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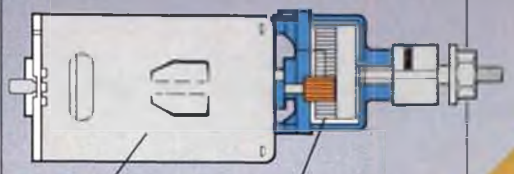

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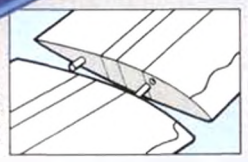

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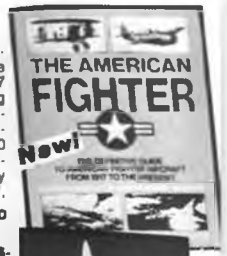

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MODEL BUILDER

JUNE 1988

Volume 18, Number 197

898 West Sixteenth St., Newport Beach, California 92663 Phone (714) 645-8830

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FEATURES

CONSTRUCTION

COVER: The well-known Gee Bee R-1 is the subject of cover artist Bob Benjamin's painting this month. The R-1 was designed to be a winner at the 1932 National Air Races, and with a Pratt & Whitney Wasp Sr. boosting the horsepower to 800 hp, the R-1 arrived in Cleveland with its reputation preceeding it. Jimmy Doolittle proved to be her master, setting a landplane speed record of 294.4 mph in the Shell speed dash, then walking away from the rest of the field in the Thompson Trophy Race at an average speed of 252.686 mph, having hit 300 mph in the stretches. His closest competitor, Jimmy Wedell, flying the Wedell-Williams No. 44, is shown symbolically pressing the Gee Bee for second place. In fact, the R-1 lapped the entire field at least once!

The original painting is available for purchase. Custom photo prints of this and other planes from the Model Builder series of covers are available through Robert A. Benjamin Aviation Art, 1222 26th Ave., NE, Olympia, Washington 98506 (206) 352-2602. A note to the many racing enthusiasts who have expressed pleasure with the creation of this series: yes, the Gee Bee Z is on the list of future subjects!

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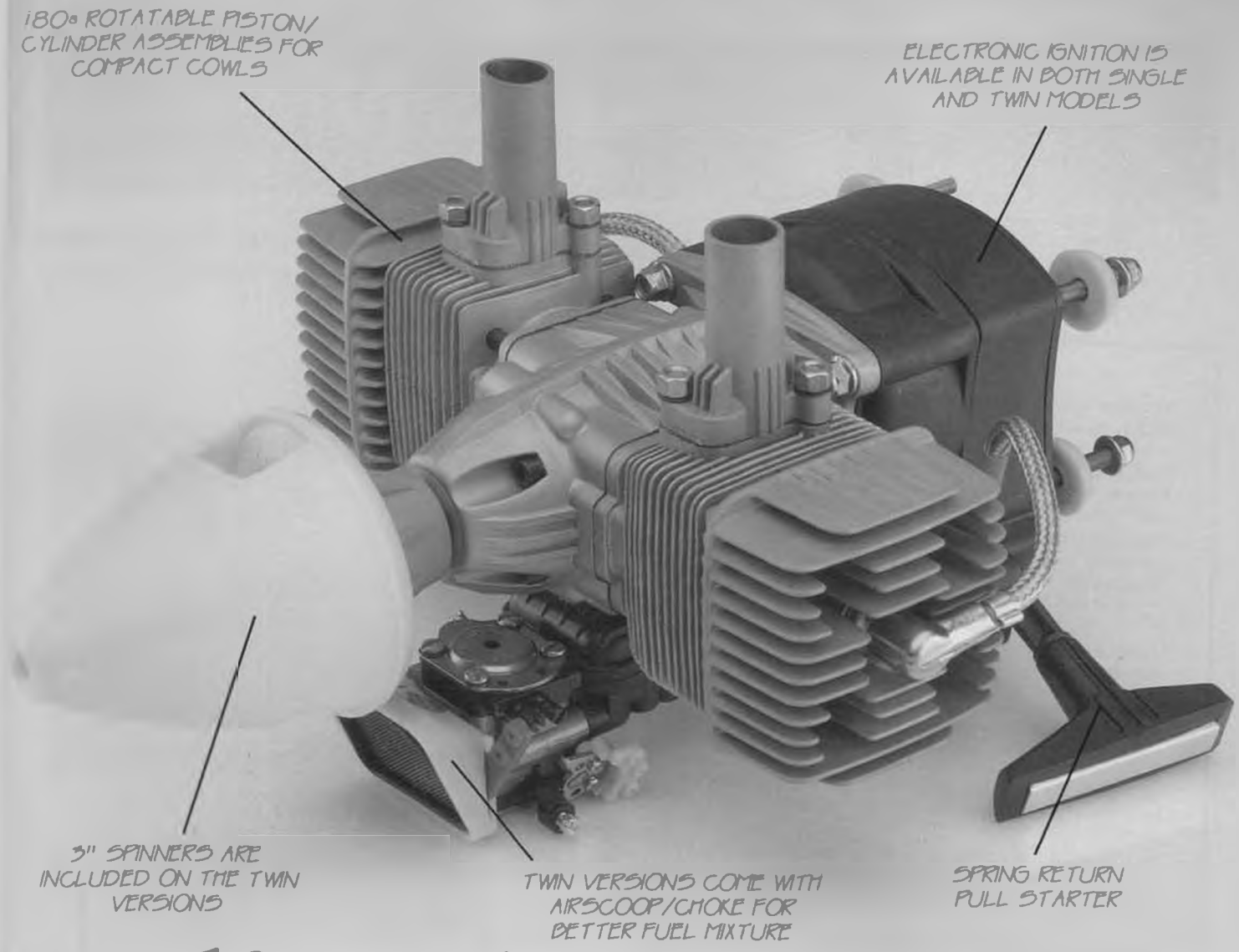

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The first engines in this line are the Super Tartan Single Glow and the Super Tartan Single Ignition. Both of these engines are designed to fly 10-17 pound airplanes (1/5 scale and some 1/4 scale applications) with no problem at all. Each of these engines has a displacement of 1.34 cubic inches (22 cubic centimeters). The glow version, which uses alcohol, swings a 18 x 6 prop at 8000 RPM and develops 16.54 pounds of static thrust (2.0 horsepower). The Ignition version, which uses a gas/oil mixture for less costly operation, swings a 18 x 6 prop at 7500 RPM and develops 14.34 pounds of static thrust (1.75 horsepower). These figures were obtained using the mufflers supplied with the engine.

The larger engines in the line are the Super Tartan Twin Glow and the Super Tartan Twin Ignition. Both of these engines are designed to fly 16-30 pound airplanes (1/4 scale and some 1/3 scale applications) with no problem at all. Each of these engines has a displacement of 2.669 cubic inches (43.75 cubic centimeters). The glow version, which uses alcohol, swings a 20 x 6 prop at 9100 RPM and develops 28.67 pounds of static thrust (4.75 horsepower). The Ignition version, which uses a gas/oil mixture, swings a 20 x 6 prop at 8800 RPM and develops 26.46 pounds of static thrust (3.95 horsepower). Again, these figures were obtained without using tuned exhaust.

For more information on the Tartan series of engines, ask you local hobby dealer, or give us a call. **DEALER INQUIRIES INVITED**

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TUCSON "BARNSTORMERS" AIR SHOW TEAM FEATURES BILLY HEMPEL AND SIG 1/4-SCALE PIPER J-3 CUB.

Each year the Tucson "Barnstormers" Air Show Team performs in front of thousands of spectators in the southwest. The team's manager, Russell Davis, recently wrote;

"The SIG 1/4-scale J-3 Cub has proven to be an ideal aircraft for use in our model air shows. It is big, beautiful, and recognizable; it can tow signs and take up parachutists; and best of all it can be spectacularly aerobatic; our audiences love it!"

"I can't imagine that anyone could do a better job of flying this aircraft than Billy Hempel. Even though it uses only a 1.2 four-cycle motor, it is absolutely spectacular! In fact, it is so beautiful and graceful, that watching Billy fly this J-3 is an amazingly emotional experience. He does slow rolls, point rolls, inverted flying, stall turns, knife-edge, and so forth - all in a narrow "box" and very low to the ground. Then he climbs and spins down with a 10 ft. pull out. His landings are beautiful - he typically slips in both directions prior to touching down. Our audiences love it!"

"Hot and fast has a place in air shows, but Billy has proven that low and slow has greater entertainment value."

Billy Hempel of Tucson, Arizona loves showing what a J-3 Cub can really do, performing spectacular low-level aerobatics before air show crowds.

NOVICE BUILDER JAMES MILLER WINS AT NORTHWEST MODEL EXPO WITH ASTRO-HOG

We call him a novice, but he builds like an expert! Fourteen year old James Miller of Tacoma, Washington recently entered his customized Sig Astro-Hog in the Northwest Model Expo in Puyallup, Washington. This is one of the four largest and most prestigious winter model shows in the U.S. (the others being Toledo, IMS, and WRAMS). Against competition that has had more years of experience in the hobby than he is old, James was able to win a trophy with his impressive model.

This is only the third R/C model young Miller has ever built, and it is every bit as slick as the photo implies. The workmanship is really outstanding! The beautiful high-gloss orange and yellow finish is clean and neatly done! To streamline the nose, James mounted his Saito .80 four-stroke engine inverted and extended the cowl fairing blocks smoothly into a highly polished aluminum spinner. Graceful wing root fillets were added with Sig Epoxolite Putty. The model is covered with Sig Koverall heat-shrinkable fabric, with a final finish of nitrate clear dope and epoxy paint.

Congratulations James, on a super job that any modeler would be proud to show and fly!

Fourteen year old James Miller of Tacoma, Washington with his prize-winning SIG Astro-Hog. Beautiful customized model shows outstanding workmanship and ingenuity.

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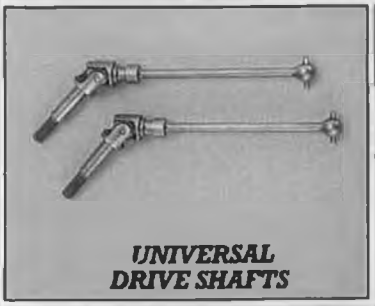
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from Bill Northrop's workbench

• The Tournament of Champions is alive and well . . . and coming back this year, November 10 through 13! Unless you have only come into the radio control model aircraft hobby in the last couple of years, this news should rekindle the excitement and anticipation generated by the most prestigious and richest event in the history of aeromodeling.

The T.O.C. was first held in 1974, put on by Bill Bennett, Chairman of the board of Circus Circus Enterprises, Inc., and the first R/C contest to offer very significant cash prises to the contestants, who were all invited to compete. The first four contests, in '74 through '77, were for aerobatic or pattern-type aircraft. Starting in 1978, the models had to be scale reproductions of full-size aircraft with known aerobatic capability, and the maneuvers were changed to the full-scale Aresti style; i.e., one continuous maneuver with a combination of rolls and loops that kept the aircraft "in the box" throughout the judged portion of the flight. With such top competitors performing maneuvers, the judging became a problem with the normal 10-point system, so the half-point scoring system was then inaugurated at the T.O.C.!

As most of the contestants in the T.O.C. are world class competitors, and the world championships take place every other year, it was then decided to stagger the T.O.C. with the World Champs so the eligible contestants could have enough time to prepare for the two different-styled competitions. Consequently, the next T.O.C.'s took place in 1980 and 1982, and in both of these, the scale requirement and Aresti style maneuvers were in effect, though now the rounds were divided into known, unknown, and free-style schedules, which really kept everyone on their toes.

The Eighth T.O.C. was the first to offer bonus points for the use of a biplane, which gave this writer, a longtime devotee of biplanes, a great deal of satisfaction. And a biplane did indeed win the event.

Speaking of winnings, the T.O.C. has awarded nearly $500,000 in prize money in the eight previous contests, and now, after a four-year break, is coming back with a $118,000 purse for the Ninth T.O.C! The biggest winner of all the T.O.C. contestants has been Hanno Prettner, of Austria, who took First Place every year but 1984! Hanno, now married and a proud father, will be a contestant again this year.

The 1988 contest is again invitational, limited to 20 contestants, 10 from the United States and 10 from other nations. Each competitor will be required to fly Known Compulsory, Free, Unknown Compulsory, and Three-Minute Free programs. A $3,500 cash prize will be awarded for the best model aircraft among those actually flown in at least three rounds of competition.

Contest Director will again be Phil Kraft, and Chief Judge will be Dr. Jim Edwards. As before, flying will take place at the R/C Model Airfield in North Las Vegas Regional Park, the construction of which was largely credited to Circus Circus. For reservations at Circus Circus for attendees, the rates will be $28 Sunday through Thursday and $38 Friday and Saturday, for one or two persons. Call toll-free from anywhere in the continental US, (800)634-3450, or dial direct (702)734-0410.

A view of the pit area at the 1984 Tournament of Champions, put on by Circus Circus and Bill Bennett, Chairman of the Board. Encouraged by bonus points, lots of biplanes were entered. The Ninth TOC will take place this coming November. See text.

LEE RENAUD MEMORIAL CONTEST

Sponsored by Airtronics, Inc., the first contest program in 1987 was restricted to Half-A Texaco. For 1988, the memorial contest is expanded to include model aircraft interest in any area; R/C, free flight, control line, soaring, Old Timer, helicopter, quarter scale, etc., still completely sponsored by Airtronics, Inc. To participate, take the following steps:

1. Announce your Lee Renaud Memorial Contest and date.
2. Complete entry form (available from Airtronics, Inc., 11 Autry, Irvine, CA 92718).
3. You will receive three Olympic Type necklace awards.
4. Register winner as shown on entry form. Winner will be eligible to win a complete Airtronics radio at the final sweepstakes drawing, to be held at the 1989 Toledo Show.

Contest Director is Joe Beshar, 198 Merritt Dr., Oradell, NJ 07649. Last year's winner was Bob Walter, of Sandusky, Ohio.

FLYING WING CONTEST

The 22nd Annual Northrop Flying Wing Contest will take place on Sunday, October 2, 1988, at Condor Field, Taft, California, from 8 a.m. to 1 p.m. For free flight models only, with Jr., Sr., and Open combined, the events are:

1. Rubber Power.
2. Glider (164 ft., towline).
3. Scale - any power (20 sec. official)
4. Gas-25 sec. engine run, or
   Electric-35 sec. motor run.

A combined event.

The Chief Contest Director is Carl Hatrak; Scale and Flight judge, Bill Stroman. Entry fee for each event is $3.00 (Sr., Open), $2.00 (Jr.). Proxy entries are encouraged. Send models to fliers of your choice, **NOT** to *Model Builder* or to the CD's. For any further information, contact Carl Hatrak, 3825 W. 144th St., Hawthorne, CA 90250. Contest was originated and sponsored by the Northrop Company Model Airplane Club, kept alive by the singular effort of Carl Hatrak, and now sponsored by Bill Northrop, publisher, *Model Builder* magazine.

B-36 REDUX

That's French for B-36 rerun; we inadvertantly left off the photo credit for the cover featuring Tony and Addie Naccarato and their electric B-36 Peacemaker last month. The photos, as well as several in the article, were taken by Glen Sunderland. The bomber

From Gordon Lauder, W9PVD, this is from a 1938 contest at Lindbergh Field, Maywood, Illinois, near Chicago. A one-year subscription to anyone (or the first) to identify plane and designer.

closeup was taken by Oscar Rauchmann. Thanks to all involved for a terrific presentation of an outstanding model achievement.

THAT SPACE SHIP!

The "Mystery Model" in Bob Stalick's April "Free Flight" column really stirred up the fond memories of many an *MB* reader, as evidenced by the avalanche of responses and the number of those who actually built one. From the interest generated, it is obvious that the "Martian Space Ship," as originally published in the April 1954 issue of *Air Trails* magazine, must be republished for the model building public. For a real scratch builder, a reproduction of the article and drawing might be enough, but we'd like to offer the full-size drawings for those with a little less building experience. R/Cers, don't start rubbing your palms together, the model has to be kept too light to adapt it for radio (There, that ought to be enough of a challenge to get some of our free flight-oriented R/Cers off their respective bu . . . , er, seats and start designing.)

As designer Roy Clough stated in a letters column a couple of years after the space ship was originally published, "The original space ship was the first true lifting body model ever built." He went on to say, "It used no downthrust . . . just a somewhat nose-heavy trim and 'up' elevator. It flew well with this arrangement, but subsequent experiments have shown it may be flown to advantage 'contest-wise'. . . that is, tail heavy, with considerable negative elevator (nose up) and a fair amount of downthrust. This results in a slower power-off descent . . . more of a 'mush' than a true glide." Roy offered further building hints which we'll include with the 'redo' of the article. Now the big question . . . Can someone lend us a copy of the full-size plans of the space ship so we can make a plans reproduction? We'll donate a free one-year subscription to the sender of the first useable set of plans.

INDUSTRY NOTE

Sig Manufacturing Co. has given us permission to reveal the fact that it has purchased all patent, manufacturing, and marketing rights to EASY HINGES from Lake Hobbies, of San Marcos, California. By the time you see this, the fact will already be known by attendees of the Toledo and IMS Atlanta shows. For those who aren't familiar with it, the real gimmick here is that the hinge material is chemically treated in such a way that installation is quick, simple, and very permanent. It is installed in slots cut in the wood to be hinged, assembled dry, and then cyanoacrylate 'thin' adhesive is 'wicked' in. The chemical treatment delays setup of the cyano so that it has time to 'wick' into the full depth of the hinge material and slot, therefore providing a 100 percent bonding that simply will not pull loose . . . no way! Let's face it. If for any reason you have to remove a hinged surface, you cut it away, and when ready to reinstall, cut new slots next to the old ones!

FEBRUARY COVER OMT

OMT . . . That's One More Time, and again, we'd hate to try to be a historian for any matter which we did not witness first hand! Remember Cox Hobbies' Bill Selzer saying in a letter to Bob Benjamin, which we published in the April '88 issue, that the racing circuit at the old Cleveland Air Races was such that the aircraft passed the grandstands off the left wing of the aircraft as it flew down the straightaway on a counter-clockwise course? Well, here comes a letter from George Washburn, of Butler, Texas.

George was at every air race held at Cleveland from 1929 through 1939, either as a spectator or as a racing crew member with Lee Williams and "Mr. Smoothie" in 1938, and again in 1939 on the "Brown B-2." George relates that, "On the first day of the 1929 races, I was sitting in the top of a

Continued on page 107

ADVICE FOR THE PROPWORN
—By Jake

• *Dear Jake:*

I am sending a joke for your consideration:

Q What time is it when an elephant sits on your airplane?

A Time to send the elephant to obedience school.

I have sent 313 "Dear Jake" jokes in previously and have not heard a single word from you. You should at least have the decency to send out rejection slips.

L. Lemming in Dallas

Dear L.:

Your 314 rejection slips are in the mail.

Jake

* * *

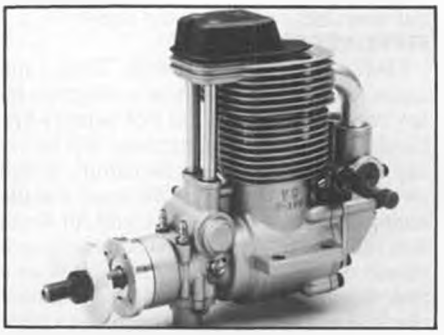
Dear Jake:

I have an opinion on aircraft design that I'd like to voice. Too many designers ignore or overlook the importance of wingtips. They just slap on a block of wood and round it off, or worse yet, opt for no wingtip

Continued on page 102

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 MB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by MB.



YS-Futaba 120 Four-Stroke.

Royal Products' .28 R/C engine.

O.S. Engines' CZ-A from Great Planes.

• This month we are buried under a pile of new products, so without further ado, let's get to the goodies!

First off we have several new airplane engines to tempt you with, including a new Enya 53-four-cycle that looks compact but is loaded with features and high performance. The 53-4/C produces 0.8 hp at 12,000 rpm, yet idles down smoothly to 2,500 rpm. The Enya GC 5.5mm carburetor is unbeatable for ease of operation; it comes with a spring-loaded choke system for quick starting in bad weather. With a steel cylinder and a ringed aluminum alloy piston, you can be sure that the 53-4/C will continue to churn out its power without missing a beat. The engine comes with a tool set, a muffler, and glow plug, which includes a safety glow plug cord set. This set consists of a clip-on terminal that attaches to the glow plug tip. A ground terminal, a socket for mounting to the fuselage, and a plug for use with your glow plug battery or starter panel are also included. The cord set eliminates the need to constantly attach and disconnect the glow plug cord to the top of the engine and keeps your fingers away from the arc of the propeller. See your Altech/Enya dealer for a closer look at the new 53-4 four-stroke engine.

* * *

Royal Products, 790 W. Tennessee Ave., Denver, Colorado 80223, is offering a new .28 R/C engine with Schnuerle porting, twin ball bearings, full fuel metered carburetion, massive one-piece precision balanced crankshaft, and comes complete with muffler. For more information on this new two-stroke engine, write to Royal Products, and be sure to tell them you read about it in *Model Builder.*

* * *

Polk's Model Craft Hobbies has been working on a new .40 and .45 engine, and they are finally ready. These gas engines are loaded with everything that could possibly be designed into it. The large carburetor has two adjustments, ball bearings, AAC, FSR, muffler, and a satin-smooth diecast finish. The new Aristo-Craft/Polk's engines are available at your local hobby shop, or for more information, write to Polk's, 346 Bergen Ave., Jersey City, New Jersey 07304.

* * *

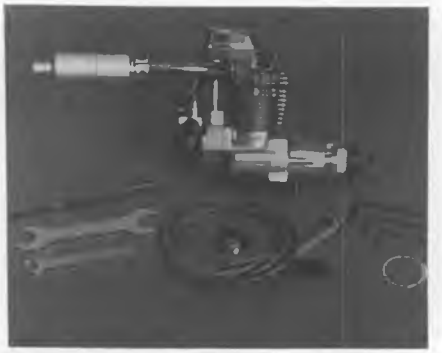
From O.S. comes the CZ-A, their latest addition to the line of .10 to .15 engines. The CZ-A is designed to give outstanding performance and yet be simple enough for a beginner to operate successfully. The O.S. CZ-A features Schnuerle porting, ABC construction, a ball bearing-supported crankshaft, and an expansion chamber muffler. It also features a specially designed carb that takes the guesswork out of engine adjustment. This carb can't be run too lean. This adds up to an engine that gives extraordinary power for its size, and yet is very easy to operate. The CZ-A is distributed to leading hobby shops nationwide by Great Planes Model Distributors.

* * *

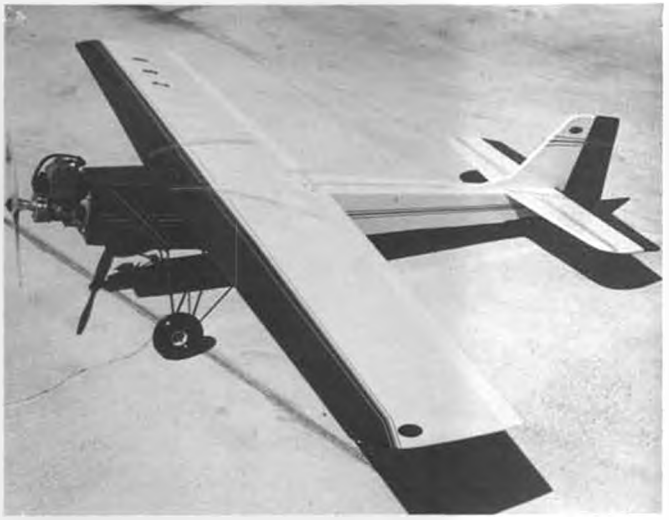
For you ducted-fanatics, K&B Manufacturing joined with Violett Models to produce an engine to power the Viojett Fan System. The result was the KBV .72. This engine features a long front end, one-piece case design for rigidity and special metals in the moving parts for longevity. The exhaust header has a built-in adjustment for pipe length and double O-ring grooves. The special tuned pipe is retained and sealed by the Viton O-rings. The carb is unique design with no metal-to-metal stops that can wear and eventually jam the barrel. The throttle arm is an integral part of the carbu-

Polk's Model Craft Hobbies' .40 engine.

KBV .72 for ducted-fan models.



Altech/Enya 53 Four-Stroke.



Bridi Aircraft's Big Bee Q-scale Trainer.

Kyosho Melody sailplane from Great Planes.

retor barrel to prevent it from failing due to vibration. A single adjustment screw allows fine tuning of the mid and low range. The new .72 fan engine is available from Violett Models at 1373 Citrus Rd., Winter Springs, Florida 32708.

* * *

Now that we've dispensed with the engines, let's look at some planes! Joe Bridi has a new model, the Big Bee, that is a quarter-scale size trainer with excellent flight characteristics and ground handling. The Big Bee can be flown with 120 two-cycle or larger engines, or twin cylinders, or smaller gas engines. The Big Bee can handle all AMA and FAI maneuvers. It's easy to assemble, and the kit comes with all machined parts, landing gear, and C-B tail wheel assembly. The wing span is 96 inches, with an area of 1630 square inches. The approximate weight without an engine is 11 pounds, and requires a four-channel radio system. See your dealer for a look at this good-flying model.

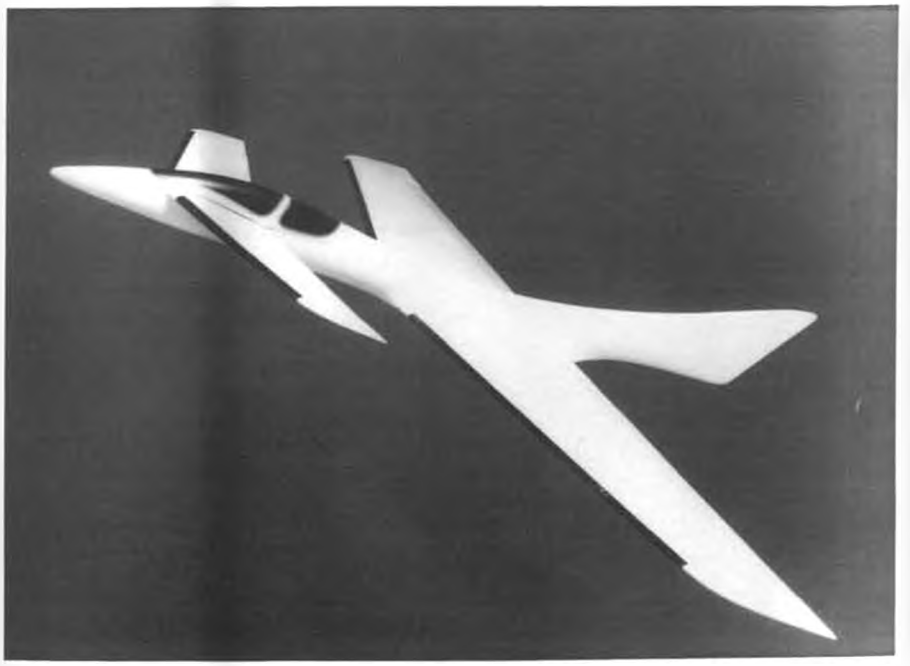
* * *

This model doesn't need anything more than nature's air to keep it aloft, and its canard configuration guarantees superior performance. The Telos from Jarel Aircraft Design and Engineering is fast, maneuverable, and capable of rapid roll rates, inverted flight, even outside loops. Yet the Telos is also the only R/C sailplane you'd ever attempt sustained level flight while using full aft stick. The main wing span is 51 inches, and the canard span is 26 inches. A two-channel radio is required, with the total weight being 27 ounces. Average wing loading is 9.4 ounces per square foot. The Telos is handcrafted using the latest composite aircraft technology, such as S-2 glass, Kevlar, carbon graphite fibers, West epoxy, and high-density blue foam wing cores. Look for the Telos at your nearest hobby dealer.

* * *

If this model looks familiar, it may be because it's on the cover this month! This is Williams Bros.' plastic display model of the Gee Bee R-1, in 1/32 scale. The kit also contains the materials to build the slightly different Gee Bee R-2 if you desire. You can find this and many other unique display scale models at your Williams Bros. hobby shop.

Williams Bros.' 1/32-scale Gee Bee R-1.



Jarel Aircraft Design's Telos sailplane.

* * *

GM Precision Products, 510 E. Arrow Highway, San Dimas, California 91773, has an intriguing model for 1988 that's worth a look. Dubbed the Thermal Charger, it's a direct drive electric sailplane designed as an

GM Precision's Thermal Charger electric plane.

Carl Goldberg Models' Vector R/C trainer.

entry-level electric sport plane. It uses a Leisure .05 electric motor that's supplied with the kit, and has a 60-inch wingspan. The ready-to-fly weight is about 39 ounces, with a seven-cell 800 mAh pack. The Thermal Charger is said to be a very easy to fly and build model. Flight time is 10 to 12 minutes in dead air, with a 4-minute motor run. The kit includes a switch harness with micro on/off switch and arming switch, the .05 motor, and a propeller. Look for it at your dealer, or write for more information.

* * *

Carl Goldberg Models has introduced another in their series of R/C trainer-style kits, the Vector. It's a .40-size, high-wing trainer, very similar to their popular Eagle 63. With a flat bottom airfoil, tricycle landing gear, and 630 square inches of wing area, the Vector is perfect for the neophyte flier. The Vector comes almost completely assembled in the box. The fuselage is built totally of balsa and plywood, ready to accept any finish. The 59-inch wing is foam core with a sheet balsa covering that requires little assembly. There are only 17 parts in the whole kit, but they're all top quality. You get full-size plans to make assembly a snap. And another plus is that the modeler can finish the Vector anyway he wants; any color, any finish. Look for it at leading hobby shops everywhere.

* * *

The Kyosho Melody sailplane comes with a blow-molded fuselage and OHS composite wings, making it easy to build and fly. The 59-inch wingspan makes the Melody a perfect ship for slope and thermal flying. Its T-tail design gets it out of the wing's turbulence, making the glider easy to control. The Melody comes complete with a rubber hi-start for launching. The only thing you have to add is a two-channel radio. Look for the Melody at Kyosho dealers everywhere.

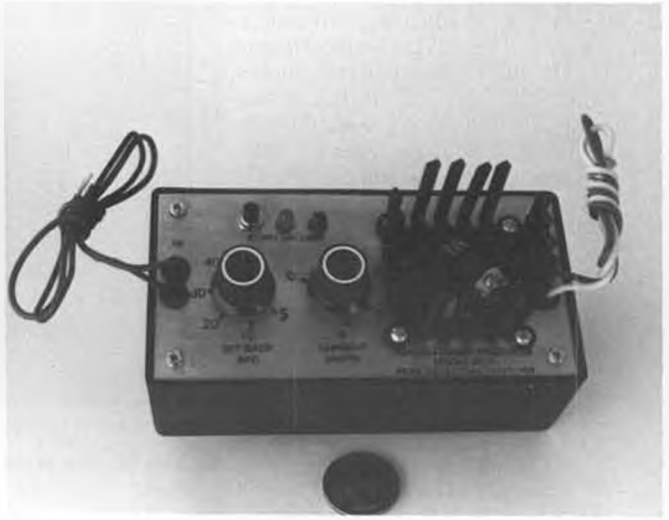
How-to video from Circus Hobbies.

* * *

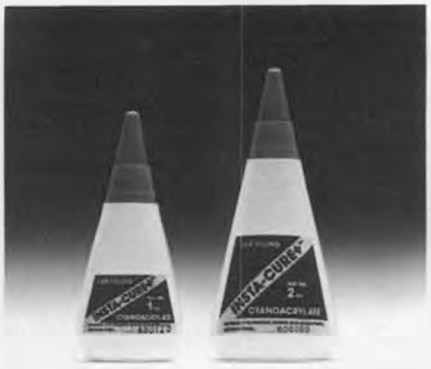
For novice or would-be chopper pilots, this new video from Circus Hobbies is just the thing to introduce you to the building and flying of model helicopters. National AMA Helicopter Champ Mike Mas did an excellent job in preparing this tape for beginner and expert alike. The tape is full of valuable information on constructing the Kalt Baron 20, 50, 60, and Cyclone, and takes you right through setup, installation, trimming, and preflight procedures. Also covered are heli radio systems, functions, gyros, and field support equipment. With the help of this tape, you'll become a better

R/C Video's Byron extravaganza.

Robart's new Electronic Speed Control.



Benson Hobbies' Peak Detecting Charger.



Insta-Cure cyano from Bob Smith Industries.

flier faster, with less trial and error. The video is available in VHS format directly from Circus Hobbies for $49.95. To order your copy, call toll free: (800)782-0022.

* * *

Still in video mode, R/C Video Magazine is offering a new special edition called *Striking Back*, an action-packed tape of Byron Originals' amazing WWII reenactment. This 30-minute tape was created by a combination of 16mm and video, with film cameras placed close to the set and controlled by remote control to capture the pyrotechnics and excitement of an actual attack and counterattack, in miniature. Nearly 400 hours of editing went into the production of this exciting video, and it can be yours, direct from R/C Video, Box 98, Lafayette, Colorado 80026.

* * *

A Peak Detecting Charger from Benson Hobby Products, 7119 N. Chimney Rock Place, Tucson, Arizona 85718, will allow you to peak charge your battery packs without fear of overcharging. The charger cuts off when it reaches a preset number of millivolts, which is adjustable from 10 to 50 mv. The unit will charge 4- to 7-cell packs from a 12V DC input, either battery or rectified AC. More cells can be charged by using a voltage booster. Each unit comes with a 10-day money back guarantee and a 6-month repair warranty. Order directly from Benson Hobby Products.

SpaceCase transmitter module kits.

Hannan's latest!

How to Build Control Line Models book.

SpaceCase by Matrix has a new easier-operating, positive-action latch that is standard on all of the transmitter and expander

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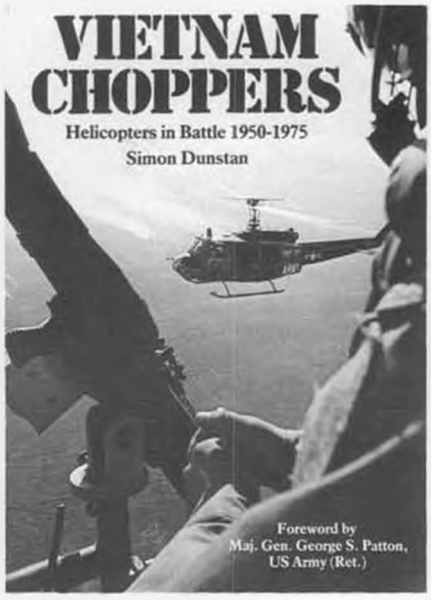

Vietnam Choppers from Zenith Aviation.

Airbus book from Zenith.

Flying Dragons, SVAF history, Zenith Aviation.

SUKHOI SU-26

By RICHARD SCHNEIDER. . .Here's an interesting profile control line model that has taken two firsts in competition. Designed for .35 power.

• The SU-26 is a Russian aerobatic airplane, one they have been using the last several years with some degree of success in competition. It uses a radial engine of about 360 horsepower, has a wingspan of about 25 feet, and I understand it uses some composite (foam and plywood) as well as more conventional construction techniques. And, as is true of most full-scale aerobatic airplanes, it looks like a big model.

Above: author used a Fox .35; he says if you build heavier, consider a .40-size engine. At right, author with his Sukhoi profile control liner.

Any airplane that looks like a model, and especially one that has a neat color scheme, should be made into a model. Anyway, I thought so, and since my main interest is in control line scale, why not build a stunt lookalike of the SU-26? If you don't follow that line of reasoning, let me explain: Over the last great number of years I've had the privilege of being friends with Tom Dixon, who is somewhat famous in control

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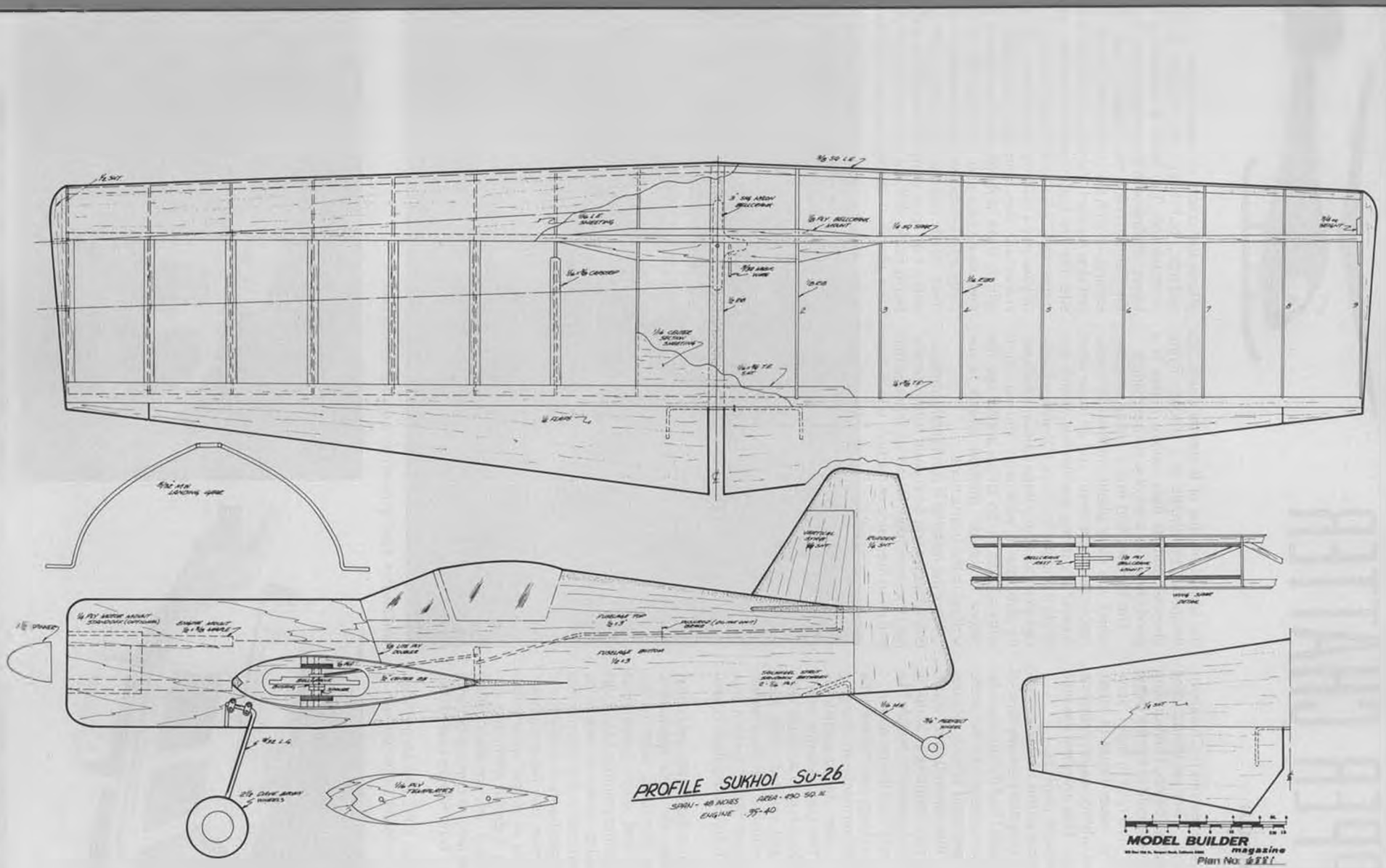
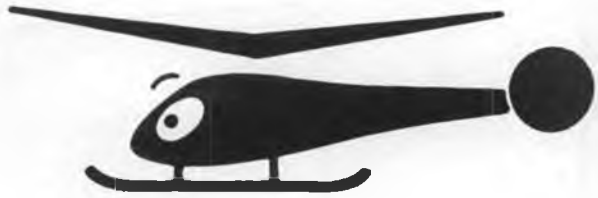

PROFILE SUKHOI SU-26
SPAN - 48 INCHES AREA - 490 SQ. IN.
ENGINE .35-40
MODEL BUILDER magazine
Plan No. 8811

CHOPPER CHATTER



BY DICK GROSSMAN

• There are only two seasons in Chicago as far as I'm concerned. They are the *building* season and the *flying* season. The building season is when it's too cold to fly; the flying season is when it's too nice to build. Summer, winter, spring; never heard of them. Right now it's the building season (temperature 5 below zero). That gives me the time to finish some overdue projects.

Don't let the name of this magazine mislead you into thinking that I am any kind of *model builder.* I wish I had the time and talent to create scale masterpieces like some of those I have seen (and whose pictures have appeared in this column). But I don't, and to be honest, even painting a canopy is a big project for me. Apparently, people like me are more the rule than the exception.

The helicopter industry has followed the lead of the airplane companies in changing their emphasis to the almost-ready-to-fly scale helicopter. The best example is the Hirobo Shuttle, which is now available with completly built and painted scale fuselages. Currently available are the Hughes (McDonnel Douglas) 500 E (photo), the Bell Jet Ranger, and the Aerospatiale Ecureil (A-Star).

Schluter and Heim both have gel-coated fiberglass fuselages for their mechanics. The gel coating eliminates most of the sanding, filling, and other preparation usually required before painting. Decal sets are available which make it simple to achieve a very intricate color scheme that otherwise would take hours of masking and airbrushing. My Heim Star Ranger (photo) has a couple coats of yellow spray paint. Everything else is a decal! Miniature Aircraft USA has decal sets for their X-Cell chopper, and they are just coming out with a gel-coated glass Long Ranger fuse for the X-Cell mechanics.

The lexan Hughes 500C fuse for the Shuttle made by Rotary Wing Concepts was at the top of my list of things to finish. It's finished. The Shuttle is a smooth flying chopper and its light weight makes it a good choice as a set of scale mechanics.

The Hughes 500 fuse is made of lexan, which is a clear plastic material like polycarbonate, polystyrene, and all those other "polys." It's strong and flexible, which has made it popular for those 1/10-scale electric cars that can take a huge amount of abuse. It's also easy to work with. You can cut it with scissors or tin snips, and/or use the "score or break" method which is described in the instructions.

Since the material is completely transparent, whatever you don't paint automatically becomes a window. It is recommended that you paint the *inside* of the fuse, which then allows the colors to show through to the outside, but keeps them from being scratched off. The body is masked off in layers, starting with the windows first, then the lightest color, next lightest color, etc. ending up with the darkest color being the last one masked. Painting is just the opposite: The last layer masked is the first layer unmasked. This should be the darkest color of your paint scheme. Successively lighter colors are then unmasked and painted, which show through the clear plastic in their true color and cover over the previously applied darker colors, making them more nearly opaque. You can even brush rather than spray using this method, and the brush marks will not show up through the clear plastic. (I like this method, and have

RWC Hughes 500C with standard Shuttle landing gear.

Author's Heim Star Ranger with decal set.

Hirobo 500E fuse for Shuttle as it comes from the factory.

Front view of author's RWC Hughes 500D shows tinted windshield.

Modified tail and new landing gear change chopper to realistic 500D.

Mounting posts for fuse and landing gear extension.

Front canopy latch converts to top mounting post.

Tech Specialties' aluminum see-saw arms.

started using it for all my clear canopies. The disadvantage is that you can't fully assemble the canopy before you paint it.) The very last area unmasked is the clear windshield, which I sprayed with a couple coats of Testor's Transparent Blue, followed by a coat of fuelproof lacquer.

A few alterations need to be made to the Shuttle mechanics and the necessary parts are included with the RCW kit. The landing gear position is lowered with aluminum posts to conform to the fuselage bottom. The original vertical and horizontal stabs are removed, and a little surgery has to be performed on the battery platform to angle the front corners.

The fuse comes in four pieces—two for the main portion of the shell, (the "egg") and two halves of the tail boom. The halves are held together with little sheet metal screws, and the whole thing is supported on three mounting posts and the original Shuttle tail-boom. This foundation is very solid and secure for the shell, while still giving it a prayer of surviving a crash.

The tail assembly is another story. Provided in the kit is the material to construct the old "C" style tail. It wasn't really easy to construct and didn't fit the tail housing very well, either. I opted to make a T-tail instead, using 1/16-inch ply for the horizontal fin, and 3/32-inch for the vertical portion. Three holes were drilled so it would fit exactly like the original Shuttle plastic vertical fin. The T-tail has been used on the full-size Hughes 500 chopper since the designation was changed from "C" to "D" (and now "E"). The change was made primarily to improve the looks of the chopper, while aerodynamically there wasn't much effect. It took me about 15 minutes to build the whole thing, and it actually came out lighter than the "C" tail. This is what they should have done in the original kit.

My next departure was in replacing the stock Shuttle landing gear assembly with a set of GMP Cobra struts and skids. I even canted them forward like the ones on the full-scale machine. This makes a big difference in creating a realistic-looking scale chopper. Removing the tail housing and painting it was the last step that needed to be done. I cut out one side window to provide access to the radio and gyro switches and the connection to fill the fuel tank. This would normally also be the window to pull

Continued on page 70

Cliff Hiatt accepts first place trophy at Tangerine Meet.

The Autogiro

By BILL YOUNG. . .In this installment of the author's continuing experiments with autogiro models, we get closer to its first flight with information on rotor adjustments and other fine points of construction.

• In my article "All About Autogiros" published in the April 1987 issue of *Model Builder*, I outlined the aerodynamics of full-sized autogiros and the application of that information to radio-controlled scale model autogiros. In this article I will expand on the definition and application of autorotation, including some experiments you can carry out. I will give a few corrections to the previous article, as well as the results of the first flight tests of the model. Finally, I have included the drawings for the rotor head and rotor for the 1/8-scale PCA-2 Autogiro.

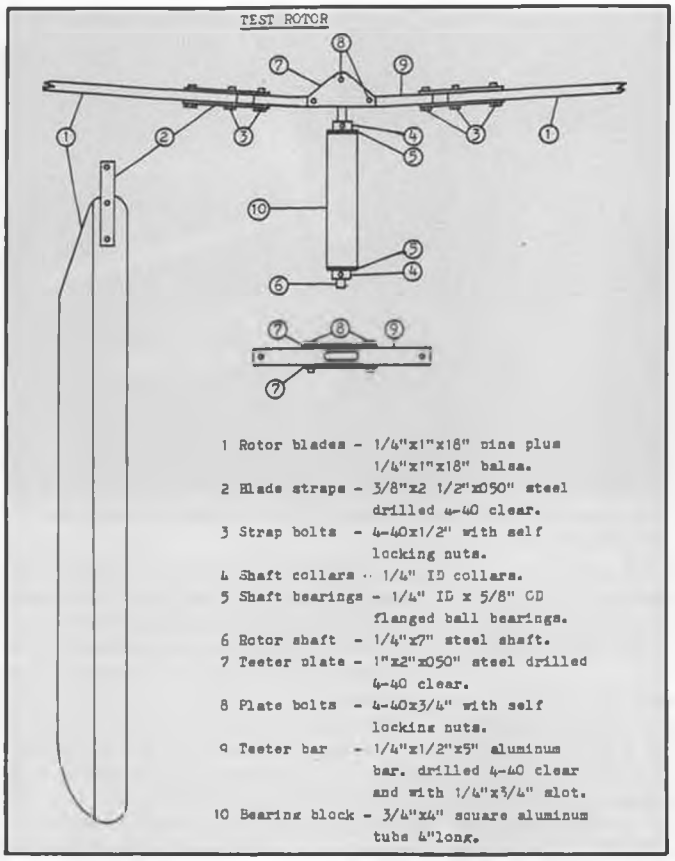
My previous article touched on the theory of autorotation. However, my true understanding only came about when I repeated a series of experiments carried out in England by the Aeronautical Research Committee of His Majesty's Air Ministry and reported in Report and Memorandum number 1154. In that work they tested three-, six-, and ten-foot diameter rotors. My results were in agreement with the tests outlined in R & M 1154. I am sure you will be as surprised as I was the first time your test rotor goes into true autorotation. I had read the results, and they did not prepare me for the actual experience.

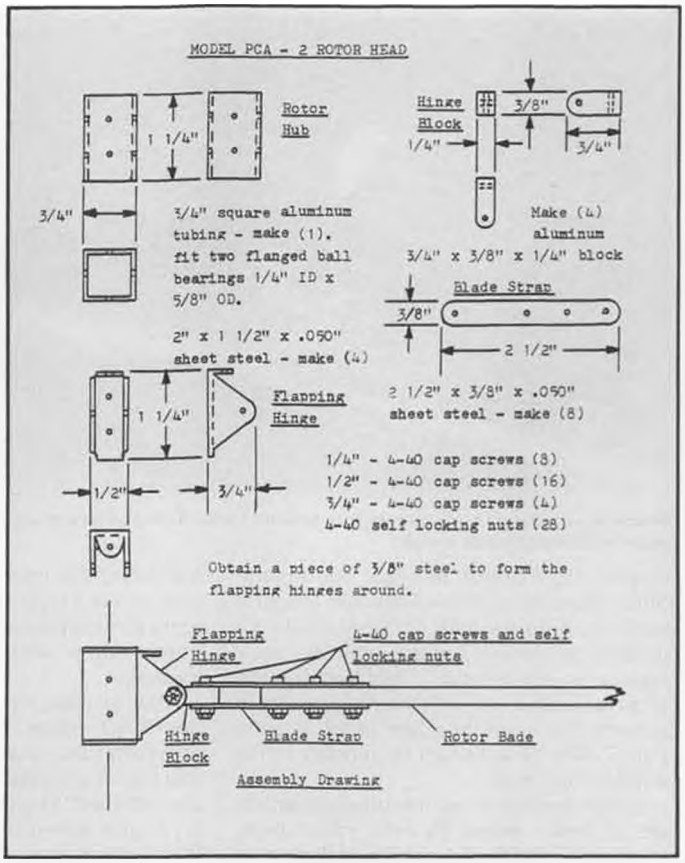
R & M 1154 noted that as the rotor diameter decreased, the blade pitch angle at which autorotation could be maintained also decreased, thus:

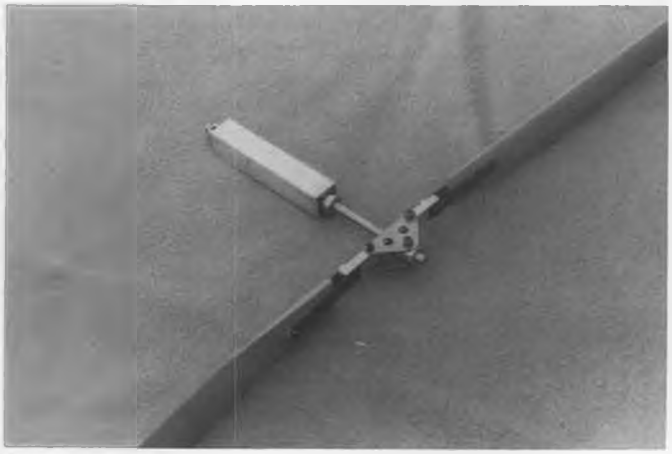
Three-foot diameter maximum rotor blade pitch angle +two degrees.

Six-foot diameter maximum rotor blade

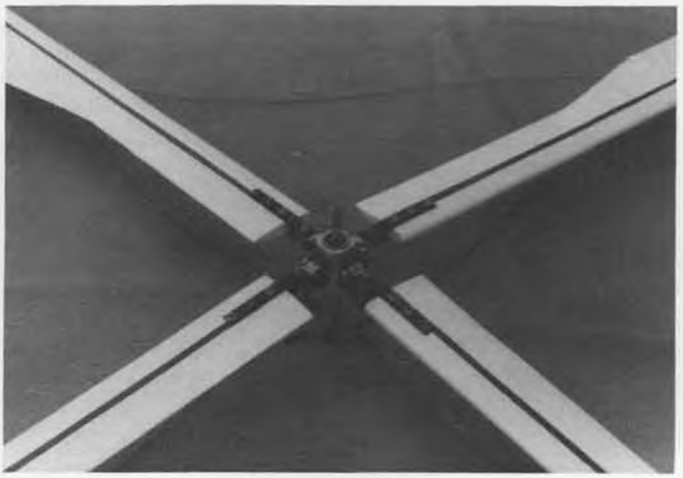
Fine scale detail on author's autogiro reflects his patient hand; all lettering and numbering is handpainted. When it comes to flight testing, the author's patience was really put to the test! A lot of critical adjustments to the rotors, cables, and center of gravity are most important.







Hand-held test rotor: set blade pitch by bending blade attachment straps.



Bottom of rotor. Note ball bearings and set screw flat on shaft.

pitch angle +three degrees.

Ten-foot diameter maximum rotor blade pitch angle +five degrees.

Additionally, as the blade angle was increased, the required initial rotational speed also increased. Thus, with the three-foot diameter rotor, the initial rpm equaled the operational rpm at +two degrees.

The test rotor shown in the drawing and photographs can be constructed using hand tools. Refer to any of the model helicopter books for information on how to balance and track the rotor blades. I also recommend the addition of a two-inch diameter knob on the bottom end of the rotor shaft to facilitate prespinning the rotor.

Now, if the wind will cooperate or you have a friend who will drive, carry out the following experiments at an air speed of 20 mph. In all cases, start by holding the rotor tilted back about 10 degrees and hold the bearing block in your hand.

1. Blade pitch angle −2 degrees: Rotor will self-start from a stand still, in the correct direction. It will build up to a moderate rpm. You will feel a lot of drag and not much lift. The rotor will not maintain its rpm when you flatten the tilt back angle. This is windmilling.

2. Blade pitch angle 0 degrees: Rotor self-starting will be ambiguous. Prespinning in the correct direction will ensure that the rotor goes that way. Shortly after you start it in the correct direction it will take off and accelerate to a high rpm. You will notice an increase in lift and a decrease in drag. You will also be able to flatten the tilt back to three degrees, and the rpm will increase slightly. This is autorotation.

3. Blade pitch angle +2 degrees: Now you will have to prespin the rotor or it will self-start backwards. You will also notice that you will need more initial rpm before the rotor will accelerate to its autorotational rpm. If the initial rpm is too low, the rotor will begin to slow down. Again, you will notice an increase in lift and a decrease in drag. In fact, the rotor will now begin to feel buoyant.

4. Blade pitch angle +4 degrees: Now you will probably not be able to prespin the rotor to a high enough initial rpm in order for it to accelerate to the autorotational rpm.

From the above you can deduce several things. The higher the blade pitch angle up to the angle where the rotor will no longer autorotate, the larger will be the lift and the lower will be the drag. Also at each blade pitch angle there is a critical initial rpm below which the rotor will not accelerate into the autorotational state.

While on the subject of model tests, I

Model during latest tests, just before ground loop. Note flatter coning angle with more blade weight.

Continued test with heavier blades with reflex. Note forward blade is still rising too far up.

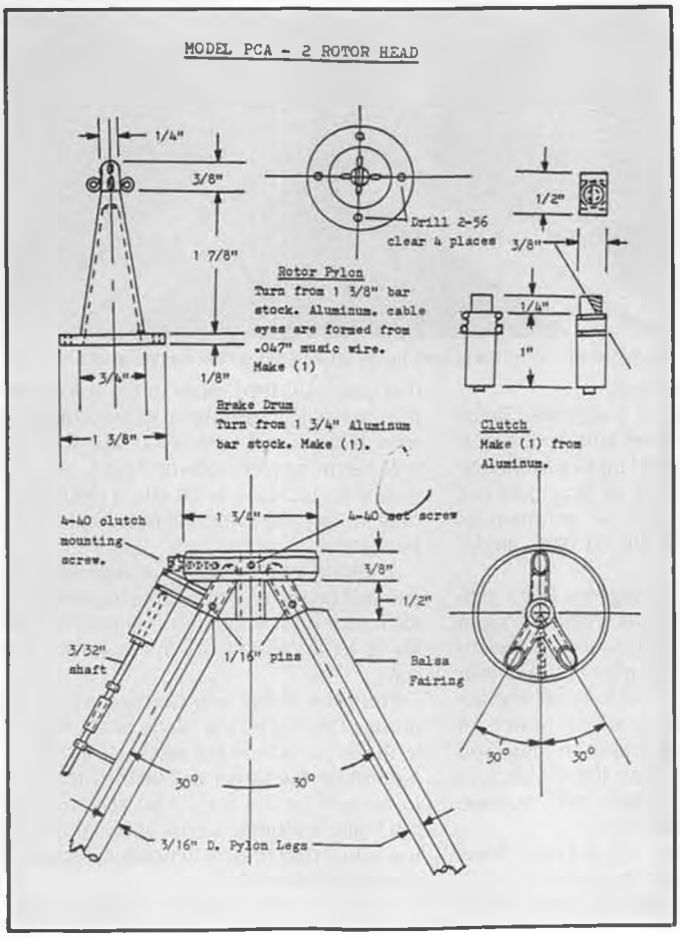
should also mention that Igor Bensen and other researchers in the full-sized autogiro world have in the past successfully flown models by remote control with the rotor system in autorotation. Additionally, the glide ratio achieved with the rotor system in autorotation is on the order of 5:1 as compared with 1:1 achieved by models in the windmilling state.

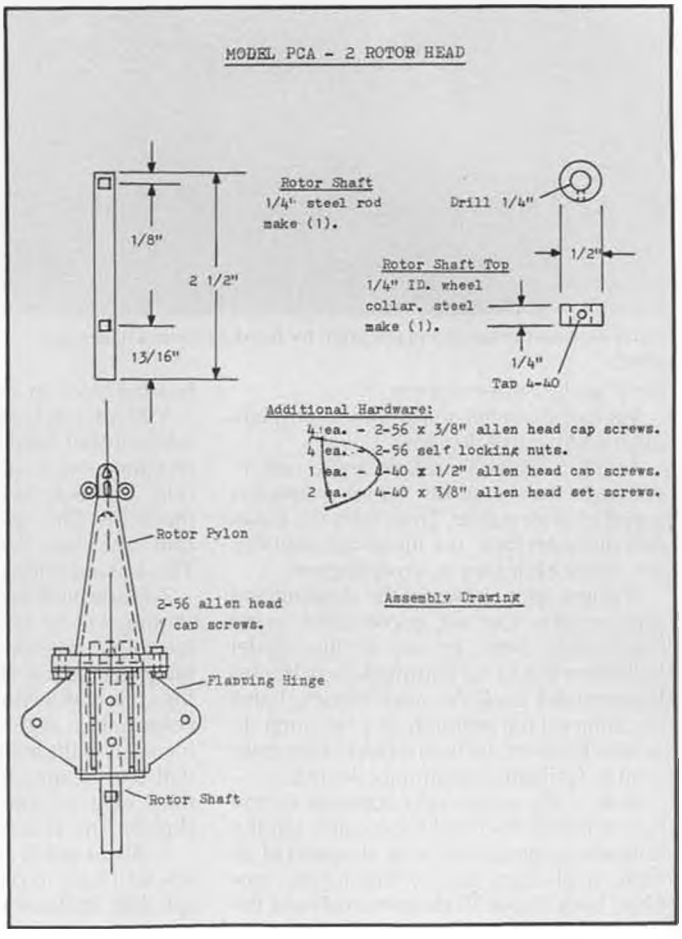
Some corrections to the previous article are in order owing to new information, these tests, and the beginning of flight tests on the model PCA-2. The blade pitch angle referred to in old engineering data on autogiros was measured from the plane of rotation of the rotor and not from the airfoils zero lift angle as previously stated. And all autorotational rotor systems will not self-start in the correct direction. They all require some amount and form of prerotation before they will accelerate into autorotation.

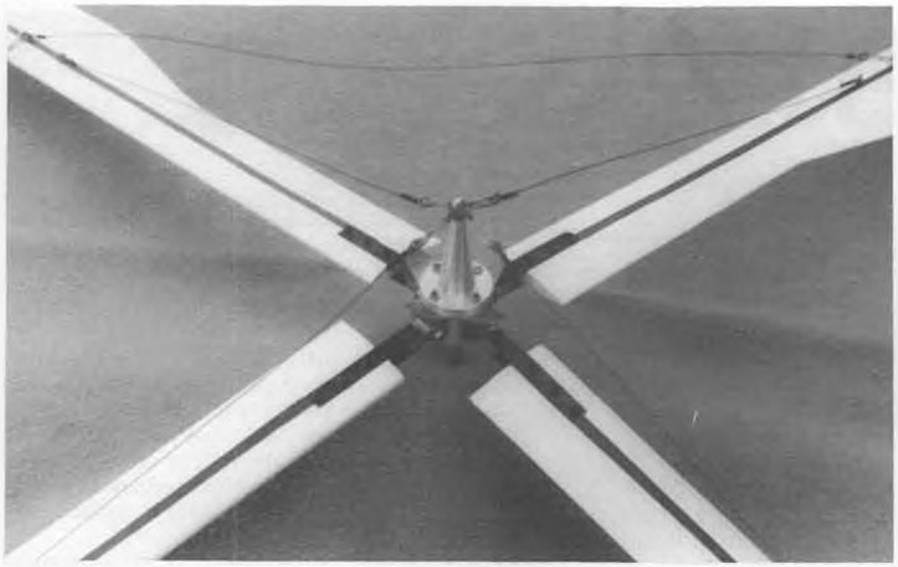
Now to what has happened so far with the PCA-2 model. The rotor was mounted on a pylon and spun with a starter motor so that tracking the balance could be checked and adjusted. Then the rotor was placed on a car and driven to 20 mph and initiated into autorotation. The blade pitch angle was +2 degrees. The rotor easily accelerated to 700 rpm and autorotated smoothly all the way down to 15 mph.

So far all flight tests have failed due to some or all of the following which have required adjustments and/or changes: broken droop and drag cables, ground looping, center of gravity adjustments, addition of a steerable tail wheel in place of the skid, insufficient blade weight, and broken cable anchors.

At this point in the development of a scale model autogiro operating in true autorotation, I have information that says if I can complete the transition from tail up taxiing to being airborne, the system will work. The information comes from the above tests and from Steve Pfister, who accomplished airborne operation of a 1/6-scale PCA-2 around December of 1985 before blade divergence caused a crash. The blade airfoil was the Clark Y, and the rotor blades







Top of model PCA-2 rotor. You can see the nice machine work well here.

had not been balanced about the 25-percent chord line. Steve's rotor blade pitch angle was −2 degrees and thus was operating in the windmilling state. What my model does now is to act as if someone put on the brakes and nose over, just when it seems to be ready to fly. That is, the tail is up, and the rotor blades have just coned.

I have included with this article the drawings for the 1/8-scale PCA-2 rotor head and rotor blades (They'll be offered in plan form with the rest of the autogiro when *Model Builder* publishes the third and final installment). While it is possible to fabricate most of it with hand tools, there are two items that are best turned in a lathe. Those are the top pylon cone and the simulated rotor brake housing which joins the top of the pylon legs. They could be made with the use of a drill press and much hand work as a minimum.

These parts are the most difficult part of the project to fabricate. With my including it here, you can start construction with the hard parts first or find someone who can fabricate it for you. This basic rotor hub and rotor blade design was used by a number of Pitcairn, Kellet, and Buhl Autogiros. In addition, some Cierva types could use it and still be close to scale.

The material in both the previous article and this one are condensed from a book I have written about my research into the characteristics of the autogiro. Much of this work was done in the Gugenheim Aeronautical Library at California Polytechnical University at Pasadena. I want to express my thanks to the Librarian, Ms. Jean Anderson, for her gracious help and to Dr. Fred Culick for inviting me to present my findings to the graduate faculty and students at the University. My next article on autogiros will include the model plans.

If you would like to purchase a copy of my book *Radio Control Model Autogiros* or if you have any comments, suggestions, or questions concerning this material, please feel free to contact me at the following address: Bill Young, 8106 Teesdale Ave., N. Hollywood, California 91605.

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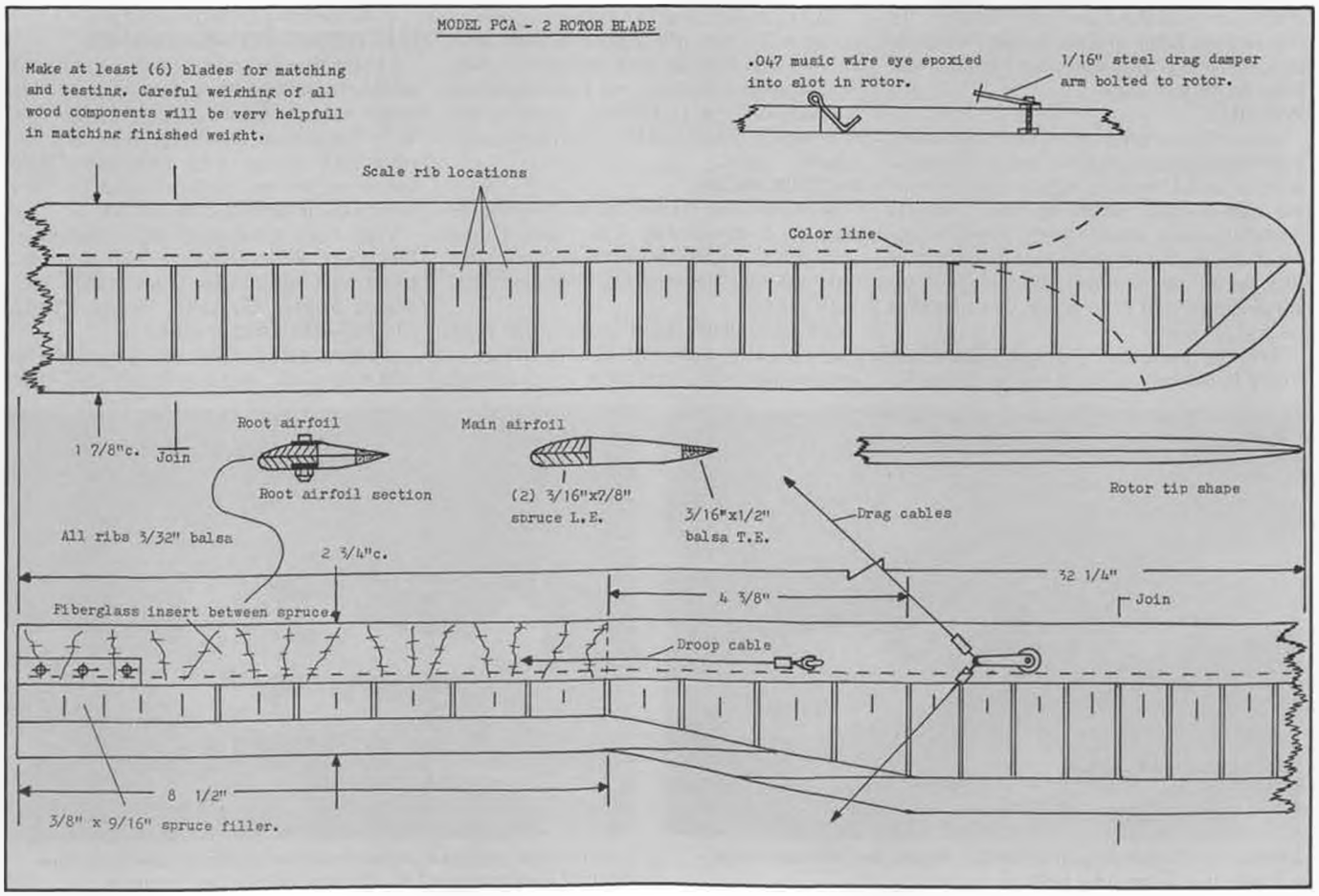
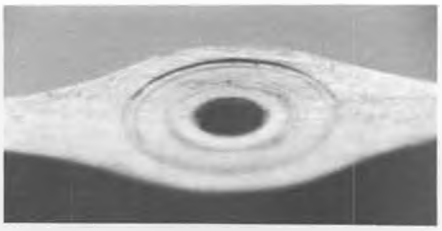


BIG BIRDS

By AL ALMAN



Here's what your prop hub looks like if you leave it on your engine for any length of time. The permanently compressed wood makes it difficult to properly secure the prop to the shaft.

• Even though the BIG Super Tigres are already powerful, easy-starting, and well-behaved, there is a way to enhance their overall performance on glow.

Just replace the standard Tigre carburetor with an O.S. 7D carb (used on O.S. 60, 90, and 1.08 two-stroke engines, but do remember to take out the insert) and whatever plug you've been using with a Fox four-cycle Miracle Plug. You'll end up with a lower and more reliable idle, a smoother transition, and a lot more rpm on the top end.

And don't slug these Tigres down with too much oil. I've found that the same 7-1/2-percent nitro, 10-percent oil fuel that's ideal for four-strokers is also great for the Tigres. This mix is easy to come by; just mix a gallon of standard 15-percent with a gallon of methanol, and voila!

And while on the subject of engines, don't overlook the O.S. 1.08 "Boxcar." It's one helluva brute and well-suited for birds up to 14 to 15 pounds because it can handle large props with ease.

WD-40

Like so many other guys, I've been using WD-40 for years to protect and lubricate all sorts of metal. Indeed, right on the front of the can it says, "Stops Squeaks, Protects Metal, Loosens Rusted Parts, Frees Sticky Mechanisms." And I hear that it also works okay as an after-run oil, although my personal preference is an equal mix of motor oil and kerosene.

Anyhoo, back last October I somehow forgot to after-run oil and bag my Saito 45, so the poor engine sat untreated and unwrapped for almost five months. And, as you might guess, she got rusty, especially the bearings, which made for one hard-to-start, lousy-running, and undependable engine when I tried to go flying about a week ago.

In desperation I saturated the engine with WD-40—through the breather, through the plug hole, down the carb, and down the stack—and turned her over a number of times to make sure the oil got into and over everything.

Two days later I fired her up again, and after blowing out all sorts of gunk and junk, the Saito settled down to running at least as good as she did when new. There's no need to take her apart now, but if I did I'm sure that a close inspection would reveal an engine devoid of rust.

So if rusty/skipping bearings are screwing up your life, try filling your engine with WD-40 and then let it sit for a day or two. This treatment seems to work wonders and is a lot easier than completely stripping that four-stroker down and then having to put it together again.

BATTERY PACKS

Because I like to keep things as simple as possible I standardize: I use only Deans connectors on all my radios and only two types of flight batteries, 800 mAh and 1200 mAh packs.

I'm particularly fond of the 800 mAh packs because there's no penalty in size or weight over 500 mAh packs even though the 800s deliver almost twice the on-time.

A few paragraphs ago I mentioned about the Saito 45 sitting for almost five months without care. Well, that plane's 800 mAh pack also sat idle for the same period of time, so when I finally got around to cycling it, I expected the Digipace to record a very short discharge time.

But it didn't! Instead the digital readout indicated that in spite of the many months since its last charge, this pack had retained over half of its capacity. What a revelation!

I'll be the first to admit that this was far from being any sort of controlled scientific test, but the message is loud and clear: we consistently overcharge our batteries, and by doing so we shorten half their life and promote premature failure.

This means that you could fully charge on a Sunday night and fly the following Saturday with no sweat because only a negligible amount of juice would have been lost during those six days. Yet, typically, most of us will sock another ten-hour (or more) charge into our battery packs if we don't use them within a few days.

It's something to think about. . . .

ELECTRONIC RETARD/ADVANCE

I know that for several years a number of people have been trying to perfect an electronic retard/advance circuit to be used with Capacitive Discharge Ignitions, but none have proven to be 100-percent reliable, so we've been stuck with the mechanical coupling and its inherent slop.

Well, I just got through bench-testing an Electronic Retard/Advance unit manufactured by GKD Products, Inc. (3705 Innsbruck Drive, Garland, Texas 75042; 214/495-4145). And it works!

It's just about the size and weight of a flat 500 mAh pack, and it evidently uses state-

Al Doerr's 127-inch version of the Ace 4-120. An OPS Maxi Twin will haul this 35-pounder aloft.

Fritz Bruning, who in his spare time is an Al Alman lookalike, trundles his Quadra-powered PA-18 to an appropriate flying site.

of-the-art low current drain devices because it'll operate on 4.8 to 10 vdc with only a mere 5 mA current drain.

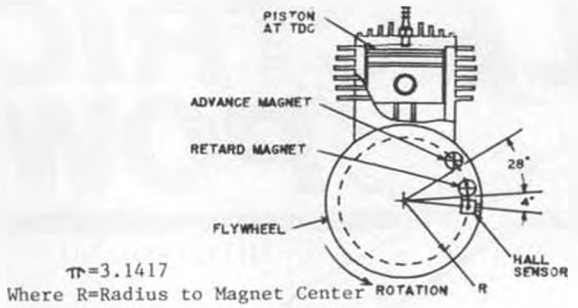
You just plug this heat-shrink wrapped E R/A in between your presently installed ignition and Hall Effect Sensor (it comes with Deans Plugs so it's compatible), and then add another magnet (included) to your flywheel. This installation is simple, and the instructions also include the formula for calculating magnet spacing since the original magnet handles the retard part of the operation and the new magnet takes care of the advance.

Of course, you must remove the mechanical advance coupling and lock the wheel that contains the sensor in place (silicone seems to work just fine). The engine will always start in the retard mode and is factory-set to advance when the engine reaches 3000 plus or minus 10-percent. Conversely, when rpm drops below this 3000 mark, timing will be retarded.

George Paris, the honcho at GKD, told me that a number of guys have simply siliconed their units right to the firewall, although I much prefer to wrap it in foam.

Take a good look at the sketches, and you'll see how simple this installation really is. You might want to update your CD Ignition system with this new Electronic Retard/Advance module.

Figure 1

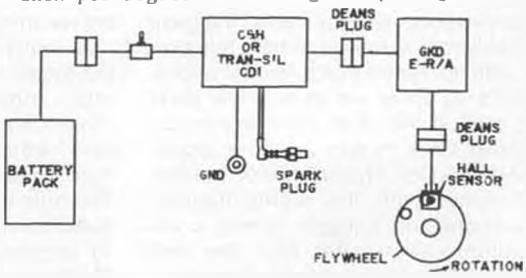


π=3.1417
Where R=Radius to Magnet Center

$\frac{2\pi R}{360^\circ}$ = inch per degree

Inch per Degree x 28° = Magnet Spacing in inches

Figure 2



Sketch shows the installation of GKD Products' Electronic Retard/Advance module and the advance magnet. See text.

COMPRESSION

No, I'm not referring to what goes on inside an engine. This has to do with squeezing/compressing our prop hubs.

Take a look at the photo. I'd left this prop installed on one of my birds for quite a while, for so long, in fact, that the wood under the prop washer lost its resilience and remained squashed (or is it squished?).

This permanently compressed condition makes it harder to properly secure a prop to an engine and is even more of a problem on four-strokers because they have a definite tendency to spit props due to backfiring and detonation.

The solution is simple: when you're through flying for the day, just loosen the prop nut and let the hub breathe.

SUPERSIZED 4-120

Want to guess who came up with this biggie? Yeah, you're right, it was Al Doerr, who "what if-ed" himself right into another B-I-G project.

"During one of my 'what if' sessions, I started to wonder what a BIG Ace 4-120 would look like. Well, now I know. She spans 127 inches, weighs 35 pounds, has a wing loading of 25 oz/sq ft, and is powered by an OPS Maxi Twin.

"Tried something new. Note gear, firewall, and hatch cover; homemade from T-6 aluminum that's buffed to a mirror finish and plated with 24K gold. Real sharp!

"Also, we flew the BIG 160-inch Robin Hood. What a sight, and she didn't even need any trim adjustment. Hey, 'what if' I made one that was 198 inches? (That would make the plans easy as all I'd have to do is double the 99.) And what if IMAA and AMA raised the weight limit to 75 pounds? And what if they let me use 12 hp swinging a 28x12? And what if. . . . Well, as you can see the wheels are turning.

"I'll be in touch before too long. Building season is about over and flying and crashing time will soon be here."

VIP'S NEW PUB

VIP Publishers (aka Col. John deVries and Dick Phillips, P. O. Box 16103, Colorado Springs, Colorado 80935) has released its third book, *VIP's Directory of Large Scale Plans—Volume I*, and it's a dandy.

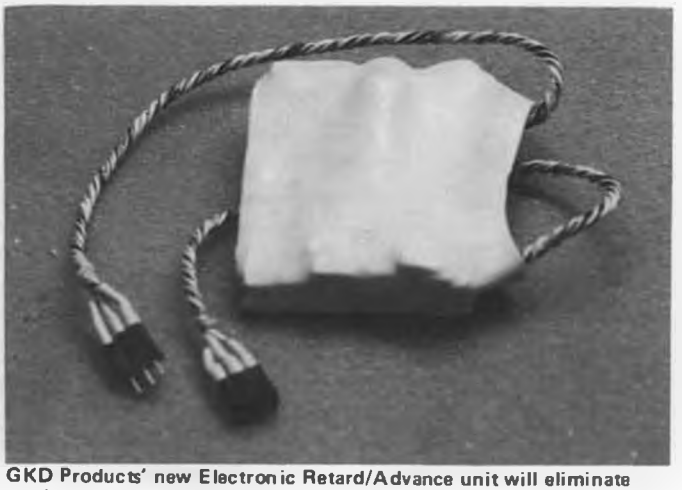
The VIP guys felt that there's long been a need for some sort of guide to the ever-increasing list of large scale plans coming onto the market, and this book is the result.

As the *Volume I* implies, DeVries and Phillips plan on following this release with several others of large scale plans, and, in fact, are already working on Volume II.

To provide much-needed information as to the relative value, use, and complexity of the many plans available was a good idea, and it was very well executed, as proven by this first volume. I'd planned on just skimming through the book but found myself reading all 116 pages before I could put it down.

Continued on page 69

Unidentified youngster finds a convenient seat on Dennis Reeves' Horner-powered Giant Stick at the Glue Dobbers Jumbo Fly-in.



GKD Products' new Electronic Retard/Advance unit will eliminate mechanical spark advance coupling and its inherent slop.

ELECTRIC POWER

By MITCH POLING

• What everyone needs is a good inexpensive reliable motor, so we can have fun, play all day, and not spend much money. Impossible? Not so; there are quite a few good motors around that don't cost very much, the offroad stock motors are an example. Another is the DSC Hyperthrust 075 motor, which comes with the wiring harness, Tamiya connector, a toggle switch, a 20-amp automotive (spade) fuse (the best ones), prop adapter, arc suppression capacitors, a nice two-page set of instructions, and a catalog of the DSC electric goodies. All this is for $24.95! All you need is a six- or seven-cell battery pack to complete the power package. If you look around, you will find very good prices on the offroad six- and seven-cell packs. They are all good battery packs, so it is quite possible to have the complete power package for less than $50.

There are some features I particularly like about this system. The motor has a metal block, excellent! This means it can stand heat and get rid of heat well. In the past, I have managed to melt bearings in plastic backs. The motor is a true 075 motor; it is wound to handle 7-4, 7-6, or 8-4 props on six or seven cells without overheating. This does mean it is hefty compared to many 05 motors, and at 7.5 ounces it is about 1.5 ounces heavier than most. However, this is not really a problem, as you will see in the performance report! DSC recommends Top Flight, Graupner, Robbe, Yoshioka, or the K&W folding prop for direct drive. I used Top Flight and Graupner props, these are my favorite for power and efficiency. DSC also sells the motor with their RPB Gear Box, with this the Rev Up 10-6, 11-6, and 11-7 are recommended.

A simple on-off using tubing, a servo, and the toggle is shown in the instructions for motor control, this works well. A two-speed motor control is shown also; this is a good idea for the large props on the gear box. Do note, however, that this uses microswitches. The only microswitches that I can recommend for electric flight are the ones rated at 15 amperes. Smaller ones will burn out. The heavy duty microswitches are sold in electronics (but not Radio Shack) stores and hobby stores that sell offroad supplies. They are used in offroad cars for reverse switches.

Other features I like are the 20-amp fuse, which is not included in many motor packages. This fuse will save you a motor or speed control one day. The prop drive—it has a very wide flange, which can be set close to the front bearing. The flange is wide enough to take up some of the shock in a bad landing if it is set close to the front of the motor, and it may help prevent bent shafts. I have not had any bad landings, so I haven't tested this out yet! And last but not least, the motor is included in the deluxe kits of the DSC Robin, Caliph, Miss Los Angeles, LeCrate, Heron, and Lucifer. Now you don't have to ask what plane to use it in!

I decided to use it in my faithful ready-to-fly MRC Cessna 172, with seven sub-C cells! The reason for this overload will be explained shortly. Anyhow, the poor little Cessna, which has a wing area of 264 sq. in., weighed 43 ounces, a wing loading of 23.5 ounces/sq. ft. This is a little high for a small plane, though okay for larger planes. The Hyperthrust motor with a 7x4 nylon Top Flight prop took it right up, at a rapid rate of climb. I left the motor on continuously since I was testing a very special bat-

Ken Martin with his modified Etude. The RTF Etude is an easy ship to modify, as it is very versatile. Ken added one more rib panel to each side and set the dihedral at 3-1/2 inches.

Ken uses an Astro cobalt 05 to the Etude, geared with the Kyosho Etude prop.

The 900 cells are slightly shorter and lighter than the regular sub-C cells, but deliver nearly the same power and duration as sub-Cs.

Dick Wetzel's Lightning, scaled up, a very difficult model to build. Dick owns Wetzel's Hobbies in Bath, Pennsylvania.

Good-looking Tiger Moth with Astro 15 for power. Photo: Wilber Moyer.

Keith Shaw at the KRC meet. Photo: Moyer.

tery pack from SR Batteries. I wanted to see what duration I could get with no off periods. I had to spin the plane down several times, as it kept getting too high. Loops and rolls were excellent. All in all the Thrustmaster is a very good bargain, and I recommend it. Contact DSC at 675 Tower Lane, West Chester, Pennsylvania 19380; phone (215)430-8645. Now about those sub-C batteries! Larry Sribnick sent me a prototype SR Magnum sub-C pack to test, with the claim that it would give substantially more flight time than ordinary sub-C batteries. So, I combined the tests with the Hyperthrust motor with the tests of the batteries, and made the Cessna work harder! Larry's claim is true, the SR Magnum batteries do deliver at least 30-percent more flight time and static run time. Very good! Here is the data:

7 SR 1200 Cells, Hyperthrust Motor, 7x4 Top Flight Nylon

Time/Min.	Rpm	Current
0	12,000	18 A
1	11,420	16
2	11,300	16
3	11,100	16
4	10,900	15
4-1/4	10,000	12

Total Capacity 1.1 Ah

7 SR Magnum Sub-C Cells

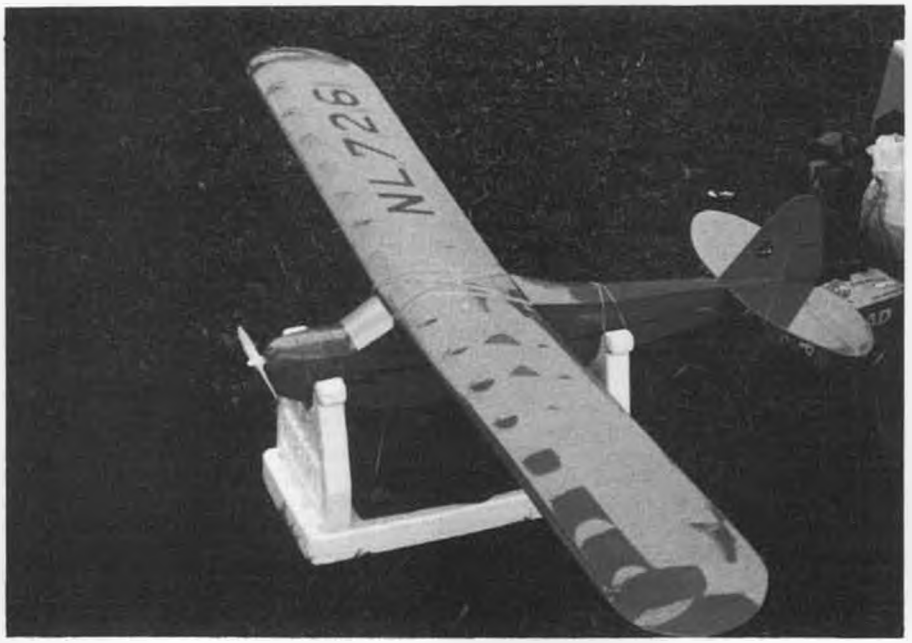
Time/Min.	Rpm	Current
0	11,800	18 A
1	11,200	16
2	11,100	16
3	11,000	16
4	10,800	15
5	10,500	13
6	9,900	12
7	8,000	8

Total Capacity 1.67 Ah

There are several things to note here. The SR 1200 batteries ran right up to the last second, then cut off abruptly. They were at body temperature at the end of the run. The Magnum cells ran strongly for 20-percent longer, then went into a gradual decline, a "cruise mode." They were medium hot at the end of the run. I did a run with the same setup with an 8x4 Top Flight nylon prop; there the current draws were 20 amps. Initial rpm was 9700 on the SR 1200 pack and 9600 on the Magnum pack. The SR 1200 pack was warm at the end of the run (3.5 minutes), and the Magnum pack was very hot, almost too hot to hold (5-minute run). Note also that the rpm run about 200 to 300 less for the Magnum pack.

So then to the field, and I found that the flight test followed the bench tests very closely. I did not turn the motor off during the flight as there were no thermals, so the flight times were six minutes with the SR 1200 pack and eight minutes with the Magnum pack using the Top Flight 7x4 on the Hyperthrust motor. I switched motors to a three-year-old stock Associated offroad motor turning a 6x4 Cox gray prop, and flight times were 7.5 and 9.5 minutes, respectively. Again, a 30-percent increase in flight time. Bear in mind that these flight times are bare minimum, no off times, and no attempt to use altitude; I spiraled down sev-

Continued on page 73



Great Planes Electric Cub flew quite well at the KRC meet. Photo: Moyer.

An original design by an unknown builder/flyer. It flew at the KRC meet, and is built like a Holy Smoke model. Photo: Moyer.

RAMBLIN' AROUND AUSTRALIA

By STU RICHMOND. . .Our traveling modeler heads into Sydney this month, where he hooks up with co-owner John Chadd of Magnum model fuel fame for a informative interview.

• Sydney, Australia, is a major city with lots of hobby shops, several large model clubs with nice R/C fields, a major hobby importer, and the home of Magnum model engine fuel. Sydney and Atlanta, Georgia, have comparable climates, so modeling is practically year-round.

Magnum model fuel was used at the Second World Pylon Championships that got me to Australia originally, and Bob Carpenter arranged my visit to the blending and mixing lab which is a neat spotless hospital-like operation. Cleanliness and quality combine to give Magnum the bulk of Australia's fuel business. Blending/mixing is done with proprietary equipment. All containers are required to carry a "poison" label. All fuel passes through five micron filters. It won't flow by gravity, so the fuel is actually pressure-pumped through the filter stage. By seeing a new and used filter side by side you get an idea of the value of filtering. The standard case of Magnum is six cans which each hold two liters. Government law requires that fuel ingredients and percentages be listed on packaging. Nothing in the plant was stored in plastic containers; mostly stainless steel for mixing. The smallest mixed fuel container is a brown light-resistant polyethylene bottle. Air pressure on top of tanks of Castrol move the oil from storage through plastic pipes to mix vats. Pressure valves ahead of the filters monitor filter life. Timers control blending. Methanol is "aviation grade" only. The oils are castor, Klotz, and a remarkable synthetic made down under called Syn-Lube. Nitro is imported from the USA. Magnum's diesel fuels use isopropyl nitrate (IPN) rather than dangerous-to-breath amyl nitrate which is a heart stimulant.

Bob Carpenter's partner in Magnum, John Chadd, took me flying one day and the following tells a lot about model fuels. I had just made a couple of roaring flights on John's model with an O.S. .40 FSR that sported a Magic Muffler.

Magnum's Bob Carpenter stands with cases of two liter cans of model airplane fuel.

John: Magnum. . .this mix is 10-percent Glo-Glide by Syn-Lube, five-percent nitro, and 85-percent methanol. It's blended by the company in which Bob and I are co-directors. We bought the business about five years ago, and it's still expanding. We distribute to all Australian states and the island of Tasmania.

Stu: Why is your fuel better than a competitor's that might cost a bit less per liter?

John: We don't make the fuel down to a price; we blend it up to top quality with the best products and techniques and containers. The end product is top quality.

Stu: In the USA it's common for some clubs to buy 55-gallon drums and split it up. Do you sell likewise?

John: Yes, we'll sell 20-liter containers to a club; there's only a slight saving from retail through package costs.

Stu: When I visited the plant, I saw the words "AVIATION GRADE" on methanol; I've not seen that in the USA. What's it mean?

John: Aviation grade is the *only* grade we purchase. Methanol is made in one plant in Australia. Maximum quality is the reagent or lab grade that's obviously too expensive for model fuels. Aviation grade is the next—that's what we use. It comes certified as to its purity. Lesser commercial methanol like Shell A and BPA Products which we think our competitors buy do often contain contaminants such as acetone. Those grades perform well in ignition engines but not as well in glow-plug engines. So we stick with "aviation grade" to be sure of the same uniform standard.

Stu: Do you often get asked how to mix fuel?

John: Yes, all sorts of questions get asked, especially by R/Cers not using our Magnum fuels. They're often having troubles with another blend. We invite them to pump out their fuel and to fill up with Magnum right on the spot. When their troubles go away, they've got their answer. Naturally we're always ready to advise them which Magnum blend is most suitable for their requirements.

Stu: Do you mix special four-stroke fuels?

Five micron filter cartridges make the Magnum fuel appear crystal clear. New and used filters are pictured. Yecch!

Magnum fuels are automatically bottled by weight in a clinical-type lab atmosphere that visitors seldom get to view.

John: Yes, we initially blended a four-stroke fuel with 8-percent Klotz and 2-percent castor; but as the four-strokes increased in power, the total oil was then increased to 15-percent. (*Note: The Japanese engine manufacturers seem to use Australia as a testing ground for new products. The O.S. Surpass engines were there long ago. The new Enya .53 four-cycle and the pump-equipped Enya .61 two-cycle engines were there a full year ago as this is written—Stu*)
Stu: For two-stroke fuel, what's the average Aussie modeler buy?
John: 70 to 80 percent choose pure castor as their lubricant in their fuel. Another 5 to 7 percent will choose a castor/synthetic blend of oil. The remainder use all synthetic like Syn-Lube, as you flew today. We will blend whatever a customer wants. We also make what we call a "90-percent" mix for 1/8-scale gas cars; it's 4-1/2 liters in a 5-liter can, and the customer adds 500 milliliters of his own super-duper oil.
Stu: I saw tin after tin of Magnum at the FAI F3D World Champs with an FAI symbol on it. It was—
John: Yes, for the World Champs we made a specific batch. All that fuel and the fuel used the following week at the 40th Australian Nats was all from one big carefully blended batch. We even had a professional chemical analysis done on that product!
Stu: John, I heard the 60 liters used at the World Champs was donated by Magnum; is that correct?
John: Yes, totally correct.
Stu: I think what you fellows are doing and have done is great. Many thanks for talking with the *Model Builder* readers.

I'd spent a night at Bob Carpenter's and the first of a few at John Chadd's. After the flying session and fuel interview, it was arranged I'd go home with Wayne Hadkins who is one of Australia's premier electric fliers. Wayne won the F3E electric event at the just-finished 40th Australian Nats and was on his country's World Champs' team. John Chadd had taken me to be the guest speaker at the UMAC (United Miniature Aircraft Club) in the Sydney area, and Wayne and his lovely wife Gabrielle said they wanted me for an evening. Like a long lost dog in a butcher shop, I was happy and eager to accept such a wonderful invitation. It included a chance to play with their two neat sons (one gave up his bed to me), dinner, and a few hours out in the workshop. The next day the UMAC club had a vintage or old-timer day (on Sunday), and I was to spend time at the contest before getting picked up by Andy Kerr, one of the resident engine experts for a couple of days more of ramblin'. But in Wayne Hadkins's workshop that night I spotted a pile of British model magazines, and the top mag had a lovely lady holding a USA Formula I pylon racer. I recognized the paint job and proudly showed it to Wayne. The index page showed the picture was taken at Toledo and the model was built by Bruce Richmond, my #1 son . . .the one who originally invited me on this ramble to Australia. Proves just how small the world is. Everything great happens through model airplanes!

Next column we'll show you how a special model engine is made . . . in Australia.•

Visiting another modeler's shop is always fun. Stu got a surprise in this one, as text relates. This DT'd free flight model is electric powered.

Wayne Hadkin's sons and the old time models at the UMAC contest. Playboy on the right was covered with brown kraft paper, water-shrunk and doped. Plenty tough and economical too!

Wayne is an ardent Australian electric F3E model builder. Even his son's styrofoam flyer is recharged from a 6-volt battery.

Syn-Lube's oil is Australian made, and costs $8.50 for 500 ml, and as little as 2-1/2 per cent can be used in model fuels.

MODEL DESIGN & TECHNICAL STUFF

By FRANCIS REYNOLDS

• This column is going to be a bit like an old-fashioned one-room school. By that I mean that the teacher (writer) has pupils (readers) of a wide range of grades (modeling experience) in the same room (reading the same column). Not all of the material will be pertinent to all of the pupils all of the time. But the little kids soon learn not to get upset when the lesson is over their heads, and the big kids don't get bored when the lesson is elementary. Instead they enjoy helping the teacher teach the little kids. This latter point will be very important in this column in months to come.

I'm an experienced modeler and a retired Boeing aerospace engineer, but the more I learn about model design, the more I have yet to learn. I will need all the help from you that I can get. Some of you will invariably know more about certain subjects that we are going to tackle than I do. Please write and keep me honest. I resent reading something and later finding out it was wrong, and I want to minimize the amount of misinformation I burden you with!

Write to Francis Reynolds, 3060 W. Lake Sammamish Parkway North, Redmond, Washington 98052, or phone (206)885-2647. Include a self-addressed stamped envelope if you want a personal reply. I will try to publish your corrections and other contributions, but since Bill Northrop is now calling me a contributing editor of *Model Builder*, I have a responsibility to "edit" your material.

The object of this column is to encourage you to include designing as a part of your model airplane hobby, because it is most rewarding and highly enjoyable. In my case I enjoy the designing most, the flying second, and the building least. Designing is a lot more than just drawing pretty pictures of neat new airplanes, however. The "& Technical Stuff," part of the title of this column implies that we have to know a few things if we are going to be successful designers. As an engineer, I love technical stuff, and I know that many of you do. Some of you beginners in this delightful hobby may also find you like that kind of thinking.

Bill Northrop prefers the term "soft technical." We aren't going to try to teach you to be aeronautical engineers (but some of you already are). Bill also noted recently that most of today's R/C model flying is being done with ARF planes. Scratchbuilding is becoming uncommon. Designing your own is rare. Too bad! Maybe we can give designing a shot in the arm through this column.

The technical part of model design includes aerodynamics, structures, materials, and processes. We will be studying all of these and others, but only to the extent necessary to become better model designers. As I implied earlier, I expect that, by your letters, some of you will teach all of us as much or more than I will teach you. This will really be a sweet deal for those with little or no knowledge or experience in model design because you will be getting not one but perhaps dozens of instructors.

My specialty is sport R/C seaplanes, but over the years I've designed and built rubber-powered, hand-launched gliders, free flight, control line, and R/C of all types. Model Design and Technical Stuff will center around R/C, but most of it will apply to all types of model airplanes.

So far I've rambled on about what this column is going to do for you, but it's been all talk; no meat and potatoes. To correct this deficiency, I will use the remaining space I have this month to present my little model airplane dictionary. After all, if we are going to grow smarter together, we must talk the same language. In this dictionary you will note the one-room-school phenomenon. Some of the following definitions are for the beginners, and some for the

Continued on page 84

Transparent wheels are hardly visible in this photo of author's Sesquiphib amphibian model.

Eva Profit babysits the Sesquiphib.

ALL ABOUT ARFS

By ART STEINBERG

• This month we are going to tackle a subject which may seem rather strange for a column devoted to ARFs; fuelproofing. Ordinarily, you would think that an ARF comes adequately fuelproofed and that no attention needs to be devoted to that aspect of preparing the model for flight. Now, a great many devotees of this type of model just assemble them exactly according to the instructions and then go out and fly. This works well for many folks, at least for a while. However, if you are the type of flier who gets in a lot of air time on a model, you may begin to run into some fuelproofing problems after the first fifty flights or so. Let's face it; those of us who are accustomed to models with short lifespans just don't have to be overly concerned with possibly inadequate fuelproofing. On the other hand, if you are a more skilled (or lucky) pilot, it's not unusual to accumulate many hours of flying time on one particular model, and that's when you can run into some real problems when fuel residue begins to creep into every opening and seam. So if you don't mind taking a little extra time to add a great deal of longevity to your brand new ARF, let's take a careful look at some of the areas which deserve our close attention.

My greatest concern is always the firewall. Naturally, this is the chief protective structure between the main airframe and the engine; and if we don't fuelproof this sufficiently, we may soon find the engine and model parting company in midair! Many manufacturers have done a really good job in this respect, but there is something about firewalls that give me an uneasy feeling, so I do all I can to achieve a measure of overkill in this particular area. I like to mix some good quality epoxy of the overnight setting type, get it nice and warm so it flows easily (*Please do not warm epoxy in a microwave oven!*), and then I brush it thoroughly all over the firewall, including the inside of the fuel compartment if at all accessible. I also do the motor mounts if they are of wood construction. This one small modification to your ARF will increase its lifespan to an almost immeasurable degree, barring unforeseen crash damage. Those of us who have a background as experienced model builders certainly are aware of taking this little precaution, but we must keep in mind that many ARFers are new to the hobby and are not familiar with the damage which often results from inadequate fuelproofing.

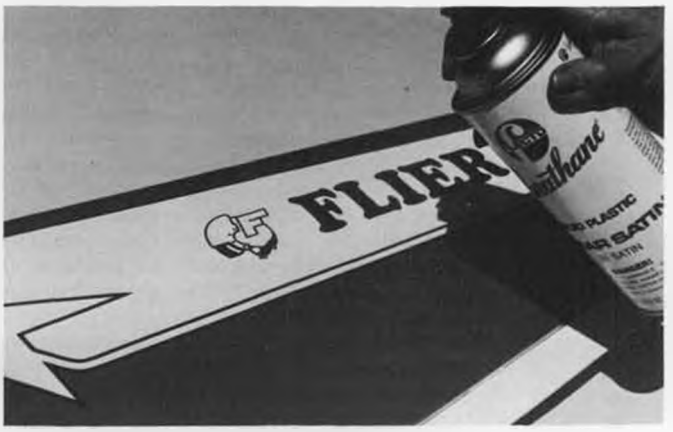
Now that we have attended to the most vulnerable area of our model as far as fuel damage can occur, we can end the job right there and go flying. What we have done so far has probably doubled or tripled the flying life of our model. However, there is still room for improvement, so let's pay some additional attention to other areas where that devil fuel residue can wreak havoc!

Examine your completed model carefully, and you will probably find many seams joining plastic sheet to vinyl, to other plastic sheet, to foam sheet, to balsa, to hardwood, or any combination of the foregoing. The point is, wherever a seam exists, you have an entry point for raw fuel, oil residue, or both. I recently retired an ARF after a year of continuous flying, and I just couldn't believe how many parts were flapping in the wind as a result of fuel and oil seepage. Once one of these greasy seams opens up, it is virtually impossible to reseal it again. Therefore, the best time to seal all those seams is before you ever fill your tank and start your engine for the first time in your new ARF, or, better yet, before you even install the engine.

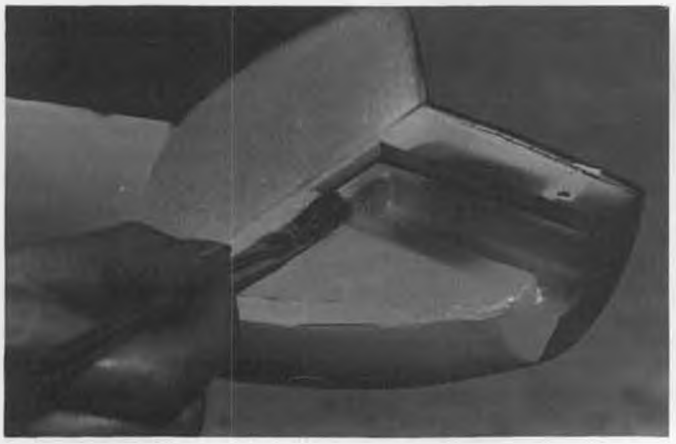
There are three ways to go about sealing

Continued on page 77

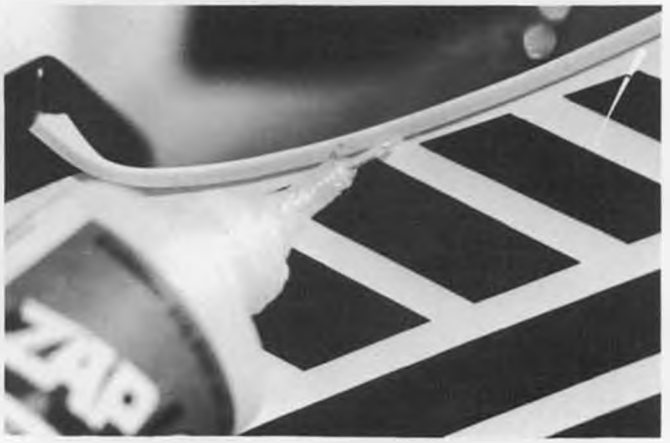
An alternate method of fuelproofing is to seal seams with polyurethane, using a fine brush.



The quick and dirty method: give the whole model a spray coat of your favorite clear fuelproofer.



Epoxy is best applied to the firewall using a stiff bristle disposable brush.



Application of cyanoacrylate to all accessible seams and joints prolongs the life of the model. Use care to prevent runs.

Simply Scale

BY STEVE GRAY

• On my trip to Yonkers, New York, and the W.R.A.M.S. show, I was pleased to discover some interesting products for the scale modeler. My only day at the show was Friday, which was a dealer-only day. This made it possible to speak to the manufacturers' reps more easily but, alas, I was not able to see many of the models for display, as they had not yet arrived that day.

I visited with many of the vendors there and heard about some of the new products they had been working on all winter. One of the booths I visited was occupied by Bob Parkinson's Models, and I spoke to Bob about his very popular semi-scale F-15 Reagle Eagle and F-18 Hornet ducted-fan kits. These built-up balsa models, as I have witnessed firsthand, fly extremely well and are ideal for the beginner just trying his first ducted-fan model. They use the Byron fan and appropriate engine or, a new development at the show, Bob's own fan called the Capricorn which cleverly uses cut down "Master Airscrew" propeller blades bolted to an aluminum hub as an impeller. The engine's exhaust is scavenged by extending it close to the blades to have them suck out the exhaust as they whiz by. Bob claims that this increases power and as a side benefit creates a turbine whine which adds realism to the sound of the plane. Bob says the fan will sell for only $69, making it affordable for everyone. Now, if only O.S. or Rossi could build a good engine for under $100 to power it, we'd all be flying Bob's designs.

Another distributor I visited was Zimpro Marketing who had on display an array of semi-finished balsa and foam models of very high quality. While the pattern flier was in mind behind the designs featured, it was interesting to note that many of the designs were semi-scale models of high performance airplanes. It seemed as though these models may be a good transition between the pattern ship and scale models. The designs that tweaked my interest were: a Dalotel 625 and 850, a Cap 21, and Extra 230, a Chipmunk 850 and a Zlinn 526. These kits were all beautifully pre-built and retailed around the $200 mark. These large models seemed ready to accept .80 to 1.20 four-stroke engines and would satisfy the fliers among you out there who want a good performing aerobatic plane which still looks like an airplane. Another jewel I latched onto while at this booth, and which I immediately purchased for myself, was a book called *Radio Control Scale Aircraft Models for Everyday Flying* by Gordon Whitehead. This British publication may be already familiar to the odd one of you out there who may have seen a copy, but it was my first encounter with it. It was published in 1980 and is a fairly modern text which describes with photos and drawings some of the processes which scale modelers use to produce some really unique masterpieces. It discusses the subjects of selecting an aircraft aerodynamics, drawing plans, construction, controls, detailing and finishing scale models. Many techniques and special processes are featured which will give you new ideas and increase your capacity to build better scale models. This book is a must for the serious scale modeler and is a steal for only $5. It is available by writing to: Zimpro Marketing, P. O. Box 3076, Oakridge, Tennessee 37830.

Rib stitching was done with Solartex and R/C 56 glue. See text for details.

Another vendor at the show had some interesting products to show. RAM R/C Models showed their navigation lighting systems for scale model aircraft. These full functioning navigation lights can be installed in your scale model for that extra bit of realism. They also had on display their assortment of realistic-looking pilot figures. The assortment included an old timer pilot, a WWII army pilot, a WWII navy pilot, a WWII German pilot, and a jet pilot. These all appear to be about 1/6 scale.

A new item they were showing for the first time was an assortment of polished aluminum cast scale propellers. These solid aluminum props were available in different sizes for static detailing scale models. I felt it was a very saleable product and that they will be sought after by many to enhance the appearance of their scale models while on display or for static judging. The people at RAM said that the product was on display to test the marketability of it and said that the pricing or availability were not yet established. I was impressed with these propellers, and I hope they decide to make them available.

While strolling past the Dynaflite booth, I discovered an assortment of R/C scale kits which caught my interest. Dynaflite produces kits for sportscale versions of the RV4, Rearwin Speedster, M.E. 109, Focke Wulf 190, P-51 Mustang, F6F Hellcat, AT6 Texan, PT-19, P-47 Thunderbolt, and Corsair. In addition to these they have two master scale model kits of the P-51 Mustang and the SBD-5 Dauntless. The sport scale kits feature foam and balsa construction with easy building for the novice scaler. The Master Scale kits include detail, documentation and instructions to the nth degree to satisfy the most discerning scale modeler. These kits are definitely worth a look. Ask for them at your hobby dealer. Dynaflite is a new company made up of Mark's Models, Craftair, and Jemco.

Another manufacturer represented at the show was Northeast Screen Graphics who are the makers of Major Decals. I spoke to Paul Major about his products, and he showed me what was available. I was amazed at the selection of different decal sheets that he had to offer. Everything from insignia to prop decals and lettering are available. Most decals are available as water transfer or stick-ons. I have used these markings and find them to be of very high quality. See your dealer about these.

As I wandered by the Dave Brown Products booth I saw being demonstrated a product I had heard about before but had never had a chance to try. Dave's model flight simulator was a surprise to me. Without the normal crowds around the booth I finally had a chance to try it out. I must say,

it is most realistic. This is not just another video game; I believe it can actually help you fly better. It can help you develop the stick coordination necessary to do new maneuvers. I have a fair amount of stick time myself, and I had no trouble flying the little image on the screen. Just for a change of pace I had Dave change the program over to the helicopter program. Now, I have had no experience before with helicopters so I thought this might be a new challenge. My attempts to hover were pretty much unsuccessful, and I decided there must be something wrong with the machine. Just to prove that it could be done, Dave showed me how. I think I'll need some more simulator time before I try the real thing.

All in all I found the W.R.A.M. show to be a very enjoyable and informative experience. It was well worth the trip for me.

RIB STITCHING

Many articles have been written about rib stitching and how to simulate it on models. I guess I will have to follow suit and give you my own secret method for doing rib stitching. My method, in keeping with my lazy nature, is easy and fast. You will need to use Solartex, a pencil and ruler, R/C 56 glue and a sealing iron. My rib stitching is simulated by using small dabs of R/C 56 glue. I like to start by covering the wing with Solartex. Natural uncolored Solartex is used if you will be doping the wing. Apply two to three coats of nitrate dope. After the wing is dry, measure the position of each rib stitch with a light pencil mark on top of the ribs. Now insert a small tube into the end of the bottle of R/C 56 glue so you can control the flow of glue carefully. Apply small dabs of glue across the ribs at each mark. You will become better at applying the glue the more you do, so practice on a piece of paper first before you actually do the wing. After you get going, it's surprising to find that you can do a whole wing in a relatively short time. Allow the dabs of glue to dry overnight.

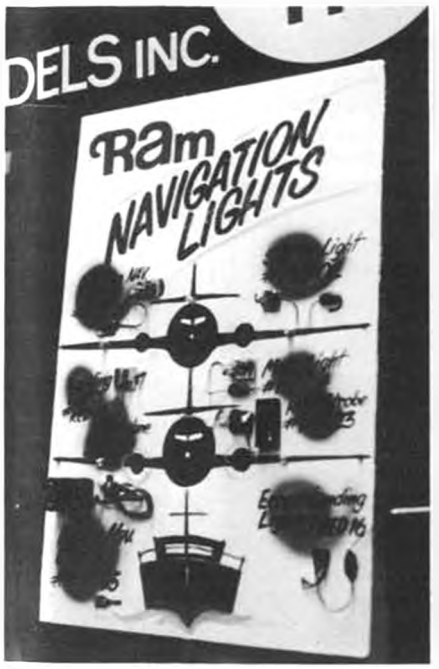
After the glue has dried, cut out strips of Solartex the correct size to simulate the reinforcing tapes which covered the rib-stitching on the full-size aircraft. Remember that early aircraft did not have pinked edges on these tapes so you need not go to the trouble of cutting pinked edges for most models. Now iron on the tapes over the rib stitching. Add more tapes along the leading and trailing edges and apply your final coats of dope. Voila! You should be pleased with the results. And it was easy!

Well, as you read this, the flying and contest season will be starting up. Make sure you check your radio batteries and engine bearings before the season begins. Avoid the heartbreaks beforehand through careful preventive maintenance. Tighten up those nuts and bolts. Set your trims and have a good season!

The companies mentioned in the article are: Bob Parkinson Flying Models, 3 William St., Thornton, Ontario, Canada L0L 2N0; Zimpro Marketing, P. O. Box 3076, Oak Ridge, Tennessee 37830; RAM, 4736 N. Milwaukee Ave., Chicago, Illinois 60630; Dynaflite, P. O. Box 1011, San Marcos, California 92069; and Dave Brown Products, 4560 Layhigh, Hamilton, Ohio 45013. •

The '88 WRAMS show presented a wide array of model companies.

Bob Parkinson Flying Models' display of easy to build and fly fan jet models at the WRAMS.



RAM's display of navigation lights for models.

Zimpro Marketing offers a great book on scale modeling full of useful information.

PLUG SPARKS

By JOHN POND

• As this is being written in February, this columnist generally has some fun at the expense of the snowbound friends back East with tales of wondrous weather in California and the Southwest.

This year's Southwest Regionals should bring a smile of relief to the long suffering tirade on good western weather as the Regionals had fair weather on Saturday with light winds, but Sunday was a complete blowout; a first-class sand storm. Contest Director introduced a bit of humor in a letter received from Jim Reynolds of Universal City, Texas. Jim says:

"Once again the Southwest Regionals lived up to its reputation. Nina and I had a grand time. The western barbecue was a great idea while the dust storm on the last day was pure genius. We have had rain in 1986, snow in 1987, what are you planning for next year? We thought an earthquake might fit the bill. Something on the order of a near eight on the Richter scale would get the attention of the Californians." Well, what can you say after fun like that? Bringgold did send in some photos, and we are pleased to show Gerald Martin, Hereford, Texas, in Photo No. 1 with his good-flying Lanzo Bomber powered with an Arden 19. Note the neat paint job on the trailer complete with Gerald and Sandra Martin lettering and stripping!

C.D. Bringgold also stated this was the first time the Annual Southwest Regional Championships (39th this time) was held at Eloy, Arizona, after 16 years at Buckeye. The new site is great, being a former experimental farm area in the desert.

As can be seen in Photo No. 2 (Toby Blizzard holding a Satellite 900 while watching a Lanzo Bomber coming in for a landing), the area is completely devoid of obstacles. With such a large area, the free flight portion of the meet was no problem.

The highlight of the meet was the social get-together on Saturday night, a turnout better than the contest! "Bo" Buice, Tom Cope, and Joe Klause came just for the camaraderie. They know what this SAM movement is all about; *fun*!

As a sidelight, the new SAM 1988 rules were great from a Contest Director's standpoint. Very little to complain about as it is all in the rules. Flight times were down slightly, but this was due to the weather conditions rather than the new 10 oz. per sq. ft. wing loading requirement.

We would be remiss if we didn't publish Photo No. 3 showing who was responsible for the O/T R/C portion of the Regionals. As Dick says, "This is not a part of the Hole in the Wall gang, but rather a part of SAM 31, the "Dirty Ones." Seen left to right are Bob Wubben, Gordon Davies, and Dick Bringgold.

We could run the results of the meet, but there were so many contestants marked DNF (like 13 out of 16 in Texaco) that any listing would not truly represent the number of contestants. Of interest is the High Point Winner, Jack Albrecht, who placed first in Electric L.E.R., first in the Ohlsson 60 event, second in the Pure Antique, first in Class A Ignition, third in Class C Ignition, and fifth in Class B Ignition. Wotta busy boy! 23 total points.

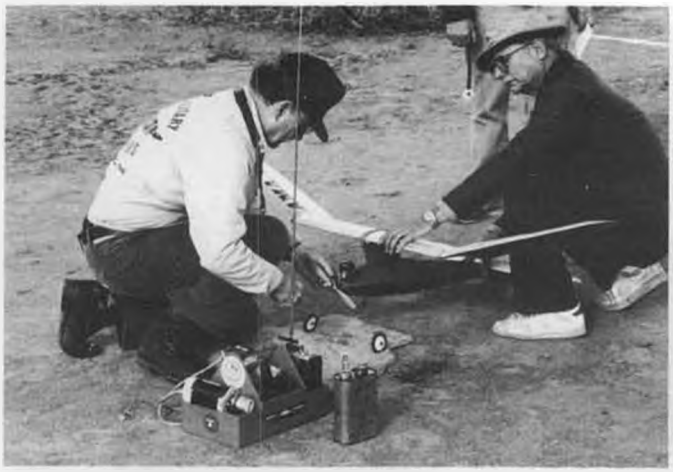
This columnist observes with everyone wanting to win, we have truly gotten into a rut. Out of 103 entries, 35 were Lanzo Bombers and 13 were Playboys. Maybe a handicap system is in order?

Just about the time this writer had concluded the Southwest Regionals report, a letter arrived from Dick Bringgold with many photos taken by Joe Klause. Hate to pick on you, Joe, but most of the fellows had their faces hidden. Is this something new?

1. Gerald Martin, Hereford, Texas, with Arden 19-powered Lanzo Bomber. Seen at the Southwest Regionals in Eloy, Arizona.

5. Dick Bringgold solved the problem of all the new frequencies for 1988 with this clever stepped stand. Photo: Klause.

2. Look at the flying area in Eloy! Toby Blizzard with his F/F Satellite as a Bomber prepares to land.



4. High point winner, Jack Albrecht, prepares his Class B Torpedo-powered Lanzo Bomber. Chuck Patterson assists.

3. These are the boys who ran the meet: Bob Wubben, Gordon Davies, and Dick Bringgold, all SAM 31 stalwarts. Photo: Klause.

Bashful old timers? Hmmm, I also sell bridges as a sideline.

Photo No. 4 is seen simply to show Jack Albrecht, the high point winner, getting his Torpedo 29-powered Lanzo Bomber ready for a flight. This model placed fifth, the lowest of any event Jack entered! Also seen is Dr. Chuck Patterson who has promoted much of the old timer activity in SAM 49.

To wrap things up, the C.D., Dick Bringgold, had things organized for the new 1988 R/C frequencies. Take a look at Photo No. 5 for Dick's idea on how to separate out the frequency pins. No question about how to find your particular pin. Note the stepped platform. A real neat idea!

KING ORANGE INTERNATIONALS

We haven't had a report from Florida in quite some time, but thanks to Charlie Alba, P. O. Box 786, Gray, Louisiana 70359, we not only have a report but photos of the activity. (*Ed. Note: for a while we figured the humidity was fogging up the films, hence no copies.*)

Alba states the K.O. Internats were held at Malabar, Florida, over the January 1 to 3 weekend. I know the easterners up north are going to kill this writer, but weather was just great for flying. Everything was not that great, as some intermittent showers did appear over the last two days.

To show how popular this site is, at least six contests a year are held here with contestants coming over 500 miles to attend. The Winter Old Timer Champs portion of the KOI featured eight gas and rubber endurance events. As can be seen in Photo No. 6, Elmer Wassman of 140 Murray Drive, Jacksonville, Florida 32205, cranks up on his Forster 29-powered "Gas Bird." Charlie Alba also notes there was a flock of trailers, campers, etc. on the field. Made for a lot of informal gatherings and good old-fashioned bull sessions.

We don't give much credit to the distaff side of the contest, but Photo No. 7 tells it all. The girls are invaluable as assistants, recorders, and timers. Seen are Ann Shammo and Nan Taylor (of Pensacola, Florida, and Smyrna, Georgia, respectively). These transplanted "Dixie Belles" are great for all meets.

The girls are a tremendous help in running a meet. Ann Shammo and Nan Taylor in a typical timing attitude. Photo: Alba.

Another shot of Merle Shammo (Photo No. 8) won't hurt things a bit. Ever since leaving Ohio and retiring to Florida, Merle has been having a ball flying free flight models. For all his old pals, Merle Shammo can be reached at 1318 Vasma Lane, Pensacola, Florida 32514.

Charlie makes the observation that Merle, being an old urologist doctor, he knows how to insert a D-T cord. Kinds lame, huh? Regardless, he has been using the Zipper long enough to garner more than a few trophies.

We didn't receive any results, but it is just as well, as space is at a premium in this column. If nothing else, this column will have every modeler moving to Florida or California. You can't beat the weather all year around!

ENGINE OF THE MONTH

For this month's engine, the James, we are again indebted to Robert McClelland, Secretary-Treasurer of the M.E.C.A., located at 3007 Travis, West Lake, Louisiana 70669. Bob has been a positive jewel on the loan of his engines and for his patience in return of same.

When Ohlsson started to produce en-

6. Elmer Wassman is still at it. A Gas Bird with a Forster 29 ignition for power. Quite a crowd of trailers in the background. Photo: Alba.

8. Merle Shammo operates on the dethermalizer fuse for his venerable Zipper. Photo: Alba.

gines in his garage, not many people were aware his partner at that time was Frank Bertelli. Operations were conducted in Ohlsson's garage at 630 North Alvarado St., Los Angeles.

Ohlsson engines were an instant hit in the West Coast, and it wasn't long before Irwin decided to subcontract additional machine work, as Frank found it impossible to keep up. The work was "farmed out" to Harry J. Rice who ran a short-order machine shop.

Irwin then concentrated on doing the final fitting and assembling of the Ohlsson engines. This appeared quite simple to Harry Rice, so he decided to go into the engine business himself, marketing an engine known as the "James," looking for all the world like Ohlsson Miniatures and later Gold Seal engines.

First announced in August 1938, the James, at the price of $12.50 sold extremely well. Rice felt he could produce a competition engine using similar parts and undersell Ohlsson. At the start, this seemed to work well for Rice, but that old bugaboo, quality control, cropped up. As more engines were sold, more went out the door with very little attention paid to good fits. It was inevitable that the James engine would fall into disgrace.

Harry Rice sold the engine under the firm name of Great Western Airplane Co., 1700 W. Adams, Los Angeles, California. Two models were produced, the second with so-called improvements, to recoup the lost market incurred by over-production. The rest is history; starting a new manufacturing facility at 3340 Emery St., Los Angeles, a new partnership was formed.

This combination with Ohlsson doing the engine development work and Rice in charge of production, O & R set all sorts of sales records.

As the James engine was falling off in popularity, a second model was introduced

9. Roy Nelder with winning model and the Moffett International Outdoor Cabin Trophy.

10. 1988, Roy Nelder, 67 years old, seen at his seaside summer home, north of Toronto.

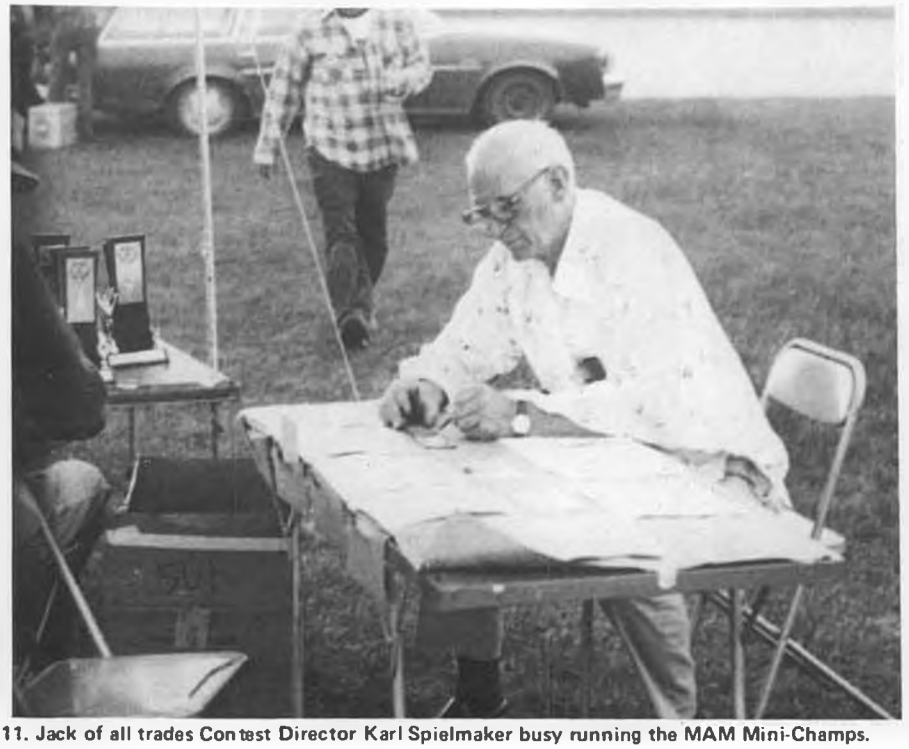
at the attractive price of $9.75. Advertised in September, 1939, this was part of a deal where Rice turned over his interest in the Maes Motor Co. to a third party to concentrate on the production of O & R engines.

As pointed out before with Rice employing and re-machining Ohlsson parts, it is no great surprise to see close similarities where the James engine featured a bore of 15/16 inch and stroke of 15/16 inch, compared to the Ohlsson Miniature of 7/8 inch and 15/16 inch bore and stroke respectively. Some of the frills such as a finned head in the Ohlsson were eliminated in the James.

The James was claimed to be 1/4 hp at 5,000 rpm and a bare weight of 8 ounces. In comparing the James with the Brown Jr. or an Ohlsson 56, both rated at 1/5 hp, the claimed horsepower of 1/5 was a bit misleading despite claims for a high turbulence domed head, giving great atomization of the incoming fuel.

Basically, the James had all the features found in the Ohlsson, bronze main bearing, drop forged dural con-rod, hardened steel piston with chrome moly-denum liner. The james engine did offer dual engine mountings, radial, or lug types. Ohlsson picked this up in the later Ohlsson 23 engines.

As usual, in real tough price competitions, with Tom Thumb at $7.50, Baby Cyclone at $9.00, Brown Jr. D at $10, the James engine simply did not offer that much more.



11. Jack of all trades Contest Director Karl Spielmaker busy running the MAM Mini-Champs.

FIFTY YEARS AGO. . .

It is always a source of pleasure to this columnist when one of the famous old timers has been located. Thanks to the efforts of Peter Mann and Harold Johnson, the long missing Roy Nelder has been found.

Peter Mann writes as follows:

"If it had not been for the widespread influence of old timer modeling, I would never have had any success in tracking down Nelder. Through a combination of membership in SAM 35, a personal visit to Sweden, return visit by a member of the Swedish old timers to my place in Guelph, and a subsequent get-together with Gahns (Sweden) and Bob Milligan (now in California) at the Canadian Nationals in Arnprior last July, we were able to ferret out Roy's address.

"Like you, I tried to find Nelder through Bruce Lester whose unfortunate death cut short the investigation from that end. Trying the Michigan modelers (and other sources) failed to produce any leads.

12. Ted Dock and grandson at the MAM Mini-Champs. How time flies!

13. Don Lockwood launches his original design compressed air model. Seen at the MAM Champs.

"In my interview with Roy, I was able to borrow several photos and have enclosed same for your use. (*Ed Note: Photo No. 9 showing Roy Nelder with the Moffett Trophy and winning model in 1938. Photo No. 10 shows Roy Nelder, age 67, last October 1987 at his summer home.*) As can be seen, Roy is still slim and very active. Although his enthusiasm is not directed toward modeling. It is as though model airplanes were a thing of the past. He regards this as a phase he went through and does not look back with any thoughts of starting to build and fly again. All that was given up a few years ago after the 1948 Wakefield contest at Akron." Peter Mann says there are three 50th Anniversaries coming up: Nelder's win of the Moffett Trophy in 1938, a 50th for the late Fred Bowers for his second place finish behind Dick Korda in the 1939 Wakefield, and again, Nelder for his 1940 Moffett win.

Mann is very interested in staging contests very similar to what was put on by the New Zealanders in the Vernon Grey Moffett winner event. Everyone built a replica of the original winner and were judged for accuracy. This gave a factor to multiply the time to obtain a final score.

Pete would like to know if there is sufficient interest in such a contest. The meet would be held in the Canadian area and run by Canadians. Anyone interested in these types of meets should write to Peter Mann, 36 Sydenham St., Guelph, Ontario, Canada N1H 2W4, for information on when, where, and rules. This will be available just as soon as Mann has a few items firmed up.

Mann is also asking for help from the readers in attempting to locate Gerry Walker of the Detroit-Flint area of Michigan. He flew Wakefield models in the early fifties and has the drawing for Nelder's modifications to his 1948 Wakefield. Perhaps someone could help on the contact.

Pete is also very much interested in the whereabouts of the Moffett Trophy. AMA has no record, and AMA Museum Curator, Hurst Bowers, doesn't know the whereabouts. In 1941 the Moffett outdoor trophy for cabin models was won by Ray Beaumont of Philadelphia. Does anyone out there remember what happened to the trophy or did it suffer the same fate as the old Texaco Trophy which was junked in a big cleanup move? Any information would be most helpful.

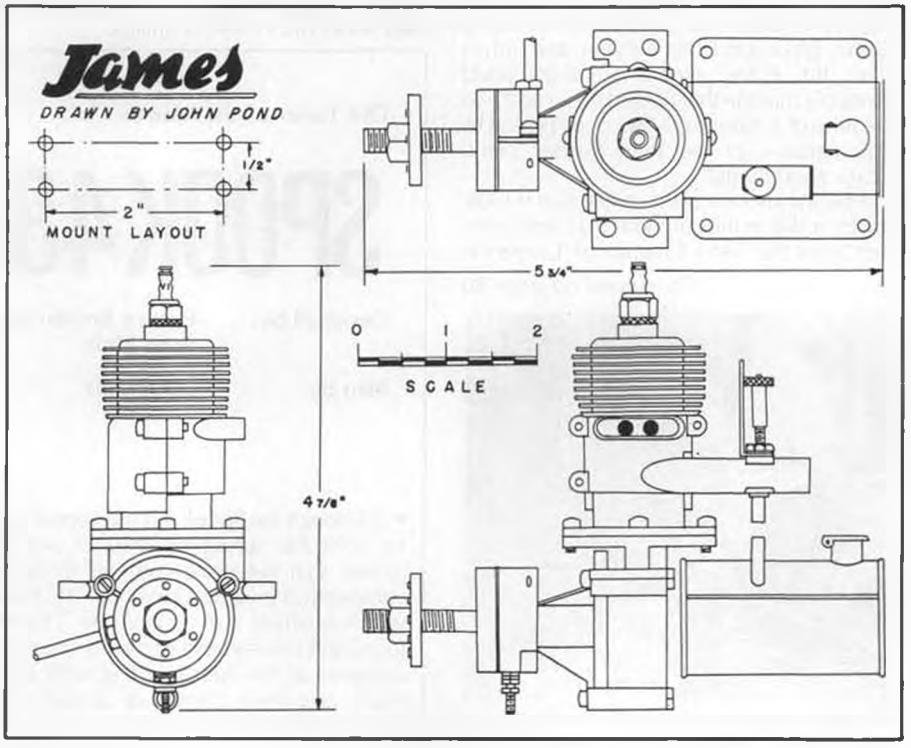
MAM O/T CHAMPS (1987)

Naturally, we are late with this report, but this columnist has the darnedest time getting photos out of the Midwest and the East clubs. Many thanks are in order to Karl Spielmaker, the driving force behind the Michigan Antique Modelers (MAM) "Mini-Champs" held last August 29 and 30.

Photo No. 11 says it all, Karl Spielmaker not only organizes, publicizes, and manages the Champs, but he runs the meet as well. Karl is one of those unsung heroes who are constantly promoting old timer free flight meets. He has practically, singlehandedly put O/T free flight on the map in the Michigan and neighboring areas.

Karl has been very active with the replica engine productions plus two of his own designs, the Golden Eagle and the Spielmaker 60. He has also produced the Megow 199 and the Bantam 16 engines. The latter are still available and can be obtained from Karl Spielmaker at his address: 4690 Burlingame, S.W., Wyoming, Michigan 49509.

Time really marches on! Seems like yesterday this writer was talking to Ted Cock's young son about his models. Now Photo No.12 shows up with Ted and his grandson getting together on an official flight. Ted is still quite active in free flight, entering and placing in four events. A good



16. A Gil Sherman Rambler by Bo Buice, SAM 29. Super Cyke power, flown by Tim Horner. Photo: Buice.

17. From Old Warden Aerodrome Vintage Day comes this shot of Arthur Fox's At Ease, with a Kalt .45 four-cycle.

haul of trophies for two days of flying.

We didn't get a writeup on this meet but did get the results. Karl is a most ambitious C.D., as he scheduled 18 events of which only four were O/T R/C types. Big winners in the R/C events were the same names: Buck Zehr, Bucky Walters, and Art White. The only breakthrough was Bob DeClerq's win in the Texaco Event.

Probably the biggest surprise of the day was the number of entrants (7) in the Compressed Air event. Photo No. 13 shows Don Lockwood (Nats winner) hand-launching his original design, a very stable model. The compressed air event was won by that good flying model that Jim Noonan brings out every year. Karl thinks it is the greatest thing since sliced bread. (If you can remember that, you are truly an old timer!)

Looking over the results that we won't publish, it certainly was a pleasure to see Charlie Sotich's name as a winner of the Class D Rubber Cabin Event. Ditto for Ed Konefes in Cl. C Stick (he actually won one first, one second, one third, one fourth, and one fifth . . . how about that?).

Elmer Jordan was up to his old tricks taking first in Class A-B Cabin, first in Class C Cabin, second in Class A Pylon, and fifth in Class B-C Pylon. Not a bad day's work! Probably the one that tickled this writer was the time of 2 minutes, 37 seconds posted by Bob Pattison in the Twin Pusher Event. That's good flying!

After the success of this meet, Karl is looking for a slot in the calendar that won't conflict with the SAM Champs at Lawrence-

Continued on page 80

14. The Vintage Rubber proxy team, Keith Murray and Peter Lloyd at the Richmond MAAA Nats with Pond's Pomona Champ.

15. Paul Gilliam at the Grand Prairie NAS with an L-5 Stinson Sentinal flying scale model.

Old Timer of the Month

SPOOK 48

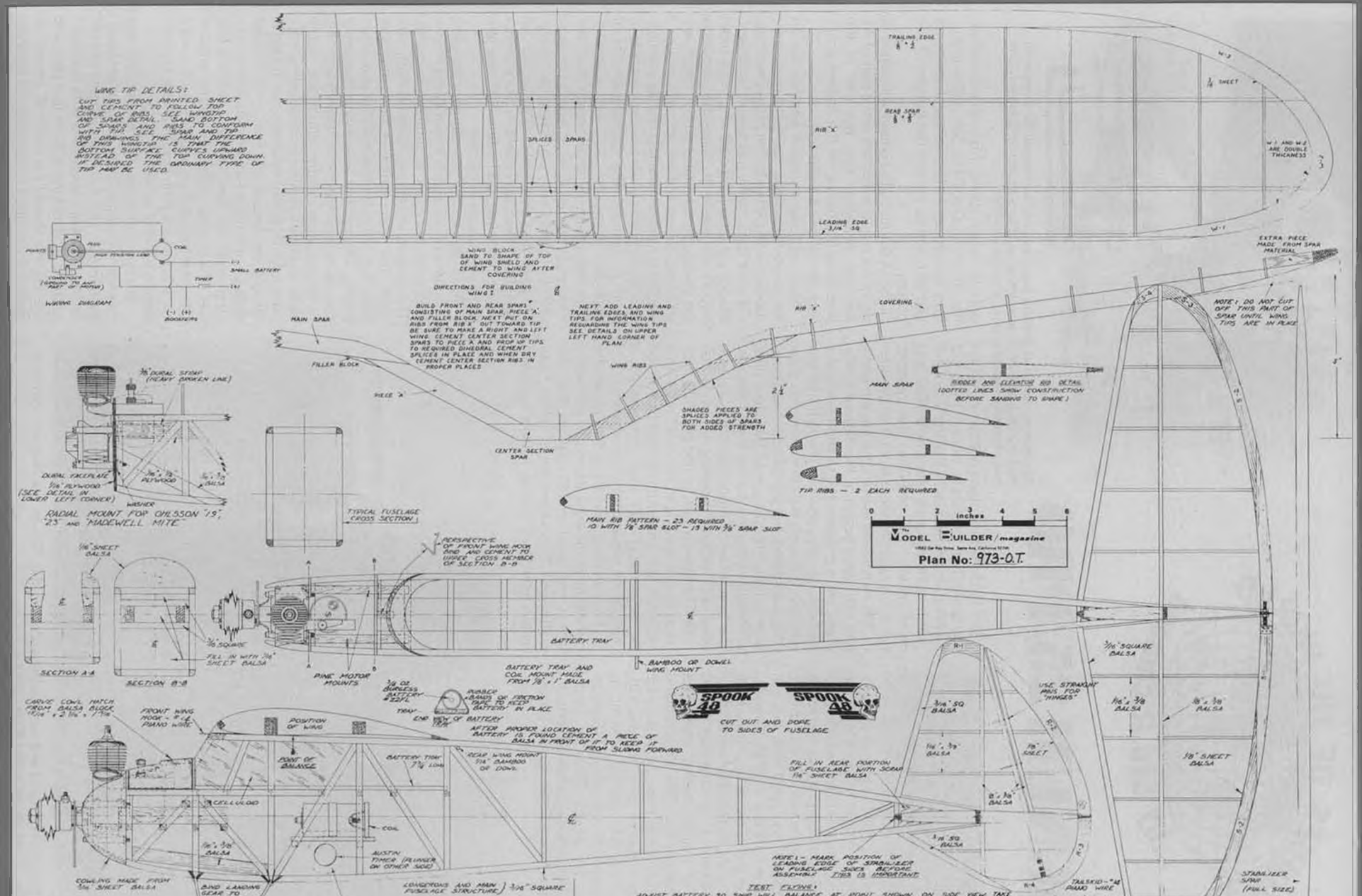
Designed by: Barney Snyder & John Muir

Plan by: John Muir

• Although the Spook did not appear as a kit until the spring of 1940, it can be proven that the prototype was flying in competition prior to December 31, 1938, which qualifies it as an Antique. This information comes from Barney Snyder, co-designer of the Spook, along with John Muir, and then owner of Modelcraft, which manufactured the kit.

The model in the photograph was built by Marge Bernhardt, Phil's mother, and is her third model, all Antiques. It is covered in orange silk and is powered by an Ohlsson .23, with a Tornado 9-4 prop. Engine has not yet been opened up to full power.

Entire fuselage, just ahead of the tail surfaces, is separated and hinged for the dethermalizer. •


WING TIP DETAILS:
CUT TIPS FROM PAINTED SHEET AND CEMENT TO FOLLOW TOP CURVE OF RIBS. SEE WING TOP AND SPAR DETAIL. SAND BOTTOM OF SPARS AND RIBS TO CONFORM WITH TIP. SEE SPAR AND TIP END DRAWINGS. THE MAIN DIFFERENCE OF THIS WING TIP IS THAT THE BOTTOM SURFACE CURVES UPWARD INSTEAD OF THE TOP CURVING DOWN. IF DESIRED, THE ORDINARY TYPE OF TIP MAY BE USED.
TRAILING EDGE
REAR SPAR
RIB 'X'
SPLICES
SPARS
LEADING EDGE
W-1 AND W-2 ARE DOUBLE THICKNESS
WING BLOCK
SAND TO SHAPE OF TOP OF WING SHIELD AND CEMENT TO WING AFTER COVERING
EXTRA PIECE MADE FROM SPAR MATERIAL
DIRECTIONS FOR BUILDING WING:
BUILD FRONT AND REAR SPARS CONSISTING OF MAIN SPAR, PIECE 'A' AND FILLER BLOCK. NEXT PUT ON RIBS FROM RIB 'X' OUT TOWARD TIP BE SURE TO MAKE A RIGHT AND LEFT WING. CEMENT CENTER SECTION SPARS TO PIECE 'A' AND PROP UP TIPS TO REQUIRED DIHEDRAL. CEMENT SPLICES IN PLACE AND WHEN DRY CEMENT CENTER SECTION RIBS IN PROPER PLACES
NEXT ADD LEADING AND TRAILING EDGES, AND WING TIPS. FOR INFORMATION REGARDING THE WING TIPS SEE DETAILS ON UPPER LEFT HAND CORNER OF PLAN
NOTE: DO NOT CUT OFF THIS PART OF SPAR UNTIL WING TIPS ARE IN PLACE
MAIN SPAR
FILLER BLOCK
PIECE 'A'
WING RIBS
COVERING
SHADED PIECES ARE SPLICES APPLIED TO BOTH SIDES OF SPARS FOR ADDED STRENGTH
CENTER SECTION SPAR
RUDDER AND ELEVATOR RIB DETAIL (DOTTED LINES SHOW CONSTRUCTION BEFORE SANDING TO SHAPE)
TIP RIBS — 2 EACH REQUIRED
MAIN RIB PATTERN — 23 REQUIRED. 10 WITH 3/8" SPAR SLOT — 13 WITH 3/16" SPAR SLOT
WIRING DIAGRAM
SMALL BATTERY
TIMER
(-) (+) BOOSTER
3/16" DURAL STRIP (HEAVY BROKEN LINE)
DURAL TAKE-PLATE
1/16" PLYWOOD (SEE DETAIL IN LOWER LEFT CORNER)
3/16" x 3/8" PLYWOOD
1/4" x 1/2" BALSA
WASHER
RADIAL MOUNT FOR OHLSSON "19", "23" AND "MADEWELL MITE"
TYPICAL FUSELAGE CROSS SECTION
1/16" SHEET BALSA
3/16 SQUARE
FILL IN WITH 1/16" SHEET BALSA
SECTION A-A
SECTION B-B
PERSPECTIVE OF FRONT WING HOOK AND CEMENT TO UPPER CROSS MEMBER OF SECTION B-B
PINE MOTOR MOUNTS
BATTERY TRAY
BAMBOO OR DOWEL WING MOUNT
BATTERY TRAY AND COIL MOUNT MADE FROM 1/8" x 1" BALSA
3/8 OZ. BURGESS BATTERY
RUBBER BANDS OR FRICTION TAPE TO HOLD BATTERY IN PLACE
TRAY
END VIEW OF BATTERY
AFTER PROPER LOCATION OF BATTERY IS FOUND CEMENT A PIECE OF BALSA IN FRONT OF IT TO KEEP IT FROM SLIDING FORWARD
SPOOK 48
SPOOK 48
CUT OUT AND DOPE TO SIDES OF FUSELAGE
CARVE COWL TO MATCH FROM BALSA BLOCK 1 1/16" x 2 3/16" x 1 7/16"
FRONT WING HOOK — 1/16" PIANO WIRE
POSITION OF WING
POINT OF BALANCE
BATTERY TRAY 7/8" LONG
REAR WING MOUNT 1/16" BAMBOO OR DOWEL
CELLULOID
COIL
AUSTIN TIMER (PLUNGER ON OTHER SIDE)
1/8" x 3/8" BALSA
COWLING MADE FROM 1/16" SHEET BALSA
BIND LANDING GEAR TO LONGERONS WITH BENT THREAD AND CEMENT WELL
LANDING GEAR 1/16" PIANO WIRE
LONGERONS AND MAIN FUSELAGE STRUCTURE
3/16" SQUARE
FUSELAGE UPRIGHTS AND CROSS MEMBERS ARE 3/16" FROM THIS STATION BACK
SUGGESTED FIRE-WALL FOR USE WHEN MOUNTING AN OHLSSON "19" OR "23" RADIALLY (1/4 PLYWOOD)
DURAL FACE PLATE
IF AUSTIN TIMER IS USED MOUNT ON PIECE OF SHEET BALSA AND CEMENT BETWEEN UPRIGHTS WHERE SHOWN
THIS KIT MANUFACTURED BY MODELCRAFT 1306 S. VERMONT AVENUE LOS ANGELES, CALIFORNIA
FILL IN REAR PORTION OF FUSELAGE WITH SCRAP 1/16" SHEET BALSA
NOTE 1 — MARK POSITION OF LEADING EDGE OF STABILIZER ON FUSELAGE SIDES BEFORE ASSEMBLY. THIS IS IMPORTANT
USE STRAIGHT PINS FOR "HINGES"
3/16" SQUARE BALSA
1/16" x 3/8" BALSA
1/8" x 3/8" BALSA
1/16" SHEET
1/8" SHEET BALSA
3/16" SQ. BALSA
TAILSKID — "48" PIANO WIRE
1/16" SPAR
THREAD
TAILSKID DETAIL
STABILIZER SPAR (FULL SIZE)
TEST FLYING:
ADJUST BATTERY SO SHIP WILL BALANCE AT POINT SHOWN ON SIDE VIEW. TAKE SHIP TO A SMOOTH FIELD AND USE JUST ENOUGH ENGINE POWER TO MAKE IT TAXI. RUN IT ACROSS GROUND, ADJUSTING RUDDER UNTIL IT RUNS IN A STRAIGHT LINE. PUT A PIECE OF WOOD ABOUT 1/8" THICK UNDER TRAILING EDGE TO KEEP SHIP FROM FLYING. WHEN SHIP RUNS IN STRAIGHT LINE TAKE WOOD OUT FROM T.E. AND GIVE ENGINE A LITTLE MORE POWER, JUST ENOUGH TO TAKE OFF. SET TIMER FOR NOT LESS THAN 10 AND NOT MORE THAN 20 SECONDS. ADJUST RUDDER FOR DESIRED CIRCLE, INCREASING POWER A LITTLE AT A TIME. IF SHIP HAS A TENDENCY TO STALL AS POWER IS INCREASED, TILT MOTOR DOWN. INCREASE DOWN THRUST UNTIL SHIP CAN BE FLOWN WITH FULL POWER. SHIP SHOULD CIRCLE TO LEFT UNDER POWER, BUT DO NOT INSIST ON THIS AS IT WOULD BE NECESSARY TO REBUILD SOME SHIPS TO KEEP THEM FROM FLYING TO THE RIGHT. KEEP THE CIRCLE WIDE ENOUGH SO THAT THE SHIP DOES NOT SPIN IN. THE IDEAL CIRCLE IS ONE THAT IS TIGHT ENOUGH FOR THE SPEED OF THE PLANE TO PUT IT INTO A GLIDE WITHOUT A STALL AND WIDE TOO TIGHT A LEFT CABLE IS CORRECTED BY TURNING ENGINE TO RIGHT. IMPORTANT: MAKE ONLY ONE ADJUSTMENT BETWEEN FLIGHTS.
0 1 2 3 4 5 6 inches
The MODEL BUILDER/magazine
Plan No: 973-O.T.
THE "SPOOK 48"
WINGSPAN — 48 INCHES. FLYING WEIGHT — 18 OZ.
POWER WITH ANY CLASS 'A' OR 'B' ENGINE.
ORIGINAL DESIGN BY — BARNEY SNYDER AND JOHN MUIR
DRAWN AND TRACED BY — JOHN MUIR
CHECKED BY — BARNEY SNYDER AND STUART JONES

ENGINES OF THE WORLD

...by Stu Richmond

MAGNUM 25/PRO

Removable dual ball bearing front end can be rotated 90 degrees so that the Magnum 25/Pro could be used in a pusher R/C model. The manufacturer also produces a pusher muffler.

FIRST IMPRESSIONS: beautiful castings, beautiful machining, beautiful value. This engine is a clone of O.S.'s similar size .25 cubic inch displacement engine, but carries a lower price.

• The Magnum 25/PRO engines are produced by Thunder Tiger Model Co. in the most modern of model manufacturing factories. The present building was erected in 1985 in Taichung Industry Park, Taiwan, and it was heavily equipped with modern sophisticated machinery in 1986. Thunder Tiger has won the "One of Ten Finest Outstanding Factories and Mines Award" in the Republic of China. They have over 40,000 square feet of manufacturing space, are fully computerized with MIS, Research and Development, and they manufacture model engines, model cars, airplane kits, accessories, and R/C control systems as well. Their products are sold in 36 countries around the world. Thunder Tiger's modern efficiencies have allowed *reduced* prices to become available for our model pleasures.

But back to this month's engine. When the crankshaft is slowly turned by hand there's just the slightest hint of the top of the piston grabbing or pinching near TDC (top dead center). This indicates the cylinder has a very slight modern taper. The cylinder is .708 inch inside diameter at the top and a few millionths bigger at the bottom inside diameter to enhance the piston-to-cylinder seal during compression. The cylinder has a husky .060-inch wall thickness. No glow plug is supplied, but the cylinder head does have a brass insert to hold the glow plug and inhibit stripping out the head's threads. The head's combustion chamber is a single bowl .475 inch in diameter and .115 inch high. The bowl is surrounded by a .120-inch wide squish band, and the head rests on a .015-inch soft aluminum gasket that forms the head-to-cylinder seal. This design is completely modern and conventional.

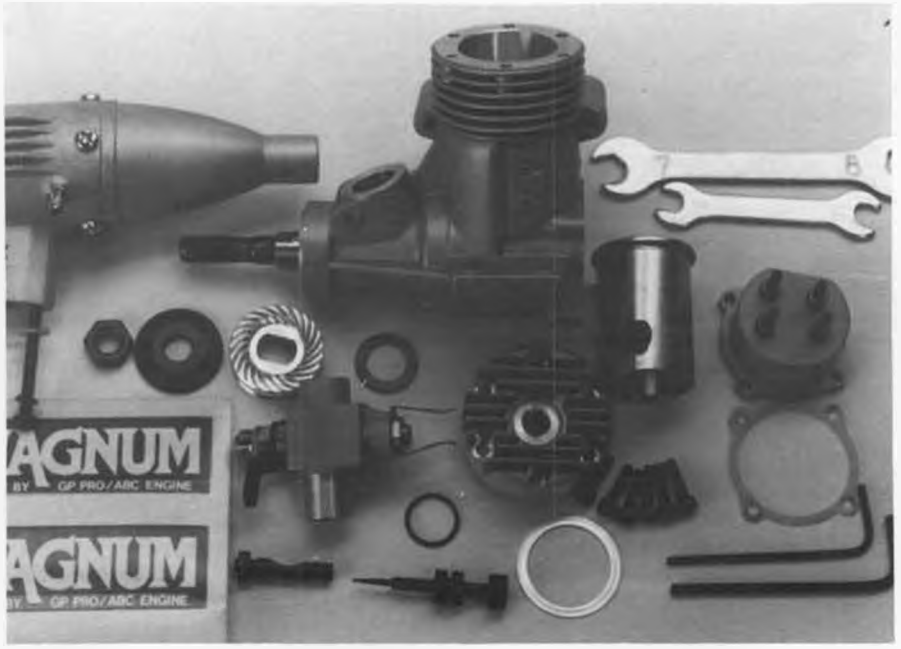
The bottom of the piston rises above the bottom lip of the exhaust port by .005 inch; this is not usual in R/C engines that idle really well. This clearance is called "sub-piston induction," and it's usually common only to single speed, high speed engines like the small Cox .049s. Sub-piston induction introduces additional combustion air and also serves to cool the bottom of the piston.

The Magnum 25/Pro comes with a pair of shiny open-end wrenches and a pair of Allen hex wrenches too. But two of the wrenches fit nothing on the engine; omission would be cost-effective.

Many of today's smaller engines use an air bleed carburetor, but this one is truly modern in that it has both a high-speed needle valve (beautifully machined, hardened, blackened, and protected in a vinyl tube) and an idle needle that leans the mixture as the throttle barrel rotates shut. A simply engineered almost hidden spring serves as a ratchet to maintain the idle needle's setting. The high-speed needle has dual ratchets to hold its setting. The carburetor's throat measures a modest .220-inch diameter. This conservatively small inside diameter ensures good fuel draw although the muffler also comes with a pressure tap to supply pressure to the fuel tank to further aid fuel draw. The carb is held in place with a single pinch rod, and a tiny "O" ring prevents air leakage at its base.

The Magnum 25/Pro is aimed at the sport flier who might match it to a Great Planes Perfect Trainer *P.T. 20* or similar size model. The engine, at *very* competitive cost, provides the chrome-plated brass cylinder liner that expands more than the aluminum piston, a feature that lessens the chances of damaging metal-to-metal fits with a wrongly set too lean needle adjustment to the carb. And this engine's crankshaft is supported by dual ball bearings that increase the engine's useful life. Fuel draw is good enough to pull fuel up from another popular trainer's too low fuel tank position (the fuel tank should always be with its horizontal centerline at the same or slightly lower, 1/8 inch to 3/8 inch height as the engine's needle valve or valves).

Before running any new engine, the rear crankcase cover and the glow plug should be removed and the entire engine should be immersed in a bowl filled with isopropyl rubbing alcohol (about 35 cents a pint) and the engine should be swished around to flush out any stray metal particles inadver-



Parts reveal flawless machining and electroplating. Produced in Taiwan, the Magnum 25/Pro is a clone of the O.S. of the same size from Japan.

tently left there during assembly. Stray metal particles can ruin precision fits. Nothing else should be disassembled! A big curly piece of aluminum came out of this engine; *not* unusual. The four rear crankcase cover bolts were slightly loose, probably due to the paper sealing gasket having compressed with time. The crankshaft has a fuel/air inlet window that is .305-inch wide by .345-inch long, and the passageway inside the crank is .325-inch diameter. Without doubt a larger throat carb would allow this engine to run much faster and produce more power, but performance as a *user-friendly* sport engine is the manufacturer's aim. A pair of 180-degree opposed flats key the prop driver to the shaft. A blackened steel washer .040-inch thick fits behind the prop driver to make sure the driver's rear surface won't touch the outer race of the front ball bearing when an electric starter is used.

The Magnum 25 connecting rod is cut from a long aluminum extrusion; only the sides and ends are machined. The bottom hole is bushed, and two peripheral lubrication holes are drilled.

A 20-page English instruction booklet is the most/best I've seen, but page three contains a parts identification chart that has some glaring errors. The glow plug is called a prop washer; the crankcase is called a needle valve, etc. It's darn little to find wrong with a fine value sport engine! An attractive sheet of red-white-blue emblems (three different sizes) is included to decorate your model.

Performance with muffler after break-in; Master Airscrews; Red Max 10-percent fuel; K&B #4520 glowplug. Engine and muffler weigh 10 ounces.

Prop Size	High Speed	Idle Speed	Speed Ratio
8-4	15,200	2,700	5.6 to 1
9-4	13,400*	2,400	5.6 to 1
9-6	12,550	2,200	5.7 to 1
9-1/2-6	11,750	2,100	5.6 to 1

*Peaks at 14,300 rpm without muffler

A speed range below 4:1 is unsatisfactory performance.

A speed range of 4:1 is barely satisfactory performance.

A speed range of 5:1 is average performance.

A speed range of 6:1 is excellent performance.

A speed range above 6:1 is superb performance.

The Magnum 25/Pro FSR-ABC R/C engine is imported into the USA from Taiwan, Republic of China by: Varicom Industries, 18480 Bandilier Circle, Fountain Valley, California 92728. Retail price is quoted at $102.95.

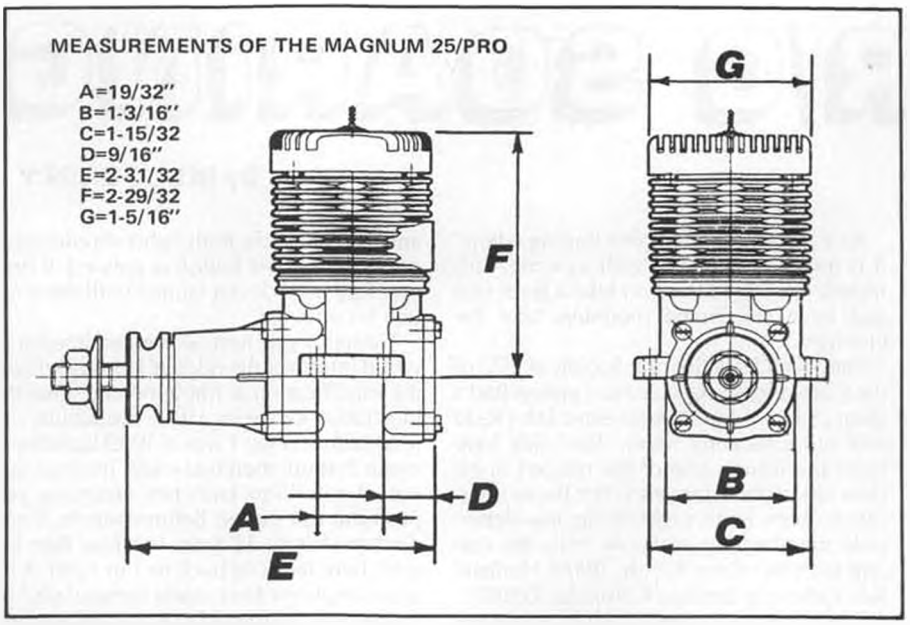
Inside diameter of the carburetor's throat is .220 inch.

Inside diameter of the muffler's outlet is .310 inch.

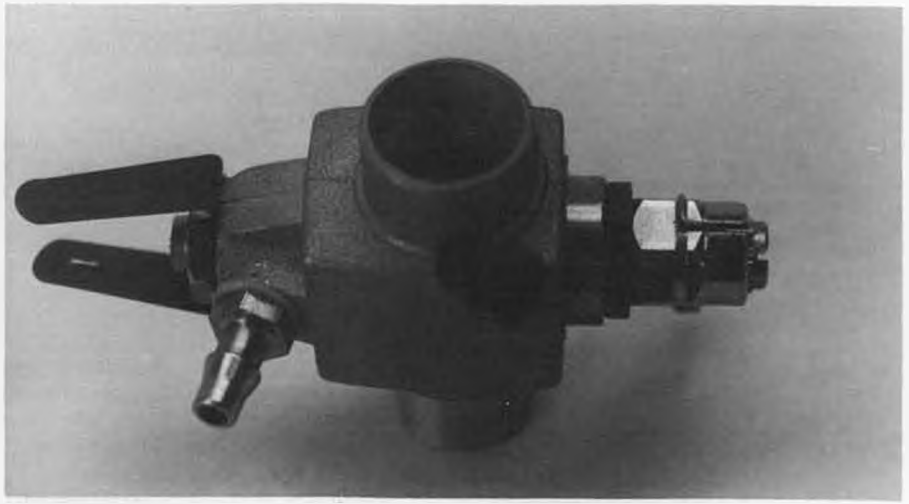
Displacement is .25 cubic inch or 4.07 cubic centimeters.

The engine *with* matching muffler weighs 10 ounces (muffler weighs 2-1/2 ounces).

The Magnum engines are advertised in the USA, England, France, and many other countries. Substantial discounts from retail are often available. •



Generic engine is shown above.



A dual sheet metal spring ratchet(left) maintains the setting for the high speed needle valve. A clever tiny wire spring dual ratchet(right) does the same for the idle needle whose screw/slot is visible at the extreme right.

Magnum 25/Pro offers unusually fine options of dual ball bearings and an aluminum piston with a chromed brass cylinder, at attractive pricing.

R/C SOARING

By BILL FORREY

As a *Model Builder* "contributing editor," it is my duty to edit as well as write. This month it is time for me to take a back seat and let a few noted modelers take the limelight.

The Pike's Peak Soaring Society (PPSS) of the Colorado Springs area has always had a great club and a great newsletter. John Read and more recently Randy Reynolds have been publishing one of the nation's finest club newsletters for years. For those interested, there is an eight-dollar newsletter-only membership available from the current treasurer Barry Welsh, 10565 Hungate Rd., Colorado Springs, Colorado 80908.

The thing that makes a club newsletter really special (like the PPSS' newsletter *The Spoiler*) is that it not only gives the vital club news and announcements, but it encourages special effort articles by its members which enrich and edify the club as a whole. Often, these special articles are picked up by other newsletter editors and even columnists thereby benefiting a much greater number of soaring enthusiasts.

The following winch modification article was written by Barry Welsh for safety reasons. It is a very unique way of making a potentially hazardous piece of equipment a little safer both for the people around the winch and for the aircraft being subjected to its powers. Barry gives it as a "Winch Note" for club members informing them of a change in the club launching equipment. All clubs should look into the feasibility of emulating this idea.

"The club winches have double relays installed now for protection against stuck contact failures. In May a relay stuck and did impressive things to my Oly II. At that time I installed the double relays and test lights. During a contest in October a relay stuck again, but this time the only indication of failure was a bright test light! If you want maximum protection against failures of this kind *use the test button* before each and every launch. Both lights should come on when the test button is pressed. If only one light is on *do not launch* until the problem is corrected.

"Some of you have expressed interest in why it improves the odds of failure and how the modification is implemented. (See the illustration for wiring.) If the probability of a relay failure is say 1 out of 1000 launches (I made that up) then two relays in series is 1 out of a million launches assuming you push the test button before launch. If you don't push it for 32 times in a row, then the odds have reduced back to 1 in 1000. A lot of assumptions were made in the math, but it gives you an idea of the scale of the protection that is added with $14 worth of parts." As I said, the above was published in the PPSS newsletter. The following more detailed description was furnished by Barry to me directly for publication here.

SAVE A SAILPLANE

"Are you willing to make a $14 modification to your launching winch to prevent an occasional failure due to sticking relay contacts?

The Setup

"Most launching winches for R/C sailplanes I've observed consist of a 12-volt battery, a relay, a footswitch, a motor, and a reel mechanism for the line. Some units have a second switch used to disable the footswitch. The footswitch activates the relay which contains a set of contacts which connect the battery to the motor. (See Figure 1.)

The Problem

"Because very high currents pass through the contacts, they will occasionally become welded closed and will not open when the footswitch is released. The launching motor continues to run at full power and often causes the destruction of the sailplane being launched. I can tell you from experience that my Oly II can withstand full power for about one and a half seconds before the wings succumb to the high loading. One solution to this problem that I have seen implemented is to put a heavy knife switch in series with one of the main battery cables. The idea here is to pull the switch open if the relay sticks. The rub here is that by the time it would occur to me to pull the switch, my Oly would already be toothpicks! Another problem with this solution is that switches that can withstand the high currents involved are hard to find.

A Better Solution

"Here is a simple solution that is inexpensive, does not require quick thinking at the moment of truth, and approaches the absolute security of the manual knife switch.

"Adding a second relay in series with the first, with test lights, can cost under $15. (See figure 2.) Look what it can do for you. If the chances of a single relay system failing are one in a thousand launches (a wild guess), then two relays in series will fail only one in a million launches! I believe that this kind of reliability can be achieved with standard Ford starter relays from your local discount auto parts store for a cost of about $8. (See materials list).

"Every solution has drawbacks. In order to achieve the least chance of winch failure with the double relay system, the test button must be pushed before each launch to make sure one of the relays did not stick during the last launch. If the pilots do not push the test button, the probability of failure reduces to the same as a single relay system after approximately 32 launches.

The Implementation

"First disconnect the battery cable from the negative battery post. This prevents accidental shorts while you are installing the second relay. Disconnect the cable between the relay and the motor. Mount the new relay in a convenient position. If possible, mount it directly facing the existing relay. This makes it possible to use a solid copper or brass connection between the newly unhooked existing relay terminal and one of the terminals on the new relay. I use a short piece of half-inch copper tube with the ends smashed flat. You must use something large enough to handle the heavy current. A very short length of conventional battery cable will work OK. Connect the cable from the motor to the remaining terminal of the second relay. Next,

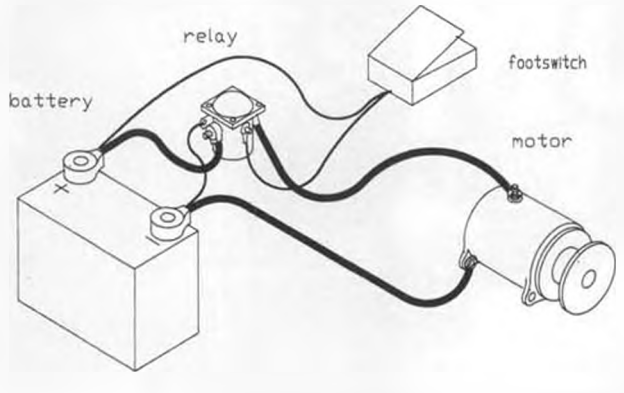


Figure 1

MINIMUM WINCH HOOKUP

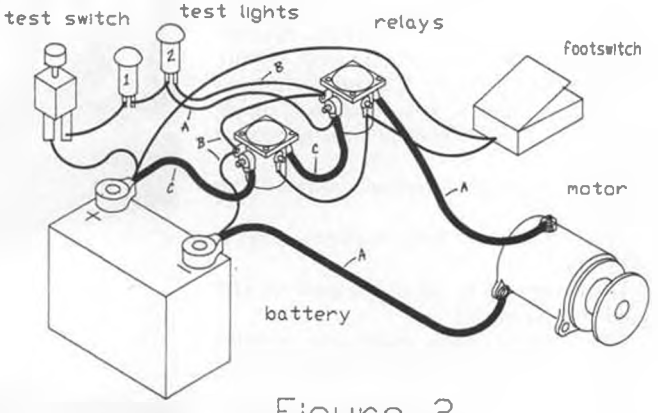


Figure 2

DOUBLE RELAY HOOKUP

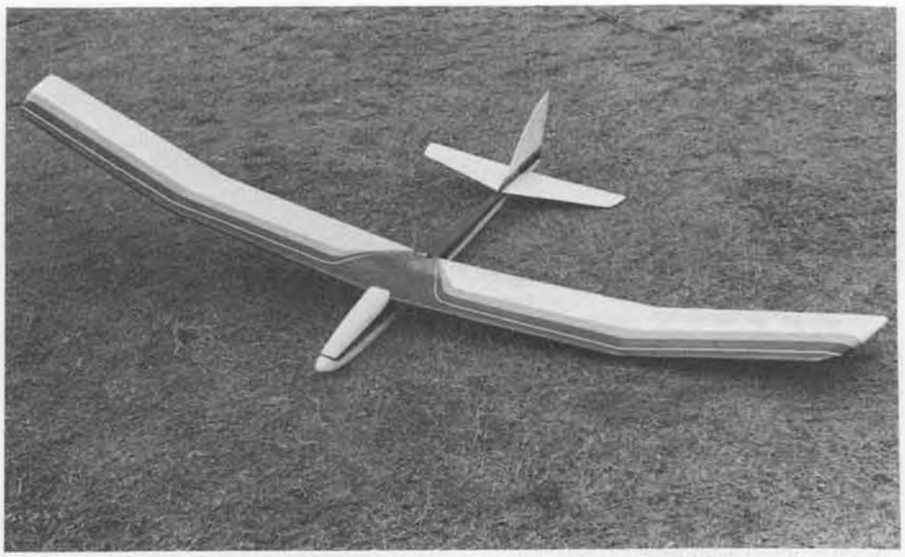
connect a short length of 20-gauge wire between the existing relay's activation terminal and the new relay's activation terminal. The footswitch should already be connected to the existing relay at this terminal. The negative battery side connections normally are made through the metal frame of the launching system. Simply bolting the new relay to the frame will make this connection. Next, wire one terminal of the test switch to the positive battery cable at any convenient connector. This might be the positive side of the existing relay. Wire up one wire from a test light to the other terminal of the test switch. The remaining wire of this test light is connected to the other side of the first relay. This is where you have connected the short cable or metal strip to the other relay. One wire from the second test light is also connected to this point. The remaining wire is connected to the chassis or any other negative battery connection. Connect the negative battery cable back to the battery and you are ready to fly.

"Before every launch, push the test button. If both relays are OK, both lights should light about half bright. If either set of relay contacts are stuck shut, one or the other test light will be brightly lit. If this is the case, usually a light tap to the relay will jar the contacts open. If a particular relay sticks more than twice a year, I would recommend replacing it.

"May you have good lift.

Material List

"Ford Starter Solenoid Switch, $7.99, Wells/Ampco F496; SPDT Momentary Push Button Switch, $1.89, Radio Shack #275-619; 20-gauge hookup wire, $2.40, Radio Shack; and 12-V Lamp Assembly (2 needed), 2/$1.69, Radio Shack #272-332; total, $13.97." After many minutes of studying the wiring diagram, it would seem to me that if the solenoid closest to the motor should stick, then when you press the test button only bulb #1 should glow. This would happen because the current which would normally pass through the second bulb and return to the battery via route "B" would mostly flow down the path of least resistance "A," through the dead short of the solenoid switch, though the motor, and back to the negative terminal of the battery. The first bulb would limit the current to a trickle, and shouldn't be enough to turn the motor.



The Midway Model Company's Gnome 2-M is typical of the Heavy Metal flying syndrome as detailed in the text.

In the case where the solenoid closest to the battery sticks shut, then I perceive a different circuit closing which should light the second bulb even without the test switch being thrown. It flows from the positive terminal along cable "C," through the stuck solenoid, up to the second solenoid, along wire "A" toward bulb #2, through bulb #2, and back to the negative terminal of the battery via route "B." In this instance, pressing the test button would light the first bulb also. The message here is, take the warning from the self-lit #2 bulb, something is wrong!

Again, I have no experience with this system as does Barry, so I may be wrong.

LOW TECH STUFF FROM BRIAN CHAN

Brian Chan is a well-known flier in the U.S. His picture often appears in these pages because he is a devoted glider guider who loves to fly in contests with exotic or different models. This writer spots him and is compelled to take due notice with camera and note pad.

Well, Brian has built and flown many an aileron sailplane with fiberglass fuselage and foam core wing. I would like to present you with his tips on servo installations courtesy of the South Bay Soaring Society newsletter *Silent Flyer*, John Dvorak editor (reprinted in *The Spoiler*).

Fuselage Servo Tray Mounting

"Would you like to know a quick and easy way to install the servo tray in a fiberglass fuselage that would not pop loose when landing? If so, read on.

"The basic problem is, it is hard to prep

Would you believe a Gnome 2-M-only contest? It happened a while back at a D.U.S.T. club function in Palm Desert!

the fuselage for epoxy to adhere to. The easy way to solve this problem is to use silicone rubber.

"Step 1: Fit servo tray to fuselage, I usually use 1/4-inch plywood. The fit is not very important, a 1/16 gap is all right.

"Step 2: Use cyanoacrylate, tack glue the servo tray into position.

"Step 3: Here is the messy part. Use silicone rubber to form a fillet on the top and bottom side of the servo tray. Using your finger is the easy way to do it; works the best but messy. Everything will slip off your finger for the next day or so. Refer to drawing for details.

"You notice that it is not necessary to sand the inside of the fuselage for the RTV (silicone) to adhere to.

"That's why it is the quick and easy way. The silicone rubber will actually act as a shock mount for the servo tray and servos.

Aileron Servo Mounting

"Question: Is there an easy way to install servos in the wing?

"Answer: No, but there is some way that works better than others.

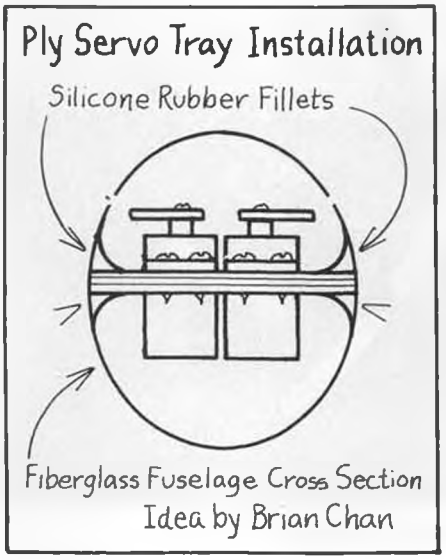
"For open structure, wood framed wing, it is not too hard to mount a servo in the wing out by the ailerons. Locate the bay in which the servo will be installed. Cut a piece of 1/8-inch plywood to go between two ribs, cut a slot for the servo arm to come through the plywood (see illustration), glue the servo onto the plywood with silicone rubber, position the servo so that the servo arm comes through the slot. Make the direction of servo travel correct; i.e., so that one aileron goes up and the other one goes down, unless you are working on the flaps. After the silicone is dry, glue the plywood flush with the bottom of the rib (or the wing) with the servo on the inside of the wing. Now all you have to do is the wiring for the servos and then cover the wing with your choice of covering.

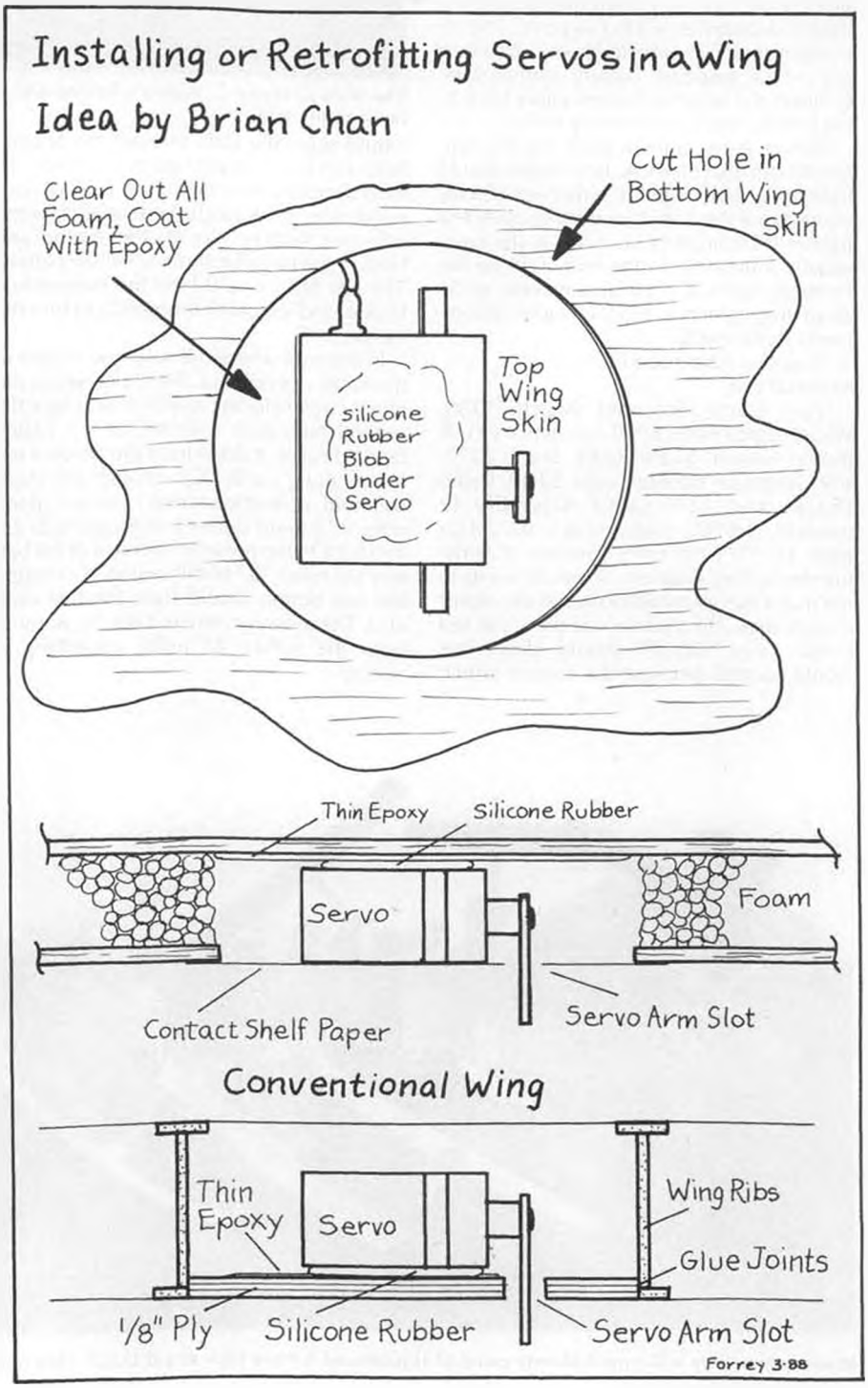
"For the foam wing, locate the spot which the servo will be installed. Remove bottom skin material; the best way is to cut a round hole just a little bigger than the servo, remove the foam all the way to the top skin. Lay the wing top surface down on the table, mix some slow curing epoxy and pour it into the servo hole to create a flat surface for the servo to glue to. Make sure not to use too much epoxy, just enough to cover the inside surface, otherwise the servo may hang below the wing. This will also stiffen the top surface for the servo to mount.

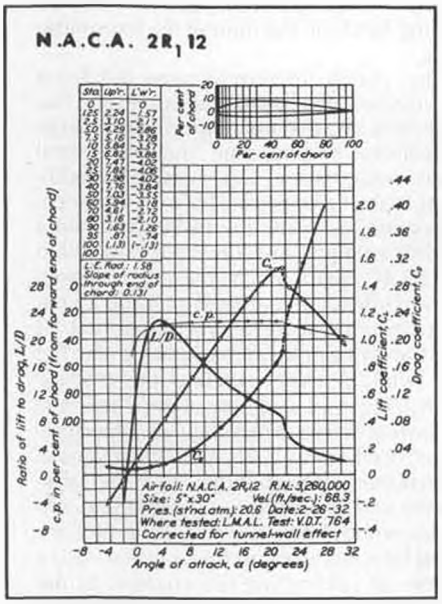
"Here comes the fun part, use silicone rubber to glue the servo to the cured epoxy, use enough of the silicone rubber to create a good bond, but not too much to make a mess. Now use masking tape to hold the servo in place until the glue is set. This will also set the level of the servo flush with the bottom surface of the wing.

"To finish the job, cut a round disk of contact shelf paper a little bigger than the hole for the servo. Cut a slot for the servo arm to come through. Apply the sticky-backed paper to the wing with the servo arm hang-

Fred Fredrickson of S.O.A.R. club in Illinois sends this photo of a footswitch which is itself the solenoid switch.







ing down through the slot.

"Unfortunately, sometimes one has to remove the servo from the wing for repair (or whatever one does to a servo). To remove a silicone mounted servo, go find some dental floss, preferably unused variety, tuck it under the servo and then start sawing through the silicone. The dental floss works great.

"There is another way. I think it is a better way, but it involves more work, such as mold making and casting."

"HEAVY METAL" by Mike Hickman

One might also entitle this section, "Raising Your Efficiency by Raising Your Reynolds Numbers." From the Minnesota R/C Soaring Society comes this piece on flying heavy by Mike Hickman. If you fly a ship with an Eppler, Quabeck, Selig, Althaus, or Girsberger type of modern airfoil, then what Mike has to say may make perfect sense. Most modern sections were designed to become very efficient well above 100,000 Rn—speeds ranging high above the typical "gas bag floater" regime. These sections usually fall apart below this Rn level. If on the other hand your glider has an open structured, "turbulated," flat bottom airfoil or the like, what he has to say really doesn't pertain to you.

"How many times have you heard 'by using those little XYZ brand servos I saved three ounces,' or, 'I didn't want to sheet the tops of the wings because it would have added too much weight'? If I had a dollar for each time I have heard something similar, I know that I could go out and buy that new set of heavier and more accurate servos that my 'lead sleds' seem to thrive on.

NACA 2R112

Line #	Stn. %	Upper coord	Stn. %	Lower coord
1	0.00	0.001	0.00	-0.001
2	1.25	2.240	1.25	-1.570
3	2.50	3.100	2.50	-2.170
4	5.00	4.290	5.00	-2.860
5	7.50	5.160	7.50	-3.280
6	10.00	5.840	10.00	-3.570
7	15.00	6.820	15.00	-3.880
8	20.00	7.470	20.00	-4.020
9	25.00	7.820	25.00	-4.060
10	30.00	7.980	30.00	-4.020
11	40.00	7.760	40.00	-3.840
12	50.00	7.030	50.00	-3.550
13	60.00	5.940	60.00	-3.180
14	70.00	4.610	70.00	-2.720
15	80.00	3.160	80.00	-2.100
16	90.00	1.630	90.00	-1.260
17	95.00	0.870	95.00	-0.740
18	100.00	0.130	100.00	-0.130

Max. Thickness.....12.0% at 30% chord
Maximum Camber..... 2.0% at 30% chord

NACA data. Airfoil plotting by Cygnet Software Foiled Again program.

"After seven years at this hobby which we all tend to enjoy (at times), I have reached two conclusions, namely:

"1. No matter how hard you try, it is impossible to build a kit sailplane as light as kit manufacturers claim is possible.

"2. Who gives a damn!

"To some folks these are fighting words because they will go to unbelievable lengths to get a plane as light as it says on the box. Then these same folks can never figure out why their plane just doesn't seem to perform as well as the local club hotshot's seemingly identical plane. Unfortunately these poor souls have fallen prey to the magic of marketing. Once the manufacturer advertises that his 'Super Killer 100' has a flying weight of 45 ounces, then it becomes cast in stone that this is the proper weight to strive for.

"At the risk of having some of these stones cast back at me, I would suggest that the kit manufacturers would better serve their customers if they would abandon the marketing of low-advertised weights and suggest weights that would guarantee the plane a chance of flying as advertised or claimed (or close to how the club hotshot's same plane flies).

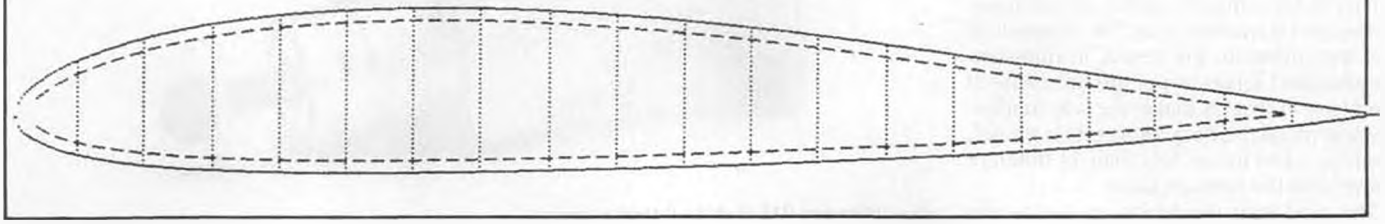
"Before I proceed further, I should say that the type of plane I am talking about is a high-performance sailplane with Eppler 205, Selig, or Quabeck type airfoils as opposed to the flat-bottomed Oly type.

"By now most of you are probably saying 'get to the point, Hickman,' so without any further beating around the bush, I contend that attempting to extract maximum performance out of a plane as defined above with a wing loading less than 9 oz. per sq. ft. is like trying to win a Formula One Gran Prix with a '55 Chevy Bel Air. It will run, but it won't get you anywhere.

"A Sagitta 900 at 42 to 44 oz. results in a wing loading of 6.72 to 7.04 oz. per sq. ft. It will fly at this weight, but it has the mobility and performance of a hog wallowing in a mud hole. Increase the weight to 56 oz. and it starts to come alive at 9 oz. per sq. ft. Increase the weight further to 75 oz., and at 12 oz. per sq. ft. it really comes into its element. At these higher weights the plane performs as its reputation would lead one to expect. It's too bad so many builders are misled and don't realize how simple it is to extract maximum performance from it. Just build it a little heavier and put the extra weight to good use in areas such as sheeted

Continued on page 82

Airfoil NACA 2R112– 7.00 ins: 177.8mm



European Scene

BY CEES KAIJIM

Seen at the 1988 Nurnberg show, the Profi MC 3030 radio system from Multiplex of Germany.

• News from the Nurnberg Show. Although there were less new products introduced at this "trade-and-press-only" show than last year, we found some interesting things certainly worth telling you about.

Multiplex, the German firm famous for its top-class gliders and hi-tech radios (which are really made in Germany for a change) showed their latest radio system, the PROFI MC 3030. The picture we managed to get hold of is not of the highest quality, but it enables you to see the clean design. However, as interesting as the design may be, that can't be enough to attract the sort of attention that this transmitter got at the Show. The real attraction was in the way Multiplex has approached the use of the programming possibilities of today's microprocessors. Their name for it is BOSS, an abbreviation standing (in German) for Benutzer Orientierte Sender Sprache, which, translated, means User Oriented Transmitter Language. The transmitter communicates —for the moment in German only—with its user through a large liquid-crystal display; the display has room for 64 positions on 4 lines.

The user can install the receiver and the servos in his airplane, switch on the transmitter, and start dedicating the channels of that transmitter to the servos in question. He shouldn't forget to put the full name of the plane in first, as that is the way to identify and recall the data for a certain model. There is room for no less than 14 different names and the relevant data!

The next step would be to decide the amount of throw for each channel, on each side of the neutral point, and the turning direction. After that he can either tell the transmitter which servos he wants mixed and the amount of mixing, or he can use one of the many included standard mixing programs that allow for even the most demanding F3B or chopper pilots. All the possibilities appear in full language on the display. The programming unit sits behind a sliding hatch on the front of the transmitter case.

Our search for engine news did bring some result. It appears that SuperTigre has definitely decided not to produce the large four-stroke engine they showed several years in succession. O.S. showed two additions to the Surpass series of four-stroke engines; the FS-70 and the FS-90. Enya had a slightly enlarged .46 four-stroke, now called the 53-4C. Saito, the Japanese four-stroke's only manufacturer, showed a 1.3 and a 3 cu. in. twin for the first time in Europe. That 1.3 twin, with a single overhung crank (like the .90 twin), is a very compact powerhouse with 1.9 hp and weighing under 2 pounds!

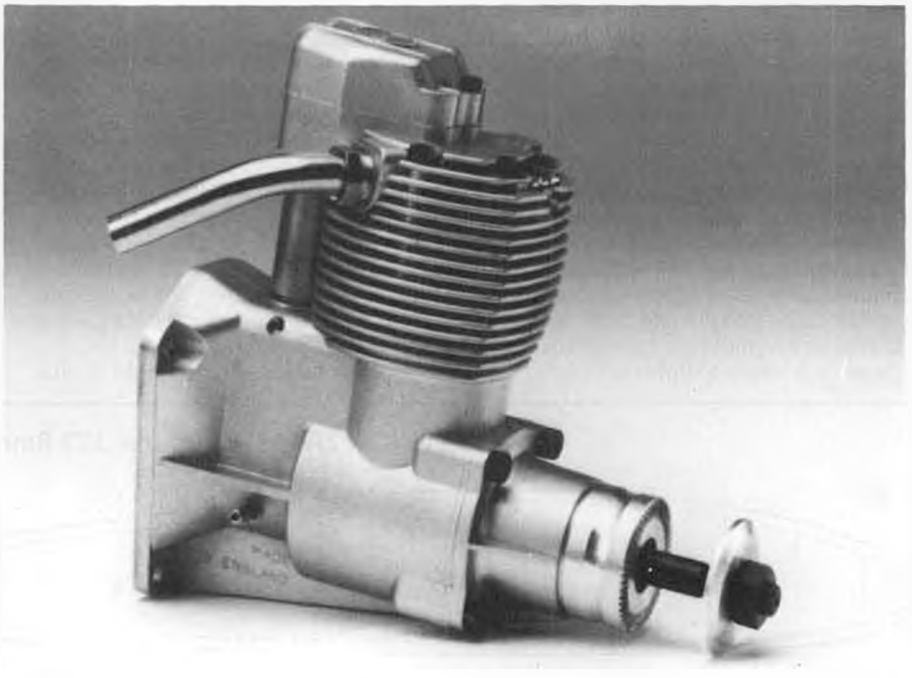
Turning to two-stroke engines: SuperTigre introduced new .61, .75, and .90 engines of which they claim that they have the same power characteristics as long-stroke engines, without being, in fact, long-strokers. Must be a matter of porting, I guess. Also a matter of porting are the changes to the OPS 1.8 single and 3.6 twin two-stroke glow engines. From now on, they both are available in two versions; for a normal silencer or for a tuned pipe.

Simprop, the German radio manufacturer, is going to distribute the British "Magnum" line of four-stroke engines, among which are the new 91S and 120S singles, the 180 and 240 V twins, and the radial three-cylinder 2.7 and 3.6 engines.

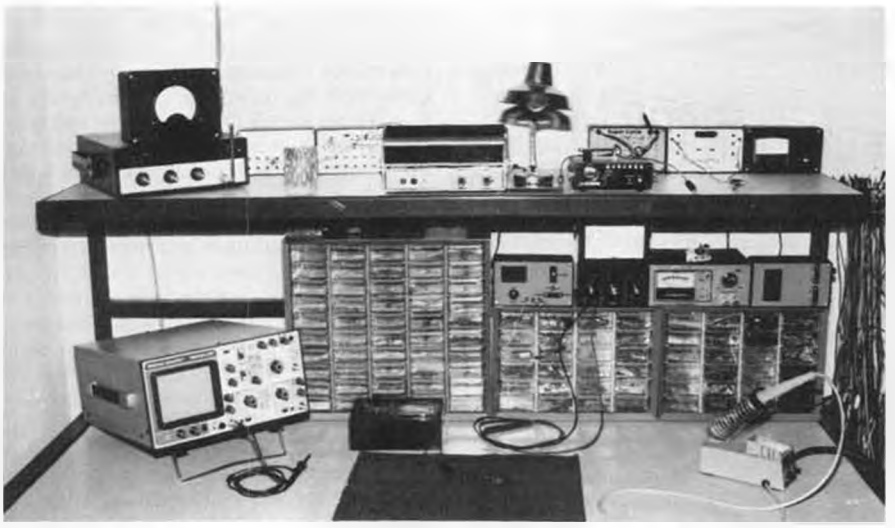
Another well-known European manufacturer, Webra, introduced a large marine engine, the .80 RCW. 3.1 hp is claimed for this ABC-engine with rear intake.

Schluter showed the Bell 222 Junior, a new fuselage around the Junior 50 mechanics. Their Champion is now delivered with a number of modifications, like an altered gear ratio (10:1) for those latest high-revving engines, a stronger motormount, improved tail rotor, and much more.

Well, I think I have covered most of the news now. See you back next month, when I'll have three enormous biplanes for you!•



New Magnum 91S Hi-Max 4-stroke engine.



Electronics Corner

By ELOY MAREZ

• Mail call! I don't always have the time to answer all of my mail as soon as I would like to, for which I ask your patience. Fortunately, many of you seem to be better in that respect, especially when I send out calls for help. Did I ever mention how much it pleases me to receive and pass on needed information?

For example, back in March we had a query from Barry Eisen, of Pittsburgh, about an article on single-channel flight that he remembered but could no longer locate. My SOS on that brought an immediate response from James Patten, in Urbana, Ohio. According to Jim, the article in question was written by a Chris Soenksen, and appeared in *American Aircraft Modeler* for April 1971. A footnote states that it was reprinted with permission from Paul Runge, the father of both Tom and Ace R/C, and my original supplier of quench coils and XFG-1 "valves" back in the days when Wee R/C was all there was.

The article ends with what I think is a fitting dedication to Frank "Dick" Adams, whom the author seemed to know personally. To fill in your R/C history knowledge, Dick Adams gave us the Adams Actuator, and further gave us, as the dedication reads: "uncountable pleasure-filled hours." Entitled "Pulse Rudder-Only Flying Techniques," this is excellent material, which now has a permanent home in my files. As I was reading it over, it came to me that this kind of information is infinitely more difficult to obtain than similar data on how to fly world class aerobatics or Mach .33 ducted fan models. And just think—you too can have your very own copy for only a business-size SASE. Oh, yes, if you care to include a donation to the AMA Building Fund, I will pass it along.

Thanks, Jim! And Barry, I'm not sure I'll be able to locate your address. If you haven't heard from me by the time you read this, please send it again so I can mail your copy. You'll enjoy it!

MORE MAIL

Another reader who sent in interesting and useful information is Mike Anderson, of Ames, Iowa. It also deals with an earlier item here in EC, referring to the use of 9-volt Ni-Cd batteries for various R/C purposes, especially those available under the "Varta" trade name. Mike had just completed a most comprehensive test and report for his club newsletter on the Varta and similar batteries, and was kind enough to send along a copy. He has thoroughly tested five brands of these small cells in all important aspects from charging to discharging, and clearly documented the results. This took a lot of time, and I hope Mike's club members appreciate his doing it. I know I do, and while I would like to include it here, I really don't have the space. Therefore, we'll have to resort to Plan "B," so if you are using or plan to use any under-100 mAh Ni-Cd cells, send along a SASE for a copy of Mike's fantastic battery report.

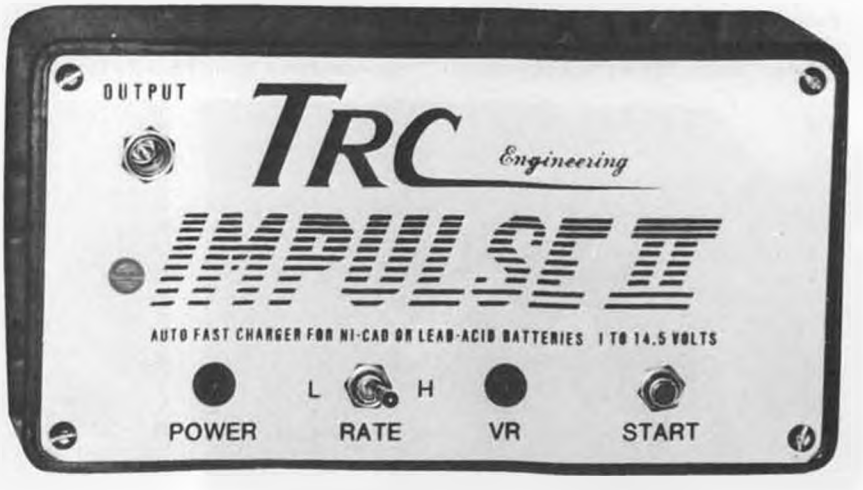
TALKING ABOUT NEWSLETTERS

I receive a few and am well aware of the tremendous efforts that a lot of you make in editing and having them published. A lot of the information is of local interest only, which is fine, as that is the main intent of the whole thing. But every now and then, something will appear in your newsletter that merits wider distribution, and if you spot something like that, for example Mike Anderson's battery information mentioned above, please send it along. Both the author and the newsletter will be given credit for anything used.

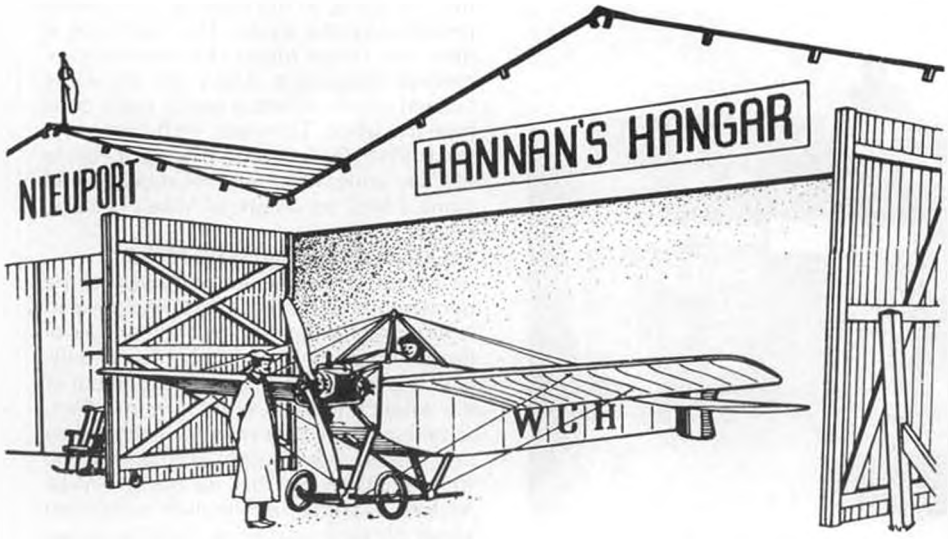
TALKING ABOUT NEWSLETTERS, PART II

This one is for you, dealers! Futaba Corporation publishes one especially for you which if you are not already receiving you should definitely ask for. Bearing the descriptive name of *The Futaba Dealer*, this newsletter is intended to keep you up to date on the many products distributed by the company here in the US. You do know about the extensive line of R/C equipment I'm sure, but you may not know about its engines, tuned pipes, R/C cars and boats—the list seems to grow monthly. Equipment tips, company policies, new frequency information, personalities, coming events—these are just some of the subjects covered. If you are a dealer, you should write or call for your copy. I'm sure you'll find it well worth your while. The current issue, which will still be so when you are reading this, even gives you a chance to register for a drawing for an FX-10, Futaba's popular 1/10th scale electric R/C car kit. Address: Futaba Corporation of America, 555 West Victoria St.,

Continued on page 101



The TRC Impulse II, a 12-volt charger that hooks up to a DC power source for on-site charging.



"As long as the rain is not dripping off the umbrella, it's still flying weather."

• Our quotation of this month, by Richard Castle (formerly of England) was uttered during a very wet San Diego Scale Staffel scale model contest, which continued to a successful (if somewhat soggy) conclusion.

CLEANUP TIME

We commence this column with some assorted aeronautical and philosophical trivia, some of it left over from 1987. We really must sweep out our hangar more often!

From an Escondido, California, newspaper questions and answers column:

"Q: Which movie character was made in North (San Diego) County?

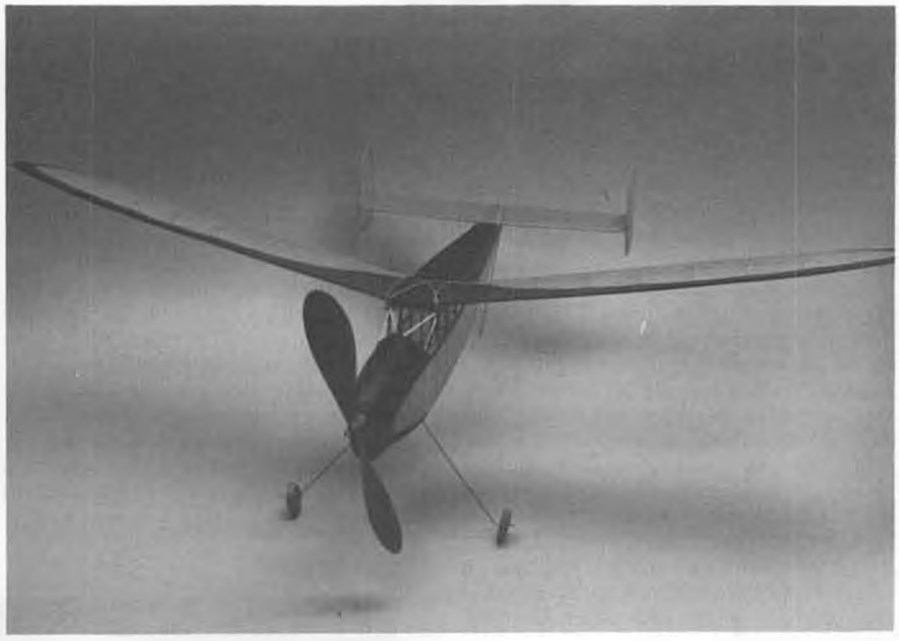
"A: The seagull in *Jonathan Livingston Seagull* was made by Mark's Models (Mark Smith) in San Marcos." And from Jim Alaback (source unknown): "The best way to get rid of work is to do it." (The best way to get rid of unfinished models is to complete them?)

From the *West Coaster*: "A lot of people feel they can't make a point unless they use a sharp tongue." From *Jane's Historic Aircraft 1902-1916*, via Vic Nippert: "X—the unknown quantity, the search for which by immature scientists has ruined more perfectly good aeroplanes than anything else in the world." From the September 1968 *Model Airplane News*, in an article by William F. McCombs: "Don't 'knock' cut-and-try, for aerodynamics is a science that defies exact mathematical prediction in full-size planes as well as models. The modeler can get close with rules-of-thumb, but the final touch in the field is always needed, and he must know what he is trying to do here." From Houston Peterson's *See Them Flying* newspaper clippings collection: During a circa 1910 air meet, the Wright brothers' team of aviators, Ralph Johnstone and Arch Hoxey, encountered such fierce winds that their aircraft was blown backwards, even though their engines were wide-open. Both were pushed steadily back over the edge of the horizon, landing many miles from their starting point. When asked about the adventure, Wilbur Wright commented: "It was just one straight forward progress, backwards. When they got up to a thousand feet or more they struck a wind blowing about 25 miles an hour faster than they could travel, so they just drifted. That's all there was to it. But I guess it's the first time in the history of aviation that anybody ever made a flight tail end foremost." (And we guess Wilbur wasn't recalling his earlier canard designs.)

And finally, to close out our leftovers: What if famous people in history had been model builders? Perhaps we would be reading quotations such as this: "That model needs more nose weight." *Henry Clay*

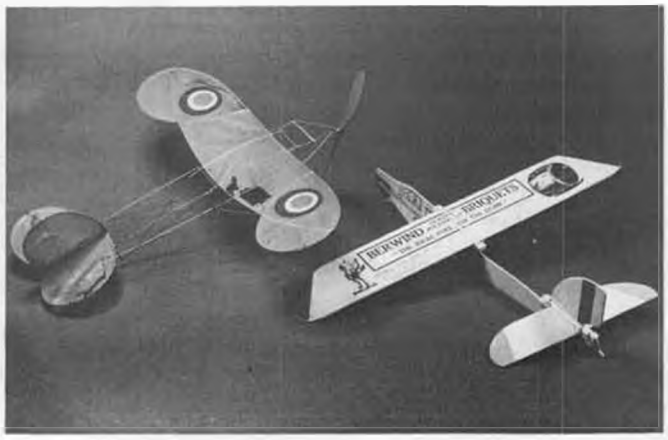
"PAPPY" BOYINGTON PASSES

Gregory "Pappy" Boyington, legendary



Handsome Miss World's Fair by Dr. Laird Jackson, was constructed from a Fresno Models kit.

Tiny canard glider of type flown during 1932 by Carlos Whiting in South Dakota. This recent example, made from a toothpick and paper, is heavier, but glides well. Photo: Ed Whiting.



Relics of an earlier time. At left, a Japanese silk and wire model of the 30s, and at right, a Lorin Wright glider of the 1920s.

WWII pilot, passed away at age 75 during January, according to a press clipping from Florence Bakken. The famed Ace had joined the Chennault Flying Tigers in 1941, then rejoined the Marine Corps at age 29, becoming the leader of the Vought Corsair-equipped Black Sheep Squadron, notorious for their nonconformity, yet renowned for their effectiveness.

During his action-filled lift, Boyington obtained a degree in aero engineering, was a prisoner-of-war, a wresting-match referee, a Congressional candidate, and a successful author. His book *Baa Baa Black Sheep* became a bestseller and led to a popular television series which helped immortalize both the author and his bent-winged aircraft.

THOSE PESKY AUTOGIROS!

Bill Pinkston, of Mount Vernon, Washington, thinks he has the answer to the frustration frequently encountered in trying to fly model autogiros. Bill's solution? A "time-saver" pre-crashed model! His construction drawings include such refinements as a cracked fuselage side, a ready-made hole in the covering, fractured landing-gear with one strut missing, and (of course) already-broken rotor blades. Written instructions on the plan suggest the following approach: 1. Build model autogiro. 2. Fly model autogiro. 3. Watch model autogiro crash. 4. Find a professional longshoreman with at least 25 years' experience. 5. Ask him what to say because model crashed. 6. Alternate to four and five: Seek professional help at mental health clinic or become a magazine column writer.

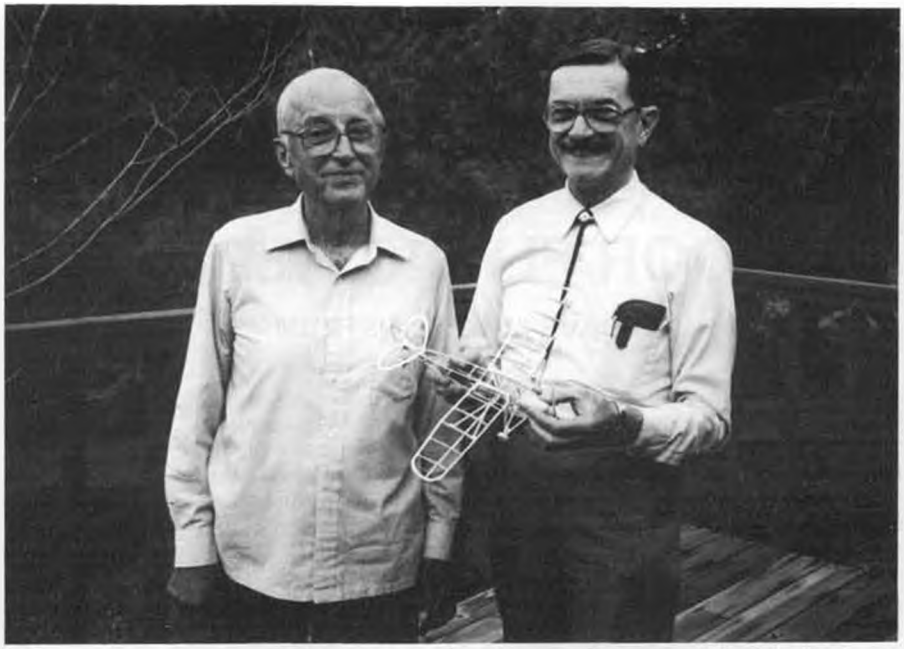
NFFS AWARDS

Jon Zeisloft, National Free Flight Society Models of the Year Chairman, has announced the 1988 winners:

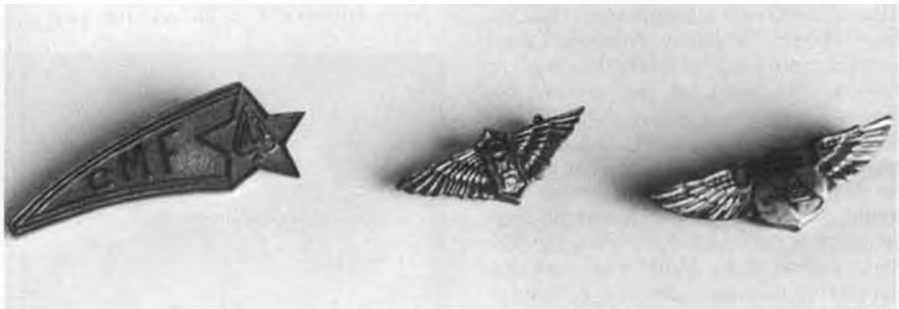
International Class: 1. F1A—Nordic; Vt-38, by Victor Tchop (USSR). 2. F1B—Rubber Power; RW-22, by Bob White (USA). 3. F1C—Power; EV-43, by Eugene Verbitski (USSR).

AMA Outdoor: Large Power; Atlas Mk III A/B, by Rol Anderson. Small Power; Astro Star 1/2A, by Terry Thorkildsen. Large Rubber Power; Le Nomade, by John Linderman. Small Rubber Power; Square Eagle P-30, by Phil Hartman. Hand-launched Glider; Shockwave, by Jim Lueken.

Indoor Rubber Power: Manhattan Pieces, by Walt Van Gorder.



Comet Model Airplane Company founder Bill Bishop and Jim Alaback with the framework of a Comet pre-war Puss Moth.



Three styles of Comet Model Airplane Company lapel pins, now collector's items. We know of at least one other design. Were there more?

Special Award: Quality mechanical accessories (winders, torque-meters, etc.), by Bob Wilder.

PLACES TO FLY

Finding suitable model flying sites is a worldwide concern, as confirmed by Heinz Neumann, of Wenhausen, Germany: "You wrote that a high percentage of modelers build just-for-fun and not for competition. This is a goal I can understand. But I can understand the "normal" competition freak too. He lives in a relatively small country, like Germany, in a big town. Where can one have his fun with his funflyer? Small parks (or even bigger ones) seem to be the property of dogs and children. Who will drive away the dogs when the model is starting or landing? Who will explain to the children not to catch the Peanut like a butterfly?

"After a few experiences in outdoor flying, the modeler begins to try indoors—and with lighter planes and longer flights." Heinz explained that the nearest Peanut builders are a long distance from his home,

Continued on page 88

Fine flying 24-inch span Mr. Smoothie racer by Mark Fineman was built from Arthur Hall scale plans.

Al Backstrom's canard Bostonian still lacks an appropriate name, almost a prerequisite for the event!

the INSIDERS

INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM

• Those of you who turn first to "Dear Jake" or who enjoy the dry humor found in Stalick's column "MBFF" or "Hannan's Hangar" will enjoy this tidbit from full-scale airplane annals (notice we did not say "real" airplane—model airplanes are decidedly real). Things have not changed much since 1903; have they?

Newspaper item: "Immediately after Orville Wright's historic 12-second flight at Kitty Hawk, North Carolina, his luggage could not be located."

MYSTERY OBSCURE AIRCRAFT

Again borrowing a theme from Bob Stalick, whose "Mystery Models" have stumped more outdoor F/Fers than you can shake a 1/8 square at, we present our premiere "Mystery Obscure Aircraft." It is presented in drawing form, and as usual there is a prize—two, in fact. First prize is one day in Johnson City, Tennessee, and second prize is a week in the same spot. Trips *cannot* be taken during any "Indoor Week" period at the Mini-Dome, because then you would have a reason to go to Johnson City.

Identify on a postcard the correct Obscure Aircraft from this list of really obscure WWI biplanes with radial engines:

A. Bristol "Baloney"
B. DeHaviland "Cantfly"
C. Shuckert "Surprise"
D. Neiuport "Nonsense"
E. Macchi "Madman"

Send your entry to: Mr. Fun E. Business, c/o The Insiders, 4057 San Luis Dr., Sarasota, Florida 33580. Winners will be announced in the *National Enquirer.*

If you wonder why we had to resort to this, it is because you readers are not sending in many candidates for the Obscure Aircraft (little-known planes worth modeling for indoor scale, rubber, CO_2, or electric) feature we started last spring. We do have a few, like the TransAvia Airtruk, the Breda-Pensuti Triplane, and the sleek French Wibault 170 CI "Trombe." We need more—so send us your suggestion, complete with photo or scale drawing. Walt Mooney, over the years, has managed to come up with over a hundred unusual full-scale designs; can't you find just one? Then send it in!

MORE INDOOR WEEK HYPE

NFFS Emperor Tony Italiano has sent us the full entry information for Indoor Week at Johnson City, which we first plugged in the February "Insiders" before details were final. By the time you read this in May, it may be too late, but look at your calendar watch, and, if you can, rush off to the travel agent or gas station. Indoor Week begins with the FAI Indoor World Champs (by invitation only to about 20 National Teams—but you can time, or pay $10 for a pit pass) then flies on to an F1D International Microfilm event and the U.S. Indoor Champs, with some 27 official events. Tucked in there on the 50-yard line somewhere (the floor is an Astro-turfed football field) is a Chicago Aeronut Kit/Plan Scale event for scale models from any published plan or kit. Turn-in time is 4:00 p.m., Wednesday, June 1st. The MIAMA Club will also run a Pistachio Gran Prix.

Indoor Nats '84 winner Hank Cole of Los Altos, California in his workshop. See text. Biplane has wingtip curtains, subfin.

As we said, it may be too late to go, but just in case you read this before, the Indoor W/C starts on Sunday, May 29 (May 28 is a practice day) or the F1D International starts on Tuesday, May 31, or the USIC commences on Thursday, June 2; head for the Smoky Mountains. Last-minute entries are allowed with a late-entry fee paid on site. Accommodations may be in short supply.

Before approximately May 25, you can try calling Tony Italiano at home (after 7:00 p.m. Milwaukee time; is that like Miller time?) at (414)782-6256 for details.

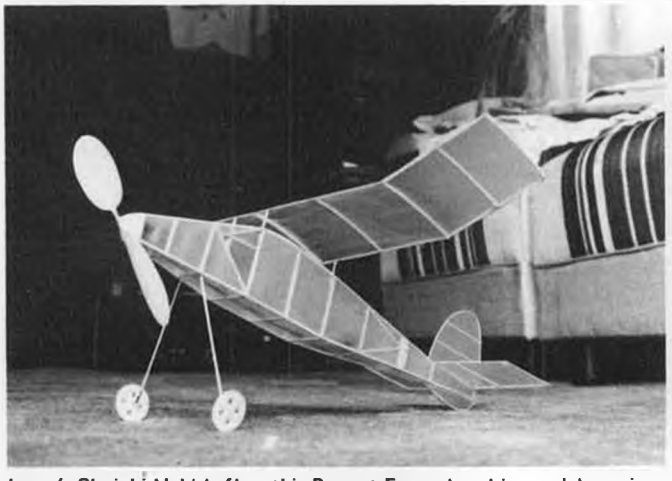
Indoor Week is a moment in modeling history. Be there or be square (1/20 or 1/16 square, preferably) in the eyes of your "Insiders" flying buddies.

INSIDERS WORKSHOPS

In the February column, we began an irregular feature suggested by Doc Martin: peeks into the workshops of famous indoor modelers (Doc won't let us look in his—it is too messy) from around the world. First off was Butch Hadland of London, who keeps his immaculate.

This month we present genial Hank Cole of the Oakland Cloud Dusters, sitting on a stool with his Reno Nats-winning Expert Pennyplane. The model has a huge prop, big subfin, and vertical "curtains" between the biplane wings as a substitute for dihedral. Hank really knows how to get the max out of an airframe. But wait, we are here to look at the workshop!

The Cole shop is in a small basement in



Japan's Shoichi Uchida flew this Peanut Formula cabin model, a miniature Manhattan, to a 2-minute, 12-second time.

Magnificent Telco CO_2 power Bristol Brownie from 1925, flown by scale ace Butch Hadland, of London, England.

VTO with his Florida version of the Stalick Bostonian Pacific Ace. Flies indoors by Gulf of Mexico.

his home in Silicon Valley where he recently retired from a NASA career at Moffet Field Ames Research Facility. The shop is cluttered (a sign of genius), and models share space with electronics (not R/C, mind you) on the workbench and storage areas. A treasure chest of World Class Wakefield models resides behind the stairs. A single overhead fluorescent fixture provides adequate light over the bench. Wall racks and drawers are stuffed with hand tools and supplies. The shop is small, but then so is a "galley kitchen'; if you are a great chef, you can produce some real gourmet model aircraft in a small space.

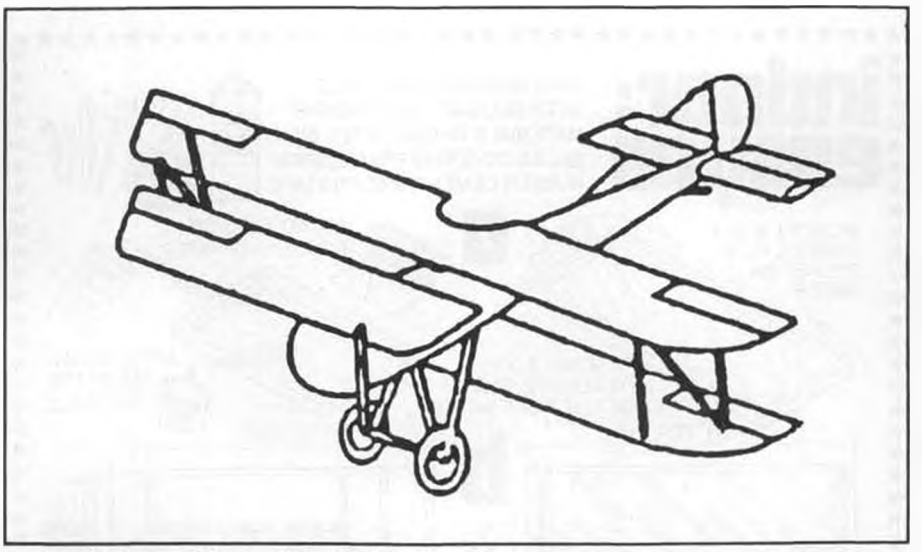
Hank Cole makes some great pancakes up in the kitchen, but his best recipes are cooked up down in his basement workshop. Now that he is retired, we expect he will be butchering a lot of balsa and putting in more winning flights. That smile on his face in the photo is just a hint of what's in store for the Cole Model Works.

NFFS PUBLICATIONS

Just a bit farther down in Silicon Valley from the Cole place is another Oakland Cloud Duster (only Meuser lives in Oakland these days) habitat, but Fred Terzian's home is stuffed with National Free Flight Society Publications. He minds the repository for more aero literature than you ever imagined. His latest publication is the Silver Anniversary 20th Edition of the NFFS Symposium Report. The cover shows a "postage-stamp" collection of the covers from the past 20 Sympo Reports (some designed by your "Insiders" scribe), and inside is a commentary by NFFS Exec Hardy Brodersen on how they came about.

The 1975 and 1983 Sympo Reports are out of print, but Fred has the others. He also has, from Merry Old England, the Free Flight News 200th Edition, the *Aeromodeller* 50-year compilation, and *Model Flying—the First Fifty Years*. The latter two are by ace writer Vic Smeed and reek of nostalgia.

Fred's publications' list is far too lengthy to repeat here, but an SASE (self-addressed

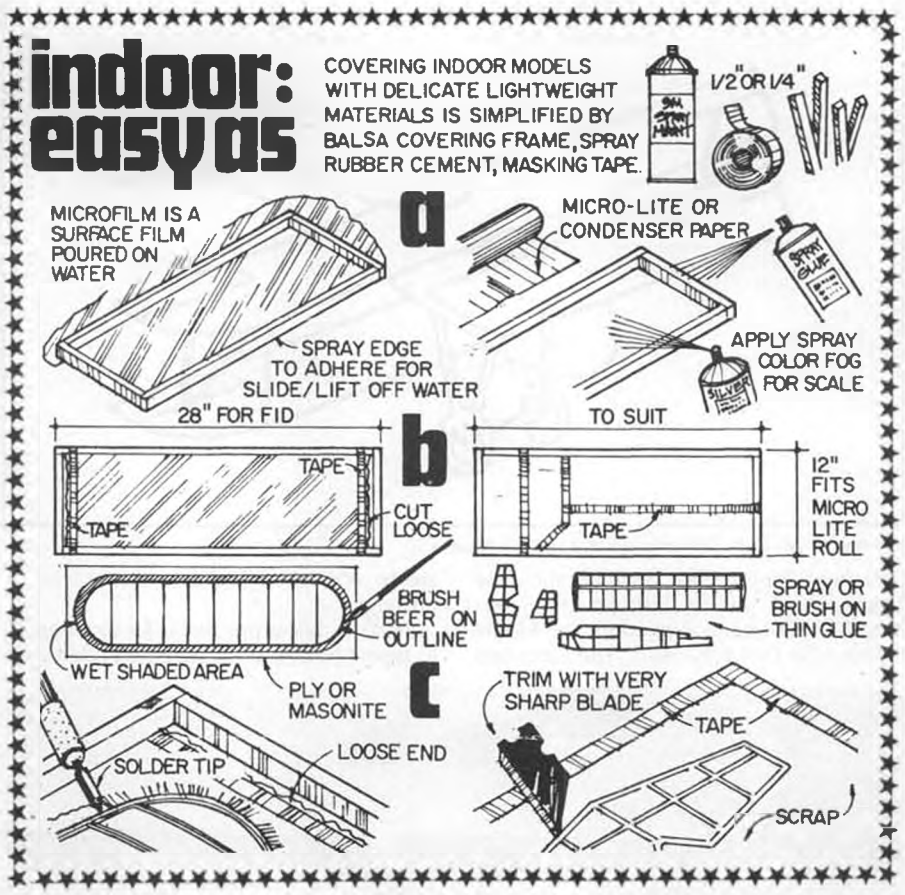


Linstrum's Mystery Obscure Aircraft of the Month

It must be indoor season again. Here's Bill Gaiser and Stan Fink observing and coaxing a stuck EZB down from the rafters using a helium-filled balloon attached to some fishing line. Ship came down in one piece, albeit a bit bent.

Portland's Jim Longstreth built this Ben's Bostonian for his son. Very clean lines. Wheel pants have since been added.

Porsche Pickup Bostonian by Gerald Myers, of Redway, California. Note paper profile pilot.



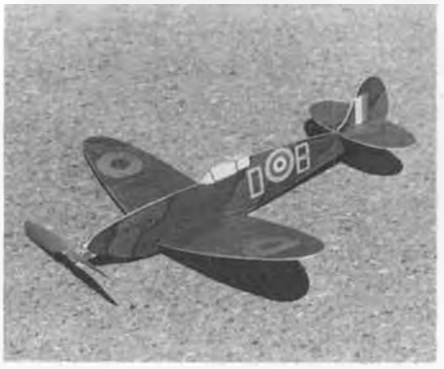
stamped envelope, #10 size) will get it for you. Write today to: NFFS Publications, Fred Terzian, 4858 Moorpark Ave., San Jose, California 95129.

By the way, if you are not an NFFS member, you should be. If you attend Indoor Week, be sure to sign up with Tony Italiano.

LIDBERG NOCAL PROFILES

Al Lidberg flies most of his nifty little FAC NoCal profiles outdoors out in sunny Arizona; but built light, they are suitable for indoor flying in more rainy or wintry climates. The WWII warbird "Spitfire" we show in photo form this month is one of many military craft Al has, others include the odd Blohm & Voss and the Japanese Zero ("Empire of the Sun" fans will love it). Al also has the Zlin Z50L and other good-

Bill Criss Lt. Col. USAF(right), timed for Canadian U.S.I.C. flyer Bill Henderson who won Peanut event with exquisite Bleriot VII.



WWII Spitfire is one of amny No-Cal profiles available from Al Lidberg's plan service. See text for details and address.

flying types. New to his plans line is the 27-inch span Dayton-Wright Racer, which has a "fat" fuselage for Rubber Scale.

Whether you are on a diet or not, try some of these quickie profiles. Full-size plans are only $1.50 each postpaid. For a complete plans list, send $1 for a catalog to: Al Lidberg Plans, 614 E. Fordham, Tempe, Arizona 85283.

WHERE FUN TAKES OFF

We have asked before in this column (which began a year ago; how time files when you wind in max turns!), how many "Insiders" fly just for the fun of it? Certainly Bill Hannan is one of these folks. His latest book, *Peanuts & Pistachios Vol. III* (now at the printers as we speak) exemplifies this fun state of mind. Indoor can be low-key and fun-filled if you let it.

One of the fun parts is reading the aero literature and writing other fliers. To let the fun take off, you need books, notecards, rubber stamps, and accessories from Hannan's Runway. Efficiently run by Bill's wife Joan, this mail-order source is impeccable. They have such goodies as *Dan Jordan Sky Soldier, Bravo for Adventure*, the *1932 Flying & Glider Manual*, and, of course, the *Peanuts & Pistachios* series. Also good are Noonan notecards and fun aero stamps.

For a complete catalog of fun stuff, send $1 to: Hannan's Runway, P.O. Box A, Escon-

Continued on page 70

Dave Aronstein set to launch his 28-inch BFW M.20 rubber scale, soon to be an MB construction project. Watch for it!

Free Flight Scale

By FERNANDO RAMOS

• Another year has come and gone, and in the process, one wonders if everything wanted accomplished was done so. I'm certain that many of you have seen the license plate frame that states, "So many women, such little time!" That is kind of the way I feel about the building of models. There are so many that I want to build, it becomes rather frustrating not being able to get more of them constructed. However, I am doing my best at doing so. Therefore, I wish all of you the best for '88 and that your goals will be achieved this coming year!

Dave Diels, the nearest thing to being a perpetual machine, has come out with another nifty kit. This one, a peanut of the venerable P-40. As usual, the quality of the materials are first-rate with an extra plus for the decals. Like all of Dave's kits, those decals are reason enough to make the purchase. I've seen several of his kits built up, and they really make beautiful models.

I've carefully misplaced the cost of the P-40 kit, but this would be a good excuse to send Dave a buck to get his latest kit and plan offerings. His address is: Diels Engineering, Inc., P. O. Box 101, Woodville, Ohio 43469.

THE 1988 FAC NATS!

Yes, it is that time again. Personally, I've been waiting for this event for over a year, and it is finally around the corner. It is scheduled for July 8, 9, and 10 of this year. The location will be the same place as it was in '86, Geneseo, New York. It is a beautiful spot to fly model airplanes.

The entry fee is $13 if sent by June 15, and $15 after this date. Dormitory rooms and meals will be available at the State University of New York, Geneseo. Cost is $112 for double occupancy, $128 single occupancy. This includes a room for Friday, Saturday, and Sunday nights.

By the time you read this, it will be past time thinking about building for this most outstanding event. Please plan to be there, there is nothing to compare it to for our type of modeling! Allan Schanzle, 20008 Spur Hill Dr., Gaithersburg, Maryland 20879, will be the Contest Director.

How accurate is accurate when assembling a completed model? I used to assume all kinds of things such as perfectly square fuselages (I built them thinking I had them square), wings at perfect right angles to the fuselage, aligned tail, etc. My assumption was if you build the fuselage square, then the wings and tail should always align perfectly. Everyone knows that; right?

Sometime back I built a nifty scale biplane, and I had used my usual eyeball to align everything. It wasn't until I saw a picture of me holding the model that I was able to see the most severe case of stab tilt! I thought that I had measured fairly accurately when attaching the stab to the fuselage, but obviously I had not.

Let me point out some pitfalls which can cause one to think that everything is going

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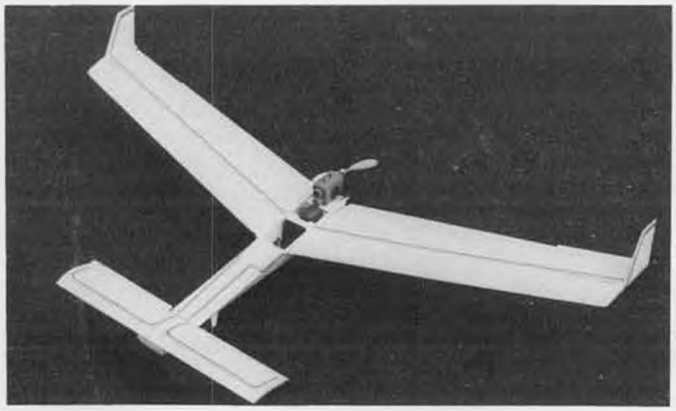
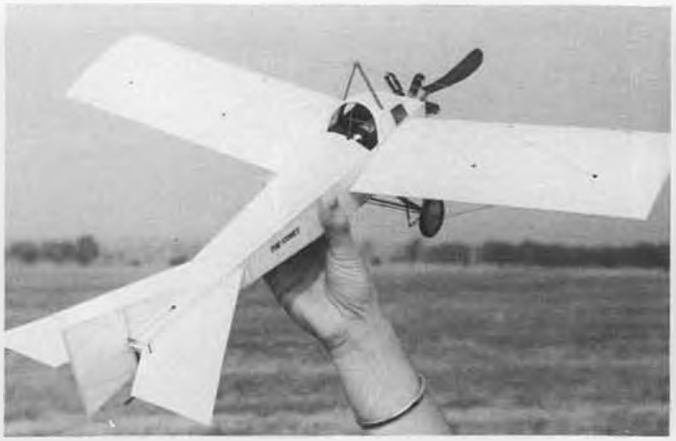
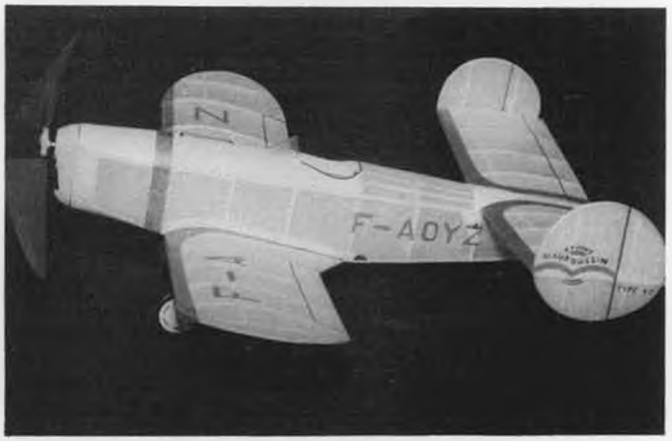


Unusual Goldwing ultralight canard by Larry Kruse is powered by the tiny Brown A-23 motor. Ship features movable control surfaces and a canard surface trimmable by way of a concealed nylon set screw. Model spans 26 inches.

Jumbo Scale Crackerjack, also by Kruse, features plug-in wing panels and adjustable control surfaces. Struts pop on and off via Robart hinge point connectors. Model spans 36 inches, weighs 3.75 oz.



The '87 Nats winning Cessna Comet by Kruse is powered by a Telco Turbo CO_2. Model is tissue covered with an airbrushed dope finish. Weight is 59 grams, wingspan is 22-1/2 inches.



Peanut Mauboussin Hemiptere Type 40 was based on an Al Backstrom design, modified by Jim Alaback's drawings. Plane weighs 9 grams, and is flown outdoors. Has five maxes to its credit in '87 competition.

Control Line

By JOHN THOMPSON PHOTOS BY THE AUTHOR

• It's before dawn on the second Sunday of a winter month.

All over the Pacific Northwest, individuals and pairs of model aviators quietly slip out of their homes, start up cold vehicles, and defog dewy windshields. In the early morning darkness, they pull out onto highways and converge, as if inward on the spokes of a wheel, toward a central destination.

Delta Park, Portland, Oregon.

It's been going on for 10 years, for, by the time you read this, 50 winter Sundays.

It is the Northwest Sport Race Drizzle Circuit.

It began as a roving five-contest winter racing series designed to keep Northwest control line model aviators in touch and enthused over the months between the last big meet of one summer and the first of the next. Like the newsletter *Flying Lines* that was born about the same time, it was intended as a way of reversing the decline in contest participation.

The name Drizzle Circuit reflected the liklihood that contests would often be flown in the rain—and that the series would travel from town to town. Oddly enough, the name is not as descriptive as originally expected.

For one thing, contests have been dry and pleasant more often than they have been wet and cold—after all, Northwest winters are only about half as bad as Northwesterners let "foreigners" think, and not nearly as inclement as many parts of the country's north half.

For another, it was perhaps the biggest milestone in the circuit's evolution that it stopped being a "circuit" and became a "series" that is centralized in one location.

The DC has been discussed in the modeling press before, but, as its 10th season draws to a close, it seems fitting to examine some of the aspects that have caused the series to be so successful and to make such a valuable contribution to Northwest CL model aviation. It may be a model that could be studied by CL enthusiasts in other regions. Note that I said *enthusiasts*, not just racers.

In the winter of 1978, nobody thought ahead to 1988. Few expected the level of success that would mark the DC. But here we are in 1988, jockeying for position on the big scoreboard that separates the champions from the contenders.

How did it all begin, and what, really, is the DC?

Like many other regions, CL modeling in the region historically has been a boom-and-bust activity. In 1977, it was boom—huge attendance at contests, contests nearly every weekend, and by the end, a lot of tired fliers and builders. In 1978, things looked bleak. A couple of major clubs and groups had declined in activity, contests went begging of entrants, and, worst of all, modelers were drifting apart; some of the contest attendance was the result of people simply not knowing about contests or about the activities of other modelers as club and contest officials changed without handing on vital information.

A group of model aviators concerned about their modeling future got together to produce the independent newsletter *Flying Lines*, which was conceived as a communications network. Through some 90 issues and up until January of 1988, *FL* served its function of keeping modelers aware of each other over the vast distances of the Northwest as well as around the country.

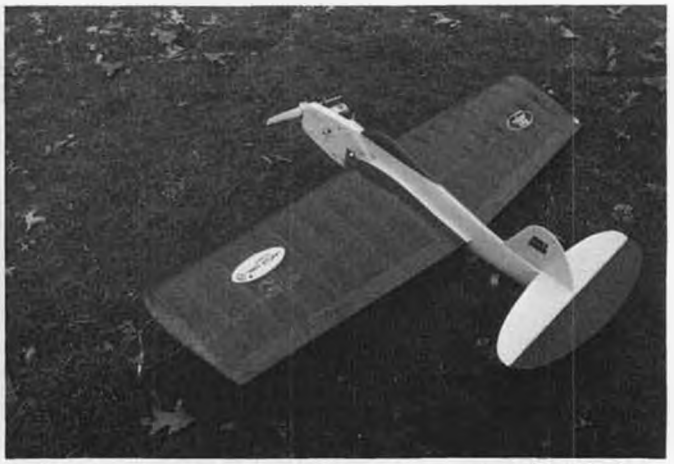
These same fliers perceived that part of the problem of declining activity was the result of winter inactivity. People's habits changed over the winter when they weren't flying, competing, and enjoying the camaraderie of model aviation.

At the particular time, late 1978, the most popular competition event in the Region was called Northwest Sport Race. It had been conceived in 1976 as an entry-level competition event that also would be enjoyed by experienced modelers—and in mixing the novices and the experts it provided the perfect laboratory for quick training of new competitors.

Racing series had been tried before with

Pit area and Killer super sport plane of Nitroholics Racing Team.

NW super sport race plane by Jason Huntress.



Typical Nortwest sport racer, a Ringmaster, campaigned by Nitroholics Racing Team of Oregon.

Wayne Drake, a top free flighter, spends his winters on the CL racing scene. Shown here with a super sport plane.

DC Kingpin Dave Green catches champion Minotaur NW super sport plane on a test pit stop. Dave is from Astoria, Oregon.

temporary success. The modelers then concerned with CL's future decided to try to organize a series built around the popular Northwest Sport Race event.

It would travel around the region for five months, stopping in a new town the second Sunday of each month, showing off CL and NWSR to local fliers while providing regular competition for the "circuit riders" interested in winning a big perpetual trophy and the annual season championship and fast-heat trophies.

Contrary to the expectations of even some of the circuit's original organizers, it worked!

Today, 50 contests later, the concept is virtually unchanged, though some of the specifics have evolved considerably. And today, participation is still strong, the competition excellent, and the enjoyment of competition optimum.

Let's look a little closer at some of the details that made the circuit spin:

The Drizzle Circuit started out as the showcase for the original Northwest Sport Race. Each contest would mostly involve extensive competition in NWSR but also would include some kind of secondary event which came to be a tradition as a "warm-up" activity. The secondary event took place at 9:00 a.m., with NWSR starting at 11:00. The secondary event remained a part of the series until the 1987-88 season, when the racing program was expanded and the secondary activity dropped.

Professional chef Glenn Salter enhances DC by providing hot soup for lunch. Here Mike Hazel samples the fare.

The original Northwest Sport Race is different from what now is known as Northwest Sport Race, and its evolution had an impact on the circuit as well. What once was known as Northwest Sport Race divided down the middle into two events which have remained substantially the same since the 1980-81 season.

(By the way, Northwest racing rules have been developed through a proposal-and-poll system through the pages of *Flying Lines*, with new rules taking effect at the Drizzle Circuit opener in December. Changes, however, have been few.)

The original NWSR, developed by the Prop Spinners of Europe, Oregon, required kit airplanes powered by stock plain-bearing, single-bypass .35 engines. No shutoffs, fastfills, or hot gloves were allowed. The planes were flown on .018x60 braided lines, with one pit stop per 70-lap heat and two per 140-lap feature.

However, as will happen, some fliers developed their abilities a bit further and faster than others, subverting the entry-level concept. These fliers, seeing the danger of such a trend, came up with a proposal: split NWSR into two classes, one retaining the entry-level flavor and the other accommodating those with a desire to experiment and progress.

The idea was approved, giving birth to the *new* Northwest Sport Race and the event that was dubbed Northwest Super Sport Race.

The new NWSR still required the kit airplanes and all the old restrictions, but it added the requirement that all planes had to be powered by stock Fox .35 stunt engines. Duke Fox worked with *Flying Lines* to provide engines at discount price to get the event off the ground. *FL* readers bought 44 engines in that first order. The event re-

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John Hall of SHT Team of Seattle shows off unusual Mover III which looked good the first time out. It's for NW super sport racing.

Rich and Dick Salter, the S&S Racing Team of Seattle, are always in contention in Portland Drizzle Circuit contests. shown with SS plane.

Comte AC-12E

By WALT MOONEY. . .The ol' perfesser of Peanuts dug deep into his bag of tricks to come up with this little gem based on a 1931 full-size aircraft. With proper trimming, it should be a good flyer for you.

• The Comte AC-12 was first produced by Alfred Comte in 1931. This was a very good-looking, three-place airplane powered by an inline four-cylinder, air-cooled engine. A few years later Mr. Comte produced the AC-12E with a shorter lower aspect ratio wing improved the real airplane or not, it certainly improves the design as far as Peanut Scale is concerned. This little model is relatively simple to build and flies quite well in spite of the fact that it is built with scale dihedral. That is, the top of the wing is straight, and the only geometric dihedral is on the bottom surface of the wing due to the taper in thickness of the wing.

We can't say that the model flew right off

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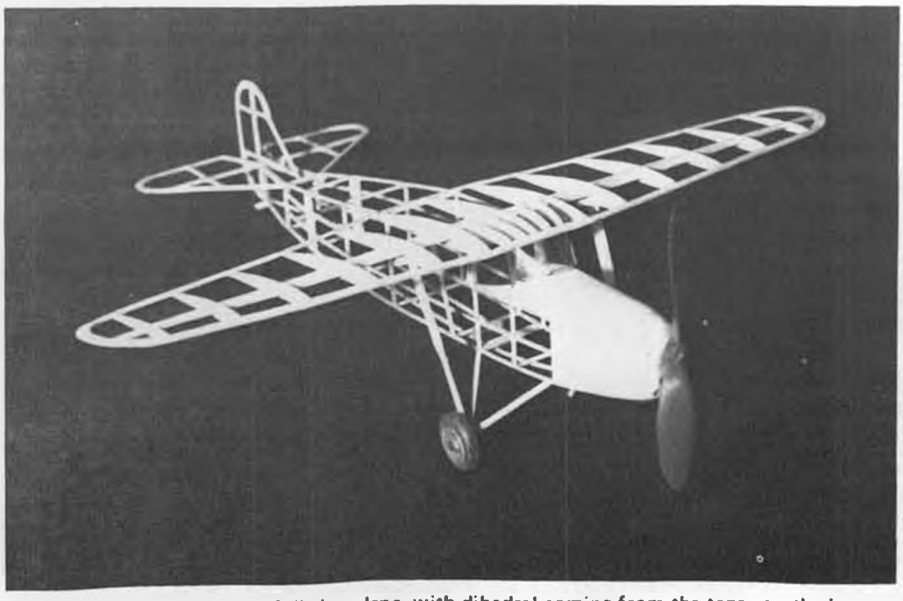
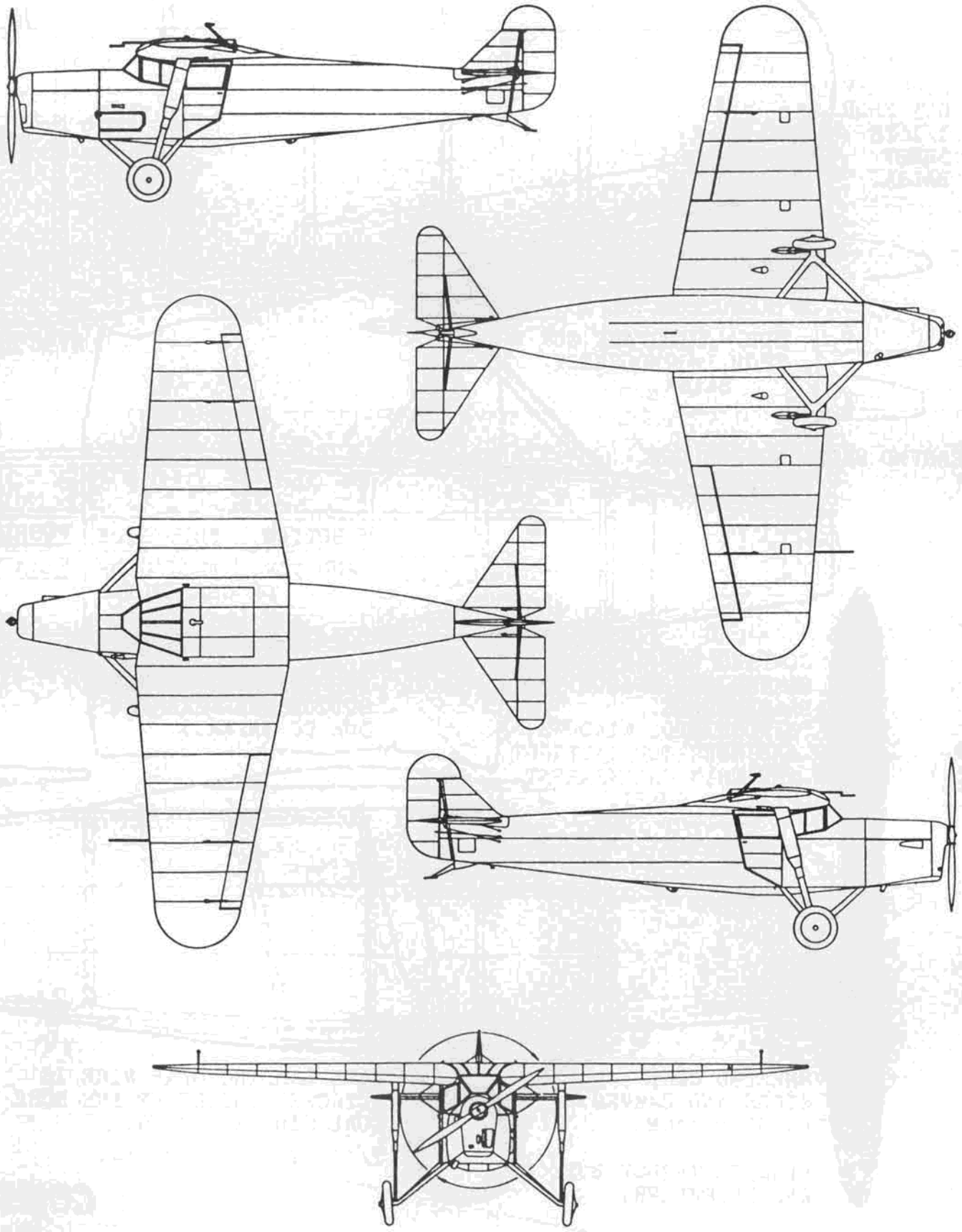


Top of wing is straight, as in full-size plane, with dihedral coming from the taper on the bottom of the wing. Model flies well in spite of lack of more dihedral.

Prototype had inline four-cylinder air-cooled engine, which makes for a long nose moment that aids model's flight characteristics.

COMTE AC-12E



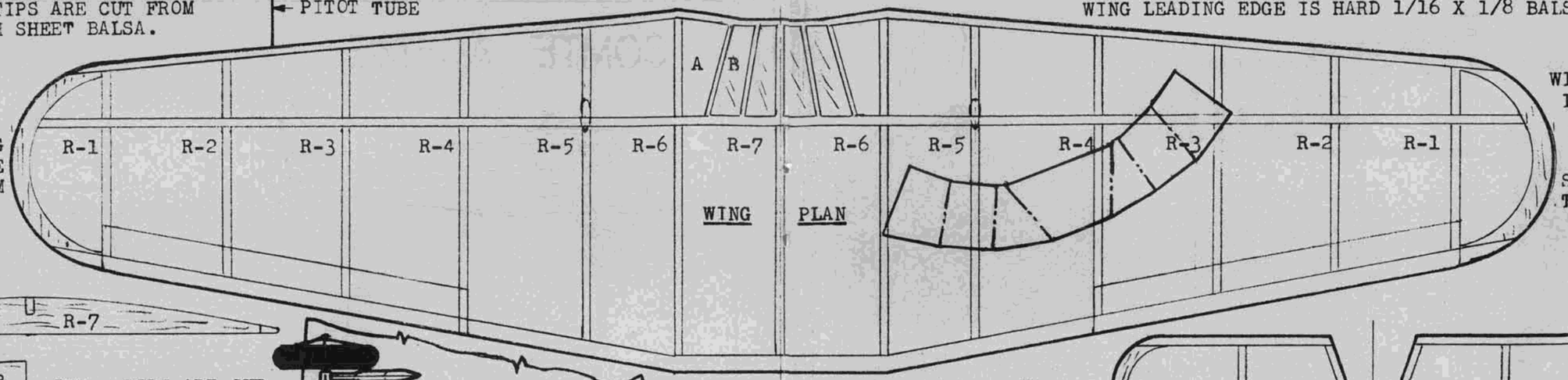
WING TIPS ARE CUT FROM 1/16TH SHEET BALSA.

PITOT TUBE

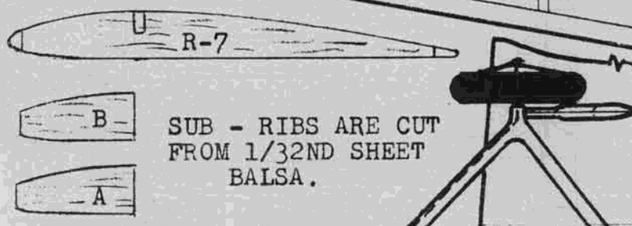
WING LEADING EDGE IS HARD 1/16 X 1/8 BALSA.

WING SPAR IS 1/16TH BY 1/8TH TAPERED TO 1/16TH SQUARE AT THE WING TIP.

ALL WING RIBS ARE CUT FROM 1/16TH SHEET BALSA.



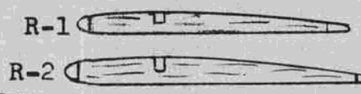
WING PLAN

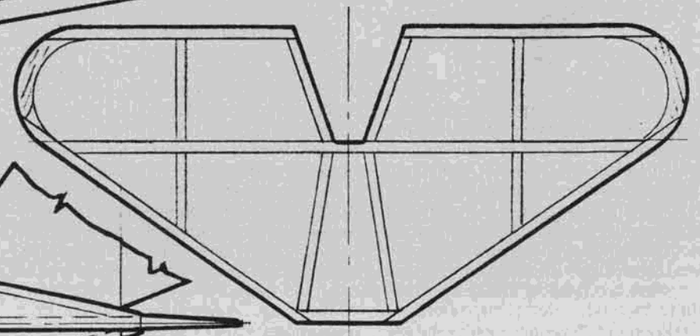


SUB - RIBS ARE CUT FROM 1/32ND SHEET BALSA.

CARVED BALSA NOSE BLOCK

WING TRAILING EDGE IS 1/16 X 1/8TH.





BOTTOM, THIS SIDE
AND TOP, THIS SIDE
OF CENTERLINE

FUSELAGE PLAN VIEW

1/16TH SQUARE CROSS PIECES

HORIZONTAL TAIL

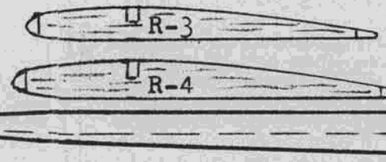
ALL STICKS ARE 1/16TH SQUARE TIPS ARE CUT FROM 1/16TH SHEET.

VERTICAL TAIL

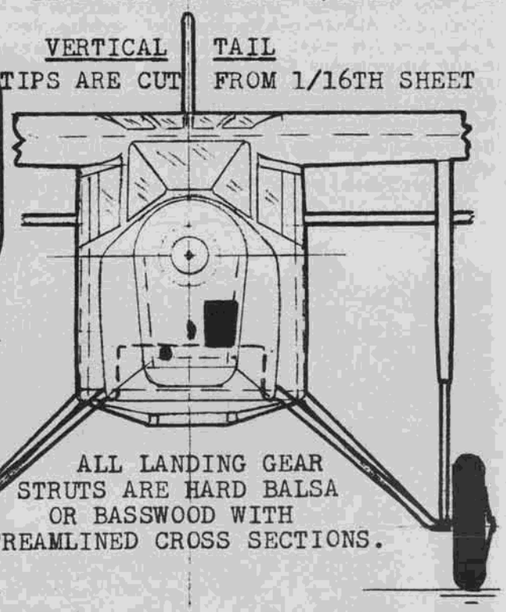
TIPS ARE CUT FROM 1/16TH SHEET

COWLING TOP IS CARVED AND HOLLOW BALSA BLOCK.
WINDSHIELD, WINDOWS, AND WING TOP SKYLIGHT ARE THIN TRANSPARENT PLASTIC SHEET.
PITOT TUBE

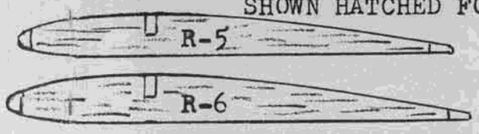
(TOP OF WING IS FLAT, BOTTOM DIHEDRAL IS DUE TO TAPER.)



1/16TH SQUARE STICKS



FUSELAGE SIDE FRAMES ARE SHOWN HATCHED FOR CLARITY.



SHEETED COWL SIDES AND CARVED BALSA BOTTOM.

PLASTIC THRUST BUTTON AND PROPELLER.

NOTE LANDING GEAR WIRE IS ATTACHED INSIDE OF THE NOSE COWL SIDE SHEETING.

7/8" DIAMETER WHEELS.

ALL LANDING GEAR STRUTS ARE HARD BALSA OR BASSWOOD WITH STREAMLINED CROSS SECTIONS.

COMTE AC-12 E Walt Mooney 11-25-86

Free Flight

By BOB STALICK

Greg Davis and his Blue Flame model. Ship is powered by a K&B .35 Green Head and is very competitive in NW Nostalgia competition. Greg is member of Vancouver Gas Model Club.

• Radio Assist Free Flight = Electronically Actuated Free Flight. With all of the print being devoted to the use of radio gear to control or affect the flight of free flight models, someone must think that it is a good idea. It appears that the majority of those promoting the idea, the major voices, are ex-free flighters who are now radio controllers. Meanwhile, the dyed in the wool free flighters are fighting this newest onslaught to their perceived purity of flight. I have chosen not to get involved in the debate, as it is obvious that the positions are polarized with little room for compromise. I became aware of this polarization when I received a copy of a letter from Bob Hatschek, a long time free flight competitor and New York dweller, who took John Worth, of the AMA, to task for promoting Radio Assist Free Flight. John's apparent motive for promoting Radio Assist Free Flight is to help people like Bob, who live in places where free flight sites are either poor or nonexistent. Bob's request of John is that they be left alone to enjoy free flight in their own way.

However, I detect a fly in the ointment. Free flighters are currently using electronic devices to control their models. In fact, I note that some of the world's most sophisticated free flighters are using electronic systems to guide, control, or assist their ships. Noteworthy in this trend is Thomas Koster, who has won the world FAI Free Flight Championships in all three events. Thomas has been successfully experimenting with electronic timers that actuate such functions as engine cutoff, autorudder, bunt, autostabilizer, and dethermalizer. It is a very small conceptual shift to on-board electronic control to on-the-ground electronic control. In fact, changing the title of the concept from Radio Assist to Electronically Actuated expresses this shift nicely for me.

As I have reread some of the *Model Builder* Free Flight columns that I have written over the past 12 months or so, I note that in nearly each one some of the text has been devoted to a new event or a new twist to an old event. Pee Wee 30, A-3 Nordic, AMA Vintage, and Ignition Nostalgia serve as examples. With these events in mind and with the notion of an Electronically Actuated Free Flight (E.A.F.F.) in mind as well, it is difficult for me to not defend the addition of a new event or even a new twist on an old event to the free flight schedule. I believe that such an addition is inevitable. If it is inevitable, then as a free flighter I would rather have a say in what the event looks like than to wait until some non-free flighter does the specifications of the event.

For example, a free flighter only needs to take a look at what SAM has done to itself with its own radio events to see what should not be done. R/C Old Timer has warped the notion of Old Timer flying well beyond the original intents of the event. Should E.A.F.F. turn out like the SAM R/C events, then the fault is at the feet of the free flighters. My belief is that any E.A.F.F. event should not be an addition to the current schedule of free flight events and not a replacement. The event or events should use ground-based transmissions to the least extent possible, with electronic d.t. being most appropriate. I agree with Bill Northrop that the model should be flown with hands off the transmitter until it is needed to abort a bad flight or actuate the d.t. system. At the time the flier touches the transmitter, the official flight ends. To what end the flier uses the transmitter during model trimming sessions or the like is immaterial. It is only the use of the equipment during official flights that matters. If E.A.F.F. will solve some of the problems that exist in areas of the country where precious little open space is available, then why should we not support it? When E.A.F.F. becomes Radio Controlled Free Flight, then the event is no longer a F/F event and should be relegated to that area of AMA rules book that regulates Radio Control.

Nigel and Rose Tarvin of Vancouver show off their oddball models at a recent NWFF Champs meet. The flying wing held by Rose is CO_2 powered, and the autogyro held by Nigel has a Cox .020 for power. Both ships flew this day.

MYSTERY MODEL FOR JUNE

Well, here it is. No, it's not a canard. It's not built to fly backwards. It is a rubber-powered ship from the late 1940s that was designed with swept-forward wings and a swept-back stabilizer. In other words, it was supposed to look like it looks. According to the original article, it has a 12-inch diameter propeller, has a wingspan of 32 inches, and was the result of long experimenting with different combinations of ideas.

So, you think you know what it is? Well, send your answer to Bill Northrop, *c/o Model Builder* magazine post haste. If you are first in line with the correct answer to this month's Mystery Model, then you win yourself a free, one-year subscription to *Model Builder* magazine.

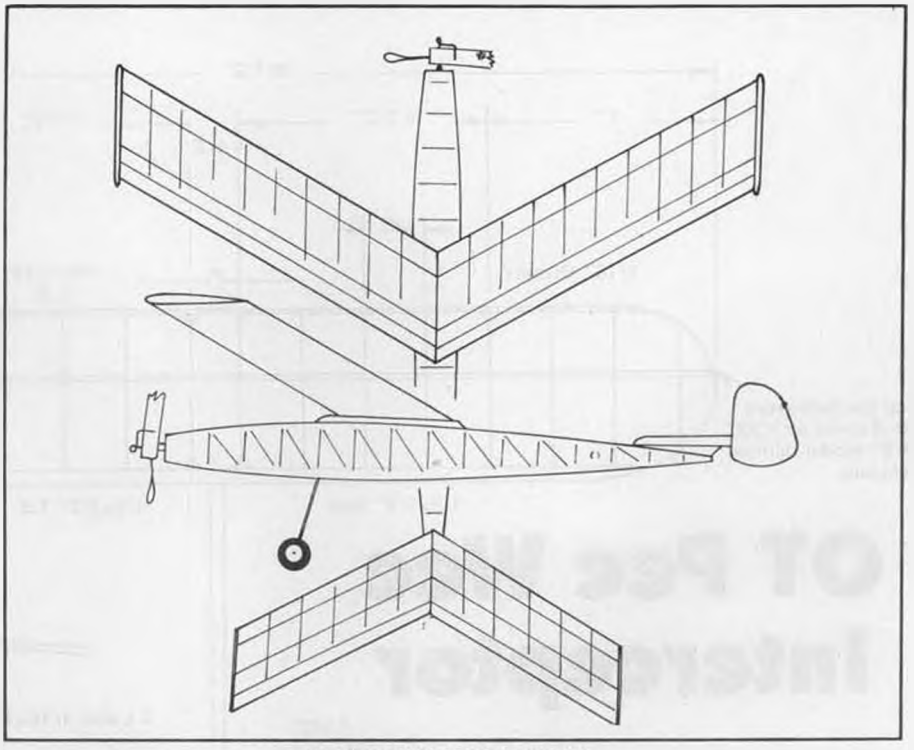
MYSTERY MODEL ANSWERS

This time we will start out with our special overseas competition. Only one winner to announce, and that's Jean McCullagh, Diep River, Republic of South Africa, who was first in that category to correctly name the JAI-FAI as the December 1987 Mystery Model. Congratulations!

John Lenderman, from Clatskanis, Oregon, who has a pretty good track record for being first in free flight competition, has scored another one by being the first to correctly identify the January 1988 Mystery Model. It's Bill Winter's "Bantam," which appeared in the 1947 issue of his *Model Aircraft Plan Book*.

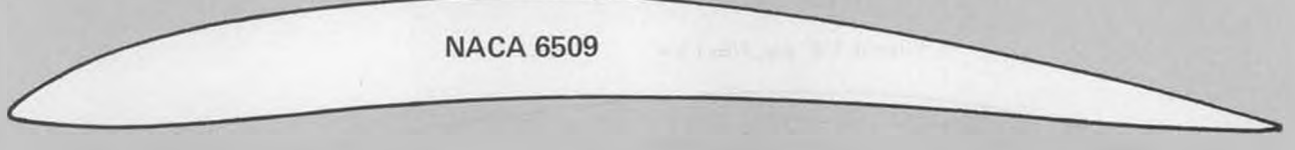
The February '88 Mystery Model was Paul Plecan's "Smokey," also found in Bill Winter's plan book. Paul, who was a member of the *Model Builder* graphics production staff in the mid-70s, used to refer to his wife by the nickname "Smokey," so we assume that's how the model was given its name. Ed Mate, from Riverdale, Illinois, was the first to come up with this one.

John Carbone, of Huntington, Long Island, New York, was first of many to correctly identify the March Mystery Model as the "Uranus." Many of the answers credited Joe Wagner as the designer, and though his name appeared as the "Drawn By" on the plans presented in the October '64 issue of *MAN*, it was Oscar Mayes who was credited with the design. One writer, Pete Young, from Centreville, Virginia, explained that during his first years at M.I.T. in the mid-60s, he flew with Oscar and Jim Mayes, and credited both of them for the design. He went on to say that he had contacted Oscar at his home in Horseheads,



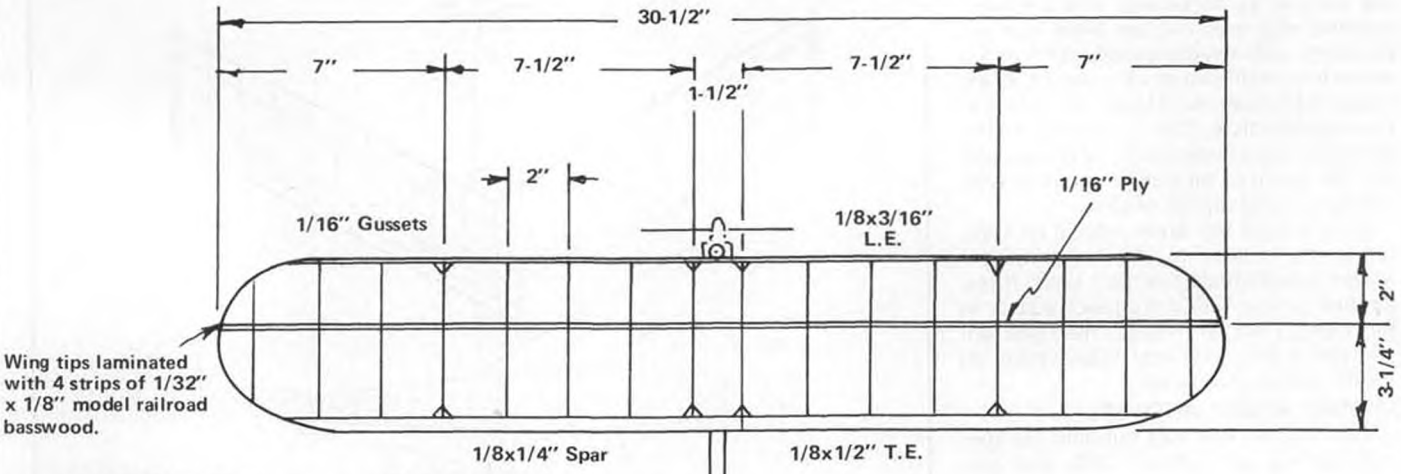
JUNE MYSTERY MODEL

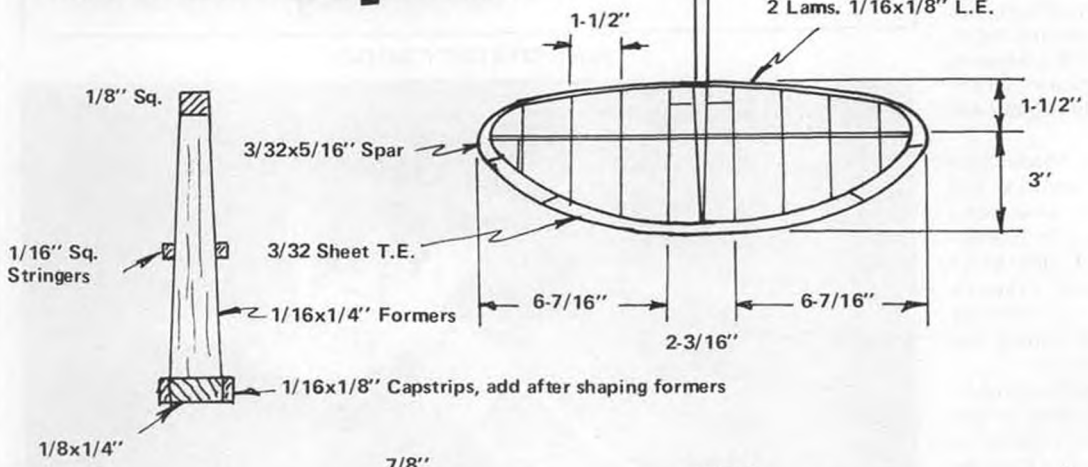
Text identifies Bob Wilder's products as one of the award winners in the NFFS Top Ten categories. Here is a picture of one of Bob's custom Wakefield Torque Meters.

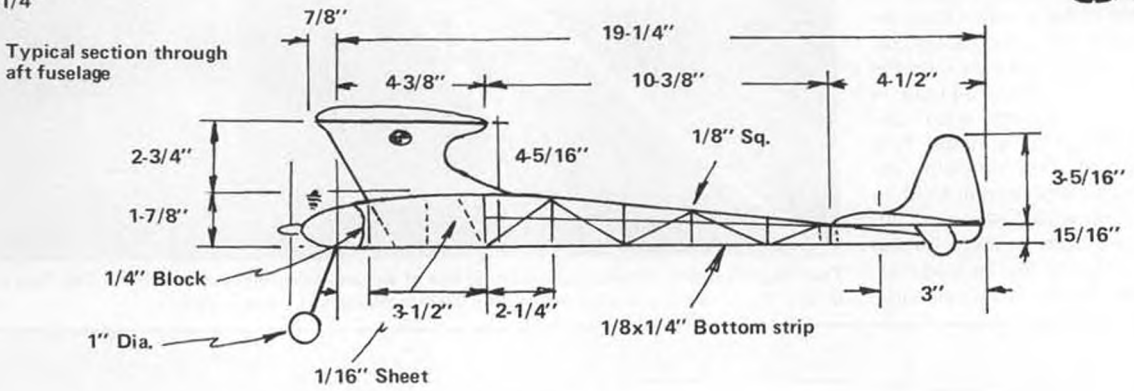


STA	0	2.5	5	10	20	30	40	50	60	70	80	90	100
UPR	0	2.75	4.0	5.8	8.2	9.6	11.1	10.0	9.2	7.8	5.85	3.3	.9
LWR	0	−1.3	−1.45	−1	−.15	1.4	2.0	2.3	2.3	1.9	1.1	.5	.9

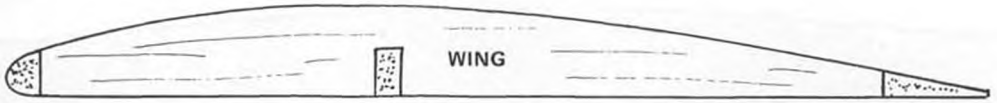
OT Pee Wee Interceptor







Firewall 1/8" ply, 7/8x1-5/8"



1/16" ribs(16)

Stab ribs 1/16x5/16" sand to this section

New York, just recently, and expects to visit with him this summer.

It's going to take a packing crate to forward the answers received on the April Mystery Model to Bob Stalick! He must have thought we were hard up for mail when he decided on that one! We're referring to Roy Clough's "Martian Space Ship" from the April 1954 issue of *Air Trails*. With so many answers coming in, we were bound to get a tie, and in this case, it was a three-way deal. The winners were: J.B. Sullivan, Homosassa, Florida; Charles Schafer, Rushville, Illinois; and Phil Oestricher, Ft. Worth, Texas.

An interesting additional mystery came out of this one. Several readers came in with the name "Windbag," referring to a model published some time ago in *Aeromodeller*. Our *Aeromodellers* are buried in storage, so we couldn't check this, but we vaguely remember there being a similar design appearing, but have no idea how the dates jibed. Anyone have an answer on this?

The following note in Charles Schafer's letter is interesting. "I built the body of 'Ol' Reliable' (*the Old Timer model in our July '87 issue—wcn*) fifty years ago, and then I lost the plans. I have kept the body of this plane for 50 years thinking that I might find the plans someday. I was delighted to find the plan in your magazine a few months ago, and sent in for it. I will now be able to build a plane that took 50 years to complete."

Let us know if you finish it this year, Charles. "Ol' Reliable" appeared in the January 1938 issue of *Flying Aces*. Can anyone top this one? I'm working on the record with my quarter-scale Aeronca C3, which is now in its twentieth year!

JUNE DARNED GOOD AIRFOIL —NACA 6509

In the years since the Darned Good Airfoils feature has been included in *Model Builder* Free Flight, a large number of the NACA airfoils have been covered. The most popular sections appeared quite some time ago. It seemed appropriate this month to introduce the 6509. For some of you who may not know, the NACA numbering system really means something. The first digit (6) gives the maximum camber in percent of chord; the second digit (5) the position of the maximum camber in tenth of chord; and the last two digits, the thickness in percent of chord. So, the 6509 airfoil has a 6-percent camber 50-percent back from the leading edge, and is 9-percent thick at that point. If you were to compare this section to the popular 6409 section, the only difference that could be noticed is that the high point (point of maximum camber) has moved from 40 percent to 50 percent of chord. This section should provide similar performance to the 6409; it may even be better. I would appreciate hearing from someone out there who has used this section to see what experiences can be reported.

JUNE THREE-VIEW OF THE MONTH —PEE WEE INTERCEPTOR

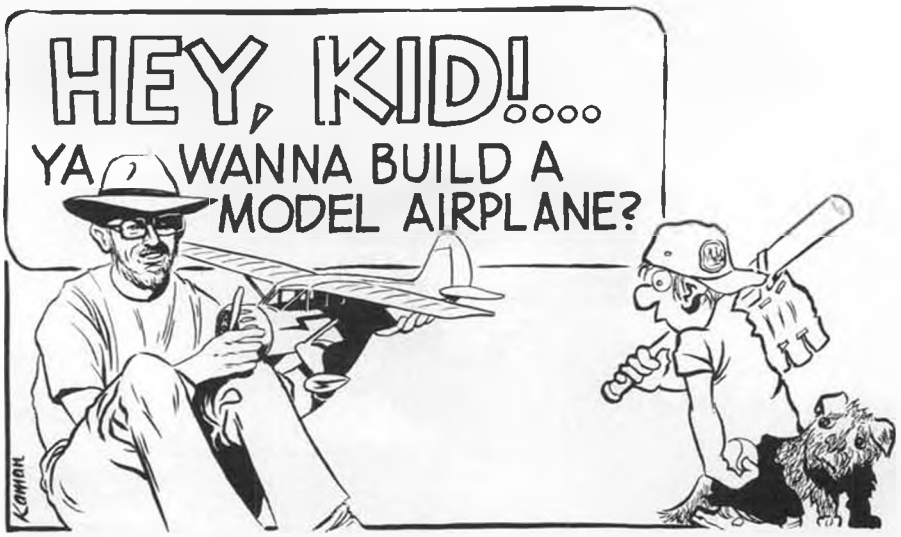
In the January 1988 issue of *Gas Lines*, the newsletter of the Southern California An-

Continued on page 66

David Payne prepares to launch his Curtiss Robin at the 1988 King Orange Meet. David is from Wittle, Tennessee.

Lee Campbell, of Campbell's Custom Kits, lights fuse on his Starduster 350. This was at the King Orange Meet. Lee is from Lake Worth, Florida.

Joe Macay of Southfield, Michigan goes for a max. All photos on this page are by Charles Alba.



By BILL WARNER

Illustrations by JIM KAMAN

• "Who reads the plans? They only slow ya' down!" One of my nieces has a bumper-sticker on her car that says, "I may be lost, but I'm making good time!" That's the way a lot of kids build models. The plan is your road map. The printed woods are there to help you over the trouble spots. No driver with any brains just starts out driving in a strange city without first studying the map. No model builder can afford to ignore the instructions, either.

The Sky Bunny R.O.G. is going to be your first "scratchbuilt" model in the series. That means that you have to get your own supplies together to build it. Scratch building is a lot cheaper in the long run than building kits, and it also lets you pick and choose the right wood, whereas kits may give you stuff that is almost, but not quite right. I could name a popular kit company that gets their wood from the petrified forest it's so heavy! Even if you buy your balsa mail-order, you'll be able to afford to get enough of it extra so that you can pick and choose a little.

The first thing you will want to do is go to a place that has a photocopy machine and have them Xerox both your plan and your parts layout for you. You don't want to cut up your magazine! Photocopy machines can sometimes blow up or reduce plans, too. You could even reduce the Sky Bunny plans down to use a smaller prop if you have one around, and you could substitute 1/32-inch wood for the ribs and use 1/16-inch square for the rest. Or you could go bigger and power the model with a gas engine like a Cox .02! For now, we'll stick with the magazine size.

TRANSFERRING THE PARTS TO THE WOOD

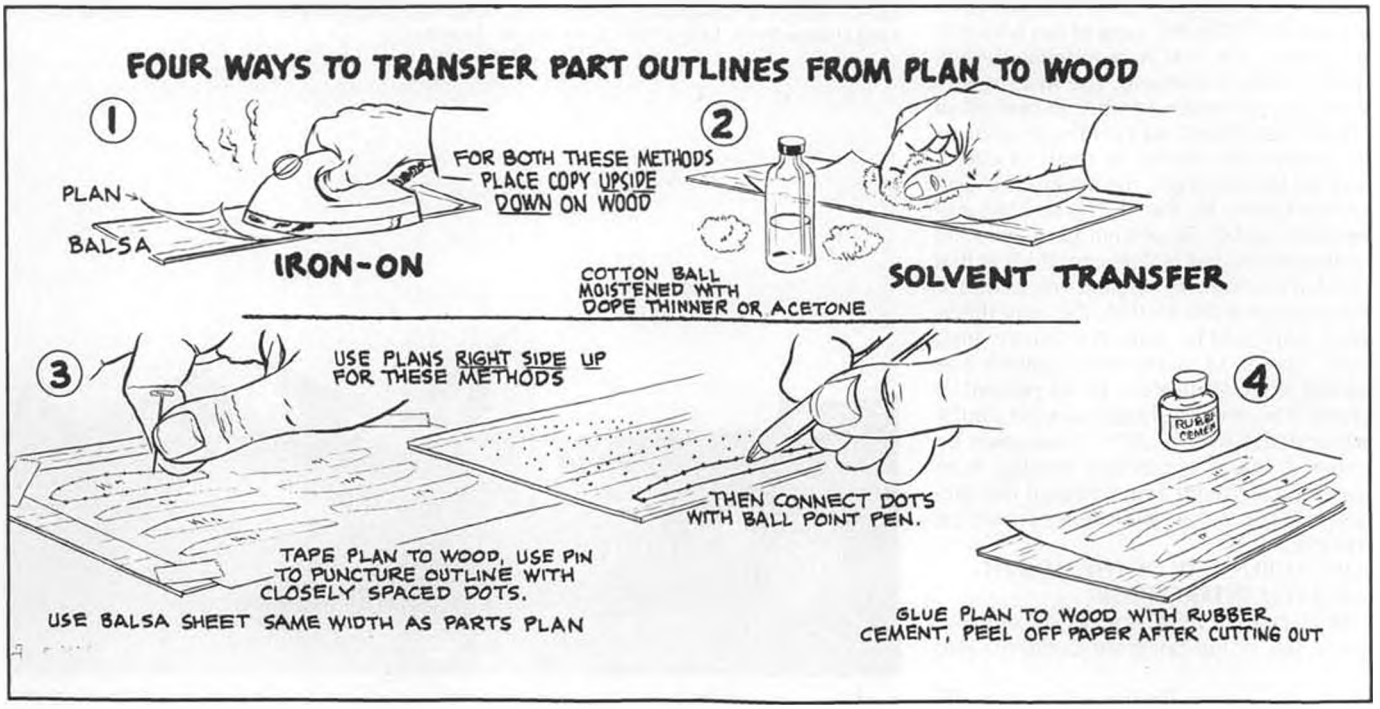
There are many ways of doing this. Some photocopy machines deposit carbon lines on the copy that can be ironed on to your sheet wood with a hot iron. Some can be transferred using a cotton ball moistened in dope thinner or acetone. Then again, some copiers use an ink that won't do a thing but sit there and look stupid! You might try two or three machines on the parts sheet and experiment. To make the ribs and other parts come out on the balsa, lay the copy face down on the wood, making sure the grain direction is the right way (from L.E. to T.E. on the ribs, W-1 through W-6, and top-to-bottom on the pylon). Then iron or swab applying slight pressure, checking under one corner occasionally to see if anything's happening.

Another way to do it is to glue the parts sheet onto the balsa sheet using rubber cement. Then cut out the parts and peel off the paper (you'll need paint thinner to help you if you leave it on very long). I ran a practice session on Sky Bunny-making after school for a few days, and we used this method with success.

If you want to make more than one model, you might consider cementing the parts sheet to thin card stock and cutting out "templates" or part outlines to draw around on your balsa. If you do this, cut the templates to the *inside edge* of the part outline to make the template just a bit small. That is so that when you draw around it, the width of your ball-point pen line will bring the part outline on the balsa back up to normal size. If you cut your lines in the middle on templates, the part will come out oversize.

Some people like to use the "connect-the-dot" method, and lay the parts sheet over the wood (always checking grain direction) and then poking little holes with a pin around the outline and through into the balsa. How far apart? On small curvy parts, maybe every 1/8 inch, making sure to poke a hole at each corner where you change direction. The tiny holes on the balsa sheet can then be connected with a ball-point line.

On harder sheets, you might even try carbon paper (new), which works fine some-



times. As in any method, make sure the parts layout or the wood doesn't move while you're working! Using some Scotch tape at the end or side can help out here.

CUTTING OUT THE PARTS

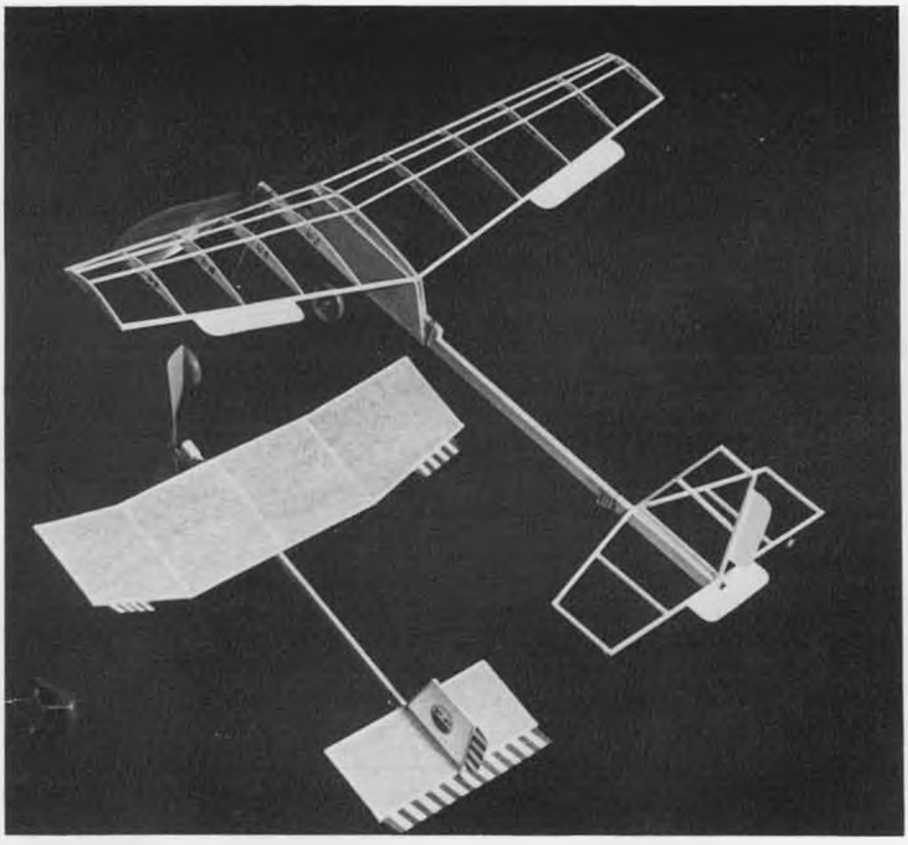
When you cut out your parts, you have to decide where to cut on the line, which is always wider than your knife cut. If you are an experienced modeler, go ahead and cut right down the middle of the line. If you are more cautious, cut to the *outside* of the line and sand it to size later. Some even cut a little way outside the line and sand to size with a sanding block just to be on the safe side. Now, printed outlines and ball-point pen lines on balsa help you cut out the parts, but they *look like the devil* smiling at you through your tissue paper! This won't hurt the flying, but can be avoided by lightly sanding off any ink that's right where the tissue goes.

CUT THE RIBS A BIT LONG

You may notice that I have left a little extra on each rib at the small (T.E.) end. That is so you can trim each one to fit exactly where it goes. It is always disappointing to find that something is too short. It's much easier to take it off than to put it back on!

CUTTING BOARD

I know that you aren't cutting on your mom's table, but I just want to remind you to use something other than your building board or plan to cut on. As we mentioned before, a bit of solid cardboard, linoleum tile, a telephone book, or the like will work fine. If you've been using the knife or razor blade for some time, it may also be getting dull and require sharpening or changing. The same X-Acto blades can be turned around to the new, sharp end. An Uber Skiver stainless blade will remain sharp much longer than a carbon steel blade. Resharpening is an art which requires a coarse and a fine whetstone, a length of leather belt, some light oil, and a bit of jeweler's rouge. If you have all these, it's just a matter of drawing the blade across the stone, at just a little more angle than was on the cutting edge originally, until dull spots on the edge are gone. Then the blade should be "stropped" on the belt (glued down to the edge of a piece of wood makes it easier to use). A little jeweler's rouge stick rubbed on the belt makes a fine, polished edge that you can shave with (if you've a mind to). Still, this is a beginner's series, and maybe you're rather just buy a few spare blades. Using a dull one can be very frustrating when cutting (tearing) across the grain! In actual use, a dull blade is more dangerous than a sharp blade. Think about it!



The Peck R.O.G. and uncovered Sky Bunny models.

SEPARATE THE PARTS FIRST

Once you have the parts all laid out on your balsa sheet, take your knife and cut between them, staying away from the part outlines. This will make each one easier to handle. Then, trim away the scrap down to the line, making *several small cuts* when cutting *across* the grain to keep the wood from splitting or tearing. It is about three times as hard to cut across the grain as with it. If you can't tell which way the grain runs from the grain lines on the wood surface, you'll find out soon enough when you try to cut it! *With* the grain, it usually cuts like hot butter.

PAYING ATTENTION TO GRAIN DIRECTION

Balsa's strength runs with the grain. You can tell this by noting how much pressure it takes to break balsa *with* the grain, and how much it takes to snap it *across* the grain. The reason we run the grain from end-to-end on a wing rib is because that is the way it needs to be strong and not buckle. The grain in the pylon goes vertically (the short way) because the strength of the pylon is needed to keep wing and fuselage together. If the grain went the "long" way, the wing could easily wobble or break off. Why do you think the pylon parts are laid out *across* your sheet of balsa instead of the long way, where the whole piece could fit on the sheet? Right! Grain direction. The problem with doing this is that some kids, who are not reading their "road map" or plan very well, are going to mess up and glue the pylon sides together with the little end piece we couldn't quite get to go across a standard three-inch wide balsa sheet on the wrong end of the big pylon piece! You're smarter than those guys; right?

STUDYING THE ROAD MAP

Just as a road map of Massachusetts is probably not going to have Henry's Bar and

A NOTE ABOUT THIS MONTH'S INSTALLMENT

The April '88 installment of "Hey Kid" probably looked OK to you, but it really wasn't. The explanation is more complicated than the interweaving plots of a radio soap opera, but we'll give it a try.

As you read this month's article, and study the illustrations, you'll come to realize that it was supposed to precede the April article and illustrations, and was also supposed to accompany the full-size plans for the "Sky Bunny," instead of the article and illustrations that did accompany the full-size plans!

For those of you who are closely following this series, and are maybe even copying the material and putting it together in sequence for club or school building sessions (which we don't mind your doing as long as you credit Model Builder as the source), let us give you the proper sequence of the material:

Parts 1 through 5: As published in the November '87, December '87, January, February, and March '88 issues.

Part 6: Includes text and illustrations in this, the June '88 issue, and the plans for the "Sky Bunny" from the April '88 issue.

Part 7: Text and illustrations as published in the April '88 issue.

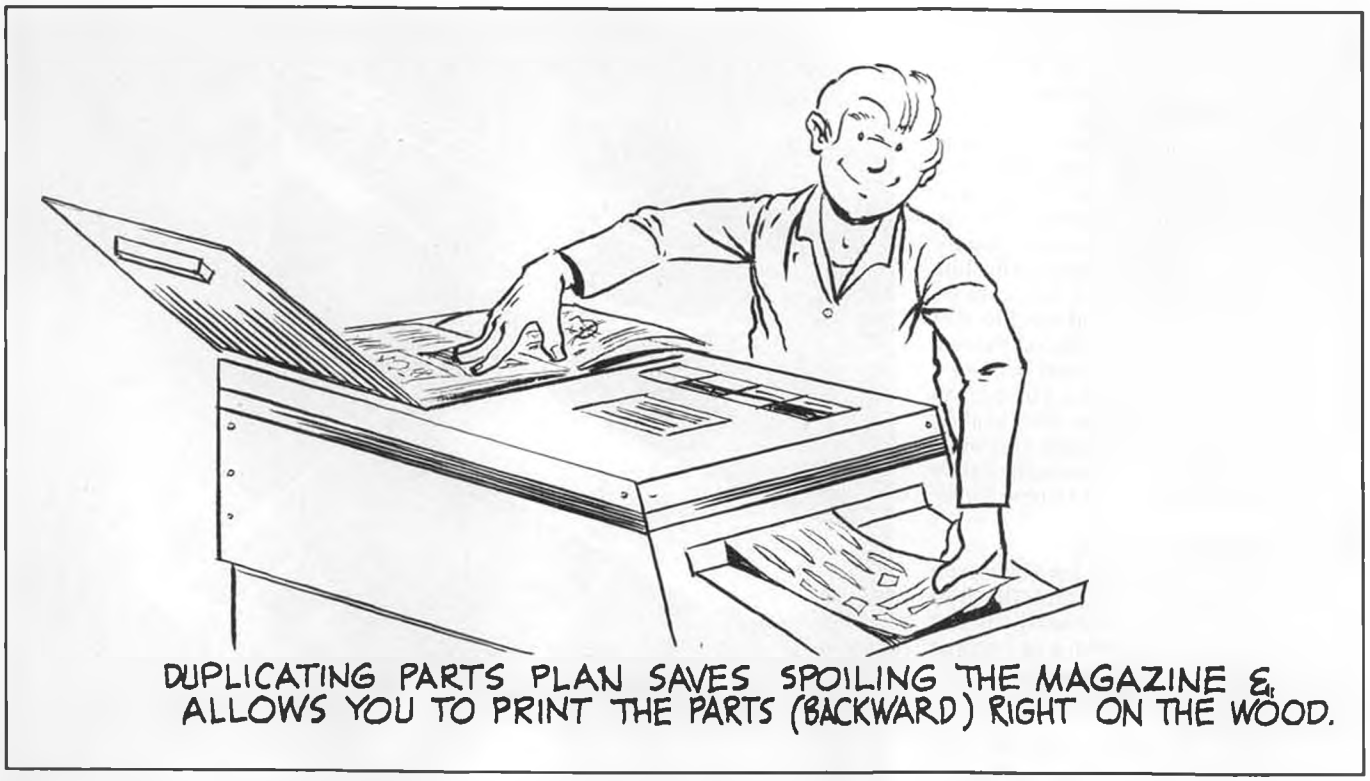
Part 8: As published in the May '88 issue.

Part 9: To appear in the July '88 issue.

. . . and so on . . .

One more thing . . . the parts layout drawing on page 59 of the April '88 issue was reduced somewhat during the reproduction process, so the parts will not fit if cut to the sizes shown. The layout is reprinted to the proper size in this issue, and the text explains how to use it.

Hopefully the above will clean up and redo the slate, and there won't be any more mixups in future installments. This series was meant to help newcomers in the hobby, not to hinder them! wcn.



Grill in downtown Framingham on it, a model plan is probably going to leave some question unanswered that you will just have to figure out for yourself. I have never yet seen a perfect plan. Still, the main stuff is usually there, and you should be able to find it. Most of the information is drawn out in outline form, and you build your structure right on it. When I worked in the full-size aircraft industry, plans always warned you not to "scale the plan," and preferred giving you dimensions which often went down to a couple of ten-thousandths of an inch! Nothing on most models is that close, unless you make your own engines! Sometimes, though, scaling the plan can get you into trouble. I have seen many plans where the ribs shown on the plan were a different size than the same ribs printed on the balsa! That has to do with the fact that sometimes printing machines go a little bigger or a little smaller. Be sure that the parts you copy onto your balsa match the size of the ones on the plan! Photocopy machines do not always copy exactly the same size as the original.

Let's just look over the plan to make sure you understand what the person who drew it had in mind. Starting at the nose of the fuselage, can you tell how the thread is wound on after the front end is glued together? Notice that it is spaced a little ways apart between winds. It is the glue which does the job, not the thread. It just helps. You are going to rub glue on the thread to keep it in position later. Next, if you get your fuselage wood from Peck's, it will be shorter than your fuselage on the plan, and will need to be "spliced" as shown by the angled dotted line. If you have a long stick, ignore this splice. That is why we call it "optional." Looking in the pylon area, you will note that I took pains to make sure you knew the whole pylon assembly could slide back and forth so you could move and remove the wing later. This is an important feature of this model, but I'll bet some people will glue it on anyway, if past experience is anything to go by!

You will notice that I have not drawn in the little notches on the ribs. That was on purpose. If I drew them on, you'd cut them out when you cut out the ribs; right? But then, they would probably not all line up when they were glued into the wing frame. They never do. In the next article in this series, I'll explain three different ways to do your wing structure. You will pick the way that works best for you. If you are one of those who can't wait until next month to get going, then you'll just have to figure out for yourself how to get the notches all in and lined up. Next month you'll see if you did it "right'!

Sky Bunny zooms skyward above California's airplane-catching palm trees on its way to a fine flight.

Continuing to study the plan, you will notice that the "W-1" rib, or "root" rib is not perpendicular to the plan (90 degrees, straight up-and-down). It is leaned toward the tip a bit. How much? Look at the third page of the plan and you'll see something called a "dihedral gauge" which should be glued onto card stock or balsa and used as a tool to get just the right amount of "lean" to the W-1. There is also a "dihedral sketch" to show just how much the tips of the finished wing will be higher than the roots. It shows four inches under one side with the other flat down. That means two inches under *each* tip. This is necessary for lateral stability, which we'll go into later.

You will notice that two styles of propeller shaft are shown. We'll go into how to bend these later.

On the third plan page is a side view and a bottom view of the nose. Study those carefully, for downthrust and sidethrust angles here are quite necessary and not optional. Again, we'll tell you why later. Everything is done for a reason, take my word now for that.

When I was a kid, we used to go to the movies every Saturday morning (no TV then). One of the things they'd show was a short part of an adventure series that always ended with the hero diving in a plane with the controls stuck, sinking in the quicksand, or hanging off a cliff while the villain stomped on his fingers. That was called a "cliff-hanger serial." As much as I want to get you into the air, due to the space we have in each issue, we have to call it quits

before we finish what's hanging! Sorry about that! Come back next month for the next installment if you can wait that long! One neat thing that has been happening since we started is hearing about youth groups being formed to build models together at a one-shot meet or with regular meetings. Even two kids in a neighborhood building models together can do a much better job than one alone, and with adult guidance. . .well, the sky's the limit! Another advantage is that when you send away for supplies, it's cheaper. Two or three kids splitting the cost of a bottle of dope or a winder helps a lot.

For those of you just joining us, there have been six articles in this beginners' series, starting with the November 1987 issue of *MB*. Back issues are available if you missed any. Also, Peck Polymers/Beginners, P. O. Box 2498, La Mesa, California 92044, telephone, (619)448-1818, will send you a sheet with the materials and models used in this series for an SASE. They have the supplies to make the Sky Bunny, though you'll have to splice two sticks together to make the fuselage. The materials sheet is free. Their regular catalog is $2, or free with your first order. After we finish with the present project, we are going to tackle the fantastic Flying Aces Moth kit, and finish up the small rubber model building and flying with the Nationals-winning Lacey M-10 scale model, just in case you're interested in ordering ahead. Happy landings! •

BILL OF MATERIALS

(Available from Peck-Polymers except as noted.)

1 sheet—1/16 x 3 x 11-3/4-inch balsa.

14—3/32 sq. in. balsa sticks (get two 10-packs from Peck).

1—3/16 x 3/8 x 24-inch balsa (or two 11-3/4-inch lengths from Pecks and splice, as they don't ship long sticks).

1 piece—Aluminum tubing 3/32-inch outside, 1/16-inch inside diameter.

1 large glass bead or two or three 1/8-inch brass washers (PA-31) from Peck, .050-inch hole.

1 piece—.046 or .031-inch music wire 11-3/4 inches long for landing gear. (.046 inch best, but harder to bend for kids).

1 pair—1-inch wheels.

1 sheet—Domestic (cheaper) or Japanese (better but four times as expensive) tissue.

1—8-inch plastic propeller (PA-23) or 7-inch propeller (PA-22). (8-inch was used on ours, but 7-inch will work if you have one.)

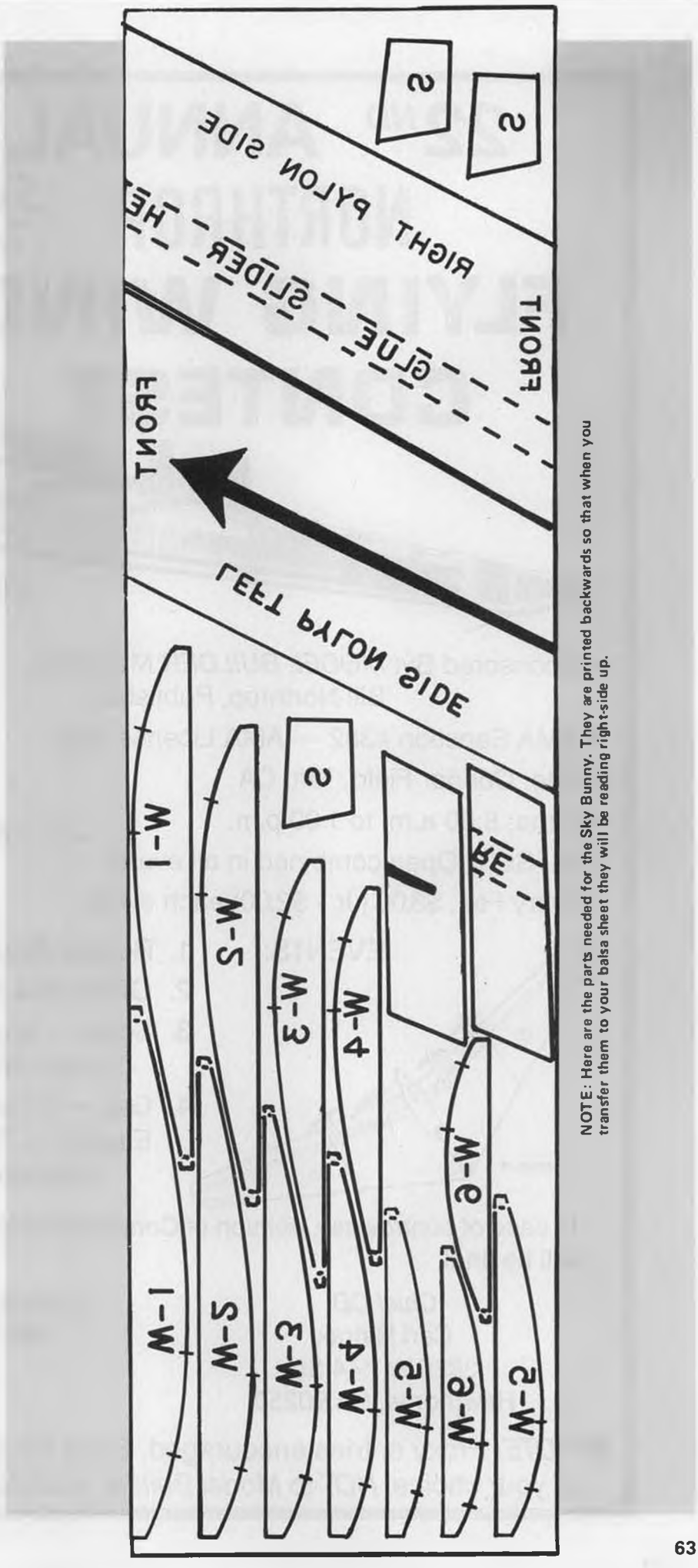
1 piece—.031 music wire for prop shaft (4 inches long) or order ready-made shaft pack of 10 (PA-44) from Peck.

1 small can—Sig "Lite-Coat" or similar *non-shrink* clear model airplane dope.

1 bottle or can—thinner for the above (same size for mixing 50-50).

1 tube—Testor's "Cement for Wood Models—fast drying." (Some 5-minute epoxy for the nose-bearing tube is nice, but not essential.)

1 spool thread, some pins, a modeling knife, Saran Wrap, and a building board will finish up what you need.



NOTE: Here are the parts needed for the Sky Bunny. They are printed backwards so that when you transfer them to your balsa sheet they will be reading right-side up.

22ND ANNUAL NORTHROP FLYING WING CONTEST

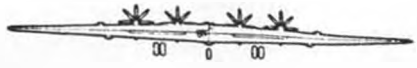
F/F ONLY

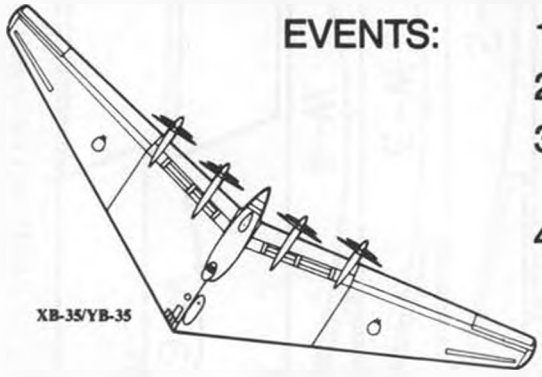
YB-49

OCTOBER 2, 1988

— Sunday —

- Sponsored By: *MODEL BUILDER* Magazine
  Bill Northrop, Publisher
- AMA Sanction #382 — AMA License reqd.
- Site: Condor Field, Taft, CA
- Time: 8:00 a.m. to 1:00 p.m.
- Jr., Sr., & Open combined in all events
- Entry Fee: $3.00 (Jr. - $2.00) each event





XB-35/YB-35

EVENTS:

1. Rubber Power
2. Glider (164 ft. towline)
3. Scale — any power
   (20 sec. official)
4. Gas — 25 sec. eng. run, or
   Electric — 35 sec. motor run

• combined event •

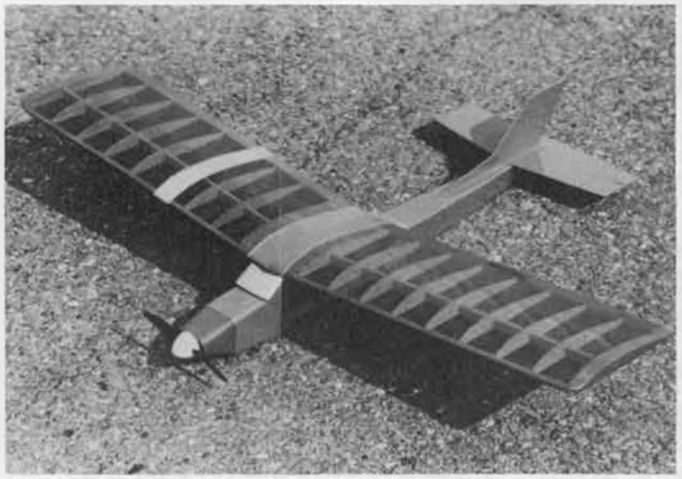
In case of controversy, opinion of Contest Director and Judge will be final.

Chief CD
Carl Hatrak
3825 W. 144 St.
Hawthorne, CA 90250

Scale & Flight Judge
Bill Stroman

● *NOTE:* Proxy entries encouraged. Send models to flier of your choice, *NOT* to *Model Builder* or CD's.

ELECTRIC POWERED AIRPLANE KITS



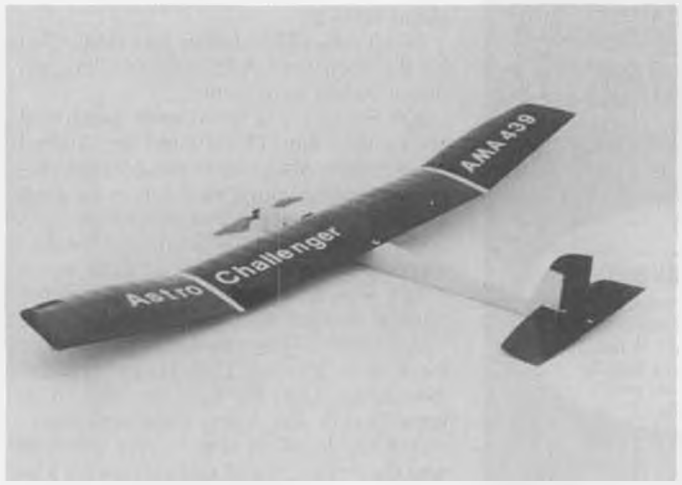
THE ASTRO SPORT

The Astro Sport is a cute little high wing sport trainer that is specially designed for schoolyard fun. Install the Astro Cobalt 020 Motor and you have a gentle and forgiving trainer that is very easy to fly. Install the more powerful Astro Cobalt 035 and it becomes a real schoolyard show-off doing snappy rolls, loops, and other schoolyard maneuvers. The kit contains all machine cut and sanded parts and is super easy to build. Wing Span 37 inches; Wing Area 292 sq. in.; Eppler-195, Flying Weight 22 to 28 ounces. **Kit # 1019 ..... $ 39.95**

PARTENAVIA P-68 VICTOR TWIN

Our popular PARTENAVIA P-68 kit has been comnpletely redesigned for the Astro Cobalt 05 Motor. The airfoil section has been changed to the Eppler-195 for improved aerobatic performance. The P-68 has always been a popular model at our electric contests, and in fact an Astro Cobalt 05 powered P-68 won first place in aerobatics at the 87 EAA Electric Championships. The deluxe kit features all machine cut and sanded balsa parts. Wing Span 50 inches, Wing Area 400 Sq.In., Flying weight 4.5 lbs.

Kit # 1013.....$89.95



THE ASTRO CHALLENGER NATS WINNER

Bob Boucher's Astro Challenger won the 84 Reno Nats its first time out and has been winning electric sailplane contests all over the country ever since. Powered by an Astro Cobalt 05 Geared Motor turning a 12 inch folding propeller, the Challenger climbs almost out of sight in 45 seconds, and can repeat this climb three or four times on a single battery charge. The distinctive wing planform with elliptical tips maximizes aerodynamic efficiency and minimizes tip stalls. It's gentle and forgiving nature make it perfect for beginners too. Kit features all machine cut and sanded balsa parts. Wing Span 72 inches, Wing Area 612 sq.inches, Airfoil Eppler 193 Flying weight 39 ounces. **Kit#1020..... $ 49.95**

THE PORTERFIELD COLLEGIATE

The Porterfield Collegiate makes a great sport scale electric model. It's gentle and forgiving nature make it perfect for beginners, but at the same time it can be quite responsive in skilled hands. The large wing and light wing loading lets the Porterfield climb steeply to and land short. Just what you need for flying in your neighborhood park or schoolyard. Beginners to R/C should install the Astro Cobalt 15 Geared Motor. More experienced flyers can install the Astro Cobalt 25 geared motor for very realistic scale like maneuvers. Wing Span 69.5 inches, Wing Area 690 sq inches, Airfoil Eppler 193, Flying Weight 4 to 5 lbs.

Kit # 1018 .....$ 79.95

ASTRO FLIGHT INC.

13311 BEACH AVE. • MARINA DEL REY, CA 90292 • PHONE (213) 821-6242

Free Flight. . . *Continued from page 59*

tique Model Plane Society (SCAMPS), editor Eric Strengell speculated, "Why not old time Pee Wee 30?" He notes, "A quick scan of the events and their entries on the score sheets of most any large meet, be it O.T. or modern, reveals a rather startling trend in aeromodeling—fun-type events are really getting popular. Events such as 1/2A Texaco, .020 Replica, two-bit rubber, P-30 rubber, and O.T. Rubber in general offer flying fun and competition that is inexpensive, low-tech, enticing to newcomers, and featuring models that are usually quicker and easier to build and trim. Also, it doesn't hurt as bad when you lose one.

". . .Maybe the time has come to reload that hypo-syringe and aim it at the O.T. arm and see if it sparks some liveliness in those hardening arteries. Why not old time Pee Wee 30?

"Old Time Pee Wee 30 would depart significantly from the Orbiteers rules only by limited model designs eligible to any reasonable facsimile of a gas or rubber model designed prior to 1956, which would make any old timer or nostalgia model a candidate. A model need only be a recognizable design and interpretation would purposely be broad so as not to discourage any creativity. Profile fuselages are encouraged as are all sheet balsa designs." To this end, Eric carried this month's three-view in his newsletter. The O.T. Pee Wee Interceptor is a neat-looking little ship. Even if Old Time Pee Wee 30 didn't catch on, the Interceptor should be built to fly in the regular Pee Wee 30 events. My assessment is that it would be competitive and that it would garner its share of "oohs and aahs." In fact, I'll bet that someone will figure out how to build one of these for Pee Wee 30 that will also be eligible to fly in the .020 Replica event.

HOMELY HOMILY

Government spending gives you some idea why laws are called "bills."

TOP BANANA REDUX

Way back in July 1985 I featured a three-view of Jay Jackson's Top Banana 1/2A design. This ship is a bona fide Nostalgia ship. After some time had passed, I became aware that the model was doing quite well in the Nostalgia contests in SoCal. Terry Thorkildsen was one of the free flighters extolling the virtues of the Banana. A couple of the Northwest fliers showed up with Bananas last summer and proceeded to do very well in competition. So, I finally decided to contact Jay Jackson to see if I could pick up some information about the Top Banana. Little did I realize when I wrote to Jay that I would receive a large parcel in return. For your information, the Top Banana design is available in a wide assortment of sizes. These sizes along with comments by Jay are as follows:

200 Sq. In.—the Original Top Banana. Powered by the then new Wasp .049. The 200 sq. in. was considered to be a very large airplane for 1/2A models at that time. Sold about 200 kits.

240 Sq. In.—This design was developed for the then new Anderson .065 engine. About 20 kits were made.

300 Sq. In.—This version was developed for use with the T.D. .049 and the Cox red plastic tanks. About 40 of these were built. For many of the young modelers in the area, this was their first gas-powered F/F design.

FAI Top Banana (404 Sq. In.)—This ship was developed for the Torp. .15 G.H. when it was new. It has a shorter TMA than the original designs. About 15 kits were made.

500 Sq. In.—This size was developed for the K & B .19 and .23 G.H. using radial mountings. Later Jay flew this size with Veco .19 and .201. A very good performer.

600 Sq. In.—This size is very effective with the K & B .29 and .32 G.H. It is Jay's favorite size and power. Presently he is flying it with a Veco .29. This size was kitted during the early 1950s and about 20 kits were sold.

700 Sq. In.—This size has been flown with K & B .35 G.H. and flown later with Super Tigre .29 and .35. Recently, Jay built one and used an O.S. .35 Mk III for power.

800 Sq. In.—Jay built this size for a Torp. .35 G.H. when they first came out. He built this size with a 1/8-inch square stick fuselage covered with 1/16-inch balsa. Came out very light, according to Jay, and climbed well. Jay feels it would be a good ship with a Johnson Combat .35.

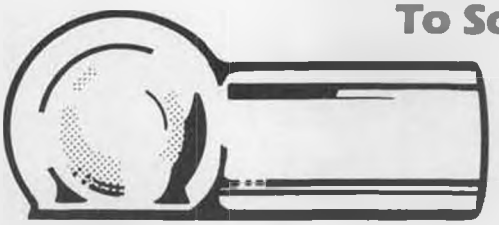
Jay also noted that he has one other size not listed above. This is the 650 version. None of this size have been built to date, however.

For Nostalgia meets that use the NFFS rules, any of these ships would be legal en-

DU-BRO BALL LINKS

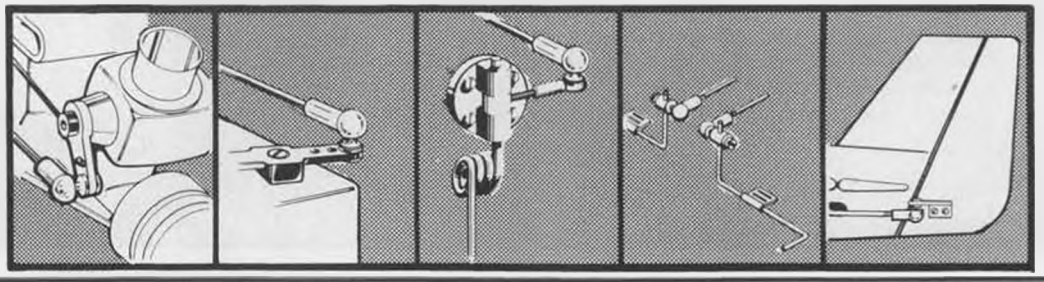
"A SNAPPY SOLUTION"

To Some Common Linkage Problems



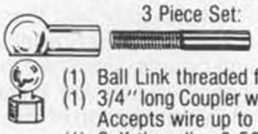
The Ball and Socket action of Du-Bro Ball Links help eliminate linkage binding or any play that may occur when off-set or misaligned hook-ups are made.

Du-Bro Ball Links are clean in appearance and are ideal for many R/C plane, boat, car and helicopter applications. They are ideal for eliminating differential throw in aileron connections and taking the slop out of steering hook-ups. Du-Bro Ball Links are the perfect connection when flex-cable is used to wiggle its way to a carburetor. If your application requires the need for two axis movement, Du-Bro Ball Links are the ultimate!!



No. 180 BOLT-ON BALL LINK

3 Piece Set:



(1) Ball Link threaded for 4-40 Rod
(1) 3/4" long Coupler w/ 3/8" 2-56 thread Accepts wire up to .072 dia.
(1) Self-threading 2-56 nylon socket

No. 181 2-56 THREADED BALL LINK

5 Piece Set:

(1) Threaded Ball Link for 2-56 nut
(1) 3/4" long Coupler w/ 3/8" 2-56 thread Accepts wire up to .072 dia.
(1) Self-threading 2-56 nylon socket
(1) Flat Washer
(1) 2-56 Hex Nut

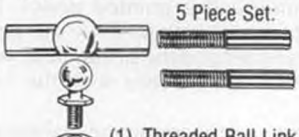
No. 182 RIVET BALL LINK

4 Piece Set:

(1) Ball Link for peening on
(1) 3/4" long Coupler w/ 3/8" 2-56 thread Accepts wire up to .072 dia.
(1) Self-threading 2-56 nylon socket
(1) Flat Washer

No. 183 AILERON CONNECTOR BALL LINK

5 Piece Set:



(1) Threaded Ball Link for 0-80 Nut (1/16" dia. thrd.)
(2) 3/4" long Couplers w/ 3/8" 2-56 thread Accepts wire up to .072 dia.
(1) Self-threading 2-56 dual nylon socket
(1) 0-80 Hex Nut (1/16" dia. thrd.)

No. 189 AILERON HORN WIRE BALL LINKS

8 Piece Set:

(2) Horn Wire Ball Links for 3/32" dia. wire
(2) 3/4" long Couplers w/ 3/8" 2-56 thread. Accepts wire up to .072 dia.
(2) Self-threading 2-56 nylon sockets
(2) 4-40 × 1/8 screws

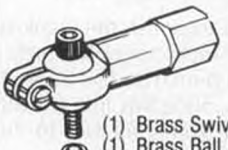
No. 190 1/16" THREADED BALL LINK

4 Piece Set:

(1) Threaded Ball Link for 0-80 Nut (1/16" dia. thrd.)
(1) 3/4" long Coupler with 3/8" 2-56 thread. Accepts wire up to .072 dia.
(1) Self-threading 2-56 nylon socket
(1) 0-80 Hex Nut (1/16" dia. thrd.)

NO. 259 4-40 E/Z ADJUST BALL LINK

6 Piece Set:



(1) Brass Swivel Ball
(1) Brass Ball Link Shim
(1) 4-40 × 5/8" Socket Head Bolt
(1) 4-40 Nylon Insert Lock Nut
(1) Adjustable Nylon Socket self-threading for 4-40 Rods
(1) Adjusting Screw

No. 367 2-56 SWIVEL BALL LINK

4 Piece Set:

(1) Nylon Swivel Ball Link self threading for 2-56 rod (burnished brass swivel)
(1) Brass Ball Link Shim
(1) 2-56 × 1/2" Socket Head Cap Screw
(1) 2-56 Hex Nut

No. 369 2-56 SWIVEL BALL LINK FOR 4-40 RODS
Same as above except ball link is self threading for 4-40 rods.

No. 368 2MM SWIVEL BALL LINK

4 Piece Set:

(1) Nylon Swivel Ball Link self-threading for 2MM Rod (Burnished Brass Swivel)
(1) Brass Ball Link Shim
(1) 2MM × 12 Socket Head Cap Screw
(1) 2MM Hex Nut

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tries. Although I haven't seen any but the 200 sq. in. size perform, I can't comment about them, but the 200 is a winner. If you are interested in further information about any of these ships, contact Jay Jackson. He can be reached at 2150 So. 300 W. #1G, Salt Lake City, Utah 84115.

HOMELY HOMILY #2

Retirement is when you are too busy to do things you planned to do when you had the time.

NATIONAL FREE FLIGHT SOCIETY ANNOUNCES THE TOP TEN FOR 1988

For the past 15 years or so, the NFFS selects its Ten Models of the Year Awards. This year's selections have been announced by Chairman, Jon Zeisloft. They are as follows:

INTERNATIONAL CLASS

F1A - Nordic:	VT-38	Victor Tchop	(USSR)
F1B - Wakefield:	RW-22	Bob White	(USA)
F1C - Power:	EV-43	Eugene Verbitski	(USSR)

AMA/OUTDOOR

Large Power:	Atlas MK III A/B	Rol Anderson
Small Power:	Astro Star 1/2A	Terry Thorkildsen
Large Rubber:	Le Nomade	John Lenderman
Small Rubber:	Square Eagle P-30	Phil Hartman
Hand Launch Glider:	Shockwave	Jim Leuken

INDOOR

Rubber:	Manhattan Pieces	Walter P. Van Gorder

SPECIAL AWARD

Quality Mechanical Accessories: Winders, Front Ends, Torque Meters, et al by Robert Wilder

For your information, many of these designs will be available in full size plan form after the Symposium event is held at the 1988 AMA Nationals. Each of the Top Ten will be featured in three-view with appropriate comments from the designer in the Symposium Publication. Although the costs for the 1988 Symposium are not known at this time, orders may be sent to: NFFS Publications, c/o Fred Terzian, 4858 Moorpark Ave., San Jose, California 95129.

If you are interested in the plans offered by NFFS, contact NFFS Plans Service, c/o Bob Klipp, 10115 Newbold Dr., St. Louis, Missouri 63137.

HOMELY HOMILY #3

Pain is relative, especially if the relative stays longer than the weekend.

PEE WEE HOP UP

Back in the early days of the Pee Wee engine, an article appeared in *Model Airplane News*, November 1960, giving details by Warren Curtis about how to hop up your Pee Wee engine. Now, with the increased interest and use for the Pee Wee engine, it seems to be a time to revisit the article. For those of you who have this magazine in your collection, I would suggest that you dig it out and turn to page 26. For those of you who don't have the magazine, here is a brief synopsis of the original.

First order of business is to disassemble the engine and clean the bore of the cylinder with a soft balsa paddle about 1/2 the diameter of the bore. The solution to use is a mixture of jeweler's rouge and oil combined to the consistence of a paste.

The second thing to do is to produce a slight radius to the top edge of the piston. This radius should not exceed .055 inches or about 1/2 the thickness of a cylinder fin. Use a fine Arkansas stone for this procedure. Rotate the piston slowly against the stone to accomplish this step.

The third step is to clean both the piston and the cylinder thoroughly and then to thin out the rouge so it is a free flowing oil. Lap the piston and cylinder slowly for three minutes. Lap only between the exhaust ports and 1/32 inch from the top of the cylinder bore.

The fourth step is to lightly polish the rod bearing. This is done by using the thicker rouge solution and a pointed dowel. Do each side of the bearing for three minutes.

Put the cylinder and the piston in solvent to soak while you proceed with the next steps.

The fifth step is to remove the crankshaft, wash it, and dry it. If any roughness can be felt or seen on the shaft, gently rotate a fine crocus cloth around it until the roughness seems to be gone. Now use some of the jeweler's paste solution and gently smooth out any remaining roughness. Do the same with the crankpin.

The sixth step is to polish the crankshaft bearing. Slit a 1/8-inch dowel 3/4 inch on one end. Catch a 1/8-inch fold on a 3/4-inch wide crocus cloth. Slide this into the main bearing and rotate gently for two to three minutes.

The seventh step is to lay a piece of 400 wet or dry paper on a sheet of glass. Press the case back surface squarely on the paper and twist it three turns to remove any burrs. Do the same with the cylinder seat giving only one turn.

Clean all parts thoroughly using solvent and a brush. Reassemble the case, piston, and cylinder, and apply the oily polish to

shaft, piston, bore, crankpin, and rod socket. Strokelap at fast speed for three minutes. Disassemble and clean again.

Finally, break the engine in using some Hoppe's #9 Nitro Powder solvent mixed at one to two capfuls per pint of fuel. Hoppe's can be obtained from any gun shop. Run the engine rich until it is hot, then lean out to peak. If the engine fades, then richen it again. This break in procedure will keep varnish formation down and prevent overheating.

Some other things that you can do to make your engine go faster are as follows:

First, remove the tank unit and drill out the venture with a #55 drill and fair the backplate air inlet into a bellmouth shape.

Second, replace all of the gaskets with new ones, and if your engine has the old-style brass reed, replace it with the new mylar version. Now clean all parts thoroughly, reassemble the engine, and lightly oil all moving parts. Finally, trim the stock Cox 4.5 x 2-inch propeller to 4.2-inch diameter and balance it carefully. Now use a high nitro fuel—50-percent or more. If your Pee Wee doesn't hit at least 22,000 rpm by now, start over with a new one.

LETTER FROM CHET LANZO

In the February issue of *Model Builder* Free Flight, Bill Northrop explained some of his early experiences with the October Mystery Model, Chet Lanzo's Wakefield Defender. Recently, I received a letter from Chet with some of the background of this ship: "Now, getting back to the Wakefield Defender, which was published in Bill Winter's Plan Book. Bill had asked me for a Wakefield design that he could publish in his plan book, so I obliged with the Wakefield Defender, which was a smaller version of the original 400 sq. in. 'Record Holder.' The 'Wakefield Defender' was a 210 sq. in. version of the pop-up cabin-style Record Holder. At the same meet in England (50th Anniversary of the 1937 Wakefield Event), I ran across a rubber model flier who had built and was flying two of the 'Wakefield Defenders.' He said the Defender looked good but was a—lousy flying machine—(these are my words, not his). He was quite a bit more diplomatic in his wording. He said the climb was very poor. I apologized for the poor design and blamed it on the poor reproduction of the RAF 32 airfoil that was shown in Bill's Plan Book." Thanks for the information, Chet. Nice to hear from you.

THE END AGAIN

Well, that does it for another month. As you can see from the pictures that are included in this issue of *Model Builder* Free Flight, I am beginning to use a bunch of local fliers again. That means that if you have some good pix, send them in for everlasting fame in your favorite model magazine. In the meantime, catch a thermal for me! •

Big Birds. . . . . *Continued from page 21*

And you'll also like this Volume I, mainly because it's gonna keep you from buying a pig in a poke. Each of the 50 reviews includes specs, historical data, and an evaluation of the plan, and is topped off with a most helpful degree-of-difficulty rating, ranging from an ultra-simple "1" up to an exacting and difficult "5." The introduction states, "Our comments on the suitability of plans will necessarily be subjective; each of us is affected by his own experience and preferences, and the authors are no exception." However, in spite of this modest disclaimer, I found their evaluations to be surprisingly objective. So if you prefer to "plans build" rather than mess with kits, you're gonna want, and need, this directory.

THOUGHT OF THE MONTH

(From the Brazoria County Modelers Association) Suppose there was a merger of Allegheny Airlines and Braniff; then we'd have All-Bran, the most regular service.

Al Alman, 16501-4th Avenue Court East, Spanaway, Washington 98387; (206)535-1549. Why not try something different this season and build a set of floats? Water flying is F-U-N, give it a try.

SAFETY IS THE BOTTOM LINE! •

Peanut. . . . . . *Continued from page 53*

the drafting board. Somehow the wing of the model in the photos ended up with a twist giving the left wing about the right amount of washout, but the right wing the wrong amount of washin. This design has a tapered wing which makes washout in both wings very important. About half an hour with a hot hair blower was required before the right wing retained about an eighth of an inch of washout and the model would fly in consistent left-hand circles without tip stalling and diving at the ground. The very first flight attempt consisted of a pull-up

into a gentle stall and a two-turn tailspin into the deck, *so be sure both of the wings end up with at least 1/8-inch of washout.*

The model structure of this model is very conventional in almost all respects, so there are only a couple of points that need to be taken up.

The wing is assembled directly over the plans; leading and trailing edges, ribs, and tips. Do not install the spar until the rest of the wing can be removed from the plan because the top of the spar needs to be straight. Note that the bottom of the spar must be tapered up to match the notches in the ribs.

The fuselage structure is conventional. There are two stringers on the sides and two on the bottom, but no stringers on the top. Add a shim on the top of each motor peg upright between the side stringers so the wood structure comes out to the surface of the tissue when the fuselage will be covered.

Finally, the windshield was kind of a pain, in fact, on the real airplane it was several flat panes, so after getting it to fit on the model we carefully cut it off and traced it over the wing plan on the right side so the builders will have a starting point. The pattern is not quite symmetrical; the suspicion is that it ought to be, but it's what fits on the model in the photos.

The model is covered with red Japanese tissue and was given two coats of thin nitrate dope. The registration numbers are white.

Although a 4-1/2-inch Peck-Polymers' plastic propeller is shown on the plans and will probably work okay, big propellers never look very scale, so we actually used a 4-3/16-diameter plastic propeller designed for the CO_2 motors. The model does well with a 12-inch loop of 1/16th rubber.

There are a lot of tiny details that can be added to this model showing on the three-view. Add them if you want a super-detailed Peanut. •

Insiders. . . . . . *Continued from page 45*

dido, California 92025.

HINT OF THE MONTH

Our HOTM this time is graphic, since no verbiage could explain the great mystery of how to cover with microfilm or Micro-Lite/Ultrafilm polycarbonate films. Both take some practice (the experts consider that microfilm is easier to cover with than condenser paper) and manual dexterity/patience. To learn more, take a look at our "Indoor: Easy as ABC" covering guide. •

Choppers. . . . . *Continued from page 15*

out the starting belt, but I have one of the new O.S. 32H *cone start* engines installed. I start the engine from the bottom of the helicopter (just like the Heim).

Tech Specialties converted the DDF head to a "pro" style head, by installing a solid bar through the head, and making a few other changes. This is the solution for those all-too-frequent boom strikes that were occurring. If you send your old style head to them, they will convert it for about $40. They can be reached at 218 Vernon Road, Greenville, Pennsylvania 16125; (412)588-1335. Also they make aluminum seesaw arms, which replace the original plastic ones that were breaking frequently.

Hirobo now has two new versions of the Shuttle which have eliminated many of the faults of the old model. The sideframes have been beefed up, as has the tail housing. The dual damped head has been replaced by a single damped head similar to the one on the Cobra and Competitor. A more expensive version with additional ball bearings is available at, of course, a higher price.

So, now I've got a pretty nifty fun-scale Hughes 500 *D*, with a power-to-weight ratio that should make it fully aerobatic. With a 1200 mAh battery pack, it balances just a shade ahead of the main shaft. The O.S. 32H cone start is a little heavier than either the 28 or the standard 32, so the balance will change depending on your choice of engine and battery. The scale fuse itself doesn't seem to change the center of gravity much at all.

The O.S. 32 fits the motor mounts with only a *tiny* amount of filing required to allow totally flush seating. It seems strange that O.S. now has a 32 FSR with a case essentially the same size as their 21FSR, 25FSR, and 28FSR.

My overall evaluation of the Rotary Wing

Inside are 48 little reasons not to drink and drive.

MADD

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Concepts Hughes 500 is that for $59.95 it's a nice scale body at a reasonable price. It's easy to put together and paint. A 14-page instruction booklet is included which is very complete, although a little wordy and not as clear as it could be in all areas. Most of the problem with this kit is the "C" style tail assembly, which, as I stated earlier, can be replaced with a simple-to-construct plywood T-tail. Although I won't get to fly this for a couple of months, I did see U.S. Pattern champion Tony Frankowiak fly one last year, and it did fly well. He had plenty of power and no overheating problems with the O.S. 28 H engine under the hood. I figure with the O.S. 32 H and the new rotor head, *mine* will fly better.

TANGERINE

Put me in Florida in December, with my helicopter and a nice place to fly, and I'll find a way to have a nice time, no problem.

So, I'm hard-pressed to understand all the dissension that occurred in the helicopter competition at the Tangerine Invitational in Orlando, Florida.

Apparently, the controversy was whether the 1987 or 1988 rules would be in force. Under the 1988 rules all the maneuvers are compulsory, including some aerobatic maneuvers that were previously optional. Several fliers complained that they weren't notified that the 1988 rules would be used and hadn't practiced them (a reasonable assumption being that the contest took place in December *1987*).

A protest was filed, several contestants threatened to withdraw, and allegedly at one point it almost came to blows between two individuals. Eventually, cool heads prevailed and a compromise was reached, in which the old rules were kept, except that no "K" factors (weighting) were assigned to any maneuvers. The winner was Cliff Hyatt, the 1984 Nats winner, who, happily, is getting involved in competition again. Second was Tim Schoonard. The results were as follows:

FAI F3C EXPERT

Place/Name	Helicopter
1. Cliff Hyatt	X-Cell
2. Tim Schoonard	X-Cell

3. Dan Chapman	Champion
4. Ted Schoonard	X-Cell
5. Mike Mas	Champion
6. Tom Dooley	X-Cell

AMA INTERMEDIATE

1. Wes Suggs	X-Cell
2. Craig Mallory	X-Cell
3. Jim Himes	X-Cell

Being that Florida is Miniature Aircraft country, the preponderance of X-Cell choppers was not surprising. Still it is quite amazing that a helicopter that has only been on the market since last summer has attained such a high degree of popularity among the top competitive fliers.

My suggestion for next year's competition: single elimination, three rounds, mandatory standing 8 count, three knockdowns in a round ends fight. That way, after the winner is declared, everybody can go out and fly their helicopters—*for fun*. •

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

eral times in all these flights.

More normal flying times using on and off should be well over ten minutes on the Magnum pack. This pack is most efficient and most effective at currents of 18 amps or below. Set your motor and prop up for currents between 10 to 18 amps, and you will have good results. Avoid currents of 20 amps or above. The DSC 0- to 30-amp ammeter is ideal for checking current drains for motor/prop combinations; it is part 604A (Molex) or 604B (Tamiya), $22.95. Another way is to use an electronic throttle and fly at 3/4 throttle once you have altitude, and the flight will be much longer. By the way, the slightly less rpm on the bench did not show in flying. Both packs flew very well, and I could see no differences in flight during the full power part of the motor run. The Magnum pack shows a "cruise mode" in the last one or two minutes of flight. This flies and feels like about 60-percent power, enough to hold level flight or extend a landing approach but not enough to decide to do a go-around. Larry says the Magnum pack is intended for those who fly for fun and want more duration, not the competition fliers, who need max power in less then two minutes. I agree, that is exactly what it is for, and now you can hog the frequency pin!

There are two cautions I would pass on, both related to the fact that the Magnum pack runs hotter. First, *do not use a charge jack!* Remove the pack each and every time you charge. I do this routinely on all my planes. I do not use a charge jack. This is by far the best way to catch a hot pack. Second, it would be a good idea to provide cooling air for the pack. This is not mandatory if you remove the pack for charging each time, but it certainly would be if you insist on leaving the pack inside and charging it inside. For more information on the Magnum pack sizes and prices (prices had not been determined yet; this was a prototype pack), contact SR Batteries, Box 287B, Bellport, New York 11717; phone (516)286-0079. Fly longer, fly SR!

RTF ETUDE

Ken Martin sent in detailed photos of his Etude modifications. The Etude has got to be the most popular RTF to modify; it is very versatile. Ken's can do Cuban 8s, inverted, loops, rolls, you name it! Ken added one more rib panel to each side and set the dihedral at 3-1/2 inches total under one tip (the other panel flat on the table). He uses an Astro cobalt 05 geared with the Kyosho Etude prop on seven 900 mAh Sanyo red cells. Ken uses an Adams throttle (a very good throttle, and now available under the Robart brand) and has gotten flights over 15 minutes. Ken did a nice job of fitting in the modifications, as you can see. The 900 cells are slightly shorter and lighter than the regular sub-C cells. They deliver nearly the same power and duration as sub-C cells; I consider them to have the best power-to-weight ratio of any Ni-Cd and are available from Astro Flight. The Astro cobalt motor just drops right into the cradle mount and is held in with rubber bands. The MRC Cessna MRC has the same type of cradle mount; the cradle mount is one of the reasons I use it so often for testing because it will accept any motor and motor installation takes one minute! Nice work, Ken! Ken says the Houston Sparks spring fun-fly will be April 9 at Scobee field in Houston, Texas. Contact Ken at POB 720801, Houston, Texas 77272, or phone (713)933-1688 for more info. Ken's letter arrived a week too late to get this into the May issue, so this may be in the past by now, but, if not, go for it!

ELECTRIC EVENTS

There is quite a string of electric events coming up, so I'll summarize them here:

June 18, 19: Astro Flight sailplane and old timer events, Estancia High School, Costa Mesa, California.

June date unknown: Astro Flight scale, pattern, pylon, Sepulveda Basin, California. Contact Bob Boucher, 13311 Beach Avenue, Marina Del Rey, California 90292, phone (213)821-6242, for details about both of these events. These contests always show the state-of-the-art in electrics, a good reason to come and fly or see!

July 9: EMFSO at London, Ontario, Canada. Contact Vic Walpole at 102 Admiral Rd., Ajax, Ontario; phone (416)683-5973. I highly recommend the EMFSO newsletter, by the way, it is well worth send-

ing Vic $10 US for a year's subscription.

July 16, 17: Midwest Electric Fly, Saline, Michigan. Contact Ken Meyers, 9043 Satelite Dr., Union Lake, Michigan 48085; phone (313)698-4668. The contest director on Sunday will be the one and only Keith Shaw! If you want to see fabulous electrics, be sure to catch this!

August 12, 13: Rockton, Ontario, Canada. Canadian Nationals with Electric Sailplane and electric Old Timers, seven-cell and over seven-cell classes. Contact Bud Wallace at (416)274-3177.

August 15 through 20: Second F3E Electric World Championships, Parks College, Cahokia, Illinois. Send to AMA, Madeline Madison, 1810 Samuel Morse Drive, Reston, Virginia 22090, for the entry blanks. All fees must be paid by July 1, so don't delay! There will be pylon racing, seven-cell duration, aerobatics, and scale the week before (August 10 through 14). For these events, contact Cal Ettel, #3 Castle Drive, Florissant, Missouri 63034; phone (314)831-5031. There will also be an extensive social program for the families, conducted by Mrs. Annabel Ettel (see above address), including tours of St. Louis, river cruises, historic homes, and many more. Do contact Annabel as soon as possible so she can plan ahead. Bring the family, there will be something for everyone!

August 20, 21: second annual fun-fly, Winston Salem, North Carolina. Contact John Mountjoy, MD, 1420 Plaza Drive, Winston-Salem, North Carolina 27103. Events will be similar to the KRC meet.

September: KRC Meet, I have no info yet, so details in the July column.

This is the longest list yet! Just for fun, here are some photos that Wilbur Moyer sent of the KRC meet last year. Wilbur did not include any details about the photos. I do not know the motors, battery packs, weights, and wing areas involved. Most of you are familiar with the Electri Cub; it uses a motor very much like the DSC motor and usually weighs three pounds. The delta wing "Holy Smoke" looks like it would use an Astro cobalt 15. Keith Shaw's CAP21 uses a motor in the Astro .40, .60, or Keller 50/24 size. The Lightening looks like it is a twin cobalt 035 or 05 design. Wilbur Moyer's Tiger Moth uses an Astro cobalt 15. All but the Electric Cub are scratchbuilt. Sorry I can't say more! Till next time, fun-fly with electrics! •

F/F Scale. . . . . *Continued from page 49*

to be OK (EGBOK). Let's start with the fuselage. I like to build fuselages, so this is my starting point. If something goes awry with the fuselage and it doesn't go like I perceive it, at least I haven't wasted time building wings! I will be discussing primarily structure for gas-powered models, but much of it is applicable to rubber models as well.

One side of the fuselage is built directly over the other for the best duplication possible. I like to use a thick straight edge and place it over the longeron drawing which are perfectly straight. Then the longeron material is pinned right up against the straight edge. I have found out that every line on a drawing is not as straight as it appears. With the natural shrinkage of the paper this is not uncommon, therefore the use of the straight edge whenever possible.

When the two fuselage sides are dry, they are removed from the workboard and sanded carefully with a block before being separated. After sanding, I carefully mark where wings will plug in, where pendulum linkage is located on the fuselage, etc. I drill the correct size holes at this time. Incidentally, if you rub a little zap where these holes go, you will find that you can make nice clean holes without splintering.

After all the necessary holes are drilled, the fuselage halves are separated. This can easily be done with a sharp razor blade, but I have found that a Zona saw blade really does a super job. These blades can be removed from the frame they are inserted into with little effort. Once separated, the inside of each half is given a little sanding with a block.

Here is something that many of you have probably not given much thought to: take

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an air blower and blow off all residual sanding dust. Even though the framework may look clean, that fine dust can cause a poor glue joint, so remove it.

The fuselage framing is done in the conventional manner except that I will pin it down upside down (usually the top longerons are perfectly straight) on a center line. I use right angle templates to keep it on center and to keep the fuselage square. When all of the joints have completely dried, I will spray the whole structure with water with ammonia added. Why? I believe that this helps relieve stress which are built into the structure and "locks" the structure in place. On these powered models, I will also add diagonal bracing along the cross-section of the fuselage so that it will not twist, particularly at the tail post. This is one sure way of avoiding stab tilt!

Up to now, I think that I have done about everything to assure a perfectly square fuselage. One can assume that the wings and tail can be placed onto the fuselage and everything be aligned; right? Wrong! For a long time I was content in letting the wings and tail plug in where they belonged, and if one wing was slightly ahead of the other, well, it wasn't that noticeable! However, I wanted to find out how come this was happening and what would I do to avoid it.

I tackled the wing construction with the same fervor as the fuselage. This is something for me since wings are monotonous building. I like laminating the trailing edge and wingtip as one unit using basswood. Again, I use the straight edge and place it over the trailing edge part of the drawing. The laminated trailing edge is then pinned right up against the straight edge. I use several ribs to locate the spars. I have found too often that by pinning the spars down directly over the drawing, then placing the ribs onto spars, the two would not always agree.

Usually the root rib is the last rib to be glued in place, and only after dihedral is cranked into the wing. I have found on occasion that the root rib drawing is not always at right angles to either the trailing or leading edges. To eliminate any problems here, I will take a piece of 3/4-inch plywood and place it on edge in front of the wing. Each wing tip is raised to whatever amount of dihedral is required, and supported properly. The leading edge of each wing half should be right up against the plywood. Now, each root rib can be glued in place at right angles to the workbench. The plywood fence obviously keeps the wings perfectly aligned from one side to the other.

By rights, the wings should plug into the fuselage and be perfect, that is, if Murphy doesn't get into the act! I have found that the following procedures will assure final, once and for all alignment. Take a look at Fig. 1. I took a piece of 3/4-inch plywood large enough that the assembled model will fit completely on it. The first thing I do is to draw a center line using a fine point pen. (Too wide a mark makes measuring with any accuracy quite difficult.) Next a

notch is cut out of the front of the plywood to accommodate a fixed landing gear. This allows the fuselage to be tangent to the surface of the plywood.

Next, I will locate the position of the wing and draw another line on the plywood—this one at right angles to the fuselage center line. If you are building a biplane, then a second line should be drawn for the other wing. Finally, one last line is drawn, and that is for the leading edge of the stabilizer.

The following is done before the model is covered. The fuselage is slipped into the notch keeping the front of the model and the tail post directly over the center line. The fuselage should be supported in a flying attitude. I like to glue a couple of right angle blocks on either side of the fuselage to keep it on center, and kind of locked in place. This way it is not constantly moving while you are making adjustments.

Take and plug the wings into the fuselage. Their leading edge should line up perfectly with the line drawn on the plywood. If by chance they do not, this is the time to find out. Here is a simple solution in case they do not line up properly: Place a couple of pieces of wax paper or equivalent to either side of the fuselage where the wings attach. Take and coat the root rib with some vinyl spackle and plug the wing back into the fuselage. Squeeze the excess out aligning the wing with the lines on the board. The dihedral blocks should be under each wing at this time also.

If your model is a biplane, check the upper wing in the same manner. After the spackle has dried, remove the wings and sand everything carefully. Plug the wings back in and make one final check. This is now a good time to either make the interplane struts or the wing struts if it is a monoplane. Since the wings are propped in the proper position, these struts will assure that the final assembly will be right on!

All that remains is the tail. The main item you want to check here is whether the stab has a tilt or not. If you find that it does, then a shim on the fuselage is required.

Once the model is covered, painted, and detailed, it is then placed onto the plywood fixture and assembled for the last time. Is this too much work to get something as critical as a flying scale model nearly perfect? I don't think so. The less out of alignment a model is, the easier it will be to get it trimmed and flying. Also, it is kind of satisfying to look at a model from all angles, and know that it is right on! •

ARFs..... *Continued from page 27*

these seams, so let's take them in the order of complexity. The first method is to apply a bead of thin cyanoacrylate adhesive to each seam. This is an excellent method and will assure an absolutely permanent and fuelproof seam. The second method is to apply a coating of clear polyurethane along each seam, using a fine pointed brush, or even a toothpick. This procedure only takes a little longer than the previous method, is just as fuelproof, and has the advantage that if you make a mistake, you can clean it up easily. The disadvantage of using cyanoacrylate is that if any of it runs down the side of your plane, it will probably leave a permanent mark. So to play it safe, you may wish to use the polyurethane instead, especially where you don't want any slipups to show. The last method is the easiest of all. Just give the entire plane a coat of clear polyurethane with a spray can or brush, being careful not to gum up any hinged surfaces. This will add just a little weight to the model, but it shouldn't amount to anything that will be noticeable. Now you have it, a way to improve your ARF and keep it flying indefinitely.

SAFETY PLUS SUNGLASSES

A few months ago our erstwhile editor devoted a few comments to a new product. I would like to add my own observations to what he has already said, as I have just finished some exhaustive tests on this flying-related product which I feel is important enough to tell you about. First, a little background on myself. I am an optometrist, with a career spanning over 30 years, 20 of which were served in the Navy. I have been in charge of a number of government safety vision programs, and, in the course of events, I have become very familiar with what makes a good pair of protective sunglasses.

Now I am going to let you in on a very well-kept secret: There is absolutely no correlation between the price of sunglasses and their quality. I have seen many five-

dollar sunglasses that easily outperformed products with fancy names selling for up to a hundred dollars. Never assume that you are getting quality sunglasses just because you paid a lot for them! Which brings me to the topic at hand. For at least 15 years I have been searching for a quality pair of sunglasses that will fit over my regular glasses, and I can enthusiastically report that I have found them in a product put out by "Safety Plus." These glasses have no discernible optical aberrations, and that means the wearer is far less apt to get headaches and eyestrain from extended wear. I also had the glasses tested for ultraviolet transmission, and they turned out to afford maximum protection in that respect. But the bottom line is that I found them to be the most comfortable fit-over type sunglasses I have ever worn. I tried both the regular gray lens model and then I checked out the mirrored type which is darker at the top and bottom. I found the regular ones were just right for me, but if you are extra sensitive or do a lot of fishing or skiing, you get a great deal more protection from the mirrored lenses. They also come in amber and haze penetration as in target shooting, and clear for safety use in the workshop. The distributors showed me a sample pair of glasses which had been used as a target. The sunglasses had been hit by a .22 long rifle bullet from a distance of 50 feet, but the polycarbonate lens was *not penetrated*! How's that for safety glasses? For further information, contact Safety Plus at P. O. Box 1173, Clinton, Mississippi 39056, or call (601)924-9640.

Today was a busy flying day for me, as I gathered my chief of construction, my test pilot, and my photography team together. We photographed and test-flew three very interesting ARFs all in one morning. All assembly, engine and radio installation, and general ground support was handled by my handpicked expert, Captain Charles Strange, U.S.N. His comments will be included in product reviews slated for future columns. Various pilots are enlisted in our informal model evaluations, and we'll also report on what they have to say about flight testing these models.

CORRECTION DEPARTMENT

One of our sharp-eyed readers has pointed out that I incorrectly identified the EZ Fairchild PT-19 as the "Ryan PT-19" in our last ARF column. If anyone was offended by this absurd error, please accept my profound apology.

Speaking of EZ models, if you liked the EZ P-51 Mustang in its military form, you will probably fall in love with the latest EZ release, the very same P-51 done up in "Dago Red" racing colors with a modified cockpit arrangement. This one is a real beauty! What next, a yellow Rockwell P-51?

SHAKE, RATTLE, AND ROLL

One of the most destructive forces attacking our models is vibration. While most of our models are sensitive to this source of potential damage, ARFs are generally even more susceptible because of their particular type of construction. Rigid materials are the first to show cracks, and this is where standard wood framework really is superior. The wood seems to soak up vibration, while plastics are more vulnerable and need to be constantly inspected and repaired if necessary. Occasionally we see a model constructed of wood which has been finished with resin and paint. The wood has become so rigid that cracks begin showing up all over. One sign that trouble is brewing is when screws begin working their way out after every couple of flights, and one of the first places cracks show up is often in the plastic canopy or in the plastic

engine cowl. Of course, imbalanced propellers are a frequent cause of undue vibration, and much has been written about the proper way to balance a prop, so we won't go into that here. On the other hand, some engines seem to vibrate a great deal, no matter what we do, and this may be due to poor design. If you have an engine and propeller combination that really shakes up your ARF, you better solve the problem, even if an engine change is required, because you are going to be picking up the pieces sooner or later.

Fuselages are the real victims of vibration. The thinner the walls, the more cavernous the space inside, the more plastic used in the construction, the less wood used to back up the plastic, the more the vibrations are amplified. Fuselages which have long and slender tail moments can be made to shake back and forth like a kind of pendulum, and cracks usually first appear somewhere in the wing saddle. Many attempts have been made to lessen the vibrations in such fuselages. One method I tried many years ago was to fill up the fuselage with foam from the wing trailing edge all the way back to the tail. To do this, I used Sig two-part foam. After doing some experimenting, I managed to fill up a fuselage and eliminated a significant amount of vibration. However, if you do try this, keep a few precautions in mind. First, the foam puts out heat from the chemical reaction taking place. The more you mix up, the more heat you create. So, the proper way to do this is to mix just a small amount at a time, pouring it in, and waiting until it expands and cools before making up the next batch. Otherwise, the heat might melt the fuselage, and you might get such rapid expansion that the whole structure could swell up and burst. One more precaution, this method does not work if you have rigid pushrods or wire cables running to the tail surfaces. Nyrod-type systems are absolutely mandatory here. A few ARFers have told me that they have reinforced fuselages by using the insulation foam that comes in cans. Though I haven't yet tried it myself, it sounds like it should work. It certainly should be less messy than mixing and pouring. I don't know if any heat is generated by this method, so be cautious and start off using just a little at a time. Don't forget to check the center of gravity when you finish. Granted, foam is quite light, but putting any amount of weight in the tail can be risky. So be careful, and don't hesitate to add compensating weight to the nose area if indicated.

Well, it's time to put myself on charge until the next time, so whether you prefer ARFs, kits, or scratchbuilts, keep 'em flying! •

Plug Sparks. . . *Continued from page 34*

ville, Indiana, July 19 through 22. What Spielmaker is trying to avoid is the contestants using his meet as a place to test their models. You can lose your shirt on this kind of meet!

ARTHUR BECKINGTON FOLLOW-ON

Received a nice phone call from Roger Gudahl, 615 Winter Drive, Phoenix, Arizona 85002, who says the article on Art reminded him when he and Art worked for McDonnell-Douglas in St. Louis for several years.

Roger says he has been informed Art Beckington is now working for Lockheed in the Sunnyvale area and is having Parnell Schoenky look into this. This writer is rather excited at the prospect of Roger reporting a fantastic story of Art landing in the Royal Garden. For this insult to the Emperor, he was put in jail, not a P.O.W. camp, and spent the rest of the war in the hoosegow.

Just as soon as Roger is able to piece a story together, we will run it. Sounds really good!

"WHO LUVS YA, BABY?"

For those who have viewed Telly Savalas on TV as Lt. Kojak, this phraseology was used many times by Theo Kojak when he would do a favor from someone in trouble, like overlooking a minor crime, getting a person out of jail, etc.

The analogy is apt in this case. As can be seen in Photo No. 14, Keith Murray is seen holding Pond's Pomona Champ (Peter Lloyd on the right) that he received at the Waikerie MAAA Nationals. The MAAA stages an auction every year at the Na-

tionals with ten-percent of the proceeds going to a local charity. This always helps cement good relations with the townspeople.

This columnist put up his Pomona Champ at the auction (donating all proceeds) which Keith Murray purchased. Keith then planned to enter the model in the Richmond MAAA Nats the following year in conjunction with Peter Lloyd. As a proxy team for Pond, Peter was to be the assistant and help retrieve the model.

Alas! Things went astray. Keith was so heavily involved in trying to win the Overall F/F Championship, he never did get to fly the model more than once. The one flight taken was rather poor due mostly to some inexperience with the timer setting. The model D-T'd early at two minutes. Keith also notes that Pete wasn't much help on the retrieving end of things as he was conspicuous by his absence.

Truly a shame, as it was such a good idea. However, "youse guys" get another chance. Bring the model to Amberly AFB at Brisbane for the MAAA Nats over the 1988-89 New Year's weekend. This writer will be there to supervise. If we don't get at least a place, then he is convinced the Coriolis Effect is to blame. Haw!

READERS WRITE

As mentioned before, while at the I.M.S. in Pasadena, the writer was fortunate to receive several old photos from Bill Krescik, an old timer himself. Photo No. 15 shows the very popular Paul Gilliam at the 1951 Dalla Grand Prairie NAS about to launch his Stinson "Sentinel" L-5 model. According to Bill, this model design was scaled, but from what plan this writer has been unable to determine.

As reported, quite some time ago, Gilliam was a commercial photographer in the film industry, and contracted Rock Mountain Fever on location. He seemed to recover after a lengthy illness in a Florida sanitarium and moved to Eureka, California, in the northern area. Evidently, it was too late for a complete recovery, as Gilliam died suddenly in early 1980.

Gilliam will be remembered for his well-built and designed series of Civy Boy models ranging from Civy Boy 24 to Civy Boy 88. The design was so popular, Clyde Austin kitted the Civy Boy 24 and Civy Boy 32 while Kenhi (Hi Johnson) produced the Civy Boy 61, a very successful kit.

TEXAS

When this writer was at the Seguin SAM Champs in Texas, he approached "Bo" Buice with the complaint he never received any photos of old timer activity by SAM 29, the Ft. Worth Planesmen.

Needless to say, Buice immediately rounded up a flock of photos plus those he had taken at the Champs. Such is Photo No. 16 showing a Gil Sherman "Rambler," an Antique design (approved by SAM) built by "Bo." The model, now flown by Tim Horner, is powered by a Super Cyclone. The model is covered in blue and clear silk and finished in butyrate dope. The model has turned out to be a good flyer. All it needs is a little more luck!

SAM ABROAD. . . ENGLAND

Received a series of photos from Keith Harris, the MECA Region 12 Director located at 21 Burns Lane, Market Warsop, Mansfield, Notts, NG20 OPA, England. We have picked out Photo No. 17 showing the "At Ease" model as it appeared in the 1938 Zaic Year Book.

This model, built by that prolific modeler, Arthur Fox, was a design by Charles Tracy and Willard Myers. At that time, Tracy was the Model Airplane Editor in the Cleveland *Plain Dealer* newspaper and as such wielded considerable influence in that area. Most contests held in that area were a result of the publicity generated by Tracy.

The model as seen in the photo does not have the spring-loaded, shock-absorbing strut. This was fully detailed in the Pond plans of this design. Just a bit of nit-picking, but the landing gear was quite a novelty and the drawing thereof a considerable amount of detail work. If Arthur decides to put on this shock absorber, we would be most interested in the results.

FIELDS AND HOW TO KEEP THEM

Don Bekins sent in the most interesting letter on the problem of SAM 27 and their field located in Marin County outside of the town of Novato. The problem was brought about by some campers and trailers being parked overnight on the field. The local residents blew the whistle claiming the field should be classified as a commercial airport.

In response to the complaint, the Planning Commission then requested SAM 27 to put up a *nonrefundable* deposit of $1,150 to seek a use permit for the field. There was no guarantee the field would be approved. To compound the situation, SAM 27 was in a bad shape financially and did not have that sort of money to gamble with.

The worst part about this field is that it is under water for at least five months of the year. Being a marshland, the field must be leveled and trimmed every year. Of course, this leads to the motorcycle vandals using the field as a drag strip and tearing up same. Finally, SAM 27 had to end up by chaining the entrance and policing the open end to the farmers land.

Don Bekins, the leading light of SAM 27, has been personally embarked on a campaign to have the use permit requirement set aside and to work in close cooperation with the property owners association. Inquiries so far have been most positive. A meeting has been scheduled for March 11 to work out an arrangement satisfactory to both parties.

Don's letter was sent to illustrate what some investigation and a lot of patience can do to keep flying sites intact. Not only have the SAM 27 members secured the cooperation of the field owner and the adjoining farms, but State Senator Milton Marks has been helpful from the standpoint he regards this activity as unique and a healthy recreational outlet.

Bekins feels the best approach to any opposition is to take the position our activity is a community service. Young people are helped under this program, and the real key is a friendly approach to the neighbors.

Although much of the foregoing has been written before, it is refreshing to see a go-getter like Don Bekins take on a project requiring leadership. The answers are generally pretty much the same; public relations, community service, and a solid rapport with the public and their associations. For those interested in his methods, Don Bekins can be reached at P. O. Box 722, Tiberon, California 94920.

THE WRAPUP

It remained for Ken Sykora, editor of the SCIF (Southern California Ignition Fliers) newsletter, *The Flight Plug*, to pose the question of why, year after year, do we keep coming back with new ships, possibly a fresh idea, trying to improve our personal skills, etc.? Why do we do it?

As Ken says, "If you are wondering about it, maybe that old timer Senior Statesman, Frank Zaic, had the right answer: When asked why he continued his daily modeling, research, study, and writing, long after his reputation in modeling history is unimpeachable, Frank replied, "Climb the mountain as long as you can so that when you no longer can, you can say you did." •

R/C Soaring. . . *Continued from page 41*

wings and better servos.

"My contention that a high-performance sailplane, as I have defined it, needs a wing loading of at least 9 oz. per sq. ft. to properly perform is not based on any great aeronautical analysis, just a good deal of observation and firsthand experience. In looking back over the past six or seven years of flying with both the Pikes Peak Soaring Society and the Rocky Mountain Soaring Association, the club championship has almost always been won by someone flying a plane in the 11 to 12 oz. per sq. ft. range: This is no accident!

"Already I can hear the doubters out there. 'The heavy plane won't launch as high,' or, 'It won't work the light gopher belches we have for lift around here.' Basically this is just hogwash. I will admit that in a downwind launch, my Heavy Metal lead sled is at a slight disadvantage, but with a even slight amount of wind down the line (as is usually the case) I have always been able to launch as high as just about anyone on the field. CG location, towhook placement, trim settings, and launch technique are the keys to a good, consistent launch. As for not being able to work light lift, I am convinced this is more a case of learning how to properly fly the heavier plane. Granted, the heavy plane may not be able to work the tight little thermal near the ground that a Gentle Lady can, but many is the time that I have witnessed the 'heavy,' efficient plane climb right up through a thermal full of so called floaters.

"Why is the heavier plane so successful you ask? From what I have observed the following would tend to apply:

"1. At the higher weights the Eppler type airfoils tend to fly at higher speeds and lower angles of attack.

"2. The resulting increase in efficiency results in much greater lift to drag ratios allowing the plane to cover much greater areas from a given height, greatly increasing the odds of finding lift.

"3. The ability to cover greater areas seeking lift tends to make pilots more aggressive because they know they can go look for lift and always make it back for a landing. Aggressive pilots win!

"4. Heavy planes land more consistently as they are less disturbed by gusting winds.

"Added together, this results in a decided advantage for the Heavy Metal pilot. Think heavy metal!"

THORNBERG'S RULES

Dave Thornberg was very active in R/C soaring during the seventies and early

eighties. He wrote many an article for *Model Builder* and was respected both as an authority on the subject of model soaring and as a very entertaining writer. Many years ago "Thornberg's Rules" was published as a means of imparting words to the wise on various topics related to flying R/C gliders.

Since that first appearance, his rules have made the rounds in newsletters across our country and even in England. The Mississippi Valley Soaring Association (MVSA), Editor Gary Meissner, was one such newsletter back in March of 1986. Mark Nankivil submitted it to Gary as ". . . some food for thought . . ." Likewise, I felt it appropriate, this being the June issue, to review Thornberg's Rules so that they will be fresh in mind for all those summer days and green air days. Regardless of whether you are a contest flier, these rules will improve your flight times and heighten your enjoyment of the sport.

"1. Drift with lift.

"A. Thermals tend to blow along with the wind.

"2. Stay with what you've got.

"A. Low thermals have down air nearby.

"3. There ain't no zero lift.

"A. A weak low thermal will almost always grow.

"B. If you're not sinking, there's some lift.

"C. If you are sinking, move someplace else fast.

"4. Don't leave a thermal and come straight back upwind.

"A. Sink holes follow thermals

"B. Strong lift will usually have strong down nearby and vice versa.

"5. Fuselage angle indicates rising or sinking air.

"A. A rearward CG will make the fuselage a more sensitive barometer of 'up' or 'down' air. Also more sensitive to stalling — which must be avoided.

"B. Thermals will tend to push the plane outwards - so turn back against a lift-induced turn to get into the core.

"C. Establish where the core is by making a couple of passes through the lift. Figure '8' works well.

"D. Once circling in lift, notice which side of the circle is better and drift that way.

"6. Develop a minute sensitivity to air quality.

"A. Lift comes through in cycles.

"B. Hot spots for thermals and ridge-type lift tend to stay put for a period of time.

"C. A thermal passing through as you launch can often be caught up with downwind.

"D. A sudden wind shift usually indicates a thermal nearby; the wind on the ground blows toward the thermal.

"7. Learn to use ballast.

"A. Wing loading translates into flying speed.

"B. The trick is to add enough ballast to achieve good glide speed without handicapping the ship in weak lift, or making it hard to land.

"C. If the wind is strong enough to require ballast, flying downwind is usually bad."

Now for those contest fliers who are desirous of improving their skills, Dave gives us some sage advice:

Ten Ways To Win a Contest

(Reversed from Ten Ways to Lose a Sailplane Contest!)

"1. Have a positive attitude going to a contest.

"A. Confidence in yourself and your ship can go a long way.

"B. A positive attitude improves your thought process and worries the other contestants.

"2. Practice in advance.

"A. Practice makes perfect.

"3. Practice under all kinds of conditions.

"A. Be prepared for anything.

"4. Stick to a particular sailplane.

"A. The more you fly a particular ship, the better you will know its traits.

"5. Practice on a winch.

"6. Fly in as many contests as you can.

"A. It builds the club treasury (and maybe your trophy room!).

"7. Fly in man-on-man contests.

"A. You all fly in the same air at the same time under the same conditions thus negating somewhat the 'luck' factor.

"8. Watch the air around you.

"A. Figure out the lift and sink cycles of the thermals around you. Watch for birds, bugs, or fluff rising in thermals.

"B. Figure out what objects around you help or hinder your flying (power lines, tree line, hills, or plowed earth, etc.).

"9. Plan your flight in advance.

"A. Figure out before you launch what you want to do; don't just flail about the sky.

"10. Help out during a contest.

"A. Help out by timing; you can learn from other contestant's experiences or mistakes.

"B. You will make friends."

AIRFOIL OF THE MONTH:
NACA 2R,12

Here is an oldie (but goodie) which has really proven itself over the years as an excellent model sailplane section. I have no idea why it has such a funny designation, but I can tell you that it is 12-percent thick and has two-percent camber (thus the 2 and the 12). There is a $2R_2 12$ which has more reflex in the trailing edge than this one, so perhaps the subscript 2 or 1 has to do with mean camber line shape?

Anyhoo, the NACA $2R_1 12$ was the "Rubber Ducky" and "Goose" airfoil used by Bill Watson, Perry Neuschatz (spelling?), and Jerry Krainock in various designs in the mid to late seventies. The "Goose" name was given to many designs which used Bill's fiberglass fuselage mold and had this airfoil. The most common Goose was a polyhedral ship of about three meters or 120 inches. It had foam core wings with 1/16 balsa sheeting to the spar and cap strips behind. Few Goose models had flaps or spoilers. At least two stretch-wing Goose models were made that I can remember, one of which was published as participating in the L/D trials of the San Fernando Valley Silent Flyers, circa 1978 (to the best of my knowledge). It had a span of 135.5 inches, had an area of 1,127 square inches, and had a wing loading of 10.2 oz/sq ft. It had the best L/D of any glider tested, and it used this airfoil.

Sometime try this. Place this airfoil next to an Eppler 374. The NACA $2R_1 12$ predates the E374. Kinda makes you wonder if the E374 was an Eppler-sized 2R-1-12; don't it?

TIME TO GO

That's all for this month. Please send all mail to the magazine for forwarding; however, I prefer phone calls: (714) 777-4514. Thermals! And don't forget Thornberg's Rules. •

Model Design. . *Continued from page 26*

upper classmen. Reading a dictionary is usually dullsville, but give this one a try. Sprechen sie flug modell?

AN ABRIDGED DICTIONARY OF MODEL AIRPLANE TERMINOLOGY

Acrylonitrile-butadiene-sturene: ABS plastic.

Aeroplane: A flying machine. This spelling became obsolete when air was invented.

Adverse yaw: The tendency for some airplanes to yaw in the opposite direction from the roll induced by the ailerons. This is caused by greater drag on the down aileron and can usually be corrected by adjusting for differential aileron action.

Ailerons: Wing-mounted control surfaces for roll control.

Airfoil: Vertical cross section shape of the wing (shape of the wing ribs). The airfoil has a major effect on the performance of the airplane.

Angle of attack: The angle between the direction of the relative wind and the wing chord.

Angle of incidence: The angle between the fuselage reference line and a fixed surface such as the wing chord, the stabilizer, or a canard.

Arrow shaft: Commercially available, light, strong tubing of fiberglass or heat-treated aluminum, intended for archery arrows. Excellent for wing spars, push rods, and other model applications.

Battery: Two or more cells, guns, machines, etc. working together. A single cell is not a battery.

Bounce: A "bounce" of an airplane on a poor landing, most frequently on tail draggers. If the airplane touches down while it still has flying speed and the wheels are ahead of the CG, the slight impact force may pitch the plane to a sufficiently higher angle of attack to make it take off again for a short hop. It doesn't really bounce.

CA: Cyanoacrylate resin glue. Plain CA has very low viscosity, penetrates well and sets almost instantly. CA+, Super CA, gap-filling CA, etc. are thicker, slower setting, and can be used to fill cracks and holes.

Canard: An airplane with the wing at the rear and the stabilizer or "canard" in front. The Curtiss XP-55 canard was called the Ascender, or was it Ass-ender?

Coriolis force: "Warp! Hell, I built the wing with that twist in it to correct for Coriolis force!" A force resulting from the rota-

tion of a body, such as the effect of the rotation of the earth on tornados and whirlpools.

Dead battery: Watt you have when the electricity is feeling low, hertz, revolts and goes ohm to ampere again currently or some faraday after recharging. I gauss that's right; in this coulomb at least.

Decalage: Longitudinal dihedral. The angle of incidence of the wing minus that of the stabilizer. This angle is usually zero or positive for stability. In canards the reverse is true. In a biplane, decalage is also the difference between the angles of incidence of the upper and lower wings.

Design: Deciding where to stick the decals.

Differential aileron action: Wherein the up aileron goes to a greater deflection than does the lower aileron, by means of appropriate linkage design or adjustment.

Dog: Derogatory term applied to some of my airplanes.

Downthrust: The angle between the thrust line and the longitudinal reference line. Many airplanes require a few degrees of downthrust to prevent the airplane from pitching up excessively when more power is applied.

Elevons: Split elevator surfaces which serve as elevator for pitch control and as ailerons for roll control, when they are moved differentially. Chiefly used on flying wings.

Empennage: The tail of an aircraft; including fin, rudder, stabilizer, and elevator.

Epoxy: A much better resin to use in fiberglassing than polyester resin because it is stronger, doesn't stink, doesn't dissolve foam, and it is much easier to clean off brushes, hands, etc.

Fin: The vertical stabilizer. The fixed vertical portion of the empennage.

Flaperons: Combination flaps (when used in unison) and ailerons (when used differentially).

Flutter: Aerodynamic vibration of any part of an airplane. Aileron flutter is not uncommon in fast R/C models. It can usually be avoided or eliminated by use of light, stiff ailerons and linkages, low-backlash fittings, and/or static balancing of the ailerons.

Flying tail: Where the stabilizer and elevator are combined into a single, moving horizontal surface. A stabilvator.

Flying wing: What you have when the rubber bands break in the air. An aircraft designed to be stable without an empennage.

Glitch: A common excuse of a crash due to pilot error. Radio interference or malfunction causing temporary loss of control.

Ground effect: The phenomenon where the air is compressed below a hovercraft or between an airplane wing and the ground during takeoff or landing. Ground effect greatly increases the lift, so some airplanes, especially low wingers, tend to float instead of land. Ground effect can also lead to a stall or a snap roll on takeoff if an inexperienced pilot permits liftoff before the plane is above stall speed without ground effect. Ground effect is negligible at altitudes above one wing span.

High aspect ratio: High wing span compared to the chord or wing width. Increasing the aspect ratio reduces the induced drag, therefore increases the efficiency of the airplane. For this reason sailplanes have

high aspect ratio wings.

Horsepower: A unit for measuring power, which is the rate of doing work. One horsepower is equal to 550 foot pounds per second, a hot .40, a sick .60, or a very lazy horse.

Hot: Term of awe applied to overpowered flying bricks.

Kinetic energy: The energy of an object due to its weight and velocity. $KE = MV^2/2g$. THe heavier an airplane and the faster it flies, the greater its kinetic energy and the more damage it can cause to itself, other aircraft, people, and automobiles.

Lead-acid battery care: Keep your starter battery charged if you want it to last! Discharged lead storage batteries "sulfate" if they are left standing. This greatly reduces their capacity and life. This does *not* apply to nickel-cadmium batteries. They keep as well discharged as they do charged.

Maneuverability: The ability of an airplane to change its flight path rapidly and extensively on all axes. The more maneuverable the plane, the less stable it will be and vice versa.

Methanol: Methyl alcohol. CH_3OH. Also known as wood alcohol. Main ingredient of glow fuel. Will cause blindness and death if ingested in lieu of ethyl alcohol (ethanol or grain alcohol). You already know what ethyl alcohol will cause if ingested.

Ochroma lagopus: Balsa wood.

Pilot's seat: The rear seat in an open-cockpit two-place plane. The plane is balanced for a pilot's weight in the rear seat at all times. When a passenger occupies the front seat, which is at the CG, the balance is not affected.

Platinum: A noble metal used for glow-plug elements because it catalytically ignites the methanol and the nitro methane in the fuel when it is red hot.

Polygon: Dead parrot.

Pylon: What some modelers do with the paint.

Receiver antenna: May be put *inside* the airplane because wood, fabric, and plastic are transparent to radio waves.

Reflexed trailing edge: Where the trailing edge of an airfoil is curved upward. Such an airfoil is stable and can therefore be used on flying wings (which lack stabilizing tails). Combat or aerobatic flying wing models with symmetrical (neutrally-stable) airfoils are stable only because the deflected elevator serves as a reflexed trailing edge, when flying either upright or inverted.

Retractable gear, flaps, mixture control, and on-board starter: What most beginners want on their first model.

Reynolds' number: A relationship developed by Sir Osborne Reynolds. Reynolds' number, represented by is useful in comparing the performance of full-scale airplanes to models and of fast airplanes to slow airplanes.

Seaplane: Formerly "hydroaeroplane." Seaplanes include both float planes and flying boats.

Sesquiplane: (sesqui L., one and a half.) An airplane with one and a half wings; i.e., a shorter lower wing. Three quarters of a biplane or one and a half monoplanes.

Ship: Slang for airplane. If it is "shipshape" it is a ship because airplanes are "airplaneshaped." **Shear web:** Thin web of material which good designers include between the upper and lower spars, to make a single composite spar consisting of upper and lower spar caps and the shear web between them. Shear webs add very greatly to the stiffness and strength of a wing.

Step: What you must not do on your models, but what you must put on the bottom of your seaplanes to "break the suction." **Tail dragger:** An airplane without a nose wheel. Tail draggers are a must with the two-wings and round-engines crowd.

Velocity: Speed; usually specified in units of miles per hour or feet per second.

Velocity squared: Used in lift, drag, and kinetic energy formulas to make things more difficult.

Winch: A catapult-like device for launching gliders. Actually a gliderpult. Catapults are used for launching cats.

In the months ahead we will be using most of these words, but no more dictionaries, I promise. I also promise to stay out of Jake's delightful territory in the future. Next month's lesson will be on stability. Meanwhile your homework is to build and fly. Until then, designer is more than designer jeans. •

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Hannan..... *Continued from page 45*

thus they are seldom able to fly together, except in places such as Flemalle, Belgium (only once per year). As he put it: "We exchange letters, questions, answers, helpful ideas; but we (the Brotherhood of Peanut Builders) have the same problem as a child: It cries if it must play alone."

SPEAKING OF CHILDREN

The Williams Brothers received a letter from a customer who was constructing one of their racing plane kit models, which said, in part: "I was a young person when the National Air Races were held. I became 'hooked' on airplanes, and although I am now 71 years old, the 'child' in me is very much alive!"

FRANK MACY WRITES

American Junior Aircraft Company, founded by the late Jim Walker, is now operated by Frank Macy, in Portland, Oregon. He reports that he receives many letters from customers praising AJ models, however, some complain of losing their models into the clutches of "the biggest and meanest tree in the neighborhood." Frank explains: "Even though our instructions warn the fliers to avoid flying near trees and tall buildings, many do not heed these words of wisdom. It has been our policy to send a card of deepest sympathy, but the situation seemed to demand more than that, and we've discontinued that policy.

"After months of extensive research by our specialists, we are convinced that we must defend the honor of the trees. Here's why we've reached this important conclusion (and this is the first public announcement of our findings): Airplanes which are made of wood come from trees. Balsa, birch, holly, and spruce name only a few of the wood types used in airplanes. There are many more. It is our opinion that the natural attraction of the tree to the plane, or the plane to the tree, as the case may be, is based purely and solely upon genetic heritage and family orientation. The tree is the parent, while the plane is the offspring of said parent. Of course, one might well ask, why would a heavy oak exhibit any natural affection for light wood such as balsa, especially being of foreign origin? They are cousins; family. Balsa is listed generically as a hardwood, for one thing, so in reality, they are *close* cousins.

"Though at times it may seem that 'trees reach out, grasping and clutching' at our models, such is not always what it may appear to be. For example, there have been many observations where the flying (wood) model apparently followed its inborn homing instinct, and headed straight for the tree. Haven't we, as humans, often felt the yearnings within to return to the place of our origin? This whole thing seems to be based upon love and family, not hate and strangers." To be continued in a future Hangar column.

HAPPY MUSEUM ANNIVERSARY

Ten years ago the San Diego Aerospace Museum was consumed by fire. Starting from ashes, patient rebuilding began, largely through volunteer effort and donations, until today, the collection ranks among the finest in the world. By way of gratitude to the citizens, a no-admission-charge day was offered during February, and attracted some 7,200 people!

MUSEUM MODEL CONTEST

Ray Crowell, San Diego Aerospace Museum Master Model Maker, has announced a model aircraft competition to be conducted during October 7, 8, and 9. More than 100 prizes are posted, and three age categories will be recognized (Elementary School, Junior High School, and Senior High School), with events for static display and flying-type models (which need not be flown). Additional information is available

from: San Diego Aerospace Museum Model Contest, 2001 Pan American Plaza, Balboa Park, San Diego, California 92101.

ANOTHER CONTEST

The New Mexico Free Flight Fliers are holding their second annual state-wide event. Events for rubber-powered models include: Saturday, June 10, Scale: 1. Golden Age, 2. National Air Races, 3. World War I, 4. World War II, 5. Peanuts (No Fikes or Laceys!); Sunday, June 11, Non-scale: 1. Bostonians, 2. Sport Endurance. For more details, contact: Ann Eckerson, NMFF, 810 Baird Circle, Aztec, New Mexico 87410. Please include return postage and envelope.

POSTAL CO_2 CONTEST

Klause Jorg Hammerschmidt informed us that *Thermiksense* magazine, of West Germany, is sponsoring an international postal contest for CO_2-engined duration models. There are no restrictions on the model design, and no entry fee is required.

The entrant may employ a Modela motor and Modela propeller, or any other CO_2 engine and propeller, except that the maximum CO_2 tank capacity allowed is three and a quarter cubic centimeters (3.25 ccm). The model may be flown during any free flight event anywhere, and must fly five or six times during the meet. The duration time cards or lists are to be sent in, any time before November 30, 1988, accompanied by a copy of the model plan to: *Thermiksense*, B. Schwendemann, Rohrachweg 88, D-7060 Schorndorf, W. Germany.

Prizes will include CO_2 motors, spare parts, etc., and every entrant will receive a book compiled of all model plans received, absolutely free. Why not try your luck/skill in low-cost *international* competition?

BOOK REVIEWS

New publications constantly arrive at the Hangar, and many of our readers consider aviation books a second hobby, that is, a welcome change-of-pace from building and flying. Certainly it is a less demanding pastime.

First on our list is *Another Icarus*, by Philip Jarrett, the story of pioneer hang-glider Percy Pilcher. Apparently inspired by the experiments of Hiram Maxim and Lilienthal, Pilcher began his own testing during the late 1800s, employing model gliders. Unfortunately, ". . . objections from his landlady forced him to seek alternative accommodations." (Some things never change.)

Having gained the use of a suitable workshop in Scotland, Pilcher, considerably aided by his sister Ella, fabricated a flying-wing glider dubbed the "Bat," which he delayed testing until paying a personal visit to watch the great Lilienthal fly. Returning home, Percy attempted flights with his Bat, which were not successful until he installed a horizontal tail. He constructed additional gliders, including the "Beetle," and "Gull," and the "Hawk," and had a powered machine in the planning stages.

Regrettably, Pilcher was killed in an accident before he was able to construct his engine-driven craft. His Hawk survives in a museum, and six reproductions of his craft have been made, one of which was flown for BBC television.

Apart from its inherent interest, *Another Icarus* serves as a fine example of what a technical history publication ought to be, as it is thoroughly researched, accurately documented, carefully indexed, and well-illustrated with photos and drawings. Published by the Smithsonian Institution Press and highly recommended.

GIANT SCALE PLANS DIRECTORY

New from VIP Publishers is this compilation by Col. John de Vries and Dick Phillips. Intended as a "preview" of commercially available R/C Giant Scale model construction plans, the directory is divided into categories such as World War I, Golden Age Racing Planes, World War II, and Post-war civilian types.

Although the plans are not shown in drawing form, the subjects are photographically portrayed. Typically each is described with a brief historical background, followed by an analysis of the model plan and a rating opinion, on a scale of one through five in "degree of difficulty." Taking, for instance, the Bucker Jungmeister, we learn a bit about the design of the full-size aircraft, the fact that it took part in the 1936 Olympic Games (the only time aerobatics were a featured event), and that about 30 of the approximately 600 Jungmeisters constructed still survive.

Next, we find a discussion of two different Jungmeister giant scale plans, including suggestions for possible revisions. Also noted are references for those who may care to pursue greater authenticity or embellishment. Finally we arrive at the numerical ratings, suggesting the amount of experience required by potential builders. Also supplied are ordering addresses for all of the book's plans (including some from *Model Builder*).

From the Volume No. 1 on the full-color front cover, we anticipate seeing more in the series from VIP Publishers. The *Directory of Giant Scale Plans* is priced at $11.95 plus $1.50 postage and handling from: VIP, P. O. Box 16103, Colorado Springs, Colorado 80935.

SIGN-OFF TIME

Some of the best evaluations of the modeling hobby come from those relatively new to it. Consider Stuart Van Dorn, of Glenview, Illinois. Stuart is a former skydiver, who took up control line combat flying some three years ago, before trying

his hand at free flight. He says: "Free flight feels like fun. That is, the appeal of free flight is really in two areas for me; artistry and function. The art of building appeals to my esthetics; the flying, to my appreciation of function. But for me it is the *people* that make a difference.

"And free flight people, at least the ones I have met, have a keen eye for artistry, for craftsmanship. They also tolerate strange questions from neophytes, such as, 'How do I keep a knot tied on this rubber motor after it's been lubed?' And no one laughed at me. 'Warps, what warps?' 'Fifteen degrees to what angle?' 'You mean I have to put this stuff in my hand and then rub the rubber band into it?' 'Gross!' And so on.

"They have yet to laugh at me when my first Peanut scale flew like a helicopter. They didn't make fun of my wrinkles, and they didn't giggle when I wound the prop the wrong way and the plane taxied backwards. (I appreciated that one!)

"So all in all, fun is reflected in how we spend our time with people. Be it free flight, power, R/C, or whatever. It is an attitude of fun, it is a willingness to help the new guy, it is the giving of a small part of us that makes it all fun. Without that. . .well, I guess I'd rather play solitaire." •

Control Line. . . *Continued from page 51*

mains virtually unchanged today aside from some refinement of the definitions of the kits eligible to be used in the event.

Early rules implied that the airplane must be built from a profile kit made by a major manufacturer. As those kits become more scarce and limited in selection, the rule was changed to specify that the planes could be from a kit, or an accurate copy of a kit; and the kit need not be made by a major manufacturer, as long as it met certain specified minimum dimensions that are virtually identical to AMA slow rat dimensions (except that the tank must be outboard of the fuselage). The flier merely had to convince the contest director by some documentation such as plans or a kit box if necessary that the plane was a manufactured item. This opened the door for garage manufacturers while retaining the intent that NWSR planes must be easy to build for novices and that the event would be accessible to existing planes brought out for the occasion by casual modelers.

Meanwhile, the new Northwest Super Sport rules allowed unrestricted design in keeping with AMA slow rat rules, as long as tanks were outboard of the fuselage (the rule is intended to defeat swing-weight carburetor systems that employ centrifugal pressure). Engine specifications were similar to the original NWSR; plain-bearing, single-bypass .36 engines. However, the new rules allowed modification of the engines as long as all parts came from the engine manufacturer's factory and were designed for that engine. Fastfills, hot gloves, and shutoffs were allowed.

Super Sport retained the braided .018 lines but eventually added a third pit stop in the feature to conform with AMA racing tradition. NWSR retained the two-pit feature because existing planes had been equipped with tanks designed for that circumstance. Races are four-up in NWSR and three-up in Super Sport.

Northwest Sport Race was infused with new interest as it became once again a simple and enjoyable event for beginners and experts alike, while the racers with the urge to go faster found Super Sport an inviting challenge.

As it happened, Super Sport became one of the most exciting and interesting racing events available to racing enthusiasts with all the trappings of the best AMA racing classes without the expense and superhuman physical requirements of those events. Speeds top out around the 100-mph mark, and racing is usually close and excellent.

The Drizzle Circuit format changed to accommodate the new arrangement of classes; it became a two-event series, with both Sport Race and Super Sport Race as feature events.

But back to the Drizzle Circuit concept.

Another of the problems that circuit organizers saw besetting CL racing in general was that it was not, in fact, really *racing*. It's more appropriately described as sort of a multiple-speed event. In the traditional AMA format, it doesn't matter who you're in the air with; it's your ultimate time that

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counts.

Originators of the Drizzle Circuit decided to create a real racing competition that put competitors head-to-head against each other, more like virtually all other forms of racing.

Times became important only to settle the placing within heats and to break ties in scoring. What really matters on the DC is not how fast you go, but how you *place* in your heat. For this reason, all DC heat groupings are settled with a random draw—no substitutions are allowed to accommodate team conflicts.

The DC also provided for multiple heats. In the first year, each entrant flew four heats, with the top scorers advancing to a final. The second year it was three heats. After the classes were split, it was two heats. In 1987-88, with the elimination of secondary events, the series returned to a three-heat format for each event.

A whole new realm of strategy develops as racing teams look across the circle to their competitors in a whole new light. You not only have to be fast, you have to be *first*. By the same token, you don't always have to be the fastest plane on the field to win heats. This can provide new challenges for the faster teams and new hope for the slower ones.

Here's how the scoring works:

There are two separate and distinct kinds of points: heat points and championship points.

Heat points are scored within preliminary heats and are used to determine who makes it into the feature race. First place in a Northwest Sport Race heat is worth four; second, three; third, two; and fourth, one. In Super Sport, with three-up, it's three, two, and one.

So, if you win all three heats in Sport Race, you score 12 points. The top four fliers in Northwest Sport Race and the top three in Super Sport advance to the feature (fast times break scoring ties).

After the day is over, heat points are discarded.

Championship points are those that are compiled towards the perpetual and championship trophies. Those who make it to the feature race score championship points based on the number of entries (first place in the feature = number of entries, second = number of entries minus one, etc. Example: if there are 12 entries, first place is worth 12 points, second is worth 11, etc.). Racers who do not make the feature score one championship point per heat *finished*, so that a flier can score three points without making the feature.

That scoring system makes certain that competitors hang in there for the whole day of racing, scratching and scraping for heat and championship points. Even if they don't win today, there's always next month and the hunt for the championship.

Racing becomes a *season*, not just a single Sunday's diversion. If you don't win this year, there's always next season.

As a result of this format, several things have been accomplished:

Competitors have indeed bridged the winter gap. Many now fly all winter in the DC, and the contact between geographically diverse areas is maintained. Interest in CL activity in general is sustained by the constant sharing of ideas, designs, and competition. Many important issues, schedule concerns, and other matters are discussed in an ongoing matter by representatives of the various regions.

And, best of all, the series has developed new competitors not only in racing but in all CL sectors. The quality of racing in the region has greatly improved as experts and novices have rubbed elbows on the circle. The old common "DNF" is almost nonexistent in DC racing. Everybody finishes!

If there can be said to be a drawback to racing resulting from the DC, however, it is that the Northwest's serious racers have generally concentrated their best efforts on the DC and largely ignored the AMA classes and some of the more major meets. Even at the Northwest Regional Championships, when the best of the West's racers converge on Eugene, Oregon, the Northwest's top names typically are on the sidelines or only halfheartedly involved, as they are busy officiating. But on the second Sunday of any winter month, it's serious racing with an undertone of fun and humor.

As mentioned above, the biggest change was the centralization of the series in Portland. This was a move that was made—and continued—with mixed feelings. Circuit officials and competitors agreed upon the value of showing the CL winter activity off in a variety of cities. However, it was determined at one point that the health of the circuit depended on the people who officiated and who attended every meet—not on the individuals who might come out to watch or participate in a single local meet. DC enthusiasts wanted to involve those local people but felt that they no longer could sustain the effort of the traveling circuit. In the circuit's traveling days, it meant an overnight trip for virtually all of the regulars two to three times a winter in far-reaching locations from Eugene to Seattle to Yakima to Portland to Astoria (Oregon). The Portland location is central to all and can be made in a single day.

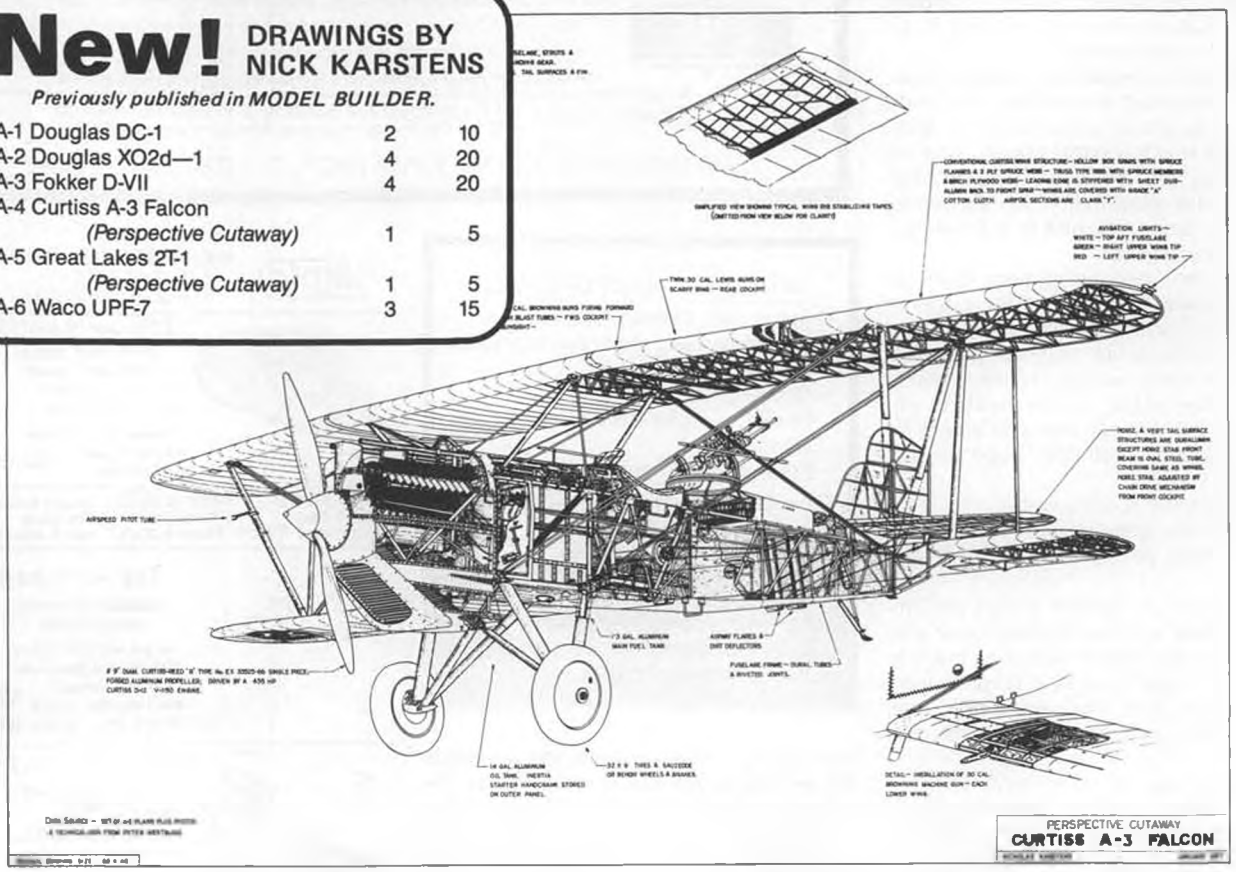
As might be expected, a few of the com-

Peter Westburg's
SCALE VIEWS

New! DRAWINGS BY NICK KARSTENS

Previously published in MODEL BUILDER.

KA-1 Douglas DC-1	2	10
KA-2 Douglas XO2d—1	4	20
KA-3 Fokker D-VII	4	20
KA-4 Curtiss A-3 Falcon *(Perspective Cutaway)*	1	5
KA-5 Great Lakes 2T-1 *(Perspective Cutaway)*	1	5
KA-6 Waco UPF-7	3	15



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1/12th scale: 1" = 1 ft.		
WE-2 Boeing F4B-4/–3	4	20
WE-3 Boeing P-12E	3	15
WE-4 Curtiss A-8 Shrike	3	15
WE-7 Curtiss Gulfhawk 1A	2	10
WE-8 Curtiss N2C-2 Fledgling	4	20
WE-9 Curtiss O-1B/A-3 Falcon	3	15
WE-10 Curtiss P-1B Hawk	3	15
WE-12 Curtiss XP/YP-23	3	15
WE-13 Curtiss SBC-4 Helldiver	4	20
WE-14 Czech Avia B-534	2	10
WE-15 Davis D-1K	2	10
WE-16 Douglas O-25C	3	15
WE-17 Douglas O-31A/O-31B	3	15
WE-19 Douglas O-38/O-38B	2	10
WE-20 Douglas O-43A	3	15
WE-21 Douglas O-31C/Y10-43	3	15
WE-22 Douglas O-46A	3	15
WE-24 Fokker D-17	3	15
WE-25 General Western Meteor	1	5
WE-28 Grumman F2F-1	3	15
WE-29 Grumman F3F-2	3	15
WE-34 Stearman 4E Mailplane	2	10
WE-36 Travel Air 2000	2	10
WE-37 Waco ATO Taperwing	2	10
1/10 scale: 1.2" = 1 ft.	Shts	$
WE-1 Berliner/Joyce P-16	4	20
WE-5 Curtiss BFC-2 Goshawk	4	20
WE-6 Curtiss F9C-2 Sparrowhawk	4	20
WE-11 Curtiss P-6E Hawk	4	20
WE-24 Fiat CR-32	3	15
WE-26 Great Lakes Trainer	4	20
WE-30 Hawker Fury Mk I	4	20
WE-31 Hawker High Speed Fury	3	15
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petitors have been involved in the DC from the start and many others have come and gone. Work considerations interrupted your columnist's unbroken string of DC meets at 40, but I was able to resume regular attendance after a year's layoff. Like some others, I find the circuit a perfect change of pace after the rigors of a summer of heavy combat competition.

A couple of other interesting features have developed during the DC's tenure.

It was the idea of the late Paul Wallace, a competitor who was getting along in years but enjoyed a good hard race with the best of the young turks, to give the racing events a bit of color and class. Paul suggested a number/name registration system. Entrants in a DC would sign up for a racing number —based on their finish the previous year, with new competitors assigned numbers consecutively. Thus, the winner's plane wore No. 1. Paul also suggested naming and decorating racing planes. The idea caught on and for several years the planes were numbered, decorated, and named. The registration system has fallen by the wayside, but the brightly decorated planes and the names have continued as a DC tradition. The old days of drag clear finishes and a row of identical, undecorated clones are long gone.

Being in winter in the Northwest, there are days when it rains or is cold, but fliers have learned how to dress. At the end of a dismal day—in which the flying never stops—competitors just peel off the rubber rain gear and the layers of warm clothes and head off to the nearby pizza parlor dry and happy.

Over the years, individual entries have to some degree given way to team entries, partly because of the logistics involved with finding teammates on the spur of the moment because of the random draw. Not surprisingly, that situation also has led to higher quality racing as teams practice, build, plan, and travel together. There still are many individuals, of course, but the planes are decorated with names like "Dark Ages Racing Team," "Nitroholics Racing Team," and "S&S" Team.

This column is written after the third contest of the 1987-88 season, and the results give a flavor of the event, which was held on a Sunday in which the weather was pleasant enough with only a few sprinkles.

Northwest Sport Race was won by free flight expert Wayne Drake, of Troutdale, Oregon, in his first-ever DC win after four years on the circuit. Wayne turned a time of 8:55 in the feature, edging out perennial favorite Dave Green of Astoria by three seconds. The S&S Team, Dick and Rich Salter of Seattle, Washington, was third with 9:39; and the SHT Team, Glenn Salter and John Hall, of Seattle and Puyallup, Washington, was fourth with 10:04. Green (who works with pilot Bill Varner as the Dark Ages Racing Team, had the day's fast heat at an excellent 4:13.

The Nitroholics Racing Team, Mike Hazel and John Thompson, of Salem and Cottage Grove, Oregon, captured Super Sport with a modest 7:46 time, ahead of Green's mechanically-troubled 9:01 and 117 laps by first-time feature race contestant George Mickey of Seattle. The Nitroholics had the fast time on a day when times were mediocre, with a 3:42.

The race left Green leading both classes, followed closely by Drake and Jim Cameron in Sport Race and Drake and the Nitroholics in Super Sport.

As mentioned above, an interconnected series of contests for a single event, particularly a straightforward event like racing in a restricted class, can be a jumping-off point for novice competitors into all sort of CL activity as well as a place for experts and middle-of-the-road competitors to hone their skills. It's a chance to enjoy concentrating on a single event, rather than rushing around the field trying to do 10 things at once as one does in a major summer meet.

The DC format could be adapted to other events and other regions. If your area is looking for a new way of approaching CL model competition, the DC concept might be worth some thought.

I am interested in receiving club newsletters from all over, so that I can report on significant events and trends in CL model aviation across the nation. Please feel free to mail anything you think might be of interest to CL fliers to me at the address below!

John Thompson, 1505 Ash Avenue, Cottage Grove, Oregon 97424. •

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Sukhoi. . . . . *Continued from page 12*

line stunt circles. As I've mentioned before, my interests lie along scale lines, while Tom's obviously tend towards precision aerobatics. This slight diversity of interests, together with our common interests in the grand sport of control line building and flying led to a probably ill-advised challenge being issued by one of us to the other, to wit: "If you'll build a stunt airplane, I'll build a scale model." So here's my stunt model, and that's how it came about.

For those of you who are looking for the ultimate easy-to-build, high-tech stunt model from a world-famous designer/flier, you may have to look just a little bit further. This airplane is pretty basic with regards to design and construction. As far as any relationship to a world-famous designer/flier, the model design was influenced very heavily by Tom's suggestions and edicts, and it borrows liberally from some basic parameters already set down by some existing good-flying profile stunt models. (That means the moments and areas are basically those of a Twister.) Anyway, since I'm not qualified to comment intelligently on the stunt-ability of the model, I'll leave that part to Tom, assuming he'll admit to any involvement with it after all of this.

FLYING BY TOM

As Dick has written, this model arose out of a friendly bet, sort of. He's winning so far, as a new house and our rambunctious 2-1/2 year old have put a severe dent in the building schedule. But just you wait—there *will* be a Dixon scale project, and it will loop and fly inverted just like "real" airplanes. None of this wallow around the sky stuff; no sirree!

As for the subject here, it works! I flew the second-ever flight on the model and put it through the pattern despite the aged, ailing Fox on the nose. (A new piston/liner will fix that.) Total trim changes I advised were (1) move front leadout back a half inch, (2) decrease tip weight by a quarter ounce, and (3) install a pushrod brace on rear pushrod. That's it. These changes are shown on the plan.

The model is definitely a cut above the average profile. Part of this is attributable to Dick's light, straight construction. The remainder of the credit goes to his design. The wing is quite special, as it increases in airfoil thickness percentage towards the tips. This makes it easy to build on a flat board, but also greatly decreases wobbling in tight square corners. The sheeted leading edge, common on full-bore stunters but not profiles, also does its bit for airfoil efficiency. If you don't like the SU-26 fuselage, no sweat; build whatever *you* like around this wing, moments and areas and you'll have a profile that could make the top 20 at the Nats. More than anything else, the plane feels like a good Geiseke Nobler.

Don't alter the control hookup! This is part of what makes it so smooth. If you build heavy, consider a .40 engine for power. The wing can carry extra weight, but power will be needed to do it. The modified Fox .40V, O.S. and Magnum 40GP in stunt configuration would be good. The HP 40, properly reworked, is excellent too, but no longer sold in the U.S. Other good engines would be the Merco .35 and Old Series O.S. 35 stunt.

Playing with this thing has got me thinking. Let's see, if you take a Rabe Bearcat and the outlines of the SU-26, and. . . .

If anyone is still with us, let's get down to:

CONSTRUCTION

This model is pretty simple and straight forward. I did make a conscious effort to keep the weight down as best I could, given the volume of that big slab of fuselage. (I considered making a built-up profile fuselage—I've done it before—but good sense and laziness prevailed.) To this end, the model uses contest-weight balsa from Lone Star for all of the balsa parts. That stuff is really nice to work with. I recommend you also use contest-weight wood (from whatever source).

For adhesive, I stuck (no pun intended) with 30-minute epoxy and CA. I used the epoxy where a large area was involved—fuselage doublers, wing mounting, bellcrank mounting plates, etc., and CA everywhere else. Keep all the joints neat and tight and the thin CA works fine.

A good way to proceed with the construction is to make a kit; cut out all the major pieces so you'll have a collection of airplane parts in front of you all the time. This makes it apparent that there is always something ready to glue to something else, and

reduces the tendency to drift away from the work bench and do something nonproductive such as watching a race on TV or raking leaves. These activities, as much fun as they are, are time-consuming and must be avoided.

The task of cutting out all of these parts need not be a chore. An inexpensive drill press (I use the kind that mounts a hand electric drill, it works fine), a Dremel (or Sears) jig saw, and a Dremel (or Sears) disc/belt sander takes all the work out of drilling accurately aligned holes and cutting and shaping plywood and large chunks of balsa. My wife has graciously presented me with these handy power tools over the years for Christmas, birthdays, etc. (She's still waiting for me to make her some doll furniture.)

The wing ribs, as always, are the most tedious cutting task. I made a 1/16-inch plywood template of the root and tip ribs, then cut enough ribs from 1/16-inch balsa for the whole wing, using the root rib template. I just rough cut these quickly, not trying to be too precise. I also had drilled two matching holes in the templates, so I could bolt the stack of rough cut ribs in the usual plywood and balsa rib sandwich. (This is making me hungry.) These holes were marked on each rough cut rib (with a fine line marking pen) and were then punched or drilled out. Next, I stacked all of these ribs between the plywood templates, bolted them together, and carved and sanded the stack to a nice tapered shape. This will be easy, since the airfoil section aft of the 1/4-inch spars, top and bottom, is constant from root to tip. Only the airfoil forward of these spars is tapered. This results in two positive aerodynamic attributes: One, the *relative* thickness of the wing increases towards the tip, and two, the *relative* high point of the airfoil moves forward, root to tip. This should make the wing stall root first, and add roll stability if the wing gets into a high lift or stall condition. I guess this is an advantage, and I don't think it can hurt. (I knew my AeroEngineering in college oh so many years ago would come in handy.) Tom thought that would make a funny-looking wing. I don't think it's so bad. Anyway, now you've got a nice stack of tapered ribs, and they would work great if you were making a wing that tapered from a wide tip on one end to a narrow tip at the other. But you're not. So separate the ribs two-by-two starting from one end of the stack or the other. (See Genesis:6 for a more thorough coverage of this two-by-two business.) Take each pair of ribs and "square-up" the tapered part to match the smaller of the two, and presto, you have two ribs of the same size, one for each side. Punch leadout holes in one of each pair and you now have matching inboard and outboard ribs.

Assembling all of the ribs and other wing parts—spars, leading and trailing edges—is next. Nothing unusual here. If you've carefully cut all the notches and things, the parts can be put together "dry," and then hit with the CA to make things permanent. The wing can be assembled in two halves, then joined with the spar joiners, or in one piece. It depends on how big a *flat* building surface you have. Mine is small, so I did it in two pieces.

The bellcrank mounting is a little different. Study the detail on the plans and you'll see it is suspended between the top and bottom 1/8-inch plywood mounts. Instead of the usual bolt or threaded rod, I used a length of 1/8-inch music wire. It is just long enough to stick through the two pieces of plywood, and is "trapped" by the 1/16-inch center section sheeting. Put spacers above and below the bellcrank to center it in the wing. I used some leftover 1/8-inch I.D. plastic bushings from a pair of Robart's Scale wheels. (See, every stunt person should build a scale model now and then so he'll have these handy pieces left over.) Be sure you put the flexible lead-outs and the pushrod on the bellcrank before you mount it permanently. The pushrod goes in the innermost hole of the three-inch bellcrank, and is 3/32-inch music wire.

Don't neglect to put shear braces between the ribs and spars. I used 3/16-inch square balsa diagonal braces; they're a bit more work than vertical grain sheeting, but they look more elegant before the wing is covered. I'm sure sheeting would work just as well, but please put something in there.

All that's left now is to put the leading and trailing edge sheeting on, the center sheeting, and the capstrips and tips. Also, put about 3/4 of an ounce of weight in the outboard wing tip. I use old wheel weights for this. You do collect them from roadside parking lots, old wheels, etc.; don't you? They're so handy, they're marked with their weight so you don't have to guess, and once you've removed the mounting flange (whack it off with a cutoff wheel in your Moto-Tool), it can be easily shaped or flattened with a hammer and a concrete garage floor. Secure it to the wing tip with bracing and epoxy. *Don't* put the flap hinges, flaps, or flap horn on yet!

Even though I'm going to talk about the fuselage now, you don't have to wait until after the wing to do it. In fact, it's a good idea to do it before the wing for two reasons: One, the piece of wood you cut out for the wing can be used for the half-inch thick center rib when you build the wing, and two, once you've got the fuselage cut out and shaped some, it seems like the airplane's almost finished and you're home free. The fuselage is made from two pieces of 3-inch wide, 1/2-inch balsa sheet (plank?), glued edge to edge. You'll probably notice that the two sheets are not exactly straight, so you may have to try matching different edges and orientations to get a pretty good joint. There are only eight combinations—think about it. Fasten the sheets together with CA; first one side, then

the other.

Before you cut this six-inch wide plank to shape, look at it a minute. Is one of the three-inch pieces harder than the other? If so, lay out the fuselage shape so that the harder piece is on the bottom. There's more load on that part.

After you've cut the fuselage to profile shape, very carefully measure and locate the wing and horizontal stabilizer holes and slots on the balsa. Take your time, be exact, and make sure everything is marked correctly. There should be *no* incidence, positive or negative, in either the wing or the stabilizer. Everything is 0-0! This is the most important step in the whole building process (along with keeping warps out of the wing), so take your time and make sure everything is correct before you *carefully* cut out the wing hole and the stabilizer slot.

Now, carve and sand the fuselage to your heart's content, tapering it front to back and top to bottom. If you're lazy, just round the edges, but it won't look near as neat. Leave the nose where the plywood doublers go flat for now. Now, very carefully lay out the locations of the hardwood motor mounts. The spacing is shown for a Fox .35. If you use some other engine, adjust the spacing if necessary. Double check everything, don't build in any up or down thrust! This isn't a free-flight, you know! When you're satisfied with your efforts, carefully cut out the fuselage to receive the motor mounts. Trial-fit everything, and when you're ready, epoxy the mounts in. Let it cure good, and in the meantime get to work on the 1/8-inch light plywood doublers. When you cut these out, notice the inboard one does not have a notch for the engine. I think profiles look neater when you do it this way. If you want to go all the way, don't put the inboard doubler on until after you've epoxied the outboard doubler on and have drilled the motor mount holes and installed the blind nuts. Then grind out little recesses in the inboard doubler to clear the blind nut flanges and epoxy the inboard doubler on. That cleans up the looks of the nose even more. Of course, if you do all that, you'll have to carefully measure and cut off the mounting bolts so they use all the threads in the nuts, but don't punch through the plywood when tightened. Also, you'll need to check them for tightness more often, it won't be as noticeable if one of them starts backing out.

One more thing. If you do all of this, you will need to also use a 1/4-inch plywood U-shaped stand off to mount the engine on, if it's a Fox. Otherwise, you'll have to cut a "Foxhole" in the inboard doubler to clear the bottom backplate mounting flange, and ruin the whole thing. Other engines may not need so much stand off.

One more more thing. You did taper the rear edges of the doubler so they fair nicely into the sides of the fuselage; didn't you? You get more points for neatness if you did.

Carve and sand all of this some more, until the edges are all rounded and nice-looking. Cut out the notch for the landing gear and drill the holes for the hold down clips. Use a drill press and some care so that you can hold the clips on with 4-40 bolts and locknuts instead of the little screws that come with them.

Don't install the gear and fill in the notch yet. You can do all that just before the paint goes on so the gear won't hang around getting in the way all the time.

Now we're really on the home stretch! I assume you've cut out and shaped the flaps, vertical and horizontal stabilizers, the rudder, and the elevators during your spare time. Go ahead and cut all the notches, slots, and holes necessary for the hinges and elevator/flap horns. Keep cutting and snipping and sliding all the parts—wing, flaps, tail feathers—together until everything fits properly. Hint: offset the flap and elevator horns so that the pushrod between the two can be removed and not installed permanently until all the paint is on. Makes things a lot easier that way. Also note: the pushrod from the bellcrank goes to the hole in the flap horn that is about one inch from the hinge centerline. The elevator pushrod goes in holes in the two horns that are the *same* distances from their respective hingelines. This gives *equal* angular deflection of the flaps and elevators, and the proper angular deflection relationship between the bellcrank and the flaps. All this is what Tom Dixon says to do, on any airplane, and he hasn't lied to me yet.

Now, one more final "dry" fit. Get everything all lined up square and perpendicular, and mark the positions. Take everything apart, mix up some epoxy and reassemble it according to the marks you just made. Block/clamp it up, measure the whole thing again to be sure, and leave it alone for a while. Now's the time to go rake those leaves or watch the race on TV.

COVERING AND FINISHING

There are about a thousand different ways to cover and finish a model. I'm not going to tell you how you should do it, but I'll tell you what worked for me. All of the wood parts (everything except the wing) were covered with medium weight Silkspan,ill the slot with hard balsa or plywood. Carefully sand this smooth and touch up with filler and clear. Do the tail wheel strut now, also. I sandwiched the tail wheel strut between two pieces of 1/16-inch plywood with notches filed in them to accept the wire. This assembly was then epoxied into a matching 1/8-inch slot in the fuselage.

Now's the time to put the flaps and ele-

vators on also. Be careful not to get epoxy into the hinges where they move.

Time for color. Spray this on if you have acill the slot with hard balsa or plywood. Carefully sand this smooth and touch up with filler and clear. Do the tail wheel strut now, also. I sandwiched the tail wheel strut between two pieces of 1/16-inch plywood with notches filed in them to accept the wire. This assembly was then epoxied into a matching 1/8-inch slot in the fuselage.

Now's the time to put the flaps and elevators on also. Be careful not to get epoxy into the hinges where they move.

Time for color. Spray this on if you have access to spray equipment. Spray cans also work. I used the color scheme used by the Russian team in the 1984 World Championships. It's attractive, but it does take a lot of time and some effort to mask it all off and such. My feelings won't be hurt if you use a simpler color scheme, such as all purple or something.

And now you've nearly got an airplane. Put an engine, fuel tank, and wheels on it, and go see if it works. I used a Fox .35, Perfect four-ounce fuel tank, and Dave Brown lightweight wheels. About those wheels—they're sure light, but the square cross-section of the tires only looks good on race cars. Chuck each wheel in your drill press and round off the corners with some 150-grit sandpaper. Much better!

FLYING

Try flying this thing on 60-foot, .015-inch stranded control lines. I hope you have a ball with it! I'm going over to Tom's house and see how his scale model is coming along. •

Electronics. . . . *Continued from page 43*

Compton, California 90220; (213)537-9610.

TALKING ABOUT FUTABA

Electric flier Ed Westbrook, of Chelmsford, Massachusetts, wrote in with the following question:

"My Amptique is equipped with an Astro Model #200 speed control and the little R4H receiver controlled by a Futaba 4NL transmitter. As originally installed, I noted that the throttle control on the 4NL did not give full range control of the motor. With the throttle trim centered, it would not cut the motor off at bottom nor would it reach max rpm at top. I wrote to Astro, and they agreed to take it back and adjust it, which they did. Made a great improvement, but still, to obtain full range required full throttle stick plus full trim swing to cover the range. I could fly this way if I kept my wits about me, but this winter I got to tinkering around, and I noticed that the throttle stick on the Futaba 4NL does not have the same physical travel as the elevator stick. I took a look inside the transmitter and found that the travel of the throttle stick is limited by two little shims very nearly and obviously purposely installed for the express purpose of limiting the travel. The gimbal assembly for the left side is otherwise identical to that on the right. When I removed the two shims, I could get full off to full on over the range of the stick alone with trim centered.

"Now here are the questions.

"1. Why does Futaba limit the travel of the throttle stick?

"2. Is it just Futaba, or does everyone else do this?

"3. I have noticed no interference with operation of the other channels since removing the shims. What, if any, risk am I running by operating with the shims removed?

"4. If I 'graduate' to gas engines, should I then reinstall the shims? If so, why?" Before I get to Ed's questions, let us review some basics about transmitters and servos. Not to ignore electronic speed controls, as they work on the same input information as do servos and are, in fact, quite similar in circuitry until the output stages. Actual control is obtained by a series of pulses, one for each channel in the system. These pulses have a certain length, measured in milliseconds, at neutral, and are varied a certain amount upon movement of the transmitter control. For example, some equipment works on 1.5 mS neutrals, with a variation of plus or minus 0.5 mS, for total pulse length of 1.0 mS.

The kicker comes in that there aren't any industry standards for these values, with neutral actually varying from 1.31 to 2.0 mS, and travel often being less than the 0.5 mS mentioned. I agree with you that these values should be standardized, as there is no technical reason for choosing one over the other, but they aren't. This then creates a problem for manufacturers of accessory equipment such as Astro Flight, whose only choice is to design their equipment for optimum operation with the most popular R/C systems at that particular time. Though the adjustments can usually be made broad enough to work over the wide ranges involved, they then tend to become too sensitive and difficult to set properly. Most manufacturers, like in the case of Astro as mentioned, are aware of the problem and know the circuit changes required for optimum operation with any of the major equipment brands.

Now for Ed's questions; 1 and 2. Checking the transmitters that were readily available to me, I found that in addition to Futaba; Acoms, Airtronics, and Aristo-Craft's Challenger transmitters have a mechanical stop as described on the throttle, some more pronounced than others. The reason? Simply to keep the stick from rubbing on the edge of the opening when it is moved in the horizontal plane while it is also at either extreme of vertical travel. If allowed to rub on the lip, some of the smoothness does

disappear, and I guess would be aggravated in time. Yes, the pulse length mentioned is reduced in this manner, but since throttle connections are so easily adjusted anyway, I guess it is felt that it is an acceptable tradeoff.

Ordinarily, no ill effects or interference should be experienced if operating without these spacers, or shims, installed. However, anytime any change is made, it is a good idea to check things thoroughly. In this case, it should be done by operating all other channels to both extremes, including trim, simultaneously with the throttle, also to extremes, and looking for unwanted servo action. A more precise test can be done with a pulse meter, such as Ace R/C's "Datamaster." Ed, your reference to "graduating" to gas engines in your fourth question is going to earn you some static from the electrics-only crowd. Anyway, when that time comes, and whether some like to admit it or not, a lot of the flying now done would not be possible with electric power, you can decide for yourself whether or not to restore your throttle stick to normal. You will find that even with the restrictors in place, you will have adequate servo travel to move the engine throttle to both extremes.

Now, the primary reason that the designers of the transmitters put the things in there in the first place is not all that important if you fly Mode Two, throttle and rudder on the same stick, since the rudder is the least used control. However, for Mode One fliers with the throttle and ailerons on the same stick, keeping the smoothness of the assembly becomes more important, and I recommend that the shims be kept in.

FIELD CHARGING OF NI-CD BATTERIES

This has become more important with the arrival of PCM radios and the widespread use of more and more battery-powered auxiliary equipment. I would like to tell you about a 12-volt DC-powered charger that I have been using for the last couple of months and which has now earned a permanent place for itself in my field equipment.

First, however, I would like to clarify that point about PCM systems and their high current consumption. It is not that PCM requires the transmitting of higher power, or that they are inefficient, or anything else that you may have heard. It is simple that a lot more is going on inside that transmitter or receiver than there used to be, whether or not you are using all of the possible functions all the time. The result is a higher current consumption: less operating time per charge.

Anyway, the charger in mind is the "Impulse II" manufactured and sold direct by TRC Engineering in Michigan. Using a 12-volt battery, or a *regulated* 12 VDC power supply as a source, the Impulse II is capable of reviving discharged or partially discharged 1 to 10-cell Ni-Cd batteries in as little as 10 minutes. It can do the same thing for your tired 12-volt lead acid starter business. This includes "gel cells" which are actually lead acid—the difference being that the electrolyte is not in liquid form.

Charging is done at a switchable low (L - 1 amp) or high (H - 2 amp) rate, using a high frequency-pulsed current. The pulsing is the secret by which cells not otherwise rated as capable of being fast-charged can be safely charged at the stated currents. The Impulse II includes sensing circuitry; two types, to be exact, one that stops the fast charge at about 90-percent charge, and one that gets the battery to what is called the "Voltage Retrograde" (VR) point, a new term in Ni-Cd battery charging. This is described as the point at which further fast charging will only heat the battery and not significantly increase the charge.

Obviously, the Impulse II can be used for charging all types of Ni-Cd batteries, including those used for electric-powered airplanes, cars, and boats. However, my main interest is to keep a safe amount of power in my radio equipment batteries at all times, and all of my testing and use up to now has been done in that direction. Done very well too, I might add, as Impulse II charging repeatedly gave my equipment a charged capacity similar to that obtained with the system charger and other conventional charging methods. All with a drastically reduced time, of course, and the important ability to do so right at the flying field.

The Impulse II comes with a cigarette lighter plug input—you'll have to make up a connector to mate the output your equipment or whatever packs you intend to be charging regularly. All very simple, and clearly detailed in the instructions enclosed, as are a couple of cautions which are merely common sense-type reminders anyway. The Impulse II is available direct from TRC Engineering, 0-10972 10th Ave., Grand Rapids, Michigan 49504; (616) 453-8527. It is priced at $78, plus $3 for postage. If you are running close to empty on those electrons, best you give some serious thought to TRC'ing it before you run completely out.

The TRC Impulse II is well built inside and out, and deserves to be taken care of. The nearest camera store will offer a variety of padded zipper cases which are perfect for protecting this type of equipment on its trips to and from the flying field.

OHM'S LAW

It should be the first law of electronics with which you form a speaking acquaintance—it is the first step towards understanding what goes on inside all those circuits we are talking about. There is another electronics law that has less bearing on R/C equipment but does come into our lives often. It is Eloy's Law for LOUD automotive radios, and you often find its affects in a pickup truck with big tires, driven by a fuzzy-faced guy drinking beer. The law states that: The volume of the rock music on the stereo is inversely proportional to the IQ of the driver.

It's *spring*—put this thing down and go *fly*!

Dear Jake. . . . . *Continued from page 7*

at all and just leave things blunt and square at the last rib. These guys are really missing the boat. Wingtip design, in terms of vortex control, can have a profound impact on aerodynamic efficiency. Innovative wingtips like Hoerner's and Whitcomb's are the wave of the future and shouldn't be overlooked. Wingtips make a difference, and anybody who thinks otherwise should think again. Don't you agree?

Arch in Arkansas

Dear Arch:

Wingtips are okay, but I've always liked oxfords better.

Jake

* * *

Dear Jake:

Do you like to play Jeopardy? If so, here's an answer for you, "ceiling zero, visibility zero." Do you know the question?

Alex in Canada

Dear Alex:

What was the score in the Ceiling-Visibility game?

Jake

* * *

Dear Jake:

I am new at the R/C hobby and have recently purchased a complete R/C plane with radio. The equipment is Citizenship Model DPT-72. I need help to find out the range of the radio signal. Do I test with one segment of the mast on the transmitter in the up position? What is maximum range in feet for total signal? Please advise, and, hopefully, do you have an owner's manual or copy for this radio?

Ron in Fanwood, New Jersey

Dear Ron:

You have chosen wisely. It always pays to start out with ultra-modern equipment. This "complete R/C plane" that came with your state-of-the-art Citizenship radio, it doesn't happen to be a Trixter Beam; does it? Or maybe a Live Wire Champion?

Getting to your question, the range should be about 100 feet with the antenna collapsed, fresh dry cell batteries, and the escapements fully wound. If you don't get 100 feet, take the tubes out of the set and test them at your local Radio Shack. Good luck finding replacement for any bad ones.

I'm afraid I can't help you with your documentation request. Operator manuals for your radio are not available because Gutenberg hadn't invented the printing press when Citizenship first came out.

Jake

* * *

Dear Jake:

I used to think that you made up all those dumb questions in your column. But, no! I picked up my latest copy of "Dear Jake" and there was no dumb question, right there in genuine print. Wow, what a thrill. I am now a famous author, and my question has been read by hundreds of people. I am so proud.

My problem is now this. How can I be a famous author if nobody knows my real name? So I'm going to call you at home next Friday at 8:30 p.m. to tell you my real name. Please print my real name so I can get proper credit for my dumb question. By the way, is it okay if I just call you "Jake"?

Published Author in Palo Alto

Dear Floyd E. Carter:

Thanks for your phone call last night. I'm sorry, but I can't publish your real name. Our legal staff is very protective of our correspondents, and they tell me that disclosing your name could lead to a lawsuit against you if someone were offended by the content of your letter. Personally, I don't see how anybody could be offended by your harmless letter, (you were much more offensive on the phone), but the legal eagles command, and I obey.

Jake

P.S. You may call me anything but "Dumpster Breath."

* * *

Dear Jake:

I have a very good buddy, and we fly our model airplanes every Saturday morning, rain or shine.

Last Saturday while we were at the local flying field, a funeral procession with a long line of cars passed by. My friend removed his cap and bowed his head. I told him that I didn't know that he had so much reverence for the deceased.

He replied, "Not usually, but, after all, I was married to her for the last thirty-five years."

Dumb Thumbs Dan

Dear Dan:

Are you sure you weren't playing golf? The last fifty times I heard that joke, the two guys were playing golf.

Jake

* * *

Dear Jake:

The jig is up, Jake. Everyone figures that "Jake" is just a pen name that has nothing to do with your real name. But I have it from a reliable authority that "Jake" is actually an acronym, and that it stands for your true name, Jonathan Ambrose Kendall-Earlingham. You're 49 years old, and you came here from Tithing-on-Willim, England, in 1974. You were a test pilot for British Aerospace, but now you fly 737s for Piedmont. Your wife's name is Carol, and you have no significant accomplishments in the modeling world whatsoever. You are totally unqualified to write an advice column, and I hope the public will turn on you now that they know what a fraud you really are.

Character Assassin in Cloverdale

Dear Character Assassin:

Jake is a pen name that has nothing to do with my real name. My only significant accomplishment in the modeling world is the hiring of several phony reliable authorities who go around spreading ridiculous rumors about who I really am.

Jake

* * *

Dear Jake:

How's your book project coming? Haven't seen you on the shelves of B. Dalton yet. What's the holdup?

Lawrence in Lafayette

Dear Lawrence:

My New York publisher and I have been having a disagreement over the title. For those of you who don't know, I have been asked to publish a hard-cover collection of favorite column material from the past few years. I want to call it *The Best of Dear Jake*, but Harcourt, Fenton, and Mudd are dragging their heels. They have no objection to the "Dear Jake" part, but they insist that "Best" is somehow inappropriate. They prefer *Probably Not The Worst of Dear Jake*.

When we get it all worked out, I'll send you an autographed copy. Whose autograph would you like on it?

Jake

* * *

Dear Jake:

Are you ever going to divulge your true identity? It must be very difficult keeping your secret from friends and family. Surely, by now somebody must have figured out who you really are.

Bryce in Banning, CT

CLASSIFIED ADS

IMPORTANT INSTRUCTIONS: Non-commercial (personal items) rate is 25 cents per word, with a minimum of $3.00. Commercial rate is 40 cents per word, with a minimum of $5.00. No advertising agency discounts allowed. Name and address free, phone number counts as two words, abbreviations count as whole words and will be spelled out. All ads are payable with order, and may be for any consecutive insertion period specified. Send ad payment to: MODEL BUILDER, Classified Ads, 898 W. 16th, Newport Beach, CA 92663.

WANTED: Berkeley and Cleveland kits or related items: parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc. Gordon Blume, 4649-191st Ave. S.E., Issaquah, Washington 98027.

THE GOON IS COMING! Soon. LSASE to Vern's Plans, 308 Palo Alto Dr., Caldwell, Idaho 83605. If catalog desired also, include $2.00.

RANDOLPH DOPE, NITRATE AND BUTYRATE. 1/2 pint to gallons. Send SASE for color chart and prices. ABC Hobby Supplies, P. O. Box 2391, Clarksville, Indiana 47131.

PRECISION ROUTER, machines "Lapp" joints. Use when joining sheets together for wing skins. Joints won't warp, gap, separate, or pucker after finishing. 50% stronger. Other uses. Uses your Dremel, or moto-tool. $29.95. Free brochure. Shape-Up Inc., P. O. Box 12895, Wichita, Kansas 67277.

LOVE EASY FUN? Discover how great the new LIL' DEVIL flies! 9-1/2-inch wingspan, stick fuselage, stable in wind, flies long and high with base length rubber motor. For plans and instructions send $3.00 to Wonder Wing Air Works, 184 Madrona Rd., Boulder Creek, California 95006.

WANTED: QUICKY-RAT, control line rat racer, kit or plans. Bob Yurcik, 266 Daniel Ln., Lebanon, New Jersey 08833.

NEW! VOLUME 3, PEANUTS & PISTACHIOS! Truly international, with plans, photos, pointers and whimsy from near and far, $5. Still available, VOLUME 2 at $4.95. NEW! VOYAGER, the complete story of Jeana and Dick's epic round-the-world flight. Hardbound, $19.95. Add $1.50 postage and handling. California orders, please add applicable sales tax. Hannan's Runway, Box A, Escondido, California 92025.

BUILD A BEER CAN BIPLANE from 15 cans. Kit contains step-by-step instructions, photographs, cut-out patterns. No special tools required. Plane is 9 inches long, with 14-inch wings, cockpit, struts, etc. Propeller spins, wheels turn; $9.95. Kit Can Kit Nine, Box 72104, Marietta, Georgia 30007.

ANTIQUE MODEL IGNITION PARTS, O.K., GHQ, Forsters, Delong, others. Excellent timers, Needle Valves, Tanks, Point Sets, Cylinders, Instructions, Kits, 1988 Catalog, 800 Parts, $4 plus $1 Shipping. Chris Rossbach, R.D. 1, Queensboro Manor, Box 390, Gloversville, New York, 12078.

FREE FLIGHT PLANS. Scale, sport, competition. Rubber, CO2, Electric, Gas, Unusual subjects, including BV-141. Send $1 for illustrated catalog. A.A. Lidberg, model plan service, 614 E. Fordham, Tempe, Arizona 85283.

CUSTOM EMBROIDERED PATCHES. Your design, made any size, shape, colors. Five-patch minimum, guaranteed colorfast. Free brochure. Hein Specialties, Inc., Dept. 238, 4202 North Drake, Chicago, Illinois 60618-1113.

WANTED: RTF u/c planes from Aurora/K&B, Comet, Cox, Gilbert, Sterling, Testors, Wenmac, etc. Compete or pieces, buy or trade. John Fietze, P. O. Box 593, Lynbrook, New York 11563.

PLANS ENLARGED, Model Drafting Software, Nicad Monitoring Software. Free catalog. Concept Technology, P. O. Box 669D, Poway, California 92064 (619)486-2464.

SCALE DOCUMENTATION: PLAN ENLARGING. Photo packs, three views, drawings for 1600 aircraft. Super Scale R/C plans for Giant, Sport. 60-page catalog $3.00. Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, North Carolina 27403; (919)292-5239.

AEROINDEX: Comprehensive index to EVERY plan ever published in *Model Builder*, including detailed descriptions; just $4.75, postage included. Aeroindex, P.O. Box 5124, Hamden, Connecticut 06518

NEW ILLUSTRATED PLANS CATALOG: Rubber, Jetex, Scale, Sport, Old Timers, $3.00 refundable. Allen Hunt, Box 726B, Dunbar, WV 25064.

WANTED: Ignition model engines and race cars, 30s and 40s vintage. Don Blackburn, P.O. Box 15143, Amarillo, TX 79109; 806-622-1657.

MAGAZINE COLLECTION FOR SALE. *Aeromodeller* 1942-83, *Model Aircraft*, 1951-65. Also model books, "Solid" model plans: Hicks, 1647 Knollwood, Orlando, Florida 32804.

MAGAZINES/BOOKS: Aviation, Model (1929/1980). Lists $1.75 & LSASE. V. Clements, 308 Palo Alto Dr., Caldwell, Idaho 83605.

Semi-kits fabricated from your plans. Parts cut from balsa, basswood, pine, maple, and plywood. Custom wood sizes and shapes cut from your specs. Send SASE for quotes: Model Wood Specialties, 4209-24th St., Kenosha, Wisconsin 53142.

BEAT HIGH PRICES on every model you buy. Static or RC. Up to 50%. Send LSSAE for details to: Second Childhood Hobbies, 14052 Hume, Armona, California 93202-8327.

"LEARNING TO FLY RADIO CONTROL With Or Without An Instructor," $2.95 plus three stamps. Jim Waterman, 3818 Deerfield Dr., San Antonio, Texas 78218.

CLEARING OUT OLD MAG ACCUMULATION. M.A.N., A.T. Flying Models, and others. Send self-addressed, stamped envelope for list to: Fruciano, 6146 E. Cactus Wren Road, Scottsdale, Arizona 85253.

FREE VIDEO TAPE CATALOG! Over 100 videos oriented to modeling. Airplanes, trains, cars, how to, also books. Kennykraft, 5665 Peninsula Rd. MB, Florence, Oregon 97439.

ATTENTION HOBBY SHOPS AND INDIVIDUALS: Factory-sealed Top Flite Gieseke Nobler C/L kits wanted and/or Gieseke Nobler C/L Kit #N-15 rolled plans sheets 1 of 2 and 2 of 2, especially 2 of 2. Jae Carter, 26 N. Anderson St., Trenton, New Jersey 08609; (609)394-1502.

JUST STARTING R/C: wanted used 35s or 40s, 5-channel R/C unit. Good condition. John Subbert, RR 2, Box 98, Panora, Iowa 50216.

BUILDING BOARDS: Flat, Warp Resistant. 3/8" Pinnable Surface, 16" Wide x 48" Long. Free Brochure. Limestone Enterprises, Box 586-MB, Athens, Alabama 35611.

WANTED: Ignition model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649.

STRIPPED GLOW PLUG THREADS REPAIRED with stainless steel Heli-coils. 2-stroke heads $7.50. 4-stroke heads $10.00 postpaid. Send head only. C.F. Lee Mfg. Co., 7215 Foothill Blvd., Tujunga, California 91042.

RUBBER POWER KITS AND SUPPLIES our specialty, also FF Gas and Electric. Send $1 to Airmen's Supply Co., P. O. Box 1593, Norfolk, Nebraska 68701.

IMPORTED DIESEL ENGINES: Aurora, KMD, K-Mills, M.V.V.S., P.A.W., Pfeffer, Silver Swallow and Replica Taplin Twins. Also M.V.V.S., P.A.W., RADUGA, and Silver Swallow Glow engines. $1.00 Catalog. CARLSON ENGINE IMPORTS, 814 East Marconi, Phoenix, Arizona 85022.

PLANS ENLARGED, Model Drafting Software, Nicad Monitoring Software. Free catalog. Concept Technology, P.O. Box 669D, Poway, California 92064; (619)486-2464.

Dear Bryce:

My friends and family know who I am; they just don't know that I write this stuff. The guy in the seat next to me on this airplane knows that I write this stuff, because he's been reading it out of the corner of his eye as I've been writing it. Now he's embarrassed and he's looked away because he just read that last line. But he doesn't know who I am because he couldn't see my driver's license when I opened my wallet to give the flight attendant four dollars for a set of headphones so I could listen to the movie that I can't see because the screen's too far away and people are standing in the aisle blocking my view anyway. Does anybody know if Rocky beat the Russian? If so, please write.

You are right, though. It is extremely difficult to have two identities and keep the people with whom you have daily contact unaware of that fact. I have been concerned for some time now that my mailman might figure it out. He knows my real name, and yet he delivers all those letters addressed to Dear Jake. This morning I asked him who he thought would win the Olympic gold medal for water polo. He said Argentina, because he had heard that their horses were very good swimmers. I am no longer worried that my mailman will figure anything out.

Jake

* * *

Dear Jake:

I built a Tamiya 1/48-scale radio-controlled swamp buggy. I took it down to Florida for realism and drove it around in the Everglades. A 1/4-scale radio-controlled alligator came up out of the swamp and ate it. What do you make of that?

Percy from Montgomery, AL

INDEX TO ADVERTISERS

Dear Percy:

I'd say you were out-scaled, twelve to one.

Jake

* * *

Dear Jake:

I hate to be the bearer of bad news, especially through the mail, but you never call and you still haven't given me your new phone number. So, until you do, I'll just have to write to your magazine like everybody else.

Your Uncle Bart passed away on Thursday. He was wearing his Shetland wool leisure suit and was mistaken for a pony. Bart had been putting on a little weight as you may know. Anyhow, he was ridden to death by a bus load of Catholic school children.

Services will be this Saturday at McNulty's. I'm not naive enough to assume that you'll show up, but I thought you might want to send some flowers. If you'd rather make a donation to Bart's favorite charity, it was the Flatulent Earth Society.

Give my regards to your wife, if you've married again.

Your Mother

Dear Mom:

What a shock, and coming so soon after Aunt Cecily's tragic accident. Cruel fates seem to run in our family. By the way, has the "Amana" imprint ever faded from Cecily's forehead? Who knew rutabagas would explode in a microwave?

Love, Jake

* * *

Dear Jake:

If "rpm" is short for revolutions per minute, then what's short for horsepower?

Jim in Boston

Dear Jim:

The engine in a Yugo.

Jake

* * *

Dear Jake:

I have to take exception to your last remark. I read your column because model airplanes are my hobby (and because I'm a masochist), but for a living I'm a Yugo dealer.

The Yugo is a fine car, carefully crafted to last a lifetime, and high on the list of customer satisfaction. It gets great gas mileage, has low upkeep and operating expenses, and has classic Communist Central European aerodynamic styling.

Your attempt at humor at the expense of the Yugo's horsepower rating is unmerited. Not only does its compact and efficient engine produce adequate horsepower, but it does so without the need for power-robbing emission control systems, unless you live in California or use alternate fuels such as gasoline.

The Yugo's attractive appearance, snappy performance, attention to detail, and unprecedented low price make it the answer to the American driving public's dream.

I hope I've set you straight, and that you'll think twice before slandering such a fine automobile again.

Franz in Pismo Beach

Dear Franz:

A thousand pardons. I guess I got a wrong impression when I found out how the Yugo got its name. Like everyone else I thought the name referred to the fact that it was made in Yugoslavia, but a neighbor who owned one told me that that was not the case.

He explained that owner comments such as these provided the derivation of the name:

"You go call a tow truck while I try and stop the leak." "You go order the parts while I get the service manual translated." "You go place the ad after I check the resale value in the blue book." I apologize for my misconception. I'll be sure never to make fun of a Yugo again.

•

Jake

Counter. . . . . *Continued from page 11*

module kits. SpaceCase is inexpensive insurance against damage to your valuable transmitters. All SpaceCase kits are constructed from tough, lightweight ABS plastic, and all hardware is molded from durable polycarbonate. All SpaceCase kits come with all materials, bonding agent, and easy step-by-step instructions for quick assembly without tools. See your local hobby dealer today for a look at the entire line of SpaceCase kits that include transmitter cases, field boxes, and more.

* * *

Robart's new HQ 510 Electronic Throttle has been designed for the utmost in advanced electronic throttling for ready-to-run electric-powered model aircraft and boats requiring 4- to 6-cell battery packs. The HQ 510 is a standard proportional speed control with adjustable high speed and neutral positions. It is optically coupled for glitch-free radio operation and has an efficiency rating of over 98 percent, giving your model the most power available from your battery pack. Weight is less than 1.2 ounces, and is available from your favorite radio control hobby shop. You can write to Robart for more information: Box 1247,

NOTICE: New Full Size Plan prices are now in effect. Send a long, self-addressed, stamped envelope for your list of revised plan prices.

St. Charles, Illinois 60174.

* * *

Bob Smith Industries, 7550 San Gabriel Rd., Atascadero, California 93422, has a new cyano product on the market, called Insta-Cure+, a gap-filling cyano glue of the highest quality. It is available in one and two ounce sizes and bonds virtually everything, even oily surfaces, in 10 to 25 seconds. Look for it at your hobby shop, or write for more information.

* * *

From this month's bookshelf we have another in Bill Hannan's delightful series on Peanuts and Pistachios, called *International Peanuts & Pistachios*. This edition contains construction hints and tips, how to mail models for proxy contests with minimal risk of damage, plans for a Peanut Farman F.450 and a Piper Cub old timer, and Pistachio plans for a 1911 Caudron. There are numerous photographs plus sketches, cartoons, and more. If you love airplanes, you have to have this book! Write to Hannan's Runway, Box A, Escondido, California 92025, send $5.00 plus $1.50 postage and handling. You won't be sorry!

* * *

Now that it seems fashionable to cover the Vietnam war, we have a proliferation of books on the subject. If you have been put off by those obnoxious Time-Life TV ads for its series on the war, don't let that blind you to some very worthwhile books on the subject. One of these is *Vietnam Choppers*, by Simon Dunstan, covering helicopters in battle from 1950 to 1970. This softbound book has 200 pages full of photos, drawings, and text covering the first use of choppers in Korea as an introduction, and then plunging into the Vietnam conflict and the many uses of the helicopter in battle. It's from Zenith Aviation Books, and it's a good 'un.* * *

Flying Dragons, by Robert C. Mikesh, also from Zenith Aviation, covers in extensive detail the creation and growth of the now-defunct South Vietnamese Air Force from its early days as an adjunct of the French forces to its culmination as an arm of the U.S. forces in South Vietnam. This hardbound volume of more than 200 pages contains a wealth of information and photos, both in color and black and white, along with several pages of full-color VNAF insignia. For anyone who wishes a history of this vanished air force, *Flying Dragons*

would be an excellent choice. It's available from Zenith Aviation Books, Box 1-MB, Osceola, Wisconsin 54020.

* * *

Another hardbound book from Zenith is *Airbus*, by well-known aviation writer Bill Gunston, which covers in excellent detail this venerable commercial jetliner made in Europe. Once only bought by European and other foreign airlines, the Airbus has begun to make inroads within the U.S., giving American transport manufacturers a tough run for their money. You'll find both color and black and white photos chronicling the history of this international company in the book's 200 pages, along with an informative and detailed text.

* * *

In a modeling vein, *Building and Flying Control Line Model Aircraft* by Dick Sarpolus is a terrific how-to manual for anyone desiring to enter this most enjoyable form of model flying. Beginning with a brief history of CL flying, the book moves into mechanisms and hardware, training, engine selection, construction, competitive flying, and building instructions for four 1/2A models and three larger models, as well as a listing of CL organizations and suppliers. Priced at $7.95, this softbound book is an invaluable resource for interested modelers, from Carstens Publications.

* * *

The YS Futaba 120 four-stroke is designed primarily for F3A aerobatics, scale competition, and the serious-minded sport flier looking for the ultimate in performance. It was first flown in competition at the 1987 F3A World Championships in Avignon, France, and was the first four-cycle to combine the YS Futaba variable pressurization system and supercharging. The YS 120FS idles perfectly when inverted and possesses reliable performance without need of an on-board supplemental battery system. Any two-stroke fuel is acceptable, with no special four-cycle fuel necessary for reliable running. At 19.96cc, the 120SF is the largest displacement legal for F3A competition. See your YS-Futaba dealer for more information. •

Workbench. . . . *Continued from page 7*

tree directly opposite the North end of the straightaway speed course, which was used to time qualifying speeds for the various races.

"Starting in 1931, they used this course for the Shell speed dashes for speed record attempts. So Bob's picture can be said to be a qualifying run, in which case it would be accurate!" Further information from George indicates that the race course in 1929 and 1931 was counterclockwise *around* (shudder) the stands. In 1932, the layout was moved away from the stands, with the straightaway way out in front of the stands, but with a banked turn pylon close to and in front of the stands (Good Grief!). Sure enough, Bill Warrick and Paul Bloom collided right at the 'home' pylon in front of all the people in the stands, and if they had been higher, it would have been possible for the pieces, and even the planes themselves, to have reached the stands. They changed back to the old layout in 1934! Hmmmm . . .wonder what letters we'll receive about *this* month's cover!?

WAKEFIELD DEFENDER OMT

Yes, OMT again! This time, Chet Lanzo 'hisself' comes to the editor's rescue. In the February "Free Flight" column, we identified the October '87 Mystery Model and went on to relate our story about finding, buying, and building a kit of this model while in college after WWII. We repeat portions of Chet's letter, as follows: "In 1943 or '44, I set a national record with a super large size rubber powered model in the Class E category. The model had about 400 sq. in. of wing area . . .Along with the original 400 sq. in. model, I also built one that was slightly larger in area, that was published in *Air Trails* and in Zaic's Yearbook. Bill Gowan, a model building friend of mine, and I, manufactured a kit for the 400 sq. in. (record holder) original model in about 1945. We sold rubber strip, as well as putting out the kit in Bill's basement in Cleveland, Ohio. Therefore, if no one else put out a kit for the 'Record Holder', you must have built the model from the limited number of kits that we put out."

Thanks for restoring my sanity, Chet. I knew I couldn't have dreamt about building that model from a kit! Actually, the so-called "Wakefield Defender," as published in Bill Winter's plans book was a 210 sq. in., smaller version of the big 400 sq. in. model, which Chet designed to accommodate Bill's request for a Wakefield model. It was more or less a smaller version of the 'record holder' complete with the cabin-style DT.

F/F WITH R/C RECOVERY OMT

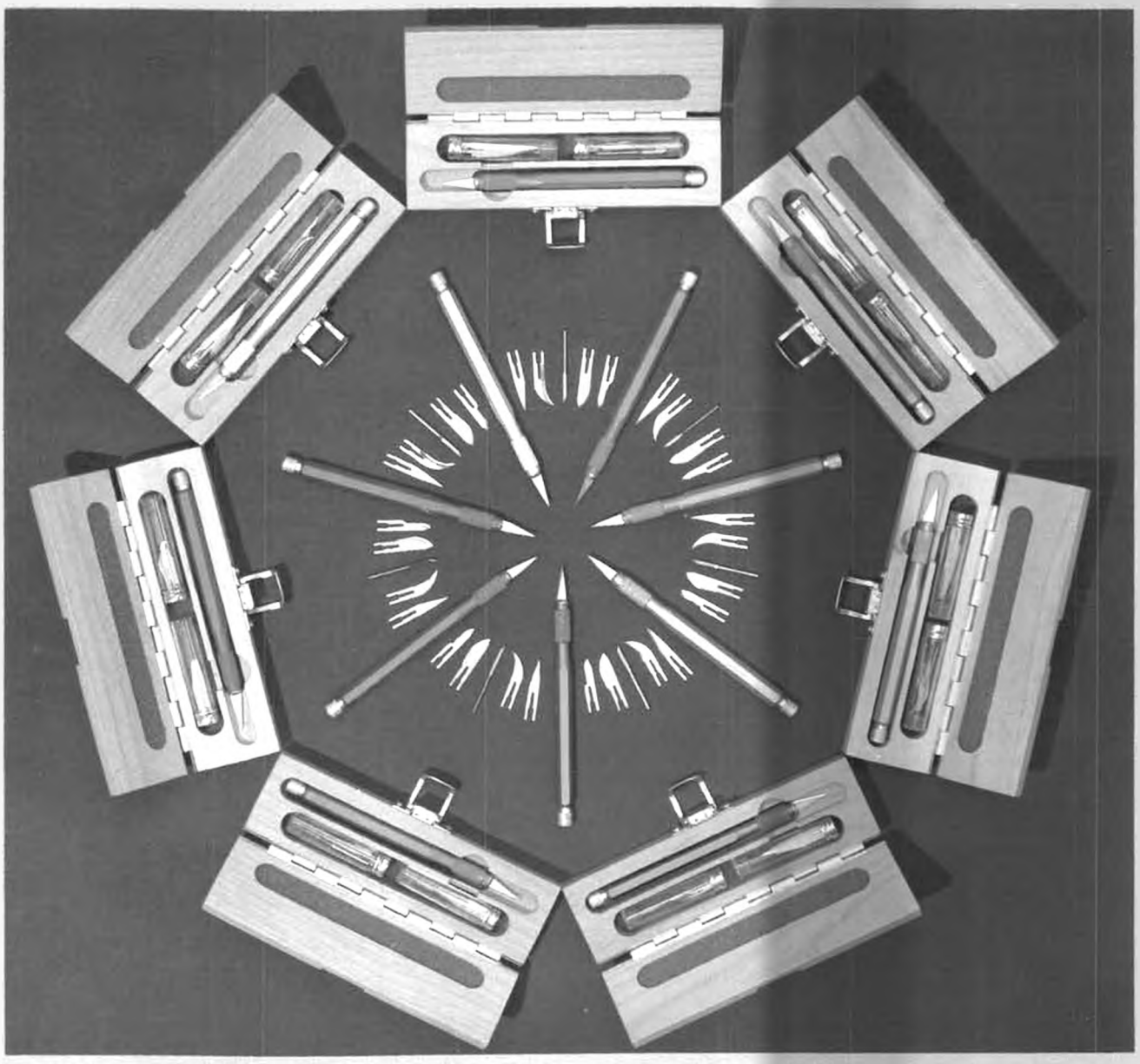
The last OMT (for this issue). The R/C in F/F debate goes on, and now, as you'll see in Stalick's July column, the CIAM of the FAI is getting into the act. By the time this appears there will have been a vote taken in Paris regarding the use of R/C in F/F for engine cutoff and DT. This goes beyond our suggestion that the radio be used only to abort a bad or going-out-of-sight flight or to recover a model after it has achieved its max. If radio is used during the official flight, it is no longer a free flight event . . . period!

In a phone discussion with Bob Stalick today (Fortunately he had to cut it short because he had a meeting to go to, otherwise, we'd have spent the rest of the afternoon on the subject!), Bob pointed out that even allowing radio to abort a flight is an unfair advantage over a non-radio equipped model, and we agree. It simply comes down to the fact that you cannot alter the destiny of a pure free flight model once it is released, no matter how many preset gadgets it may have on board. And since that's an indisputable fact, there's no way you can fairly match the two types against each other. . .

However, we still feel that there should be a Free Flight . . . not R/C . . .event category for free flight models equipped with radio for the purpose **only** of aborting a flight to save the model or for recovering the model after it achieves a max. Such an event would permit the perpetuation of free flight design and flying competition in the many areas of the country where this type of model flying is no longer feasible.

Using R/C for recovery would not be cause for a change in design trend, in fact, the many free flighters who have been forced to retire from the activity, or take up another phase of model building (probably R/C because of the flying site availability), could get back into free flight and continue the development ideas they were involved in when they were forced to quit. Granted the idea, at this time, seems only reasonable for the gas-powered classes, but it's a starting point, and we'd like to help some one or a group give it a try. All existing Free Flight Gas rules would apply. The only change would be to allow whatever radio installation the modeler desires. As outlined previously, the flight terminates whenever radio transmitter operation is initiated, or when a max is achieved, whichever comes first. Any takers? •

IN THE BEST CIRCLES, IT'S **über skiver**



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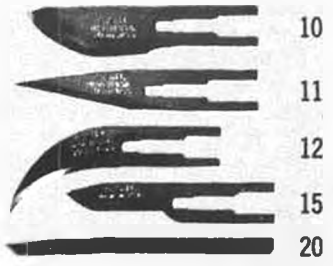

Available in seven satin anodized handle colors: silver, blue, red, green, gold, black, & violet. Complete set in fitted hardwood case, includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $16.95

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NEW 6NHP/PCM Heli system with mixing, idle up, invert and programmable fail safe.

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(Far left) 6NLK/FM 6 channels of Conquest performance with dual rates, S148 servos and FM. 6NLK/AM also available.

5NLP/PCM brings contest features like Pulse Code Modulation and dual rates to sport flyers.

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MRC-Tamiya Thunder Shot

Ready to blow the doors off the 4WD competition

It's the Shot heard around the R/C world! Tamiya, the leaders in R/C off-road buggies, in an effort to blow the doors off the 4WD competition, engineered a 1/10 scale buggy that's lighter, more powerful, with performance and handling characteristics that make it an instant contender.

TO MAKE IT FASTER, WE MADE IT SIMPLER

To get the maximum speed out of the Thunder Shot, Tamiya reduced every ounce of excess weight, while maintaining structural integrity. For instance, instead of using a complicated chassis/frame assembly, we combined the two, molded it out of lightweight engineering plastic, and designed it to allow easy access to all the major R/C components. Then we added features like simplified sealed gear boxes to enclose the beveled gears, so they won't float and lose traction. And there's a lighter bumper to keep the nose up and out of trouble.

THEN WE ADDED MORE...PERFORMANCE

We designed the Thunder Shot with new linkage steering (just like the full sized buggies), to eliminate toe-in when you corner hard. A new running battery position for an ultra-low center of gravity. A new motor mount that takes the guesswork out of adjusting pinion gears.

We also provided oil-filled shocks, so you can adjust them to match the terrain. And there's the aerodish wheels, for a smooth, clean look. Plus a new one-piece body design, which slips through the wind in a breeze. We also put an easy access hatch in the body, so pit time adjustments take a fraction of what they used to be. And you can modify the Thunder Shot to compete in your favorite class. Soup it up with available ball bearings, super hot motors, and just about everything else you'll need.

BULLETIN

In its very first race, The Thunder Shot took first place in A Main Modified

Racing against 2 RC 10's with 4-wheel drive conversions, 6 Optimas™* and 2 AYK Radiants, it not only won but TQ'd and set new track record.

MRC™

TAMIYA

Model Rectifier Corporation
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*Optima is a trademark of Kyosho Corporation.