MODEL BUILDER

APRIL 1979

volume 9, number 87

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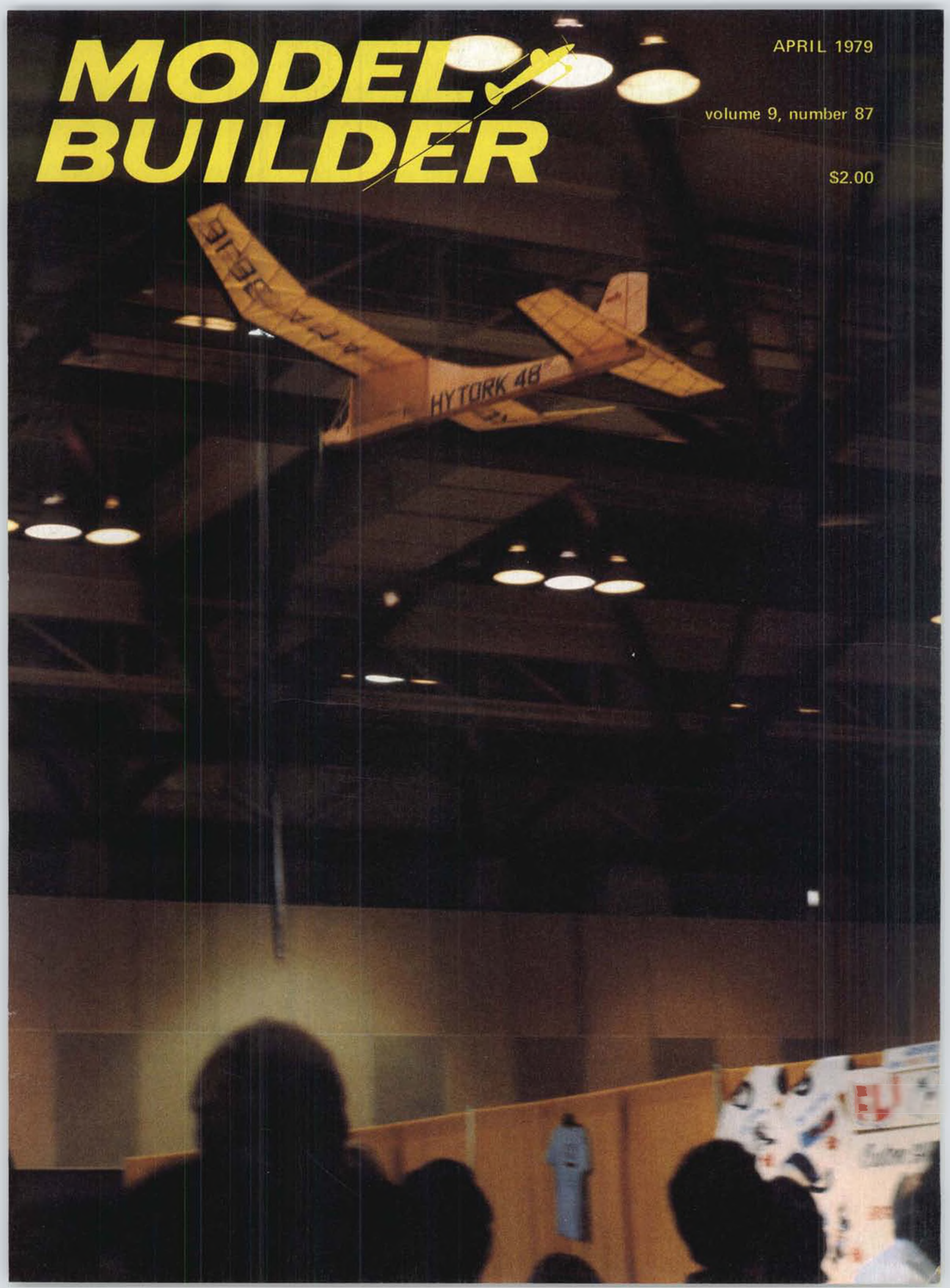

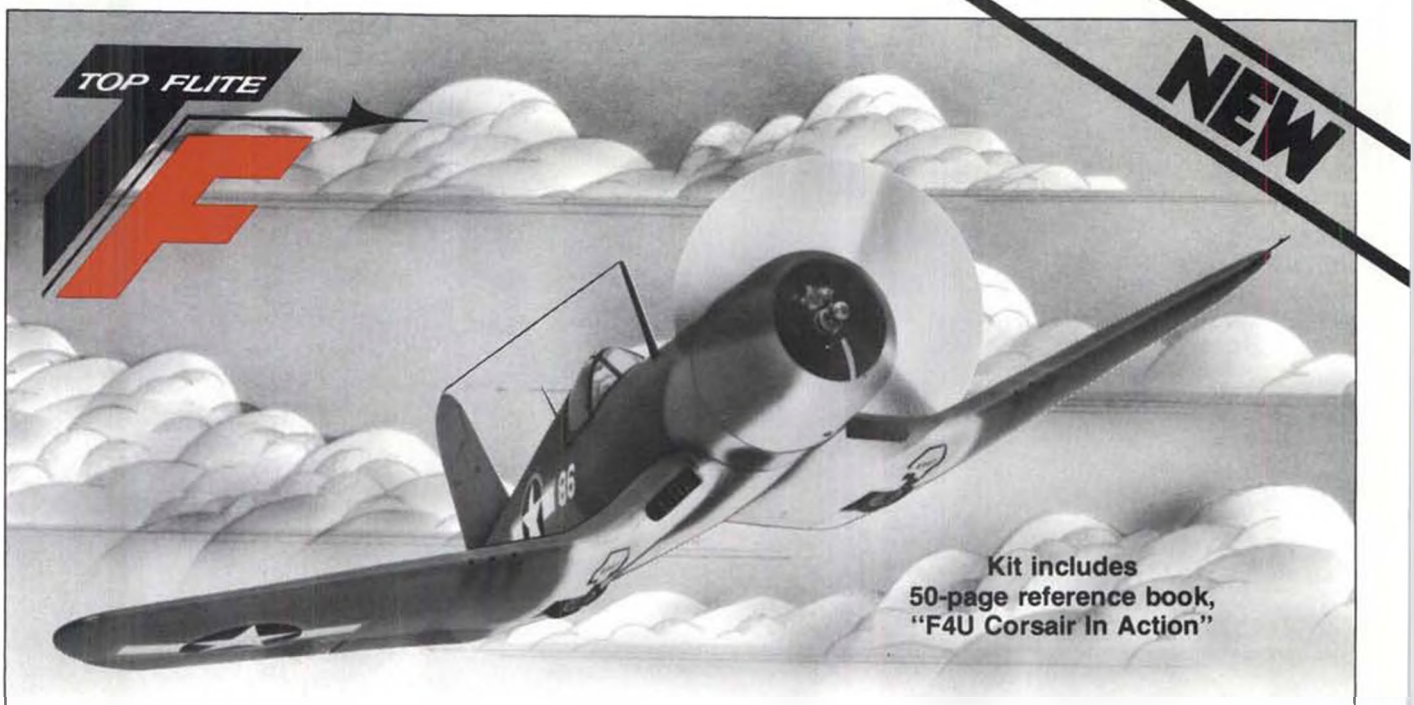

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Length	48"
Engine size	.60
Weight	7-9½ lbs.
Kit no.	RC-21

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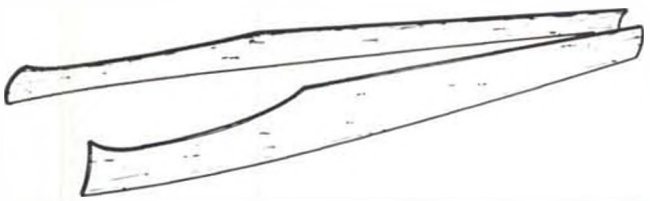

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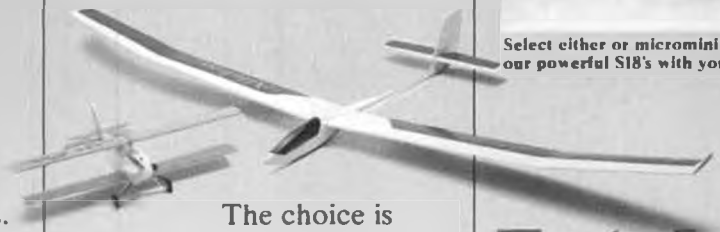

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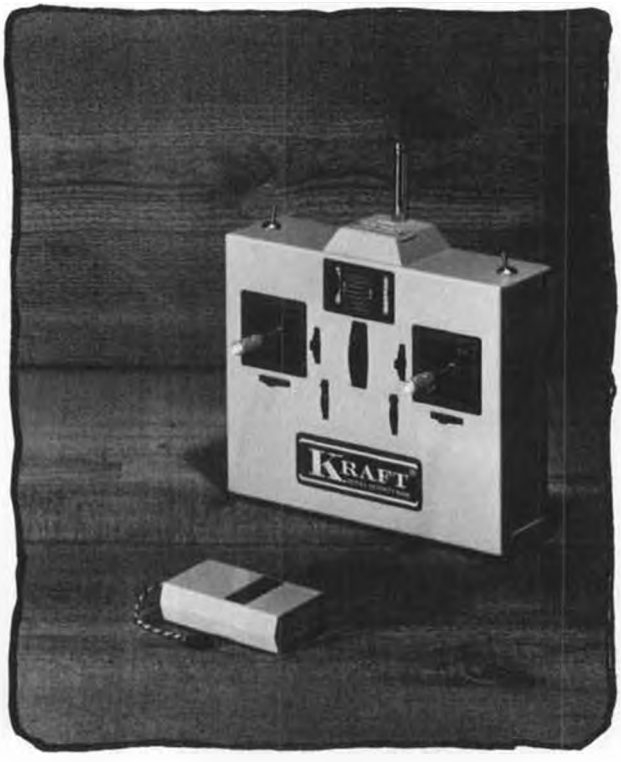

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Top Left: John Theodorsen's Kougar features custom wing fillets, an inverted fully-cowled engine, and completely internal control horns.

Top Right: Lad Plachy launches his Sig Stinson L-5 Sentinel, a perennial FF Rubber Scale favorite design by AMA Hall of Famer Henry Struck.

Right: Here are two of Bill Lubkemann's favorite "models" - his daughter Sarah and a Sig Kougar. The "Kougar was just about the easiest model I've built." Bill is an aircraft pilot and mechanic living in Brazil, S.A.

Below Center: Ed Carew (Ontario, Canada) says that his Smith Miniplane "is the most enjoyable model I have ever flown".

Below Right: John Myers informed us, "I have flown my Sig Kadet, built in 1977, over 1000 flights with no major repairs. Each flight averaged over 10 minutes. It is a great airplane for anyone to fly".

Bottom Left: John Conn says his Kougar "flys great and is easily handled. It is an ideal first low wing plane. Without a doubt, the Sig kits are the finest on the market today." Kathy Longar completes this pretty picture.

Bottom Right: A colorful red, white, and blue Sig Kavalier built by Steve Tesnear of Colorado Springs, CO. "Flys very nice. A super kit."

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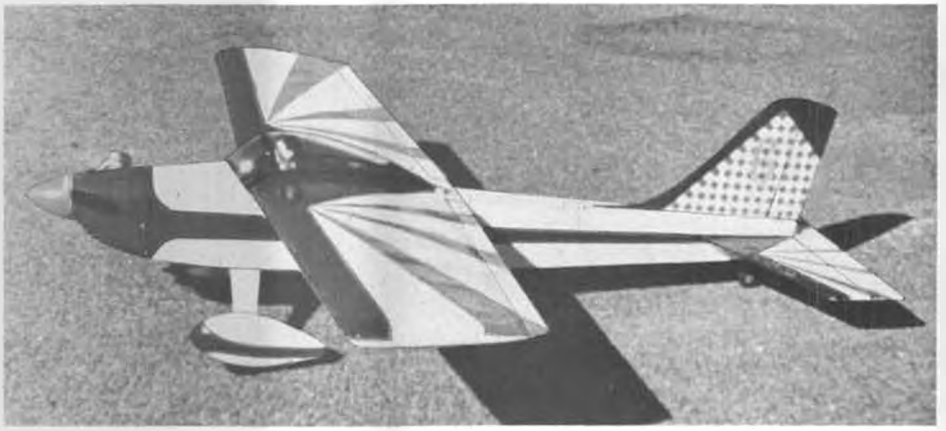

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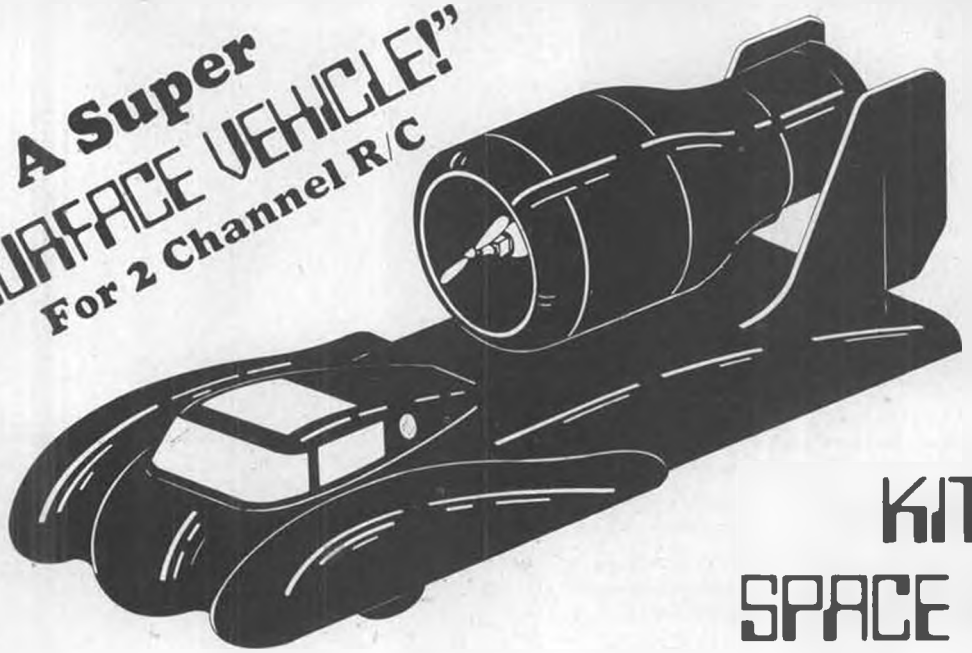

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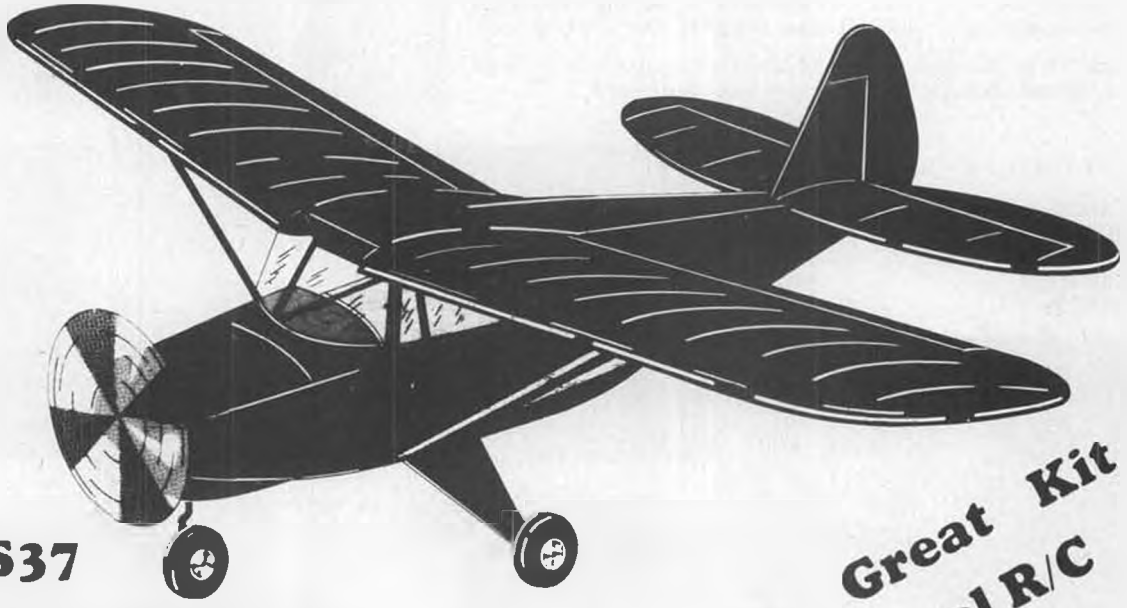

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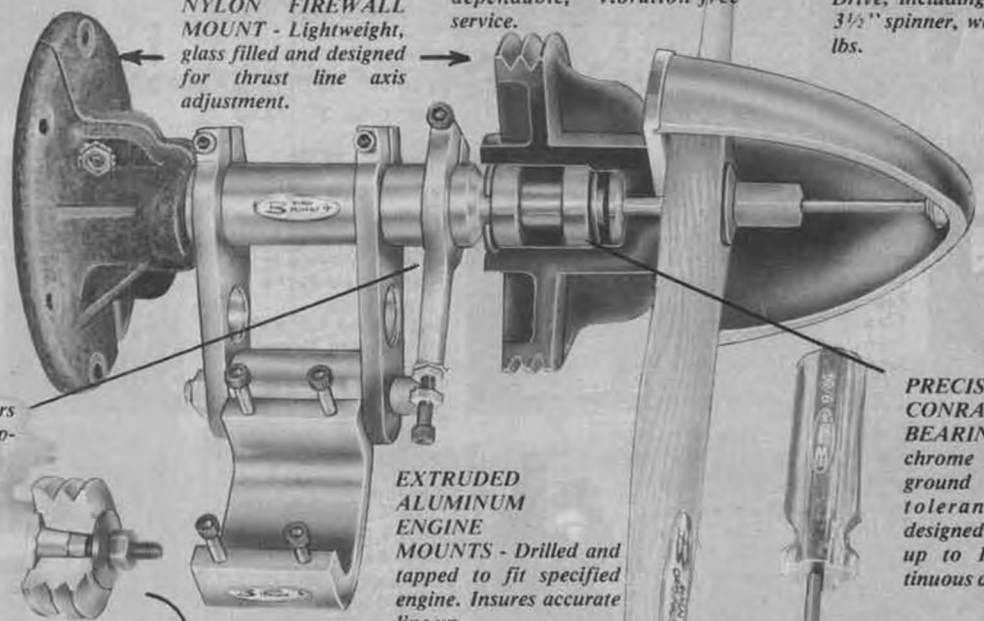

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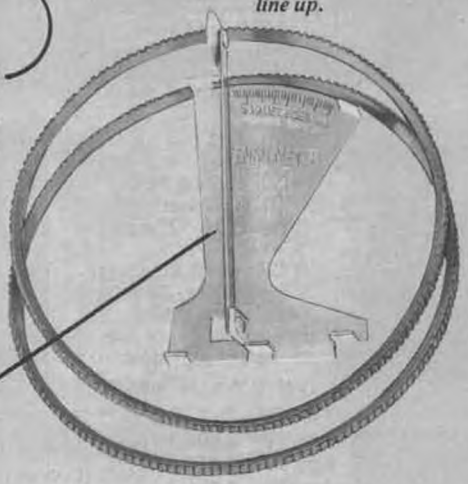

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MODEL BUILDER

APRIL

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volume 9, number 87

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COVER: For just over 23 minutes, this model traced a figure-8 course, 400 feet to a lap, over the heads of exhibitors and spectators at the International Modeler Show in Pasadena, California, on January 7, 1979, to establish a record for indoor, electric powered, radio controlled model aircraft. The model was designed, built, and flown by Hal Cover, Thousand Oaks, California, and more detailed information will be found, beginning on page 20. Kodachrome 35mm transparency by Myram McJunkin, Riverside, California.

Winners of the world's first Indoor R/C Record Trials, conducted during the Pasadena, California International Modeler Show (l to r): Addie and Tony Naccarato (mother and son), MB's editor (sponsor of trials), Bill Watson, and Hal Cover. For more info, see "R/C World" column.

from Bill Northrop's workbench . . .

• The model industry recently lost one of its top business personalities, when Mike Schlesinger passed away in late December, at the age of 67, after nearly a year-long fight with cancer.

Mike retired as president of Top Flite Models in February 1978, having held that position since 1945. Under Mike's firm hand, and along with the modeling and engineering expertise of his partner, Sid Axelrod, Top Flite became a leader in the hobby industry. Certainly Mike and Sid can be credited with changing the building habits of modelers all over the world, when they introduced Monokote, the iron-on covering material. Before that, veteran R/Cers will remember their introduction of the Orion, Ed Kazmurski's National and World Champion aerobatic model, in kit form, followed by Ed's Taurus and Tauri. The Taurus, built by thousands of fliers all over the world, probably appeared in more pattern contests than any model aircraft before or since. In a similar way, George Aldrich's Nobler, kitted by Top Flite, has no doubt outcircled any other control line aircraft ever known.

Mike Schlesinger, 1911 - 1978.

Mike's role in the hobby industry went far beyond Top Flite and its products. His contributions of time and effort to the Hobby Industry Association are best known by other hobby industrialists, but included chairmanship of the trade show committee, election to the HIA's Board of Directors in 1956, ten years as chairman or co-chairman of the Model Aeronautics Division, and service on the HIA's nominating committee for several years.

Our acquaintance with Mike was held together by personal contact at the various open-to-the-public trade shows, such as Toledo and White Plains. Mike was always easy to spot, very tall, and slender enough to annoy the diet set. He was an immaculate dresser and had a friendly way of not only remembering your name, but also some little incident from your last meeting . . . a trait that made you feel like someone special to him, and a trait that made him well liked by everyone.

We'll miss you, Mike. And as always, our best to Sadie.

THE SHOWS GO ON

The Stony Creek Radio Control Club, Burlington, Ontario, Canada, is presenting its 9th annual R/C Model Aircraft Exhibition and Flying Show, on the weekend of May 5 and 6.

There will be prizes to third place in Military Scale, Civil Scale, Stand-Off Military Scale, Stand-Off Civil Scale, Finish, Sport Biplane, Sport Plane (!?), Original Design, R/C Sailplane, Solarfilm covered model, Helicopter, R/C Boat-Sail, Power, Scale; Junior Model (16 yrs. or under), Best 1/4 Scale Aircraft (too bad, you big models that are 1/5 or 1/3!), and Best Model Aircraft built by a Canadian.

The Nelson Recreation Complex, scene of the show, is at 4235 New Street, Burlington. There will be distributor displays, a Swap Shop, and two flying shows each day. Carl Small is Exhibition Director.

* * *

Almost too late to mention in this issue is the March 9, 10, and 11 date for the 28th National Model Plane Show, in Cleveland, Ohio. Sponsored by the Cleveland Aeromodel Society and the

Continued on page 110

Another Mystery Modeler! One of MB's contributing editors. Photo taken at the ripe old age of 13. First correct answer gets a prize.

OVER THE COUNTER

• There's lots of good news from the people at Midwest Products this month. First off, they've just announced the release of a new kit patterned after the classic Esquire, only scaled up 1-1/2 times! Called the "Super Esquire" (what else?), the model spans 80 inches, weighs 8-1/2 pounds, and is designed to fly on .40-.60 size engines and three channels of R/C. If you're looking for a slow, docile trainer, or just a big sport job to tool around the sky with, this is it. Kit features include Midwest Micro-cut balsa, plywood, and basswood. All ribs are die-cut and dihedral braces machined. The cowl is pre-formed from ABS plastic. Also included is an aluminum motor mount, pre-bent landing gear, and all the hardware you'll need to finish the model.

Retail price of the Super Esquire is $94.95. It should be available at your dealer by the time you read this.

The second piece of good news is that Midwest is coming out with yet another kit, this one for the ELCO PT-boat. This is a good-size boat, measuring 35-1/2 inches in length and 9-3/4 inches across the beam. The hull is fiberglass and comes already joined to the plywood deck. All deck parts are die-cut basswood, and the kit includes all necessary materials to make the version shown in the photo. The boat is designed for gas or electric power and can be run on one or two channels. Radio and motor installation, as well as finishing info, is shown on the plan.

As of this writing, the price of the Midwest ELCO PT-boat has not been announced, but the kit is slated to be available in late January. If you can't live without one, write to Midwest at 400 So. Indiana St., Hobart, IN 46342, for more information.

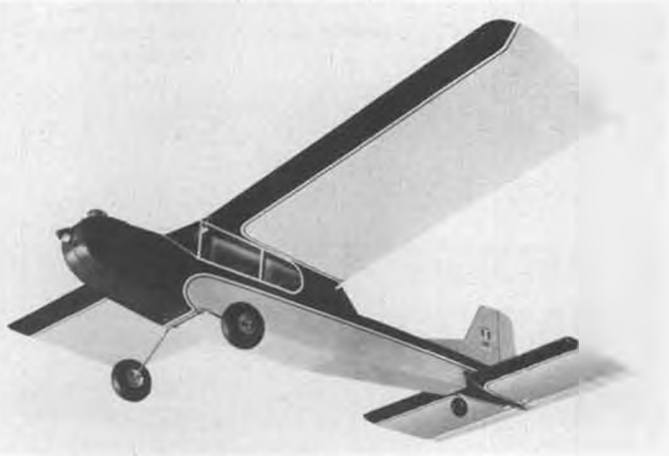
And last but not least, we've just received the official word that Hal deBolt, MB's "R/C Forum" columnist

Top Flite's new F4U-1A Corsair.

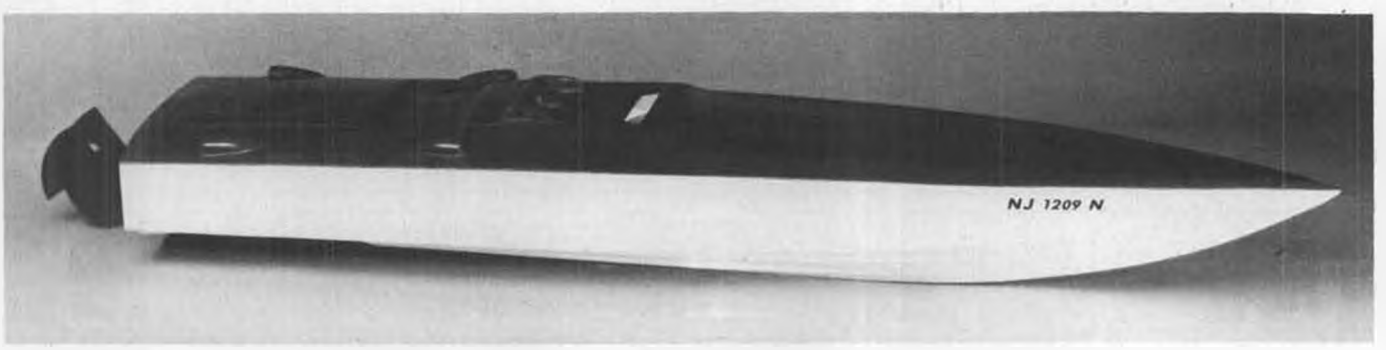
The Kraft KBC-D charger. Switch selects high or low charge rate.

New Tray Base Mount from Panavise.

Elco PT-boat from Midwest, for gas or electric power.



Another new one from Midwest, the Super Esquire, an 80-inch version of the well-known Esquire design.



MRC's third in a series of ready-to-float boats is the Offshore Racer, equipped with the exclusive Turbo-Trol water jet propulsion system.

and a familiar name to most all R/C'ers, has joined forces with Midwest and will be working in the design/engineering department. Frank Garcher, President of Midwest, made the announcement at the recent EXPO show in Dupage, Illinois.

Be sure to stop in at the Midwest booth at Toledo and welcome Hal aboard.

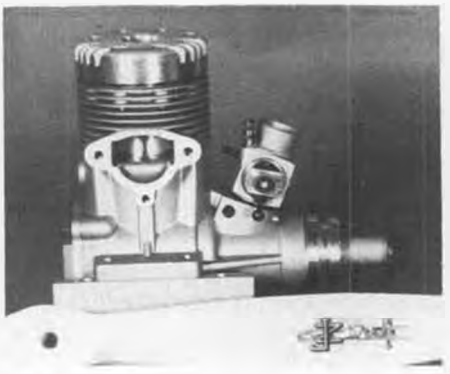
* * *

If you love Corsairs, you're gonna go nuts over Top Flite's new one. Designed for .60 size engines, the F4U-1A Corsair is an exciting addition to Top Flite's excellent line of warbirds, which presently includes the P-51 Mustang, P-47 Thunderbolt, P-39 Airacobra, and P-40 Warhawk.

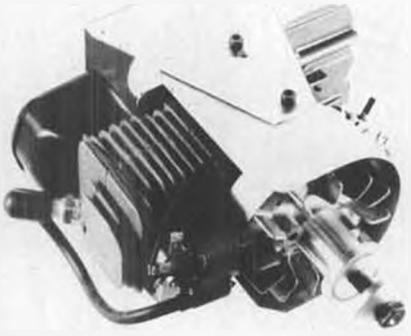
This Corsair is not a small model: the wingspan is 61 inches, with a wing area of 693 squares and a gross weight of 7 to 9-1/2 pounds. The kit is loaded with all sorts of goodies and special features, including Top Flite's exclusive "Super-form" fuselage shells, heavy-duty pre-bent landing gear (40 lashes to those who don't substitute rotating retracts, such as Robart's), full balsa sheeting for the wing, fuselage, and tail, two-piece plastic cowl, clear plastic canopy, top-quality die-cut and machined balsa parts, three full-size plan sheets, check-off instruction booklet, complete hardware package . . . well, you get the idea. Of special note is that the kit also includes a copy of the "F4U Corsair in Action" book from Squadron/Signal Publications. This is a complete 50-page reference on the Corsair and contains 13 full-color paintings, 14 drawings, and 125 black-and-white photos. It's about the best proof of scale available for this airplane.

For price information on the Corsair, write to Top Flite at 1901 N. Narragansett Ave., Chicago, IL 60639.

We've also received word from Top Flite that four new colors of Monokote, one new color of Econokote, and two new colors of Monokote trim sheets are now available. The new Monokote colors are Cream, Maroon, metallic Aztec Gold, and metallic Copper Red.



The new O.S. .90FSR, due to be released soon.



Tarno Super 2, a 1.9 cu. in. engine for Mammoth Scale models.

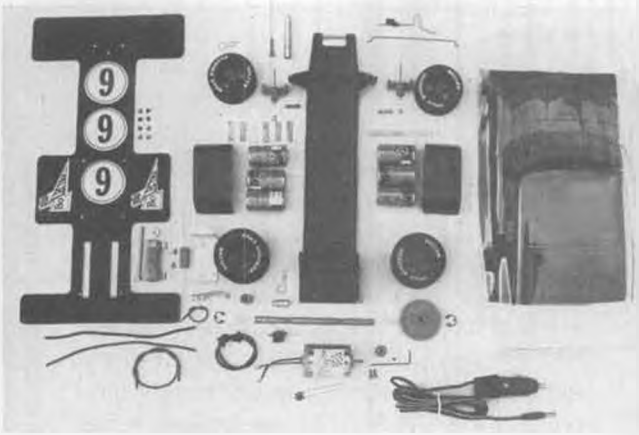
Don Lowe's Phoenix 8, now a kit by Aero Composites.

The Electro Mate, from RAM, mates the K&B outboard to an Astro 25 electric motor.

"Master Airscrew", a new line of glass-filled nylon props from the Windsor Propeller Co.

Also new from RAM is the "O Bee 30", an all-plastic tri-hull runabout designed for gas or electric outboards.

Three new car bodies from Bolink are (l to r): Can Am Spyder, Volkswagen Scirocco, and Mercedes 500 SLC.



Bolink's new 6-cell electric car kit.

The C&D Glo Driver, from C&D Enterprises.

In Econokote, Midnight Black has been added. No word on the price, but we assume they are the same as the other opaque and metallic colors of Monokote and Econokote.

The new trim Monokote colors are Day-Glo Orange and Day-Glo Red. These brilliant fluorescent colors are just the thing for gliders, Old Timers, or any type of model that requires extra-high visibility. In addition, they allow you to make authentic military markings and other distinctive designs.

The new Day-Glo trim sheets are the same size as the others (5 x 36 inches) and are applied in the same manner. Retail price per sheet is $1.79.

* * *

The Prather Deep Vee, first in a new series of boats from Prather Products.

Right on the heels of its Mariner and Cobra Jet boats (see Jerry Dunlap's review of the Cobra Jet in last month's **Model Builder**) comes yet another ready-to-float offering from MRC, the Offshore Racer. Like the other two boats mentioned, the Offshore Racer has a brightly-finished fiberglass hull and is equipped with MRC's Turbo-Trol water jet propulsion system, a feature which has a few advantages over conventional exposed-prop boats, the main ones being safety, ease of operation, and extreme maneuverability.

The Offshore Racer measures 39 inches in length, has a beam of 9-1/2 inches, and comes complete with factory-installed waterproof radio box, control rods, fuel tank, starter belt, MRC-Enya .35 Marine engine with muffler and glow plug, and the Turbo-Trol unit. All you have to do is install your radio, which shouldn't take more than an hour or so. A two-channel rig (not included) will operate the boat, but a third channel is required to operate the thrust reverse mechanism on the Turbo Trol unit, should you want to use it.

Suggested retail price of the MRC Offshore Racer is $279.95. The boat is also available in an almost-ready-to-float configuration, which allows the more experienced boater to install a hotter engine and conventional prop drive for competition deep-vee racing. Price of this ARF version, which consists of a finished hull and factory-installed waterproof radio box, is $99.98.

Continued on page 104

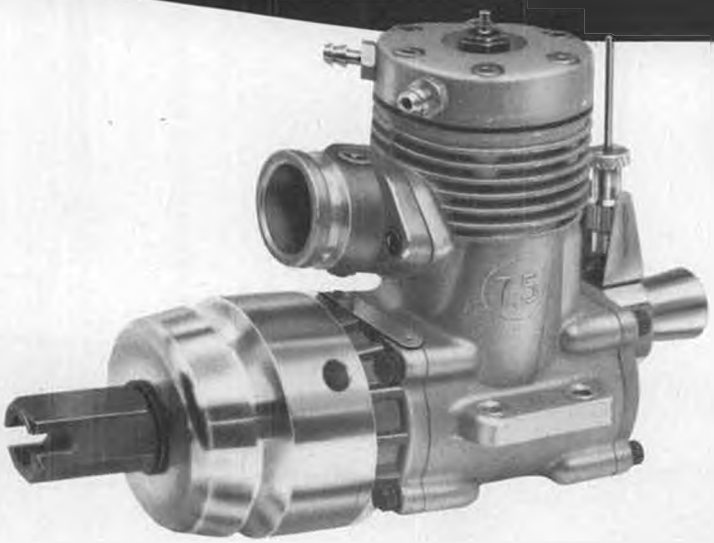
Another big engine! The Mag-Aero K-21, 1.26 cu. in., from Mag-Aero Mfg. Co.

Very light radial engine mount for 1/2A's, from Hiscott Components.

NOW everything you've loved about K&B MARINE ENGINES plus more....

WE BLEW IT!!!

TOO SOON THAT IS . . . telling you about our Two NEW K&B 7.5cc Engines. We ran this ad last fall but vendors unable to keep their commitments prevented us from completing the engines. Both are now in good supply. We are genuinely sorry for any inconvenience we may have caused you.



in the K&B 7.5cc (.45) R/C Inboard MARINE RACING ENGINE

We feel certain this new K & B 7.5cc Marine Engine will break many or all of the existing records held by the highly successful K & B 6.5cc Marine Engine. It has power to spare! It is equipped with a rear exhaust butterfly throttle and water-cooled head.

Features include:

- CHROMED BRASS SLEEVE and LOW EXPANSION ALUMINUM PISTON constitute the ABC combo.
- CON ROD — machined from 7075-T6 aluminum solid bar stock. Bushed both ends.
- REAR ROTOR — with all new machined steel rotor disc.
- BALL BEARINGS
- ROTATABLE CASE (center block) — permits changing of exhaust from forward to aft position.
- BEEFED UP CRANKSHAFT — tungsten alloy counter weights for super-smooth operation.
- K & B's QUINTUPLE PORTING

The K & B 7.5cc is easy to mount. If your present hull is equipped with a K & B 6.5cc and you want to add more power, it just takes minutes to install the new 7.5cc as it fits the same mounting set-up.

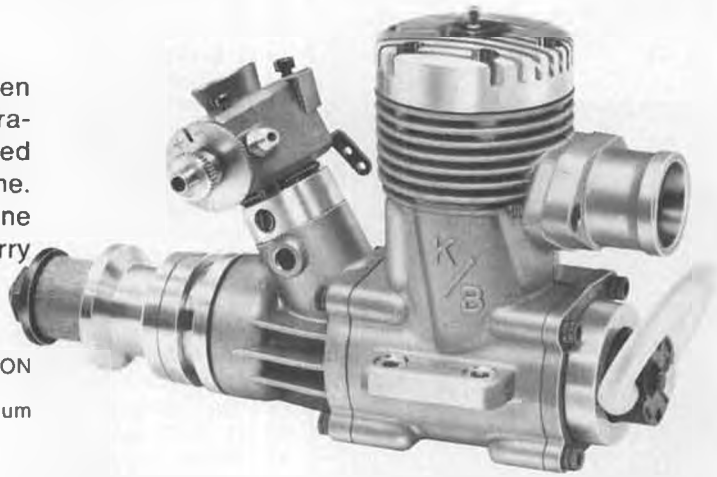
in the K&B 7.5cc (.45) DUCTED FAN ENGINE

Another sure winner! This engine has been developed specifically for Ducted Fan operation. We feel as confident about this Ducted Fan engine as we do the above Marine engine.

Now you can have a Ducted Fan engine "right out of the box," complete with Perry Pump/Pump Carburetor.

Features include:

- CHROMED BRASS SLEEVE and LOW EXPANSION ALUMINUM PISTON constitute the ABC combo.
- CON ROD — machined from 7075-T6 solid aluminum bar stock. Bushed both ends.
- BALL BEARINGS
- PERRY CARBURETOR
- HIGH PERFORMANCE HEAD — machined from solid aluminum bar stock.
- K & B's QUINTUPLE PORTING



With our expertise, our years of experience (30 years), and our quality control, you expect the best from K & B. That's what you get!

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R/C WORLD

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HALF-A SCENE 54
WOOD BENDING 56

Bill Watson's giant R/C blimp, the "Golden Football" starts off on its 7-1/2 mile record flight for Indoor Lighter-Than-Air models. Scene is the IMS Pasadena model show, where all record flights took place over the heads of exhibitors and spectators.

Business goes on as usual in the K & B booth, as Bill Watson's "Golden Football" blimp passes overhead at one end of the figure-8 course. The 9-foot long blimp completed 100-1/2 laps of 400 feet each to cover a little over 7-1/2 miles on its record-setting distance flight.

R/C WORLD AT IMS PASADENA

by BILL NORTHROP

• The Second Annual IMS Trade Show, first major open-to-the public model trade show of the 1979 season, took place at the Pasadena Center, Pasadena, California, on January 6 and 7. Returning to the most popular time of year for Southern California shows (the Eastern exhibitors love it!), this year's affair avoided last year's close conflict with the MAC show and also the Super Bowl, which took place two weeks later.

Feature attraction of the IMS Pasadena show was the first ever record trials for heavier and lighter-than-air *indoor* R/C model aircraft. Official flights took place *during the show* and *over the heads* of fascinated exhibitors and spectators! Cash prizes totaling $1000 brought out over a dozen fliers, who sought to establish tough-to-beat endurance records for rubber, CO_2, and electric powered model airplanes, and distance records for electric powered lighter-than-air craft.

More about the record trials a little farther on in the story. Even though the show avoided conflict with the MAC Show and the Super Bowl, it still had competition. As most any red-blooded sport fan knows, Sunday, Jan. 7, was the date for the two major playoff games to determine the Super Bowl participants. The most popular booths were the ones

Gary Rheault and Fred Eastman drove their Eastcraft Specialty van all the way from New Jersey and back to attend IMS-Pasadena.

Bob Seigelkoff, C.B. Associates, displayed a line of high-quality accessories, including Quadra mount and cable control system.

Col. Bob Thacker's latest, the Turner Special, is smooth, fast flier. First in Non-Military Sport Scale. A future construction article.

First in Military Sport Scale, O.S. .40 powered Corsair, by Ron Branch, Tujunga, California.

John Roper, from S.L.E.C. in England, showed an interesting line of accessories. Will be imported through California Hobby Supply.

Also from England, John Rudd, Precedent Balsa, showing a beautiful scale power boat with glass hull. Line includes aircraft as well.

that had TV sets tuned in to the games! Next year's show is scheduled for the weekend *between* these events.

Even so, the turnout for only the second annual show was excellent, and many exhibitors were confident that this year's show definitely established the IMS Pasadena Show as a permanent annual affair.

The Pasadena Center, located just a block from Colorado Boulevard, of New Year's Rose Parade fame, occupies a complete city block in Pasadena. The complex includes the old auditorium, scene of the most recent Emmy Awards, a new 30,000 sq. ft. conference building, the 31,000 sq. ft. Exhibition Building, and a large Holiday Inn. The buildings are joined by picturesque plazas and tree-lined walkways. Almost the entire area is undermined with two levels of underground parking.

More than 50 exhibitors occupied 75 booths set up in the Exhibit Building, displaying a variety of model aircraft, cars, boats, R/C systems, and accessories.

American R/C Helicopters and Gorham Associates (Schluter Products) displayed the latest in aerobatic helicopters, and also put on live flying demonstrations on the plaza area just outside the Exhibit Building.

Ron Shettler, who is the man primarily responsible for bringing the Quadra to the modeling public, brought a factory representative with him from Canada, along with a full line of Quadra-related items. Quadra powered R/C boats are here!

Custom T-shirts are a big fad now, and Bob Martin, of Fli Shirts, Las Vegas, is right in the thick of it. He's making shirts for many clubs, organizations, and special events (and **Model Builder** Magazine), and his booth was decorated with many samples.

Bob Boucher, in addition to attending his Astro Flight booth, was also busy offering assistance to several of the modelers who were attempting to set new indoor R/C records. Astro Flight motors powered most of the entries.

Another dual-purpose exhibitor was Bob Peck, of Peck-Polymers. In addition to providing a fine exhibit booth loaded with Peanut, Embryo, and P-30 type rubber models, Bob was busy giving live demonstrations in the art of adjusting free flight rubber models from his booth adjoining the center clearing. And if not that, he was adjusting and flying his unusual two-balloon entry in the R/C LTA record trials.

K&B's very professional booth displayed its complete line of engines and the ever-growing "Marine Specialties" line of powerboat equipment. John Brodbeck Sr. is really into R/C powerboating, and he feels that it is the most rapidly expanding facet of the R/C hobby. John is also a strong supporter of the model-only trade show concept,

Mr. and Mrs. Fred Jamieson, for Master Airscrew propellers, out of Windsor, California. Black, glass-filled nylon with white lettering.

Mrs. Bob (Kathy) Martin and Ron Stevens in Bob Martin R/C Models booth. Concrete floor couldn't hurt plastic fuselages.

Jim Sunday and Gloria Clark covered the IMS Show for R/C Sportsman. Bert Baker's 1/4-scale Cherokee protrudes from Quadra booth.

Bob Holman continually adds to his line of plans and kits. Also building up a good library of scale reference material.

Dave Henderson (left), Precedent Balsa, compares notes with John Gorham, who represents Schluter Products in the U.S.A.

George Killeen and Hal Ockert represent Kraft Systems in Orange County, Calif., and also service many other systems.

and has been a tremendous help launching the Pasadena-based IMS Show, which follows the same pattern as the popular WRAMS (White Plains, New York), Weak Signals (Toledo, Ohio) and Southwest Modelers (Dallas, Texas) shows.

Gary Rheault (like "row") and Fred Eastman, of Eastcraft Specialty Products, drove their van all the way from Beachwood, New Jersey to show their well-known onboard electric starter line for boats and aircraft, and also introduce the clever Easy Bailer, which does just what it says for R/C boats. Driving back, they were caught in a Kansas snowstorm, and the 42-1/2 hours coming out became 4-1/2 days going back!

Wally McAllister, of Mac's Products, Sacramento, displayed his complete line of mufflers and tuned pipes, including the unique ball-shaped units for helicopters.

The guy with a variety of new products is Bob Seigelkoff, of C.B. Associates, Hayward, California. Included is a beautiful cast aluminum alloy engine mount for the Quadra, various fittings for the installation of cable control surface linkages, a unique prop balancer, and of course, the excellent line of engine mounts, spinners, and the sprung, steerable tail wheel strut.

Coming all the way from England was John Rudd and Dave Henderson, of Precedent Mfg. Ltd., showing its line of model boat and aircraft kits. The kits will be distributed in this country by California Hobby Supply, and are of top quality.

Also from England was John Roper, of SLEC, showing a line of R/C accessories, also to be available through Cal Hobby.

A new propeller company introduced its line in Pasadena. Windsor Propeller Co., Windsor, California, is owned and operated by Fred Jamieson. The props are of glass-filled nylon, and are finished in black with white markings. Very good looking, and already gaining a favorable reputation.

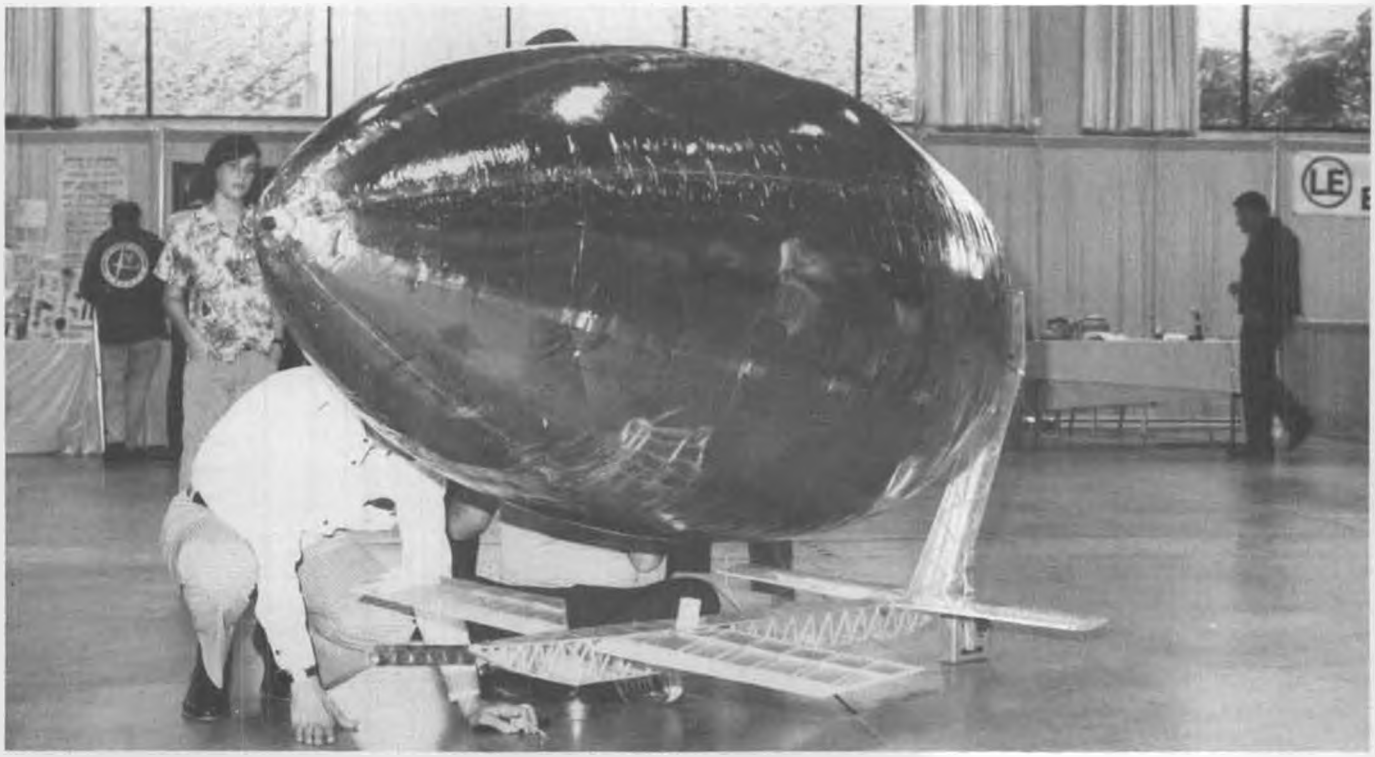
Both Pro Line and Cannon Electronics displayed their radio systems. Bill Cannon also had an electric model aircraft for the record trials, but it didn't get to show its full potential as it suffered too much damage during the trim flights on Thursday evening.

The radio servicing business was represented by Authorized R/C Service and Kraft Orange County. The latter is also a Kraft distributor in Orange County, California.

Bev and Kevin Smith came by way of Pearblossom to represent Pettit Paint Co., manufacturers of Hobbypoxy. Bev

Rudy Calvo's Goldberg "Valkyrie" was an easy winner for best R/C Old Timer. Uses Kraft radio and OS .40 engine. Fantastic performer.

Another polished beauty by M.C. Skee, not finished in time for show. Fokker DR-1.



"How long have you had this feeling that your head is a blimp?" Bill Watson's record-setting R/C LTA "Golden Football" gets some minor adjustment. Note battery "stinger" at front of gondola, for balancing. R/C controlled water bottle counteracted helium leakage.

is a real full-scale soaring nut, and never misses a stop at Pearblossom when in the Southern California area.

D&R Products, which primarily supplies molded parts for many of our radio manufacturers, has now opened a consumer marketing branch under the name of Rosie's R/C Products. The company will market all D&R Products, including servo mechanics, output arms, servo trays, switch holders, and engine power pods.

Dave Lloyd has taken over the Windspiel line of R/C gliders, and showed many from the wide selection. Bob Martin R/C Models also showed some tough new fuselage material that refused to give in after a weekend of floor whacking by anyone who cared to try.

On Sunday afternoon, a drawing was held to award raffle prizes. Four radios (Kraft, Hobby Shack, Pro Line, and Cannon) were to be given away, as well as two Bridi Kits. Most satisfying was to see young Mike Morales whose number was called to win the Pro Line radio. On crutches, he dropped both of them in the excitement and hopped to the microphone to receive his prize. Then Sierra Madre dentist Art Major won the Bridi UFO kit. Moments later, another of his numbers was called to win the Kraft radio. At that rate, it's too bad there weren't drawings for an engine or retracts!

And now, back to the record trials.

All fliers in the indoor R/C record trials were required to qualify Thursday night, in the exhibit hall, before making official attempts on the weekend. Thursday night was selected for several reasons. First, the IMS contract for availability of the exhibit hall began on Thursday, when the decorator would come in and install the booths, backdrops, tables, etc. This meant that the

Bill Watson's "Golden Football" leads Bob Peck's blimp around the far turn.

Tony and Addie's hobby shop had a variety of model aircraft on display. Look close, they're huddled over electric R/C model.

Mr. and Mrs. Bob Martin, Fli Shirts, Las Vegas, Nevada. Theirs was a popular booth . . . they had the pro football playoffs on TV!!

Dave Lloyd recently acquired the Windspiel line of foreign and domestic R/C glider kits. Some esthetically beautiful aircraft.

"There I was, on my back at 100 feet . . . " John Simone shows how to do it with a helicopter.

Maus Taota, Los Angeles, won another First Place with his monster Pitts. Other trophy came from QSAA meet in Las Vegas.

John Pahlow, Granada Hills, Ca., won 1st in Precision Scale and Best of Show with his D.H. 82A Tiger Moth.

modelers could test their aircraft . . . and their own piloting skills . . . under actual hazard conditions, but without the exhibitors' displays in place. Officials had this time to check qualifications of the aircraft, and also the flying ability of the pilots. After all . . . on Saturday and Sunday, they would be flying over costly exhibit materials and the heads of hundreds of spectators . . . no place for "Bombs" in the hands of inexperienced pilots!

The course, reminiscent of the man-powered requirement, was a figure 8, around crepe paper ribbon pylons which were hung from the overhead beams. Test flights indicated that the pylons were, at first, too far apart in width, causing the aircraft to fly too close to the side walls of the exhibit hall.

After relocating, the pylons were 30 feet apart in width and 120 feet apart in length. This resulted in a figure 8 course that was approximately 400 feet long. This distance was based on two straight crossing paths of about 112 feet each, and two 227 degree curves about 88 feet long. Obviously, no one flew this exact path, but it was used for calculating the distance flown by the blimps. Incidentally, duration was measured for heavier-than-air models in order to discourage fast flight, whereas distance was measured for lighter-than-airs in order to avoid stationary floating, which could conceivably go on for days at a time!

Probably the biggest surprise was the record set by Hal Cover, of Thousand Oaks, for electric powered HTA aircraft. His model, which resembled a conglomerate of old-timer power ships of the pre-WW II late '30's to early '40's, turned in a first official flight on Saturday morning of 23 minutes and 2 seconds! You'll find more specs in Mitch Poling's report, but Hal's 7 foot model, with a wing loading of 2.25 oz per sq. ft.(!) proved that the maximum loading we had set for the trials of 4 ounces was actually generous, rather than impossible to achieve. In spite of the light loading the model seemed to fly at about 15 mph, and if you don't think that's fast, try flying in a confined space where you are constantly making left turns, then left to right straight, then right turns, then right to left . . . always watching walls and ribbons . . . plus maintaining altitude above 8 feet and below about 28 feet . . . a 20 foot vertical corridor . . . and keep it up for 23 minutes! It's *not* just a question of battery endurance.

To prove that Hal didn't really have it all to himself, Bill Watson, of Van Nuys, flew a pod-and-boom, glider-like de-

Bob Novak drinks a toast to the success of his Bantam Midget servo, an excellent add-on or substitute servo for any system, at good price.

Peggy Jones and Gaylerd Evans, of Mail Call Models. Models are not the action type, but aroused a lot of interest.

The King and Queen of small radios, Bill and Charlie Cannon. Most of the R/C Indoor models were controlled by one of their systems. A review of one of the kits is coming shortly.

Ted Yee's R/C Indoor HTA model circles overhead. Battery power was too short.

John Worth was assisted in the AMA booth by the distaff side of the Stream and Wisniewski families. Earl Witt also on hand.

Wally McAllister, MACS Products, Sacramento, California, with his excellent line of mufflers.

sign for 12 minutes, 50 seconds. His electric power unit was removable, however, and he replaced it with a CO_2 power unit, to be the only entrant in the CO_2 division. The model was now quickly named the "DO-X", as the power unit consisted of 4 Telco CO_2's mounted side-by-side above the wing, all drawing CO_2 pressure from a single tank.

Bill's first CO_2 official flight was only 39 seconds, as he did not fully charge the cylinder tank. The next attempt, with a full charge, was foiled at 58-1/2 seconds, when one engine's supply tube broke a solder joint, letting the remaining CO_2 escape. He then put up an unhindered flight of one minute, 7.7 seconds, to set the record.

Tony Naccarato, of Burbank's T and A Hobbies, put up the third best electric endurance mark with a flight of 11:43.3, but he also had an ace up his sleeve for which he won some cash. Tony produced a beautifully built Wakefield/Unlimited Rubber type model, and like Bill Watson in CO_2, faced no opposition except time itself. The model featured a long "Diamond" fuselage, and the Cannon radio gear was mounted in the wing pylon. A curious crowd gathered as Tony held the model and Addie stretched out the rubber motor and began to pack in winds. Very few modelers, except those who are competition free-fighters, have ever witnessed this procedure. It takes place only in the far reaches of free flight sites, not normally inhabited by your everyday modeler.

Not only that . . . Addie, Tony's mother, is a tremendously talented modeler, who has built and flown just about every type of model, and is an active competitor. She built this ship for the record trials.

A genuine demonstration of "Hot Stuff" also took place as this rubber ship was prepared for flight. Addie, while attempting to fit the nose block back on the fuselage, and while resisting the pull and twist of the fully-wound rubber, let slip just enough to allow one blade of the huge balsa sheet propeller to break right near the hub. While others held on, Tony cut and held strips of silk on each side of the blade at the break and then applied Hot Stuff. Within a minute the prop was repaired, the excess silk trimmed off, and the flight began. A blow-by-blow description of the repair was announced by yours truly as the operation proceeded.

The flight was short, by electric standards, but was the most smooth and stable of all, for its full 47 seconds.

"Boy! This is wild! Sure gotta try it. What I'm going to do is. . ." This series of

Russ Barrera and Sal Taibi do some rapid calculations in Mike Taibi's Superior Aircraft Materials booth.

The whole Peck gang always shows up for these affairs. Bob also entered the record trials with his two-balloon blimp.

Belinda Northrop and Carma Petersen selling tickets for the raffle as hopefuls fill out their names and phone numbers.

Triple winner Art Major. First Place with the Jet Ranger, and then drew the Kraft radio AND the Bridi U.F.O. kit!!

Belinda draws ticket as Mommy holds. Pat Patton, IMS, waits to read lucky number.

Winner of Hobby Shack Aero Sport IV was Mike Adams, Modesto, California.

Mike Morales dropped his crutches and hopped to microphone to claim the Pro Line radio he had just won. Top that all you faith healers!

remarks was heard over and over, coming from modelers who were observing the flight of electric powered blimps, as they passed back and forth, ever so silently, over the spectators below.

Think it was easy? The problems were strange, some unexpected, but not insurmountable. Force set-ups did odd things. Elevators at the back end of the "fuselage" structure hanging below the helium bag on Bill Watson's and Bart Hibb's blimps made the nose point up and the blimps climb when "UP" elevator was applied. However, down elevator, rather than pointing the nose down and making the blimps descend, made them climb while remaining horizontal. The control stick gave them "UP" and "UP"!

Tony Avak and Bob Peck (Peck-Polymers) apparently anticipated the pitch and directional control problems. The motor in Tony's blimp was pivoted and linked to the elevator. Bob took this idea further, with the motor gimbal-mounted and linked to both rudder and elevator controls!

There was another interesting problem which had to be solved by all but one of the blimp modelers. With the exception of Bob Peck, who used two weather balloons in tandem, the blimp bags were fabricated from several pieces of plastic (Kapton, in the case of Hibbs and Watson), and a significant amount of helium could leak from the seams in the bags, over a period of time. Solution? Drop ballast while in flight!

Tony Avak installed a tilted aluminum tube in the underslung framework of his blimp, filled with B-B's and an extreme control on one of the servos would release one B-B at a time, as needed to compensate for helium loss! Bill Watson chose to use a plastic bottle of water, the contents of which was released one drop at a time as necessary.

Tony set the pace on Saturday with a 35-lap flight, taking approximately an hour and a half, the official distance being 14,000 feet. Bob Peck's two-balloon model made several attempts, but was handicapped by high drag and low power making accurate control difficult.

Bart Hibbs and Bill Watson built similar blimps, the bag design being Hibb's creation. Unfortunately, on Thursday night, Bart's bag broke loose

Tony and Addie Naccarato prepare their R/C rubber powered ship for its record setting indoor flight of 47 seconds. Not long? Try it!

John Pond and Jim Gerard tried to finish John's Aeron dirigible in time for an official flight, but ran into last-minute difficulties.

Electro-Mavin showed many interesting surplus electronic items. It's based in Los Angeles.

Pat (hidden by the cup-in-hand) and Monty Groves had many interesting nameplates and dash plaques, to scale.

First Place in R/C Gliders went to Bill Mueller's Mirage. He's the manufacturer of the Hi-Flight winch, from Hemet, California.

District 10 AMA Vice-President Jim Scarborough's much flown Korda Wakefield was the best competition rubber model.

from the cables (thread) holding the fuselage suspended underneath, and was ripped beyond repair when it hit the overhead beams and catwalks in the exhibit hall. And so it was up to Bill to prove the design concept.

On Sunday afternoon, Bill Watson launched his "Gold Football" and, flying faster than any of the other blimps (average walking speed), he completed 100-1/2 laps! He probably could have done more, but lost some helium during a hold period for some HTA attempts, and also ran out of show time. We had to close up at 5 p.m.! But a record was set, 40,200 feet (a little over 7.6 miles), and it may hold for a while.

What about the record? No, there is no official AMA or FAI category for these models at this time, but we hope we may have opened the door to the possibility. The records have been written up, documented, and forwarded to Guiness, however, and we look forward to their publication in the next book.

For their efforts in establishing these records, cash prizes were awarded as follows: Electric Power, HTA, Hal Cover, 23 min., 2 secs, $150.; CO_2 Power, HTA Bill Watson, 1 min., 7.7 secs., $150.; Rubber Power, HTA, Tony & Addie Naccarato, 47 secs., $150.; Longest HTA Flight Overall, Hal Cover, $250.; LTA Distance, Bill Watson, $300.

We'd also like to thank those who came out to give it a try: Larry Jolly, Bob Sliff, Bill Cannon, Mitch Poling, Tony Avak, Bart Hibbs, Ted Yee, and John Pond. Mitch Poling's "Electric Power" column will cover the model specifications in more detail. He describes the HTA electric models in this issue. •

Walt Schroder and Bob Rich "Look up" per instructions, from Walt's private booth.

This young spectator went wild every time Roland Boucher ran his Leisure Electronics car nearby . . . until we took this photo.

Anita Northrop's niece, Bobbie Torres, shows off the Uber Skiver knife to Bill Hartill, who will officiate at F/F World Champs.

The record setters (l to r): Addie and Tony Naccarato, rubber; Bill Watson, CO_2 and LTA; Hal Cover, electric and longest HTA flight overall. A total of $1000 went to these winners.

Hank Fasola, designer of the Hytork electric motor, prepares to launch Hal Cover's record setting "Electrolite III". Motor is turned on by radio at moment of launch.

INDOOR R/C *RECORD TRIALS*

By MITCH POLING . . . The first meet of its type ever held, the indoor record trials at the Pasadena IMS Show was a big hit with participants and spectators alike. You can bet it will be held again next year!

• Take a group of talented modelers, challenge them with indoor R/C, and what do you get? You get success; in fact, you get astounding success, considering that most of these modelers had to design and fly their models with no chance to try them indoors before the qualifying rounds on Thursday night, January 4th. The models and the pilots had to be right on the first try. There were nine entrants in the Thursday night qualification runs for the indoor record trials at the International Modelers Show in Pasadena, and six qualified, a two out of three success rate that amazed me. I had flown my R/C model indoors and I had to be quick on the transmitter to keep from hitting the walls, so I knew what the challenge was like. Those who qualified looked like they had been flying indoors every weekend! Two pilots did have trouble turning soon enough in the convention hall, which is about the size of six basketball courts side by side, and could not qualify their planes. This was too bad as one of the planes was a beautifully-built canard similar to the man-powered Gossamer Condor. A very interesting tandem monoplane had motor troubles and also did not qualify. It looked like a good design . . . perhaps next year! My plane did hit the wall once, but with hardly any damage.

After the qualifying was over, it was clear that Hal Cover's Electrolite III was going to be the top contender in the record trials on Saturday and Sunday. Hal drew on his extensive free flight background, and came up with an undercambered airfoil and beautiful slow flight. As Hal said, "It all depends on where you're coming from," and he was right. Bill Watson's design was also outstanding, and reflected his experience as the chief builder for Dr. Paul McCready's man-powered airplanes. His plane featured his own airfoil, designed on a computer, and resembled the sections used on the man-powered planes. He also used the same mylar covering used on the MPA's! Paul McCready was there checking out the action. I could understand his interest, as these models were testing the same problems he deals with; slow flight with minimum power. Tony and Addie Naccarato entered a plane that looked a lot like an FAI glider, and my own entry owed a lot to my R/C glider background.

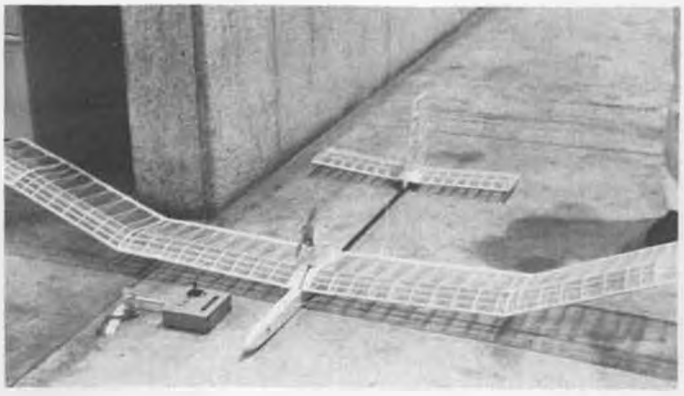
Hal's plane flew no more than 10 mph, while all the others flew quite a lot faster, perhaps 15 or 20 mph. The higher speeds put a lot of stress on the pilot; the planes were quite capable of flying indoors, but the pilot didn't dare get behind. This made the pilot the weak link, which in my case was a real handicap!

On Saturday morning, Hal Cover set the pace immediately with a beautiful 23:02 flight. About 18 minutes into the flight, his batteries started to drop power, and Hal did some very nice piloting to keep the plane in the air for another five minutes. His plane was just perfect in the air, with slow, graceful flight and smooth turns. Hal got a well-deserved round of applause when he landed the plane in his hand on the last lap. I tried my plane next, and only did a couple of laps. The plane had pitch instability, due to its short fuselage. Twenty-twenty hindsight tells me that this was a big mistake. Bill Watson followed with an excellent 12:50 flight, which was the limit for the sub-C cells in the plane. I tried a longer wing on my plane, and did well until I came

The Electrolite III with power pod detached, about 6 ounces of airplane in a seven foot span! Looks like typical pre-war F/F.

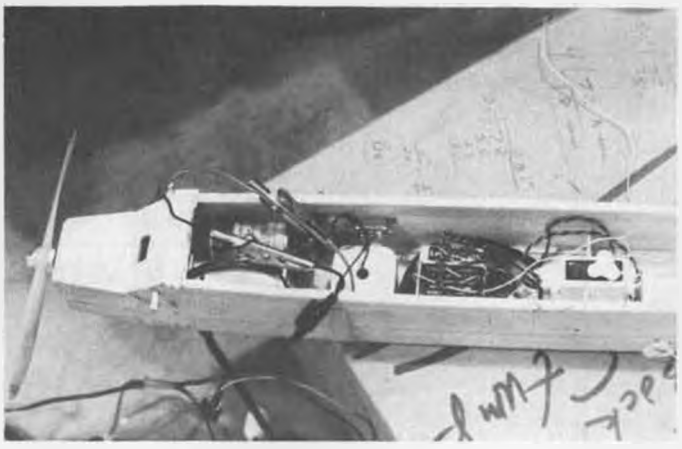
Ted Yee's model was largest and heaviest loaded. Flew well, but did not have the battery life to keep the load moving.

Larry Jolly's tandem wing model. Had good possibilities, but motor problems kept it from qualifying on Thursday night.



Bill Watson's model had two power pods; one for electric as shown, the other being four CO_2 engines rigged side-by-side, single tank.

Tony and Addie Naccarato, just after qualifying their electric powered model Thursday night, prior to record trials.



Power and radio unit in Tony's model. Note thread control cables attached to Cannon servos; one sticking out side of fuselage.

out of a turn. The G-load bowed the wing until the tips were almost touching, and the plane made an abrupt landing in the landing area, breaking the fuselage in two. Tony Naccarato followed with a very good flight of 11:43.3 with his plane, which was the fastest of all the entries.

Tony is a cool and sharp pilot though, stayed ahead of his plane at all times, and flew to the limit of the sub-C cells in the plane. That ended the flying day, with Hal's flight standing far above the rest.

I repaired my plane that night and added a second spar, which stopped the flexing problem. Bill Watson concentrated on the CO_2 airplane class and the lighter-than-air category, so he had no time to try for better times in the electric plane class. Saturday had been a good day for flying, but Sunday was bad; nobody could do well except the lighter-than-air craft. Hal tried to beat his own record, but had a power problem and could not hold altitude for more than a few laps. Tony, who had the best chance for a high time, also had power problems and could only do a few laps too. I flew and found that I had solved the wing problems, but the pitching problem remained, so I did a few laps and then decided that I wasn't a good enough pilot to hang in there, and landed.

After all was said and done, Hal's first flight was the best of the meet. He won $150 for the best electric plane flight and $250 for the longest flight of all the heavier-than-air categories. It was a well deserved win. Hal's plane clearly had it all together; the rest all had drawbacks as indoor planes.

Here are some of the facts and figures for a few of the planes, in case you want to try it out yourself. Hal Cover's Electrolite III had a 7-foot span, 8 square feet of area, and an undercambered wing. The motor was a VL 101 Hytork 48 geared to a 24:1 ratio, turning an 18 x 24 prop at 600 rpm. The flying weight was 21 ounces with 1.5 Ah cells. The plane flew on 3.6 volts, and used a Cannon radio for rudder, elevator, and motor. Hank Fasola designed the motor and gearing, and also a clever relay on-off switch for the motor that eliminates the need for a throttle servo. The overall wing loading was less than 3 ounces per sqaure foot. The photos show the overall layout of Hal's ship. I think this will be a very popular design for the indoor events in the future.

Bill Watson's plane had a 93-inch span, 12-inch chord, and an original airfoil designed by Bill on the McCready group's computer. This airfoil has a very

Continued on page 90

Mitch Poling's model had a fairly low aspect ratio wing . . . to say the least. Wing was too flexible, almost folded in flight.

Bill Cannon's plane had condenser paper covering on the tail surfaces, was damaged during test flights on Thursday night.

PHOTOS BY AUTHOR

HOLLY HAWK

By MIKE HOLLISON . . . A stand-a-mile-away, could-be scale model of the type of plane that was raced during the 1930's. Simple and quick to build, and will really move out with a .19 up front.

• "Holly Hawk" was inspired by the shoulder-winged racing planes of the 1930's, with their zero-visibility cockpits, spoked racing wheels, cowled in-line engines, and bulky fuselages.

The model was intended as a Sunday flier, of simple construction, nippy in the air, but no screaming bomb that the average pilot would have difficulty handling. It can be built with a bolt-down wing for cleaner looks; however, an alternative dowel and rubber band version is shown on the plan for those who prefer this method. Pilot and windscreen were omitted from the original model; these may be added if desired. Finally, the author's Holly Hawk was flown without the cowl attached; this made for a cooler running engine and made it easy to correct any problems with the power end of the model. The decision to fly cowled or uncowled is, of course, up to the builder.

WING

Notch the 3/8 x 1/4 trailing edges for the ribs, and epoxy the aileron hinges in place. Slot the trailing edge for the aileron horn bearing, but do not install at this point. Cut the rear wing brace from 1/16 ply and epoxy in position on one of the trailing edge strips. Next, cut sufficient wing ribs from 1/16 and 3/32 sheet balsa, and cement ribs W1 and W3 to the trailing edge. Cement the 1/4 sq. leading edge to the ribs, and add the 3/16 sq. wing spars, filling in the gap between the spars with 1/16 balsa. This sheeting should be added between the tip rib and rib W1 closest to the center-section; the gap between the spars from W1 to W4 should be filled with 3/16 balsa sheet.

Cut the main wing brace from 1/8 ply, slot for ribs W2 and W3, and epoxy in position. Add the 1/8 balsa gussets at the tip and leave to dry while you repeat the procedure for the other wing panel.

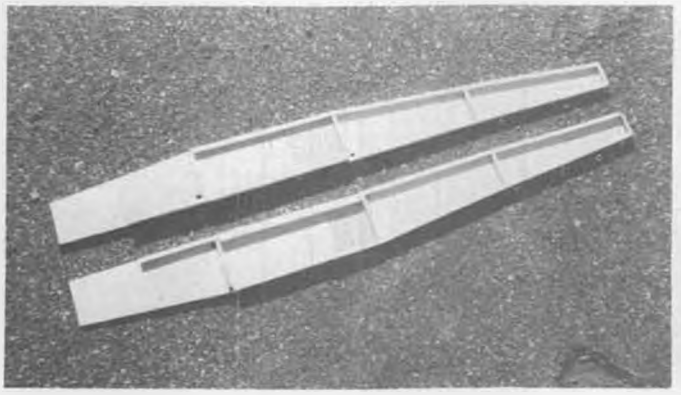
When both panels are dry, epoxy the two together by means of the ply wing braces, and glue the pieces of ribs W4 in place. A length of 1/16 balsa glued crosswise between ribs W3 forms the rear wall of the aileron servo box. The wing should now be sheeted with 1/16 balsa as shown on the plan, and the cap strips added, top and bottom. Then, cut two wing tips from 1/4 soft balsa sheet and cement in place; add the 3/16 sq. spars, and cover the tip leading edges with 1/16 balsa. Remove some of the center-section sheeting for the servo, slide the 3/32-inch diameter wire aileron horns into the bearings, and epoxy them into the wings. Add the center-section trailing edge, which is cut from 1-1/4 x 3/8 tapered stock, making sure that the control horns are free to move.

At this point, it will be necessary to decide whether the wing is to be bolted to the fuselage or held on by means of rubber bands. If bolted, the wing must be drilled at the leading edge along the centerline to take the 3/16-inch diameter spruce locating dowel, which should be epoxied in place after the wing has been covered. A strip of 1/16 ply should also be epoxied to the trailing edge as shown, and drilled for the 3/16 x 1-inch nylon wing bolts. When this is done, cut two pieces of 3-inch wide fiberglass tape and glass over the center-section, top and bottom. (If the wings are to be secured by means of rubber bands, omit the locating dowel and ply strip, but glass the wing as described above.)

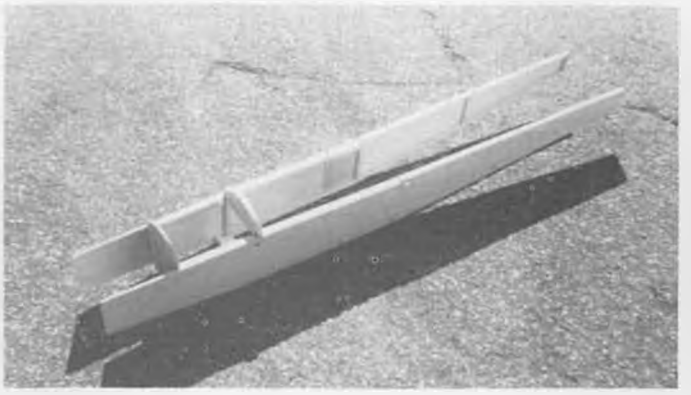
Cut out the tape for the aileron servo, and sand the whole wing smooth. All that remains now is to make the ailerons from 1-1/4 x 3/8 tapered stock, slot them

An engine inspection is part of any preflight inspection, as GI Joe demonstrates. Mike did his Holly Hawk in blue and white, flies well with a .19. More power is not needed or recommended.

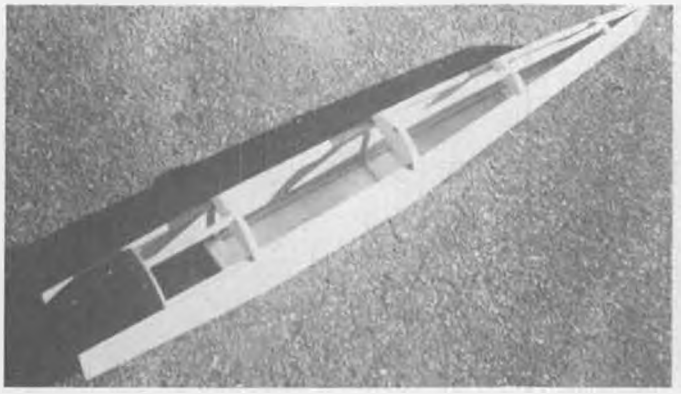
Mike Hollison, President and Chief Pilot of Hollison Airlines, Ltd., and his Holly Hawk.



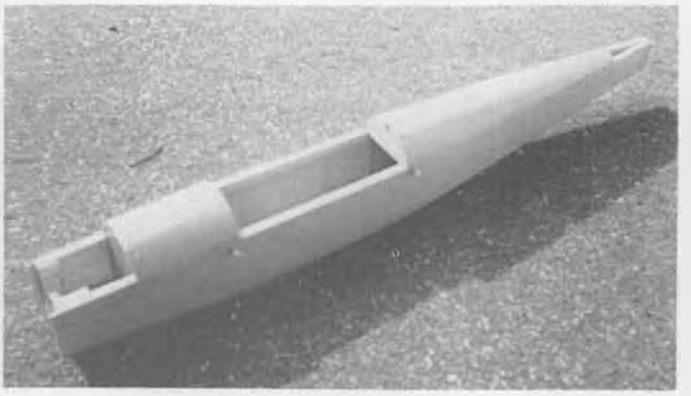
Basic fuselage sides, ready for joining. Plywood doublers extend back to wing t.e. All straight lines make it easy to build.



Formers F1 and F2 in place.



Tail pulled together, remaining formers glued in place, and bottom sheeting added.



Basic fuselage structure complete. Drawing shows optional wing hold-down method, using nylon bolts.

for the hinges, and then put them aside, ready to install after covering.

FUSELAGE

The fuselage is made by cutting two side panels from 3/32 balsa sheet and two doublers from 1/32 ply. Epoxy the doublers to the inside of each fuselage side, and cement the 3/16 sq. stringers and spacers in place, as shown on the plan. If the wing is to be secured by rubber bands, drill holes for the 3/16-inch diameter retaining dowels. Cement the 3/8 x 3/16 wing saddles in place and put aside to dry.

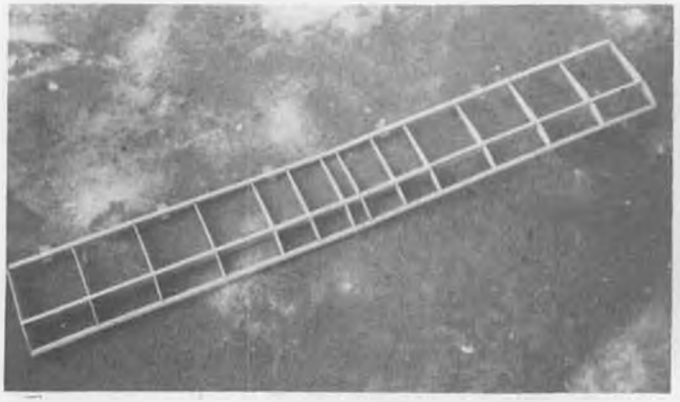
Now cut engine bulkhead F1 from 1/8 ply, and drill for motor mount, throttle pushrod, and fuel feed outlets. The motor mount blind nuts should be epoxied in place at this point. Cut the remaining formers F2 to F5, remembering to drill F2 for the wing locating dowel if necessary, and notch formers F2 to F4 for the 3/16 sq. top spar. Cut the landing gear mounts from 1/4 ply and, using the rear mount as a cross-brace, epoxy the fuselage sides to F1 and F2. Cement the remaining formers and 3/16 sq. balsa spacers in place, epoxy the forward landing gear mount in position, and allow to dry.

Cement the fuselage top spars fore and aft of the wing bay, and sheet the bottom of the fuselage with cross-grained 3/32 balsa. Install the 4 oz. fuel tank, and sheet the curved fuselage top with 1/16 balsa. Next, slot a piece of 1/16 ply for the tailwheel bracket and epoxy in place; then add the 3/16 balsa stabilizer floor. Build up the nose section with 1/4 sheet balsa ready for carving, and sheet the bottom of the fuselage between the landing gear mounts with 1/4 balsa. Add two pieces of scrap balsa immediately behind F2 to conform to the curve of the underside of the wing leading edge, and if the wing is to be bolted onto the fuselage, epoxy the pre-tapped 3/8-inch hardwood triangles each side of the cockpit as shown on the plan.

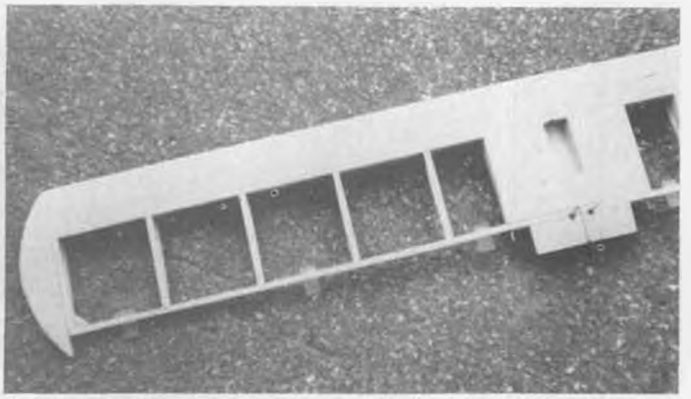
If your Holly Hawk is to be flown with the cowl attached, cooling slots should be cut on either side of the fuselage nose as indicated, with possibly an additional cooling vent in the bottom of the fuselage just ahead of the forward landing gear mount. Shape the cowl from soft balsa, ensuring that there is an adequate air intake at the front of the cowl, and that the top of the cylinder head is sufficiently exposed. You may have your own method of attaching the cowl to the fuselage; however, a simple way is to spot glue the cowl in place, once the aircraft has been test flown and any necessary alterations made to engine offset, fuel feed, etc.

The landing gear is bent from 1/8-inch

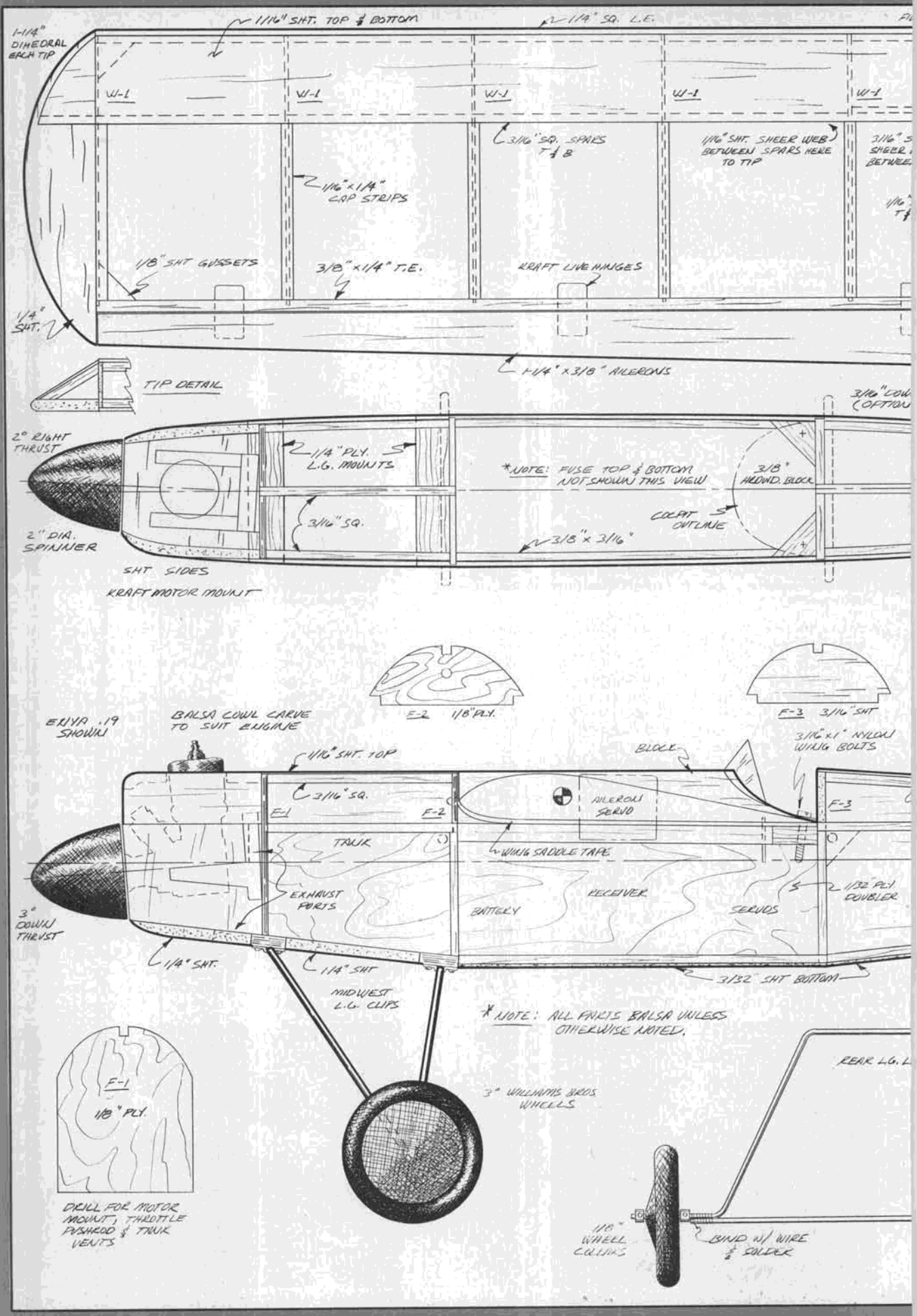
Continued on page 78

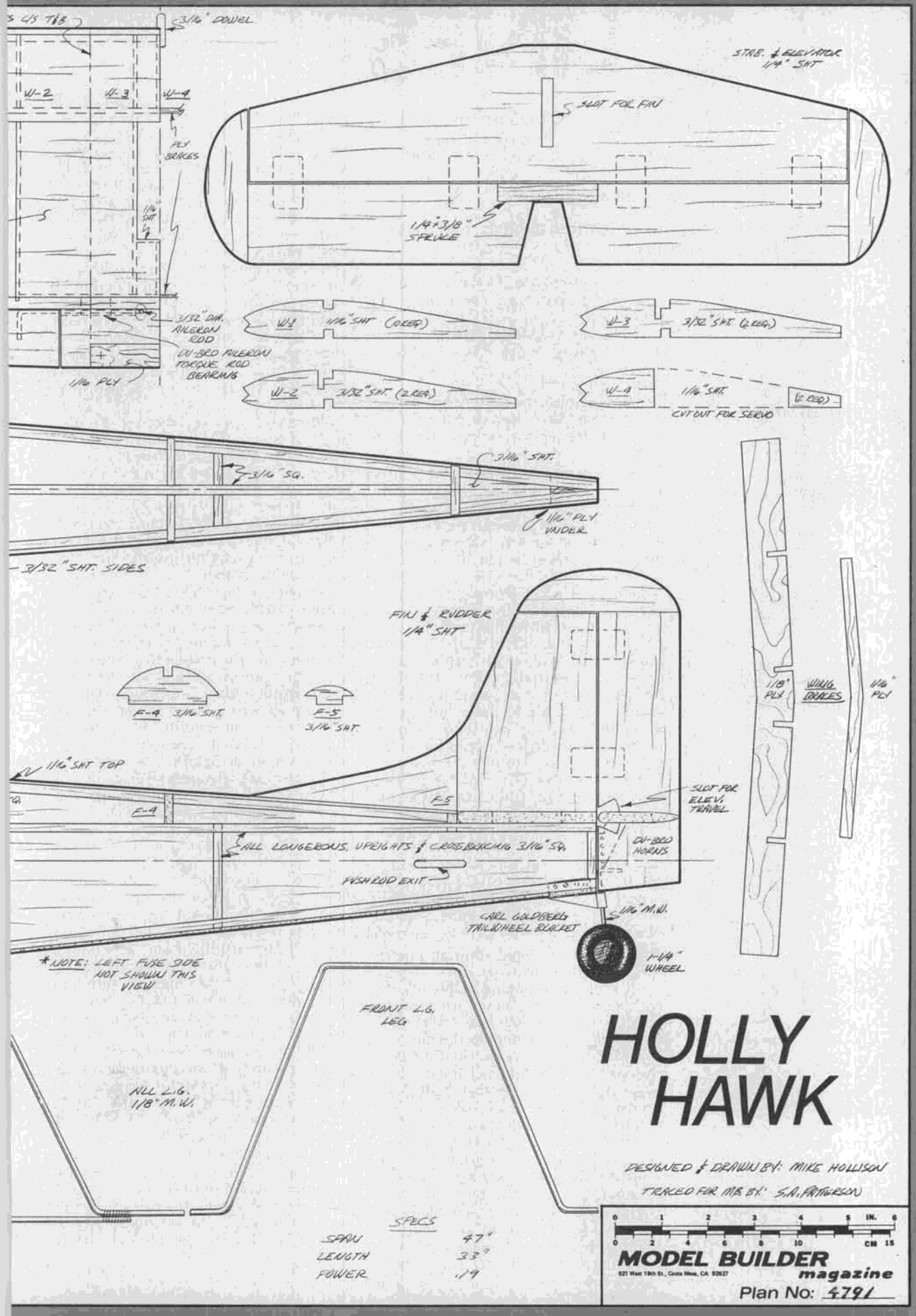


Basic wing structure is about as simple as you can get. Has spars top and bottom, webbing between.



Completed wing, ready for ailerons. Kraft live hinges are epoxied in place. Use of l.e. sheeting makes for a strong wing.


1-1/4" DIHEDRAL EACH TIP
1/16" SHT. TOP & BOTTOM
1/4" SQ. L.E.
W-1
W-1
W-1
W-1
W-1
3/16" SQ. SPARS T & B
1/16" SHT. SHEER WEB BETWEEN SPARS HERE TO TIP
1/16" x 1/4" CAP STRIPS
1/8" SHT GUSSETS
3/8" x 1/4" T.E.
KRAFT LIVE HINGES
1/4" SHT.
1-1/4" x 3/8" AILERONS
TIP DETAIL
2° RIGHT THRUST
1/4" PLY L.G. MOUNTS
*NOTE: FUSE TOP & BOTTOM NOT SHOWN THIS VIEW
3/8" HARDWD. BLOCK
COCKPIT OUTLINE
3/8" x 3/16"
3/16" SQ.
2" DIA. SPINNER
SHT SIDES
KRAFT MOTOR MOUNT
E-2 1/8" PLY.
F-3 3/16" SHT
ENYA .19 SHOWN
BALSA COWL CARVE TO SUIT ENGINE
1/16" SHT. TOP
3/16" SQ.
E-1
F-2
TANK
EXHAUST PORTS
BLOCK
3/16" x 1" NYLON WING BOLTS
AILERON SERVO
WING SADDLE TAPE
F-3
RECEIVER
BATTERY
SERVOS
1/32" PLY DOUBLER
3° DOWN THRUST
1/4" SHT.
1/4" SHT
MIDWEST L.G. CLIPS
3/32" SHT BOTTOM
*NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.
F-1
1/8" PLY.
DRILL FOR MOTOR MOUNT, THROTTLE PUSHROD & TANK VENTS
3" WILLIAMS BROS WHEELS
REAR L.G. L
1/8" WHEEL COLLARS
BEND W/ WIRE & SOLDER



HOLLY HAWK

DESIGNED & DRAWN BY: MIKE HOLLISON

TRACED FOR MB BY: S.N. PATTERSON

SPECS

SPAN	47"
LENGTH	33"
POWER	.19

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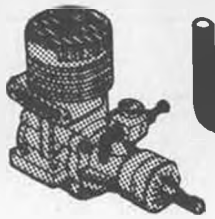
FUEL LINES



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Send in your questions, relative to glow or ignition engines, and these experts will give you the correct answers.

ALDRICH

• We'll start this month off with a letter from one of the foundation people in our hobby/sport, the Sport Flier.

Dear George: First, the "Fuel Lines" Column in **Model Builder** *is excellent. I feel that* **Model Builder** *has risen to number two in the R/C model publication field.*

I have a couple of questions and comments.

I have started in R/C first, using 1/2A engines and planes. Then I purchased an O.S. .10 FSR R/C and have ordered a K & B .19 R/C which I plan to grow into. I have been using K&B 1000+, as it doesn't varnish up my engines as does most other fuels. (I always use a muffler.) I just bought a can of your Magnum 25 to try. I have broken in the .10 on K&B 500+ and plan to run the 25% in it when broken in. It would sure simplify my field box if I used one fuel for the three type of engines. Would using your Magnum 25 in all three engines present any problem?

Secondly, it seems to me that engines, like radios, are reasonably complicated products requiring sophisticated equipment to determine compression, run-out, clearances, etc. As there are radio service centers all over the country, it would appear to me that an engine service center would fill a need. I would imagine most people run their engines until over the hill before they rebuild them themselves with only an assumption of what is wrong. I have appreciated the service Cox offers, especially as a beginner. If I don't know what's wrong with the engine, I send it to them to service. I am not aware that any other manufacturer offers this service. I was very hesitant to purchase the O.S. .10 FSR because parts were available from only one source. It's up to me to determine what problems might exist. I figure the K&B offers me local parts. Does this idea make any sense? Why not send in engines for their once-a-year service like we do radio equipment?

I believe it was in your column in a recent issue where it was mentioned to use silicone tubing and a washer to help in setting needle valves on the Cox reed valve engines. This idea really works; I've used it on all my engines. It also works on the Tee Dee series. I just slip a piece of tubing over the threads on the needle valve and it eliminates air leaks completely.

I have enclosed a stamped, self-addressed envelope for your convenience.

Tell the guys at **Model Builder** *to keep up the good work. Yours, Steve Benjamin.*

Dear Steve:

Thank you for the kind words on the column and **MB** . . . I agree, except it was No. 1 with me before I started writing for them!

The Magnum 25% will run fine in all of your engines; it's just that you are spending more for the 25% to use in the K&B .19 than you probably need. Unless you are on the underpowered side and need extra power, 5% to 10% is usually plenty of nitro for .19 and up size engines and sport flying. It is best to break-in lapped piston engines using a fuel that contains some castor oil . . in particular, the .35 and smaller O.S. engines that are set up rather free in order to eliminate a long break-in period. The cast iron piston is "green" and it is desirable to get it hot several times, to grow it to give a good compression seal. I ran into this problem a couple of years ago when testing the Magnum Power Fuel in an O.S. .35. After 2 or 3 runs the compression was terrible, but the piston showed little or no wear. The engine just wasn't getting hot enough to grow the "green" piston on the new fuel. The solution was to run about a quart of old style castor-base fuel through it on a small prop (7x6 cut from a 9x6 Top Flite Super M) in short 2-minute bursts, allowing it to cool between runs. That engine has been running fine on Magnum Power 5% ever since.

All of the U.S. engine manufacturers offer a complete repair service. Fox has a flat rate overhaul policy, whereby if you really dork an engine into the concrete and total it, there is a maximum charge that you will have to pay, which is most reasonable. I believe that K&B has a similar policy, and all have full-time employees to repair engines sent back to the factory. As to the imported engines, I'm quite sure such organizations as MRC, World Engines, Shamrock Competition Imports, Bill's Miniature Engines, etc. all have statewide repair service. The way our dollar is losing on the foreign market makes any U.S. product much more attractive today.

The tubing over the needle valve came from Dale Kirn or Joe Klause, I believe, and it works on some larger engines, too.

Thank you for writing, and if I can ever be of any help, don't hesitate to write again.

* * *

One other thing to consider when using fuel that contains a higher percentage of nitro is the chance of burning the piston if you get an over-lean run. We've said it before, but it's worth repeating: Many engines are not set up to run on higher nitro fuels. With many engines, when fuel containing over 5% nitro is used, a definite crackle or oversensivity will be noted. If more power is really needed, then many times an extra head shim will be needed to stop pre-ignition and also smooth out the idle. So many times we have seen such efforts come to grief, when someone thought they needed extra power, only to have inconsistent, maddening results when they used a fuel with too much nitro.

The exact opposite can also be true with an engine that is of the true racing class, by an American manufacturer. For example, an engine such as the K&B 6.5 would not only be unimpressive if run on 5% sport fuel, it could be hard to keep running under certain conditions. Racing is an expensive game, and if you buy a racing engine, expect use 25% nitro fuel or higher.

To change the subject a bit, we had a phone call the other day (why don't you modelpersons write?), asking about the bearings in an engine. The question was, "When I turn the engine over and feel a slight bumpiness, is this O.K.?" As usual, there is not a black and white, right or wrong answer. Like, "Do you mean when the engine is cold?" Many times a bearing can have compounded tolerances. When the bearing is a *tight* shrink fit in the crankcase and the crankshaft is a *tight* fit to the bearing inner race; this can produce that lumpy feeling. Another thing that can give a false indication of a bad bearing is the bearing retainer "falling down". A bearing retainer is designed to hold the individual balls in place during operating rpm. Sometimes, for any of several reasons, this retainer can "fall down" on the balls, toward the inner race. If it's a racing engine and you are in doubt, change it! For other engines, here's an easy check to see if the bearing(s) is really bad. After making certain everything is clean, and with an old prop bolted on, put a few drops of oil on the bearings, then set the engine on top of your kitchen gas stove for 45 seconds to one minute. Set it on the grate in an upright position so that it heats mostly the bottom of the crankcase. After the case has been heated as described, pick the engine up in a rag and spin the prop around. If it bumps of feels bad, tap the end of the shaft smartly with a mallet or small hammer. If the bearings still feel lumpy, replace 'em. Simple, ain't it! •

KLAUSE

• This month marks the start of a series of articles explaining how to do elemen-

tary tuning of Cox 1/2A engines . . . both Tee Dee and reed valve. Before beginning, however, it is important that you realize that there's a pretty good possibility that you will ruin some engine parts even if you closely follow the instructions. This is because there is a touch or "feel" involved in several of the procedures. A good example of this is lapping a cylinder and piston. The "feel" of when they're right comes from years of experience, and no amount of descriptive words can fully substitute for that experience. Nevertheless, if you're very careful and patient, you can do a creditable job. Want to give it a try? Here's how to go about it.

A variety of common tools and materials will be needed, and in general, I'll comment on them as the need arises. However, there are several things that you should get together at the outset. They're just basic cleaning materials, but you'll find them to be invaluable now and in the future. Because one of the brushes is a little unusual, a photograph is included to help you identify it. Here's the list of basic items:

Test tube brush
Child's small toothbrush
Medium toothbrush
Bridge and clasp brush
000 steel wool
Liquid detergent

The test tube brush can usually be found in a hobby or toy shop that carries Perfect brand chemistry set equipment. All the tooth and denture brushes normally are found in a drugstore, and the 000 steel wool should be available from a good hardware store.

ENGINE DISASSEMBLY

OK, let's assume that you have a brand new T.D. .049 or .051 engine. First, completely disassemble the engine using the two Cox No. 1530 wrenches which come with the engine. Be sure to use the proper part of the wrench on the flats of the top fin of the cylinder when you remove it. Any other method in all probability will ruin the cylinder. The only unusual part of the entire engine disassembly will involve removal of the propeller drive plate. This aluminum plate is press-fitted onto splines on the front end of the crankshaft. The best method of disassembly is to use an arbor press to drive the crankshaft out of the plate. However, since most of you may not have access to a small arbor press, simply use what's already available on the engine. With the small spanner portion of the 1530 wrench, carefully unscrew the aluminum carburetor housing retainer nut as shown in an accompanying photograph. As you do this, it will gradually force the drive plate off the front of the crankshaft. Once this plate is off, the entire crankcase assembly will come apart easily. Now is the time to carefully inspect all parts of the engine. Use a strong magnifying glass and look for obvious flaws, such as a tiny crack in the plastic carburetor housing, etc. Although the quality control of Cox engines is exceptional, a flawed part is always possible. If you find one, replace it. Don't waste time with questionable parts.

Assuming that everything checks out

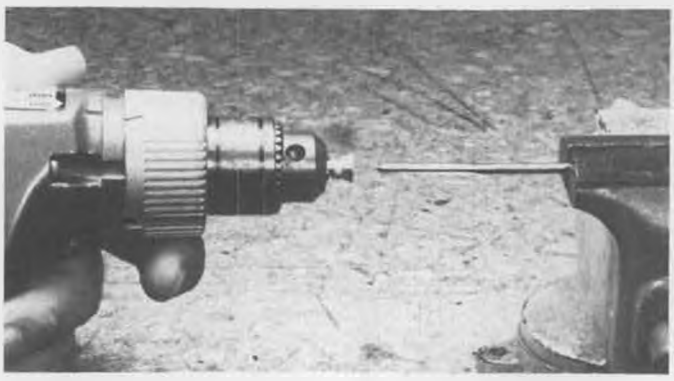
Cleaning tools required to do basic I/2A engine rework (l to r): bridge and clasp brush, two toothbrushes, and test tube brush.

well, carefully put all of the parts in a small box or container to guard against inadvertent loss. It never ceases to amaze me how often small parts can disappear off the workbench and become lost on the floor. Be especially cautious whenever you handle the cylinder and piston. It's best to keep the piston in the cylinder to protect it from any nicks or scratches. Above all, never force the

Continued on page 97

By unscrewing the carburetor housing nut, the prop drive plate is forced off the splines of the crankshaft.

Lapping the case to the crankshaft using a variable speed electric hand drill. Procedure fully described in text.



Reaming a venturi by holding it in a variable speed drill. This is an easy operation to botch up, so be careful.

A custom enlarged venturi and pressure backplate. Pressure backplate is preferred over the pressure tap on the carb housing.

Flight INSTRUCTOR

Conducted by
DAVE BROWN
8534 Huddleston Dr.
Cincinnati, OH 45236

As the thermometer outside reads about -10°, I find it somewhat difficult to really get into writing a column on flying techniques this month, so I think I'll write about a subject on which I've gotten a bunch of letters: coupled flaps. Most of the questions I've received have been of the "When, How Big, How Much, and Why" type, so I'll try to answer these questions.

Coupled flaps/elevators are not new, as they have been used on control line stunt airplanes for more than two decades, but until recently, they have been ignored by the R/C fraternity. Although I don't think anyone claims to have the ideal set-up or all the answers to the myriad of questions possible pertaining to coupled flaps, the present state of the art has us using flaps of about 2-1/4 inches by 6 inches, located near the root of the wing and moving approximately 1/2 inch down when up elevator is applied and approximately 1/2 inch up when down elevator is applied. That answers the "how big" and "how much", which leaves us with the "when" and "why". Theoretically, there are very few situations where the coupled flaps would be a disadvantage if the control system sensitivity were adjusted accordingly. In practice, however, most users have found that the ability to couple/uncouple the flaps with the elevators in flight is advantageous. This can be accomplished either in the transmitter by paralleling channels, or by using a switcher in the airplane, which uses yet another channel to effectively switch plugs in the airplane.

I have found the flaps to be advantageous in the takeoff, snap roll, spin, and landing maneuvers, yet surprisingly, I have not found them to help in the square maneuvers, as the airplane seems too jumpy. There are a lot of unanswered questions on flaps, a few examples of which are: Should the flap servo be faster or slower than the elevator servo? Would more flap travel and less elevator travel be better or worse? And most importantly, are the flaps worth the penalty in weight and complexity involved in installing them? I haven't decided myself yet, but after using them for one year, I feel that they do not deter performance and may be helpful in some situations. I am installing flaps on my new airplane and may be better able to answer these questions after next season.

The first letter this month comes from Bennie Hancock, but I lost the envelope and can't say where he is from. Sorry, Bennie.

Dear Dave: I hope you will go into this question in great detail. What is the full potential of three-channel equipment? I am about six months into the hobby and have a Falcon 56, K&B .35, and a three-channel Futaba.

Some of the questions I would like answered are: Why not substitute ailerons for rudder? Why not make control surfaces bigger? Why not use two servos for coordinated aileron and rudder control? Why not connect flaps and elevators like control line planes? I hope you don't think these are "why is the sky blue" questions.

Enjoy reading your column every month and I am anxious to hear your advice. Bennie Hancock.

Dear Bennie: The potential of three-channel equipment is limited primarily by the imagination of the user. By coupling the rudder with the aileron, almost any four-channel airplane can be flown not only successfully but probably as well as 95% of the models are flown with four channels, as most pilots don't use the rudder anyway, except for ground handling. I have seen a rudder/elevator/throttle airplane (the old class II) perform the pattern almost as well as a full-house pattern ship, and I believe, if memory serves me right, that one year when class II was held at the Nats, the winning score in class II was higher than in class III using the same pattern! My answer to all of your other questions except one is "Why not?" These ideas all have potential and should work out well. The only one to be real careful about is enlarging the control surfaces too much, which could lead to flutter.

Dear Dave: I don't have any problem trimming a plane out until it comes to rudder. Of all the articles I have seen, people seem to ignore it. All my planes seem to have this problem: in order to track properly through inside loops or climb straight up from the inside, I require about 1/16 inch left rudder. Then they will track perfectly, but once I do inverted maneuvers, the plane will not track unless I trim in right rudder. Should the rudder be left in neutral and adjustments made by wing tip weight or engine thrust adjustment? In straight and level, it seems to track fine whether upright or inverted.

All aileron gaps are sealed and the plane is balanced laterally. I can't say for certain if, on previous planes, I would require rudder trim in the same direction, but the problem would be the same. I am presently flying a Dirty Birdy with pipe and side-mounted engine. Previous planes have been Phoenix 7, Mach I, Eyeball, Banshee, etc., and with none can I trim properly to track straight through insides and outsides.

If one requires aileron adjustment to fly straight and level, should you adjust only one aileron or both? If only one was adjusted, would it not cause a difference between inverted and upright flight? Dave Smith, Dartmouth, N.S.

Dear Dave: The problem you have is a common one which can be caused by many things. Assuming that the wing airfoils are the same on both sides and that the ailerons are sealed as you said, the first thing I'd look for would be a warped stab or the elevators traveling unequal amounts (too much throw on the right elevator). The second thing I'd look for would be excessive right thrust, as compared to the plane. Now, if you don't find any of these problems, or if correcting them doesn't cure the basic problem in loop tracking, then I'd try the following, in order. First, try left tip weight, 1/4 ounce at a time. This will probably cure the problem, but if it doesn't, try increasing the throw of the left elevator. Next, try decreasing the right thrust, but don't go beyond 0°. If all this fails to cure the problem, do just what I do: try anything until something works!

Dear Dave: Why do so many planes seem to fly well without sealing the hinge line gaps? I tried it on a 15-500 and found no noticeable difference.

In knife-edge, why do some planes tend to roll out? How is this corrected? In some of the current designs, specifi-

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Bob Oslan, of the SAM 49'ers, did a beautiful job on this Scientific Commodore. Even though it's R/C (Futaba), the orange silk covering keeps grumbling among O.T. purists down to a minimum. Model spans six feet, takes off easily at half power with Enya .29.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• The Easterners will die when they read this report of the very successful SAM 49 Texaco contest held on December 3 at Taft. Although Taft is regarded as the mecca of free flight, a considerable number of Old Timer radio control contests are held there also.

This day, the radio boys had Taft all to themselves, and a beautiful day turned out despite the very frosty beginning. With temperatures dropping below freezing during the night, the day warmed up to a surprising 60 to 65 degrees. Thermals were weak, but those fellows who found them and knew how to exploit the lift were the big winners.

Point in case was the spectacular soaring exhibition put on by Phil Bernhardt. With Pond sitting in first place with a flight of 44 minutes (12 minutes ahead of the nearest competitor), Phil took off with his Super Cyclone powered Ehling Contest Winner. Promptly hitting lift, he allowed the model to drift downwind following the thermal. Having acquired enough altitude downwind, he flew upwind to find lift. At 28 minutes, Phil looked like a goner!

Finding a small thermal at about 200 feet, Phil flew the Ehling literally on a wingtip until he had again acquired enough altitude to follow the thermal. Upon bringing the model back again, the 49 minutes was more than enough to capture the special "Bent Prop" Trophy so kindly donated by Jack Jella of Air Trails, Inc.

This trophy, now starting to acquire a little age, was actually made from a propeller that was damaged by a Piper Comanche in a belly landing. Jack salvaged the bent propeller, had it polished and mounted on a mahogany base. What a neat trophy! This trophy also represents the last meet of the year to determine the top flier either from

Jack Tisinai gives his Korda the heave-ho at Chicago Aeronuts O.T. meet at Bong Field.

Mass launch of twin pushers at Bong. L to r: Tim Banaszak, Don Lockwood, and Jim Noonan. Bong pics by Chuck Markos.

Bob Warmann can't bear to look as George Gordy winds the motor in his Gollywock at Bong Field. Both are Chicago Aeronuts.

MB's very own Phil Bernhardt cleaned up at the last SAM 49'ers R/C Texaco with this Ehling Contest Gas Model. Powered by Super Cyke, controlled by Futaba. Model has full-flying tail.

Ross Thomas flew his scaled-up Shereshaw Eaglet at the SAM 49'ers Texaco. All that chrome Monokote made it the most visible model at the meet! Flies with O.S. .60 4-cycle.

the North or the South.

This year, before Bernhardt's remarkable flight, SAM 21 (the Northern California club) had four people sitting in the first four places. Looked like a sweep again, and the trophy was to be retained by the North (Von Konsky and Tulp being the 1976 and '77 winners). However, there were enough lovely trophies and merchandise prizes for all, so it really turned out great for everyone.

One hilarious highlight of the day occurred when "old weakeyes", Nick Nicholau, flew his new PB-2. Much to Nick's surprise, the model flew quite well. As a matter of fact, it flew so well, it flew out of sight. Then the fun began! Miriam Schmidt spotted a gleam in the sky some five minutes after Nick started to spin the model down. She was handed the black box until she, too, lost it. Then Loren Schmidt saw it and was handed the box. Actually, with the aid of five handlers, the model was finally brought back after a very hair-raising flight of 25 minutes. Whew!

The writer found out that Phil Bernhardt has learned from his boss, Bill Northrop, as the columnist clocked Northrop's Powerhouse for a motor run of one minute, fifteen seconds for a not too shabby flight of 20 minutes plus! Bill has the technique but failed to find lift of any great sort. Still a great competitor!

As a sidelight event, Bob Sliff staged an electric event sponsored by Bob Boucher, of Astro Flight. The event was the standard two-minute motor run with five-minute flights. Most of the boys are using Playboy Cabin designs, which seem to suit electric power eminently. Best electric combination seems to be an Astro Flight 10 motor with the Astro 15 battery pack. The reader might compare for himself the winners and their models:

1) Don Bekins (Playboy Cabin)
2) Bob Sliff (Long Cabin)
3) Ross Thomas (Long Cabin)

The contest was definitely livened up by the parachute club which uses the adjoining field. It was quite a spectacle to see about eight parachutists jump out among four Texaco models and pop their colorful chutes. The sight of the combined models and parachutists was one not to be easily forgotten.

The real piece de resistance of the meet was the barbecue put on by the Bernhardts. With real hot hot-dogs and cool beer, it was a treat hard for anyone to resist. Of course, for the teetotalers, there was soda pop available. We need a few more meets like that!

While passing out the kudoes, you have to hand it to Otto Bernhardt and his assistant, Bill Cohen, for a great job of officiating. The writer did note one precedent that was set when Ross Thomas, test flying Bob Laviguer's beautiful new Buccaneer, experienced radio problems and augered into the Bekins/Tulp group of models. Upon discovering his KG-2 was damaged and unable to fly, Tulp demanded and received his entry fee back. The columnist can readily sympathize with Karl's problems, but in the big meets such as the SAM Champs, Nationals, etc., once you have put up your money, there is no way of getting it back. Call it what you want, breaks of the game, whatever, this is the procedure, as any entry withdrawals at a large contest only tends to add to the already confused picture of a contest.

Here's what the 1978 SAM 49 Texaco contest results looked like:

1) Phil Bernhardt (Ehling)	49.17
2) John Pond (Dallaire)	44:17
3) Don Bekins (Lanzo)	34:00
4) Ted Kafer (Flamingo)	30:00
5) Karl Tulp (Dallaire)	28:00

SATURDAY CONTEST

Ever want to fly your models on

Nick Nicholau's brand-new PB-2 almost got away at SAM 49 Texaco . . . see text. Flies well with O.S. 4-cycle.

Ron Doig shows off one of the best-looking Flying Quakers we've seen in a long time. Flew at SAM 49 Texaco meet at Taft.

Dave Brodsky's Schmaedig stick model sure sounds (and smells) different with a Drone diesel in the nose! Design won't fly as a F/F.

Bob Laviguer's scaled-down Long Cabin placed 2nd in Electric at SAM 49 meet. A popular choice for O. T. Electric events.

1979 WESTERN OLD TIMER F/F SCHEDULE

February 24, 25 — Vamps Annual	Las Vegas
March 10, 11 — SCIFS Kickoff	Taft
April 8 — Scamps Texaco & Brown Jr. Only	Taft
April 21, 22 — SAM 31 S.W. O.T. Annual	Phoenix, Arizona
May 26, 27, 28 — U.S. F/F Champs	Taft
June 23, 24 — Bakersfield Annual	Taft
August 19 — Scamps Ohlsson 23	Elsinore
September 29, 30 — Amps Stockton O.T. Annual, North/South Challenge	Fresno
*October 7 — SCIF Texaco	Taft
November 17, 18 — Scamps Annual	Taft
December 9 — Scamps O.T. Wakefield & Rubber	Elsinore

*This date could be superseded by the International FAI Champs. In that case, the SCIF meet will shift to October 14.

Saturday and make points on Sunday by taking your wife out on that day? Well, the President of SAM 21, Bill Squires, feels quite keenly about this and finally put on a meet that he could attend (he goes to church on Sunday).

Surprisingly, for a club meet, it drew contestants over 300 miles distant. Best part of all was that the sun finally came out after a most unusual prolonged cold spell. Those fellows who failed to fly before 11 a.m. ran into a light breeze that had a chill factor that numbed your hands to the box on long flights. The old man caught the boys napping on that one, as lift was noticed as early as 10 a.m.

No contest would be complete unless there was an excellent free flight demonstration. This time it was Jim Kyncy's Lanzo Record Breaker that was launched with the receiver turned off! Luckily, the design was adjusted to fly so it gradually flew off towards the hills in ever-dwindling circles. Luck again was with Jim, as they successfully retrieved the model with no damage, and promptly flew the Lanzo in the Texaco Event.

Actually, the meet was not all Old Timers, as Dave Bruner showed up with a Dragonfly (**Model Builder,** Feb. '76) as designed by Tex Newman, SAM 21 member. Surprisingly, for a little-publicized meet, quite a few spectators showed up at Hill Country, the site of the contest.

This beautiful area, used primarily to stage outstanding scale contests, is a natural for Old Timers and their relatively quiet operation. Several more meets, to be held again at Hill Country in 1979, are planned by SAM 21. Results of the meet looked something like this:

TEXACO

1) John Pond (Dallaire)	20:30
2) Jim Kyncy (Lanzo)	18:48
3) Bob Von Konsky (KG-2)	18:17
4) Hal Cullens (Dallaire)	12:52
5) Ted Kafer (Flamingo)	9:10

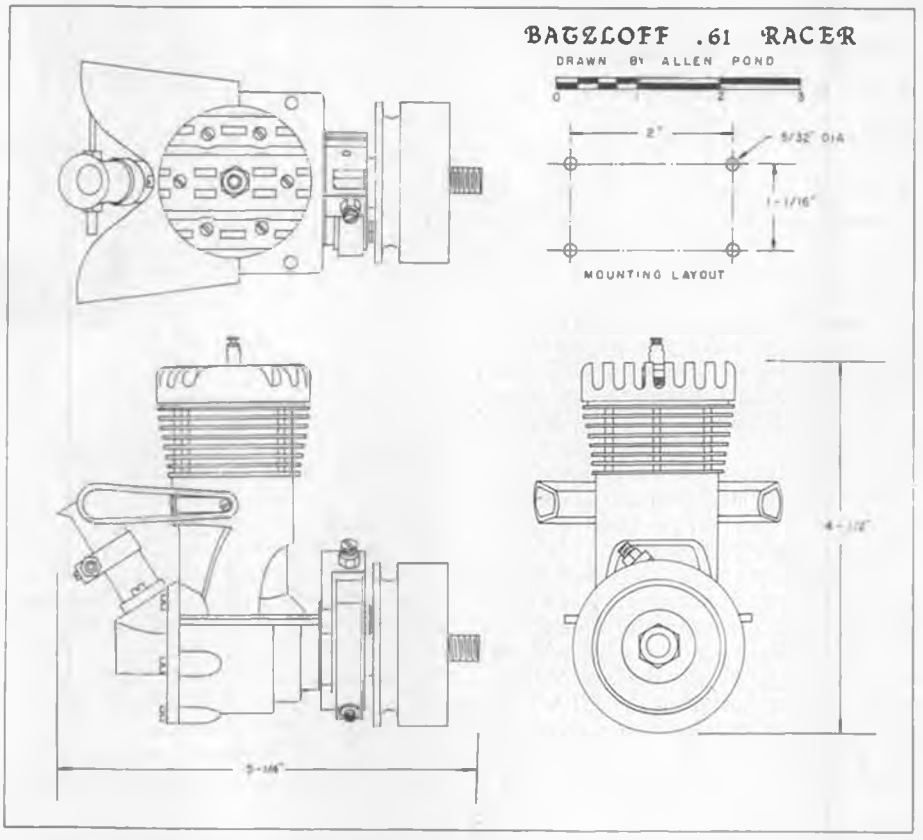
LTD ENGINE RUN

1) Bill Squires (Playboy)	970 pts.
2) John Pond (Playboy)	684 pts.
3) Paul Forrette (Long Cabin)	642 pts.
4) Dave Bruner (Rambler)	450 pts.
5) Dave Brodsky (Playboy)	420 pts.

.020 REPLICA

1) Ted Kafer	7:35

Bob Sliff, of Hobby Horn, ran the Electric event at the SAM 49'ers Texaco. Besides being event director, recorder, and organizer, he also competed! Event was won by Don Bekins, of SAM 21.



Good thing Thanksgiving is over; this ancient turkey might not have gotten away! An original design, circa 1940, by the Williams brothers, Larry (left) and Granger.

Rolf Norstog, of Lakewood, Colorado, sent in this photo of his Orwick "Speedcraft" low wing F/F ship, powered by a Herb Wahl Hurleman .48. Photo by Rolf's daughter, Tracey Jill.

2) Don Carll 6:80
3) Bill Squires 3:10

Field notes: Look out for the latticework that provides shade for the spectators. It cannot be knocked down. Kafer proved this by shredding his Flamingo through the slats. The .020 Replica event is a good one, but needs a shot in the arm badly. Dave Bruner is probably the most conversant with Rambler structures. He is rebuilding his for the third time!

ENGINE OF THE MONTH

This month's engine is a rare one indeed, the Batzloff racing engine, which highly resembles the Hassad, a very successful race car motor. Small wonder, as Bill Batzloff and Ira Hassad were fairly close buddies and ran race cars using Hassad engines before World War II.

Batzloff and Hassad first attracted national attention at the National Miniature Race Car Championships at Chicago on July 4, 1941. Hassad preferred to race on the rails, as his motor really turned on when coming out of the turns. This was due to the terrific amount of torque developed by the Hassad, as compared to the free-running Dooling and Hornet motors. The latter engines were virtually unbeatable on the cable lines, where drag was a low factor.

Although many felt Hassad had the best engine on the field, in one of his qualifying runs the high tension lead vibrated loose with two laps to go.

Surprisingly, the first four places went to the Los Angeles boys, with Kenny Clark leading the way with a Super Cyclone powered Rexner Zipper car. Disappointed Ira Hassad was second with his Richter car, using his unbeatable Hassad engine; his time of 70.80 mph barely losing to Clark's 71.03 mph. Interestingly enough, Bill Batzloff placed sixth with 67.16 mph.

Continued on page 99

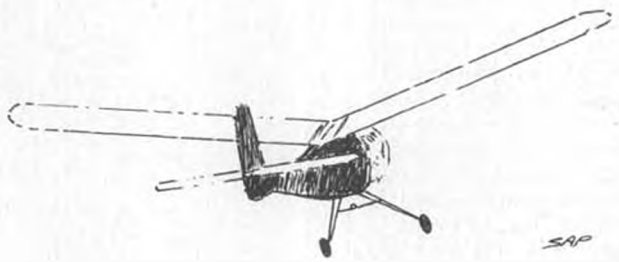
OLD TIMER Model of the Month

Designed by: Francis Tlush

Drawn by: Al Patterson

Text by: Bill Northrop

TLUSH "MITE"



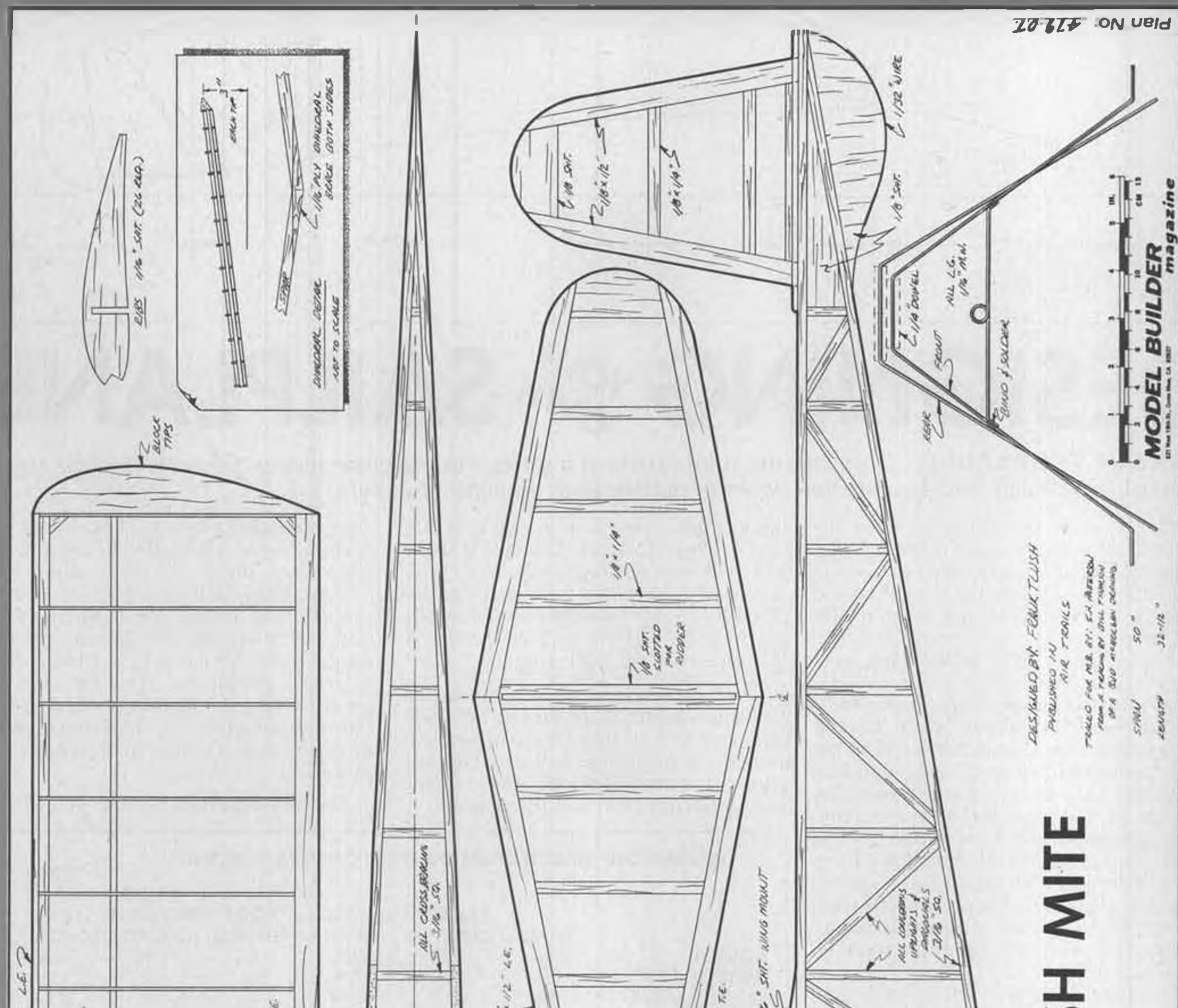
• The cover painting in the May 1938 issue of *Air Trails* shows a Lockheed Electra XC-35 in U.S. Army colors. The cover story, also by artist Frank Tinsley, tells of the experiments being conducted at Wright Field by the Air Corps, attempting to solve the problems related to flying passengers above 15,000 feet, in pressurized cabins . . . something we all simply take for granted these days.

Back in the model section of the magazine, we find plans and a construction article by Francis Tlush entitled, "The Midget-Powered Mite". Tucked in the pages with the article is a yellowed piece of paper containing a price list of the materials to build the model. The material, as we priced it out back in 1938, came to $1.69, without the Austin timer, which was an additional $1.25! According to the list, we must have covered the fuselage with blue bamboo paper, and the flying surfaces with yellow tissue.

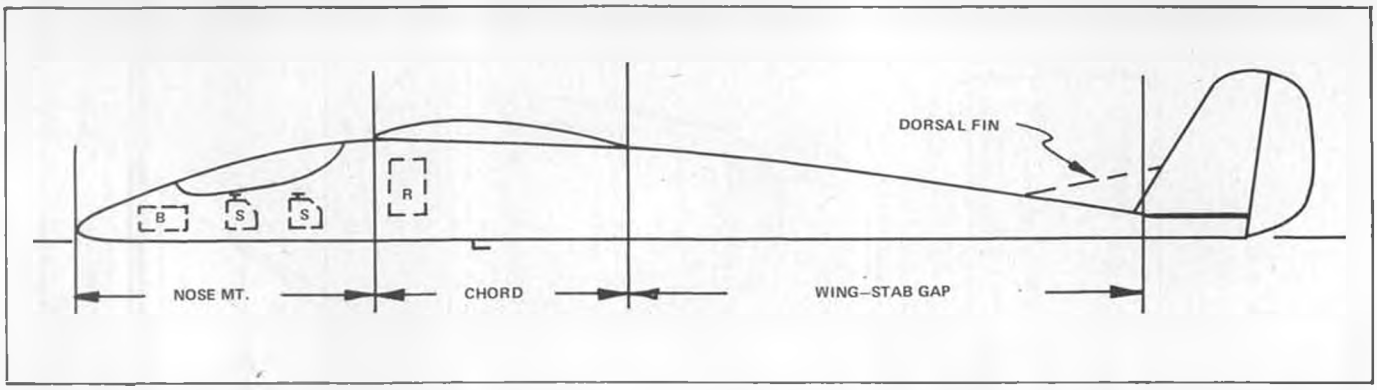
Oh yes, we built the model, modified (don't we all?) the wing from V to polyhedral, and installed an Atom engine. Being our second ever gas model (first was Bassett's "Miss Philly" with Baby Cyclone), the Mite spent much of its air time in cautious test glides. The greatest were down the gradual slope on a part of the nearby University of Delaware campus. Powered flights were definitely of the sport variety, nothing sensational, but consistent and very stable. The Atom engine was a jewel. It started easily on the pen cell flight batteries . . . no boosters needed, and was easy to maintain. The retail price was $12.50, and the cash was accumulated from lawn mowing and caddying at the local golf course.

The Mite would make a nice same-scale model for 2-minute precision competition, and based on the 225 sq. in./.10 cu. in. displacement rule, it should really perform with an .09 engine, although a hot .049 would be adequate.

Wish we had a photo of our original so we could put in the polyhedral. . . •



FULL SIZE PLANS AVAILABLE – SEE PAGE 112



PHOTOS BY AUTHOR

DESIGNING YOUR OWN SAILPLANE

By DAVE THORNBURG . . . In this, the third article of a series, our ace glider guider discusses fuselage and vertical stab design, and actually gets down to putting lines on paper (finally!).

• Way back in the February issue we settled most of the parameters of our "Dream Soarer": we decided to make it a floater (6.0 to 6.5 ounce wing loading) with a 90-inch span and around 800 square inches. As you may have noticed, all these figures refer to the wing, and don't tell us a thing about the fuselage and tailfeathers except how heavy they should be. (The whole plane has to weigh between 33 and 36 ounces to hit our projected wing loading figures.) What we have to tackle now is fuselage design . . . tail moment, nose moment, size and shape of the fin/rudder.

To most folks, this is the really exciting area of design. After all, the fuselage and rudder are what people notice first about a new plane; nobody looks at wings. You can spend months perfecting a new wing for your Olympic 99 . . . winch-launching every morning before sunrise and recording each flight time, hanging off the right fender of your car at 40 mph and listening to the whistle of various wingtip shapes, recording the dewline separation on the airfoil's upper surface during late evening flights, etc., etc. But when you show up at the contest field and turn ten seconds flat in the FAI speed run, what people are going to say is, "You still flying that old 99? Why don't you build something new?"

Conversely, all you have to do is saw off a cardboard mailing tube to the same length as the 99's fuselage, mount the Olympic wing and tailfeathers in their customary places at their customary angles, and half-a dozen kibitzers are going to say. "Well, Bufo, glad to see you finally built yourself something new!"

So we probably need to treat the fuselage as something more than just a long stick to hold the stab in a fixed relationship to the wing. Even if it ain't.

Here's how I begin a fuselage layout. First, I determine roughly what my overall length ought to be. In the July 1970 issue of *R/C Modeler*, Chuck Cunningham told us that the basic sailplane had a fuselage length of 50% of its wingspan. This is still a pretty good rule of thumb, although the newer designs seem to be snipping away at that figure: The Aquila and Olympic II are at 46%, while the Paragon, Bird of Time, and Viking are around 41%-42%. Some of Hi Johnson's fuselage/wing combos go down to as little as 35% (a 54-inch fuselage on a 156-inch wing).

So we can tentatively place our overall fuselage length at anywhere between 40% and 50% of the wingspan without wandering out of the ballpark. Hurrah! After three months of talk, we can finally begin drawing! Get out the paper!

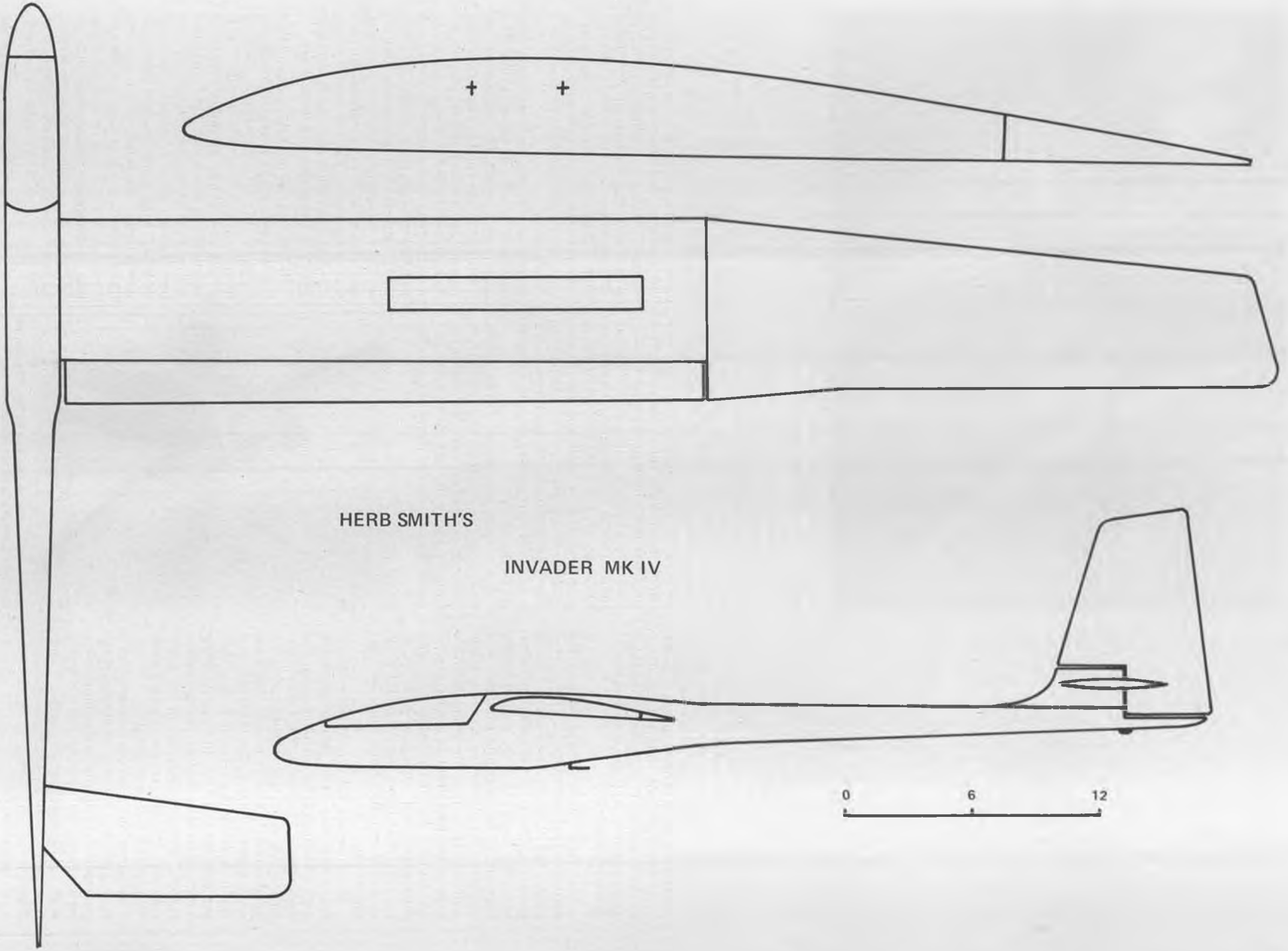
Incidentally, a good source of large drafting paper is a weekly or small daily newspaper plant . . . the smaller the better. They will usually sell you a remnant roll of newsprint for next to nothing. Otherwise, use the back side of whatever kit plan you have handy. For example, I've drawn some reasonably good-looking sailplanes on the back of old Ugly Stik plans . . . "aesthetic bleed-through" doesn't seem to be much of a problem.

Begin by drawing a fuselage reference

DESIGN COMPARISON OF SIX CONTEMPORARY SAILPLANES

	SPAN	FUSE. LENGTH	% OF SPAN	ROOT CHORD	NOSE MOMENT (CHORDS)	WING STAB GAP (CHORDS)
AQUILA	99	46.2	46%	9	1.16	2.1
BIRD OF TIME	118	49	42%	10	1.1	1.8
GULF COASTER	108	53	49%	9	1.57	2.94
OLYMPIC II	99	46	46%	10	1.1	1.8
PARAGON	118	50	42%	10	1.2	2.0
VIKING	118	48	41%	11.5	.94	1.8

Herb Smith's latest (and best) FAI ship is the Invader Mk. IV, which placed 8th at the FAI Finals at Pensacola. Has a 114-inch span, 836 sq. in., 8.5 oz. wing loading.


HERB SMITH'S
INVADER MK IV
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line down the center of your paper. Some sort of straightedge is a good thing; Bill Northrop once accused me of using a piece of wet 1/16 square balsa for a straightedge on some drawings I sent him, but it was a vicious slander . . . I never use less than 1/4-inch square for anything. I admit it had been broken a couple of times, swatting flies. And it probably was wet, because we had a lot of flies in those days. Until we finally got the roof on.

Whether this "fuselage reference line" turns out to be down the middle of the fuselage or not matters very little: what we want it for is mostly to determine our nose and tail moments. On the drawing that heads this month's column, the reference line became the bottom line of the fuselage itself . . . how's that for design simplicity?

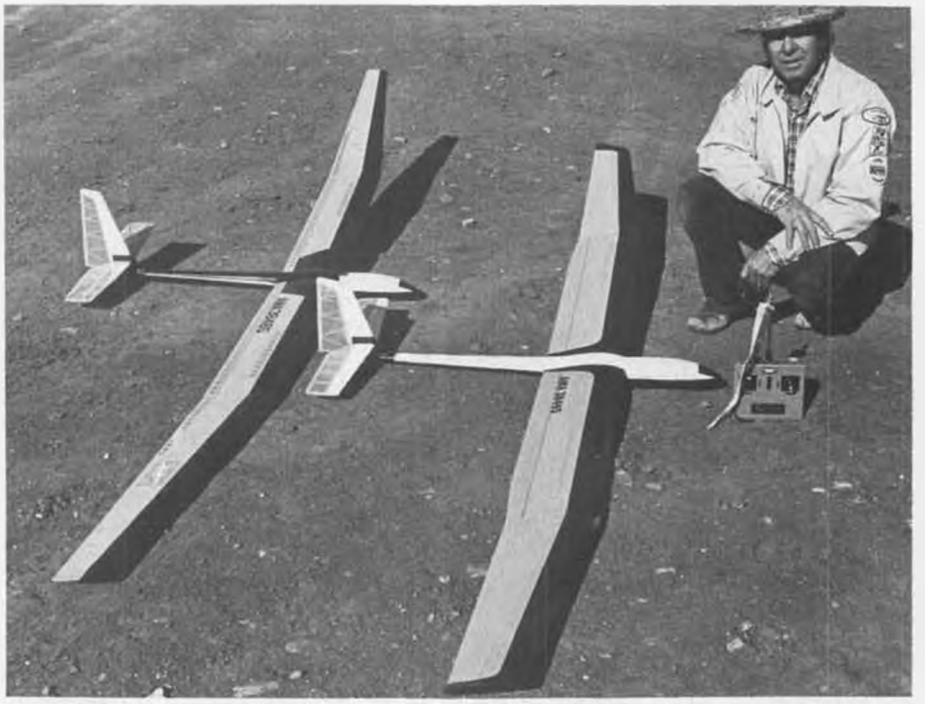
Now, how do we go about dividing this line up into nose and tail? Back in the old days, in Albuquerque, when everyone in the club was obligated to come up with four or five new designs a year just to appease the gods of the rocky and turbulent New Mexico slopes, we used a very simple system for roughing out fuselages, and I find that it still works pretty well. In this system, all the fuselage measurements are functions of the root chord of the wing. The nose length, from wing leading edge to tip of noseblock, was decreed to be 1.0 to 1.25 times the wing root. The distance between the trailing edge of the wing and the leading edge of the stab was to be 1.8 to 2.5 times the root. And that was about all there was to it . . . lay out those two measurements and your fuselage was ready to rough in!

I can hear the engineers and assorted mystics screaming already: "Hey, what about Tail Volume Coefficients? What about the Center of Lateral Area?" Well, everyone needs a hobby. If your hobby happens to be plugging numbers into formulas, then I refer you to an excellent article by Le Gray in the December 1973 issue of **Model Builder,** or the long series of articles by Tony Estep that ran throughout that same year in RCM. If, on the other hand, you'd rather draw airplanes and then build them, let's get on with it.

Since we settled on a 9-inch chord, that's now our basic unit of measurement. Multiply it by 1.0 (that's easy) and again by 1.25 (fetch the calculator, Maude!) and our nose length comes out approximately 9 to 11 inches. Mark the wing leading edge point 11 inches from the left end of the reference line, then put another mark (for the trailing edge) 9 inches past this. Now our wing location is fixed, and we can rough in our wing-stab gap: in this case, it will be between 16 and 22.5 inches in length.

What we have at this point is not a fuselage, but merely some fuselage parameters. Without exceeding these parameters, we can still design a ship with a long nose and a long tail, a short nose and a short tail, or any combination thereof.

Ah, decisions!



Herb Smith with his Mk. III and Mk. IV Invaders. Both ships have glass fuselages and rudder, elevator, flap, and spoiler controls. Plans and kits are available from Herb . . . see text.

Since time immemorial, I've had in my box of drawing equipment three blocks of scrap balsa. One of them is shaped like a Futaba battery pack, one like a receiver, and one like a servo. Now is the time to drag them out . . . they can take some of the decisions about nose and tail moments right out of our hands. You probably don't have such a set of blocks, and you certainly can't afford to cut them at today's balsa prices; it would be cheaper to have them milled from titanium. That's assuming your radio itself isn't available. If it is, you can lay the pieces out directly on the drawing paper and start getting an idea of what we're up against.

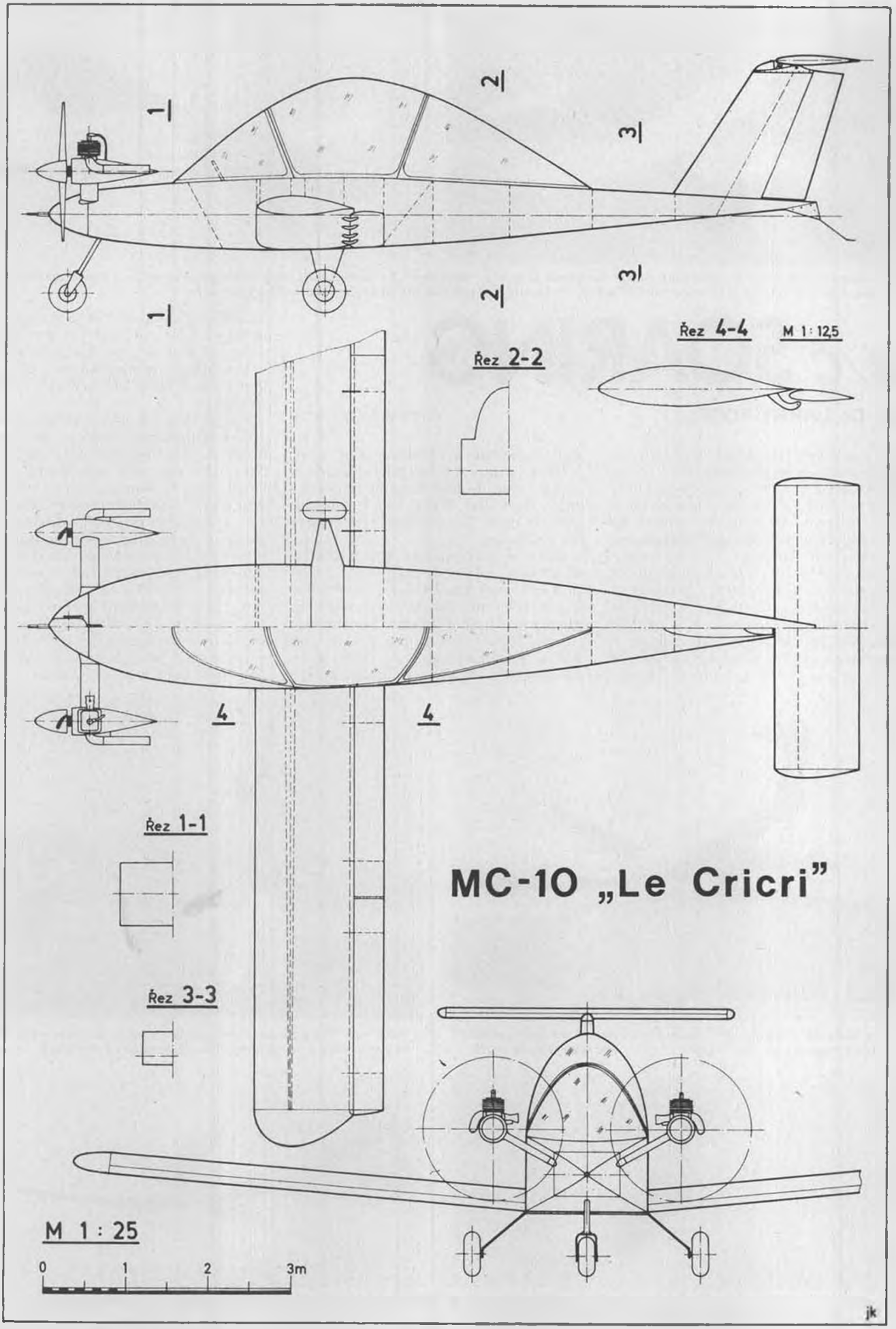
Since God has decreed that radios must go in the very front of a sailplane, in order to protect the wing and towhook from excessive damage in the event of a crash, we can use the shape of our radio components to help us pin down an exact nose length. Batteries, because of their weight, go as far forward as possible. For sailplane use, I always strip my pencell packs of their plastic case and wrap them in a single layer of electrical tape. I realize this makes the cells more vulnerable to shock damage, but it saves weight (the cases weigh around 20 grams) and more importantly, it reduces all three dimensions by 1/8 to 3/16 of an inch. These dimensions may seem minor, but they can make quite a difference to the crowded business end of a sailplane.

Brrrrr! Herb must really like to fly. The rest of the field is empty, and no wonder!

Traditionally, the receiver follows the batteries, with the servos last in line. This order isn't inviolable, however; on small, light ships I like to push the servos forward against the batteries and put the receiver behind them. This way, you can shorten your nose moment while still keeping most of your weight forward. With conventional pushrods, the aft receiver location isn't always practical, but I'm a great fan of cablerods (nyrods with wire cores). For two-meter ships, the .030 wire cables are usually enough; anything larger gets the .058 cables.

By now you've probably noticed that the servos in the drawing at the beginning of this article are mounted in tandem, rather than side-by-side. This is simply one of my prejudices, born of long years of flying free flight and small sailplanes. I rarely design a plane two servos wide, unless I'm more interested in looks than performance. The rule seems to be "the smaller the plane, the more important it is to have a minimum cross-section". If you're one of those folk who sincerely believe that full-scale fineness ratios (ratios of width to length) apply to models, then you ought to start seeking converts among the free-flight-

Continued on page 94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MC-10 „Le Cricri"
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Two views of Ken Raymond's original design two-meter ship, the "Flamingo". Pylon mounted wing makes good sense, as it allows maximum use of wing area and reduces the interference effect of the fuselage. Model has 710 square inches, weighs 40 ounces.

R/C SOARING

by Dr. LARRY FOGEL

PHOTOS BY AUTHOR

• If you haven't tried night flight, you've been missing something. The Torrey Pines Gulls recently had a contest scheduled for 3:00 p.m., ending in a picnic at 6:00, followed by sailplane soaring off the electric winch through twilight and on into full darkness. This all sounds impossible unless you're acquainted with the Cyalume lightstick, a compact, self-contained, safe, non-toxic, easy-to-use lighting device which is quickly activated by bending and shaking. It produces a distinctive yellow-green color as a result of a chemical reaction that takes place inside the plastic tube.

The Cyalume reaches full brilliance in about a minute and remains bright for hours thereafter. The colder it gets, the less the light. The warmer, the greater the brilliance.

You attach a Cyalume lightstick to the winch line and one to each wing tip with a rubber band. You bravely march to the winch, peer into the darkness, hook up the plane, stumble about to find the foot switch, lean back, tromp down, and throw. Swish, and you see three lights piercing the sky. You pulse the winch until the lights appear to be at maximum altitude. Ease off and the two lights separate. You turn the craft to head over to the nearest residential area in hopes that there'll soon be reports of UFO's sighted.

It's particularly exciting when there are several planes in the air simultaneously. Hard to find thermals at night, but they do exist, and we found some. Finally you're running out of altitude. You guide your plane toward the runway and judge pitch by watching the speed of the two lights as they approach. It's tricky, but there were no accidents in our event. And what a thrill to walk back with your beaming face illuminated in the yellow-green light of the Cyalumes. No, this isn't an event for beginners, but it's fun for the spectators as well as the experienced pilots who are willing to risk their craft (and reputations). Cya-

Jerry Slovacek's "Hawkaloft" has got to be one of the most realistic bird-like models ever. Tip "feathers" really add the finishing touch.

Like most flying wings, the Hawkaloft goes up at a very steep angle. It's not really a flying wing, though, because of the V-tail.

The Hawkaloft is very realistic-looking in the air, as these photos show. Photo on right shows "talons" extended. Jerry says real birds don't show as much interest in this model as most people think they would.

Howard Short, of the SULA club, with his original design "Ace Express". Combines ease of construction with good looks.

The Ace Express with hatches removed to show radio and ballast boxes. Model weighs 43 oz. empty, can carry up to 1 lb. of ballast.

lumes are readily available (manufactured by American Cyanamid Co., Bound Brook, NJ 08805). They're widely used by campers and divers. Here's an adventure waiting to be tried.

The Flamingo is a new two-meter design conceived and constructed by Ken Raymond, of the Torrey Pines Gulls. The wing is supported by twin pylons. This allows maximum lifting surface and cuts down on the interference effect of the fuselage. The 710 square inch wing carries 40 ounces of weight. It's polyhedral with constant taper and has the same airfoil as the Olympic II. The 56-inch fuselage is made of balsa, reinforced with plywood. All in all, it's a neat design. Let's wish Ken many happy hours with his new creation.

Eric Beilby, of Belmonte, Australia, represents Kraft Systems down under. He reports on some recent exploits of Brian Laging. It seems Brian designed and constructed a fully-equipped quarter-scale Fokker V that weighs in at 16 pounds. His purpose is to capture the Australian endurance record. He's already had an 11-1/2 hour unofficial record-breaking flight.

But not easily satisfied, Brian is now building a new lighter-weight version (to stay within the FAI limits). He stays warm during these long flights by sitting in his car, using the car's battery as the source of power for his transmitter. According to his latest design, the airborne battery pack should support a 45-hour flight. Who can stay awake that long? The fuselage is fiberglass. The wings are foam, covered with balsa and Monokote. I'll let you in on more of the details as word reaches us from Australia.

Howard Short, of Playa Del Rey, (and a member of the Soaring Union of Los Angeles), designed and built the Ace Express. This conventional appearing sailplane operates at about 7.4 ounces per square foot (43 ounces empty weight), but it can carry an additional pound of ballast. The airfoil is 12% thick at the root and increases to 14% at the tip. The wing has six degrees of dihedral at the root and seven degrees for the outer panels.

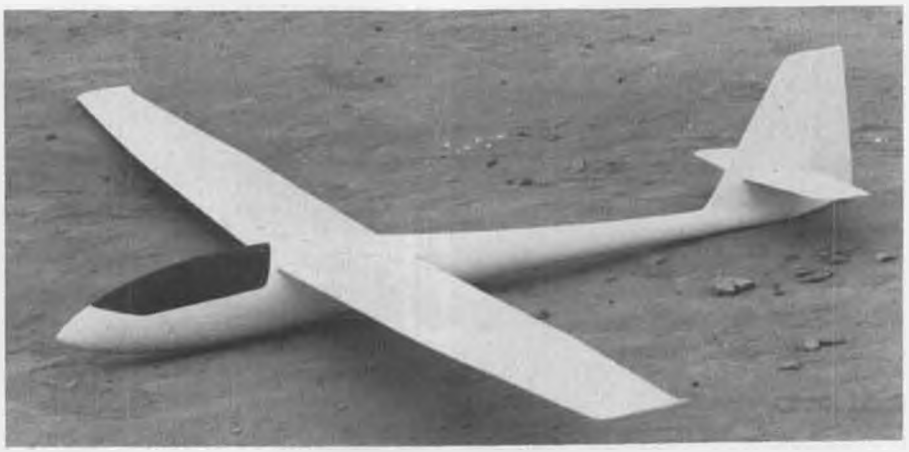
Here's an aircraft that's beautiful, yet designed for ease of construction. Ordinarily you'd expect a simple box-framed fuselage to be unattractive, but clearly, that isn't the case here. Howard has used some spiffy styling to make this plane particularly pleasing to watch. The construction is obviously light and strong. A transparent Monokote section in one wing helps to identify the plane whenever it soars at altitute, flying "in the flock." Here's wishing him well with this potential contest winner.

For years the Alan and Harris Nelson brothers have been designing high speed, high performance fiberglass sailplanes. They're now testing some new configurations. Alan's Foo Fighters

Sandy Edwards, of the Torrey Pines Gulls, designed this nifty "Pixie" for two-meter events. One of the better 2-meter ships.

Bob Flores launching the Pixie for Sandy Edwards. Note that the outboard wing panels are longer than the inboards.

Harris Nelson with his version of the "Foo Fighter", high-performance slope glider.



Harris and Alan Nelson have been designing high-performance fiberglass sailplanes for quite a while, the latest being the Foo Fighter. Model is designed primarily for sailplane combat.

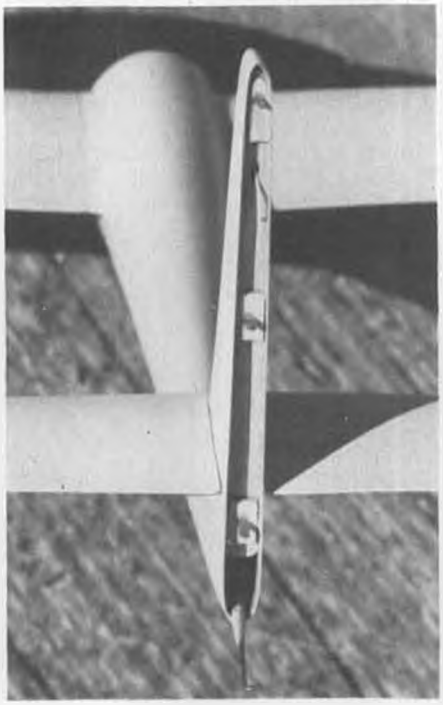
are intended for sailplane combat. They're highly maneuverable, fast, and almost indestructible. The fuselage is fiberglass with a fiberglass tray built in as the epoxy resin hardens. This provides strength as well as a neat mounted panel. The body is laid up with from 10 to 20 layers of half-ounce cloth in epoxy resin. The symmetrical full-flying stab is controlled from inside the fuselage. The rudder is held in place with a hinge pin . . . precision control with no air gap to speak of. The original wing is seven-foot span, the chord going from 6-3/4 to 4-3/4 inches, single tapered, without sweep. The airfoil is a modified Eppler 387 (with the high point moved forward as you go toward the tip). This provides slower stall speed at the tips. A small amount of washout is a further asset. The set of wings designed by Harris Nelson are 7-1/2 feet, the chord going from 5-1/2 to 2-1/2 inches. These are also made of high-density blue foam with 1/64 plywood cover, then either Silkspan or fiberglass before the final primer and paint.

Here's another situation where words are insufficient to describe the experience. These aircraft are sleek and appear to be scale, even though there's no attempt to mimic any particular aircraft. It's high performance from the word go. All this goes to show what can be done if you really try to build in only good characteristics.

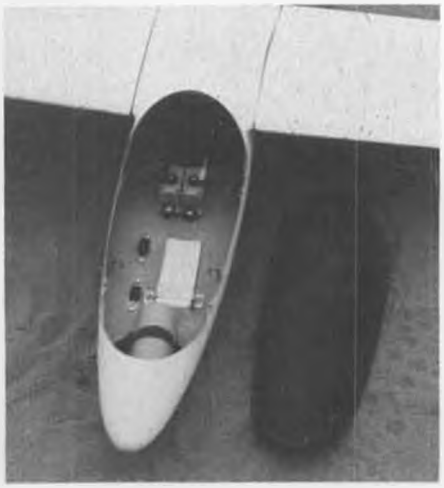
Sandy Edwards, of the Torrey Pines Gulls, has come up with the Pixie, a two-meter polyhedral-winged craft, with the outboard sections larger than usual. It has a full-flying swept stab. The fuselage is glassed in the forward section and on the bottom behind the wing. I asked about the airfoil. He indicated it to be a "shoefoil"; that is, the outboard shape of a footprint transformed by intuition into the airfoil. Believe it or not, it flies great. It hangs in there when other planes are falling out of the sky.

The Hawkaloft was created by Jerry Slovacek, of San Diego. This bird is really intended to look like a bird. The 100-inch span, 17-inch chord wing is extended by winglets made of 1/64 plywood. These are the tip feathers of this hawk. The wing itself sweeps forward, then back, and is reflexed as any flying wing must be. The airfoil is that of the Raven, but modified to have polyhedral more like a bird. The V-tail is used to mimic the appearance of the hawk when viewed from the ground. The large size of these surfaces is required for stability and control. Jerry uses a sliding servo mixer arrangement. Flaps are included in the wing to ease the landing approach. These also provide a near-vertical climb by electric winch. The wings include spoilers . . . the kind that rise from a slot, but these are really not required for the full performance of this bird. To complete the picture, the nose is sculptured to look like the head of a hawk, including eyes that move as a function of pitch and bank angle. Jerry has engineered a landing gear that is servo-released on final approach. These spring-loaded talons drop down in the same way a real hawk would use his. They're made of spring steel, the only missing part being the claws at the end of the talons. I asked Jerry how birds behave when this craft is in sight. He said they show a distinct curiosity, but have never shown any obvious flirting. All in all, the Hawkaloft is a sight to behold . . .

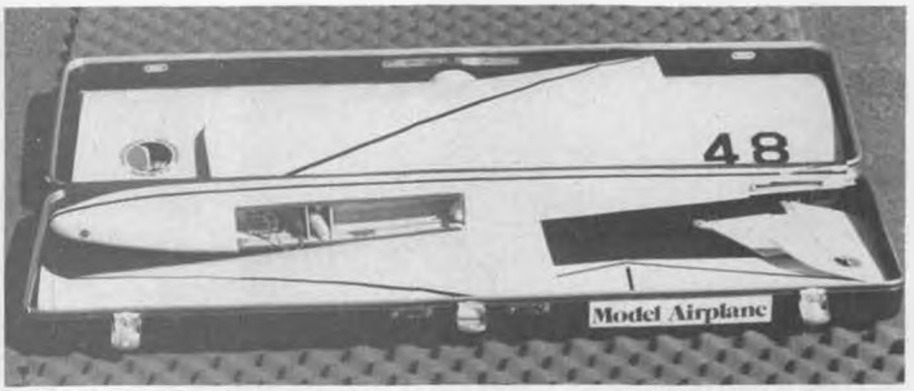
Alan Nelson's Foo Fighter has clipped wings for tighter turns. Normal span is 7-1/2 feet.



Rudder hinge detail. Single hinge wire holds rudder in place. Note close fit of stab to fin.



No shortage of radio room in the Foo Fighter! Fuselage has 10 to 20 layers of cloth.



Left, Larry Fogel's Olympic 650 in flight; right, how he gets it around the country. Plastic rifle case is a perfect fit for this particular model. Foam rubber padding absorbs shocks and jolts of traveling. Needless to say, the model must be disassembled into more than the usual number of parts.

a complicated structure well worth the time and effort. I wonder when this bird will give birth to some smaller chicks of similar configuration?

For those who enjoy considering aerodynamic questions, I offer this challenge: what is the best flexibility of wings under specified conditions of speed and turbulence? Too rigid a wing produces extra trailing edge drag as a result of the varying angle of attack. Too flexible a wing loses lift when passing through such air. Can these factors be quantified and related in some way?

There ought to be a best design between planes that are stiff-winged and those that have wings that flop around in the sky.

Boeing Vertol Company recently announced an advance in the state of the art with respect to the construction of fiberglass helicopter rotor blades. In the early days, rotor blades were fabricated from round, step-tapered steel tubes covered by an envelope of wood veneer and spruce blocks. Then there was a decade of all-metal rotor blades using aluminum, steel, and titanium.

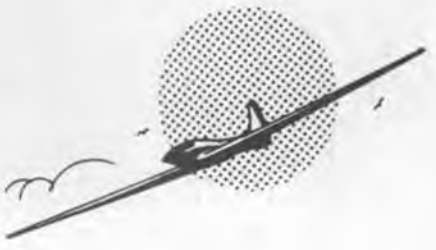
Now, rotor blades are in a transition from metal to the greater structural reliability of composite fiberglass construction. Imagine vertical aluminum honeycomb aft of the main spar, this encased in fiberglass. Hey, wouldn't it be nice if this construction were available for model sailplanes? Could we use the same airfoil as this rotor blade? Would you trade the extra weight for the added strength? Could we find a suitable design that would allow sufficient numbers to be produced to justify the initial production cost? . . . Just something else to think about.

I try to take a plane with me wherever I go. The Hobie Hawk is convenient for this purpose, but the package is still a bit on the cumbersome side. An alternate plane is the Olympic 650. It fits neatly into the plastic half-size rifle case marketed by Challenge Manufacturing Corporation, Mt. Vernon, NY 10550. This comes with foam rubber padding. It's an understatement to call this a good fit. You'd think the plane was designed for the case (or the case for the plane). I've now taken this combination all around the country. It packs quickly, and in this container, the plane easily withstands the jolts of travel. Why not load such a rifle case and make it your travelling companion? Wait until you walk up to the airport security guard carrying this rifle case. You're bound to be stopped. That provides a great opportunity to "show and tell" about our joyous hobby/sport.

P.S. Just received good news from Ralph Learmont. It seems that Brian Laging's attempt was successful. His airborne duration was a few minutes over 28 hours! Brian launched at 18 minutes after 2:00, Saturday afternoon, September 30. The day had been absolutely dead calm since his planned takeoff time of 5:00 a.m. It looked like the event would have to be called off. The first two hours in the air were a struggle to keep up (mainly on thermals and in extremely light lift from the north). After 4:00 p.m., the wind steadied and Brian flew *through the night* without problems. He landed on Sunday at about 6:20 p.m., at twilight, to the cheers of almost 30 onlookers. •

Brian Laging, of Australia, carrying his 1/3-scale Foka 5 (it's *not* a 1/4-scale Fokker 5, as mentioned in the text). Ship has a span of 14 ft., 10 in., and weighs 14-1/4 lbs.

Brian has flown his Foka with a movie camera mounted on top . . . bet the results are interesting! Brian has his eye on the Australian endurance record. Think he'll make it?



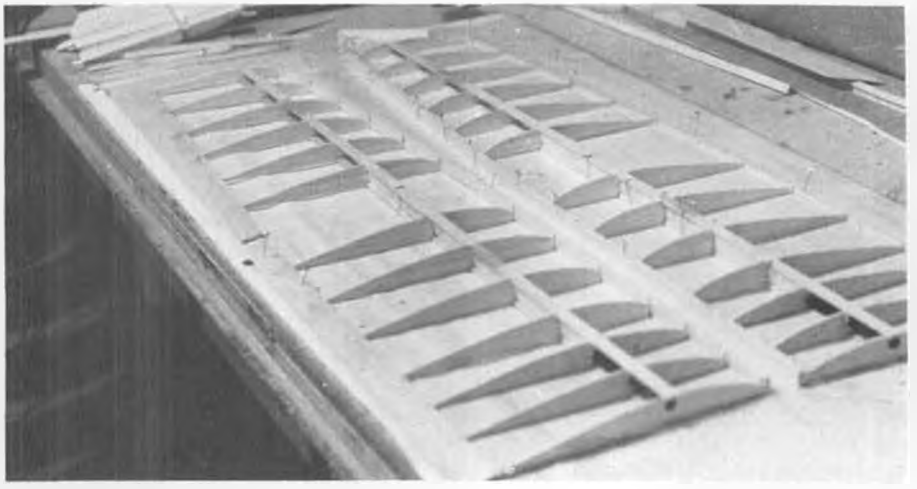
PHOTOS BY AUTHOR

Left, "Petrel" designer Jim Ealy; right, his son Jimmy about to launch the Petrel on a hi-start. Design follows current trend toward lower aspect ratios, as Dave Thornburg points out in his Sailplane Design article in the February MB. Plans show optional spoiler installation.

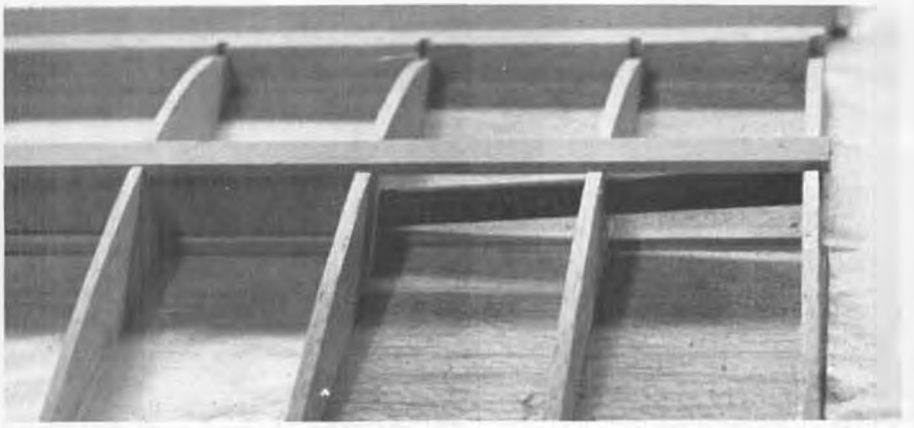
PETREL

By JIM EALY . . . An excellent 2-meter design for competition or sport flying. Plans also show how to make 100-inch wings.

• The Petrel, as in "Storm Petrel", is a member of the group of various small birds that inhabit the shores of most oceans. These small aggressive birds are extremely maneuverable and can penetrate easily in stormy weather, but can relax and soar with the best in calm, light air. The model, like the bird, appears to have all of the above natural talents in the hands of a beginner, and can keep the expert from becoming overly complacent. If you are on the contest trail, as well as being a Sunday flier, it will bring home hardware and help you look like one of the experts. I wish to thank one of my favorite experts, Don Climeson, for encouraging me to make detailed drawings and for showing me and others just how well the Petrel could fly. He gave me the enthusiasm to start the long process of making the drawings, as well as getting homemade kits to the interested fliers . . . an undertaking not recommended for the sound of mind!



Basic wing layout. Note that the ribs are not yet notched for the turbulator spars or spoilers, as the author prefers to do this after the wings are assembled.



Closeup of the fiberglass wing rod tube in the wing root. Space between tube and spars is filled in with 3/16 balsa. At 1/4-inch diameter, an aluminum wing rod is plenty strong.

The Petrel was designed for my son to compete in the two-meter LSF contests. While it was being built, he was at hockey camp. He returned the day before the contest, test flew it for three short flights at dusk, entered it the following day, and did quite well! Maybe the advantage of youth (ten years old) and the fact that he is working on LSF Level Four makes some difference. The plane has been flown by several others of greater skill than either of us, and it has made an instant, positive impression. However, the reason for this article is that several "novice" club members have been handed the transmitter, and most of them felt that they could fly it better than their own ship. Those of us who were watching agreed. Also, the ease of construction and the several variations that can be made during the building appeals to both novice and expert alike.

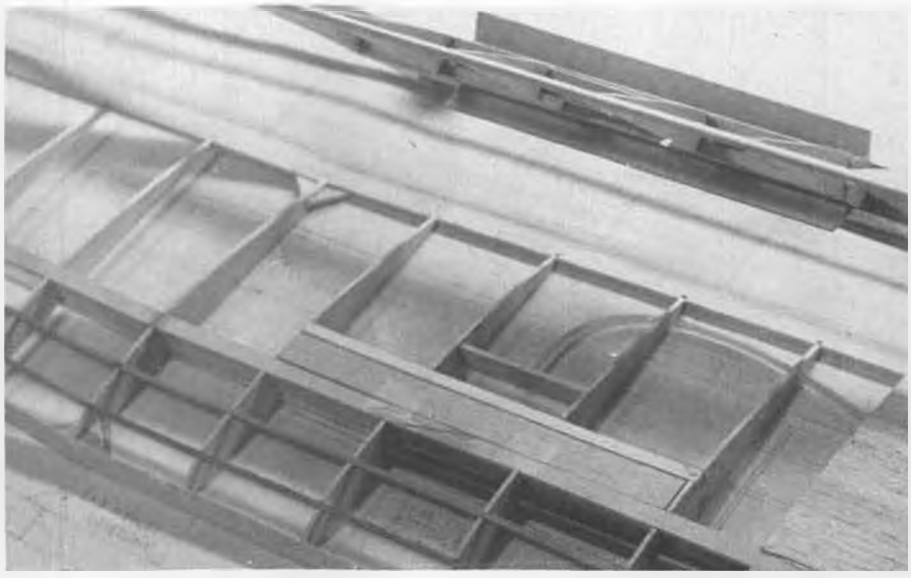
I teach at THE HILL SCHOOL, an all-male college preparatory school, which has the good fortune to have about fifteen acres of open athletic fields (mowed several times a week), several large basketball courts (for indoor flying) and a pond that can be used for power and sailboats. This lends itself to a good, active model club. As if this were not enough, we also have a very complete metal shop and wood shop. Several students in the past have built .40-size glow engines from scratch, and a possible full-size glider is being talked about for the wood shop under the guidance of the EAA School Flight Program. THE HILL SCHOOL enrolls young men in grades eight through

twelve; some become club members, with little or no model experience, and a few have placed at the Nationals. The club needed an easy-to-build, strong and stable ship to teach the novice members how to fly, and the Petrel was the answer.

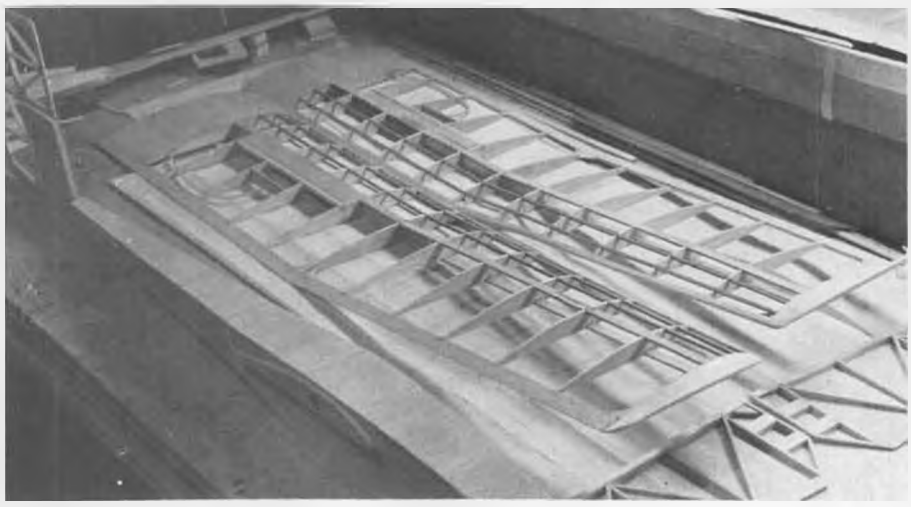
The design parameters have been selected with regard to the published advice of true experts and winners, and from my own experience and conviction. Most of these convictions are the result of my years of building and designing, but mostly result from the frustration with designs that, with a little more thought, could have been so much easier and logical. This would have made it easier for the young person to be successful and to continue with the hobby. Too many designs are for the well-advanced expert (who rolls his own anyway), or so simple that the beginner will know that when he takes it to the field, everyone else will know he is a rank beginner. We were all beginners, but we tried not to be that obvious about it.

The design parameters are listed as follows, and include a reason for that parameter. Two-meter wing span: a new challenge and a relatively untried class. A wide nine-inch chord for the inboard panel and a reasonable taper to a seven-inch tip chord: lots of squares (650 sq. in.). The airfoil is a compromise: a thin 9.8% at 31% of the chord but with turbulator spars. The turbulator spars are optional, but they will guarantee extra height on launch and guarantee a true airfoil at high speeds, when coverings deform, thus increasing efficiency . . . the name of the game! Notched trailing and leading edges: ten-fold increase in structural and torsional strength. This small procedure takes about five minutes, and is well worth the time. The spars are a bit much and so is the webbing, but 1/8 x 1/4 spars and 3/32 webbing instead of that shown on the plan will only earn a decrease of 7/8 oz. This decrease in wing loading versus strength at a wing loading of 5.0 to 5.2 oz./sq. ft. is an academic argument and not a practical one . . . Besides, some of our friends need a ship that will break winch lines without folding the wings to gain a relaunch! Ballast tubes in the wings are also optional, and can be made from plastic, brass, or aluminum; however, use brass filled with lead, and not aluminum! Depending upon the tubing size you select, you can add about 2 to 2-1/2 pounds to the ship's weight.

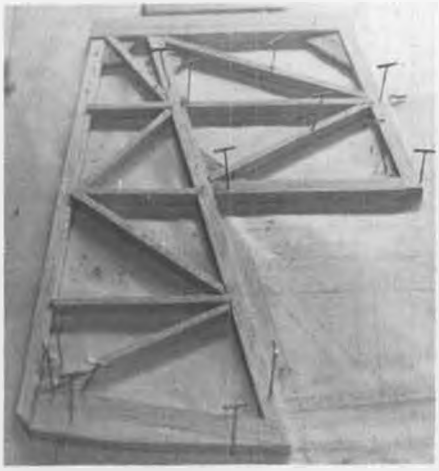
We do some slope flying here on the East Coast, but only when we are forced to by heavy rain. Built as per plans and ballasted to the hilt, the Petrel can be dived and pulled out without concern on your part and without much flex in the wings. The flying stab provides ease of trimming and change of in-flight incidence angle, as well as having the positive effect of no hinge line drag. The balanced rudder is very efficient and sturdy; a few of us are still surprised by strange and sudden gusts of wind that seem to cause our ships to invert on landing. This fin and rudder won't

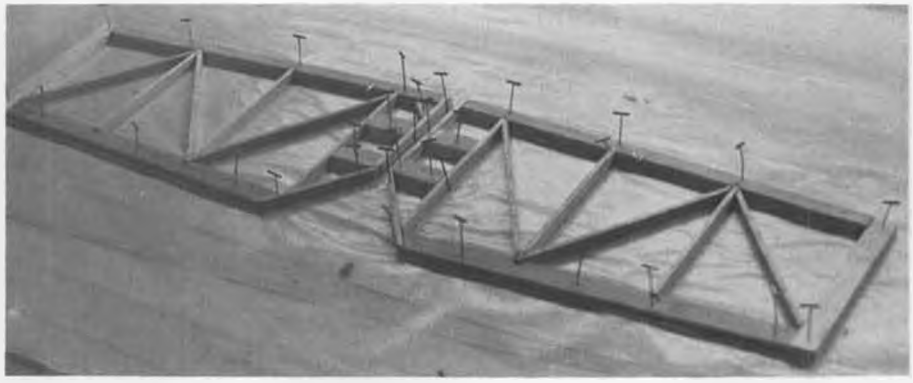


Spoiler details. Rear view of wing at top of photo shows top and bottom spoilers open. Also, note the optional ballast tubes just in front of the main spar. Lots of options on this model!

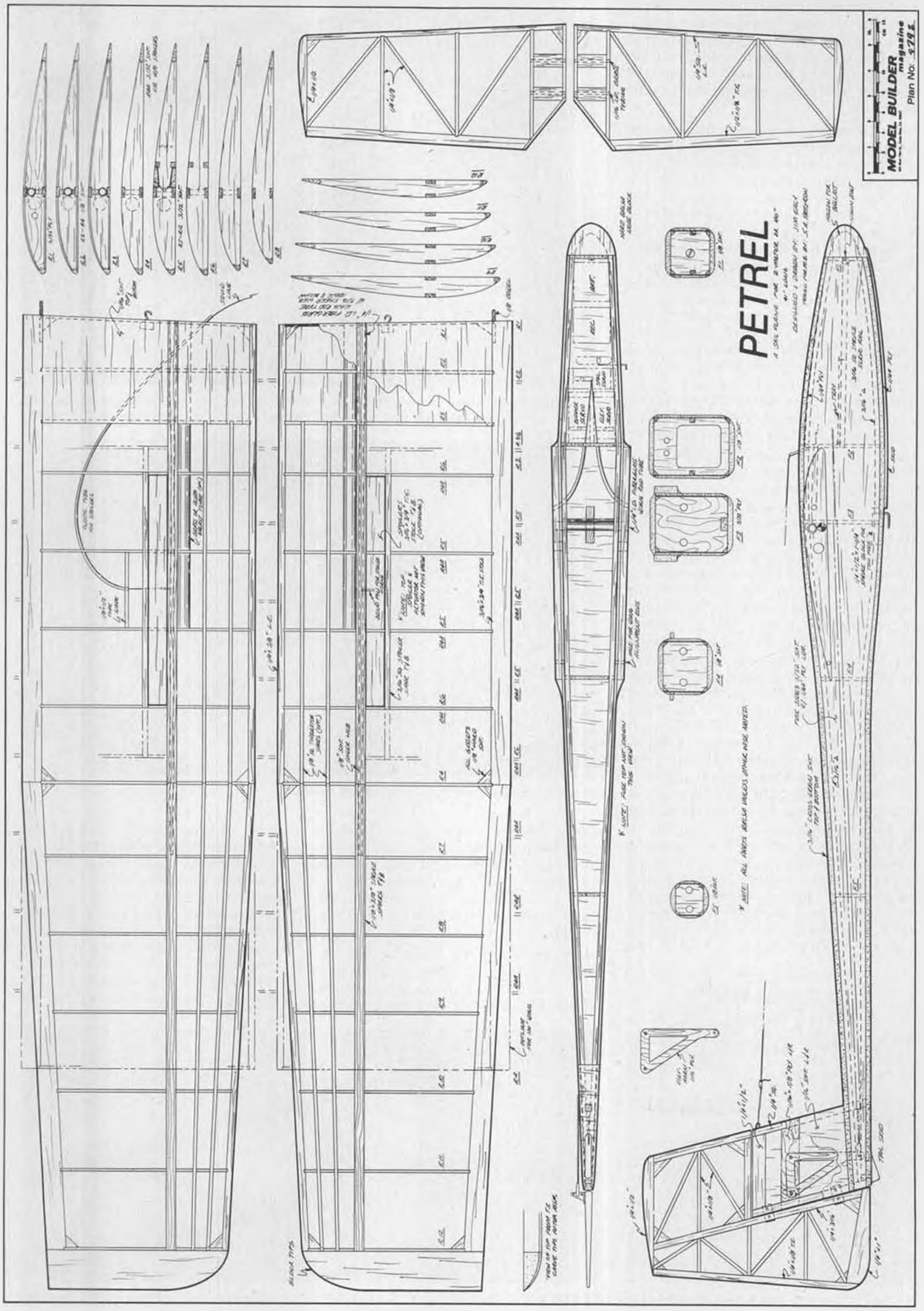


The entire airplane, ready for sanding and finishing.

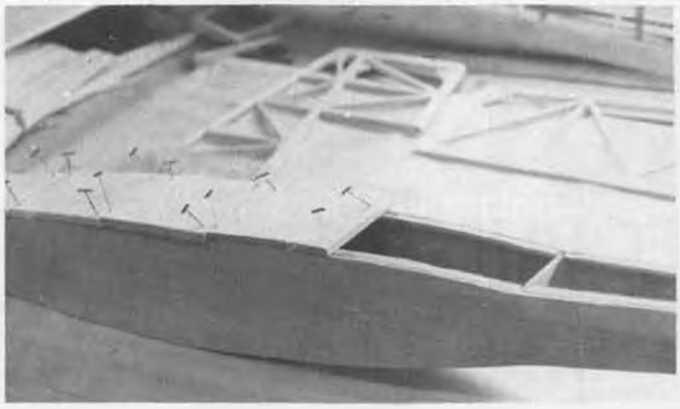




Both the rudder and stab can be completely assembled before taking them up off the board. Rudder is designed not to break if the ship flips over in an overzealous attempt to hit the spot. Extensive use of notching provides extra strength.


PETREL
MODEL BUILDER Magazine
Plan No: 5791

Fuselage structure without top and bottom sheeting. With full-length 1/64 ply side doublers, that fuselage should never break!



Use of thick top and bottom sheeting and triangular stock in corners permits well-rounded edges on finished model.

crunch.

The fuselage is reasonably wide and deep to allow us to put all of the necessary equipment in place and have it look neat, particularly those of us blessed with short, fat fingers. The nose block is hollowed with a Dremel tool, and a cut-off 1/4-inch nylon bolt will allow easy access to change the ballast towards the mad, mad, mad 45%. The width of the fuselage, the wing tips, wing root fairing, and the length of the fuselage allow us to make use of standard 36-in. sheet and strips. The full-length 1/64 ply doubler makes the fuselage much stronger than you will believe. The really neat thing about the Petrel is the fact that you can build 100-inch wings for it by simply adding more No. 4a ribs and using 48-inch stock instead of the 36. Now you are saying, "Ealy, you finally went too far!" NO! The two-meter version has moments almost at the maximums, but the model is still very responsive. All who have seen it fly agree to that fact. After attaching the 100-inch wings, we are now near, but not beyond, the minimum moments for the wing span, chord, etc. One might guess that it would now be too sensitive, but in truth, the increased lateral mass slows down the yaw rate . . . again, a smooth and responsive 100-incher. With the wing loading decreased by the increased area of 850 sqs., you now have another winner!

"To spoiler or not to spoiler, that is the question." I need them to get landing points, but my son doesn't, so it is your option again. I personally believe that spoilers on just the bottom are more efficient airfoilwise, but I use them on top and bottom. With top and bottom spoilers, the Petrel will almost stop in midair. You can bring it in for 100-point landings everytime, unless someone is already there and the nose of your plane is too high off the ground for the 100-point section to reach, because you are on top of his ship. Go ahead and laugh, this happened to a person who was eager to win.

CONSTRUCTION

1) Read all directions first, before doing any building. (Alright, go ahead without reading, Murphy loves you!) Separate all strip wood, sheeting, and hardware into neat piles that will become the wings, fuselage, fin, stab, and rudder.

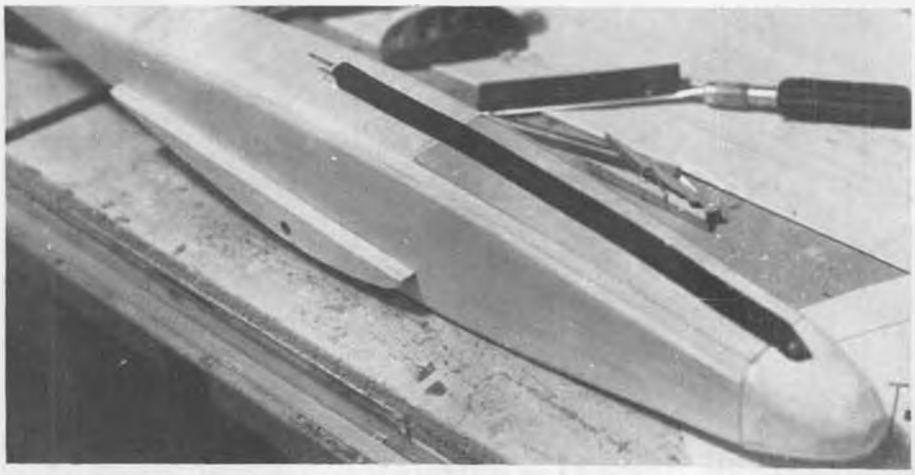
2) Cut out all ribs and notch them for the spars. Pin the l.e. and t.e. to the plans and mark and notch them 1/8 inch deep for the ribs with three hacksaw blades. If you plan to use ballast tubes, sand one end of the tube very sharp and use it to cut holes in each rib. Insert the tube into the holes after step No. 7 and attach with epoxy or cynoacrylate adhesive.

3) Pin l.e, t.e. and bottom spoiler to plans (be sure to cover the plans with plastic wrap first!). Cut and glue bottom sheeting in place and glue all ribs in place except the dihedral ribs.

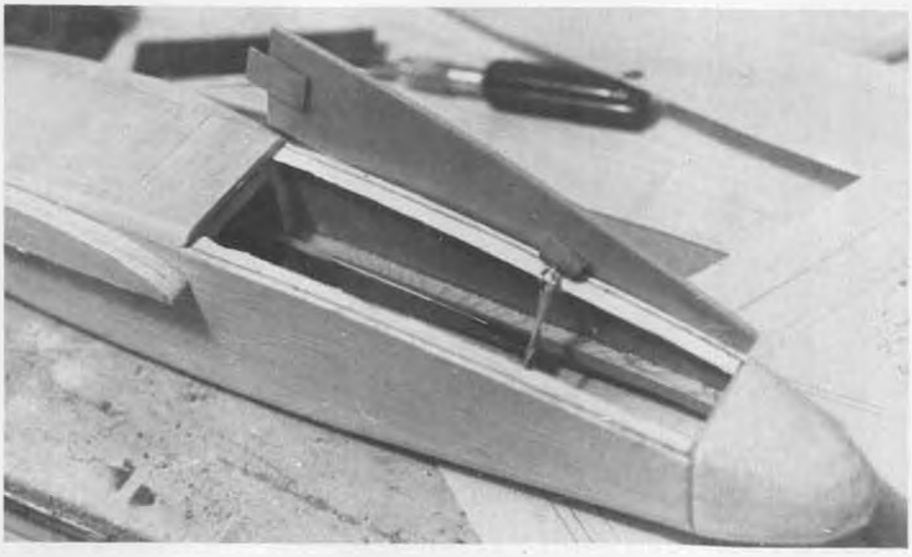
4) Place the fiberglass wing rod tube (cut to exact length) in place. DO NOT GLUE. Cut and place 3/16 webbing between tubing and spars and tack glue only. Cut and glue the 1/8 webbing between the appropriate ribs and glue top spar in place. This is to be done with inboard and outboard panels.

5) Notch top and/or bottom of ribs to accept spoiler blades and spoiler spars,

Continued on page 93



Bottom view of fuselage showing skid, towhook, and 1/64 ply bottom doubler. Rubber skid keeps ground slide to a minimum, which helps when making spot landings.



Radio hatch has 1/64 ply doubler on the inside. Former F2 is notched on top to accept the tongue on the rear of the hatch. Nose block is hollowed out to serve as a ballast box.

R/C FORUM with

Hal deBolt

P.O. Box 147
Buffalo, N.Y. 14225

How to get the most in performance and reliability from your Radio Control System.

• Mail in your questions or concerns. •

• We had some correspondence this month which reminded me of one of the more enjoyable ways that R/C can be used without any additional effort. Soaring or gliding with R/C has become very popular, and we see many people building and flying various sorts of models whose only purpose can be to soar in one way or another. The objective, of course, is to get the aircraft to a sufficient altitude in some manner so that lift can be found and the desired soaring accomplished. There is no doubt that the best soaring is done with an aircraft especially designed for the purpose; it is also true that obtaining such a craft requires special effort of one sort or another.

There are so many things that most of us would like to do with R/C that we often have to pass some of it by, simply for lack of sufficient time. Like many, I find myself in this position, and yet always seem to manage to have a simple, lightweight "sport job" around to use when the desire is to just go flying for fun. To me, soaring can be sport flying . . . doing something different just for fun. Not owning a glider, I have found that if one takes his normal sport job up to an excessive altitude and cuts the engine, a little searching around will quite often find some lift, and a considerable amount of soaring can be accomplished without having a special glider. The "fun of soaring" can be enjoyed! What is amazing is that I have seldom seen others using this procedure, yet many express a desire to try some soaring. You might like to give this trick a try, if you have not already been initiated. I realize that among glider people it would never be kosher, but then, not all of us are glider enthusiasts. *(Could be the first time Hal ever flew an R/C glider was when we were demonstrating same during the '67 or '68 Wright Memorial, Wright Field, Dayton, Ohio. He took away our transmitter, flew around for a few minutes, grunted, and handed it back, with a remark something like, "It ain't fast enough." wcn)*

What brought this to mind was a fine letter from Bill Rauch, of Crofton, Maryland. Bill tells of starting modeling in the Buffalo area way back in 1937, before your author arrived on this scene. Seems like Buffalo has always been an active modeling area. Bill tells of recently getting interested in soaring via an R/C "Buzzard Bombshell", and then finding that there are no facilities for launching normal gliders from his flying field. Bitten by the desire to do some real soaring, the next step was a "Dragonfly" powered glider (from **Model Builder** plans) and he had considerable success in finding thermals with it. Inspired, Bill enlarged the Dragonfly to an 11 foot span and powered it with a .15. This bigger combination would gain about 400 feet of altitude on 2 ounces of fuel, where thermals were easily found. This allowed average flights to 2000 feet of altitude and considerable more soaring time than previously.

Bill has obviously found a way to adapt soaring to his facilities, and to do it in a manner suitable to him. Like the hunter who finally bags a bird, you cannot get the soaring bug out of Bill, and he is off to another very interesting project.

Bill wonders if he is alone with his powered glider approach. Many of us can tell him that he is not, and that much can come from it. One example which comes to mind is interesting and was developed in full-scale aviation at much expense and with considerable success. Most of us are familiar with the Lockheed U-2 jet aircraft and its exploits as a spy plane. How many have heard the stories of its use as a glider? To understand the application, you have to realize that the U-2 was developed to operate at extreme altitudes, practically into the stratosphere. Apparently there was a need to explore the airstreams at very high altitudes as they passed over the Rocky Mountains. We all know of the lift created by the upsurge of air as it strikes a cliff, etc., and of course, a mountain range could appear to be a cliff if you looked at it on a grandiose enough scale. The high-altitude jet streams pass over these mountains and, as with a cliff and wind, can be affected in a similar manner. The question apparently was to what extent the effect was, how continuous, and all sorts of good things like that. As the story goes, the U-2 made these explorations, and in so doing, acted as a glider much of the time. The flight duration of a U-2 under power would only be 2 or 3 hours, but by shutting down the power at altitude and soaring, the U-2 remained aloft for many hours and could have been extended indefinitely as far as the ability to soar was concerned.

The point of this story is that Bill wishes to do some soaring, has a problem which prevents him from doing it in the normal way, and yet has found an answer. If something other than "normal" is good enough for full-scale, then why should we R/C'ers not look for an answer also?

Bill's latest answer appears to be a design which will reach soaring altitude (where the fun is) much quicker, a la the U-2 approach. It will also exploit all the aerodynamic means to create efficiency. His 3-views indicate an extreme attention to drag reduction and even the use of a retractable landing gear. It is somewhat reminiscent of a very pretty Hughes design of the war years. It seems quite obvious that it should accomplish Bill's purpose very well, but we wonder if he also realizes that he will have a most interesting sport airplane as well as a powered glider?

Of other interest this month:

So often it is the simple things about R/C which can lead to problems, and the lack of a thorough understanding often creates the problem. While it was far from being the first time it was seen, an "expert" flier recently lost a precious new model to radio failure. The cause turned out to be real simple; he just did not have sufficient range with a well-proven radio which he assumed would work just as well as it had been doing previously. Before chastising him too much as an "expert", we should point out that he did make a range check after installation in the new model, but the fact was that he did not understand thoroughly enough how it should be done. So, let's run through receiver installation and the basics of range checking, in hopes that we can prevent the demise of someone else's precious new bird. . .

You may have an R/C system which is in perfect operating order, yet when installed in your model, the range does not check as the instructions indicate it should. How come? More often than not, short or intermittent range under these conditions can be traced to improper routing of the receiver antenna. In practically every case, you will note that the antenna exits the receiver case on the opposite end from the power and servo cables or connecting block. The purpose is to keep the antenna away from all cables and other components. To understand the "why" of this, you must be aware of how an antenna works.

The antenna is only a common piece of wire, however, it is cut to a precise length which is a harmonic of the radio wave length in use. In addition, it is attached to a tunable circuit which acts as a vernier adjustment, so that the actual length of the antenna, electronically, can be very minutely adjusted. Properly adjusted, this length is far more compatible to the desired frequency than it is to any other. When the receiver is operating, there is an "aurora" about the antenna, along its length. If, instead

of being a wire, you would think of the antenna as being a piece of tubing about 2 inches in diameter, you can visualize the aurora, which is quite similar to the field which surrounds a magnet. The transmitter emits radio waves into the atmosphere at the desired frequency. While passing through the air, these waves also pass through the antenna's aurora; should the antenna be tuned to the frequency of the transmitter's radio waves, it easily picks up the signal and feeds it to the rest of the receiver, as we would like it to. For the antenna to act with its greatest efficiency, the "tuned length" of it must not be affected and the aurora must not be interrupted. The antenna was tuned by a technician while it was completely free of any obstructions. Therefore, the best installation will be one in which it is kept at the same exact length and its aurora is kept intact. This means that "thou shalt not shorten the wire or add length to suit thy model!" The aurora, thankfully, is not particularly affected by wood or plastics. However, it is *drastically* affected by metal and all electronic components. It is important to keep the antenna at least 1-1/2 inches away from anything metal or electronic. Anytime the antenna is closer than that to the forbidden materials, it will be detuned to some degree. So, what is the best manner to install a receiver antenna?

If you will run the antenna directly out of the fuselage, using the shortest possible route that is free of any metal or electronics, that is a start. Once out of the airplane, it can be routed to the tip of the stabilizer and anchored with a rubber band. Should your antenna run alongside the fuselage at all, you should remember that the 1-1/2 inch clearance still must be maintained. There have been cases where some interference within the fuselage could not be seen, and thus was not suspected to be within the forbidden area. Remember that wood and plastic are not an insulator to the aurora.

A properly installed antenna will help greatly with range. When everything seems to be in order and yet the range check comes up short, often just rerouting the antenna will relieve some unseen condition and correct the problem.

Where to range check? The radio waves emitted by the transmitter are not unlike the ball used when playing handball in a 4-wall closed court. If you deliberately strike the ball hard and angle it into one wall, it will ricochet from one wall to another, and each time it strikes a wall, some of its energy will be absorbed, until nothing is left. The radio waves emitted by your transmitter antenna would travel infinitely in a vacuum; thus, our space probes can get information back to earth with very little transmitter power. The short range we have on earth is created by the waves being absorbed by anything they come in contact with. For these reasons, it is important to choose a range checking spot as free as possible from all obstructions of any nature. Obviously, no two spots will ever be exactly alike, hence it is important to make comparison checks using the exact same spot each time. Remember that the waves also ricochet or reflect off of obstacles of most any sort, so nothing should be close to the path between the transmitter and the model or receiver.

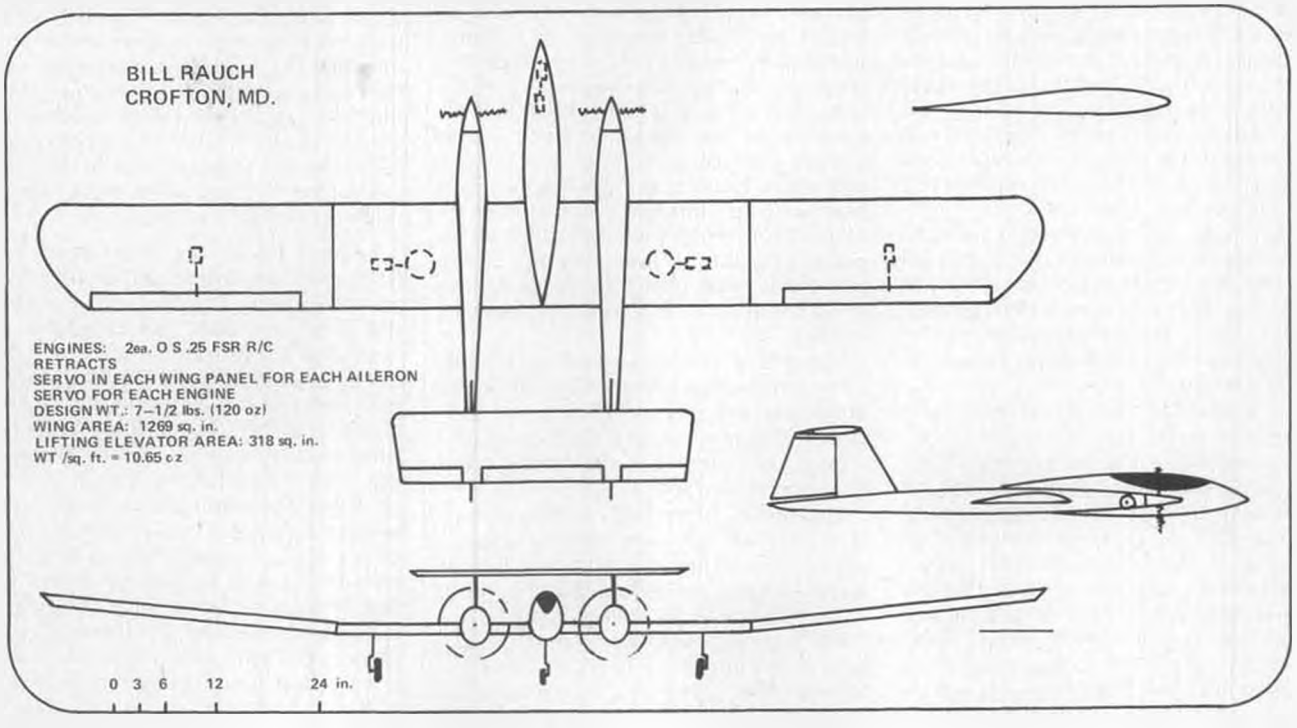
Ordinary dirt, grass, etc. is an excellent absorber of radio waves; in addition, its absorption factor will vary with the material's dampness. Thus, the transmitted signal will be far less affected and much stronger just a foot or so above the ground. Simply setting the model on a cardboard or wooden box will alleviate any such effect.

In making a range check under controlled conditions such as this, you will establish a standard for yourself which will tell you when you are encountering a problem. Once you have made a check under these conditions with a system which is working properly, you will know what to expect, and if you do not see it at some time in the future, trouble can be suspected.

Most manufacturers provide instructions for range checking with their equipment, even though they may be sketchy in some cases. All of them follow the same general procedure. The idea is to reduce the output of the transmitter to a bare minimum, which serves to simulate the condition your receiver will see when it is at maximum range. Maximum range can be a question. Usually it is described as being *as far as you can see the aircraft in flight*. Ground range can be as little as 1/3 the range available in the air, for the reasons I just described. However, remember that this is only true for a system in good order. Should your range check be shorter than normal, do not hope that the increased air range will make up for the problem which is causing your short range on the ground.

Transmitters that have antennas which collapse into the box and which have to be unscrewed to accomplish it, normally disconnect the antenna from the circuit in this process. With an antenna which does not collapse into the box, the antenna can usually be removed from the transmitter by unscrewing it. If by chance the antenna can be collapsed into the box without unscrewing it, there should be no more than 1 inch remaining outside the box when the antenna is fully collapsed. Whatever the process used, the object is to reduce the transmitter's output to a minimum so that you can make a range check within a reasonable distance while the entire

Continued on page 83



Take a look at this photo and then tell us that a pilot in the cockpit doesn't make a scale model look better! Closeup of Bob Nelitz's Chipmunk reveals faultless workmanship.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• A letter from Bill Knepp prompted a thought which has been hanging around the darker recesses of the writer's mind for quite a while, waiting to get out. Since a new year has come upon us, it would be well to let it out and allow the mind to return to its usual vacuum condition.

How many times have you seen a beautiful scale model, well constructed, interesting, but ruined by markings which were carelessly applied? I can recall occasions in which photos have appeared in magazines where the author or editor has placed the model next to, on top of, under, etc., the full-scale aircraft they used for the rendition. Often the caption under the photo will read something like "Joe Schlunk has produced a model hard to tell from the original", or "an exact copy".

As you casually study the two subjects, things begin to jump right out and strike you. Not the fact that perhaps a cylinder head is evident or even that control horns hang from the elevator, but rather that the markings are very badly formed and placed.

Two kinds of markings that seem to be the most flagrant offenders are stripes and numerals. There are so many numerals. There are so many numeral forms with stylized corners, angles, and the like, plus the nasty old slant which is induced in the numerals and letters placed on fuselage sides or fins, that it is often hard to duplicate them accurately. An additional problem develops when area sizes have been tampered with. If the wing area has been enlarged, something needs to be done to correct letter and number sizes to match the increased size.

But correct size and shape often seem to be the least of some fellow's problems. After you have used the photography or opaque/overhead projector method of enlarging the 3-view, then you have the markings from that source, which *hopefully* are accurate. (Many times they aren't, and your photos only serve to prove it elsewhere in the presentation.) If you have enlarged the 3-view, then trace them and bingo, you've got them. However, as I stated, size and shape aren't the only problems. Look out for the placement.

As is so often the case, the construction items we speak of here come toward the completion of the model, and we're huffing and puffing to get it over with. In addition, with some types of masking techniques, it's difficult to actually locate the markings due to the size of the mask itself. Spend extra time to accomplish the actual location of items.

Some fellows have a good eye for this sort of thing, but others have difficulty judging a foot if it kicks them. I'm convinced that much of it is not necessarily inborn, but develops essentially from patience and practice.

Locate key items such as hinge lines, handles, rib outlines, rivets, screws, panels, you-name-it, to help you. But for heaven's sake, be certain that the guide you are using is accurately placed.

Measure from edges, wing tips, etc. before settling on a spot. In addition, look at the placement from different angles. We become so obsessed with what we are doing that we often see it only from one perspective. As an illustration, when I placed the stars on the fuselage side of a Russian Lavochkin, I concentrated so hard on the side view that I missed another problem. When the model was completed and resting majestically in the back yard, a small child not skilled in the intricate niceties of our exacting hobby/sport and not realizing that agonizing hours of diligent craftsmanship had gone into the magnificent creation, stood next to me about ten feet behind the tail of the model, and after a cursory glance, asked me why the top point on the two stars were at different levels as they wrapped around the upper curve of the fuselage! Darn kid was right, and it looked terrible.

Experiment, check, recheck, and look from all angles before completing the job.

Stripes, especially pin stripes and numeral outlines, can be quite a problem. The long distances involved in some striping serves to accentuate any problem with the width. I think you will find that in the case of pin striping, the most noticeable and critical distance is the base color space between two colors. Pay close attention to this factor.

The importance of sighting from many angles is equally true of striping. It is very hard to keep lines true, so squint and sight along the length to pick up those little undulations in the tape, or the drawn line if you are using a material like Liquid Mask by Fliteglas.

As an aside, consider the liquid mask method, for it makes it possible to lay out and locate the markings without obscuring other parts. In addition, it gives a very sharp line. Some people have shied away from it over open bay construction, fearing that they would cut through the covering material. I have successfully used it over Super Coverite on two models. Obviously, a great deal of care needs to be exercised when doing the cutting. I found that the weight of the small X-acto handle with a *new* No. 11 blade was generally satisfactory to cut through the Liquid Mask film. In regard to other coverings, I would suggest that you experiment beforehand. Super Coverite is tough compared to some other materials and doesn't puncture as easily.

Some persons are frightened away from markings which utilize writing and small lettering. They are familiar with the use of rub-on types, but sometimes discover that the letter styles do not fit their needs or are just not available. I looked with concern at the lettering on the fuselage side of the Stormovik for quite some time. Finally I took the bull by the horns, got a 0000 brush, and had at it. I soft penciled the writing in and then proceeded to paint it in. Actually, it proved to be quite simple. Even if there is a minute error, it is hard to detect with that type of marking since the *original* was hand painted by some Russian worker at Kustiani during the middle of a war! That type of marking is impres-

Continued on page 91

John Preston, of Falls Church, Virginia, sent in these photos of fellow NVRC club member Kirby Crawford's beautiful 2/9 scale Curtiss Gulfhawk. Conventional construction, weighs 26 lbs., and has a very effective smoke system. Plans were scaled up from Westburg 3-views in MB.

MAMMOTH SCALE

By RON SHETTLER

PHOTOS BY AUTHOR

LET'S ALL HAVE FUN

This month, as promised, we'll present an answer to some problems that beset modelers, build they big or small. But first let's lay out the problems, because some modelers, organizers, and fliers haven't been on both sides of the fence; i.e., that of organizing and participating in a meet. Incredibly often, the hardest working people at the meet are the persons who are rarely seen flying during the year, or the complete opposite: those who are considered the steadiest, most competent *sport* fliers the club has, the guy or gal who test flies just about every airplane the owner wants to get back in one piece. Mention "contest" and this person leaves town, sends his radio out for repair, or volunteers to take a job at the meet that will not allow him to take part in the flying. If someone does con him into flying by saying it's a fun fly, all you have to do is mention that the next "competition", instead of "event" or "fun thing", will be such and such, and the transmitter he is holding will turn into a blur of vibration. He is definitely not enjoying himself. Yet, if planned events bog down, spectators get bored and this same person will step into the breach and put on a dazzling show, looking for all the world like a calm professional with both him and his aircraft under light control.

Recognize anyone yet? How about the best flier on the field, who is so intent on watching his egg drop in his first bomb drop event that his aircraft hits the ground first? Actually, it's not very funny, especially if you were hit by the aircraft or if it was *your* aircraft. Scratch a few more people from the fun list.

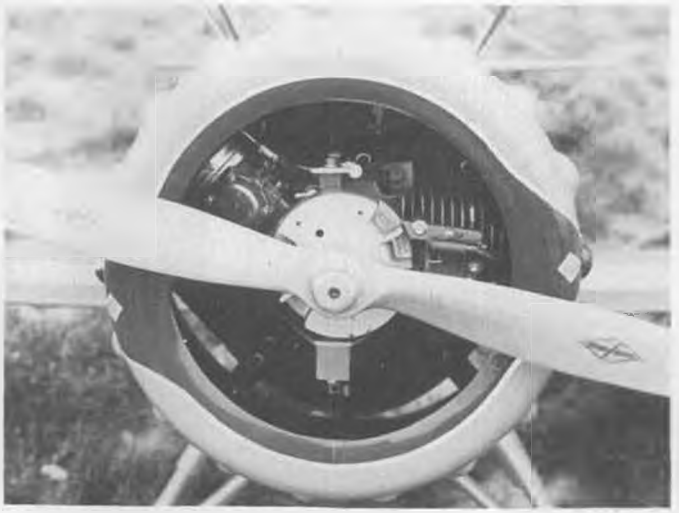
As a spectator, I don't enjoy myself when being buzzed or having to duck an aircraft which is being flown dangerously, either intentionally or unintentionally. Ask yourself if you are really right about your wife or girlfriend not wanting to share your enthusiasm for your sport/hobby, or is it that she's a bit more realistic as to the dangers which spectators are often subjected to, and her sense of danger is not blunted as much as ours is, being an active participant. Too often, the flight line or pit area are the safest places. At any rate, there is someone else who is not having fun.

How about the serious competitor who drives all night to get to the contest so he can enter as many events as possible that weekend, and he's so intent on winning that he watches only his nearest competitors fly. I somehow doubt that he's having much fun.

How about the contest director who finds he can't depend on volunteers, has bitten off more than he can chew, and things generally aren't going as planned. Ask him how much fun he's having and

Continued on page 84

Kirby's Gulfhawk making a low pass. Largest Du-Bro big wheels (6-inch) dictated 2/9 scale. It's Kirby's 2nd big model.



Most successful engine in the Gulfhawk so far is a 1.6 cu. in. Homelite with a 1.9 crankcase and 2.5 carb. Turns 20x6 prop.

In this first of a three-photo sequence from Chuck Black, No. 1057 barges down onto No. 1677 before the gun goes off for the start.

STRICTLY SAIL

By ROD CARR

• I have been notified by the members of the Minuteman Model Yacht Club and their newsletter editor, Jack Sullivan, that they will host an evening with Mr. William Avery Baker on Friday, March 30, 1979, at the lecture hall of Pollard Junior High School in Needham, Mass. Mr. Baker is the curator of the Hart Nautical Museum at Massachusetts Institute of Technology. He will speak and present slides on his experiences in building replicas of 17th Century ships. Built on a scale of 1 inch = 1 inch, his best known "models" are the MAYFLOWER II, which retracted the journey of the pilgrims from England to the Plymouth colony; the ADVENTURE, a 1725 plantation boat built for the South Carolina Tricentennial; and the MARYLAND DOVE, a 40-ton replica of a 1663 pinnace built for the city of St. Mary's, in Maryland. For information on what promises to be a most interesting presentation, call or write Minuteman Model Yacht Club, c/o Needham Park and Recreation Commission, Town Hall, Needham, MA 02192, phone (617) 444-5100.

Chuck Black continues to send us informative photos of action in the San Diego area. A three-photo series provides us with much food for thought. In Photo 1, just before a start, No. 1221 has had to slack sheets and is killing time behind the line. No. 1677 is closehauled, and not obligated to give anybody room between herself and the starting mark we can see to starboard of her. The conclusion is that No. 1057 is barging, trying to force a leeward boat down and squeeze between her and the mark. What kind of Monday morning skippering can we apply to the situation already?

Well, first, No. 1221 is really taking himself out of contention. He has borne off the wind, and is now giving up ground to weather that she will have to make up after the start. She is too early.

The realistic approach would have been to have luffed up, lost speed and maintained steerage so that she could hit the line with the gun. No. 1677 is doing just the right thing. He is just about going to have to hit No. 1057 to prove to the race committee that the blighter was barging.

The trick will be to just kiss him and then bear off quickly so as not to lose too much way. Hopefully, the skipper of No. 1677 is presently yelling at the top of his voice, and that should be convincing the offender to round up quickly to avoid contact. The quicker No. 1057 can be made to round up, the more way he'll lose and the more likely that No. 1677 will be able to squeeze ahead into clear air. The guy wearing the black hat, No. 1057, has just plain blown it. Seeing the possibility of being squeezed out, he'd been money ahead, and not have the foul points hung on his head, if he had merely dropped behind No. 1677 and started late but in clear air.

Photo 2 shows the situation a bit after the start. No. 1677 seems to be in the best overall position (realizing that No. 1057 is carrying the foul points already). A close look at No. 1057's mains'l leads me to think that he ought to be protested for illegal placement of battens on his sail. They are certainly not dividing the leach into equal segments.

Photo 3 shows No. 1677 consolidating her lead. No. 1221 will eventually have to tack, and No. 1677 can either tack and cover, or hold on and make No. 1221 pass behind her. The strategy will depend on the position of the lay line for the weather mark, and the wind direction at the time. No. 1677's sails are set just beautifully. They are smooth, crisp, with little twist and no flat or "hard" spots on them. Compare them to the other two boats and you just seem to get a feeling of power and authority.

A number of years ago I stood a stint at the helm of the STAR 45 Class as it gained AMYA sanctioned status. At the time we set up the class specifications, we measured a number of the boats that had been built from the wooden-hulled Dumas kit. The dimensions were collected and we took the biggest dimension we ran across as the upper limit. A change in both rudder and keel were allowed, controlled by a maximum depth for each of these appendages. I know that there are well over 3000 of these boats out, and as a service to their owners, would like to present the current class rules for their use. The major change that needs to be made for racing the boat is to acquire a suit of new racing sails from one of the sailmakers who advertise in these pages or those of the AMYA Quarterly. After that, work on the keel and rudder would be in order. I ran a couple **Model Builder** discussions on the boat and would be happy to send

Photo 2: After the start, they make a beat for the weather mark. Don't know where No. 137, the leeward boat, came from.

them out if you'll provide me with 2 stamps (16 cents each, of course).

STAR 45
CLASS RATING RULES

HULL

Standard Hard Chine hull as manufactued by Dumas, Reynolds Manufacturing (Mainwaring mold), and other manufacturers as designated by the Class Secretary, Hulls may also be built from plans so long as they conform to the STAR design and specifications:

Hull construction: Wood or Fiberglass

Maximum LOA: 45-1/2 inches plus or minus 1/2 inch.

Deck constructed in accordance with sound practices

Beam maximum 11-1/2 inches plus or minus 1/2 inch. Rub rails up to 1/4 inch may be added at sheer, but will not be included in measurement at maximum beam.

KEEL

Keel shall be no more than 11-1/2 inches from bottom of hull to bottom of keel.

RUDDER

Skeg rudder or spade rudder. Rudder shall not project more than 7 inches below hull.

MAST

Maximum height above deck to be 70 inches. Rotating, permanently bent, permanently curved, or wing masts are prohibited.

RUNNING RIGGING

All running rigging controlled by R/C is prohibited except for main and jib sheets, jib tensioners and jib "twitchers".

STANDING RIGGING

Height of jib stay attachment to mast not to exceed 54 inches above the deck.

SAILS

All boats in the class shall be as alike as possible in sail plan, and none shall have undue advantage by reason of size of sails or construction. Cotton, nylon, and dacron sail material are permitted. All sail dimensions are to be cloth to cloth with sails attached to spars, and wrinkles pulled out. The sails shall conform to the following dimensions which will represent the maximum allowable: (all dimensions in inches)

Main: Leach 64-1/2; Luff 61-3/4; Foot 24-1/4; Roach 2-1/2; Foot Round 1.

Jib: Leach 36; Luff 41-1/4; Foot 14-3/4; Roach 1; Foot Round 1.

BATTENS

Main: Maximum 4, equally spaced across leach and not to exceed 8-1/2 inches in length.

Jib: No battens permitted.

JIB CLUB

Permitted on jib, or jib may be loose footed.

DISTINGUISHING MARKS

Each yacht shall carry on her mainsail the class 5 point "STAR emblem", and an assigned AMYA registration number. The "star" should be at least 2 inches in size and positioned above the registration number, and both should be positioned on the upper half of the mainsail on both the port and starboard sides of the sail. Identification numbers shall be 3 inches in height and at least 3/8 inch thick and clearly readable.

NO LIMITS

LWL, weight.

PROHIBITED

Movable keels, or movable ballast.

* * *

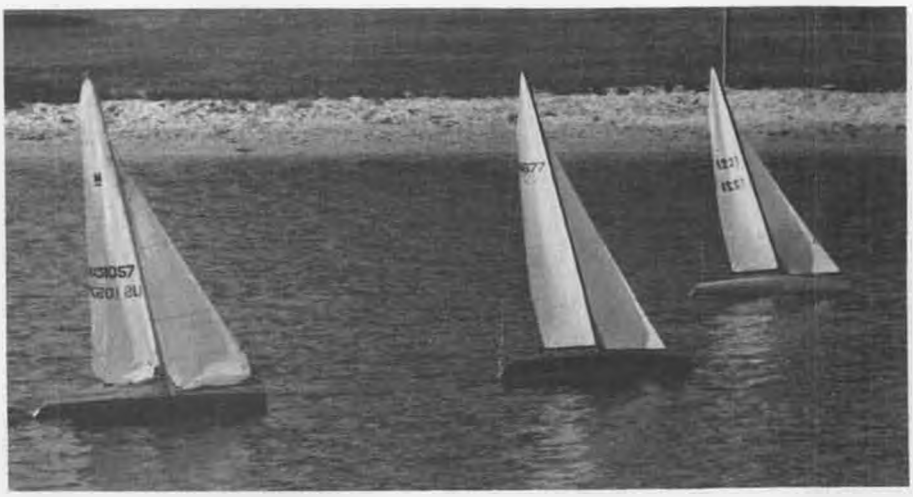


Photo 3: No. 1677's nicely-set sails pull her out in front. No wrinkles, cups, or creases make for maximum power.

During the recent AMYA balloting, the membership overwhelmingly voted to maintain organizational autonomy. The AMYA is not recognized by the International Model Yacht Racing Union (IMYRU), while another organization, the Model Yacht Racing Association of America (MYRAA), is. In an effort to bridge the gap, MYRAA President Angus Scott-Fleming has invited groups of 5 skippers to form clubs for the purpose of obtaining MYRAA membership. The bottom line is the opportunity to sail in the 1980 IMYRU World Championships in Canada. I've offered to serve as a point of reference for individual skippers who may need help in interfacing with MYRAA, and sent the following letter to the AMYA Quarterly and MYRAA officials:

Gentlemen:

I am in receipt of the Angus Scott-Fleming letter of December 1, 1978, addressed to all AMYA Clubs.

He offers a policy of cross-pollination, and tactfully refrains assigning roles as bees or flowers!!! More power to him. I have been peripherally involved with MYRAA over the years, first as handling the admittance of our original Capitol R/C'ers into MYRAA back in 1970 and 1971, and more recently within the competition framework of the International A-Class in which John Krick and Angus have forged some excellent competitions for skippers within both organizations. I have always been happy to see that warm wind and a weather mark were all that was necessary to leave organizational squabbling far behind the starting line.

My reason for writing this open letter is a concern for the individual AMYA members who make up an approximate 65% of that organization. The MYRAA has taken the position of discouraging individual memberships for the purpose of eligibility in the 1980 World Championship to be sailed under IMYRU sanction in Canada. This is a reasonable result of their structure, which is a loose confederation of clubs, while AMYA has chosen to organize as a collection of individuals.

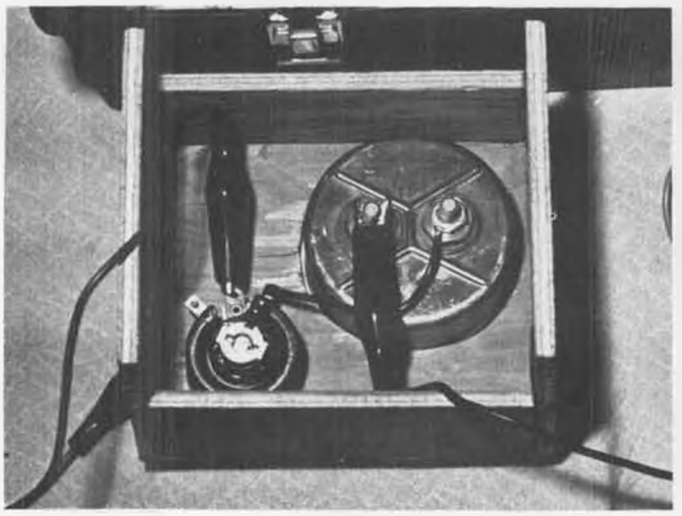
I propose to serve both organizations at the same time as a central contact point for AMYA members who either do not belong to AMYA clubs and wish to join MYRAA, or for AMYA members whose clubs choose not to affiliate. In either case, I will be able to shuffle such individuals into regional organizations that will be simultaneously compatible with the aims and structure of both organizations. Since I had the misfortune to draw the short straw and serve as AMYA's first Secretary/Treasurer, I am well acquainted with her structure, distribution of membership, and roster of current skippers. I would seem to be an obvious choice for providing the administrative bridge which AMYA members will need for easing the passion of this phase of cross-pollination.

I have maintained some semblance of credibility within both organizations, maybe through creative laziness if nothing else, as I've always preferred to sail rather than slug. When I felt the need to massage a typewriter, it was usually in production of copy for national publication intended to introduce and promote model yachting across the country.

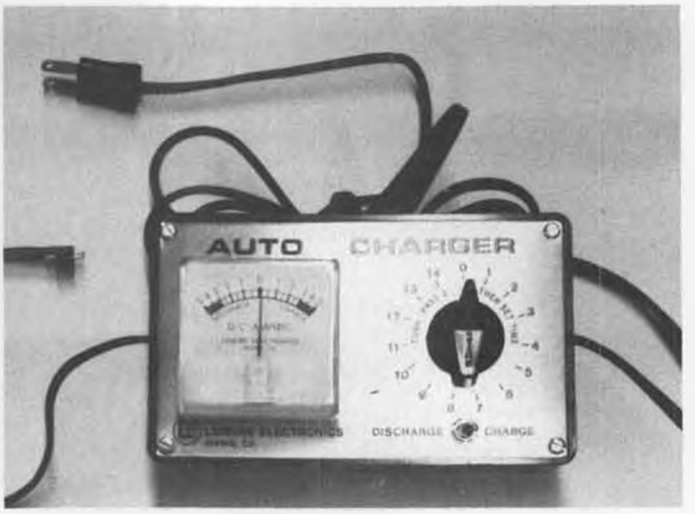
I selfishly hope that such a position will be repaid in an increased flow of photographs and technical information from MYRAA that I can use in descriptions of international formula class activities. (I'm quite proud of my record in promoting 50/800, A, and 10-R classes within the pages of **Model Builder**, Radio Control Modeler, Model Boats, Radio Control Model Boating, Model Boating World News, *and a number of other publications.)*

Simply put, the bottom line is as follows to AMYA skippers: Send me your name, address, AMYA number, a $2.00 bill, and a stamped, self-addressed envelope if you agree with me that cross-pollination between AMYA and

Continued on page 98



Homemade charger with variable resistor and ammeter, seen from underneath. Resistor is 0-10 ohms at 20 watts max.



The resistor charger for 1/12-scale electric cars, made by Leisure Electronics. Really a well-made unit.

ELECTRIC POWER

By MITCH POLING

• The Astro Dandy finally flew indoors, thanks to the generous permission of the Boeing Hawks free flight club, which had an indoor meet at a local high school. The gym was 90 feet square with a 35 foot ceiling, smaller than the Pasadena exhibit area, but big enough for circling flight.

I quickly found out how critical power loading is, because the Dandy couldn't climb on 17 watts; too much altitude was lost in the sharp and hard turns necessary in the gym. Outdoors, all had been just fine, but I had had room to keep the turns gentle. So, from a shoulder-height launch, the Dandy could make two circuits of the gym before it settled to the floor. I then raised the power to 25 watts, and had a tiger by the tail! The speed had been just about right on 17 watts, easy to control with time to think, but at 25 watts the speed went up by 50%, and it was all I could do to keep it off the gym walls. After a couple of wild pylon racer type circuits around the gym, I turned it off and landed.

The climb was good, and the wing loading was low, at five ounces per square foot, but that didn't slow it down. The Dandy is a low drag design; perhaps more drag would get the speed down, but it might also hurt the climb.

Anyhow, it proved to me that power loading is just as important as wing loading in indoor flight. Too much power, and the plane is too fast; too little, and it won't climb. Indoor free flighters found this out long ago. Indoor free flight planes show a beautiful balance between power, turn rate, flight speed, ceiling height, and room area. I knew this from flying Peanut Scale myself, but somehow I had to learn the lesson all over again for indoor R/C.

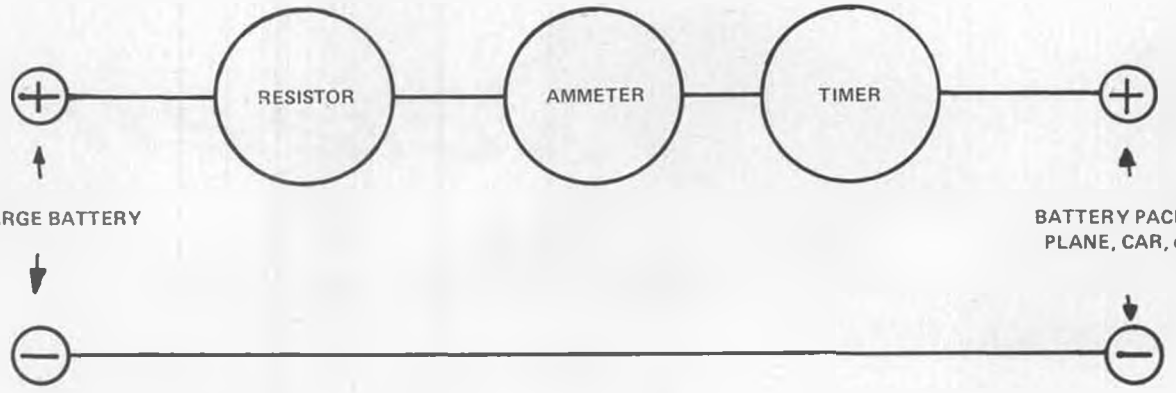
Mother Nature doesn't change the rules just because the plane has a radio in it! So, the challenge gets more complicated; it's more a problem of designing an indoor free flight ship that has a radio to interrupt flight, or so it seems. Another way of putting this is that the plane should be able to fly free flight indoors without a radio almost as well as with one.

In the last column, I finished covering the Astro Flight fast charging method, and mentioned the other method of charging, the resistor method. The circuit diagram for resistor charging is almost as simple as for the constant voltage (Astro) method, only one more component is needed: a fixed or variable resistor. Most commercial chargers use a fixed resistor and a fifteen minute charge time. I use a variable resistor and charge anywhere from seven to fifteen minutes. The beginner to fast charging should use fifteen minutes, because it isn't quite so easy to overcharge at this rate as it is with the shorter times.

There are two rules that must be obeyed in resistor charging: one, the battery pack must be discharged low enough so the motor just barely turns; two, the charge rate times the charge time in hours must not exceed the amp-hour rating of the pack. The consequences of ignoring these rules is a

Jomac charge cord *must* be used in conjunction with a timer; it's too easy to forget!

The Astro Flight resistor charger, charging a car at a local indoor race track.



ruined battery pack; the cell seals will let go and the electrolyte will leak out in a sad, gooey mess. Let's face it, you have to be careful if you use the resistor method, more careful than if you use the Astro method. Carelessness will ruin the pack in resistor charging, but you can goof and get away with it most of the time in the Astro method.

There are two advantages of the resistor method over the Astro method: one is that there can be any number of cells in series (the Astro method is limited to multiples of four cells), and two, charge times of less than fifteen minutes are possible if you are careful.

One other condition holds: the cells must be made by General Electric or made with the welded internal construction General Electric uses (I understand that Sanyo cells are also OK, but I have not tried them).

So, let's see how the formula works for the three most common cells used in fast charging, the AA pencell (.500Ah), Astro cells (.550 Ah), and the sub-C cells (1.0 Ah). The formula is: fraction of an hour charged, times charge rate, equals capacity of the pack. As said before, use fifteen minutes (¼ hour) if you are a beginner. So, for the pencells, the rate is 2.0 amperes (¼ hr. x 2.0A = .500 Ah); for the Astro cells, it is 2.2 amperes (¼ hr. x 2.2 A = .550 Ah); and for the sub-C cells, it is 4.0 amperes (¼ hr. x 4.0 A = 1.0 Ah).

There is no safe way to do resistor charging on your own without an ammeter. The only exception to this is the commercial 1/12 scale cars and the charging cords included with them. The manufacturers have already done the testing for you, as long as you use the charge cord specifically designed for the car. A friend of mine nearly burned up a pack in his car by using a cord for six-cell cars on a four-cell car (same brand), so confusion can still happen very easily. The cords look alike physically, though they are labeled. Fortunately, he noticed that the cord got quite hot and disconnected it in time.

The charge rate does taper a little, typically down to 75% of the initial rate as the pack charges up. This is normal, and the rate should be left alone, so that the pack gets about a 90% charge, not 100%. Hot doggers after every last drop of power can reset the current to keep it at maximum rate throughout the charge, but it is a good way to blow the pack, since some cells will already have some charge at the start, and will get overcharged.

After 10-20 cycles of resistor charging, the individual cells will start to vary in their charge; some will be flat discharged at the end of a run, and some may have 10% or more of their charge left. This can lead to trouble, because the cells with the 10% charge will get overcharged eventually and will start to leak and go bad. The remedy is to put the pack on an overnight charge at the 1/10 capacity charge rate (50 ma. for AA cells, 100 ma. for sub-C cells). This will even up the pack to 100% charge on all cells. The 1/12 scale car manufacturers have chargers that can do this; I advise having such a charger.

What batteries should be used for charging? The rule of thumb is to use a charging battery of 4 Ah of better, and use a six-volt battery plus resistor for one to three cells in series, 12 volts plus resistor for four to seven cells in series, 18 volts plus resistor for eight to eleven cells in series, and 24 volts for twelve to fifteen cells in series. The resistor must, of course, be tailored for the particular number of cells and charge rate needed, and it should be rated at 20 watts. Some of the commercial and home brew chargers will be described in a future column.

On a less serious note, I would like to close by claiming the farthest north (250 miles south of the Arctic Circle) R/C electric flight, in Nome, Alaska, in June, 1974. The equipment for this record attempt was the Mattel Super Star with an Ace R/O radio, with a flight duration of five minutes! And to prove it, here is a photo of Sandra holding the plane on the shore of Norton Sound, in front of an Eskimo skin boat (which is wood frame, almost an airplane construction). Anyone who has claims to farther north electric flights, drop a line, and I'll print it! Charge up and fly high! •

Mitch Poling claims to hold the record for the northernmost electric R/C flight. Plane was a Mattel Super Star with Ace radio, being held by his wife, Sandra. Looks plenty cold.

One of the neatest kits from Flyline is the Kinner Sportster. The model shown here was built by Hurst Bowers. Span is 39 inches, power is a Cox Golden Bee, control is by a 3-channel Cannon "Super Mini" radio. Scale is 1 inch to the foot. Design also flies well as a free flight.

The 1/2-A SCENE

By LARRY RENGER

• Ace just sent out its latest newsletter. The company has some interesting new goodies available. From Tarno, there is a reed engine carburetor for Cox .049's. This carb, with accessory reed housing and mount, will fit Black Widows, QRC's, etc. Specs given are; idle at 3500 rpm with a 6x3 prop, engine may still be run in either direction, and a throttle override is built in. Another item Ace stocks is the Tornado line of propellers. Included are the 6x3 and 6x4 3-blade props, which seem to work extremely well with Davis diesel converted engines.

Ace is also a source for spare parts for the D&R Bantam Midget Servos. I guess I failed to mention that Ace carries this new sub-miniature servo both in kit and assembled form. As you may recall, these have got to be the servo of choice for miniature aircraft. Their size is similar to the KPS-18's, and they are compatible with a wide variety of receivers (especially the Dorffler 2-channel from Royal Elec.). Despite the small size, the servo has outstanding power and speed. This unit really proves that the state of the art is continuing to improve.

For those of you who have joined us recently, let me remind you that Ace has a really nice catalog, mostly of 1/2A goodies (Box 511, Higginsville, MO 64037). Other catalogs worth getting are Sig's (401 S. Front St., Montezuma, Iowa 50171), Hobby Shack's (18480 Bandilier Circle, Fountain Valley, CA 92708), Hobby Hideaway (RR 2, Box 19, Delavan, IL 61734), and Flyline Models (2820 Dorr Ave., B-2, Fairfax, VA 22031). Be sure to tell 'em **Model Builder** sent you!

BEGINNER'S WORKBENCH

Well, here you are, fairly new to modeling, you've got a few kit projects completed, you have been reading this fantastic publication, and you want to make one of the models you see in an article (I'm talking about **Model Builder** and airplanes, not Playboy, in case you lost track). (*Larry!*) Back to the subject: "How do you transfer all those clean lines on the plans to clean lines of cut-out parts?" There are several ways, and I prefer the ones that are easy and don't wreck the plan sheet.

1) Use a photocopier to duplicate each part to be cut out. (You can also trace the parts if you need a big part, or can't get access to a copier.) Roughly cut the pattern out with scissors, then use rubber cement (applied to the paper only) to stick the pattern to the wood. Cut the parts slightly oversize, just outside the lines, and use a sanding block to final finish the parts. One of those nifty disc sanders would be just the thing for this part.

2) An old trick is to just lay the part drawing over your wood and use a pin to puncture the drawing and wood surface all around the part. You can either draw in the part by connecting the dots or just cut to the dots if they are clear enough.

3) Do not try to just cut out the plans, hold the pattern to the wood and cut or draw around it. Paper is too flexible, especially on small parts. Repeat! DO NOT do it this way!

4) If you are a masochist, you could graphically reproduce each part by laying out a grid and duplicating each part on the wood. (Don't try it, I'm kidding!)

5) If you have a lot of constant size ribs, or plan to build several copies of the model, you can cut a pattern out of thin aluminum or 1/16 plywood. Glue sandpaper to the contact side and you can cut the parts out directly. Little or no sanding should be necessary. For large parts, I like to pin through the pattern into the wood in several places to assure no flex or slipping. A good set of patterns for a popular model makes a good club project. Each member makes one pattern and several sets of parts, then the "kits" are distributed. Great for "one design" contests.

Photography, yet again. This month, I wanted to show you a strictly professional type of camera. This baby has absolutely automatic nothing and adjustable everything. It is slow and awkward to use, inconvenient, must be used on a tripod with a cable release, and

The Midwest "Plumb Crazy", 1/2A Scale racer, designed by Russ Sandusky and Jerry Kramer. Would also make a good sport model.

costs a mint (how about $1500 for a used system?). The only redeeming feature is that no other type of camera can take photos which are as good as the ones this one does.

The camera is called a "view" camera and is the standard for professionals who do any kind of static subject photography. You definitely do not need one of these to take really good photos for my column, so you have no excuse . . . let everyone see what you are doing in 1/2A flying. SEND PHOTOS, BLACK & WHITE, GLOSSY FINISH, and reasonably carefully posed.

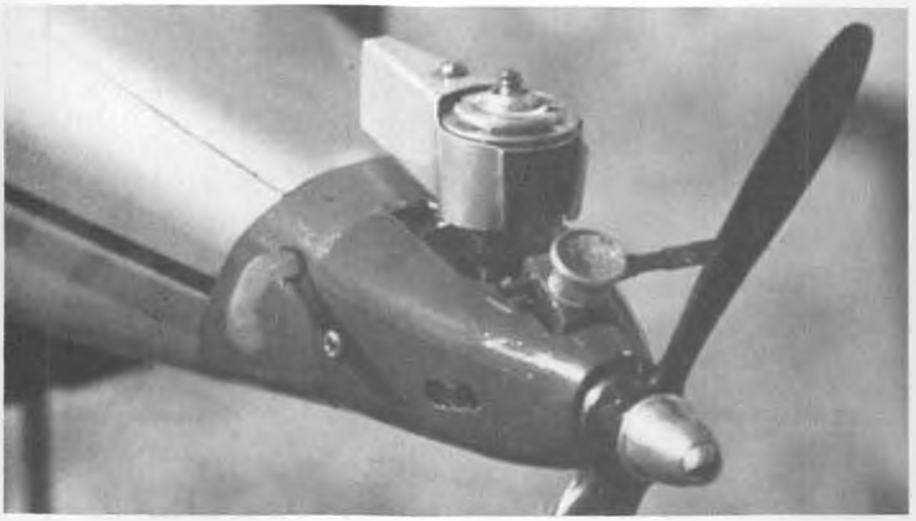
Next photo is a Tigercat by Ron Clem. This one is unique, in that it has an upright engine. Ron went back to his inverted engines because the planes just seem to go faster that way. I expect the thrust line closer to the wing requires less elevator trim and reduces drag. As always, the only sure measure is a stopwatch. Hand waving and slide rule (remember them?) numbers don't bring home trophies. This and the next photo are from some 1/2A R/C races put on by the R/C Bees in 1976.

The unusual combination cooling duct and heat sink was part of a very fast "Quicksilver". I apologize, but I failed to record the builder's name. That fiberglass cowl is about as tight around the engine as you could hope for. Note also the old black nylon Cox 5x4 prop. Seems to be as popular as the 5x3 grey nylon/glass prop.

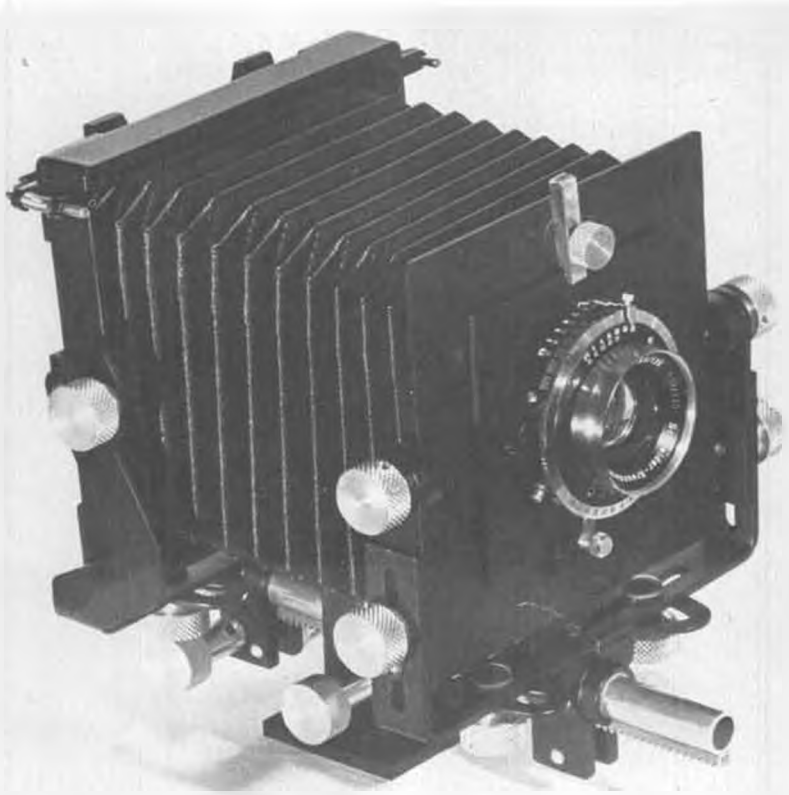
Next airplane is Flyline's "Kinner Sportster", this one built by Hurst Bowers. He used a 3-channel Cannon Mini system and a Cox Golden Bee R/C. Span is a nice 39 inches, for a slow Schoolyard Scale model. These kits are a real building project. That is, you can make an absolutely gorgeous model, but they are you-cut-'em-out, stick-and-stringer-and-tissue-and-dope type models. For those who enjoy leisurely craftsmanship, this is the line of models to buy.

Last model for the month is a 1/2A Goodyear U/C model. The "Plumb Crazy" is one of Midwest's new 1/2A line of performance models. The hardware included is extensive, and some parts are machine cut. Design is by Russ Sandusky and Jerry Kramer. It is legal for AMA Scale Racer, Class 1. The Plumb Crazy would also be a fun sport model if you like to fly a blur. Span is 17-1/2 inches. I'll bet you can get it down to 5 ounces with careful sanding. A Cox Black Widow gives it "Go Power", especially if the venturi and backplate have been drilled out a bit . . . say, to 1/16 inch diameter. Then add a 1702 glow plug with 2 gaskets, a 5x4 prop, and racing fuel. ZOWIE.

See you next month. •

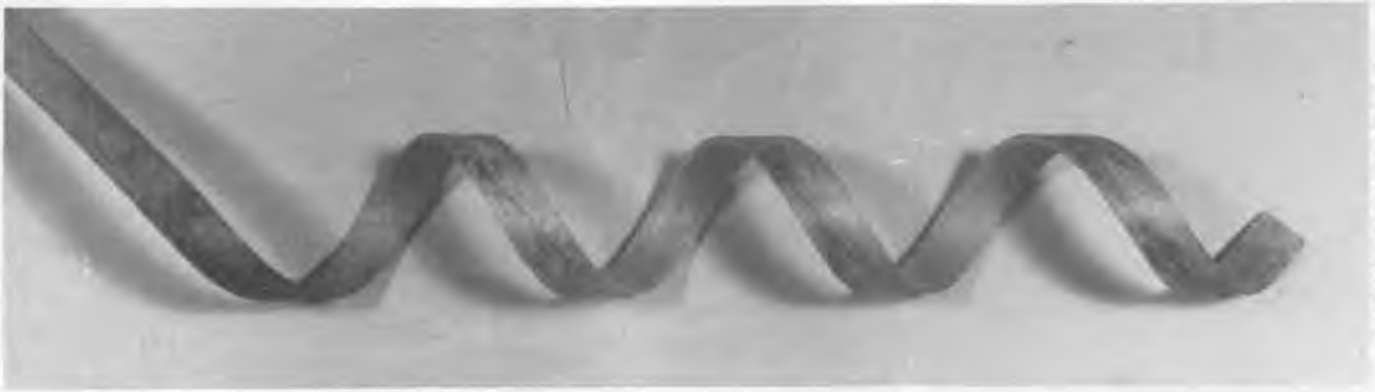


Closeup of the nose of a "Quicksilver" 1/2A pylon racer, by an unidentified builder, showing the combination cooling duct and heat sink.



To get readers to send in photos, Larry is telling you how to take pictures. This is the "view" camera mentioned in the text. Not recommended unless you are some kind of a nut.

A Tigercat 1/2A racer by its designer, Ron Clem. This one uses an experimental upright engine configuration, but proved to be slower than the Tigercats with inverted engines.



PHOTOS BY ELOY MAREZ

Probably the most convincing example of Bud Croshere's wood bending technique is this corkscrew-shaped piece of alder wood, which was treated as per the text and then wrapped around a 3/4-inch dowel. Alder wood is a member of the birch family and is pretty tough stuff.

WOOD BENDING TECHNIQUES

By BUD CROSHERE . . . If you've ever wished, in the middle of a construction project, that some of the sticks or sheets were already pre-bent to shape, this article is for you. It's easy to do . . once you know how.

• *This article was presented at the 1st Annual Southwestern Model Shipbuilding Symposium, Oct. 15, 1977, sponsored by the Nautical Research Guild, So. Cal. Chapter. It is used by permission of the author, and of the Ship Modelers Association Newsletter, in which this article also appeared.*

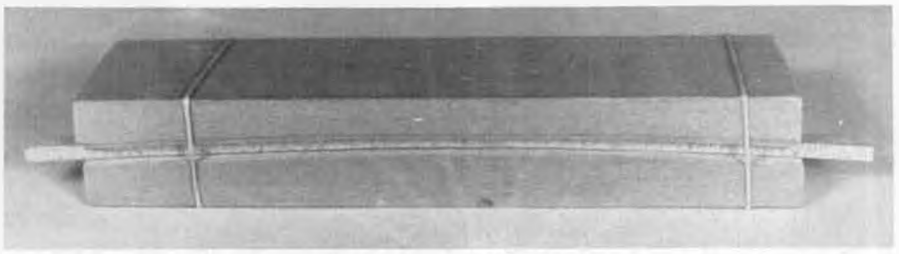
The author, Mr. Bud Croshere, is retired from aerospace and related industries, and has extensive experience in model building, both ships and airplanes. He has developed many techniques, such as the one presented here, on the use of materials and tools, both hand and power, to make life easier and more interesting for the modeler.

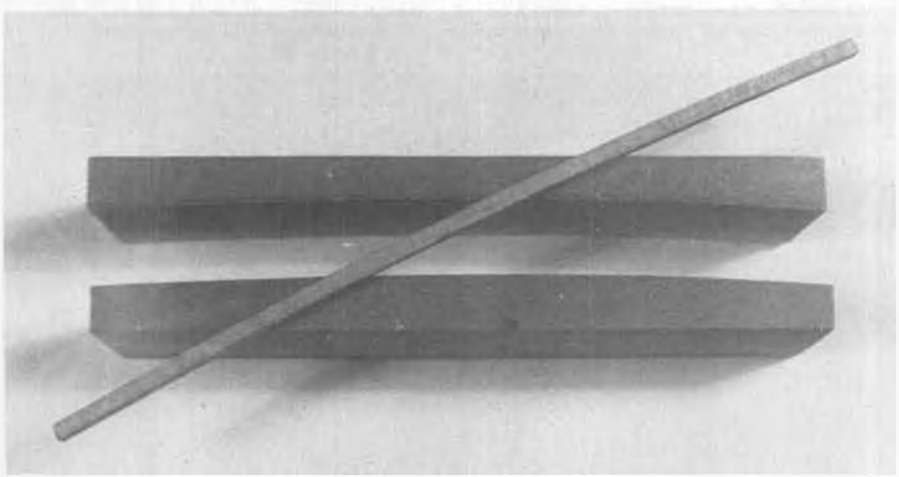
The wood bending techniques described are aimed at the builder of model ships, or miniature ships, as Bud prefers to call them, but they will be equally interesting and useful in many phases of airplane model building, especially those scale models of Wright Flyers, Bleriots, and similar all-wood construction planes.

We hope to present more of Bud Croshere's work in the near future, and ask your comments on this method of working wood and your ideas about other construction or tool use techniques that need extended description.

The model shipbuilder is frequently faced with the need to bend accurately strips or sheets of wood to complex contours that must be followed closely. Heretofore, this need has been approached either by steaming, drybending over a hot mandrel, or cold soaking and drying in position. None of these is entirely satisfactory.

Steaming or cold soaking requires that the piece to be formed be clamped securely into position until dry. Frequently this is not possible in the confined areas often encountered. In both of these techniques, the dried piece will spring back somewhat when released and special fastening is required to force it into position while it is secured. Dry bending over a hot mandrel (such as a soldering iron) can eliminate the problem of springback, but it is essentially a trial-and-error process that requires tricky multiple bends that are difficult to control. Except for the simplest forming problems, this method rarely produces satisfactory results in practice. Most model ship builders find that accurate bending of wood to complex shapes is one of the most difficult tasks, and one for which an improved method is necessary.





No matter how slight the bend, the finished pieces will hold their curve permanently. One of the best things about this method is that there is no loss of strength in treated strips of wood.

Several years ago, there appeared in contemporary model magazines vague references to the efficacy of adding small amounts of weak household ammonia to the water in which wood to be bent is soaked. In support of these recommendations, there were suggestions that the ammonia changed the physical character of the wood is some way and thus rendered it temporarily more pliable. Although tests based on the published information were disappointing, they served as a prod to further investigation.

This report summarizes information gleaned as the result of correspondence with the Weyerhaeuser Company and the Forestry Colleges of Syracuse and New York Universities concerning the theoretical and practical aspects of treating wood with various concentra-

tions of ammonia. Also reported are results of practical tests made by the author using simple equipment found in most model makers' shops. These are based on the extensive experiments conducted by various wood product laboratories who kindly furnished much valuable information on the subject.

A list of the references consulted is attached for the benefit of those who want to explore the subject further.

DISCUSSION

For the present purpose, wood may be thought of as an orderly assembly of microscopic elongated hollow cellulose tubes held together by an adhesive called lignin. When wood is deformed by external loads, forces are set up in directions tending to cause slippage between these cells. The strength of the wood depends not only upon the amount of cellulose in each cell, but also upon the ability of the lignin to prevent slippage between adjacent cells. Conversely, success in forcing wood permanently into arbitrary shapes requires temporary plasticization of the lignin (thus permitting good reorientation of the fibers), followed by complete restoration of its adhesive strength (thus locking the cells into their new positions).

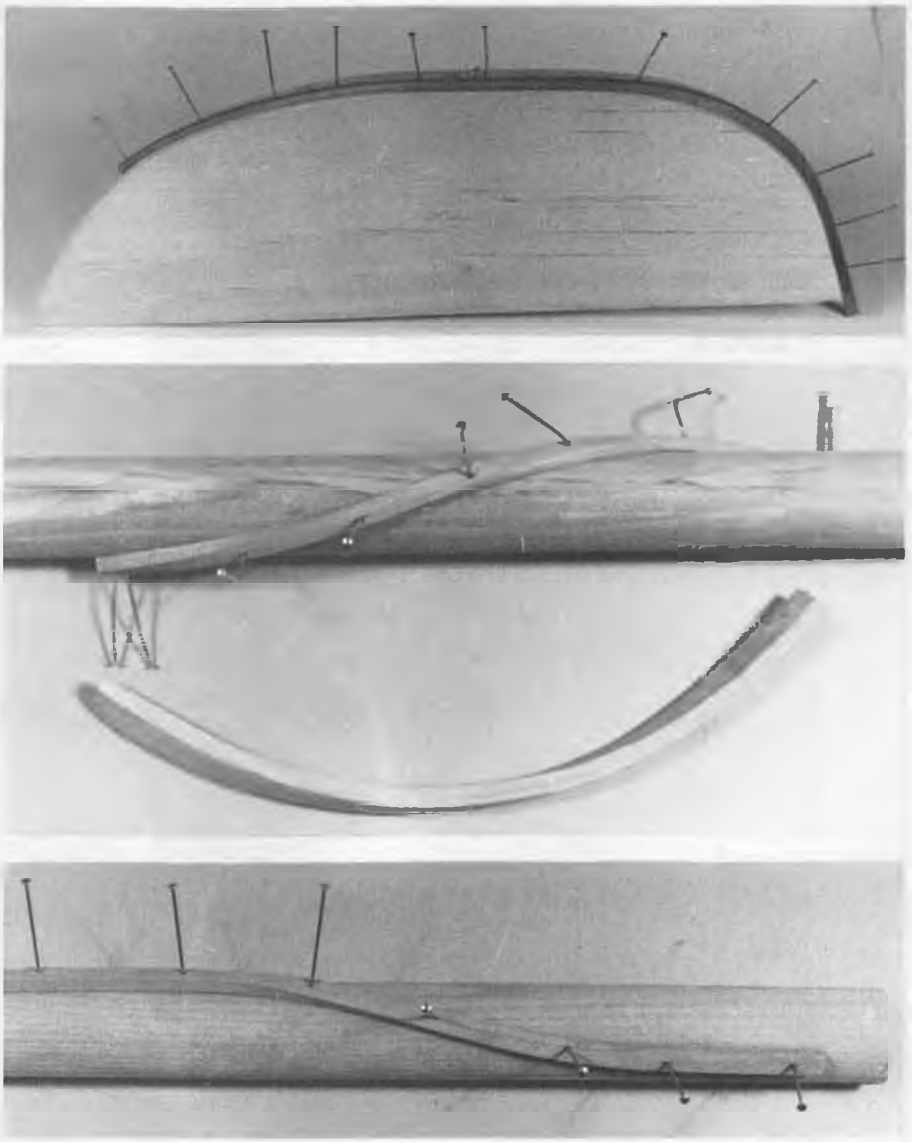
The lack of complete success using steam or cold soaking to bend wood into intricate shapes and having it remain bent with little springback lies in the inability of these methods to cause adequate plasticization of the lignin adhesive agent.

Although the chemical composition of lignin is not simple nor well understood, its role in providing wood with its remarkable strength and durability is well known. Further, the tendency of lignin to become plastic in the presence of weak alkaline solutions is documented. Chemical science has long known that ammonia, a gas, is readily soluble in water and that the solution is alkaline. Further, a solution of water and ammonia will evaporate, leaving no residue.

From the above, one can hypothesize what happens when wood is bent after being treated in a solution of ammonia and water. The lignin is plasticized by the alkalinity and the cells rearrange themselves in response to the internal stresses set up within the wood by the bending loads. As the piece dries, the ammonia goes out of solution, the water evapoates, the lignin regains its adhesive properties and the wood is locked in its bent position.

RESULTS

While all investigators report that best results are obtained when wood to be bent is treated with liquified ammonia and superheated steam in specialized retorts, such equipment is far too costly and dangerous for the home workshop. To avoid these practical difficulties, a concentrated solution of ammonia in water, called aqua-ammonia, was obtained in ordinary gallon bottles from a local chemical supply house.. A small amount of the solution was poured into an 8-inch test tube and stoppered to prevent escape of the pungent fumes. To avoid spills, the tube was held upright in a mason jar positioned before an open window to let the fumes escape as work progressed.



More examples of what can be done with this wood bending technique. Very little, if any, springback occurs when the parts are removed from the forms.

Several test pieces of alder wood, 6 inches long, 1/4 inch wide and 1/8 inch thick were inserted into the tube and soaked for 15, 30, and 60 minutes. Even after the shortest soaking, the wood had taken on a very water-logged appearance. The pieces were very pliable, had the general texture of wet leather, and easily could be bent with the fingers. It was not difficult to wrap them spirally around a wooden cylinder 3-1/2 inches in diameter and to hold them in position with ordinary pins. When dry and unpinned, the bent strips sprung away from the cylinder less than 1/16 inch. This is a highly significant and favorable achievement not attainable either by steaming or cold soaking methods. The dry wood was slightly greyer than an untreated strip, and the grain was somewhat raised. The bent pieces could be sanded, drilled, cut, glued, and painted as readily as virgin pieces.

To check for a possible loss in strength, two identical pieces, one untreated and the other soaked for 60 minutes and then dried straight, were clamped in a vise and their ends loaded with equal weights. Each bent down the same amount and, when unloaded, returned to their original straight shape. From this, it may be concluded that there is no significant loss in bending strength due to the ammonia bath.

It was found that if the test pieces were soaked longer than 60 minutes, they became somewhat more difficult to form than those soaked for a shorter period. When bent around cylinders less than 2 inches in diameter, fibers on the inside of the bend failed in compression, probably due to column failure by the individual cellulose cells.

After a dozen or so strips of alder had been soaked, the solution in the tube remained transparent but had a reddish cast resembling strong tea. Whether this was caused by dye extracted from the wood or lignin dissolved by the aqua-ammonia is not known.

Other types of wood usually used by the model shipbuilder, such as pine,

Continued on page 87

18th, 19th, & 20th
MAY, 1979

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MARINE CORPS AIR STATION (Helicopter), Tustin, CA

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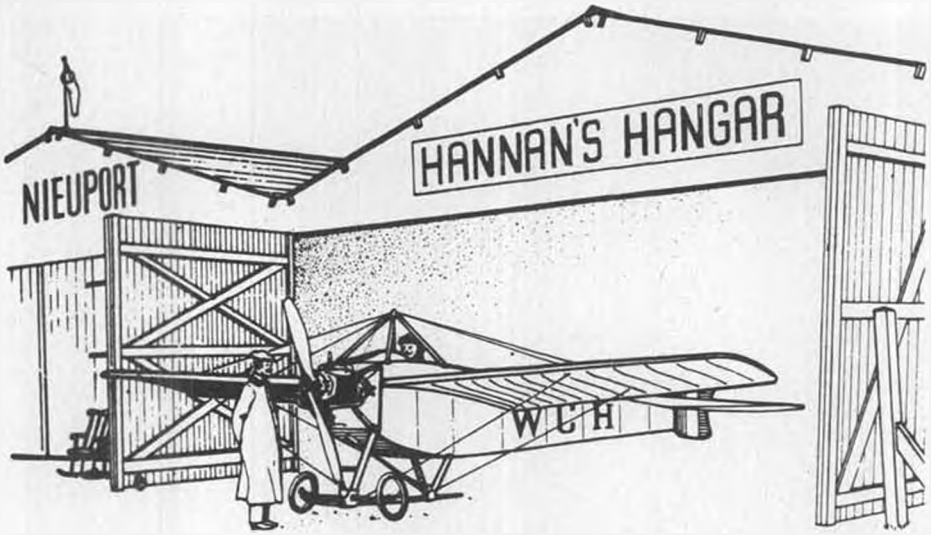
FREE FLIGHT AND CONTROL LINE

TLUSH MITE O.T. 32
HANNAN'S HANGAR 60
PEANUT XP-47H 61
CONTROL LINE 64
SHOW-BIZ TOOLBOX 66
PELICAN 68
FREE FLIGHT SCALE 71
FREE FLIGHT 72

Johnny Womack tests his Penny Plane prior to basketball intermission demonstrations in the Pan American Sports Arena, Las Cruces, New Mexico. Demonstrations put on by the Mesilla Valley Model Airplane Club brought requests for encores by Arena officials.



"Among the birds, the parrot is the best talker and the poorest flier. May I never be a parrot!"

• Our lead-in line this month is a quote from Wilbur Wright.

THE WRIGHT BROTHERS REVISITED

The 75th anniversary of powered flight success brought forth a series of articles and programs in many parts of the country. Thanks to Bob Farrenkopf, Pearl Reynolds, Tom Elliot, Frank Scott, Granger Williams and others, we are able to share a few abstracts:

From the program of the San Diego AeroSpace Museum: "It seemed to us the main reason why the problem had remained so long unsolved was that no one had been able to obtain any adequate practice." Wilbur Wright.

* * *

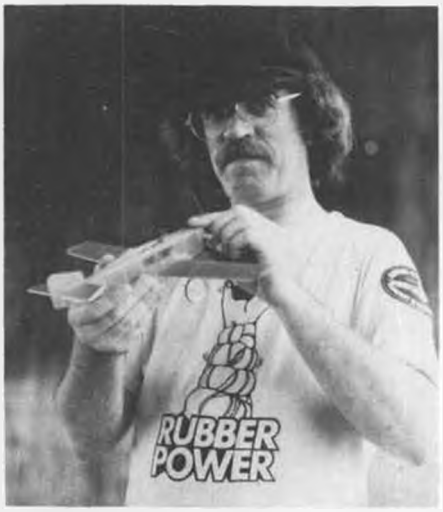
In 1941, a reporter asked Orville Wright this question:

Reporter: "Did you have a lot of apprehension about whether the first power-driven machine at Kitty Hawk would fly?"

Orville: "Oh, we knew the machine would fly all right; all our tests in the wind box indicated it would. We were really more concerned if the engine would start and about the weather." (Sound familiar, model builders?)

* * *

A cartoon in the Dayton Daily News, Ohio, depicts a hayseed's bored reaction to seeing a Wright aircraft in flight: "Nonsense, it's only swamp gas. . ."



Carl Hedley with his Udet U-2 Peanut, designed for experimental 9" fuselage rules.

* * *

Also from the Dayton Daily News, we learn about the dedication of a Wright Brothers Room in the Wright State University library. It will contain a 1904 Wright propeller, "The Coupe Michelin" bronze sculpture award won by Wilbur during 1908, and various other items of Wright memorabilia.

* * *

The Lowell Bayles Memorial Trophy described in the text. Photo by Don Foster.

From the "World War I Aeroplanes" newsletter, we read how Hud Weeks' son, a TWA pilot, found three beautiful alabaster light fixtures in an antique store in Dayton, Ohio. Seems the NCR Corporation bought the former Wright brothers mansion at Hawthorne Hill, and *redecorated the place,* doing away with all the historical artifacts! Thank goodness aviation enthusiasts, who appreciate such things, were able to buy at least a few items.

* * *

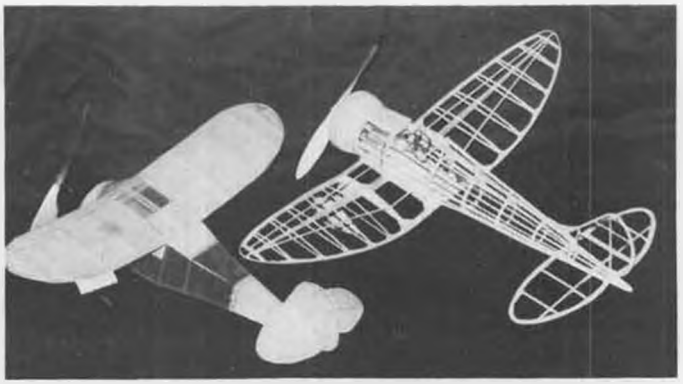
Regarding the TV special "The Winds of Kitty Hawk", the less said the better, according to local opinions. It was disappointing, to be charitable, with questionable acting and glaring historical inaccuracies. Let us hope it will inspire someone to do better!

* * *

Another "klinker" award to the Los Angeles Times newspaper, which managed to confuse Orville with Wilbur in the photo caption of its December 10th

Continued on page 87

Roger Aime, of Salon, France, built this Stampe S. V. from Peck-Polymer plans. Excellent craftsmanship is evident in this photo.



Fred McCuram's Monocoupe 110, now owned by Ichiro Yamada of Japan. Model on the right is Ichiro's Type 96 "Claude".

PHOTOS BY BOB MOSHER

PEANUT SCALE ✪ REPUBLIC ✪ XP-47H

By PRES BRUNING . . . This model of a little-known WW-II aircraft ranks with the best of the Peanut warbirds, both in looks and performance. Article also tells where to get your scale documentation.

• The XP-47H was a modification of the razorback P-47B and was designed around a new 16-cylinder inverted "V", liquid-cooled Chrysler 2,300 hp engine. This brought the P-47's top speed up to 490 mph during flight trials.

Let's first begin construction with the fuselage. After cutting and gluing the complete fuselage profile together, which is cut from 1/16 sheet balsa, glue in the nose block, followed by all the fuselage bulkheads. Next, add the main fuselage stringers shown full-length on the side view. I mark the locations of the bulkheads on the profile and main stringers with pencil before assembly. This guarantees symmetry. Now add in the remaining fuselage stringers, being careful to check that the fuselage profile and main stringers remain straight. You will not find it hard to build the fuselage in your hand (literally).

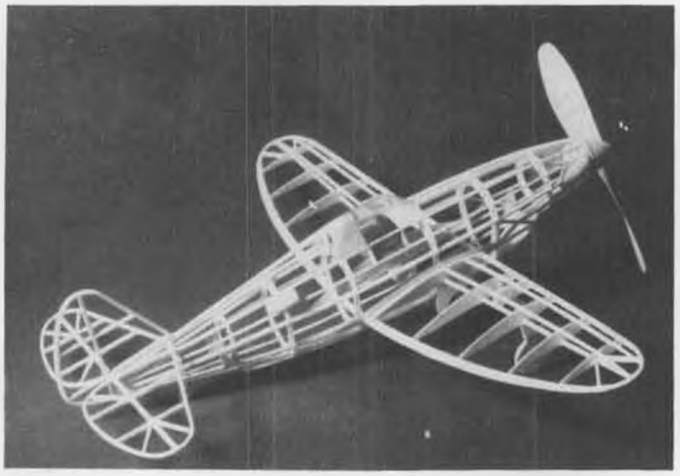
Next, cut away the profile between F3 and F3a. Plank or sheet the areas called for on the plan. Dry cover between each fuselage stringer with green Japanese superfine tissue, using thinned-out Elmer's glue (brushed on), carefully cutting with a sharp Uber Skiver blade on the center of each stringer. Cover with green down to the closest stringer above the color separation line indicated on the plan. Cover with grey below this stringer. Water shrink and clear dope the fuselage, and later dope on the irregular green camouflage pieces, being careful to butt up to the green tissue on the stringer above the color separation line.

The wing and tail are built in the conventional pin-down manner. Wing tips and tail tips were built from three 1/16 x 1/32 laminates, using thinned-out Elmer's glue, and were pinned around cardboard profiles waxed on the edge to facilitate removal. Be careful to glue the 1/8-inch wing root rib W0 at the angle shown, to give the desired 3/4 inch of dihedral when attached to the fuselage.

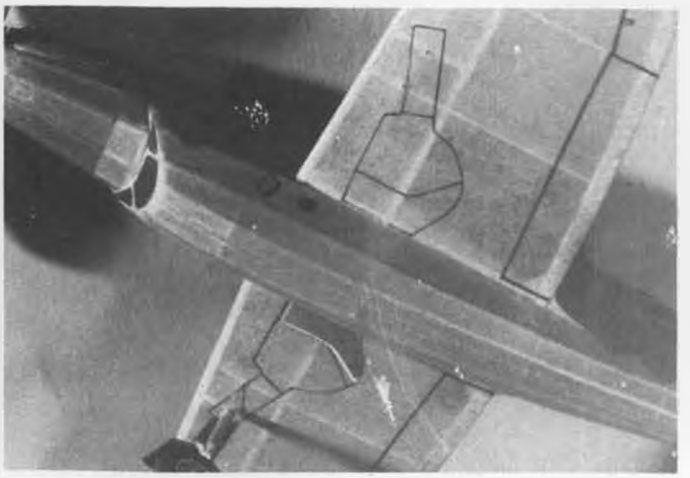
Dry cover the wings on top with green and on the bottom with grey tissue. I would suggest water shrinking the wings after attachment to the fuselage, pinning the model down in a jig to avoid warping. Before this is done, put a drop of 5-minute epoxy on the junctures of the leading edges, spars, and trailing edges as they meet at the fuselage center line. This will make a stronger model, capable of surviving wing tip impacts and preventing the fuselage sides from caving in. The wings should be clear doped and allowed to dry, also pinned down in the jig. Finish off the cockpit interior with a black bond paper floor, headrest, and pilot before installing the vacuum-formed canopy.

If at all possible, try to add all your details on the wings, tail pieces, etc., before assembly, especially in the case of the painted numbers on the tail. Working flat is a lot steadier. All the control surface lines were accomplished by taking black superfine Japanese tissue and applying rubber cement to the dull side. Next, with an aluminum straightedge and sharp Uber Skiver, cut many fine strips 1/32 of an inch wide and under; attach one end and pull slightly to get a straight line between the 2

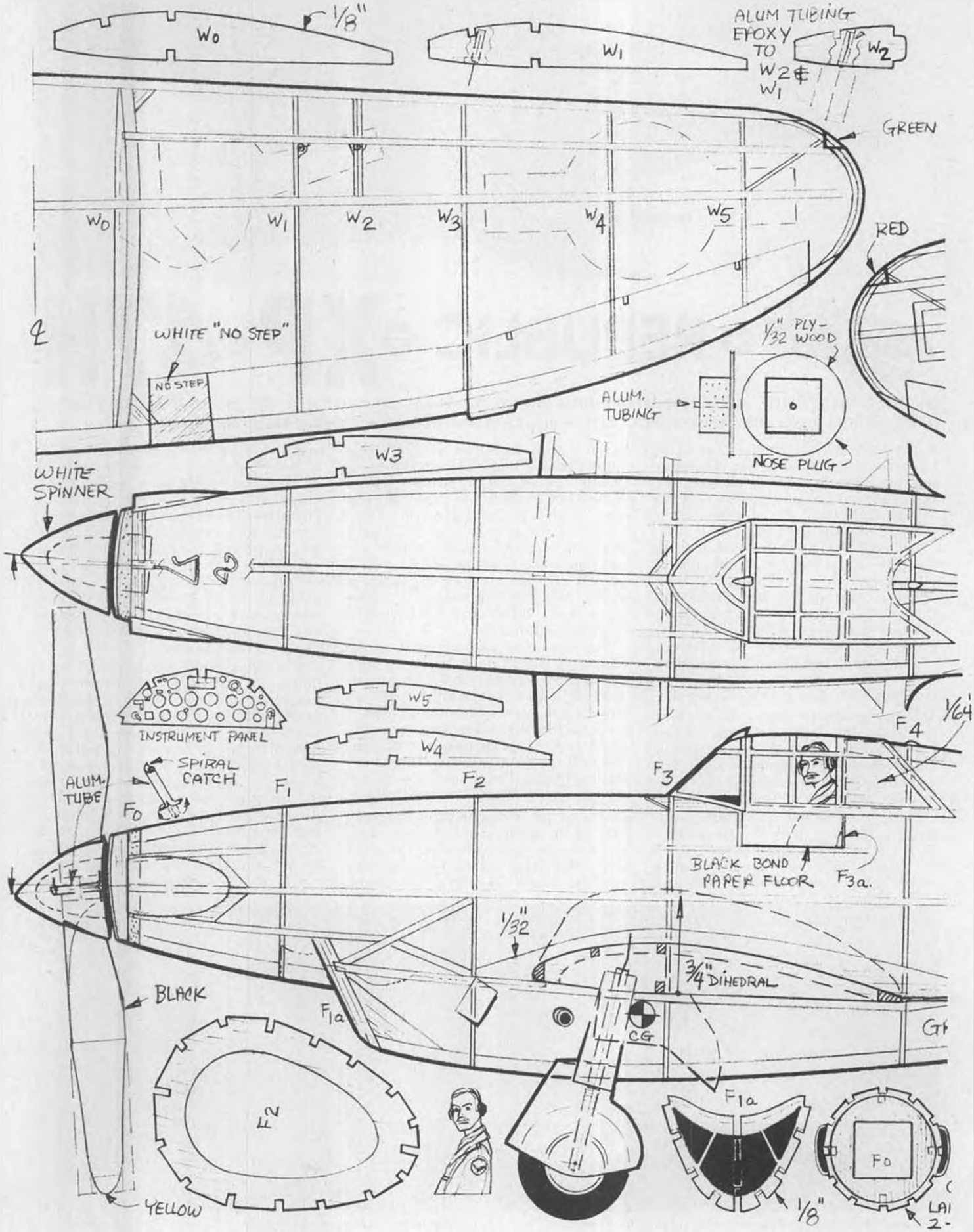
Continued on page 90

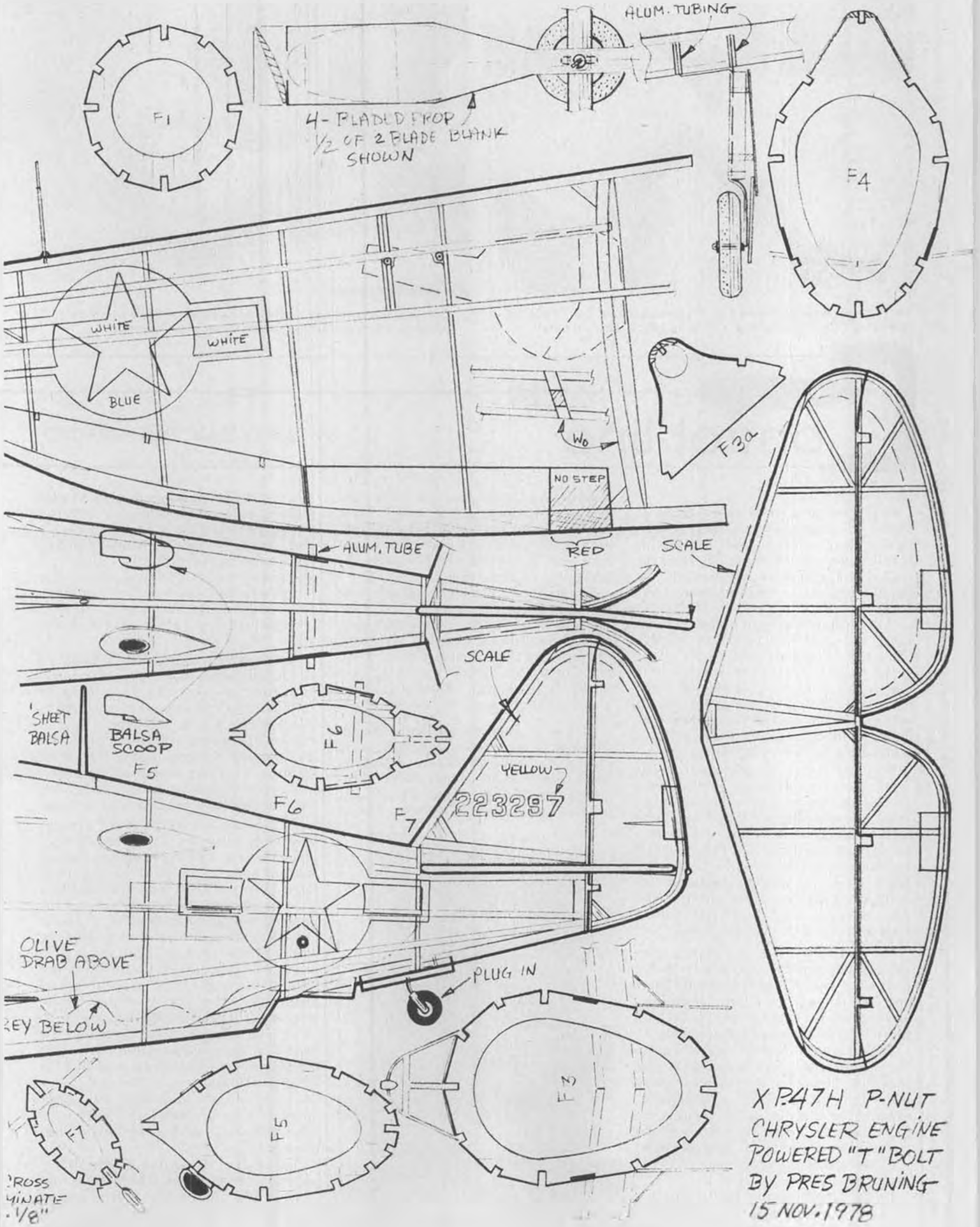


Just because it's a warbird doesn't mean it has to be complicated, as this bare framework photo shows. Good flight performance.



Landing gear is removable for flight. All control surface outlines are black tissue, held in place with rubber cement.


W0
1/8"
W1
ALUM TUBING EPOXY TO W2 & W1
W2
GREEN
W0
W1
W2
W3
W4
W5
RED
WHITE "NO STEP"
NO STEP
1/32 PLY-WOOD
ALUM. TUBING
NOSE PLUG
W3
WHITE SPINNER
W5
W4
INSTRUMENT PANEL
SPIRAL CATCH
ALUM. TUBE
F0
F1
F2
F3
F4
1/64
BLACK BOND PAPER FLOOR
F3a.
1/32"
3/4" DIHEDRAL
BLACK
F1a
CG
F2
F1a
F0
YELLOW
1/8"


F1
4-BLADED PROP
½ OF 2 BLADE BLANK
SHOWN
ALUM. TUBING
F4
WHITE
WHITE
BLUE
W6
F3a
NO STEP
RED
ALUM. TUBE
SCALE
SCALE
SHEET
BALSA
BALSA
SCOOP
F5
F6
F6
F7
YELLOW
22329?
OLIVE
DRAB ABOVE
PLUG IN
F7
F5
F2
XP-47H P-NUT
CHRYSLER ENGINE
POWERED "T" BOLT
BY PRES BRUNING
15 NOV. 1978

Les Pardue warms the nation's most unsophisticated Team Racer in appropriate nonchalance (that's D. D.'s caption, Les, not ours!).

Doss Porter busy gluing his engine (K&B 5.8cc) to his stretched Nemesis, which also features a mono-boom configuration.

Control line

By "DIRTY DAN" RUTHERFORD

HEAT

Heat can be a really good thing. It makes our engines fire on every spin of the crank, it smoothes out wrinkles in plastic coverings, causes epoxy to go off quicker, keeps us warm during the building season . . . and sometimes heat burns you.

Not necessarily a burn in the physical sense, but a burn nevertheless, and still the result of heat applied.

The type of heat being referred to is that being applied to the AMA right now, and although it is not yet certain who is going to get burned, you can bet that somebody is going to be a crispy critter here before very long.

You are aware of the controversy, aren't you? I mean, how could you miss it? All of the commercial modeling magazines (except one that claims to be non-commercial) have let loose with a bit concerning the fellow in SoCal who has decided to dig right in and see if he can't figure out where our money for AMA dues is being spent and why the AMA dues are now $25 with no option to take or reject the AMA magazine.

My first acquaintance with the controversy was through the rumor mill that is so active within the ranks of publishers and free lance writers. But, having long ago learned to regard rumors as nothing more than just rumors, I shrugged it off.

Then the next *Model Aviation* came to the house and there was Bill Winter punching like crazy at a situation which Bill refers to in his "For Openers" column like this: "As we go to press, we hear that one magazine is considering publication of a letter . . . with pie chart . . . that is the subject of what you will read here. . ."

I read it, and found it interesting that the *answers* from *Model Aviation* to its many critics, this one as yet *unpublished* letter being just one, was out before the questions had even been asked! Now, that really got me interested and definitely confirmed the rumors that lots of heat was being funneled toward the AMA and *Model Aviation* magazine.

Reminds me of a high school friend who would always punch first if he thought the other guy was in any way considering hitting him. His post-fight defense of "the other guy started it, I know he was going to hit me, so I just got in the first lick, but still he started it", always sounded suspicious in its logic.

In a few days, here came *Model Airplane News,* and sure enough, good ol' Walt had published a very interesting letter which made things more complete, now having not just the answers but the questions as well in hand. And of course, WCN mentioned it in **Model Builder,** referring readers to M.A.N., giving the address of "Mr. Heat Gun", and stating the case for **Model Builder.** Jim Sunday did his editorial on the letter, also giving out an interesting address in *R/C Sportsman,* and I assume that RCM will do the same. We might even see conservative *Flying Models* get in on the act.

"Stew" Willoughby, transplanted British dentist and a real threat in C/L racing events.

So the stage is set. We've got bunches of people who have for years been suspicious of what the AMA is really doing with our money, why they seem to need so much of it, and what we get in return. These people now have the hammer and are going for it. They want to know who gets how much and why. What our insurance policy really says. Which elaborate pie charts to believe.

Why they are forced to pay for a magazine they may not want. How *Model Aviation* was able to even get started without some of our money being spent on it. Why the AMA feels it should, as a non-profit organization, publish a commercial magazine instead of a simple newsletter that would be just as effective and a bunch cheaper. Why the AMA's non-profit status with the IRS is being risked by publishing a commercial magazine. Who got what out of the recent life insurance mailing done in '78. (Can you imagine what it would be worth to an insurance company to just be able to get its hands on a mailing list of almost 70,000 people, the vast majority of whom are in middle and upper level income brackets? This cozy little deal definitely needs to be looked into further.)

There are, of course, many other questions to be asked. The point is that now is the time to do it. If you ever wanted to gain a stronger voice in the policies of AMA, there will probably

never be a better time than right now to do it. We can change things with a little heat.

And the application of that heat is at present fairly easy to accomplish. You see, part of the situation is that the AMA has really gotten into the shorts of those publishing modeling magazines by coming out with *Model Aviation*. These independent publishers regard this as totally unfair competition from an organization they have supported for many years. So they are all very willing to publish letters, write editorials, pass on addresses and so on. In short, they are the torch, you supply the fuel.

This position taken by these publishers is only right, in my opinion. They have had to build their respective magazines up the hard way, which involves a lot of work and a bunch of money, all with no guarantee of success. While building these magazines, they have all supported the AMA in many ways, including publication of AMA advertisements at no charge to the AMA, donations to the AMA, trophy money for the AMA Nationals, and more. Lots more. Then the AMA thanks them by publishing a magazine that competes directly against them in the open market.

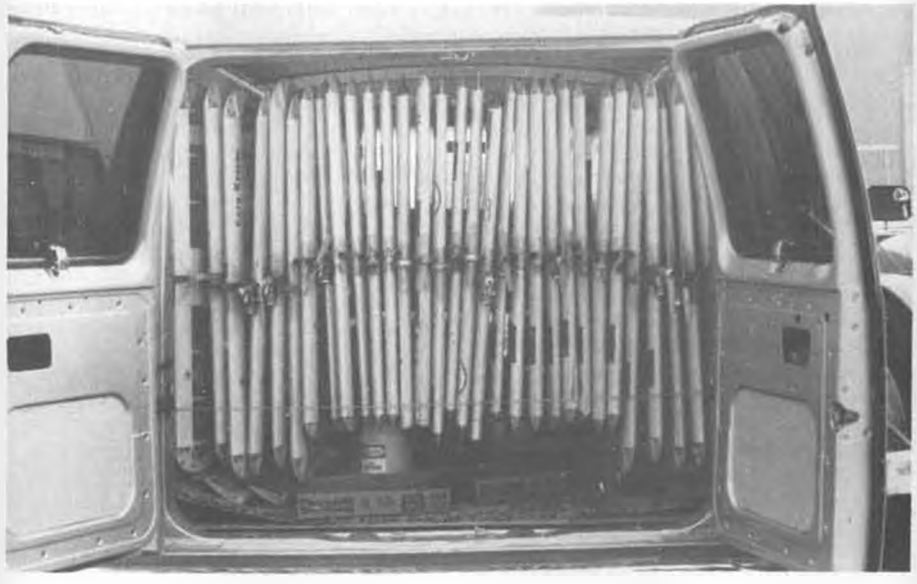
Let's put that into a different perspective, just to see how the publishers must feel. Let's say that you have for 35 years owned and operated an advertising agency, working hard to keep your accounts satisfied, giving you more advertising work to do. All this time you have belonged to, and actively supported, a national organization representing the interests of yours and a thousand other ad agencies. During the life of this organization, it was at one time decided that too many people were leaving member agencies with bad debts, so the national body got together a list of every company served by member agencies, some of them were, of course, your own customers, as you supported the national organization and contributed to this list. Over the years, the list proved valuable as a business tool, as it kept track of those companies with records of "no pay", serving to keep your losses down and profit up.

Everything is fine until, one day, the national body decides that it can also do a good job of ad work, has access to people skilled in that line of work, and some extra money (your dues) to play with. So, as a sideline, the national organization sets up their own ad agency. Finding customers is no sweat; they have that large list that you and other members contributed to for years.

Not only have you provided "your" organization with the names of many of your customers, but it then turns out that the national organization's ad agency is undercutting your prices. You see, they are a non-profit organization, so can't show much, if any, profit from this sideline. What they *can* do is provide employment for a few old friends, however.

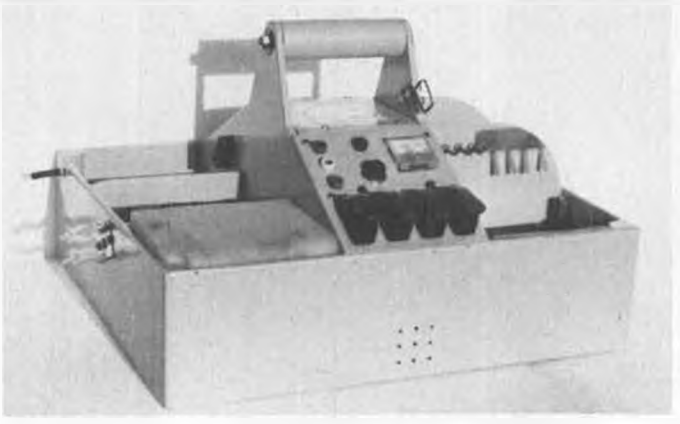
Continued on page 82

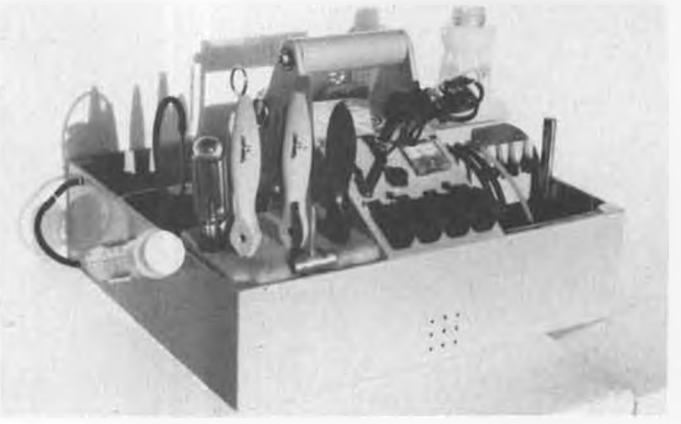
Remember the Combat field at the Riverside Nats in '77? Notice the completely destroyed Cox Conquest .15 . . . it hit a rock head-on. The stuff nightmares are made of.



If you're serious about Combat, you need lots of planes. The Flying Tigers carry their ammo in a Ford van and are ready for anything.

Dickie Ritch preparing to fire off his Rat for a qualifying heat. Notice the spilled fuel . . . Ritch is a bit sloppy sometimes.





PHOTOS BY AUTHOR

···Show-Biz···TOOLBOX····

By "DIRTY DAN" RUTHERFORD . . . If you want to do well in competition of any sort, you're first going to need a well-organized tool box. Dirty Dan tells you how to custom design your own.

• When I started competing in C/L contests, I realized that I was the new guy on the block and that I would have to have my act together, both before and during the contests, if I was to stand any kind of chance of winning. So I did the usual stuff. Tested my planes a lot and practiced before each contest. Double-checked things like fuel filters, flying lines, motors, batteries, bladders, and so forth. When I showed up at a contest, I was ready to fly and my equipment was in top shape.

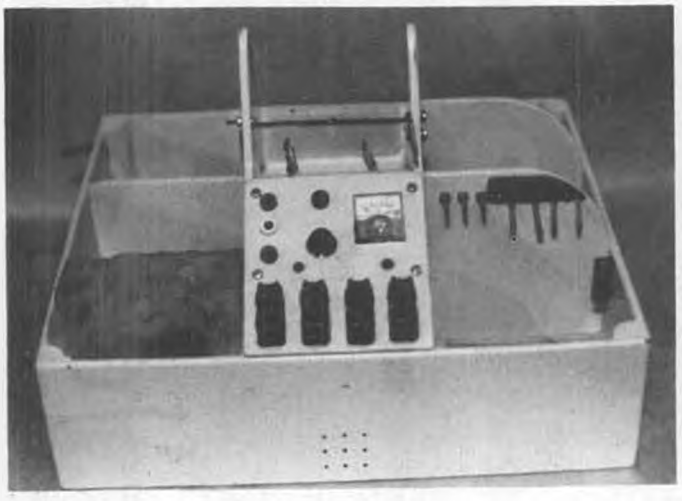
But when it came down to a five-minute Combat match or a heat in G/Y or Rat, I found myself putting up with probably the worst toolbox in the whole wide world. Ron Scoones and I would share a plastic, open-topped toolbox that he bought at a hardware store. Before a match or heat race, we would throw in whatever we thought we might need and go do it. Things would go OK until the unexpected would happen (it always does, you know), and then we would be in trouble. Necessities like glow plug wrenches were hard to find, the glow plugs themselves were always under the battery, fuel bulbs might not have fuel in them, the fuel can would fall over and soak everything in raw fuel (anybody got a match?).

Even with all of the trouble that we had with our cheapie toolbox, we never thought of building a really decent one. Everybody else seemed to be having the same problem or worse, with some carrying great, gargantuan boxes around that had everything they owned in them. Being prepared for anything is OK, but I see no need for a toolbox that contains spare motors, every kind of needle valve ever made, four different brands of glow plugs, handfuls of props, dead batteries, and two gallons of fuel. Right, Tom Tucker, Jeff Rein, and Col. Rush?

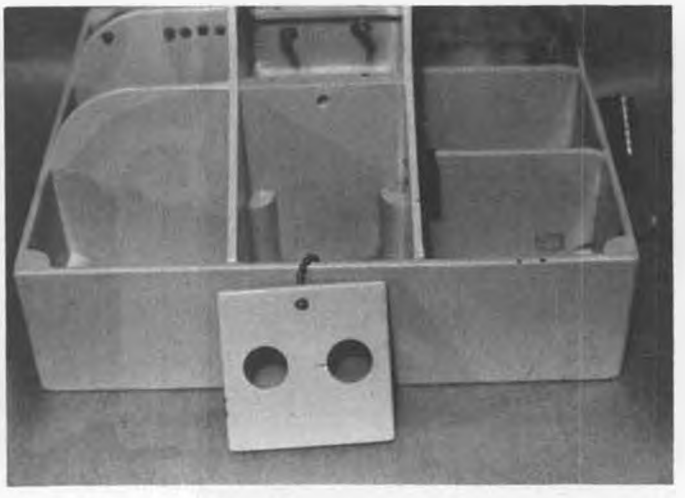
About the same time that I started thinking about a toolbox designed specifically for C/L contest flying, P.T. Granderson showed up at a contest with a thing called the Combat Pak that was designed by Bill "Moose" Allen. The Combat Pak is really neat and simple, but not quite what I was looking for, so I simply stole some of Bill's better ideas and designed my own box, which I feel is better suited to all-around contest flying and sport flying as well. Thanks for the inspiration, Bill!

Before getting into details about building your own Show-Biz toolbox, let's see what the box does. First off, everything that you might need in a match or heat race is right at hand. Props are sticking up in the air so they are easy to identify as to size and make and are easy to grab when you need one. The syringe is stored on the side of the box and is easy to get at. Plugs are simply plugged into the dangling fuel tubing, and bladders hang on 4-40 bolts, out of the way, but accessible. The power panel tells you everything you need to know about your glow plug and provides three different voltages for different plugs or just clearing out a flooded engine. An ammeter gives you a direct reading on the plug's condition. With practice, you can tell whether the plug is dead, shorted-out, or flooded, just by glancing at the ammeter.

Besides the ammeter, there is an audio and another visual check of plug condition available to you. The first switch on the panel turns on the power. The second cuts in the ammeter. With the first two switches turned on and a good



Overall view of the completed but empty box. Nine little holes in box front are for the very important electric buzzer.



Rear compartment has a lid; bathtub stopper chain keeps it from getting lost. Holes are for fingers and Hot Stuff bottles.

All the stuff that Dirty Dan loads into the box before going to a contest. Don't know why he'd take an empty fuel bottle, though.

Three-quarter rear view of loaded box. Size and location of partitions can be changed to suit your own requirements.

Another shot of the ready-to-go box. Power panel runs off 2-volt wet cell in compartment directly under carrying handle.

Spare props fit into slits in foam rubber . . . easy to get to if you're in a hurry. Fuel syringe is held in place by a fuse clip.

glow plug hooked up, flipping the third switch causes the light in the panel to come on, and flipping the fourth switch activates a very obnoxious buzzer that is located behind the nine holes in the lower front of the toolbox. Wow! Lights and buzzers and an ammeter. What's Dirty Dan trying to pull over on us this time? Read on. You'll find out.

The most important part of the toolbox is the battery. Without a good battery, you're behind before you even start, and this is the best battery I have ever found. It is a 2-volt, 28-amp/hr. rechargable wet cell. This battery will light off any glow plug around and fights off flooded engines like you wouldn't believe. The battery is capable of boiling dry a plug that is completely filled with fuel in about a second, and yet it won't burn out elements if you use fairly long leads from the battery to the glow clip.

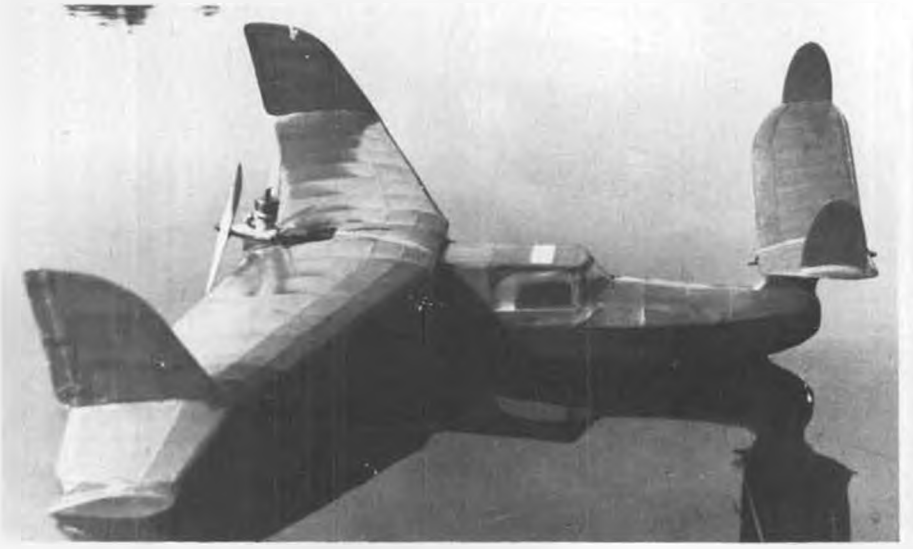
These batteries will go about three months between charges, and the condition of the battery is indicated by the built-in hydrometer on the side of the battery. The battery can be charged with any 2-volt charger (Ace R/C makes one that works) or you can do like I do and charge it with a regular automobile battery charger, but some kind of resistor must be used in the line between the charger and the battery. I use about a foot of .018 Combat lines to provide the resistance. Don't laugh, it works!

These batteries used to be fairly plentiful, but are getting harder and harder to find. If you are unable to locate one, write to: Hobbies Etc., 16661 Redmond Way, Redmond, WA 98052. For $10.00 per battery, they will ship you one anyplace in the U.S. If ten bucks sounds high for a battery, go down and

Continued on page 79

Closeup shot showing the glow plug leads tied to the wire restraint. Important if you want to stay plugged in.

Spare glow plugs dangle from short pieces of surgical tubing. They won't fall off, yet are easily removed when needed.



•PELICAN•

By JIM FULLARTON . . . A highly unusual canard seaplane pusher, originally designed in 1956. Be the first in your block . . .

• Whatever way you look at it, the conventional single-engined flying boat is an untidy piece of work, and many years ago, the writer started thinking about the advantages which the canard layout appeared to offer in this class of aircraft. Biggest improvement seemed to be in the motor mounting; the most common conventional system seems to be the "engine-on-a-stick" mounting of the Lake, or if you don't like that, you can choose between the drastically cut away fuselage of the Seabee or the structurally unpleasant twin-boom arrangement. Whatever you do, that tail unit just seems to get in the way.

With no bow overhang up front, the canard hull will only be about 60% the length of the conventional tail-behind bird, and if you move the fins out to the wingtips, where they also act as end plates and float supports, you get what appears to be a very compact and attractive layout. "One day," we said, "we will build a could-be scale model just to see how it all works out." And there the matter rested: until 1956, to be precise, when a couple of keen young members of my wife's family, Max and John Fyfe, were looking for a project, and undertook to build the thing if I would draw it up for them.

This Mark I version would take off and fly all right, but suffered from what appeared to be a typical canard failing, in that it would wind up in a spiral dive at the slightest provocation, a habit which eventually terminated its career. Back into mothballs went the project until along to the rescue comes Henry Cole, writing in a Zaic yearbook. His article, in the writer's humble opinion, really put the lid on the great spiral controversy.

"Forward of the C.G.," says Henry, "dihedral or high C.L.A. is money in the bank, but behind it, keep a low profile."

. Inspired by this theory, we went back to the drawing board and, this time assisted by son Andrew, built a new flat wing, while the elevator was raised up on struts (the pylon came later). Test flights were still disappointing; there was still that undue turning tendency, so in desperation we stuck on those elevator tip fins. That did it; from then on she became a consistent performer. The final mod was the drooped wingtips, which improved things still further.

Underside view showing wing keys, water rudder, and spray deflector.

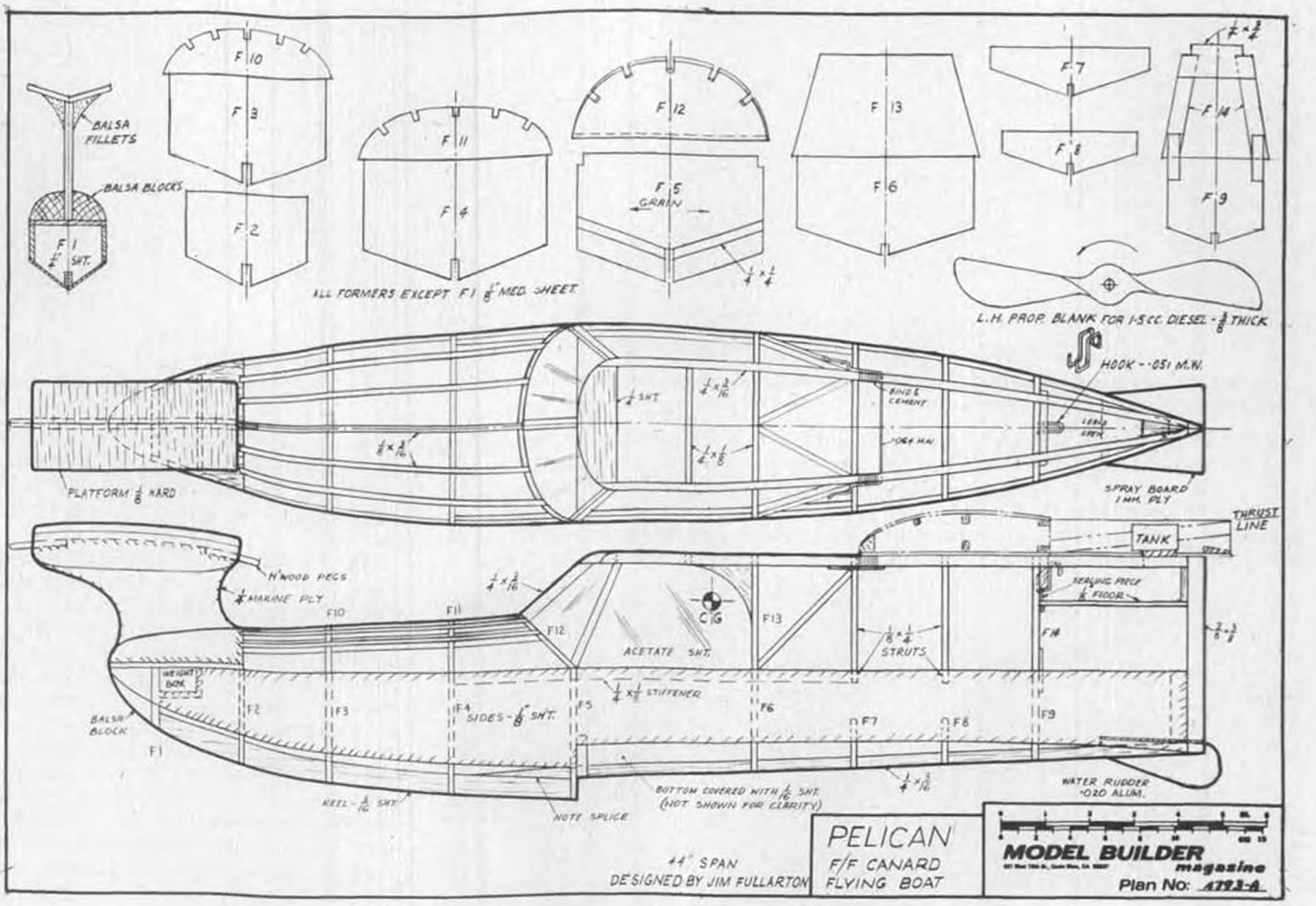
PHOTOS BY AUTHOR

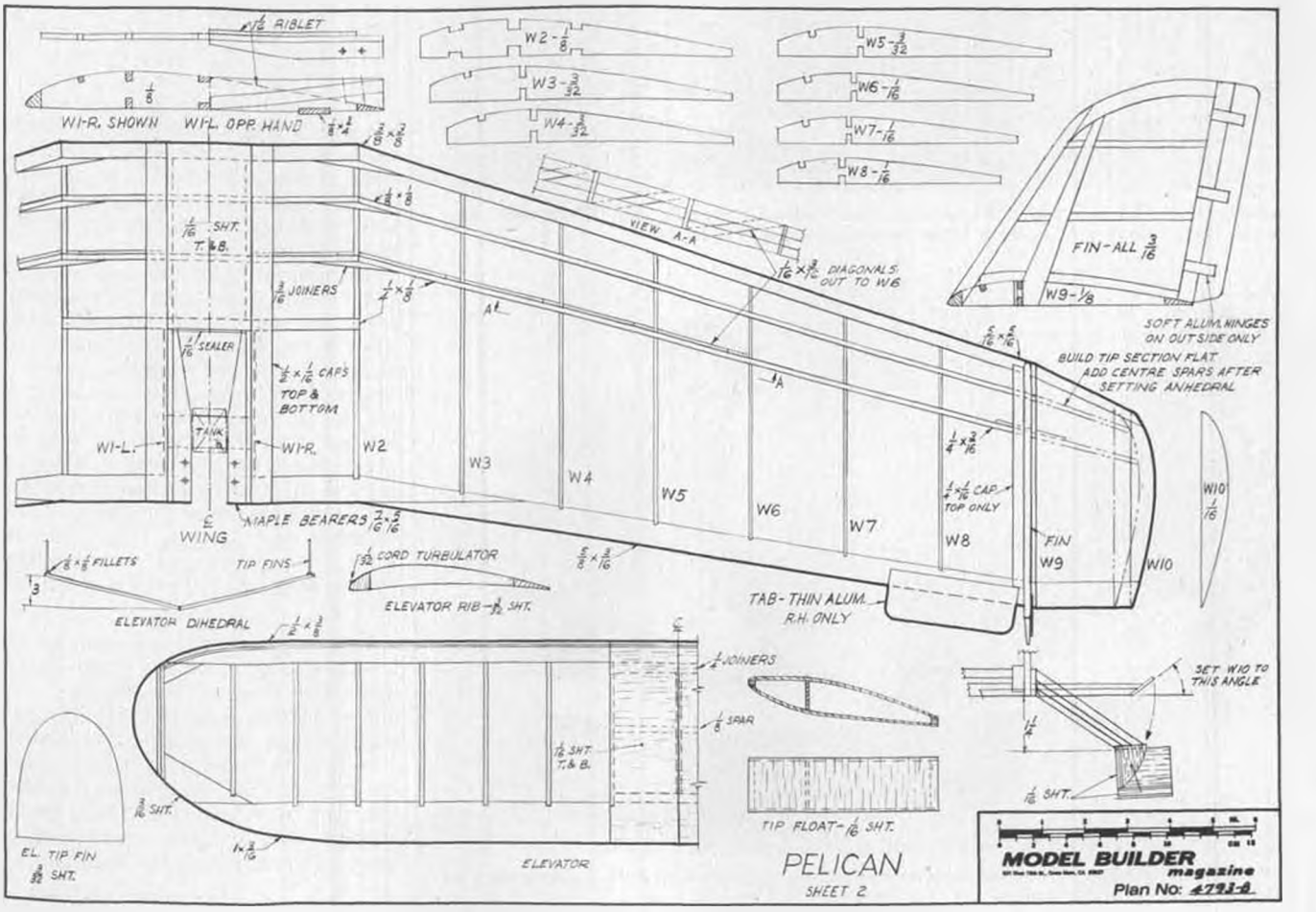
The author with his pride and joy. Canard has advantages over tractor for flying boats.

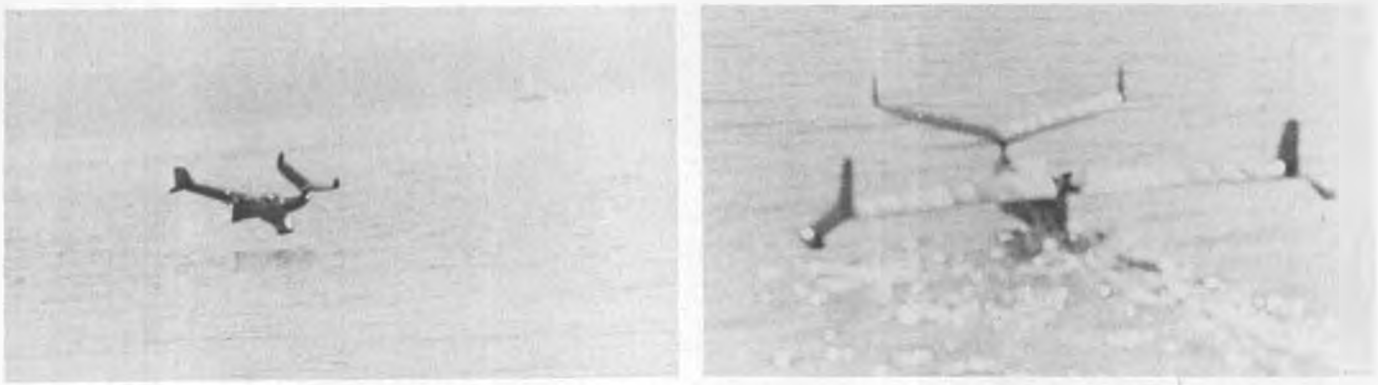
In the hypothetical full-sized version, the weight of the engine would be balanced by the crew, but in our case, we use lead and modeling clay packed in a weight box to get the correct C.G. position. Incidentally, the location of that C.G. is another thing we learned from Hank Cole, way back in a 1947 Air Trails. To minimize this weight, it pays to build everything at the back as light as possible. Use medium balsa where possible, and save the hard stuff for the spars. The mounting of the motor on the wing is a point we picked up early in experimenting with canards. It prevents the prop from chewing up the trailing edge every time the wing is knocked askew. That down thrust, which really produces a pitching up tendency, is another feature we have found necessary to prevent the model from hanging low under power.

The hull (fuselage to you landlubbers) is built upside down on the plan, bend-

You'd have to have quite an imagination to dream up a stranger looking model than the Pelican. Model uses an old Taipan .09 diesel, but a Tee Dee .049 would probably work well also.


F 10
F 3
F 2
F 11
F 4
F 12
F 5
GRAIN
F 13
F 6
F 7
F 8
F 14
F 9
BALSA FILLETS
BALSA BLOCKS
F 1
ALL FORMERS EXCEPT F1 MED. SHEET
L.H. PROP. BLANK FOR 1-5 CC. DIESEL - THICK
HOOK - .051 M.W.
PLATFORM HARD
SPRAY BOARD 1 MM. PLY
THRUST LINE
TANK
H'WOOD PEGS
MARINE PLY
F10
F11
F12
F13
F14
ACETATE SHT.
STRUTS
WEIGHT BOX
BALSA BLOCK
F1
F2
F3
F4
SIDES - SHT.
F5
F6
F7
F8
F9
BOTTOM COVERED WITH SHT. (NOT SHOWN FOR CLARITY)
WATER RUDDER .020 ALUM.
REEL - SHT.
NOTE SPLICE
44" SPAN
DESIGNED BY JIM FULLARTON
PELICAN
F/F CANARD
FLYING BOAT
MODEL BUILDER magazine
Plan No: 4791-A

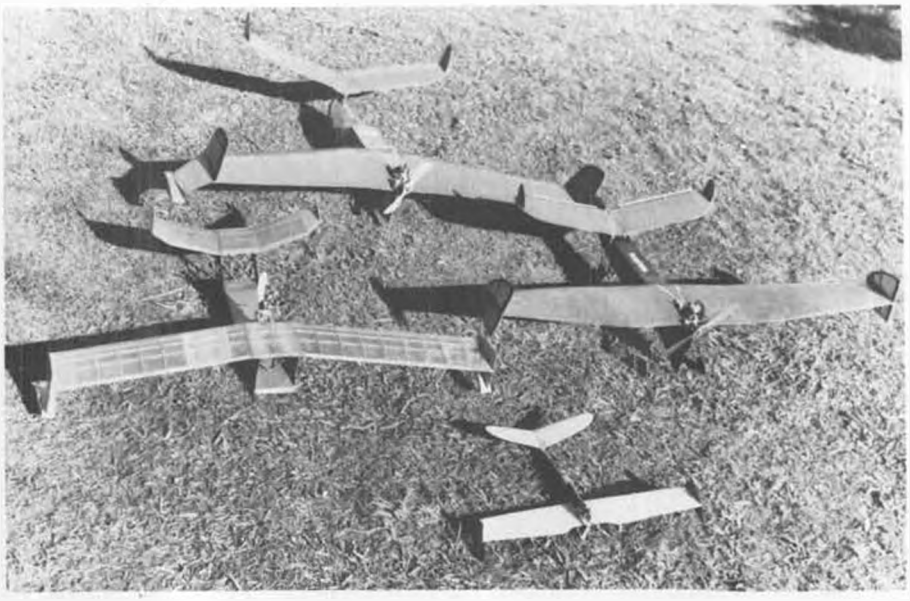

RIBLET
W1-R. SHOWN
W1-L. OPP. HAND
W2 -
W3 -
W4 -
W5 -
W6 -
W7 -
W8 -
VIEW A-A
DIAGONALS OUT TO W6
FIN - ALL
W9 -
SOFT ALUM. HINGES ON OUTSIDE ONLY
BUILD TIP SECTION FLAT. ADD CENTRE SPARS AFTER SETTING ANHEDRAL
SHT. T.E.
JOINERS
SEALER
CAPS TOP & BOTTOM
TANK
W1-L.
W1-R.
W2
W3
W4
W5
W6
W7
W8
W9
W10
CAP TOP ONLY
FIN
MAPLE BEARERS
WING
FILLETS
TIP FINS
CORD TURBULATOR
ELEVATOR DIHEDRAL
ELEVATOR RIB - SHT.
TAB - THIN ALUM. R.H. ONLY
SET W10 TO THIS ANGLE
SPAR
SHT. T. & B.
TIP FLOAT - SHT.
EL. TIP FIN SHT.
ELEVATOR
PELICAN
SHEET 2
MODEL BUILDER magazine
Plan No: 4791-B



Two shots of the Pelican taking off. Best takeoffs are made downwind, results in longer-than-normal takeoff run. Model had problems with spiral diving until the elevator tip fins were added.

ing the sides around formers F1, F5, and the sternpost. Then add F2 to F9, after which the keel may be inserted, and the bottom covered with 1/16 sheet. The frame may now be lifted and the upper formers, F10 to F14, stood up in position, after which the cabin top frame is fixed in place. You will, of course, be using waterproof cement throughout; no P.V.A. on this job.

The best way to get a good fit for the elevator platform is to pin the two halves directly to the underside of the elevator and leave them there while you glue the pylon and fillets to them, all this being done before the pylon is fixed to the hull.



The Pelican isn't a one-of-a-kind ship, as this photo shows. On the right is the "Ascender", at the rear is the "Rezenebe", and the model on the left is the "Flying Punt".

The original 1956 version of the Pelican with its builders, Max and John Fyfe. Looks quite a bit different than the current design.

The "elevator" on a canard ("front wing", "foreplane", or whatever you choose to call it) actually works harder than the main wing, in that, for stability purposes, it must carry a higher load per unit area than the wing, and for this reason it needs a good, high-lift, late-stalling section. In addition, I have found that a simple cord turbulator helps to prevent premature stalling, and was interested to note that Doug Joyce had a similar experience with his "Lil Lightning" canard (June '76 **MB**). Weight is no problem at this end of the aircraft, so it will pay to make your elevator plenty rugged.

The wing is mainly straightforward, the only parts that are a trifle unusual being the drooping tip sections. These are built flat with the rest of the wing at first, but with the leading and trailing edges angled out from underneath at the joint. The whole wing is then blocked up 1-1/4 inches, after which the tips are bent downwards and the center spars added. Make all spar joints with doublers, as the tip floats can take a bit of punishment at times.

The mounting of the engine on the trailing edge poses a bit of a problem in providing rigidity, but you will find that the cap strip system takes care of that adequately. As the wing also carries the fins, it must be located accurately, and for this purpose I used 1/8 strips, contoured to fit the side of the hull, and cemented to the underside of the center section. The fins are shown with rudders and aluminum hinges which are epoxied in place, but actually, I have found it safer to leave the rudders alone and rely on the drag tab, and maybe elevator tilt for turn.

Before covering, waterproof the whole structure with a good coat of dope, just in case. The elevator, wing center section, top of the hull, upper sides aft of the cabin, and bottom sheeting forward of the step are all covered with silk, while tissue is used for the wing outer panels and fins. Be sure all holes and openings are sealed, and dope adequately, but not excessively. A

Continued on page 81

From Lindsay Smith come these photos taken at a recent indoor meet held at Cardington, England. Photo on left shows Butch Hadland's Pietenpol, Bucker Jungmeister, and CO_2-powered Starduster. Other photo is of Bob Somes and his CO_2-powered Sig Monocoupe.

FREE FLIGHT SCALE

By FERNANDO RAMOS

PHOTOS BY AUTHOR

• Wings! After all the years that I have been building, wings are by far the most unfavorite structure to build. It seems as though I have difficulty in one form or another, regardless of the simplicity of the wing structure. I suppose part of this can be considered my poor atitude toward wing building; if I'd think positively, I wouldn't have so much trouble. At any rate, I want to cover several trouble areas and how I have attacked the problem in hopes of making wing building less painful. Regardless of my attitude, airplanes need wings and they have to be constructed with a fair degree of accuracy, if we are to make our models fly as they should. Some of the following may be in the form of review, but perhaps this review will refreshen your approach to wing building.

If I build from a published plan or a kit, I seldom use the recommended construction. I do this for several reasons. One is that too often, the structure is much beefier than necessary, and it is not scale. Usually the leading and trailing edges are much larger than required. Wing tips also fall into this category. Often, the spars are not in the correct position to satisfactorily construct movable ailerons (for trim reasons and added realism, or for pendulum control). Another reason is that I normally change the method of attachment of the wing to the fuselage. Let's see what changes can be made to make the construction easier and more realistic, and I also want to compare some of the more common types of construction methods found in most plans and kits.

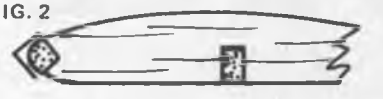
More often than not, the leading edge material is a rectangular cross section simply glued to the nose of each rib (see fig. 1). What's wrong with this? Well, not a whole lot, except that it involves more sanding than I care to do to get the proper contour. The more sanding, the more the possibility of breaking or cracking ribs. My favorite method is shown in fig. 2. With this method, little sanding is required in order to round off the corner. If leading edge sheeting is called for, you can see how easy it is to incorporate it with this type of leading edge. I use this method on 95% of the wings I build.

There are many different ways to construct or lay out trailing edges, so let's take a look at a few of these. Take a look at fig. 3. This is the old standard, dating way back. Since these preformed trailing edges are available, this is one of the most popular and easy to use. The problem for scale models is that the commercial stock is much too wide for realism. If I'm in a hurry, I'll purchase the narrowest stock available (1/2 inch) and strip it to 1/4 inch wide. This provides the necessary taper at the trailing edge, and sure beats taking flat stock and sanding it to shape. Fig. 4 shows a favorite of the R/C fraternity, and also of Flyline's neat scale kits. This method makes a neat, light structure, but for scale it is still too wide. Just to give you an example, the trailing edge on my full-size bipe was made out of .025 aluminum bent to a "V" shape. Each leg of the "V" is only 2 inches wide. This is a pretty standard size for fabric-covered aircraft. This means that at 1-1/2 inches to the

Continued on page 76

FIG. 1

FIG. 2



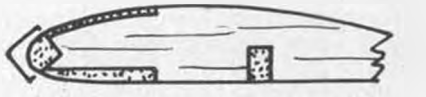


FIG. 3

FIG. 4

FIG. 5

FIG. 6

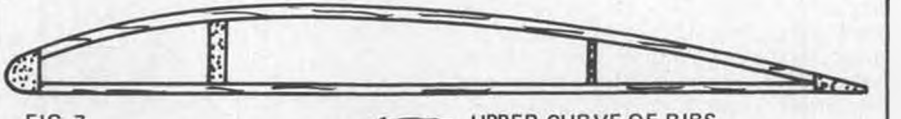
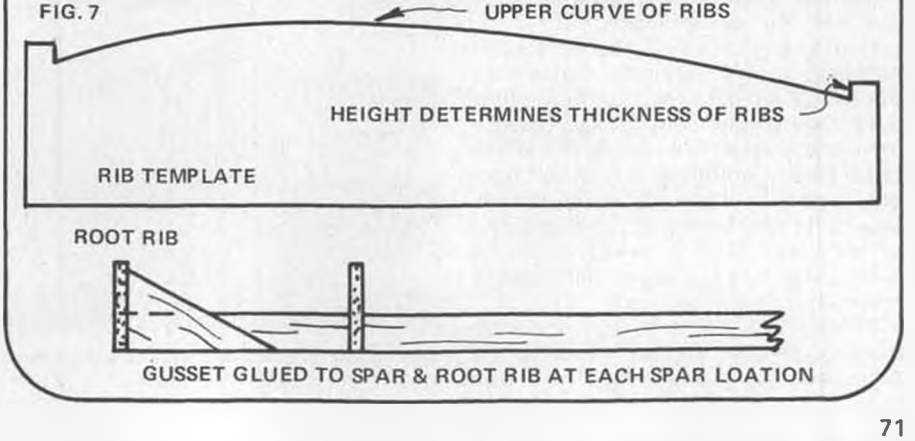


FIG. 7



Roger Simpson with his FAI Power ship at Hastings, in 1976. Had better luck in 1978, making the U.S. team with the same model. Similar to Galbreath's ship (3-view last month). Linstrum photo.

Chris Matsuno, noted rubber flier, with 1/2A model at CIA contest. Harry Murphy photo.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

• It's hard to believe this is my fourth column already. I mean, there haven't been any threats in the mail, I haven't been hung in effigy lately, and I haven't even been challenged by Dirty Dan (yet).

Judging by the newsletters coming in, the 1978 contest season is wrapped up. But since this will be printed in the early spring, when everyone's thoughts turn to the upcoming contest season, let me tell you about one contest you don't want to miss:

1979 WORLD CHAMPS
TO BE HELD AT TAFT!

As expected, Yugoslavia withdrew its offer to host the 1979 World Champs, in order to avoid having teams from South Africa and Rhodesia participating. However, the NFFS and AMA stepped into the breach with a quickly-prepared offer to host the World Champs at Taft, and the offer has been accepted. I'm operating on secondhand sources for details, but the date will be in October, probably Oct. 6-8. Bill Hartill (7513 Sausalito, Canoga Park, CA 91304) will be the Contest Manager, according to my sources. Contact him if you'd like to help . . . there's going to be a great need for timers, contest officials, and transportation for foreign teams.

With 8 out of the 9 U.S. team members coming from California, there's no doubt that we'll have a great home field advantage, solidified by the fact that our final team selection was held on the same field. Conditions at Taft in October, especially that early in the month, should be very similar to the first 2 days of last Labor Day . . . which could be quite a shock to European fliers used to more temperate climates.

There should be more representation from South and Central America this time, but I'm wondering if the Iron Curtain countries will show up, especially if there is a possibility that teams from politically sensitive nations like South Africa will also be present. Without the presence of the Russians, Czechs, North Koreans, etc., this would be a severely emasculated championships. In that case, the winners would always have to wonder whether they were *really* the world's best, if most of the best competitors stayed home.

Steve Helmick is doing his bit to make sure that as many countries as possible participate in this upcoming World Champs. He's organizing a proxy-flying effort for those countries unable to send teams, or unable to send complete teams. In addition to filling the entry lists, Steve feels that this is also a good opportunity for giving many more U.S. fliers actual competition experience at a World Champs. Contact Steve at 14804 Corliss, Seattle, WA 98133, if you'd be interested in proxying.

Charlie Martin launches his FAI job on winning flyoff flight at 1978 Power Bash.

Like father, like son! Keith Martin tied with his dad for 1st place at 1978 Power Bash.

NOSTALGIA, ANYONE?

The San Valeers have a habit of coming up with imaginative and innovative free flight ideas, like the Class D Gas event which ended up in the AMA rulebook. From the *Satellite*, edited by Ralph Prey, comes news of another of their better ideas: a Nostalgia event. Let Ralph tell it to you:

"WHAT IS A NOSTALGIA EVENT???? Good Question. It is for free flight models that were flown in the early to mid-50's . . . like the Civy Boys, Zeeks, Sandy Hogans, FuBars, Ramrods, plus others from 1950 to about 1957. These models were the mainstay of free flight, and were very, very popular. The main idea is to fly models of that era exactly like they were flown in contests at that time."

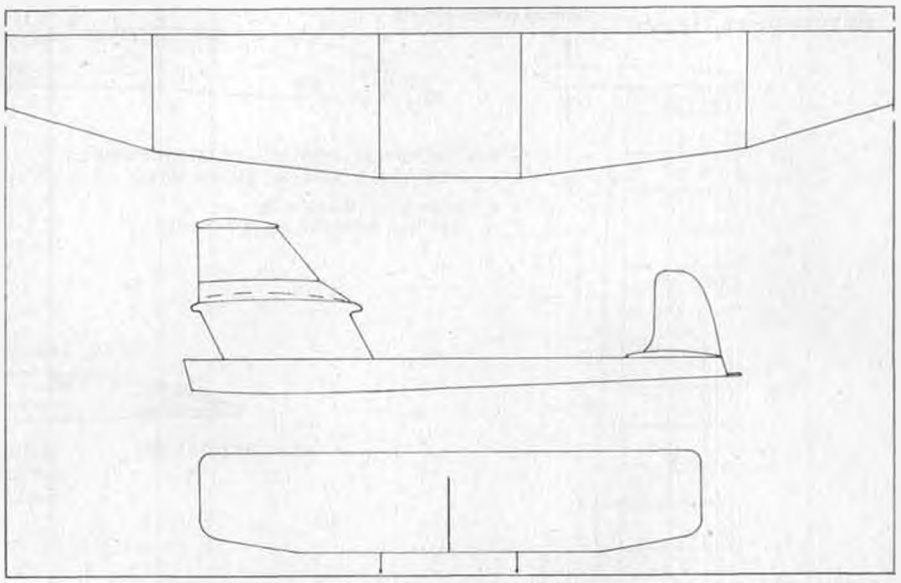
To be a little more explicit about details, the San Valeers have published a set of rules for their event. Here's a synopsis of the major points:

ELIGIBLE DESIGNS: Any free flight design published or kitted from the close of WW-II through December, 1956. Kits of current manufacture from eligible designs are OK, as are designs from Zaic yearbooks, or those reprinted in national magazines, either U.S. or foreign.

MODIFICATIONS: Original airfoils must be used; minor substitution of wood OK; construction shown on plans to be used. Sheet balsa fuselage in lieu of built-up not permitted. No auto-surfaces. Designs may be scaled up or down. Glow engines may be substituted for ignition; minor engine mount changes permitted. No restrictions on prop size or material.

POWER: Engines of current manufacture permitted if they have plain bearing crankshaft and no Schneurle porting or ABC piston/sleeve. Original vintage engines may be used, even with BB cranks. Ignition, glow, or diesel OK. Current Cox Tee Dee engines (not Conquest) are OK.

FLYING RULES: Engine runs 20 seconds ROG or 3 point VTO, or 15 seconds hand launched. Six-minute maxes. If maxed out, continue flying 6-minute maxes with same engine runs. Suggested classes: 1/2A, AB, and CD. Each contestant allowed 2 models, with exchange of parts allowed (assume they are of same design).

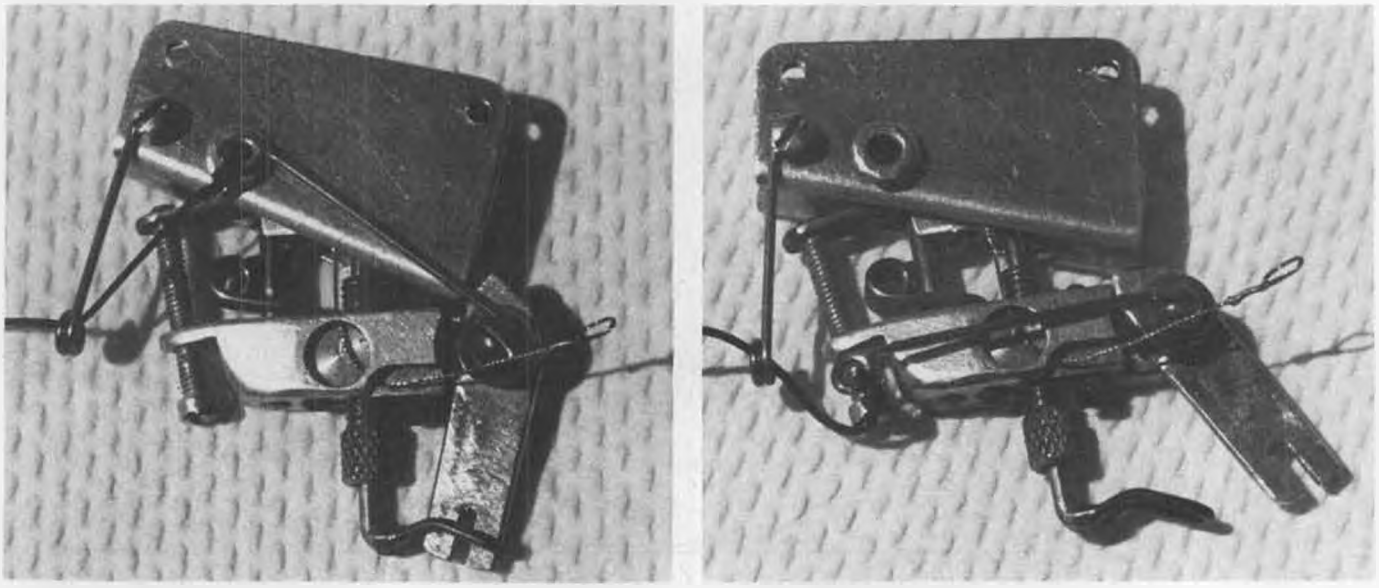


APRIL MYSTERY MODEL

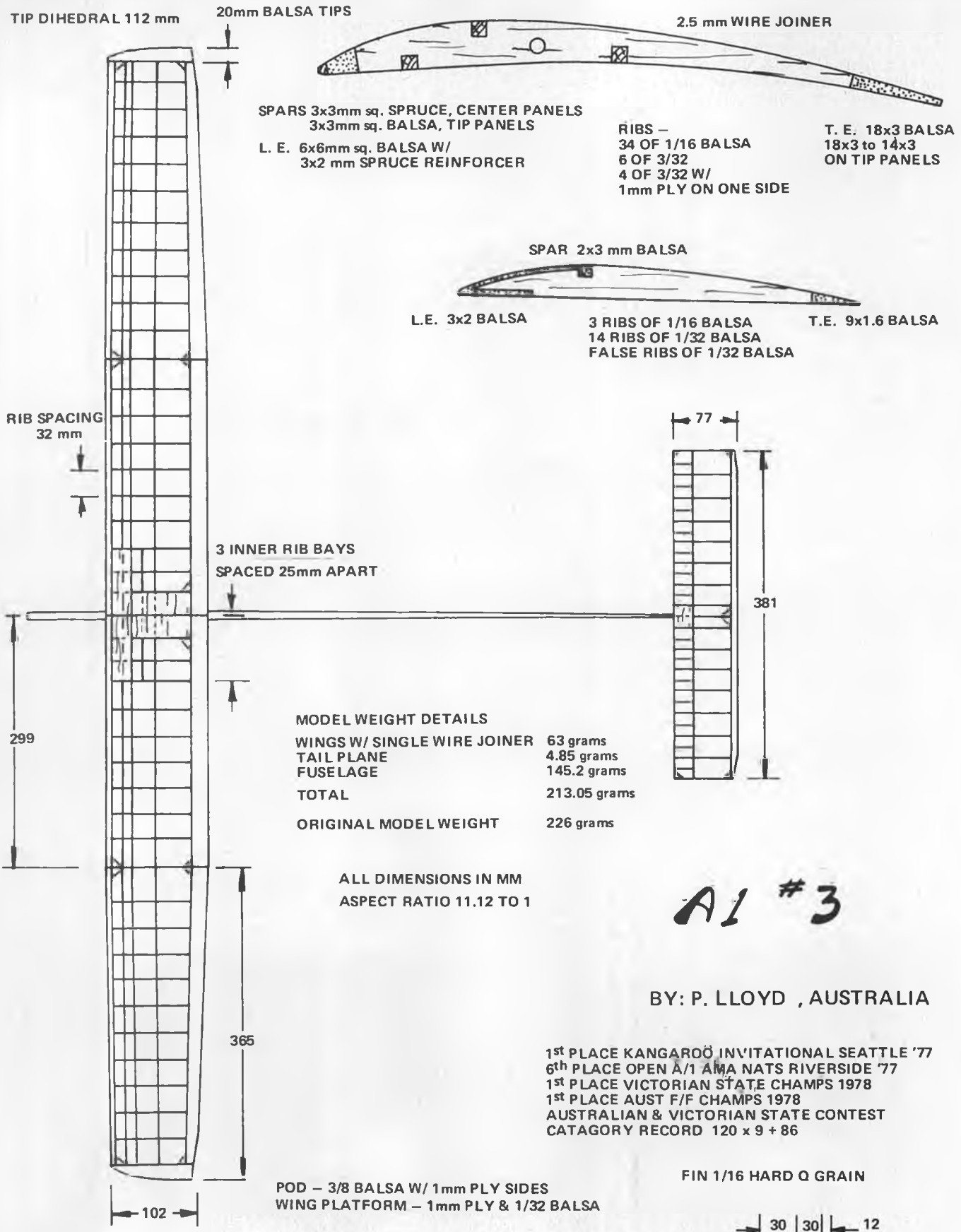
This sounds like a good event for those of us who began free flight after WW-II and who don't have any real nostalgic affection for Old Timer models of pre-war vintage. But these Nostalgia designs are a lot more like the high-performance designs of today, and have a lot more appeal, as far as I'm concerned. There are a lot of good designs to choose from, but I think the event will be dominated by Ramrods and Spacers, since those were the designs that were winning at the end of the era. The Ramrod, in particular, will be hard to beat, since it's the one design which almost anybody could make fly.

Those of you with a yen for something different might take a look at the FAI and foreign designs for the pre-1957 period. Kneeland's "Vapor Trails" (with a "Cumulus" wing and stab . . . the Cumulus might be a sleeper, too!), Wheeley's "Senator", Gaster's "Gastove", and Draper's "Crescendo" were all World Champs in that era. All have landing gear and otherwise meet the rules (no weight restriction, either!). They should really honk with an O.S. Max or Cox Tee Dee .15 in the nose. Some non-World Champs models would work well, too. Conover's "Lucky Lindy" is an ageless design which will handle power, and would do well at lighter-than-FAI weight. It's got a neat retractable landing/takeoff stick, too! Some of the British Open Power models like the "Eureka" or "Pendleton Fault" should be competitive, but would require adding a landing gear if you want to take advantage of the longer engine run for ROG/VTO.

Thanks to Walt Prey for a good idea. Now to go out to the garage and see if my Greenhead Torps, Johnsons, etc. will mind being asked to run again. Anybody



Bob Hatschek's towhook with a simple modification for automatic timer start (see text). On left is the hook in the latched position. Timer start line is attached to loop in wire on hook latch. On right is the hook in the unlatched position. Timer start line is free to move as latch moves back.



BY: P. LLOYD , AUSTRALIA

1st PLACE KANGAROO INVITATIONAL SEATTLE '77
6th PLACE OPEN A/1 AMA NATS RIVERSIDE '77
1st PLACE VICTORIAN STATE CHAMPS 1978
1st PLACE AUST F/F CHAMPS 1978
AUSTRALIAN & VICTORIAN STATE CONTEST
CATAGORY RECORD 120 x 9 + 86

Bill Giffen placed 3rd in Power Bash flyoff with 1/2A Maverick. Norm Beatty watches.

got a Zeek or Cumulus kit? I've got a Fubar 65 kit with no plans. Wanna swap? (Now I know how the Old Timer movement got started!)

MYSTERY MODEL OF THE MONTH

This month's mystery model doesn't qualify for the Nostalgia event, but a lot of West Coast modelers will probably get nostalgic about it. The designer claimed that this had the "slowest glide of any model on the field" and this characteristic certainly earned it many maxes despite its mediocre climb. The change to shorter engine runs caused its extinction. If you think you can identify it, send your guess to the **MB** office. Earliest correct entry (after handicap for location) wins a 1-year subscription.

AUTO-TIMER START FOR HATSCHEK HOOK

While at Taft for the FAI Finals, Bob Hatschek showed off a simple addition to his circle towhooks which permits the timer start mechanism to be triggered off the hook latch. The 2 photos show how it's done. A piece of .045 wire is bent to fit around the latch hinge screw, then held down with a washer so it moves with the latch as a unit. A loop in the other end of the wire goes to the timer start line. (The wire loop at the front of the hook is just a guide; it could be replaced by a hole in the fuselage, etc.) When the latch arm comes off and swings back, it takes the start line back with it, giving about 3/4-inch of movement. The timer could be triggered by a stiff piece of 50 lb. monofilament in the butterfly mechanism of a Seelig timer or fitting it into a piece of tubing.

Bob's hooks are very nicely made, and seem to have overcome the disadvantages of his earlier design. They are available for $20 directly from Bob at 316 Grosvenor, Douglaston, NY 11363.

HOT STUFF NOT HOT ENOUGH? TRY THIS

There's no doubt that cyanoacrylate adhesives, such as Hot Stuff, have caused a change in most modelers' building habits. These adhesives generally work like they're supposed to, but every now and then I get a joint where the miracle sticky stuff doesn't work. I suppose it's caused by some combination of humidity and temperature not being correct, or something on the wood, but in any case, it's most annoying to take 10 minutes to get one of these "instant" glues to work. However, I've been using a product for over a year now that ALWAYS gives you instant sticking with cyanoacrylates. Called "Woodprime", you use it by dabbing a drop on the joint, wait 3 minutes, then use the Hot Stuff . . . result is an instant bonding of the wood! Woodprime causes the wood to swell, so gaps of up to .020 can still be bonded. An added advantage is that the joint turns white instantly, so you know where you've bonded. The 3 minutes waiting time is worth it to get the instant joints, and doesn't take too long if you prime all the joints in a structure at once. Biggest advantage is that you won't have to redo any joints . . . you know how Hot Stuff hates to stick to itself!

Bob Piserchio is selling this miracle stuff by mail for $3.50 for a 50cc bottle, postpaid. Contact him at 5257 Stone Court, San Diego, CA 92115.

NATIONAL FREE FLIGHT SOCIETY NEEDS YOUR SUPPORT

Bob Stalick passed on to me a letter he received recently from Bill Booth, Jr., which is rather disturbing. Bill is in charge of membership for NFFS and reports that membership has been declining at an alarming rate during the past year. This is a real shame, since the NFFS is THE original special interest group within AMA and has been the most successful of all of these groups in terms of influence within AMA. The NFFS has been responsible for running the free flight events at the Nats. (This is probably the only reason the predominantly R/C AMA even permits us the privilege of still competing at the Nats, even though they've been succeeding in moving us farther and farther away from the center of Nats activity . . . this year, the F/F events will be held 40 miles away, in the middle of the Midwest wind belt.) The NFFS has been successful in running our FAI Team Selection programs and providing U.S. representation at the CIAM meetings. It was responsible for coming up with an acceptable plan for holding the 1979 Free Flight World Champs in the U.S. And, in spite of some problems in finding an editor, the NFFS Digest has succeeded in maintaining a semblance of regularity in publication. Now that AMA's house magazine has practically disowned free flighters as not being worthy of their attention (or of space in the magazine), the NFFS may be the only means of disseminating technical information to free flighters.

So, the Society is deserving of your support. Increased numbers will make our influence felt by AMA, since they deal mainly in numbers. There are more free flighters active today than the 700-odd members of NFFS. There was a

Ex-MB F/F editor Bob Stalick now has time to fly, flew C-Quell at Power Bash.

John Lenderman, Bill Gaiser, Doug McClean, and Dave Hagen give Clarence Bull advice on pouring microfilm at Ist N. W. Indoor Symposium. Mike demo was a big hit at the Symposium.

movement several years back for free flight clubs to enroll en masse in the NFFS . . . why not start it up again? The executive director has appointed an interim board of directors, and they are a good group. Why haven't you joined yet?

Here is the dues structure: Age 19 and over — $10 per year or $18 for 2 years; Age 18 and over — $5.25 per year or $9.50 for 2 years. It's a bargain at twice the price. Send your dues to Bill Booth, Jr., P.O. Box 192, Carlsbad, CA 92008.

MODEL OF THE MONTH

So far, I've featured one rubber model, one Open power model and one FAI Power model. Guess it's time for a towline glider. Instead of an A/2, how about one of the new weight rule (220 g minimum weight) A/1's? This month, we'll show an Australian A/1, coming to you via the *Bat Sheet*, designed by Peter Lloyd, who was a visitor to the Northwest and the Nats last year. Here's his story:

"This design dates back to March 1977, when replacement plans were made for existing Aiglet A/1 derivation, which had failed to live up to the expectations I had set for it. The dilemma: what to build? A quick survey of existing designs narrowed down to Tony Cordes 'Little Hinney', an APS design featured in the March '72 *Aeromodeller*, and it's from this model that most major dimensions came from.

"Personal preferences played a large part in the final product, like 2-piece wings for easy transport, simple wing construction using a common rib profile from tip to tip, and quick pod/boom fuselage layout. The choice of airfoils was limited to what was in the junk box . . . hence, the stab section is straight from the Aiglet and the wing section was eyeballed until it looked right. It probably has a family resemblance to a well-known Benedek section, but this is purely coincidental.

"Two models were built posthaste and shipped to 'Fab Bat Land' (Seattle), where the rest is history. The model proved viceless except for a warp in one wing panel, and the rugged construction afforded by the 220 gram rule has saved the model on more than one occasion." •

F/F Scale . . . . *Continued from page 71*

foot scale, you would have a 1/4-inch wide trailing edge, and at 3/4 inches to the foot, it would be a mere 1/8 inch wide. Granted, we need some size in order to maintain strength, but let's not overdo it! Fig. 5 shows yet another method. This one is typical of the Sterling kits. It is simple to construct, but obviously not very scale.

Before I give you my favorite method for trailing edges, let me discuss the wing tips. More often than not, wing tips on most kit plans, or just plans in general, show several pieces of cut-out balsa glued together (grain going straight on each piece) to form the wing tip. This system has been around a long time, so you can't knock success. Laminated wing tips are being used more frequently, and rightfully so. They are stronger and lighter and by far more realistic in appearance. Of course, laminating only applies to wings which have curved tips.

I prefer to laminate the trailing edge and wing tips all into one continual piece. I find this easier to make, warp resistant, and more realistic than any of the methods mentioned previously. I use basswood almost exclusively, even though I have used spruce and balsa. A combination of bass and balsa works pretty well, but I prefer not to use balsa alone. I feel that balsa alone doesn't have the strength that the other woods have, and the weight difference isn't great enough to worry about.

Normally, I will laminate four 1/32 x 1/8 or four 1/32 x 3/32 pieces of basswood, depending on the size of the model. Usually, the 1/8-inch width is used for gas models. On smaller rubber models, say 18-inch span or so, I have found that three laminations are more than adequate. Often, I will laminate the entire wing outline, which works extremely well on models with an 18-inch span or smaller.

For those of you who are new to laminating, let me just briefly mention an easy way to do it. Let's say that you have decided to make the total width of your laminations 1/8 inch. With a piece of tag board or poster board under your

wing drawings, adjust a pair of dividers to 1/8 inch in width. Punch a pair of holes around the periphery of the wing outline. If the wing has a straight trailing edge, I punch a pair of holes at the root and at the tip just before it starts to curve. Once you have finished punching around the wing, remove the cardboard from under the plan. With a straightedge and an Uber Skiver, cut the straight portion first. (Remember, you are using the inner holes!) This will assure a straight and true trailing edge. The curved portion is cut out with a pair of scissors. Sand out any irregularities that may appear. The whole template is then coated with wax from a candle or crayon (This is to prevent the laminations from sticking permanently to the template).

Soak your wood thoroughly. I use a long glass tube with a stopper on one end. The excess water is removed by blotting, then all four pieces are glued together. One end of the lamination is taped to the template, and with gentle pulling, wrap the laminations around the template, taping it down as you go. Then pin everything down to dry, making certain that your handywork is right up against the template and flat on the board.

When they have dried, remove from the workbench and carefully remove the tape only. At this point the lamination is slightly glued to the template. I find this helpful because I can sand the lamination to the shape I want while it is still attached. After sanding, remove from the template and sand the inside edge. This is done to remove any wax that may come off. Without this step, you may find that your glue joints will not be very strong. The opposite wing panel outline can be made by flipping the template over.

This may seem rather lengthy, but it only takes about 10 minutes to make the template, cut the wood, and do the gluing. Not bad, considering the additional strength and realism they provide. Before placing the wing lamination on the drawing, I pin down a ruler on the outer line of the trailing edge. Then the wing lamination is pinned right up against this straightedge. This provides a bit more accuracy.

Wing ribs. Another necessary chore, I'm afraid, but a pretty important one. First off, since most scale models have so many ribs, 1/32 sheet is more than adequate. So, rather than worry about the size of material to make the ribs from, let's devise different ways of cutting out the ribs. The first thing I do is make a Xerox copy of the wing rib or ribs. These are then transferred onto some tag board using rubber cement. I cut the patterns out, and these now become my template for cutting out the ribs. I prefer to cut out ribs one at a time. No question about this being the most tedious, but by doing a few at one sitting, it doesn't seem too bad.

Stacking rib blanks and cutting out many similar size ribs at once is a favorite of many modelers, and one that I should incorporate myself. If you choose to do it this way, the easiest method is to cut out as many rectangular blanks as there are ribs. Rubber cement the blanks together until you have a nice even stack. (A single coat of regular rubber cement holds the wood together very well until the ribs are cut out. If you find a bit of cement residue on the ribs, just rub your finger back and forth and it will easily come off. However, there is another similar type of cement, called one-coat rubber cement. I have found that this type of cement holds about the same, except that the residue is very difficult to remove from the wood.)

Rubber cement the template onto the stack of blanks. If you have a jig or bandsaw, you're now ready to cut out the ribs. Some of you may wonder why a separate template is required, rather than just the paper pattern or tracing. The answer is that the saw blade will track around the template easier, and holding a very steady hand will not be necessary. If neither is available to you, then make another rib template and cement it onto the backside of the stack. With some fairly coarse sandpaper on a block, sand between the two templates until you have a uniform rib shape. The notches for the spars can be cut now using a Zona saw with the rib stack lightly locked into the jaws of a vise. Use some kind of straightedge to keep the saw blade tracking true. Rather than using a back-and-forth motion, just pull the saw, making several light passes until the required depth is obtained.

The foremetioned system works great if you have a constant chord wing, but what if the wing you are building is tapered? The steps are similar, except that you will have two different templates. You will need a template of the root and tip ribs. Also, mark a vertical line, say, 30% back of the leading edge of both templates. Then on the stack of rib blanks, draw a reference line so that the 30% marks on the templates will line up with each other. Finish the ribs in the same manner mentioned previously. Repeat the procedure for the other wing half.

If you want to make all of the ribs for both panels of a tapered wing in one clip, cut all of the necessary rib blanks. Line up the two rib templates as before, and sand down as necessary. This system is "quick and dirty" in my opinion, and the most notable drawback is the severe slant on the upper surface of each rib. I would definitely recommend sanding the entire upper surface of the wing after it has been constructed.

The next approach to wing ribs is the spliced rib. See figure 6. This is a favorite of many indoor modelers, and is used a great deal by Walt Mooney on many of his Peanut plans. The ribs are light, yet very strong. This type of rib should not be restricted to indoor use only; larger models can use these ribs as well. Once the upper curve of the airfoil has been established, cut out a template as illustrated in fig. 7. The space between the two little posts should be the exact length of the rib between the leading and trailing edge. The material used to make the ribs should also be this exact length. Place the template on the balsa sheet and cut across the template. Now, slide the template down until these posts are even with the upper edge of the balsa sheet, and cut across again. This will give you a uniform shaped rib of equal thickness each time. See Fig. 6 again. It should be obvious that the spars are resting on the bottom portion of the ribs. This is usually 1/16 square glued between the leading and trailing edges, then the spars are glued to these. At this point, you can do one of two things. You can glue the upper part of the rib directly above or in line with the 1/16 square, whereby the rear portion of the rib will have to be cut at an angle to flare properly at the trailing edge. Or, you can glue the rib beside the 1/16 square. If you choose the latter, you will not have to trim the rear of the rib at an angle. No big thing; just another way to do it.

If you have a tapered wing, the spars will also have to be tapered, usually from the root to the tip. This can easily be done by measuring the space between the upper and lower portion of the root and tip ribs at the location of the spars.

That pretty well covers wing construction. Now, for a few added details. With light structures, certain areas, I feel, need a little reinforcing so that the structure will not distort after covering. See fig. 8. Whenever you are building a model with a two-piece wing that will be butt-glued to the fuselage, gussets should be used to keep the root rib as straight as possible. What usually happens is that after covering and doping, the root rib will tend to bend inward, due to the tautness of the covering. This will cause not only a poor joint between the wing and the fuselage, but it will look terrible as well. On a light rubber model, a gusset between the rib and the spar can really help this problem. If the wing has two spars, then use two gussets. On larger models, either rubber or gas, I will glue a large rectangular piece of balsa sandwiched between the root and second ribs. This keeps the root rib from moving after covering. The same treatment is done if you are planning to have movable ailerons. (Maybe not movable, but as a separate unit from the wing.) The inside corner of the aileron and the rib opposite that corner should also have some kind of bracing to eliminate the distortion that will occur after covering. This same technique is done on full-size aircraft.

One last suggestion. I'm building a 1-1/2 inch = 1 foot scale model of the ABC Robin. (One of the homeliest airplanes ever designed, but I love it!) I used the RAF airfoil, as did the only one ever built. The height of the ribs was such that if I didn't provide some extra bracing between the ribs, I would have each rib bent over one way or the other after covering. To avoid this, I "X" braced between each rib with 1/16 square balsa. Not the most ideal job and certainly a tedious one, but anticipating what may happen during and after covering will well be worth the effort.

Next month I'll discuss different approaches to the attachment of the wings to the fuselage. Don't forget the Flightmasters Flying Aces type contest, to be held at Mile Square Park on May 6th, from 8 a.m. until the late afternoon. •

Holly Hawk . . *Continued from page 23*

diameter piano wire as shown on the plan, and can be installed as soon as the fuselage has been covered. Sand down the finished structure and set aside.

Cut the fin, rudder, stab, and elevator from 1/4 soft balsa; hinge and slot, and assemble ready for mounting on the fuselage. Now, bend the tailwheel strut from 1/16-inch diameter wire; slide it into the nylon bracket, and epoxy the tail assembly and tailwheel to the aircraft simultaneously. Trial fit the radio, pushrods, control horns, landing gear, and motor; if everything is OK, your fuselage is ready for covering.

The only part to be built now is the fuselage top decking above the wing. This should be done with the wing attached. Stick the adhesive saddle tape in place, secure the wing, and glue on the balsa top, which should be rough-carved to conform to the airfoil section. When dry, round off the balsa so that the top decking is flush with the nose.

Remove the wing, hollow out the balsa for the aileron servo, if necessary, and your Holly Hawk is now ready for covering.

FINISHING AND FLYING

The original model was sanded and covered with Solarfilm. You may, if you wish, add optional extras such as windscreen and/or pilot. With the plane balanced as shown, Holly Hawk flew straight off the board. Power from a .19 is more than adequate, and the flat-bottomed Clark Y airfoil provides plenty of lift in those sharp pylon turns. So, get your buddies to make their own Holly Hawks and try some 30's style racing at your local field. •

Tool Box . . . . *Continued from page 67*

check the price on 1-1/2 volt dry cells, and remember that this battery will last you four or five seasons of hard use, plus give you the voltage that it takes to fire off high-performance engines.

Might also mention that the box works well (for me, at least) at F/F contests and for flying R/C, assuming there are any R/Cer's left who can do without an electric starter, fuel pump, tach, a jillion screwdrivers, a voltmeter, quick charger, towel rack, squirt bottle of 409, priming bottle, servo tester, and on and on. Thornburg may be interested in knowing that the box works well as an anchor for a hi-start! A friend and I got caught at the field one day without the peg for the hi-start, so we stripped the box down and loaded it up with rocks. Tied the tubing to the handle and let 'er rip! I even considered taking the box to a local Indoor meet, but decided that might be pushing things a little. Indoor fliers are wierd and just barely tolerate my presence at their meets anyway.

On to building the Show-Biz toolbox. You may have noticed that there are no plans for the box accompanying this article. The box is so simple that most anybody should be able to build one just by looking at the pictures. Besides, most people will modify the box in some way to meet their own requirements, and you don't need plans if you aren't going to follow them in the first place!

Start out by determining the overall width and length of your toolbox. I did this by placing the major items to be carried in the box on a piece of 1/4-inch ply. The battery is the heaviest single item, so it goes in the center of the box. A quart of fuel to the right of the battery and two fuel bulbs to the left kind of balance things out and give my box an overall length of 15 inches. I needed about 4 inches in front of the battery for the power panel, so again, to keep the box balanced, the compartments in the back are also 4 inches wide. This gives my box a width of 13 inches.

Now that you know how wide and how long to make your box, cut out the bottom from 1/4-inch ply. My box is made entirely from 1/4 ply, but Sig's 1/8 Lite-Ply should work OK for the sides and dividers and would keep the box a little lighter besides. The two main dividers, the tops of which are bolted together with the handle, can now be cut out, as can the sides of the box. The sides of the box should be about 4 inches high. Nail and glue the sides of the box to the bottom, making a little effort to keep everything straight and joints tight. Quarter-rounds 3/4 of an inch in width are used at all corners to strengthen things up a bit. The two main dividers are now glued in; be sure to get them centered in the box and be doubly sure to leave enough room for the battery.

Now cut the pieces for the other dividers and glue them in. The cover for the battery is now cut out and fitted, as is the panel for the switches, ammeter, and plug-ins for the glow leads. Notice that this panel is at an angle (about 35 degrees) so that the ammeter is easy to read from either a kneeling or standing position. The ammeter is almost worthless if you can't see it easily.

Both the cover for the battery and the power panel are secured with No. 6 x 3/4-inch sheet metal screws. Strips of 1/4 sq. spruce are added to the inside edges of the battery compartment and the wiring compartment, as putting No. 6 screws into 1/4 ply isn't the easiest thing to do successfully. The handle can now be fitted and is made from a 1-1/4 inch dowel. Holding the handle in place, carefully drill a 1/4-inch hole through the two main dividers and the dowel. A 5-inch long, 1/4-inch bolt holds it all together. Do not glue the handle in place. If you do, there is no way to get the battery out for charging and checking fluid level.

The compartment directly opposite the power panel has a lid on it on my box. The lid is cut from ply and simply sits on top of quarter-rounds that are glued inside the corners of the compartment. To keep from losing the lid all of the time, I put a light chain on it (the kind used on stoppers for bathtubs). Two 1-inch holes are cut into the lid, making it easy to grab.

Now you should have your basic box built up, so we can tackle the wiring and add the goodies. Wiring is definitely my weak point, so I am not going to try to tell you how to do it. Just start hooking stuff up and keep at it until your plug glows when everything is turned on. However, be sure to hook up the ammeter per the instructions furnished with it. My ammeter has to have the positive lead from the battery hooked up to it. I suppose all ammeters are the same, but check yours to be sure.

In my box, the only departure from normal wiring is the use of a wire-wound resistor to give three different voltages at the plug. I made a resistor by winding 1/32 dia. music wire around a 1/4-inch dia. dowel. With my battery and using six-foot leads for the glow clip, eighteen coils in the resistor is about right . . . not burning out plugs at the high voltage and having plenty of juice on the low

voltage side. Power is tapped off both ends and the middle of the resistor, and wired to the appropriate plugs on the left side of the power panel.

None of the parts for the power panel are hard to get. All of them can be picked up in one stop at a well-stocked electronic supply house. The light socket is a standard item; the only problem is finding one small enough. You will also need some 2-volt bulbs for it. The plugs for the glow leads are called banana plugs; they are cheap and work OK. I managed to find some plugs in different colors, so I used blue for the low voltage plug, yellow for the middle one, and red for the high voltage plug.

The buzzer is a cheapie 2-volt unit. Most anything will work. The toggle switches I used are kind of special, being safety switches as used in commercial aircraft. They are sealed and have a neat cover on them that turns the switch off when the cover is snapped closed. Do get a high-quality toggle switch that won't give you trouble, and notice that only one switch is required if you don't use the light and the buzzer. I used four switches because I had room for them and already had the switches lying around. Besides, people are really impressed by the row of four switches. Show-Biz, remember?

The ammeter you use should be chosen carefully. It should be of high quality and have a scale reading from 0 to 5. A lot of ammeters have scales of 0 to 15, and this means that the needle has much less travel, making it difficult to read when you are trying to see if the plug is flooded, or dry and ready to go. Hold out until you find the proper ammeter, you'll be glad you did.

When you have fitted the battery cover and the power panel and cut all necessary holes for the banana plugs, ammeter, light, switches, and the buzzer, fit everything together to be sure that you haven't screwed-up someplace. Then strip the box of all accessories and paint it. I filled all dings, voids in the ply, etc. with Dap putty. Then I hit everything with a coat of sanding resin. When the resin was dry, I sanded everything down and brushed on two coats of yellow Hobbypoxy. Epoxy paint is the only thing to use on a toolbox. Sooner or later you will spill raw, high-nitro fuel all over everything, and it will eat up most any kind of paint other than epoxy.

When the paint is dry you can start adding the little items and permanently install all of the electronics. The props are held in foam rubber. Cut the foam to size and push into the compartment. Jab a long sharp knife into the foam in several places so the props are easy to get in and out of the foam. A large screwdriver, used for tightning mounting bolts, is also stuck into the foam. A Fox 2-way wrench is wedged between the side of the box and the foam.

The CMI 2-ounce syringe is held in place by a large fuse clip that can be picked up at the electronic supply house. A short 4-40 bolt is installed in the side of the box and a one-inch long piece of tubing is wired permanently (like wrapping a bladder) onto the bolt. The loose end of the tubing on the syringe can then be plugged into this tubing, keeping dirt out of your fuel syringe. We all know what a piece of dirt can do when it clogs up a needle valve, right?

The hemostat (used for pinching off full bladders) is held in a small fuse clip. A piece of 3/32 music wire is bent into a loop and bolted onto the right-hand main divider. The glow plug leads are tied to this wire so that an accidental yank on the leads won't pull the banana plugs out of their sockets.

Three one-inch long 4-40 bolts provide a convenient mounting for bladders. Just slip them on the bolts and jerk them off when you need one in a hurry. Having the ends of the bladders plugged also keeps them clean. A piece of 1/16 thick brass is cut to size and bolted to the compartment divider, preferably right next to the bladders. Several one-inch long pieces of small surgical tubing are held pinned to the box by the brass plate. Glow plugs are then inserted into the loose ends of the tubing and are left to dangle. The plugs are securely held in place by the tubing, yet they are easy to get when you need one in a hurry.

Notice that the plug washers are slipped over the stem of the plug, and then the

plug is pushed into the tubing. Right next to the plugs is the plug wrench, and it is held in place by another fuse clip. The wrench itself is kind of special and is the only thing to use when trying to change plugs on a Fast Combat plane. It is a 6-inch long, 1/4-inch drive flex handle with a 5/16 socket. The flex handle can be used with the handle at 90° to the socket for maximum leverage to break the plug loose, and then the handle can be straightened out to spin the plug out in a hurry. Ever fought with a four-way wrench when changing plugs in a Fast Combat plane? If you have, you ought to appropriate my reasons for using a flex handle.

As the battery I use has lots of power, I prefer to use long leads for the glow clip. I make mine up to be about six feet long, and use lamp cord for the wire. Lamp cord is cheap and flexible. I have three sets of leads, for different uses. For general use, one set is fitted with a Pylon glow clip. One set has a DuBro metal clip (1/2A size) for use on .049 Combat planes, and the other has alligator clips for use on cowled-in Stunt engines.

Your Show-Biz toolbox should now be complete. Load it up with props, plugs, a couple fuel bulbs, a quart of fuel, whatever lines you use, a handle, and a few other odds and ends, and you should be ready for most anything. Most anything includes quick repairs, so stick a bottle of Hot Stuff in someplace. The holes in the lid on the back compartment are 1 inch in diameter and a bottle of Hot Stuff is 1 inch in diameter, so I wrap several rubber bands around a bottle of Hot Stuff and drop it into one of the holes.

I have used my toolbox for a year now and it works great, so I hope you try it. The only thing I have considered changing is the location of the hemostat; it is a little too far away to reach most of the time. Lately I have been wedging it between the foam and the side of the box, right next to the Fox wrench. Gary Stevens thinks the box is just a little too big, but you should see the junk tool box he uses!

Before closing, I have to admit to a little trick that I have been pulling on fliers in this area ever since I first made my toolbox. Remember back at the start of this article when I described hooking up a good plug and being able to tell if the plug is good by looking at the ammeter or flipping the third and fourth switches and having the light and the buzzer go off? I wasn't putting you on, but the light and the buzzer will work whether or not the plug is good or even hooked up. They don't do anything but make people gaze in wonder and marvel at your genius! Show-Biz, folks, nothing but Show-Biz! •

Pelican . . . . . *Continued from page 70*

suitable water and fuel-proof finish will complete the job.

Our tank was made from celluloid, which is OK for diesel fuel and lets you see how much fuel was in there, but where can you get celluloid now? It looks as though you will have to solder one up from brass shim stock, but remember, it will feed from the rear bottom corner. The original uses an old Taipan 1.5cc diesel, which provides more than enough power; in fact, it will take off on less than full throttle. For this reason, I consider that a good 1/2A contest motor would do the job just as well, especially as there would be a double weight saving, due to the reduced amount of ballast required to balance the lighter motor. The clublike propeller shown on the plans is needed, as a bigger diameter would not have water clearance, but whatever engine you use, try to provide one inch of clearance between the prop and the trailing edge for flicking it over. And please, don't overpower!

The trimming set-up is 1/4 inch of wash-out in the right wing, 1/2 inch of wash-out in the left wing (looking from the rear, of course) and with the tab bent down about 3/8 inch. The aim is to produce a right turn on power and glide. We found that due to torque, it tends to turn too tight under power, making it necessary to back off a bit by using a very slight amount of right thrust, which, on a back-to-front aircraft, has the reverse effect. Start with some hand glides over long grass, if possible, and then proceed to low power hand-launched flights until you are satisfied with the trim.

We have found that takeoffs are best

made downwind, as this gives the necessary water speed to get over the "hump", and up on the step. Like the great bird for which it is named, the Pelican takes quite a long run before getting up and rotating into the climb. She runs very straight and can operate in a slight chop, but if the waves are more than a few inches high, the prop tends to clip them when it rotates to lift off, causing a loss of flying speed.

As an old free flighter, the writer is forced to admit that radio control does appear to have come to stay, and what is more, they tell me that they now have gear small and light enough to go into this ship, so we had better see what could be done about it. To start with, as spirals would no longer be a problem, the elevator could come down off that pylon and be set into the hull where it used to be. Then it could be provided with elevators (not necessarily full-span) for control in pitch. Rudder presents more of a problem, as the thought of running rods out to those wingtip rudders does not seem attractive. Instead, I would suggest replacing the elevator tip fins with a single forward steering rudder, located right up front, as in some of the old twin pushers. Ailerons would be optional, but if used, they could be operated by a mixing device to work as elevons, as is done on the British Lockspeiser canard.

And there you have it. Whether you use free flight or radio, if you are one of those who likes something a bit out of the ordinary, I am sure you will be happy with the Pelican. •

C/L . . . . . *Continued from page 65*

If that isn't enough to get to you, it is then discovered that some of the people you used to depend on for free lance artwork are too busy to do work for you. Seems that the ad agency that "Big Brother" started is paying more money for the same work. Got to keep the profits down, you know. In a few instances, you hear of situations where a job has been promised to you, but your national organization's own ad agency has stepped in and bid more money for the same job, the free lance artist dumping you and going for the bucks.

Now, what would you do? No need to answer. But it sure does give AMA's publication of a commercial magazine a look, through the eyes of people such as Bill Northrop.

Not only does *Model Aviation* benefit from a now-captive consumer group, they compete for the advertising dollars within each manufacturer's budget, the dollars of those just looking for a magazine to buy in hobby shops, and a spot on the magazine rack at hobby shops. Added to this is the fact that *Model Aviation* is now planning a more aggressive campaign to place the magazine in more retail outlets. No doubt they can once again take dollars from the other magazines, which have to show a profit to stay alive, as opposed to *Model Aviation*, which must show only minimal profit or loss each year.

Minimal profit, preferably no profit. How do you achieve this? Must be very difficult. I see where the '78 *Model Aviation* budget had total expenses of $453,200 out of an income of $453,600. Almost a half-million dollars spent, and it comes out to a $400 profit. How cute . . . on paper prepared by the AMA and *Model Aviation*. I am just as ready to believe that financial statement as the people at *Model Aviation* are to believe the pie chart published in *Model Airplane News*.

You can take all of this and still wonder why the model magazine publishers are so bent. I wonder why they haven't gone to court over this obviously unfair competition.

For those of you who are skeptical of my position and the use of this column to add further heat to the growing fire, I suppose I ought to direct a few words your way. First, WCN and I actually don't get along all that well, he not understanding most of the stuff I write and I, being from a completely different modeling background, unable to see most things the way he does. It comes down to me writing what I want and screaming like hell if Bill even hints at cutting something out . . . and I suppose he just shudders at some of the stuff I ask him to print. It adds up to this piece on the AMA being something generated by myself and not at the request of anybody on the **MB** staff; in fact, if I were *asked* to

write the preceding, I probably wouldn't, just to maintain my valued independence as a free lance writer. *(The above paragraph is true and . . . shudder . . . unedited. wcn)*

I have written this piece because I want to see the AMA I belong to, indeed devoted many hours to in work on the CLCB, be as strong as possible, give me more for my money, be more honest about reporting on where the money goes, do more effective promotion for modeling, get out of the life insurance/land office/publishing game, and get back into being what I feel my AMA ought to be.

SHORT

Going to cut this column short, as I don't want to distract from what I've written above. If you expect a longer column, and you should, go back and read it again. Then do what you feel you should. And if that is to apply some more heat, go to it . . . you may never have a better chance to be listened to, as far as communication with the leaders of the AMA is concerned. •

R/C Forum . . . *Continued from page 47*

system is operating as it would be in flight.

The manufacturer will usually prescribe some minimum distance you should attain while conducting a range check following the methods we have described. The distance may vary considerably between system brands . . . anything from 30 to 60 feet. The prescribed distance is not really a gauge to compare the performance of various brand systems with, as the variation can be created by the mechanical nature of the different transmitters. The method of collapsing the antenna on one brand may allow a greater minimum output than the minimum from another brand, creating a false sense of greater range. What *is* important is to get *at least* the minimum range prescribed by the manufacturer of *your* system. There can be a difference between the range seen with identical systems, for any number of reasons, but again, the importance is to have above the minimum range.

Actually, there are two forms of range checks which should be made after the equipment is installed in a power model. A power-off check should be made, and if you have range checked the system before installation, do not be surprised if it may only reach 80% of the distance *after* installation. It is quite normal to lose some efficiency with the installation; simply having to crowd all of the components into a small space reduces its efficiency somewhat. However, the resulting distance must remain above the minimum called for.

The second range check should be made with the engine operating at capacity. The noises and vibration created by an engine affect the operation of the system to a certain extent. If the power is electric, there can be considerable interference from the motor. With either type of power, the accepted minimum is at least 2/3 of what you saw with the power off. Obviously, if the distance is less than these minimums, the cause should be found and corrected before operation is attempted.

When to range check: While the manufacturer of your system extended every effort to provide you with a new system in perfect order, there is always the possibility of unseen damage occurring in transit to you. Therefore, while playing with your new toy, you could have some fun seeing just how much range it does have. This will also provide you with a standard to use if trouble is suspected in the future. Another check should also be made after installing it for the first time.

In the past it was necessary to range check and even tune before each flying session, and often between flights, too. The dry batteries used were constantly diminishing in voltage, the components were unstable, and the circuits were marginal at best. The result was a constant "drift" in tuning which had to be watched carefully. With today's sophisticated circuits, Ni-Cds, and space age components, the drift is almost nonexistent. Even so, with a system that is being used steadily, it is darn good insurance to check it periodically. You never know when an installation may develop a fault, and a range check will usually provide a warning of an upcoming problem. While our equipment appears to be wonderful, experience shows that with time and usage, some drift does occur. The smart operator has his system checked out once a year, at

which time it is tuned, aligned, and range checked; again, excellent insurance for continued safe operation.

Someone once said that all models are built to crash, sooner or later. And along the way, they usually receive their share of hard bumps and knocks. It should not have to be said, considering how delicate our equipment really is, that a *complete* range check should be made after every crash or hard bump. It would be really stupid to take the equipment out of a disabled model, put it into a nice new one, and go fly it. Such a procedure is like playing poker with a stacked deck! While there might not be any visible damage, even under close inspection, you must realize that many of the components in our system are very delicate; some on the outside where they can be seen, and others internally and thus invisible. These can be partially damaged from a hard knock and still provide some operation. Another aspect is that the tuning of a receiver depends upon the relation of the components to each other; change the relationship slightly and some detuning will occur. Then too, some of the tuning adjustments are quite critical and can be subject to movement. A slight disturbance can again bring about some detuning.

What is important is that if we operate as suggested in this discussion, we will always have a simple standard which can be used to give us some assurance that things are still in good order, no matter what our problem may have been. Fortunately, most any problem which we may encounter with an R/C system will show up in some manner during a range check. If we have established the standard as suggested, noted how the system operates *and sounds* when it is in good order, then anytime any one of these items changes, we can be forewarned. The cat that checks is the cat that gets to fly another day!

Once again, it was great to enjoy a reader's ideas and experiences as we have with Bill Rauch. Please remember that if *you* are using R/C in an interesting way, we all would enjoy sharing your experiences and even problems, should there be any. All it takes is a stamp and a letter to this column, and thank you for it! •

Mammoth . . . . *Continued from page 49*

whether he'll fight to get the job next time.

How about the club which has a fair membership, but has its interests divided over the whole hobby spectrum with aircraft which run from helicopters to old timers, 1/2A pylon racers, mammoth scale, gliders, etc., but not enough in one group to hold a contest in that category, let alone organize each area and fly too. Perhaps this sounds like your club, and you know what it's like trying to satisfy everyone without worrying about outsiders to fill the events. Let's face it, holding an event or group of events in which you don't know how many will participate, despite preregistration, is a hard task, and hard tasks don't sound like fun.

One of the major complaints one hears at any meet is that modelers don't get enough time for flying. The more successful your meet is, the worse it gets. One of the best-run contests I've ever attended was the Nordsoar annual glider meet in my home town, Vernon, B.C., Canada. If you are a serious glider competitor, it's a must to attend. However, if you consider that you're getting a maximum in-air flying time per day of 17 minutes, consisting of the two, four, and five-minute precision flights, plus a six-minute duration flight, the ratio of enforced spectator/helper time to flier is all out of proportion. In addition, your turn comes up four times per day, so you can't go too far away to give your family a break, and the conditions on the field are not exactly what you would choose as the ultimate vacation spot. There almost seems to be a sigh of relief when the official flying is over and we can head for the beautiful slopes and get in some air time overlooking some of the world's best scenery. Probably the best memories would be of visiting with friends whom you haven't seen since the year before.

Last but not least, let's not forget the modeler who hasn't quite finished his model at home, and then tries to finish it at the meet, usually unsuccessfully. He's more likely to end up as the king of frustrated modelers.

Now that we have reminded everyone why they may not have enjoyed themselves in the past, let's try something new. For example, why not copy the full-sized air shows of the type where various manufacturers demonstrate their products and various air forces present their show teams in solo aerobatic and military capabilities. Usually there is a clown act, stock aircraft flown by experts in maneuvers that no one thought them capable of; aerobatic displays of civil aircraft, both in formation and solo; helicopter displays of precision and aerobatic maneuvers; and aerobatic glider displays with the all-important altitude being provided by a powered tug. People come thousands of miles just to see nearly-extinct restored aircraft such as the Lancaster and B-17 bomber do little more than fast and slow fly-bys which rekindle memories of the past in some and provide an understanding of those feelings among those who did not experience that time in history.

Mammoth scale provides the realism of full-scale aviation with the added bonus of being able to turn back the pages of history. In addition, it can duplicate a full-sized show in model size with minumum facilities, personnel, and funding, something which is impossible in the full-sized counterpart because of full-sized expenses. They require a good-sized paying crowd, while we can adjust ours to suit.

Now, with the full-sized air show concept, let's solve our problems in a model meet and add a few improvements as well. All the host club should have to do is provide a suitable area, advise participants of when, where and what to expect in the way of facilities, and provide crowd and frequency control when the guests arrive, allotting time for each demonstration.

For example, the following is one way in which a meet could be run by a small club with the varied interest membership previously described. It could also be tailored to suit any requirement.

First, take a long hard look at your facility so that you can descibe accurately what is there. Don't surprise your guests, especially if it is not a pleasant one. Decide not only on the size of the meet you want to have, but also what your facility will safely handle. Plan your advertising well in advance to suit that size. With your announcements, include an *accurate* map of how to get there, what signs to look for, a layout of the field, its type, size, obstructions, elevation, and general weather conditions for that time of year. Don't laugh! Coming from Canada, I didn't expect to see temperatures well over 100° in October at the 1/4-scale meet in Las Vegas. Your Local Chamber of Commerce should be able to assist you in putting together a package.

If, as in full-sized shows, you plan to invite some professionals, manufacturers, etc. as a drawing card, block out a time slot for them after conferring with them. Your success here will depend on your locality, the anticipated size of the meet, how soon you get your request in, your facility, and your selling job. They would rather have the facts than enthusiasm. It's in their interests to help you.

Plan your pilot's meeting well in advance of the scheduled flying. Ensure that in all your advertising you include that a witnessed statement of aircraft and pilot proficiency is required (others need not apply). It would be desirable that this proof be signed by a knowledgable flier/modeler. For those asked to sign such as statement, you are advising that you have witnessed both the pilot and the model perform in a safe manner. If there is some question in your mind, don't sign it. While this safeguard is not perfect, it will help.

OK, let's take a break. At this point, we have a group of fliers who have arrived at the right time with proven aircraft which are equipped to fly off your field. Sounds easier already, doesn't it? You already have your crowd-drawing acts confirmed (these could be a demo put on by your club) and their times reserved. All the remaining time blocks (we recommend blocks of 10 minutes each) are put in a hat and the fliers draw out their time slot; i.e. 9:30 to 9:40 or 1:10 to 1:20. If you have more time left after each flier has a time slot, those who wish may draw again. If, on one of the later draws, you have less time than fliers, add blanks to make up the difference so that everyone has a chance to draw. If you draw a blank, at least you had an equal chance. The fliers retain their draws, which are their tickets to fly. These tickets are presented to the frequency control or the transmitter impound, which has an "out" and "in" clipboard. If your time is 9:10 to 9:20, you first check that the 9:00 to 9:10 ticket is on the "in" clipboard and that the transmitter frequency pin has been returned. Remember that your time starts and ends on schedule. You must have your transmitter and pin picked up and returned within your time slot. This will eliminate problems for flier and organizer alike. The fliers know exactly when they can fly and can relax until about 20 minutes before their flight, when they should ensure that they are ready. If you are delayed in starting, don't take off unless you are sure you can get your aircraft safely down and your transmitter into the impound before your time expires. Here is one more reason why you should have safely demonstrated your aircraft before you fly at a meet such as this. It would be a good idea to have a large visible field clock to display the official time so there is no confusion.

If you wish to run more than one flight line, simply provide the number of hats that you feel your field can safely handle. Assign frequencies to these hats so there is no overlapping, and draw only from the hat which includes your frequency. If you have overestimated the number of people who show up to fly, simply remove the flight lines or hats until your show has all the time blocks filled with fliers. Keep a hat open for each flight line so that if a modeler develops a problem and can't fly, he can return his ticket to be drawn by someone wanting more air time or someone arriving too late to make the draw. If the arrival of fliers will be staggered throughout the day, consider holding two draws, one for the morning and one for the afternoon.

If you have more than one flight line and your air show attracts a team that will require more than one frequency in use at one time, have the captains of these teams draw first and then remove his time block from the hats. Each member of that team will be considered to have had one draw. If you are running only one flight line there would be no problem.

A six-hour schedule consists of 36 demonstration flights per line if ten-minute time blocks are used. Thus, even one flight line could provide spectators with a better deal than its full-sized counterpart. The quality of the performance depends, in either case, on the imagination of the entrant, his presentation, and the manner in which the spectators are informed. Once this type of meet gets going, imagination and presentation will improve quickly as participants gain experience and learn from each other.

The "informed" bit is where we most often fail. A well-placed adequate P.A. system in good working order is a

definite advantage, but it is only as good as the narrator using it and the information which he has to pass on. It's up to the participant to supply either his own narrator or a brief, written commentary to point out the highlights. A well-placed bulletin board can provide a lot of information to assist a narrator or even replace him when one is not practical or possible.

As soon as the time blocks are drawn, the fliers should fill in the boards in the order of flights. A few examples are:

9:00-9:10: Solo free-style aerobatics, 1/3-scale Pitts featuring smoke system. Pilot and builder: Jesse James, Sacramento, California.

9:10-9:20: Scale B-17 slow and high-speed fly-by, simulated bombing run with target blow-up.

9:20-9:30: Trainer demo by student pilot and instructor using a cordless buddy box and club trainer. Student: Hardley Fli, instructor: Halps Allott.

9:30-9:40: Factory team aerobatics and flight demos by pilots (give names).

9:40-9:50: Aero glider tow to height release followed by glider aerobatics and precision landing. (Give names of tow pilot and glider pilot.)

9:50-10:00: Flight demonstration of aircraft using new construction materials.

Nothing boring here, is there? I'm sure you will find that properly presented individuals can do an excellent job.

Note that the ten-minute spacing is for a well-run and organized meet, allowing as much flying as possible. Until you gain experience, you might find it helpful to allow a five-minute deadband between demos. Instead of six flights per line per hour, there would be four. The five-minute periods would allow ground crews time to put out equipment, hook up gliders, start engines, etc., and the actual air time would be 10 minutes. A five-minute delay to spectators is not too long. Remember that time can be adjusted to suit your group.

In actual practice, an air show is much simpler than it sounds. The major differences between an advertised fly-in (such as the 1/4-scale meet in Las Vegas) and our suggested replacement is as follows:

Better utilization of available time for more flying on an equal basis; no empty skies or plugged waiting lists.

More enjoyable from a spectator's point of view; you are a spectator more than a participant.

Safety is much improved, especially if the proven aircraft/flier and spotter concept is followed.

Last, but certainly not least, is communication. While protecting us from the elements, the ever-increasing use of motor homes and other RV's makes paging the next flier on the waiting list far more difficult. At an air show, the flier checks his time with the official clock and doesn't need to be notified.

If you're still uncomfortable about flying, even though an air show provides only competition with yourself, remember that you're flying a proven aircraft within your capability, and that you have been allotted a fair share of the flight time. You don't have to make way for the expert. If you're in the expert class, you might find it more enjoyable because you are not comparing yourself with someone else, only each person's performance with his own ability. Sandbagging is no use here, nor is trying to disguise a factory-sponsored professional as an ordinary competitor, but that professional can also be recognized for his ability.

In an air show, there is a great variety in aircraft and performance which do not become molded into a look-alike blob to best suit a particular pattern or rule specification. Each aircraft will be flown to its best advantage. As you enjoy watching a fine performance, someone else might enjoy watching yours, especially if it's refreshing change of pace.

In order to be able to concentrate more on your flying, take a spotter out with you. Even an expert can get into trouble if someone flies through the middle of his vertical roll or the bottom of his loop. It's not uncommon to have a full-sized aircraft buzz through, either. Most of us have experienced being temporarily blinded by the sun, disoriented, bothered by bees, or had problems for which assistance would have been appreciated. The spotter isn't there to be impressed by your flying, but to help you to do it safely, watching and listening to areas which can affect you and the spectators.

We at **Model Builder** hope you will try our proposal of an air show versus fun fly, contest, etc., because it allows the individual to operate with his ability. Let's try it and see if we can all have fun.●

Bending . . . . . *Continued from page 57*

holly, mahogany, and boxwood were subjected to similar tests. Results were similar to those described above.

Following the success of these initial tests, all of the individual planks representing the main wales of a 1/4-inch-to-the-foot model of an English 6th rate warship were cut, plasticized in aqua-ammonia, formed directly over the frames and held in position until dry, using ordinary household pine.

A layer of paper was inserted between plank and frame to prevent possible staining. When dry, each plank was removed, sanded, trimmed, and fastened in position with glue and treenails. For this and similar applications, results were obtained that could not have been achieved by any other wood bending techniques.

CONCLUSIONS

1) Aqua-ammonia, a saturated solution of ammonia in water, can be used at room temperatures under home workshop conditions to bend wood more easily and with better results than can be attained using more conventional methods.

2) The ammonia solution causes the wood to undergo a temporary plasticization that renders it pliable and capable of being bent into shapes not attainable by steam or heat bending. When the workpiece is held in the bent position until dry, there is no appreciable loss of strength and little springback to original shape.

3) Aqua-ammonia is readily obtainable in ordinary glass bottles from chemical supply houses at low cost. It can be used safely if work is performed in a well-ventilated area, if pieces are handled as little as necessary, and if hands are rinsed thoroughly after exposure.

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Hannan . . . . . *Continued from page 60*

edition. Whatever became of preef rooders?

* * *

An interesting question has been raised about the Wright "Flyer" in the National Air and Space Museum: Why are the rudders a different, much darker color now? Early photos, including some taken while the machine was in the London, England Science Museum, show them as white. Anyone know anything about this?

* * *

The tour on television of the Air and Space Museum, conducted by actor/pilot/enthusiast Cliff Robertson, was excellent, in our opinion, and could have been twice as long without danger of boredom.

AND SPEAKING OF THE SMITHSONIAN

Its fine publication for December, 1978, features a "must see" article concerning the Wright brothers. Written by Dr. Tom Crouch, the text presents some unusual viewpoints, not only of the Wright efforts, but also those of Samuel Langley and his mechanic/pilot, Charles Manly, who turns out not to be the mild-mannered "Mr. Peepers" type suggested by his photographs.

Highlighting the informative and

entertaining story is a series of delightful full-color cartoons by Robert Osborn. Osborn will be warmly remembered by any ex-Navy types for his memorable aircraft safety posters. An example of his subtle humor in this Smithsonian feature, not apt to be noticed by the less discerning readers, is the inclusion of a *rubber motor hook* on one drawing of a Langley Aerodrome!

Dr. Crouch openly and frankly recaps the events causing the long-standing feud between the Wrights and certain members of the Smithsonian staff, which led to the sending of the "Flyer" to England, where it remained for years. Yet, in spite of the years of fence-mending that have passed since the machine was returned, it seems ironical that a Langley Aerodrome model is still located higher than the "Flyer" in the current display . . . exactly the relationship advocated by the Smithsonian at the opening of the feud! Of course, the model did fly first.

GIBBS-SMITH ON THE WRIGHTS

It seems remarkable that the most outspoken champion of the Wright brothers is a *British* historian. Charles Gibbs-Smith, the first Smithsonian-elected Lindbergh Professor, observed the 75th anniversary with speeches at both Kitty Hawk and Dayton. "Simple bicycle mechanics from Dayton? Utter nonsense", was the essence of his messages.

Part of his Ohio lecture was reported upon by Jack Jones, of the Dayton Daily News, from which we have abstracted a few choice comments. Gibbs-Smith considers the Wright Flyer III, a 1905 aircraft housed in Dayton's Carillon Park, to be "The first greatest treasure in the entire world, bar none." He continued: "Of course, the one we have in the Smithsonian is very nice. It is the one in which they made their first flight at Kitty Hawk and it has the romance that all first airplanes have. But I get a bit wary of firsts. There are too many of them flying or lying around and not many of them really explained or explicable. But the No. III can be described perfectly fairly as the first practical airplane in the history of the world: it could fly for over half an hour. If its gas tank had been twice as large, it could have flown for an hour, but they never bothered to fly for an hour."

After further elaboration, Gibbs-Smith concludes: "And it is a beautiful airplane. Everything, if you look at it carefully, is thought out to the last inch."

Gibbs-Smith says he doubts that the Wright brothers were much inspired by the little toy helicopter their father brought them. However, as a model builder, I would take strong exception to that assumption. In fact, it would seem that Orville Wright himself would differ on that point, were he alive to do so. His letter to noted model builder and aero historian Bertram P. Pond, dated January 30, 1929, would appear to indicate that the Wrights owed a great deal of their inspiration to that model and its designer, Alphonse Penaud.

However, any model builder would indeed agree with Gibbs-Smith that the 59-second duration of the "Flyer" flight *is* a great deal longer than most people think.

The remainder of his lecture expanded upon the many notable achievements of the Wrights, and concluded with a chiding reminder to the audience, about the 1905 Flyer III: "If you haven't been to see it, then you're all in disgrace, for it's the first practical airplane in the history of the world."

WRIGHT MEDALS

Special medals have been cast, commemorating the 75th anniversary. One features Orville, the other Wilbur, with delineations of their aircraft on the reverse sides. Available in silver and bronze, the supply is quite limited. Information may be obtained from: Aviation Hall of Fame, Dayton Convention Center, Dayton, Ohio 45402.

WRIGHT-ON!

From the Ohio Buzzin' Buzzards model flying club newsletter, Frank Scott's tribute to the Wrights:

"Without distracting from the efforts of Langley, Montgomery, Whitehead, and the many other pioneers, the Wright brothers did it all. And of course, they must be regarded as the most famous of kite fliers and modelers.

"Our hobby may be seen by some to be in a state of decline; for most people, flight is no longer an adventure. No more do people rush to their windows to see an airborne relic clatter by, nor do

they stir to look up as a great silver jet streaks overhead bearing hundreds of souls to distant lands. Three-quarters of a century later, the magic of flight is commonplace.

"The Wright brothers did their work exceedingly well."

THE BAYLES MEMORIAL TROPHY

The magnificent award shown in our photo was won in 1932 by Jimmie Doolittle. He, in turn, presented it to Maude Tait, famous lady Gee Bee flier, who had been a close friend of Lowell Bayles. Most aviation enthusiasts had never seen the award, and few even knew of its existence, until quite recently, when Maude Tait Moriarty (married name) donated it to the "Golden Age" exhibition in the Springfield Science Museum. According to Tom Nallen, the pattern for the Bayles portrait was carved by Gee Bee woodworker Paul LaPalme.

YEAR-END TIME, AGAIN

As this is being written, 1978 is drawing to a close. Another year "down the tubes", in the view of some. But here at the Hangar, it has been one of pleasure, thanks to the willing support of our far-flung readers. While some columnists decry a lack of material, that never seems the case here. Your contributions have actually made this column almost self-composing! In fact, our problem is of the opposite kind: we are sometimes embarrassed in not being able to properly utilize all the fine information and photographs submitted, owing to lack of space. Rest assured, however, that every item is appreciated!

SIGN-OFF TIME AGAIN

Of the many remarkable and clever holiday cards received, we were particularly charmed by the handmade one of Ed Leiser. Bearing the likeness of Santa, it included the following advertisement:

FOR RENT

One sleigh; Manufacturer — Unsung Pungs, Inc.; Type — toy transport; Accommodation — pilot only; Power — battery of eight Rangifer terandus with good polarity; Fuel — plenty of lichen (not included); Dimensions — big enough; Weights — empty, 500 lbs. Gross, 4 billion lbs.; Performance — cruising speed: 3,200 mph. Ceiling: over the rooftops; Availability — most of the year; Equipment — flight suit not required, but a good belt is recommended (before takeoff); Fee — eight bucks a night; Limitations — not suitable for daylight flying. Rooftop parking only. Invisible to children; Condition — Sanguine and on the skids. •

Instructor . . . . *Continued from page 38*

cally the UFO, the rudder area seems excessively large. Don't they tend to flutter more easily? What is the best manner for installing a stiff linkage?

With the longer tail moments, do you feel it is required to support the push-rods? With the looping maneuvers, it would seem to cause the rudder to sag, and as a result there might be some fishtailing. Bill Fitzgerald, Fayetteville, NY.

Dear Bill: The effect of aileron gap is dependent upon the airfoil, speed, and angle of attack that the wing is used at, and providing that the gap was equal on both sides, the only effect that sealing them would have would be a slight increase in roll rate. The reason many airplanes tend to roll out of knife edge is due to an incorrect dihedral angle.

Basically, if it tries to roll to upright flight, it has too much dihedral, and if it tries to roll to inverted flight, it has too little. To prevent rudder flutter on most of these newer pattern aircraft, it is important that you have a tight hinge line and a good, rigid control linkage. The best way to keep the linkage rigid is to keep it straight and support it in the fuselage.

Dear Dave: Writing this letter while enjoying the Tournament of Champions allows me to deliver it in person. What specific models would you suggest as suitable for someone transitioning from A to B and up? What is the optimum weight for a pattern plane, and if overweight, are there specific problems relating to some maneuvers? Bryan Boutry.

Dear Bryan: I think that the model you select as you advance through the classes depends primarily on not only the pilot's ability, but also on his style and strong versus weak points. I feel that for the novice class, most straight-wing airplanes are better, as they are less critical to trim and are generally easier to

fly. Examples of ideal airplanes are the Dirty Birdy, Kaos, Compensator, Tiger Tail, Curare, etc. As you advance up through the classes, you may be better off with a fast, flashy airplane which is more impressive and more likely to catch the attention of the judges who may be somewhat bored after a long day. Examples are the Phoenix, Bootlegger, Vertigo, and UFO. Now comes the tricky part. As you get into the top levels in the Masters class and have built up enough reputation that the judges will notice you regardless of what you fly, it is important that you fly the airplane which YOU fly the most technically precise pattern overall.

As to the optimum weight for a pattern airplane, it depends greatly on the power available from the engine and the size of the airplane, but an average pattern airplane today weighs between 7-1/2 and 8-1/2 pounds. An airplane which is too heavy suffers in vertical performance and tends to accelerate excessively on the downhill side of loops. It also creates problems in tight turns, when too much angle of attack is required, on account of the excess weight, and they usually tend to land faster and fly mushy. In my opinion, the only disadvantage to being too light is if you had to compromise structual integrity to attain that light weight.

Keep those letters coming, as they sure make writing this column a lot easier. •

Peanut . . . . . *Continued from page 61*

points marked; carefully pat down on the tissue, trimming the excess off with your Uber Skiver. This technique is less messy than inking or painting, and is adjustable if you don't hit it right the first time. The canopy framing was done the same way, using pieces of green tissue that match the covered fuselage. Rather than apply the wing and fuselage insignia with doped-on tissue pieces, I found some "Microscale" plastic model decal sheets with the insignia the right size. I soaked them and carefully slid them into place, and immediately placed the wing under a hot 100-watt lamp to prevent wrinkles and to dry the decal.

The landing gear was designed to be removable for flying. Study the plans to see that the aluminum tubes are epoxied in at the appropriate angles in the wing halves to receive the landing leg wires. Be sure to kink the wires sufficiently for a good friction fit. To add realism, the landing gear wires were enclosed in balsa to give dimension to the gear. Weight is no problem here, as the gear is removed for flight. The landing gear doors were detailed before gluing them to the legs. However, the inboard doors are temporarily attached to the wing/fuselage juncture with rubber cement on the edges. The same is done with the tail wheel doors (bond paper). The tail wheel is a balsa disc, to which a bent pin is epoxied. Also being removable, this fits into a groove in the lower fuselage profile.

The pattern for a 4-bladed carved propeller is indicated on the plan. However, I was lucky enough to find a small commercial 2-bladed basswood prop, a little large, but perfect for hauling the P-47H up high on the initial power burst. The spinner is a cut-down model rocket balsa nose cone, centered on a wood screw in an electric drill, and sanded to shape and trimmed to the right length. The center was hollowed out and notches cut to fit over the propeller, leaving enough clearance for the prop shaft to ride freely on the spiral catch.

Trimming the model for flying required a lot of down and right thrust for a left turn pattern. All adjustments are indicated on the plan. However, in addition, small trim tabs were added to each wing half (up on the right, down on the left) to flatten and widen out the tight left turn tendency. The model, I'm happy to say, is very stable and glides nicely. Very little nose weight was added. The model must be banked to the right to offset the tremendous left torque. Climb is fantastic and transition to a slow left circle is smooth. Build it light for best flying results. My model weighs 12 grams minus rubber motor. Power is one loop of 3/32 pirelli, 17 inches long.

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IMS Electric . . *Continued from page 54*

wide speed range. Bill's craftsmanship showed in the rib construction; each rib was of truss construction . . . very impressive to see through the transparent mylar. He used an Astro 020 geared 3:1 and turning a 7 x 3-1/2 prop, with five sub-C cells providing 6 volts. The flying weight was 30 ounces, for a 3.5 ounce per square foot loading. I didn't find out what radio, but I think it was a Cannon with rudder, elevator, and motor. The plane flew fairly fast for an indoor plane, but was very smooth in flight . . . it would make an ideal solar powered plane. Bill has flown it outdoors to over 1000 feet. Since the electric power pod is a strap-

on affair, Bill could just swap it for the four-motored CO_2 pod to compete in both the electric and CO_2 categories. This paid off, as Bill won the CO_2 category with a very nice flight of over a minute.

Tony and Addie Naccarato's plane was 72 inches in span, 720 square inches, with what looked like a flat-bottom airfoil with a 10% section. It flew on an Astro 020, 6x3 prop, using three sub-C cells for 3.6 volts. It weighed 15-1/2 ounces, for a 3 ounce per square foot loading, and used a two-channel Cannon for rudder and elevator. No motor control! Once Tony launched, he was committed for the duration, but he made it look easy.

My plane, christened the "Butterfly" by Bob Sliff, who writes for RCS, has a 60-inch span, 7-1/2 square feet, with a 7-1/2% flat-bottom airfoil. It flies on an Astro 020, four sub-C cells for 4.8 volts, using a 5-1/4x3 prop. It weighs 28 ounces for a 3.5 ounce per square foot wing loading, and is guided by a three-channel Cannon radio for rudder, elevator, and motor. Its virtue is that it is easy to build and can take a lot of punishment, but it will get a longer fuselage for more stability, and perhaps an undercambered wing for slower flight.

There is a lot more to write about, including the neat rubber-powered R/C plane that won for Addie and Tony Naccarato, and the lighter-than-air craft, but I'll save it for next column in hopes that this will give the friendly editor enough room to run all the pictures I'm sending! It was a great experience. I certainly learned a lot about slow flight which I plan to use in the coming year, and it was really good to meet such a group of inventive and sharp modelers. To make it even better, everyone helped out, including fellow competitors. I'm especially grateful for the assistance Hal Cover and Tony and Addie Naccarato gave me in my own flying efforts. Until next time, go electric and stay warm and dry indoors! •

1 to 1 . . . . . *Continued from page 48*

sive, but I always harbored the fear that it said something in Russian like "Phooey to all R/C judges" and someday I'd run into a judge who could read it.

In addition to the problems of shape, size, and position of markings, there is the problem concerning gloss. I recognize that this fits more into the area of finish, such as paint color, etc.; however, often a modeler is still faced with a glossy decal that looks totally out of place on his matt-finished, battle-scarred, WW-II fighter. There are, fortunately, some "dulling" agents on the market which may help you. RS and Pactra make finishes which can be used to cut gloss. Cam-o-sheen can be added to some finishes to cut gloss. The main problem, however, is determining compatibility with the surface you are applying it to. Decals, for instance, are often *very* intolerant of paints. While you may get away with a mist coat, it is wise to experiment very carefully beforehand. Nothing is worse than getting to that stage, only to have all that hard work pucker up like a prune.

Another source of the type of markings used on many aircraft is the use of photography. An earlier article suggested this use and simply involves getting a color *negative* print of the emblem to be duplicated (if possible), having it printed to the correct size, cutting it out like a decal, soaking it in a wetting agent, and then carefully stripping the emulsion off the paper backing. This can then be applied like a decal using thinned Elmers glue as an adhesive. Just be careful to observe the placement problems suggested earlier.

At the beginning of this article I mentioned that a letter from an old friend, Bill Knepp, prompted this material. Bill forwarded information relative to the position of the lightning bolt that is found on the J-3 Cub and how often it is incorrectly duplicated. The information came from the November 1978 issue of *Sport Aviation*, which is the EAA magazine. The article shows five J-3 Cubs (real ones) at the Oshkosh Fly-In, all restored to original conditions, but each revealing a different interpretation of the lightning bolt size, shape, and position. An accompanying diagram reveals that, according to the original Piper drawings, all five are incorrect.

Incidentally, Bill and his wife, Irene, have over a number of years been involved with scale at the Nats, both as directors and as judges. Bill suggests that a membership in the EAA, which will bring the *Sport Aviation* magazine to your mailbox, is helpful for scale builders. Not only does it contain useful photos, but also items dealing with construction, etc. that can be helpful to the modeler. This is especially true for the builder of larger 1/4 to 1/3 scale models, where the techniques more closely resemble full scale.

In closing this section, may I encourage you to slow up those final stages on that excellent model you've built. Measure carefully, find your location guides and apply those markings in their correct positions and sizes. Watch for sneaky curving lines whose radii suddenly go awry, outlined stars whose points are misaligned, and the like.

Spend much concentrated effort looking and comparing before doing. Have a buddy or wife or husband "proofread" your work with you, and I think you'll be much happier with the results.

NEWS FROM PARIS

Bob Wischer once again represented the United States scale interests at the annual CIAM (FAI) meeting in Paris. Two proposals, both of which received the support of the National Association of Scale Aeromodelers, were passed, one in its original form and the other slightly altered.

Bob relates that a rather unusual event occurred when the Scale Subcommittee voted overwhelmingly against the U.S. proposal to upgrade Stand-Off Scale (Sport Scale) to an official international event. In fact, Bob was the only yes vote! However, when the recommendation went before the CIAM plenary session, the delegates opposed the chairman, Helmut Ziegler's, recommendation of the Scale Subcommittee and passed the proposal 16 to 6. As a result, Stand-Off Scale will become an official event beginning in 1983.

In 1980, Canada will hold this event, probably using the FAI provisional rules. As a result, the Nats this coming summer will be used to select a team from the U.S. for both the Precision and Stand-Off Scale events. A decision has not yet been made as to what rules will be utilized for the selection. Generally, in the past, AMA rules have been used to select the team with the understanding that the selected members would then meet FAI specifications for the competition. This does create somewhat of a problem, since there are other significant differences between the basic AMA and FAI rules. Most notable are weight and engine size. Another wrench in the works can be the wing loading limit. We will review these differences in a later column.

Besides the addition of Stand-Off Scale, the approval of a larger *total* displacement for multi-engined planes was voted. While the 13 lb./10cc limit holds for single engined models, a twin may carry a total of 15cc, and 20cc for three or more engines.

In his letter, Bob relates that Ziegler attempted to get some additional rule changes through the CIAM session that had not been included in the agenda. These concerned X-factors in Stand-Off static and the flying bonus points awarded for certain types of aircraft. These were not allowed; hence, I will not go into detail. However, one facet intrigues me personally. Bob mentions that Ziegler proposed that biplanes not be granted the 5% bonus points. It was pointed out that the Hiperbipe (I assume that mine was the subject of this item) flew like a monoplane! I assume then that, because of this, it should not be classified with a biplane of, let's say, the WW-I vintage. They also considered eliminating bonus points for a retracting mono wheel. (By coincidence, the winning model in 1978, Mick Reeves' powered sailplane, had a retractable mono wheel.)

While I am certain that there is some merit in excluding these items from the bonus categories, I would point out that they indicate the problem in legislating what is "difficult" and awarding bonus in the form of K-factors and the like. I certainly never considered the Hiperbipe as a "loophole runner" when I selected it. The entire subject becomes a Pandora's box when it is opened. If one wants to get very precise, consider this point. The Hiperbipe utilizes a lifting fuselage. Since it is a lifting surface, how about including it in the wing area category? There it becomes a triplane and would be awarded additional bonus points under FAI competition!

It would appear to me to be an impossibility to legislate complete equality in competition for *all* aircraft which are available.

A closing thought on that issue might be to provide bonus points for hard-to-document aircraft. Wouldn't that create some interesting problems?

NASA NOTES

The election results for the National Association of Scale Aeromodelers has been completed and the following persons have been voted to office for 1979:

Bob Underwood, President
Bill Hannan, F/F Vice Pres.

Jeff Perez, C/L Vice Pres.
Granger Williams, R/C Vice Pres.
Noel Allison, Secretary-Treasurer

Some 28% of the membership returned their ballots and the renewing of memberships is proceeding nicely. Committees for rules proposals, constitution and bylaws, etc. have been set up. If you have a desire to participate, please contact one of the officers above.

The mailing of the Scale Source List prepared by Jamie Gielens brought a number of nice notes and letters praising the work. This list will continually be upgraded and added to by the group. In addition, a file of photos is included. This information is available to members of NASA at little or no charge.

Work is proceeding on developing the scale program for this year's Nats and, in addition, an effort is being made to promote a series of scale fly-ins and "un-contests". Hopefully, with some support, the Association will provide recognition plaques to participate in these events. More on this later.

Dues for the group are $5 per year. Contact Noel Allison at 4174 W. 120th St., Apt. C, Hawthorne, California 90250.

THIS AND THAT

Have you dropped a line to your Scale Contest Board member concerning your vote on the 1980-81 rules proposals? Check your back issues of *Model Aviation* to see what they are. Remember: "He who not voice opinion before, not open mouth after." The initial vote is in; however, your help is still needed.

Check out Repla-Tech for scale data. For the aircraft they presently carry, they have photo packets, three-views, etc. Repla-Tech International, 48500 McKenzie Hwy., Vida, Oregon 97488.

Check out Modernistic Models. While stating primarily an interest in F/F and U/C, Bill Pepin may have scale items of interest to you. Modernistic Models, P.O. Box 6974, Albuquerque, New Mexico 87107. •

Petrel . . . . . . *Continued from page 45*

and glue spars in place. Install spoiler blade with tape to insure proper fit. Install spoiler cable tubes, epoxying the tube and tube support in place. Make and install bent-pin spoiler horn onto blade, cover with your favorite covering at the appropriate time, and attach with Scotch brand sealing tape.

6) Remove wing panels from plans and sand the outboard edge of the inboard panels vertical, both wings. Prop the wing tip up two to three inches. (Two inches will result in flights of constant turn with neutral rudder after turn has been initiated. Three inches will result in a turn being manitained only with constantly applied rudder.) After you have selected the height, sand the inboard edge of the outboard panel vertical, both wings. Epoxy dihedral rib, l.e., t.e., and spars together. Add epoxy to webbing around the dihedral ribs and add gussets.

7) Insert wing rod into tubes, prop up wings at dihedral joint 1-1/2 inches, and pin root rib to table, keeping rod level. Epoxy tube and webbing to spars, spreading epoxy onto ribs. Add gussets and hardwood blocks for screw eyes. Insert screw eyes later.

8) Add top sheeting, turbulator spars, and glue wing tip blocks in place. Locate and drill 1/8-inch hole in root rib and trailing edge to accept the 1/8-inch dowel alignment rod. Epoxy or Hot Stuff in place.

9) Sand all surfaces and l.e. to shape. If you wish, you may sand lower edge of ribs and l.e. upward to approach a "Phillips" type entry. Sand l.e. very sharp at root and gradually decrease it to a blunt edge at tip; this will eliminate the need for wash-out and the induced drag associated with it. If you wish to have wash-out, raise t.e. at tip 3/16 of an inch when you cover it, by warping it with a heat gun.

STABILIZER

1) Cut and pin l.e., t.e., and tip to plans. Mark locations of ribs, remove and notch l.e. and t.e. with the hacksaw blades. Repin l.e. and t.e., shim up t.e. with 1/16 scrap, and cut and glue all ribs and gussets. Glue the blocks for stab rod tubes in place. DO NOT DRILL HOLES AT THIS TIME. Sand the stab to a symmetrical shape. After the fin is complete, use the 3/32 and 1/16 wire rods to mark the placement of the stabilizer support

tubes, then drill and insert brass or aluminium tubes in place, holding them with Hot Stuff.

FUSELAGE

1) Cut the 3/32 balsa sides and the 1/64 ply doublers for the sides, hatch, and skid. Attach the sides to the doublers with Southern R/C Products "Sorghum" or any spray adhesive. MAKE A LEFT AND RIGHT. Those of you who are skeptical about the strength may spread a thin layer of epoxy between the pieces in the forward section.

2) Epoxy fin post and former F1 in place and clamp with rubber bands. Epoxy formers F2, F3, F4, and F5 in place. They must be square and vertical. Sight down the fuselage and adjust for a smooth and symmetrical shape. Be sure all formers are at the specified locations.

3) Epoxy the spruce servo rails in place and the 1/4 x 1/2 spruce block to former F3 for the towhook. Sheet the bottom with 3/16 balsa, cross-grain. Add 1/4-inch triangular strips for gussets and glue the 1/64 ply skid doubler to outside of fuselage bottom.

4) Route out a cavity in the center of the nose block and epoxy it to former F1. Precisely and very carefully locate and line up the wing fairing and drill holes through the fuselage sides for the fiberglass wing rod tube, the screw eyes, spoiler tubes, and the dowel alignment rods. Harden the screw eye's hole and the alignment rod's hole with Hot Stuff. Add spoiler tubes to fuselage and epoxy fairing in place.

5) Glue fin l.e. and 1/4 x 1/2 top of fin together and epoxy to fuselage, shimming if necessary. Be sure that it is vertical with respect to the wing rod. Add the 1/2-inch x 3/32 I.D. brass tube to stab bellcrank and mark hole in the 1/16 ply bellcrank supports. Cut slot for rear alignment tube to move up and down 1/2 inch and epoxy in place. Sheet fin with 1/16 sheet.

6) Insert pushrod tubes, locate and cut exit hole in the side for the rudder pushrod. Locate and cut hole in the fin l.e. for the stab pushrod tube, and epoxy in place.

7) Add triangular strips to the top of fuselage, add 3/16 cross-grain sheeting up to former F2. Cut, but do not glue, cross-grained sheeting for the hatch. Place ply hatch doubler on fuselage over waxed paper, glue hatch sheeting to doubler and hold in place with rubber bands until dry. Remove and add the spruce block for the hold-down screw eye. Slot the top of former F2 to accept a 1/16 ply tongue glued to hatch cover. The tongue will slip into slot, and the rubber band attached to the fuselage bottom and the hatch screw eye will hold the hatch in place quite well. Drill hole for antenna exit and sand entire fuselage and fin to the shape indicated by the cross-sections on plan at the formers.

RUDDER

1) Pin l.e. and t.e. to plans, shimming up t.e. with 1/16 scrap. Cut rudder post and top and bottom pieces and glue as per plans. Cut and glue all ribs and gussets, and sand to shape. Slot rudder and fin post for hinges. Insert hinges and drill a 1/16 hole through post and hinge. After the fin and rudder are covered, reinsert hinges and push round toothpick into hole. Cut off toothpick and sand flush. Hot Stuff in place.

ASSEMBLY AND FLYING

Attach wings with rubber band through screw eyes. If necessary, sand root fairing to match the wing. Insert pushrods and install radio as per manufacturer's instructions. Epoxy and screw front edge of skid in place; drill hole for tail skid, making sure the posts clear the stab horn, and epoxy in place. Add towhook and balance as per plan, or to your desire. The plane will fly best as shown on the plan, but I am sure that some of you will be able to come up with improvements. I would be most pleased to hear replies. "May the wind be at your back" (except on launch!!). Ribs, hardware, and formers can be purchased from me at Box 120, Pottstown, PA 19464, for $19.95. Good luck and find lift. •

Sailplane . . . . *Continued from page 36*

ers, especially the hand-launch glider men; they've been making their fuselages 1/8-inch wide or less for over forty years, no doubt out of sheer ignorance. (And if they could only narrow them to 1/32 of an inch without losing either strength or lightness, I'd be willing to bet . . . I admit I can't prove this . . . that their times would go up. It seems that the more air a fuselage has to displace . . .

wedge apart, if you will . . . the worse its drag will be. At least at our sizes and speeds.)

Well, at this point we're faced with the actual task of doodling some tentative nose shapes around our radio; starting to commit our Dream to paper (which often shatters it, incidentally!). Here's where most folk fall back on the shape of their favorite airplane, either consciously or unconsciously. Canopy or no canopy? (In other words, are you an Aquila fan or a Windrifter fan?) Pod-and-boom or conventional fuselage? High wing, mid wing, or low wing? Cut yourself out a wing root silhouette and lay it on the drafting paper, for ideas. High wings are still in vogue with the full-scale designers because they currently believe them to have slightly less fuselage-wing interference drag than midwings, but don't let that limit you. And remember that the only good reason for not building a low-wing sailplane is that you're likely to hash the Monokote every time you land. But suppose you had a *wheel* down there. . .

The sky is truly the limit when it comes to fuselage shapes, especially if all-out performance isn't your biggest consideration. Don't forget that you have to *like* a plane well to fly it well, so keep doodling until you hit on a shape that really lights your afterburners.

One of my own all-time favorites was a little six-footer I tossed together for the First Annual Espanola (New Mexico) Soar-In. I called it "The Espanola Espaniel," and its nose was a kind of comic profile of a dog's head, complete with rolling plastic eyes and a pair of brown corduroy ears glued down the sides. It didn't fly particularly well, but it was great for chasing cars!

You'll notice that, in the drawing, I completely copped out on originality . . . the fuselage shown is a kind of modified version of the airfoil section from Herb Smith's "design of the month". Actually, I've built two or three fuselages very close to this outline (we used to roll them out of a single sheet of 1/32 plywood, in a manner similar to that used on the J.P. "Darts" and "Javelins". Took about nine hands to do the rolling, but they sure came out light and tough!).

There are at least two design flaws apparent in the drawing as shown. With a perfectly flat fuselage bottom, and no nose-skid, the poor towhook is going to become the landing gear, and as such it won't last long, especially over tarmac.

Three possible cures: a thick nose skid, a small sub-rudder, or a nice bow in the bottom of the fuselage. The second design flaw is more subtle. Note that when the model is at rest on the ground, the wing will be sitting at a positive angle of attack. "That's normal," you say, "all full-scale planes are built that way." Full-scale, yes; models, not-so-yes. Picture the plane in the drawing coming in for a landing. When the fuselage touches down and begins its landing slide, the wing is thrown into a positive angle of attack, and hence will begin lifting again. Presto! Ze plane is once more

airborne, and ze pilot is jamming full down stick to try to get ze nose back on the ground! After two or three bounces, the beast may lose enough airspeed to stay glued down, but by then the center of the circle is about fifty to seventy-five points behind you, and fading fast.

The moral is, when designing your own fuselage, try to work out some configuration whereby the wing is at least at zero degrees to the good earth while the plane is skidding to a stop. At the same time, of course, you want your fuselage to *fly* at two to four degrees negative angle to the wing, for minimum drag. The combination of those two requirements can give you gray hair! I solved it on the Bird of Time by using a generous subfin. Anybody got a better idea?

Awright, I know I promised to talk about rudders and fins, but frankly, the subject is embarrassing to me. People tell me that the rudder on my old Honker 1/2A is stolen from a Cessna 140; the Doodler and Honker Bipe rudders, they claim, come from the Curtiss Jenny; and the Bird of Time is clearly cribbed from Frank Zaic's Thermic 100. None of these charges are particularly true, but then none are particularly false, either. The fact is, I've got a head full of other people's rudders, and no room left for any ideas of my own. So the best advice I can give you is to comb your memory and steal a nice shape from somebody you think well of. There aren't many really pleasing rudder shapes around these days, unless you're a fan of the old F-100 Super Sabre. Lee Renaud hit on a beauty for the Aquila, and then there's . . . uh, well, maybe we ought to think about building a nice vee-tail. . .

So you're on your own as to rudder shape. What I can suggest is some design parameters. In the English book, *Radio Control Soaring*, which is still the best current volume on our sport, Dallimer and Dyer suggest that the vertical ought to be 12%-15% of the wing area, for thermal soarers. If you take this figure seriously, you're going to need a larger sheet of drawing paper, as this is the figure most people today are using for the stabilizer! Fortunately, the planes they show in the 3-views all figure out to about 4%-7% verticals, and those are the figures I'd recommend as average (the Aquila, for example, has 6%).

If you're a real "eyeball designer", one who hates math the way Dracula hates clerical collars, you can think of the rudder size as "just under half of the stabilizer". Too large a rudder is said to cause spiral stability problems among free flights; this isn't an easy characteristic to detect with R/C, unless you're given to freezing at the controls, or hooking up your rudder servo backwards. Too small a rudder, however, may cause wandering, as if you or your ship had occasional attacks of senility. Since tail moment is obviously a factor in rudder effectiveness, you probably ought to push for the 7% figure if your wing-stab gap is short; if your tail moment is long, 4% may be plenty. There's nothing magic here . . . try a size, and if it doesn't suit you, try again. (Ever notice all those dorsal fins on full-scale aircraft? They're usually added at the urgent and sweaty request of the test pilot, immediately after the first flight!)

MODEL OF THE MONTH

This month's three-view comes from Denver, Colorado, a high-country design called the Invader. Designer Herb Smith flew it to eighth place in the 1978 FAI Finals down in Pensacola. The ship has rudder, elevator, flaps and spoilers, with everything tucked neatly into a clean fiberglass fuselage. The first thing you'll notice on the full-size plans is that the towhook is a full 1/4 inch *behind* the center of gravity . . . this tells you that Herb is out to WIN! Here's what he says of the design:

"The Mark IV was developed through a series, as the name implies. I observed that lift was almost always available if one could move about in search of it without hitting the ground first. So the first requirement became *a fast moving plane with a low sink rate.*

"For this, one must pay a price. I designed my own low-drag section, which produces less low-speed lift for launch and thermaling, so large flaps were my answer, to change the wing camber for various conditions.

"The high speeds generated in FAI demand a lot of strength and high-speed stability. Much attention was given to the strength of the sailplane; it will withstand dork after dork without damage. It has been stalled and dropped on a wingtip with only scuff damage. It can be brought down from altitude in high speed dives without fear of flutter. It can be brought down in a moderate dive at low speed with the use of full flaps and spoilers. Getting down is never a problem with the Mk IV.

"With all this, the Mk IV is a super light-air floater. When proper flap and stab trim is applied, it will float in light air with the best floater-type sailplanes, and beat them at their own game.

"The Mk IV is *not* a free flight and must be flown all the time except in super calm air, mainly because it reacts to the slightest disturbance in the air. It is

still very stable, and very responsive to control commands. Flown with a gentle touch it is a very docile sailplane, easily flown by the intermediate pilot."

Herb says the ship is very maneuverable, and can be snap-rolled out of the bottom of a loop! It can also be made to spin, "and anything else you can think of." This is hardly Herb's first design series; he's been modeling since 1940, with ten years off to design and fly two full-size aircraft. Plans and a limited number of kits are available from him at 3031 S. Valentia, Denver, CO 80231. •

Fuel Lines . . . . *Continued from page 27*

piston into the cylinder if there is any binding whatsoever. A small speck of dirt could cause irreparable scoring of the cylinder and piston.

CRANKCASE AND CRANKSHAFT

Since the crankcase is the foundation of the engine, let's start there by ensuring that it is properly mated with the crankshaft. If there are any spots that bind, even ever so slightly, then there's a possibility of galling . . . particularly at high rpm and operating temperatures. Experience has proven that it is a sound procedure to lap the crankcase to the crankshaft. To do this, I use a 1000 grit, grease base, aluminum oxide lapping compound manufactured by Clover Company of Norwalk, Connecticut. In lieu of this, use Fox Garnet lapping powder, No. 90812, mixed with WD-40 to form a thin paste. Fox Garnet should be available at good hobby shops. Do not use other coarse lapping compounds. Although you may have heard recommendations to use DuPont White Polishing Compound, I personally feel that it is too coarse to use. The lapping sequence is as follows:

First, remove the head of a one-inch 5-40 machine screw and thread one end into the front end of the crankshaft. Next, apply a few dabs of the thin lapping compound to the journals of the crankshaft, spray WD-40 liberally in the case and on the shaft, and then insert the shaft into its normal position in the crankcase. Now, chuck the 5-40 screw in a drill press, and lap the crankcase and crankshaft together for about five seconds. An alternative method is to use a variable speed electric hand drill, as shown in an accompanying photograph. Use a relatively slow drill speed during the lapping, and gently apply pressure as if you were trying to pull the shaft out the front end of the case. This will ensure that the thrust faces of the case and shaft are also mated together.

After this brief period of lapping, take the parts to a sink for cleaning. Using warm water, liquid detergent, and the bridge and clasp brush, thoroughly scrub the bore and thrust face of the crankcase. Do the same to the crankshaft also, using the other toothbrushes. I cannot emphasize strongly enough how important it is to completely clean the parts. Any trace at all of lapping compound will interfere with your feeling the fit of the parts. With the parts still soaked with warm water (remember, water is a lubricant), spin the crankshaft in the crankcase. It should spin most freely for several seconds. If it doesn't, additional lapping will be needed. I caution you to lap only a little bit at a time, then thoroughly wash and check the "feel" as you spin the crankshaft. This may seem like a tedious way to do things, but it is the proper way. During the lapping process you are actually removing metal from the bore of the aluminum case. Only an almost undetectable amount comes off the shaft, since it is hardened steel. Too much lapping, and the fit will be too loose. Ideally, when the engine is in operation, the crankshaft will ride on a film of fuel/lubricant between it and the crankcase. If the fit is too close, binding, overheating, and galling are likely. If it's too loose, crankcase pressure will be lost, and parts will slop around with each revolution.

When you've reached the point where the shaft will literally hum with no signs at all of any binding friction, then it's time to dry the parts. Using compressed air is the best way to dry parts. Otherwise, use a soft cloth such as an old but clean cotton undershirt, and use your breath to get the bulk of the rinse water from the crevices. A warm oven can be used to dry any remaining moisture. Coat the crankcase and crankshaft with WD-40, and then set them aside in a finished parts box. It's also preferable to first put them in a small polyvinyl bag to keep off any dust.

PRESSURE MODIFICATIONS

Let's assume that you intend to operate your engine with a pressurized fuel system for maximum performance. (If not, disregard this section.) Your fuel system can be pressurized by using a pen bladder or pacifier type tank, or by using engine pressure to either pressurize a tank or operate a pumper. In all cases, the venturi should be enlarged to take advantage of a pressure system. This is not a difficult task, but all too often it is "butchered" because the individual drills out the venturi . . . usually with an electric hand drill, a dull drill, and no lubrication. Result: the venturi throat is chewed up something awful, and any potential performance gain is usually negated by the turbulence in the venturi.

The best way to modify the venturi is to remachine the flare and ream the throat on a lathe. Second best is to ream the throat on a drill press. A third, but still effective, method is to carefully use an electric hand drill. Assuming that you have to resort to this last one, obtain two chucking reamers, numbers 29 (.136) and 25 (.1495). Start by removing the mesh screen on the venturi. The screen may block relatively large bits of foreign matter, but it will not keep fine grit out of the engine. Such grit can ruin an engine in no time at all. Further, the screen restricts airflow. Consequently, I do not use it. Because of the somewhat awkward shape of the venturi, it is difficult to hold it for reaming when using an electric hand drill. You can get around that problem by simply chucking the venturi in the drill, and holding the shank of the reamer in a vise. In this way, you'll have both hands free to hold the drill and carefully align the throat of the venturi with the reamers. A photograph shows this procedure. Use the No. 29 reamer first with plenty of WD-40 for lubrication and low rpm. Again, the use of a variable speed drill is essential. Follow this with the No. 25 reamer . . . again, with plenty of lubrication. The result should be a very smooth bore venturi that will function well with pressurized fuel. As with all the parts, thoroughly clean and dry the venturi and place it in the box.

If you intend to use engine pressure for your fuel system, it is suggested that you use a pressure backplate rather than drilling through the pressure tap on the plastic carburetor housing. Commercially available pressure backplates are designed to meter the right amount of pressure, and you won't have to experience the frustrations of having the pressure line slip off the plastic housing nipple at the most inappropriate times. If you use a pressurized backplate in conjunction with a pumper, then you should drill out the backplate nipple to .018 of an inch to provide the additional pressure needed to operate the pumper. One of the photographs shows a custom enlarged venturi and pressure backplate. If you can't find them at your local hobby shop, then you can order by mail. Refer to the Kustom Kraftsmanship advertisement elsewhere in this issue.

Next month's article will cover the cylinder the piston and reassembly on the engine. Until then, send any questions to my address at the head of this column together with a stamped self-addressed return envelope. •

Sailing . . . . . *Continued from page 51*

MYRAA will result in better sailing for all skippers.

Now, I'm sure that there are a number of raised eyebrows in the crowd. You are probably thinking what has driven me into such a public display of altruism?

The answer is quite simple. Model yachting enjoyed an almost explosive growth during the early 70's. No matter which organization you look at, and no matter whether you count noses, clubs, registrations, number of turnbuckles or inches of battens, the sport has leveled off. Part of this leveling is due to natural turnover (model yachting is, after all, a voluntary sport). It seems to me that it will require the concerted dedication of the members of both organizations to re-establish the growth trends that are necessary to encourage garage-manufacturers to supply specialty hardware for the sport. There is only a certain amount of administrative and promotional talent around that can be drawn upon. We must assure that we utilize each other's talents in the most efficient way possible.

An interesting problem is going to arise in the wide distribution of AMYA individual members who will want to join MYRAA. I intend to see them organized in accordance with the established precedent within present MYRAA Clubs. Geographical closeness is desirable for the practical requirements of sailing boats. Such closeness is not a requirement for the organizational coherence, nor for the passing of information within a MYRAA Club. The wisdom of this approach has allowed me, living in Virginia, to maintain a proper MYRAA membership by becoming a member of the Delaware

Valley MYC, headquartered in the suburban Philadelphia area. Similarly, one of my neighbors living in Virginia is a member of the MYRAA club in Montclair, New Jersey, as well as a fellow who resides in San Diego who also is allowed to maintain membership with the Montclair Club. There had to be developed a means of circumventing the vagaries of one's hometown by allowing membership with a MYRAA club some distance away. The option to let a single individual hold membership was chosen by AMYA, and is simply the other way to skin this kind of administrative cat.

In summary, I am willing to share a part of the cross-pollination program by acting as an administrative interface. The procedure is to allow AMYA members, who are PERSONS, to easily become members of MYRAA CLUBS without undue inconvenience.

I'd like to acknowledge the discussions and helpful concern of both Angus Scott-Fleming and John Krick, as well as continued dialog within AMYA with its members and directorate. The output of all these communications has formed itself into the offer I'm presenting.

I would certainly be amiss if I was to present my role as strictly a one-way flow of information and people. I would be most happy to assist any MYRAA Club members who wish to take out AMYA individual membership, associate with or start AMYA sanctioned clubs, or learn about the AMYA activities and classes in their areas. AMYA has a batallion of class secretaries, each shepherding his own flock of formula or one-design vessels. Makes for an interesting approach to sailing, each fellow sailing the same boat!!!

Sincerely yours, Roderick A. Carr

So, send in your dues, and if you have questions, send me a self-addressed, stamped envelope for a quick reply. I'm finally able to give out the right address for sending your $10.00 AMYA dues, and that will be to the Treasurer, Dick Hein, 1884 Campus Court, Rochester, Michigan 48063.

I'm still paying the mortgage at 7608 Gresham St., Springfield, VA 22151. •

Plug Sparks . . . *Continued from page 18*

Another unknown fact was that Wally Francisco (later of Francisco Fuels, Powermist, etc.) was blending fuel for the two boys using cologne as a blending ingredient! No problem in knowing who was making a run with that fuel! Actually, the Easterners were so taken with the performance of Hassad and Batsloff that all 12 engines Hassad had taken with him were promptly sold.

As can be seen from the drawings, the Batzloff engine was heavily influenced by Hassad. We are indebted to Russ Barrera, who had original Batzloff castings, and Karl Carlson, who did the machining and assembly work to produce the actual engine to work from. As Carlson pointed out, the similarity of a Batzloff engine to a Hassad is quite pronounced when the intake is placed directly behind the timer points. Voila! A Hassad engine!

Of course, World War II knocked off all engine developments at this time, but as soon as the Japanese waved the white flag, and materials were again available, all engine manufacturers were hard at it.

From best estimates and records, it appears there were only several dozen of these engines were actually completed and sold. The engine had the intake and exhausts similar to the Hassad, except for being reversed. The large butterfly exhaust stacks, so much a Hassad trademark, were freely used.

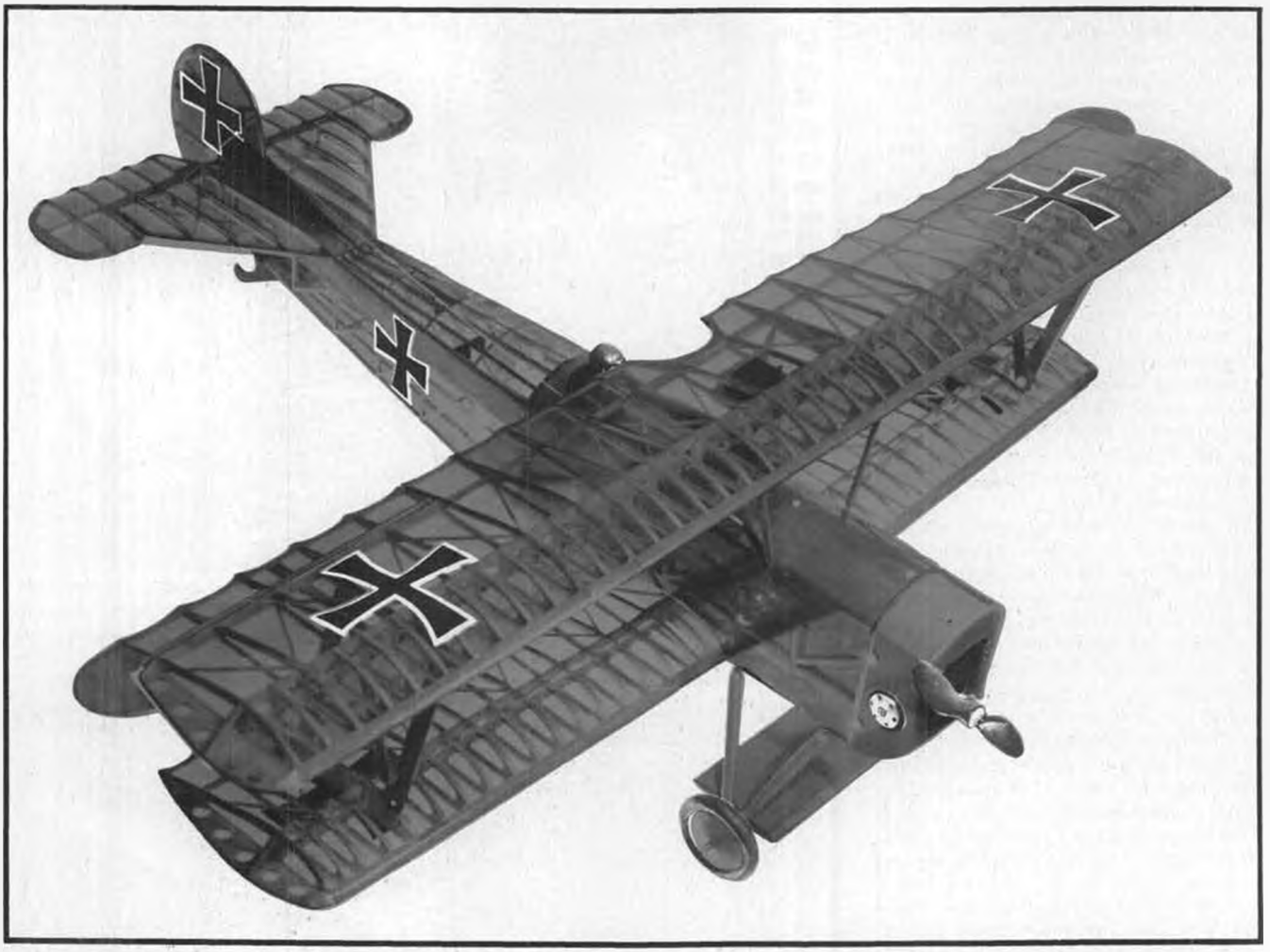
Bill Batzloff, by trade, was a deep-sea diver employed by Scripps Oceanographic Institute in La Jolla, California. Bil was also a machinist of sorts, which accounted for his interest in racing engines. Ironically, Batzloff died in the doctor's office while waiting for an examination. Bill passed away in August, 1966, at the age of 54.

For the technically minded, the displacement was .61 cu. in. with a bore of 29/32 of an inch and stroke of 15/16 of an inch (not quite "square"). Flywheel figures showed a range of 12,000 to 13,000 rpm (similar to Hassad). Inasmuch as the engine was just another racing engine with no real improvements over existing designs, the engine dropped quickly from the racing scene.

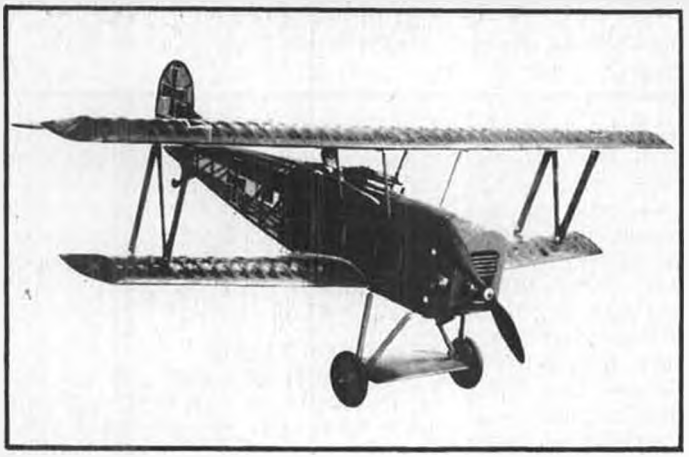
WESTERN O.T. F/F
CONTEST SCHEDULE

Boy! Have we gottum for you this year! With both the SAM President, John Pond, and the new SAM Vice-President, Jim Adams, pushing hard for coordinated dates between all SAM Chapters (regardless of free flight or radio control preference), the western schedule for Old Timer F/F contests should please the most avid die-hard modeler. There are enough of them! We have arranged the schedule in two groups for the convenience of those preferring one phase of flying over the other. (The O.T. R/C Contest schedule was included in last month's column.)

So, thanks to Jim Adams, who devoted quite a bit of time and telephone calls to



Semi-big fun scale Fokker D VII



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assure we have the best schedule for 1979. Better save this, as you are going to need it about halfway through the year!

30 YEARS AGO, I WAS. . .

In response to a query as to where Roy Nelder could be, Bruce Lester, of Toronto, writes the following:

"In those days, Roy and I were the best of friends (and still are) of long standing. As a matter of fact, he used to fly behind my home. We both worked for DeHavilland all through World War II and then with A.V. Roe (Avro) from 1948 to "Black Friday", 1959 (when Avro folded up its operations). After that, the design group broke up and Roy went to work for General Motors in an advance production group for body styling.

"To back up a little, Roy and I worked together in the 'Lines Loft' Dept. on the Avro Arrow and other jetliner aircraft. Roy was a meticulous loftsman and draftsman, a natural born mathematician who loved trigonometry. Avro sent him to Kish Plastics in Lansing, Michigan, to learn the methods of tooling for fiberglass. At the GM plant, he made friends who informed him he could always get a job there and to disregard any offers until he saw them first.

"Roy liked to build Wakefields and 300 sq. in. type models. One day he said he would go to the Detroit Nationals and see how they fly. Needless to say, the American boys found out who could fly Wakefield, Moffett, and the rest of the rubber events.

"Roy and I were probably the best prop carvers around in the 1940 era, as many an envious eye would be cast on the way the propeller blades folded flat to the sides of the fuselage. I even made up an oblique angle jig to silver solder the rear hinge plates that varied to accept narrow and wide nose blocks. They had to be strong to stand up to the power required by the 300 sq. in. 'Sky Queen' open class models we flew.

"Roy had a technique with rubber motors. He would skein his motor out, halve the skein, and then wind one about 50 turns to the left. He wound the other half 50 turns with a breast drill winder, then released the propeller end, and if done correctly, the skein would spin itself into a braid. I believe this became known as the 'White Rope Tensioner'. Anyway, the skein would take 600 turns if you didn't wind over a hot cement runway. You learn by experience to wind over the cooler grass area.

"When Avro folded, I told Roy he could work in the United States as long as he held onto his house in Richmond Hill or his summer cottage at Footes Bay in the Musoka Lakes area north of Toronto. He sold his house in Richmond and purchased a house in Birmingham, Michigan, for the wife and two kids while all the time keeping the cottage to maintain his Canadian residency.

"The latest I now hear is that Roy has sold everything he owned in the Detroit area and is now living in his cottage at Footes Bay, busily revamping the residence. He and his wife qualify for old age Canadian pension (like the U.S.

Social Security) and probably will do so shortly.

"To conclude, Roy is alive and doing well, living in Canada. During one of my visits as a retiree of the Douglas plant, I ran into another of his old lofting buddies, Ray Takeuchi. I expect Ray has gone up to visit Roy by now, so I am expecting some sort of communication from him by this Christmas."

(Columnist's note: Bruce Lester is now busily redrawing his 1941 Canadian Gas Winner, the "Blitz Buggy". Hopefully, we will have it available to you lucky readers of **Model Builder** magazine!)

BROWN JR. ONLY CONTEST

Just received another telephone call from J.G. "Bud" McNorgan, whose enthusiasm knows no bounds, announcing another Texaco type free flight contest that requires the Brown Jr. to be used as motive power.

Last year (at the same time as the SCAMP Texaco Contest), this event appeared to catch on, as quite a few did enter. Considering the dearth of Brown Jr. motors, the turnout was pretty fair. This year, with advance notice, the meet should go over great.

The SCAMPS evidently feel the same way too, as they have cancelled the 30-second Antique event normally held at the conclusion of the "Dawn Patrol" (the early morning Texaco). The meet will be held April 8 and will probably get started around 10 o'clock.

One word of warning: there can't be much sandbagging this time, as the winner will be judged on the total of three flights. Imagine three 30-minute flights! The very thought of it should either make you dog tired or raise your adrenalin count to the point where you could chase models all day long. Either way, it sounds like Bud has come up with some real fun.

Bud also announces that he has talked Herb Wahl into donating one of his high-class Brown Jr. engines (retail price $170.00!) to help pep things up. Bud is not sure, but flying should terminate in the three o'clock area.

Other outstanding awards are the copper plaque and the Beauty Trophy. The former prize is for the best single flight of the day. You don't have to win the event to come up with this plaque. The Beauty Trophy, won by Sal Taibi last year, will again be awarded for the best silk-and-dope finish. Bud says Monokote is a no-no, although there is no restriction as such in the flying end of things.

Rules briefly are: 1/8 ounce of fuel per pound of model weight. No limit on the length of flight, however, the winner will be on the best three-flight total. No minimum wingspan, as is prescribed in the standard Texaco event. So mark April 8 down on your calendar for Taft. There will be no less than three different contests going on that day!

INDOOR OLD TIMER EVENT

This idea has been kicking around for a long time, especially in view of the fact that the AMA Technical Director, Frank Ehling, has been bugging the columnist to stage such an event at the Nationals.

The latest information from Ken Johnson, of Canoga Park, California, indicates that he and his cohorts have come up with some real fun for indoor flying. They have taken several Old Timer outdoor rubber designs and scaled them down to 20-inch maximum wingspan.

Ken says they have tried scaled versions of the Sparky, Victory, Gollywock, Clodhopper, and others. All seem to perform excellently. Best part about this type of indoor flying is the ten-point bonus for authentic coloring and markings (as used on the original kit designs).

Most models are constructed out of 1/20 square balsa (as supplied by Peck-Polymers) and come out quite light at 4.2 grams (without motor, of course!). Flying under the Flightmasters West sponsorship at the Paul Revere Junior High School, Ken claims they have had a good response. Ken has made up xerox copies for interested modelers. You can get Ken Johnson at 22701 Enadia Way, Canoga Park, CA 91303.

TROUBLE IN PARADISE

The latest WMC Patter newsletter, edited by Bob Stalick of the Willamette Modelers Club, points out the biggest problem with free flight contests now-

adays. With the proliferation of so many events, the contests have grown to the point where the individual events cannot support themselves, both in entries and revenue to offset the cost of prizes and trophies.

In his article called the "Stalick Plan", Bob proposes to reduce the number of events in the Northwest F/F Champs from 15 to 9 and the Old Timer Champs from 9 to 7. In addition, the entry fee would be raised to $4.00, but the Junior fees would remain as is.

The whole point of this article is the rationale offered by Stalick, which many clubs would do well to take a good look at:

1) Events which do not hold their own weight, i.e., do not produce entry revenue commensurate with the prize purchased, should be altered, reduced, or eliminated.

2) Events which are decreasing in participation should be altered or combined with others that show loss of participation.

3) The number of events needs to be reduced. There are simply too many events that are practically duplicates. In many cases, the same plane is flown in two events. Example: Class 1/2-A; Class A-B Pylon O.T., etc.

4) Contests must be self-sufficient (or nearly so). Treasuries that are empty from contests leave room for no other activities.

5) Too few club members are doing too much of the work (amen to that!). Either the work force must be increased or the work load reduced. Since no volunteers seem to be forthcoming, the number of events must be reduced.

6) Entry fees must be increased. It is a fact of life that inflation is forcing the cost of all material up. Most prizes are secured at discount prices, but even this costs more. The only solutions are more solicitation for donated prizes, fewer club purchases of merchandise, or higher event entry fees.

The foregoing is so true of today's problems of organizing and running contests. If you, as a contestant, haven't gotten the message by now, you are free loading. You simply must get involved to keep things going.

NOFFA NEWS FLASH

One of the biggest problems plaguing the Midwest boys, particularly those in Ohio and Indiana, has been the serious lack of good free flight flying fields. Some help has occurred in the form of the Wright-Patterson AFB, but there are only six dates available.

Jim Robinson, of the Northern Ohio Free Flight Association, writes to say the group has finally landed a good site. Warren Weisenbach, club president, has been responsible for all the action. He has been able to obtain the use of the NASA Plumbrooke facility to stage meets.

Through Ohio's 13th District Congressman, Donald J. Pease, a meeting was arranged with R.J. Plumbrooke, of NASA, to discuss the use of the area. Warren was also able to gain the cooperation of Ohio Senators Mitizenbaum and Glenn. Great stuff!

The upshot of the meeting was that NOFFA was to be allowed to try out the field on a probational basis. An Old Timer contest has been scheduled for August 5 that will consist of Class A, B, C, and .020, with a radio assist O.T. event thrown in for good measure.

Of course, all is not peaches and cream yet, Robinson warns, as there are certain restrictions that must be observed. Among those are that all entrants must preregister to be placed on the list at the guard gate. No name, no get in! Other restrictions are rules regarding retrieval of models landing outside of the designated area.

In this case, the model must be retrieved within the hour and be accompanied by NASA personnel. This may be a bit annoying, but you can't knock the site! To help find errant models, Prexy Warren Weisenbach has volunteered his Pietenpol to a nearby landing strip. From there, he can fly out to spot the models from the air. The boys think Warren is so great, they may add a Class D event for his Pietenpol. How about that?

.020 REPLICA KITS

Most everyone remembers the excellent .020 Replica kits put out by Bob Oslan of Cal-Aero, but no one seems to remember who he sold the business to.

For the benefit of those who are unable to find these kits at their local hobby dealer and don't know where to get them, rest assured that R.D. Oliver is still producing them.

R.D. Oliver, under the name of J&R, is still producing the four Cal-Aero designs: Strato Streak, Playboy, So-Long, and Brooklyn Dodger. The first two kits are priced at $9.75 each, and the third and fourth kits sell for $10.75 each. All models are thoroughly proven and are excellent competitors.

So get your kits at: J&R, 5021 W. Sheridan, Phoenix, Arizona 85035. You won't be sorry!

LOOKING OVER YOUR SHOULDER

As this columnist writes the finis to this month's column in early January, 1979, he is reminded of what has transpired during 1978. Credit for the reminder should go to Ken Sykora ("King Sugar"

pseudonym) in his recent January issue of the "Flight Plug".

Probably one of the most exciting ideas to develop on the West Coast since the .020 Replica event is the San Valeers' idea of a Nostalgia Event. The writer has been heavily engaged in correspondence with Ralph Prey, editor of the San Valeers' newsletter.

This Nostalgia event is an outgrowth of the Old Timer events. As we grow older, more drop by the wayside and are replaced by younger ones. In the majority of cases, these younger members can only recall what they were associated with in their early modeling days, hence the tremendous interest being developed in the re-creation of models such as Zeeks, Hogans, Fu-Bars, and other late 1940-early 1950 models.

This columnist envisions an eventual adoption of these type events as standard and/or special SAM events. The Post-War event was a little too restrictive for the average modeler of that era, hence the answer is obvious. Give them what they want! •

FOR S.A.M. CHAMPS INFORMATION, WRITE TO:
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HUNTER, UTAH 84120

Counter . . . . . *Continued from page 9*

Contact your hobby dealer first. If he can't help you, contact MRC direct at 2500 Woodbridge Ave., Edison, NJ 08817. Be sure to tell them **Model Builder** sent you!

* * *

Our radio manufacturing friends in Vista, California, are introducing a new battery charger for 1979. Designated as the Kraft KBC-D, this wall-mounted unit can charge any 1972 or later Kraft transmitter or receiver battery pack, and can do it either simultaneously or independently. What makes this charger really unique is that you can select either high (180 ma) or low (50 ma) charge rates, just by flipping a switch. For really run-down batteries, such as after a long day of flying, Kraft recommends an initial high-charge rate for two or three hours, then charging for the usual length of time at the low rate. The charger may also be used with the KB-4L 225 mah pack by switching to the low charge rate, which is really the high charge rate for these batteries. Needless to say, continuous charging is not recommended for this battery pack.

Also, if your switch harness happens to be Kraft Part No. 200-029 (identified by a 2-pin charge receptable), you will need a charge adapter (Part No. 200-140) to use this new charger.

Price of the new KBC-D charger is $14.95. From Kraft Systems, 450 W. California Ave., P.O. Box 1268, Vista, CA 92083.

* * *

Panavise owners will be especially interested in the Tray Base Mount shown in one of the photos. Actually, the base has two purposes: it provides extra stability and resistance to tipping, and the six separate trays molded into its perimeter serve to hold small parts and tools when doing precise, delicate work. The walls of the trays are smoothly rounded and sloped, so even the smallest parts can be easily removed with fingers or tweezers. The Tray Base Mount is 8-1/4 inches in diameter and has six neoprene base pads on the bottom to keep the whole thing from sliding all over your workbench.

The Panavise Tray Base Mount retails for $9.95 and is available at your dealer or from Panavise Products, Inc., 2850 29th St., Long Beach, CA 90806.

* * *

Prather Products is getting its feet wet in the model boat field by offering a kit for the Prather Deep Vee, a 40-inch boat that can be raced in both the Deep Vee and Mono racing classes. This is the same boat that Terry and Al Prather have been racing, and any active boater who has seen it perform (and especially one who has been beat by it!) will tell you that the Prather Deep Vee can hold its own with most any competition you care to name.

The Prather Deep Vee hull was designed by George Campbell, probably the world's leading model boat designer. The hull uses the minimum angle allowed by the rules, and the sides of the hull are slightly concave, to add rigidity. The deck is tapered down toward the bow with a large windshield to utilize aerodynamics to hold the front end down at high speeds. One of the best features of the Prather Deep Vee is that the epoxy glass hull and deck are joined at the factory, while they are still in the molds. Besides the obvious savings in time, you get a hull that is as accurately aligned as possible, as there is little chance of distortion.

The Prather Deep Vee is designed for engines of .40 to .65 cu. in. displacement, and will weigh between 8 and 9 pounds. The kit includes the joined hull and deck, hardwood motor mount rails, plywood bulkheads and other assorted plywood and hardwood parts, foam flotation, and an excellent 28-page instruction booklet, complete with photos. In addition to the actual construction text, this booklet contains a glossary of boating terms, a list of tools and materials needed to complete the boat, a drawing and list of parts needed to build a waterproof radio box, a list of all the running gear (not included) you'll need to finish the boat, and a section on how to trim the boat for maximum performance. Some of this is obviously aimed at the beginner, and with the instructions being as complete as they are, there really is no reason that a beginner couldn't have considerable success with this boat.

The Prather Deep Vee sells for $99.95, and should be in your hobby shop by now. If not, have your dealer order one for you.

For those who don't want to scrounge

up their own running gear, there is a running gear kit available. It contains parts specifically designed for the Prather Deep Vee, but will work fine on other brands of Deep Vee boats, too. For $69.95 you get the strut hardware, rudder hardware, trim plates, flex cable, brass shaft log, bearings, turn fin, and all the other little parts required. Also, an epoxy glass hatch cover is available for $18.95, and will give your boat a scale appearance as well as prevent swamping from other boats' rooster tails or from rough water.

Several of the hardware items in the running gear kit are available separately and are fully described in a separate catalog sheet which you can get direct from Prather Products.

The Prather Deep Vee is the first in a new line of model boats by Prather Products. For more information, contact them at 1660 Ravenna Ave., Wilmington, CA 90744. Don't forget to tell 'em where you read about it first!

* * *

BoLink is coming out with a bunch of new goodies for the electric R/C car nuts. First off, there are three new 1/12-scale body styles to pick from: the Can Am Spyder, Volkswagen Scirocco, and Mercedes 500 SLC. The Spyder and Mercedes are complete with rear wings, and the Spyder has a front wing, too. All three bodies are available either painted or unpainted.

All three cars in the photos are equipped with BoLink's new improved wide racing tires, Stock No. BL-81. Another new addition to BoLink's large selection of wheels, tires, and donuts is the F-650 series. These narrow hard-rubber front tires can be purchased mounted on either plastic or aluminum wheels with bronze bearings. Prices range from $2.98 for donuts all the way up to $10.00 for a complete set.

For the economy-minded racer, BoLink is introducing a kit for a six-cell electric car that should be competitive with the best. Included is a powerful 05 racing motor, Kydex full protection plate, wide racing tires, fast charging GE Ni-Cds, DC auto charge cord, and all the other little odds and ends needed to finish the car. Price of the kit is $79.95.

BoLink's new 1979 catalog is now available for $1.00, and lists all of BoLink's products. Send to BoLink, P.O. Box 80653, Atlanta, GA 30366.

* * *

Boaters will be especially interested in the two new products from RAM (**RA**dio control **M**odels, get it?). One is the "O Bee 30", a sport-type tri-hull boat that is designed for .15 to .21 cu. in. outboards (or the other new goodie which we'll mention in a moment).

The O Bee 30 measures 30 inches in length and is completely molded from high-strength plastic. The manufacturer claims that the model can be assembled in one evening, and for once, we're willing to believe such a claim . . . with only five structural parts, how could it take any longer? The kit includes a radio mounting box, which can be made waterproof, and a fuel tank mount, both molded from plastic. Access to the radio and fuel tank is by the one-piece removable cockpit section. The instructions include details on how to make a simple flotation chamber that will make the O Bee 30 virtually unsinkable. And, in addition to the written instructions, there is a step-by-step photo sequence that should clear up any problems for the first-time boater.

The second new goodie from RAM is the Electro Mate, a clever conversion kit that will mate an Astro Flight 25 Marine electric motor to the lower half of the popular K&B .21 outboard. Now you can have the simplicity of an outboard and the smooth, clean, quiet operation of an electric power system, all in one package. The conversion kit is complete; all you need is the Astro Flight motor and the K&B drive unit. To complete the kit, a molded plastic semi-scale Mercury engine cover is included for realism.

The O Bee 30 sells for $39.95, the Electro Mate for $24.95. They should be available at your dealer; if not, order direct from RAM, 3631 N. Kedvale Ave., Chicago, IL 60641.

* * *

C&D Enterprises has just introduced a new glow plug driver, called, oddly enough, the C&D Glo Driver. This neat unit makes for fast and reliable starts under all engine and weather conditions, and will work with any 1-1/2 or 2-volt plug without making any adjustments. The Glo Driver uses a 4.8-volt Ni-Cd battery (more juice than other glow plug drivers) and solid state circuitry to apply voltage to the plug in pulses; the rate of these pulses varies automatically to maintain a constant plug temperature. The unit is equipped with a large, easy-to-read 0-5 amp meter that will allow you to quickly determine whether your plug is open, shorted, or flooded . . . and believe us, having seen this unit work, there's no plug around that will remain flooded for long with this thing attached!

Because the C&D Glo Driver uses a 4.8-volt battery, no special charger is

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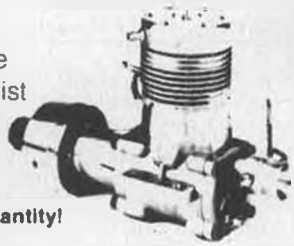

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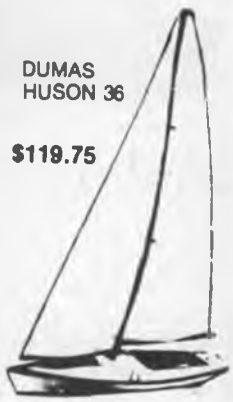

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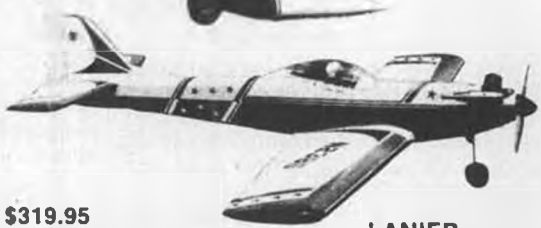

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necessary; your existing receiver charger can be used instead. If you're not using Ni-Cds with your R/C system, or are flying C/L or F/F, you can use any charger that puts out 4.8 volts at between 50 and 120 ma. The manufacturer recommends that any quick or fast charging be done with the aid of a good expanded scale voltmeter to monitor the charge, as the batteries in the unit are not designed to withstand a continuous overcharge at a quick or fast charge rate. The instructions are very thorough about charging the batteries, so you shouldn't run into any problems here.

From what we've seen, the C&D Glo Driver looks like a handy little gadget to have. It is available at your local hobby shop for $59.95, or direct from C&D Enterprises, 10042 Merrimac Dr., Huntington Beach, CA 92646.

* * *

We're sort of reluctant to come right out and say that the long-awaited O.S. .90FSR has been officially released, because it hasn't ... at least to our knowledge. However, we *do* know that a few of these engines are out and are being used (Dave Brown flew one to 2nd place in his Zlin 50-L at the last Tournament of Champions). **MB** "Fuel Lines" columnist, Otto Bernhardt, placed his order early and managed to get one of the first ones. He loaned it to us long enough to take a photo, but snatched it back before we could sneak off and run it. Rats!

No doubt about it, the O.S. .90FSR is one big hunk of motor. Judging from the performance specified in the instruction sheet, it should be almost identical to the Webra .91, developing maximum horsepower at around 15,000 rpm. Weight of the engine, not including the muffler, is just a hair under 24 ounces. (Sounds like just the thing for scale models, which are notorious for being underpowered and tail-heavy. This engine will solve both problems!) Optional accessories will include a radial engine mount that bolts on to the rear of the engine via the four rear crankcase bolts, and an exhaust adapter that will let you use a Graupner tuned pipe for maximum power.

When it comes to workmanship and appearance, the O.S. .90FSR is one of the best we've seen. Absolutely beautiful ... which is typical of *all* O.S. engines. We've heard that the asking price is going to be ... are your ready? ... $225, which includes a muffler. Sounds pretty steep, but we feel that the old adage "you get what you pay for" certainly applies here.

For more information on the O.S. .90FSR, write to World Engines, Inc., 8960 Rossash Ave., Cincinnati, OH 45236.

* * *

Having made their claim to fame by producing some excellent 1/2A carburetors, the Tarno people have jumped to the other end of the engine size spectrum and are now producing an engine for 1/4 and 1/3-scale models: the Tarno Super 2, a big 1.9 cu. in. aircraft conversion of the popular Homelite chainsaw engine.

The performance claims for this engine are impressive: a whopping 24 pounds of thrust on a 20 x 8 prop turning at 6,000 to 7,000 rpm. The unit is designed as a complete, self-contained package, and includes a prop adapter, aluminum motor mount, flywheel shroud, throttle arm, ignition switch, and fuel tank. The engine is set up to run on gasoline and oil, so it won't cost you more than a few pennies for each flight.

And if, while flying, one of your loops turns into something more like a figure "9", getting replacement parts is no sweat. Engine parts are available at any of the Homelite dealers scattered throughout the country, and the special conversion parts, such as the prop adapter and engine mount, will be made available through hobby dealers.

All in all, the Tarno Super 2 looks like a well-designed, compact, potent piece of equipment. The suggested retail price is $169.95, and is available directly from Canadian Model Exporters, P.O. Box 23142, Vancouver, AMF, B.C. V7B 1V6, for their export price of $139.95 plus $3.00 for handling and postage.

* * *

How many brands of props are there? Well, right off the bat we can think of Top Flite, Tornado, J&Z, Cox, Y&O . . . and now there's the Master Airscrew line of props, from the Windsor Propeller Co. These props are injection molded from glass-filled nylon, are fuel proof, and are claimed to be accurately balanced (although it's always a good idea to check this last item yourself, just to make sure). Five sizes are available at present: a 7 x 5, which goes for $.65; an 8 x 4, for $.75; a 9 x 6, for $.95; a 10 x 6, for $1.15; and an 11 x 7-1/2, for $1.35. Other sizes are now in the tooling process and will be announced as soon as they are available.

We've talked to a few fliers who have used them, and they all tell us that Master Airscrew props rank right up there with the best in all respects. And not only do these props perform well, they *look* good, too, being black in color with white lettering, like on a tire. Makes for a very high-performance and professional look.

Since the line is so new, Master Airscrew props might not yet be available in your local hobby shop. If not, contact the Windsor Propeller Co. direct, at P.O. Box 112, Windsor, CA 95492.

* * *

With all the big chainsaw-type airplane engines coming on the market, Mammoth Scale enthusiasts are going to be hard pressed to make a choice. The latest one is from Mag-Aero Mfg. Co. and is called the Mag-Aero K-21.

This engine is at the lower end of the big engine spectrum, having "just" 21cc (1.26 cu. in.). It should be just the thing for the big 1/4-scale lightweights, such as the Bud Nosen J-3 Cub and Aeronca Champ, which are overpowered with the bigger Quadra-type engines. The K-21 is set up to run on gas and oil and has a completely shielded ignition system to prevent radio interference. Other features include a ball bearing-supported crankshaft, needle bearings at both ends of the connecting rod, chrome-plated aluminum cylinder, Walbro all-position carburetor with built-in fuel pump, factory-installed throttle linkage, and lots more. The retail price of the K-21 is $169.95, and they are in stock and ready for immediate delivery.

Unfortunately, the blurb sheet we received didn't include any specs on the engine, such as performance and weight. If you're interested in learning more about the Mag-Aero K-21, write to Mag-Aero Mfg. Co., P.O. Box 490, Freeland, WA 98249.

* * *

Don Lowe's "Phoenix" has always been considered to be one of the most impressive pattern birds around, both in looks and performance. Now you can get the latest in Don's series, the Phoenix 8, which is being kitted by Aero Composites. Changes from previous Phoenix designs include a repositioned wing and stab, increased wing area (730 sq. in.) to carry the weight of modern engines and tuned pipes, and a fuselage that has been recontoured to provide maximum strength with minimum weight (19 oz.). The fiberglass fuselage featured molded canopy detail, stab fillets, and pushrod guides. The foam wing cores are faced off at the proper dihedral angle for accurate alignment, and the horizontal stab can be built either full-flying or with separate elevators. Full-size plan and detailed instructions are included.

The Phoenix 8 kit is available in two versions: a Standard Kit, which consists of the glass fuselage, foam wing cores, plans, and instructions, for $79.95; and a Deluxe Kit, which includes all of the above plus a complete wood package, high-quality motor mount, and all control surface hardware for $119.95.

If you're out to win contests, you'd do well to check this one out further. Aero Composites, 411 Townsend Place, Dayton, OH 45431.

* * *

Half-A'ers who are always trying to shave the last gram of excess weight from their models will really go for the new engine mount from Hiscott Components, designed to fit Cox Medallion .049's and Tee Dee .049-.051's. This ultra-light aluminum disc is installed by removing the rear crankcase cover from the engine, placing the mount in position on the engine, and then screwing the crankcase cover back in place. Easy as pie! Mounting screws are included for fastening the mount to the firewall. That firewall doesn't need to be very big, either, as the mount is designed to be as small as practical. And if you're a real light-weight fanatic, you could grab a Dremel tool and grind off the beam mounting lugs, since you won't need 'em any more.

The Hiscott Radial Motor Mount sells for $2.98, and can be obtained through your dealer or direct from Hiscott Components, 717 Ohms Way, Unit D, Costa Mesa, CA 92627.

* * *

No matter what types of models you

fly . . . R/C, F/F, or C/L . . . there's something for you in the new 1978-79 Aeromodeller Annual, compiled and edited by Ron Moulton, editor of *Aeromodeller* magazine. This 144-page book is full of all sorts of interesting and informative articles, mostly of the "how to" and theory type, and has about 35 full-page drawings (with dimensions) for just about any type of model you can think of. The articles discuss topics such as structural design, flying tactics and rules of C/L team racing, bird aerodynamics, R/C ornithopter design, flying wing design, rules and 3 model plans for the popular P-30 event . . . there's even a section on making and throwing boomerangs! With a cross-section like that, nobody should feel left out.

For price and availability, contact Bill Deans Books, 166-41 Powells Cove Blvd., Whitestone, NY 11357. •

Workbench . . . *Continued from page 6*

Randall Park Mall Merchants Association, the show will award over 280 trophies in over 75 categories! Joe Eiben, 5192 Edenhurst Rd., Lyndhurst, OH 44124, phone (216) 449-4729, is Contest Director. Show will take place in the Randall Park Mall, North Randall (Cleveland), OH 44128, phone (216) 663-1250.

* * *

The Southwest Modelers Show, which as we mentioned in previous issues, was hit hard in its first two years by the worst winter weather Dallas could stir up in mid-January, has announced June 2 and 3 as the dates for its 3rd annual affair.

As before, the show is in the Women's Building, State Fair of Texas, in Dallas. Manufacturers should give this show serious consideration for exhibiting, as it reaches a large segment of the hobby community which does not have ready access to the New York, Toledo and California shows. **MB** representatives attended the first two shows, and were impressed with the large turnout of interested modelers.

For more information, write to Southwest Modelers Show, 9427 Meadowknoll, Dallas, TX 75243, phone (214) 948-2107.

* * *

We bet that any scale airplane, as long as it's BIG and beautiful (or Mammoth) will be welcome at the Q.S.A.A. (Quarter Scale Association of America) First Annual Eastern Regional Fun Fly-In, July 6, 7, and 8, Tom Sawyer State Park, Louisville, Kentucky, home field of the River City R/C Club.

Friday will be for static display, in a building that holds 3 tennis courts (side-by-side, dummy, not stacked!), from 1 to 10 p.m., and no-rules/no competition fun-flying on Saturday and Sunday.

For more info, contact John Sullivan, 4710 Briarwood Lane, Louisville, KY 40229, phone (days) 502/636-5551, or evenings, Dave Mullins, 502/245-5648. Registration and publicity will be on hand at the Toledo show.

EPOXY ROULETTE

Like smoking cigarettes, not using auto seat belts, and standing in line with spinning propellers, modelers continue to gamble with their good health, or even more, their very lives, out of pure it-couldn't-happen-to-me carelessness.

Warnings about well ventilated painting areas may get pretty monotonous, but try the following on for size. It was quoted from the January 1977 issue of *Business and Commercial Aviation*, and appeared in the Rocket City Radio Controllers (Huntsville, Alabama) newsletter, edited by Jerome Hall, in an article by RCRC member Ron Juergens.

EPOXY AND HEALTH DANGERS

"So-called epoxy compounds have proliferated in recent years, especially in aviation. Unfortunately, the dangers associated with those chemicals are not so widely understood. A recent, chilling, experience of a North Central Airlines pilot carries its own lesson.

"One winter morning he painted a model glider with epoxy-based paint

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COMPLETE KITS from Model Builder plans, John Pond, Sid Morgan. Catalog $1.00. Repli-Kit, P.O. Box 374, Inverness, FL 32650.

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WANTED: Old model airplane engines and miniature gas powered race cars and all related items from 1935-55 Arthur G. Suhr, W218 N5866 Maclynn Ct., Menomonee Falls, WI 53051.

HOBBY HORN, hobby specialties: Old Timers, Electric propulsion, Y & O Props, Big Red Rubber Bands, Plans scaling, Accessories. Bob Sliff. Send name/address for free listing to Hobby Horn, P.O. Box 3004, Seal Beach, CA 90740. (714) 894-6223.

FF/UC SCALE PLANS. Peanuts, Walnuts, Hazelnuts, Rubber, CO_2, Gas. Modernistic Models P.O. Box 6974, Albuquerque, NM 87197.

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SPEED EQUIPMENT — pans, dollies, torque units, Monoline equipment, basswood and Kansas Twister kits Walter Brassell, 1215 N. Concord Rd., Chattanooga, TN 37421 Ph. (615) 892-5995.

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(toluol, zylon, n. propyl acetate, methyl isobutyl ketone). Since the weather was cold, he sprayed in a heated garage despite some awareness of a toxicity potential. Total time spent in the enclosed spray area was less than four minutes.

"Within one-half hour this poor fellow became aware of a strong odor of algae that was apparent only to him. Within two hours chest pains developed and increased until he ended in a coronary care unit.

"Even though this individual suspected possible epoxy poisoning and took the paint can with him to the hospital, he was unaware of the severe consequences. The vapor from those resins and hardeners inflame tissues in the lungs and around the heart, actually inducing a coronary for which there is no antitoxin. If enough toxin has been ingested, the doctors cannot help.

"When working with epoxy, do so out-of-doors or in a spray booth. If you are sanding epoxy with dry sandpaper, wear a carbon activated face mask, because the powder is just as dangerous as wet overspray or fumes. Remember, too, that the effects of epoxy poisoning are accumulative with repeated exposures.

"Epoxy paints and glues are unsurpassed for many applications. When you do use them, take every precaution, because the toxic threat is frighteningly real. —D.M."

If *that* doesn't get to ya, here's a cute one which editor Hall added on to Juergen's article.

"The most effective warning I've ever seen, and haven't seen since, was on a two-part compound for floor covering . . . IN CASE OF SICKNESS FROM INHALING VAPORS, CALL THE CORONER!" . . .Amen.

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MODEL BUILDER

NEW ROOST FOR NFFS

Bill Booth, Jr., P.O. Box 192, Carlsbad, CA 92008, writes in to say that the National Free Flight Society now has a membership and subscription address (his) that should stay put for a while. The current dues schedule, in case you're not now supporting this fraternity which is the basis of all aeromodeling, is $10 per year ($18 for two years) for age 19 and over, or $5.25 per year ($9.50 for two years) for age 18 and under. The newsletter alone is worth the price (and it doesn't compete with *most* model magazines!).

HERE IT . . . GOES!

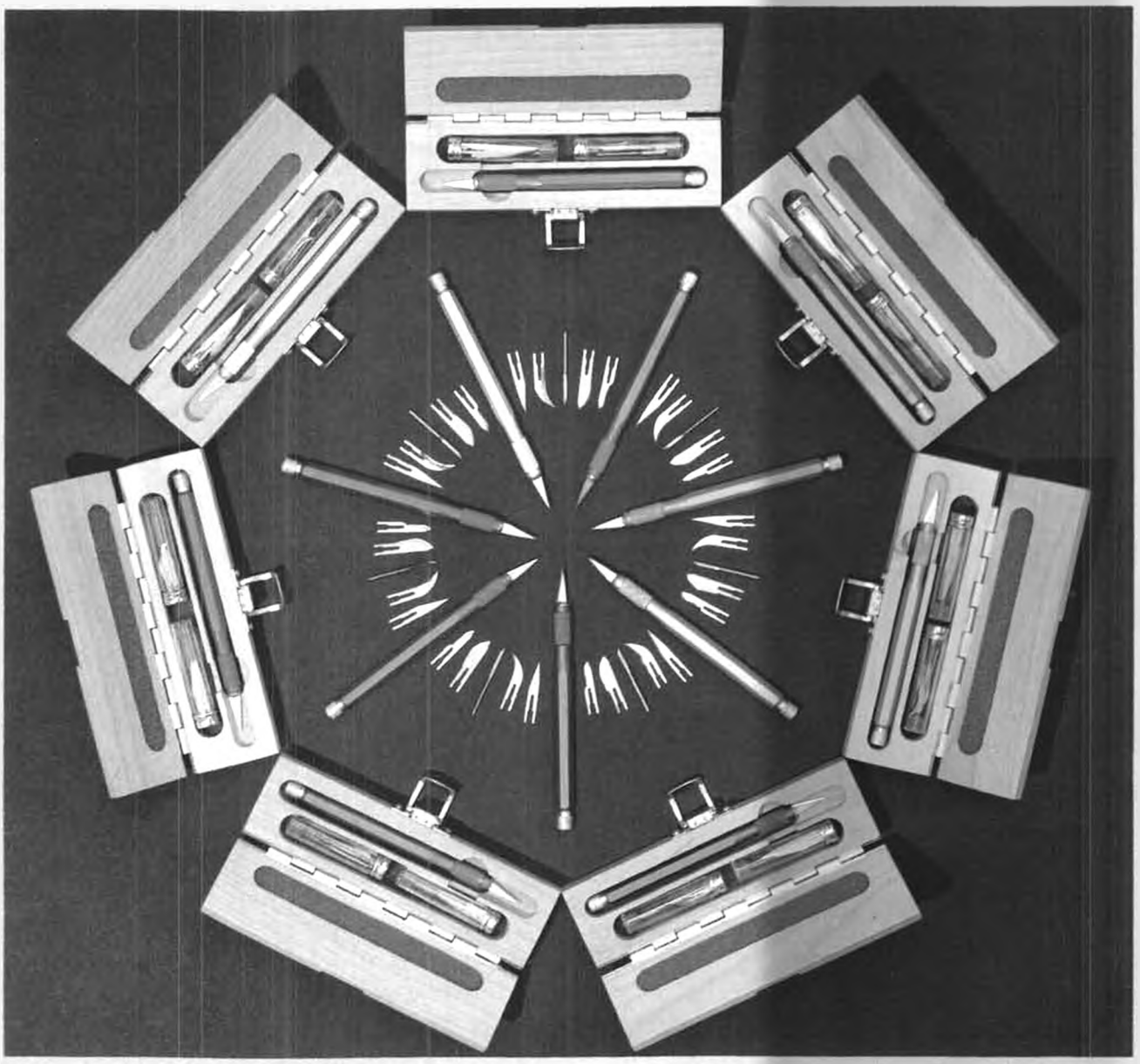
Interesting thoughts quoted from an article in the October 1978 issue of the NAA newsletter about a recent record-claim flight of an Air France Concorde jet from Paris to Washington, D.C., on August 18, 1978. The 3,000 mile route was covered in 3 hours, 35 minutes, according to official timers:

"A passenger said the flight provided a unique occurrence; they watched the sun rise in the West during the trip. When they left Paris it was nearly dark. When they arrived in Washington it was two hours until sunset. They had gained time, it was two hours earlier than when they had left Paris.

"Less than 100 miles from Dulles Airport is Jamestown, Virginia, the site of the first permanent settlement in America of Englishmen. They spent 5 months . . . 145 days . . . to cross the Atlantic. The Concorde flight landed nearly the same number of people on U.S. soil, but it took them less than one-tenth of one percent of the time required for that crossing of almost 400 years ago.

"Gaining time and seeing the sun rise in the West is hard for today's citizen to comprehend. One wonders about the reaction of a Jamestown settler if told of the record-claim flight, or of the reaction by people who greeted Lindbergh if they could have seen aviation's advancements in 50 years." •

IN THE BEST CIRCLES, IT'S **über skiver**



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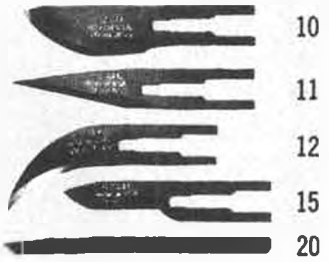
- *Non-Rolling Hex Cross-Section*
- *Deeply Knurled, Non-Slip Grip*
- *Long-Life, Stainless, Surgical Steel Blades*



Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, 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 . . . . . $14.95
Individual handles (specify color) $5.95
Vial of 6 blades (No. 10, 11, or 15) $2.10
(No. 12 or 20) $3.30

See your dealer, or order direct.
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that big

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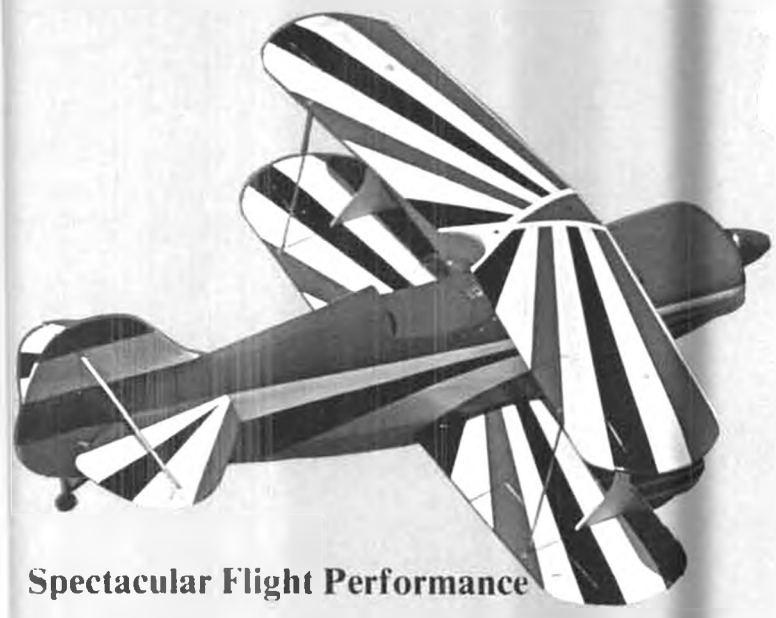


Spectacular Flight Performance

Perhaps the most fascinating aspect of this big, beautiful bipe is its superb flight performance. Thanks to its special pressure molded, foam airframe and a highly refined reduction unit called a Byro-Drive, the Pitts has overcome both the excessive weight and inadequate power problems of other giant aircraft. With a ready-to-fly weight of approx. 14 lbs., including .60 engine, and Byro-Drive, not only are the aerobatic qualities top drawer, but the low speed stability and handling characteristics are outstanding. Power loading with the Byro-Drive actually exceeds 1:1. (Based on recent tests showing up to 20 lbs. of thrust achieved with a Schnuerle ported .60, 15% nitro fuel, tuned pipe and ready-to-fly weight of approx. 14 lbs.)

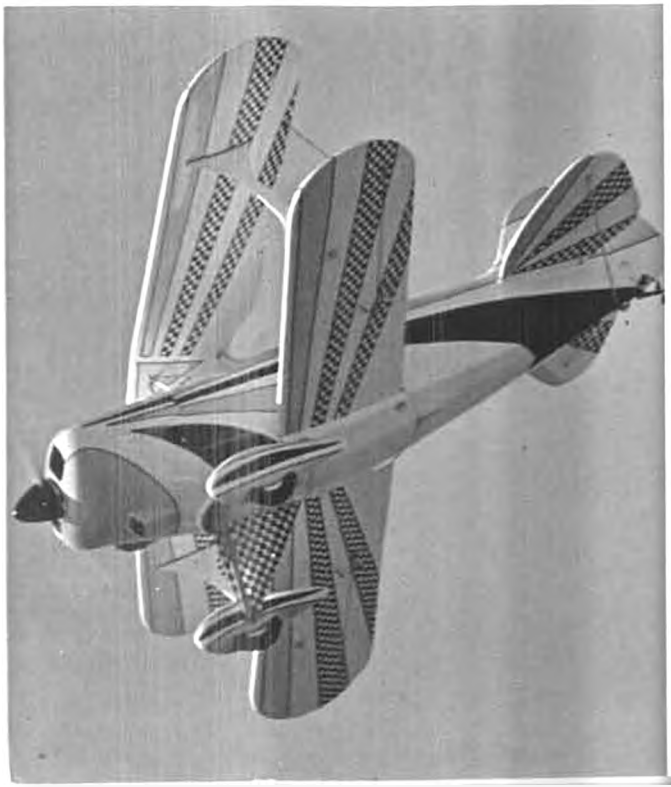
Although the Pitts will readily accept the various gasoline and chain saw engines presently on the market, excessive weight, size and vibration render them less desirable.

For best performance, use the Byro-Drive model specifically designated for the various engines.

SEE BYRO-DRIVE DETAILS ON PAGE 9 OF THIS ISSUE.

KIT INCLUDES:

- **11 Byro-Foam modules for fast construction and excellent weight to strength ratio. Thanks to a special pressure molding technique, foam components are surprisingly damage resistant, lightweight and superior in strength to wooden structures.**
- **Rugged aircraft stressed-formed aluminum landing gear with built-in shock absorber, 4½" rubber wheels and wheel discs and spring steel axles.**
- **Authentic scale details including molded-in rib and stringer effects.**
- **Mounting cavities for wood reinforcing inserts, wing spars and torque tubes make installation fast and accurate.**
- **Servo mounts are molded in, ready for servo tray and radio equipment.**
- **Scale, injection molded nylon cabane struts completely eliminate work of setting up location and incidence of upper wing. Cabane location indexed on fuselage for accurate location.**
- **All required wooden components, both balsa and plywood, are precision die-cut.**
- **Scale heavy-duty, steerable tail wheel assembly complete.**
- **Scaled air foil shaped aluminum tail assembly braces.**
- **All necessary linkage, fasteners, torque rods, push rods, control horns and foam cushioning for radio equipment are included.**
- **Fuel tank and windshield also provided.**
- **Scale fiberglass cowling and wheel pants.**
- **Detailed assembly manual with many photos, drawings, templates and helpful tips on how to build and ready your Pitts for flight.**
- **Disassembly for transport requires removal of only 4 nylon screws and two nylon nuts.**
- **A special awl is included to facilitate piloting of holes in foam and wood parts.**



Optional carrying rack (right) makes transporting your pride and joy a simple operation. Eliminates the need to disassemble and assemble wings. Adapts to most any trunk deck.

Pitts

BYRON ORIGINALS

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...cale Modeling"

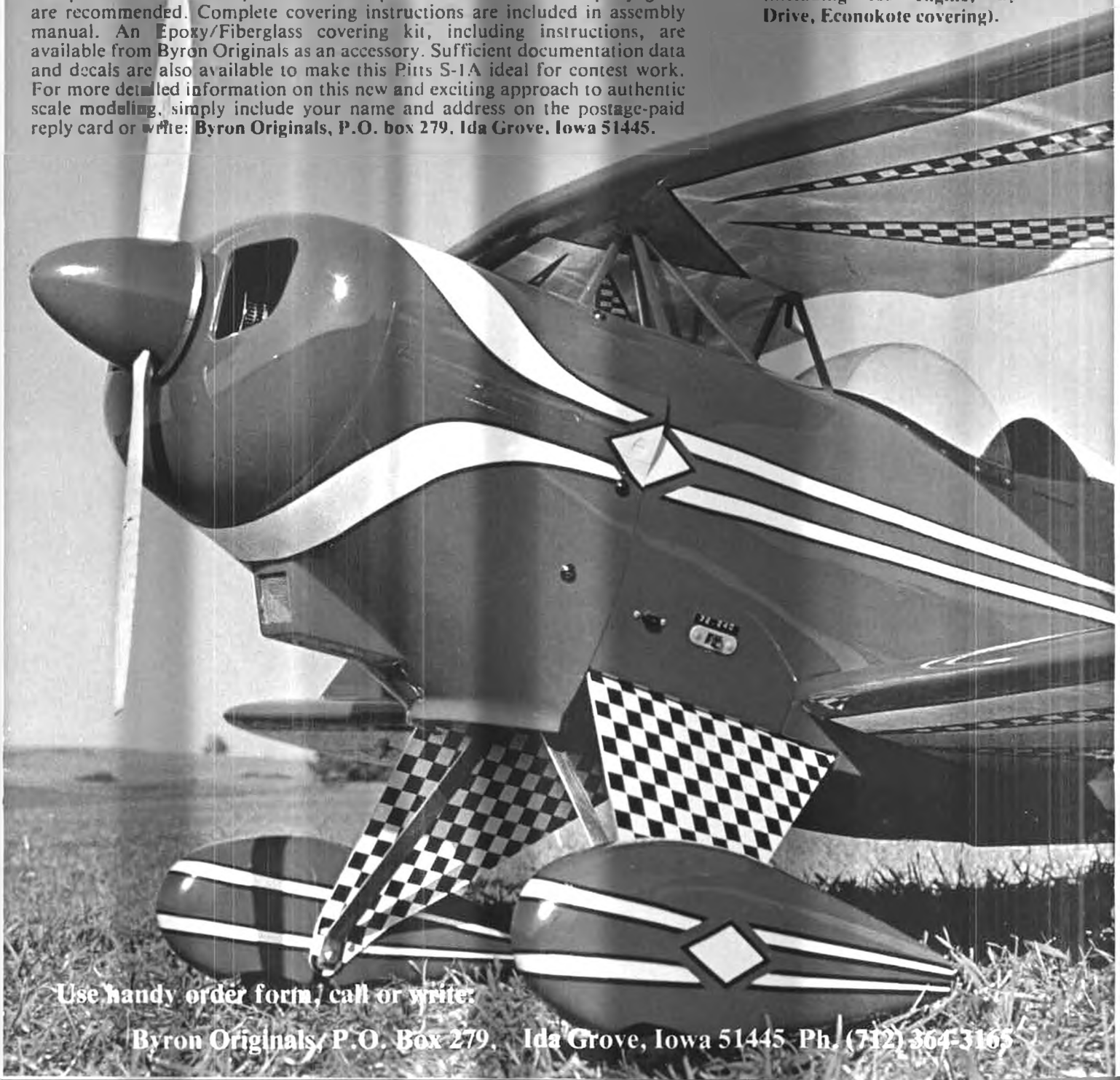
From the moment you first open the box, you'll agree the quick-building ARF Pitts from **Byron Originals** is a kit in a class by itself. Seldom, if ever, has there been a more complete package offered to the modeling world. Every last item, except powerplant and covering, has been included to facilitate quick and accurate assembly. (See listing on opposite page).

For professional finishes, either low temperature Econokote or Epoxy/glass are recommended. Complete covering instructions are included in assembly manual. An Epoxy/Fiberglass covering kit, including instructions, are available from Byron Originals as an accessory. Sufficient documentation data and decals are also available to make this Pitts S-1A ideal for contest work. For more detailed information on this new and exciting approach to authentic scale modeling, simply include your name and address on the postage-paid reply card or write: **Byron Originals, P.O. box 279, Ida Grove, Iowa 51445.**

Exact 1/3 Scale Pitts S-1A

Wing Span: 68"
Wing Area: 1400 sq. in.
Length: 62"
Wt.: Approx. 14 lbs.

(including .60 engine, Byro-Drive, Econokote covering).



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4 channels designed precisely for his needs

New Look . . . New Technology . . New Price Range: Our engineers were given the latitude to take a fresh approach to designing a 4-channel sport flier's radio. They were told not to cut corners and create an economy 5-channel like others have. This one was to be built from scratch. The result: MRC's 774 with features that make it strikingly different and more advanced than any system in its price range.

Fresh Appearance: To begin with the 774 looks different. Its unique size is just right to the touch . . . with contoured side plates for your palms. A ribbed bottom and finger-grip back make for a balanced feel and sure grasp. Modern yet functional.

Sound Engineering. Less evident, but just as new, are the smooth and responsive semi-open gimbal sticks . . . a novelty for the sport flier, long an essential in more expensive sets. The sticks also have external tension adjustments to let you set the response to match your preferences. And there's a voltage regulator for ease of operation on 9.6 volt nickel cadmiums or 12 volt dry cells. Advanced servos have a Signetic NE544 IC and two output transistors to amplify power. Even the receiver is state of the art, including C-Mos circuit decoder for low current drain and added reliability. You'll find the 774 compatible with all MRC servos. Unlike some others on the market, this 4-channel lets you interchange servos as the need arises. In short, our engineers have created what may well be the prototype for every new sport radio to come . . . including an amazingly low-key price range. Available with 2 servos and battery holder for dry cells or complete with 4 servos, nickel cadmium battery and charger. Send $1.00 for MRC's Color Model Aircraft Products Catalog.

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