Verdes, CA 90274 (213) 377-3532.

BASIC AERODYNAMICS (booklet). Explains seldom understood aircraft design points. Clear, simple, inexpensive. Postage paid $2.50. Jule Dews, 7703 Baltimore National Pike, Frederick, MD 21701.

MODEL AIRPLANES AND THE AMERICAN BOY. Magazine reprints of 1927-34 era, 160 pages. Photos and plans. "Heritage you should know." $9.50 postpaid. (SASE for INDEX.) Model Aero Publications, Box 135, Northridge, CA 91328.

PEANUT PLANS. Unusual subjects: Aircruiser, Sportavia, Taube. Sample $1, SASE for list. David Aronstein, 50 Pasture Lane, Poughkeepsie, NY 12603.

WANTED: MODEL DIESEL ENGINES circa '40s through '60s. Prefer complete, running engines. Others bought for parts. State condition and price in letter. Philip Mahony, RR1, Box 223, Lime Rock, CT 06039.

LATEST PEANUT PLAN. French Bloch MB 152. $2.50 postpaid. SASE for list. David Diels, Box 101, Woodville, OH 43469.

WILL PAY to $200 for Forster .99s and Anderson Spitfires. David Bogdanyi, 8615 Lindley Ave., Northridge, CA 91324, (213) 885-8324.

P-30 CONTEST model plans. Can do two minutes in calm air. Rolled tube fuselage. $3.75 Postpaid. P-30 Werks, 1715 Knollwood, Apt. P-4, Kalamazoo, MI 49007.

FACTORY SALE: Ras Stik 25-40 fun flier, 51-inch foam wing, balsa fuselage. Sale price $24.95 or with two rolls Econokote (colors: red or white only). Fox 36RC #23900, core glue, fuel tank, wheels, motor mount $79.95. Only 12 left. Handling charge $3.00, add $2.00 for C.O.D. GT Models, P.O. Box 869, Rantoul, IL 61866, phone (217) 893-4136.

WANTED: Factory accessory variable compression head for Drone diesel. Also want two second-model ball bearing Drone diesels. Will buy or trade original Burgess UPF-7 U/C kit used with M-5. Robert O. Knutson, P.O. Box 243, Austin, MN 55912.

BOOMERANGS — Handcrafted and handdecorated. Throwing instructions included. "Keep one in your field box for after the plane crash!" $7.00 postage paid. Denis Hentzy, P.O. Box 16, Townline, NY 14165.

NORTHROP N9M FLYING WING. Scale plans, photos. Send $1.00 for information. Bill Young, 8106 Teesdale Ave., N. Hollywood, CA 91605.

FOR SALE — Old ignition engines (50 plus), complete. Numerous parts engines; 40 glow engines. New Lindberg Hornets built by Cole, version featured in *Model Builder*, June '83, page 36. Engines listed *singularly*. For complete list and prices, send $2.00 and legal-size SASE. William A. Cole, 4978 NE 56th St., Altoona, IA 50009.

"PLANES, CARS, SHIPS — I wish to exchange models. Libor Gajdacek, G. Klimenta 4, Havirov Mesto, Czechoslovakia 73601.

club acivities, Northern Heights Gala at Fairey Airdome in particular. Those were great days, and we are looking forward to quite a few of the former club members like Ken Tansley and Cliff Buston to get things rolling again.

Actually, the old gang never broke up, only in regards to flying, as they were able to keep contacts at the local meeting house. This revival of old time contestants has resulted in the unearthing of many old designs that were considered lost.

Baker reports that with the exception of Alman, who passed away the first of this year, the entire 1936 Wakefield team that came to the USA is still intact and back in "harness" so to speak. Great stuff!

AUSTRALIA

Latest letter from Monty Tyrrell states he was the guest speaker at his club meeting with the subject as SAM. Tyrrell reports he had a splendid attendance, and spoke for over an hour.

One of the Australian SAM spark plugs, Dennis Parker, attended and was duly impressed by Tyrrell's demonstration with his Baby Barnstormer (1948 K&B ignition). Also of interest at the "Show and Tell" was Dave's big Powerhouse with an Anderson Spitfire on ignition, and Norman Garrett's *Air Trails* Sportster, with a glow OS 15 for power. Dennis Parker also brought his Forster 29 powered Pacific Ace.

To add spice to the display, Monty also displayed his complete collection of Ohlsson motors including one of Herb Wahl's new Ohlsson Gold Seals. For the collectors, he also showed a Marden 23 ignition made locally 40 years ago. Superficially, it resembles an Ohlsson 23.

Although they were invited, the free flighters (with the exception of Dennis Parker) did not show. Truly a shame as they missed a magnificent chance to gain converts for O/T Free Flight.

READERS WRITE

Ever so often one of the members of an active SAM Chapter will move away to an area where Old Timer flying is non-existant. Such is the case of Chuck Provance, former member of the SCAMPS, SAM Chapter 13 in Southern California.

Chuck now writes from Wyoming to say flying areas are great but there are darn few modelers around. He sends in Photo No. 14 showing his English P.A.W. 2.46 diesel engine in a Paul Plecan Simplex. At the time the photo was taken, there was still snow around so we have no reports on the model's flying characteristics. Bet it'll be a winner!

SAD NEWS

I guess that's about the only way you can title the news from Gordon Codding, but, as many who shrug their shoulders say, "That's life."

Gordon reports the local Arizona club lost another member, not anything fatal, but just plain family problems and poverty. Leon Tefft, formerly of Chicago and one-time master pattern maker and draftsman for Paul Lindberg models, has been suffering from heart seizures, near blindness, loss of a critical finger, overweight, and underpaid. His wife decided to return to Chicago when she inherited an old apartment building. Leon is now on the road as a wanderer living out of the back of his beat-up station wagon with his faithful, blind dog. Some world!

Gordon also says this reminds him of the time when William Wylam turned up at the North American Downey, California plant where the Apollo was being built. Near blind, penniless, wife in San Francisco, he found the going tough, when some nice young man in personnel figured him for a bum, didn't want to hire him because Bill lacked a degree in Peruvian Underwater Basket Weaving or some such nonsense.

My boss heard about it, called his superior, and as we were modelers, we naturally hired William Wylam for old time's sake. Each of us took turns inviting him to honor us with his presence for lunch, dinner, stay over night, etc., as he was broke . . . at least until his first paycheck. He stayed at N.A. for about a month and wandered away. Last we hard was a postcard from San Francisco. He has gone to see his wife, deciding he didn't like aerospace work! He had no files, no reference material, carried everything in his head, and was also going deaf as well as blind. Wotta waste!

SAM CHAPTER

This columnist has been receiving a lot of requests on how to form a SAM Chapter. As the SAM Secretary-Treasurer, this is to advise all prospective organizers that all you need is five modelers with SAM membership in good standing.

If you are having troubles, memberships are $10.00 per year (a real bargain!) and can be obtained from the SAM Secretary-Treasurer, John Pond, 4269 Sayoko Cir., San Jose, CA 95136. Once you have enough members to start a chapter, you then write to Everett Woodman, 233 Longview Dr., Bayville, NJ 08721. He will immediately issue you a chapter charter and number.

In some cases, some fellows like to have distinctive names like the California 49'ers, the Philadelphia 76'ers, and the San Antonio Club, SAM 1836 (remember the Alamo!). A special number can be requested, as long as someone else didn't ask for it first. In any respect, once you form a chapter, the good times really roll then!

LOW-WING CONTEST

For years this columnist has been listening to complaints that the same old models win all the time. His friend, Gene Wallock, has also been aware of the growing sentiment, and has proposed a low-wing contest. Gene has gone so far as to put up perpetual trophies if anything develops.

This columnist has seized upon this opportunity to announce an O/T R/C contest featuring low-wing models. At the recent West Coast SAM Champs, a sample flyer was distributed announcing the next year's Annual SAM 21 West Coast Champs featuring low-wings. Being publicized one year in advance, opinions were solicited from the various other SAM Chapters.

Under the proposed contest arrangement, all low-wing models would receive a 50 percent bonus on their flight times. For instance, if you make a four-minute flight, 50 percent more would give a total of six minutes. The limiting factor of course, would be the amount of a "max" flight.

As it stands right now, number two son, Gary Pond, has donated a huge perpetual sweepstakes trophy for low-wings, plus large, individual perpetual trophies by Wallock for each class. This should make things worthwhile as a permanent trophy will also be awarded. With one low-wing model, a competitor could end up winning three trophies in one class! How about that?!

For those doubting Thomases who think low-wing models can't perform, the columnist lists the following low-wing designs that are available (and do fly!):

NAME (Designer)	SPAN (Inches)
Dragonfly (Williams)	85
Golden Eagle (Comet) (low-wing version)	45
Gull L.W. (Bowden)	96
Loew LW I	66
Loew LW II	72
Monarch (Hamley)	82
Morio (Guillemard)	48
Panther (Peerless)	46
Pacemaker (Saddler)	78
Petrol L.W. #4 (Bowden)	96
Starliner (Atwood)	55
Speedcraft (Orwick)	63
Sykes L.W.	66

This is thirteen for a starter! There are other low-wing designs that can be drawn up if the demand warrants. The best part about low wing designs are their flight characteristics, *good!* At 1,000 feet you can't tell the difference between a low-wing and a high-wing model. Try it, you'll like it.

THE WRAP-UP

Newt Stansfield sent in an old letterhead from the Razorback Gas Model Association that struck a responsive chord with this columnist.

What I would like to do is to run a reduced copy of the letterhead section as one of the illustrations of this column. This could possibly lead to having interested clubs send in their novel letterheads for publication.

Realizing there is a terrific amount of old club literature, this should be no problem for anyone wishing to see his club's logo in print.

Now if we can just get Bill Northrop to go along with this nostalgic idea *(I think we can twist his arm a little! wrf)*, we are all set. Regardless, fellows, send them in, we'll work something out.

Next issue we will try to run as many photos as we can of the SAM Champs at La Junta. This meet promises to be a "biggie" with over 100 registrants 45 days before the meet starts. *Great stuff!* •

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Workbench . . . . *Continued from page 6*

Harry obtained photos and a non-detailed three-view from the Wichita division of Boeing, but is hoping to find photos of details, interior, tail wheel assembly, etc., color scheme, more detailed drawings, and a reasonable explanation for the upside down stab!

Also looking for more information is Thomas Ailes, 630 Old Forge Rd., Valparaiso, IN 46383. He remembers a rudder-only R/C model from Air Trails back around 1960 called the "Pixie Biplane", and is looking for plans. Tom is really into old time R/C models. He has a Technical Models "Wildfire", Midwest "Esquire" (has built over two dozen!), a Guillow "Vanguard", and a deBolt Livewire "Kitten." Future projects include a Veco "Smog Hog", Berkeley "Sea Cat", and hopefully, a Super Esquire. He has kits for the Smog Hog and Sea Cat! Let us know if you can help him with the Pixie, or contact him directly.

METRIC MUDDLE

Our comments about metrics in the August issue brought the following from John Walker, Charlottesville, Virginia, an occasional construction article contributor to **Model Builder**:

Dear Bill,

I have been meaning to write concerning a thing or two but never can seem to get around to it. However, your 8/83 editorial on metrics was the "nudge".

About metrics and the U.S. Back around '42 or '43, I was working for the AAF. As aircraft with both the RR Merlin and Packard Merlin engines were coming in for work, we were given a "crash course" in metrics. We were told that metrics were (was?) just around the corner. The USA was the only major country that hadn't made it official . . . but it would in a month or two, or perhaps a year or two. We're still waiting.

Did you know? More than 100 years ago a federal law was passed that said in part . . . "It shall be lawful throughout the United States to employ the weights and measures of the metric system. . ."

This law made the metric system legal in the USA. However, Congress did NOT make the metric system obligatory. Apparently the people at that time were more familiar with the inch-pound based on English practice.

Back to the Merlin engines . . . if I remember correctly the Packard was the "inch" model and the RR was the metric model. My memory is very good but a bit on the short side.

Regards, John R. Walker

P.S. I have two drafting books on the market. One is a metric version, the other is English measures. They are identical. The English version outsells the metric version by about ten to one.

FUEL THROUGH

Every power modeler sooner or later is faced with the problem of feeding fuel through the firewall from the tank to the carburetor. Basically it comes down to two methods: run tubing through the firewall, or place the tank so that the pick-up tube or the whole cap (in the case of a bottle-tank) comes through the firewall. The former method is most always used, and the ways of accomplishing it are varied.

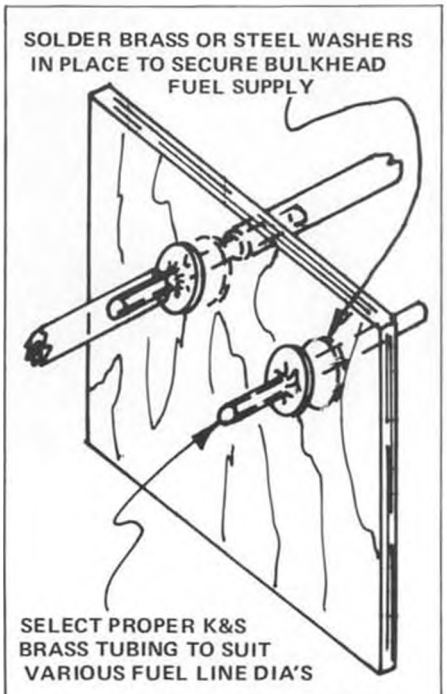

FIGURE 1

The quickest . . . and dirtiest . . . is to simply drill a hole the size of the fuel tube and shove it on through. However, no matter how snug the fit, fuel and exhaust residue will filter on through. And when it comes time to replace the tubing, you better use the same size material. I prefer to use short lengths of brass tubing, epoxied in place. The fuel line is then installed in two parts, one on each side of the bulkhead.

Ron Weiss, Huntington, New York suggests a variation of my method. He installs the brass tubing in the firewall by soldering keeper washers on each side. This seems OK, but I'd still prefer to seal the firewall area where the tubing goes through with silicone rubber. Figure 1.

Fourmost Racing Products makes a handy molded gadget that does the same job. It is fed through the firewall and held in place by a nut. Fuel line slips on each end, and the raised "neck" helps to keep it there.

CZECH PEN PAL

Libor Gajdacek, G. Klimenta 4, Havirox Mesto, Czechoslovakia 73601, wishes to exchange plane, car, and ship models and information with U.S. modelers, according to Zuzana Jasek, of Burnaby, British Columbia, Canada. We have to assume that he can write in English.

THE WINNERS!

The following announcement comes from S.O.A.R., the Silent Order of Aeromodeling by Radio, Plainfield, Illinois:

The team of Ken Bates, Ken Show, Mike McIntyre, Kurt Emerling, and Mike Bak outdistanced 21 other teams to win the annual sailplane classic, S.O.A.R.'s Great Race VIII. The winning team completed the course in 3 hours 32 minutes and was the only team to finish the grueling 47.2 miles/76 kilometer course. It was also the second time in two years the MRCS flew the complete course.

Second place went to the Suburban Aero Club of Illinois with 26.7 miles/42.6 kilometers in a time of 3 hours 18 minutes. Third place was won by the DCRC of Washington, D.C., with 22.2 miles/35.7 kilometers.

Twenty-three teams, representing 12 states, Canada, and Switzerland competed.

The new R/C frequencies were put to test as all new channels were in use for the four day event. No irregularities due to interference were noted.

The Great Race is a cross-country radio controlled sailplane event and is open to competitors from any national aeroclub. S.O.A.R. has been hosting this competition since 1976.

YOU BETCHA!

The following quote was sent to us by John Walker, ref. "Metric Muddle", and I'm almost sure it sums up the way I try to write my columns.

"Never use big words, or you'll obfuscate the significance of what you're endeavoring to communicate." •

The K-Line KP5K Confidence for his first solo.

You've given him a lot of instruction and this time he wants to solo. You want to be sure that nothing interferes with the pride of accomplishment he will feel when he finally lands. You're confident he's using the best available equipment; a reliable K-line series radio from Kraft Systems.

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The KP5K is the K-line 5 channel R/C system. This system features adjustable dual rates on the transmitter with plug-in radio frequency sections available for all existing and the 11 new frequencies. The transmitter's smooth, responsive control sticks and high technology single integrated circuit encoder send clean strong signals to the highly sensitive, interference resistant and compact receiver. Our standard K-line servos deserve special mention. Unlike other standard economy servos, ours are fast, low current drain servos that feature sealed pots with carbon wipers (not metal) and 5 pole motors with carbon brushes for high torque and long life.

There's a variety of K-line radio control systems just suited to your particular needs including our innovative championship KP3KW/B pistol grip wheel radio for R/C cars and boats. See your favorite R/C hobby dealer or write for our detailed brochure on the complete line of Kraft radios and the Kraft quality difference. Kraft Systems Co., P.O. Box 1268, Vista California 92083 (619) 724-7146.

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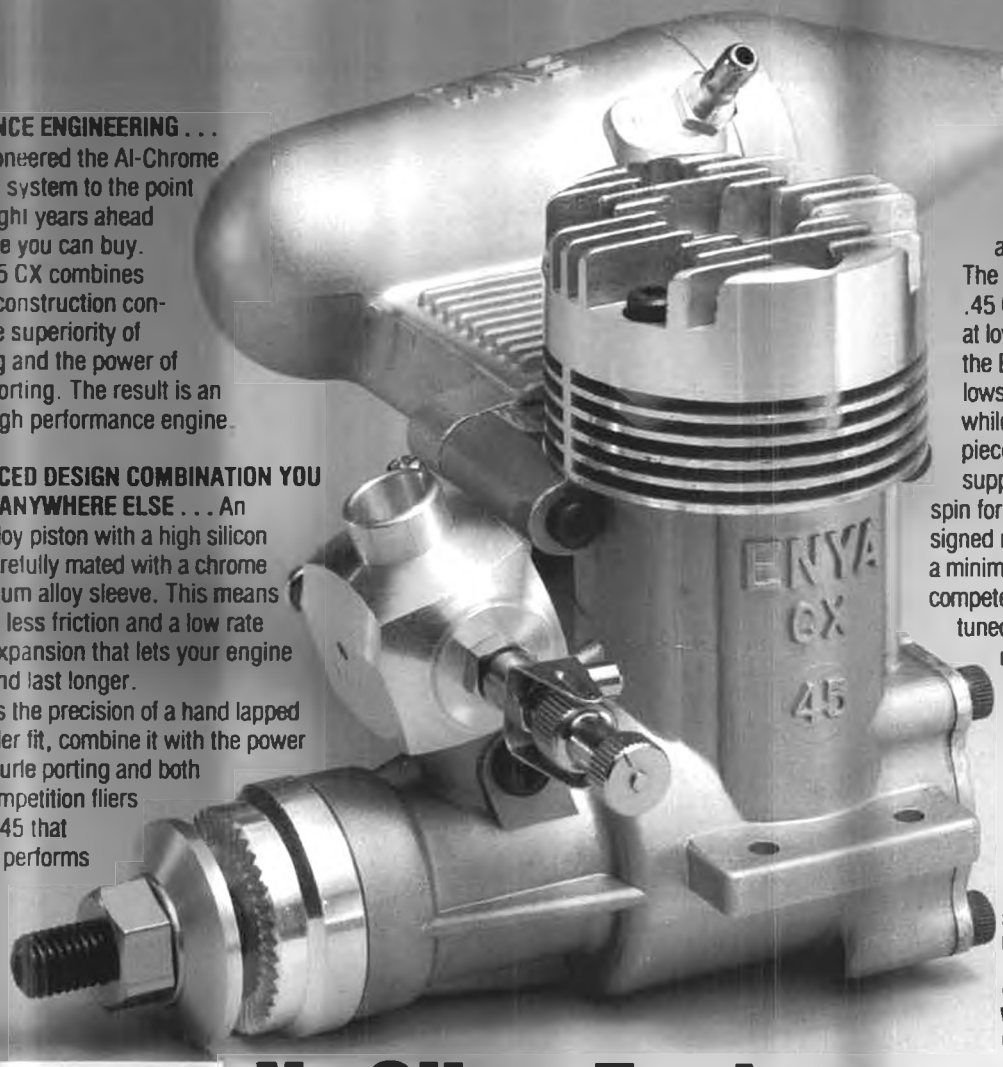

PERFORMANCE ENGINEERING . . . Enya has pioneered the Al-Chrome construction system to the point where it is light years ahead of any engine you can buy. Now, the .45 CX combines this proven construction concept with the superiority of hand lapping and the power of Schneurle porting. The result is an incredibly high performance engine.

THE ADVANCED DESIGN COMBINATION YOU CAN'T BUY ANYWHERE ELSE . . . An aluminum alloy piston with a high silicon content is carefully mated with a chrome lined aluminum alloy sleeve. This means less weight, less friction and a low rate of thermal expansion that lets your engine run cooler and last longer.

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RPM: 2,500 to 17,000

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