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MODEL BUILDER

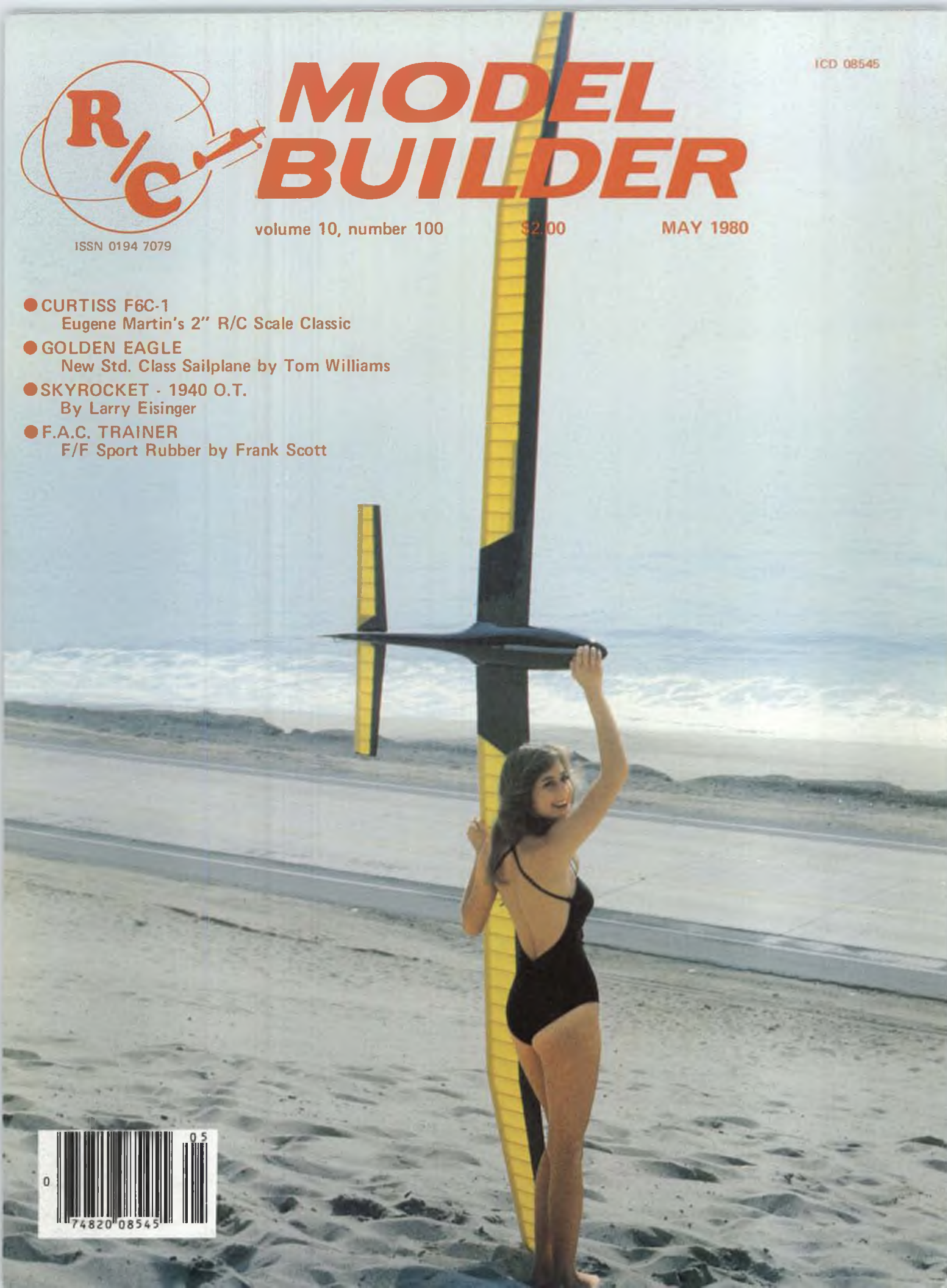
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volume 10, number 100

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MAY 1980

- CURTISS F6C-1
Eugene Martin's 2" R/C Scale Classic
- GOLDEN EAGLE
New Std. Class Sailplane by Tom Williams
- SKYROCKET - 1940 O.T.
By Larry Eisinger
- F.A.C. TRAINER
F/F Sport Rubber by Frank Scott



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MAY

1980

volume 10, number 100

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Cover: Lori Fragola, Lakewood, California, and Ron Sivils' "Magnum 12" sailplane, built from a Soarcraft kit by Mark Berg, make an eye-catching couple for this 35mm transparency taken by photographer John Craney. The scene is "somewhere along the Southern California Pacific Coast".

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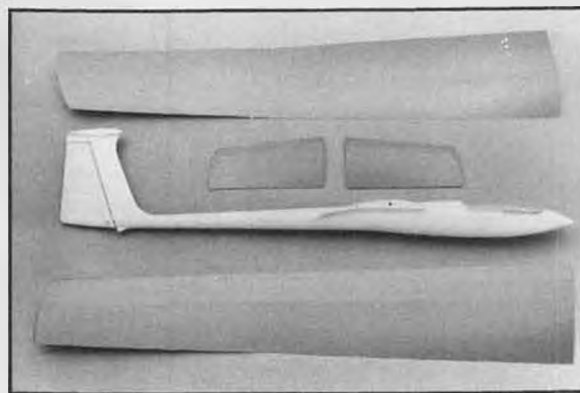
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Unlike other models with plastic fuselages, the Kwik-Bilt Cessna doesn't depend on the shell for strength. The Cessna fuselage is based on a solid balsa center profile, beefed up with plywood doublers. Tail, wing, engine and landing gear are all mounted on this profile center. The plastic fuselage shells are really only streamlined fairings, decorations that add the scale shape, instead of functional parts of the fuselage. Minimal flight and vibration loads are imposed on the shells. Even if they should crack, the structural integrity of the model is maintained.

Some kits use styrene or other types of plastic that are difficult to glue and paint. The ABS plastic parts furnished with the Cessna can be welded together in seconds with butyrate dope thinner, acetone or MEK. A wide variety of finishing materials - Sig Supercoat dope, epoxy paints or enamels - can be applied to the ABS plastic used in Sig kits.

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Son, Steve, holds as Hank Pohlmann starts up at the Lincoln Nats

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from Bill Northrop's workbench

F/F MODEL BUILDER

The above sub-title is in response to Steve (O'Bat) Helmick's revised title on the January issue of the well-known "R/C Bat Sheet" . . . well, at least "R/C" for January, though he says it actually stands for "Really Cool." Since he's being nice and not calling it "Raunchy Control," we won't say that "F/F" really stands for "Frantic Fanatic" . . . but it does have a nice ring (all right, Ron Roberti . . . down boy!).

Steve writes a very informative free flight newsletter for the Seattle-based Strat-O-Bats Model Airplane Club, a F/F oriented club which includes our former and present F/F editors as members, Bob Stalick and Tom Hutchinson. For three bucks a year and your address sent to Kevin Collins, 7902 133rd N.E., Redmond, WA 98052, you'll get 12 copies a year.

Gotta kick out of this one in "R/C" Bat Sheet: A Canadian once said, "Canada charges only 3 cents to mail a letter, but they charge an additional 14 cents for storage fees." With a slight change in numbers, the same surely applies in the U.S.

While under the F/F title, we'll mention that Australian Paul Van Leuven's second place 1980 World Champs Wakefield model will be featured in a near future issue of R/C . . . oh, what the hell, F/F Model Builder. The plans are well done and clearly illustrate two different front end set-ups.

We have just received our honorary membership card in the NFFS from outgoing Membership Chairman Bill Booth,



DOWN MEMORY LANE . . . We took this photo at a Delaware R/C Club invitational get-together in the mid-1950's. Note that there is only one frequency line . . . 27! And who says large scale models are new? Look at No. 4336! Man in long-sleeve shirt with hand in pocket was Vern Kroemer, now deceased, who was a leading R/C experimenter in the Philadelphia area. Most every ship in that line was escapement controlled. Also recognize Carl and Betty Cantera. Hi!

Jr. (maybe that's why he's "outgoing!") for which we wish to thank whoever is responsible. Bill also notifies us that the new Membership and Subscription Chairman is Kit Sonesen, 8616 Maple Grove Ct., Sacramento, CA 95828, and the Supplies and Service is now managed by Marty Thompson #1, 2012 Landon Lane, Sacramento, CA 95825.

Geez . . . what with that NFFS membership, we better take the radio out of our Starduster 900!

LEST WE FORGET

Genuine modeling old timers, whether they attended or not, must certainly remember the great Plymouth International Model Airplane Meets of the late 40's and early 50's, before the I.R.S. made it impractical for large companies to use excess profits for tax-deductible sponsorships. Regardless of the secondary motive, modeling in general received great benefit from these meets, which were second in size only to the AMA Nationals.

Thanks to a letter from Arthur Ryan, Farmington, Michigan, we are at least able to call our readers' attention to the fact that the head of the Plymouth meets, and at the time, Director of Personnel Management for the Chrysler Corporation, was Warren E. Bartlett, of Detroit. Mr. Bartlett was also founder and president of the Strathmoor Model

Airplane Club, formed in 1946 at Jack Davis' model shop in Detroit. Art Ryan was a founding member and AMA contact for the club.

Main reason for Art's letter, unfortunately, was to enclose a clipping from a July 1979 issue of *The Detroit News*, which stated that Warren Bartlett, 57, and his wife Betty, were killed on July 9, when the plane he was piloting crashed as he was making a landing at Clearwater Executive Airport, Clearwater, Florida. Ironically, Bartlett had headed a drive to keep authorities from closing the Clearwater airport, which was the center of controversy and criticism by some safety groups who claim the airport is unsafe. The newspaper did not give any details of the accident.

OHIO NATS

After a great deal of fingernail biting and groans of "Where do we go from here?" AMA officials have finally been able to firm up a Nats time and place . . . (s). In brief, R/C Pattern, Pylon, and Scale, and all Control Line events will be at Wilmington, Ohio. Free Flight, R/C Soaring, and Helicopter will take place at Wright Field, Dayton. Indoor will be flown at the University of Cincinnati. The Western Ohio Radio Kontrol Society (WORKS) lived up to its name in bringing the whole thing together, while working in

Continued on page 106

"...THREE if by AIR"

(Letters to the Editor)

Dear Sirs:

In response to Dan Lakenmacher's request in your March issue, here is some information about aeronautical museums. First, the aeromuseum business seems to be pretty dynamic, and museums come and go with surprising rapidity. The older and larger ones are, of course quite stable, except that the aircraft on display change from time to time either because they cannot display all of their examples, so rotate them, or because they loan items back and forth between museums. Any listing, therefore, will slowly but surely get out of date. I have been told that the Smithsonian keeps a record of most museum aircraft in the U.S. on a computer file, and that a printout is available at a nominal fee. If so, an annual update would provide fairly good data.

The number of museums, particularly if you include the smaller museums with only a few aircraft, is amazingly large, numbering better than 100 in this country. The listing therefore gets quite large, particularly if you include address, phone number, curator, and major items. There are, however, a few softback books published with fairly complete data. These of course become dated in time, but still are of great value. Four that I have found to be useful are:

Aircraft Museum Directory, Quadrant Press, 19 W 44th St, Suite 707, New York, NY 10036 41 listings, 72 pages, \$2.25, 1976.

Aviation & Space Museums of America, Jon L. Allen, Airco Publishing Co., 219 Park Ave South, New York, NY 10003, 57 listings, 287 pages, \$6.95, 1975.

Museum and Display Aircraft of the United States, Bruce Wm Oriss, American Aviation Historical Society, Box 99, Garden Grove, CA 92642, 103 listings, each aircraft listed, 76 pages, price not known, 1976.

Veteran and Vintage Aircraft, Leslie Hunt, Charles Scribner's Sons, New York, 9000 aircraft worldwide, 336 pages, \$12.50, 1974 (4th edition).

Now for some of the major U.S. museums. I have visited all of the ones listed, and all are very worthwhile, well worth extending a trip an extra day to see.

National Air and Space Museum, Washington, D.C. Outstanding museum, with coverage from pre-Wrights to space. Write ahead of visit (three months) for reservation to tour their Silver Hill facilities, where they keep the really good stuff. (Ask to see models on 4th floor of Smithsonian wcn)

Air Force Museum, Dayton, Ohio. Best museum in this country, in my opinion. Primarily Army and Air Force examples, well restored. More emphasis on people than Smithsonian. Quite dark. Take very fast film or a huge flash.

United States Naval Aviation Museum, Pensacola, Florida. Great museum. NC-4 mind boggling. Most post-war aircraft outside where moist salt air is deteriorating aircraft rapidly. Don't delay visit if these are to be seen in reasonable condition.

Confederate Air Force, Harlingen, Texas. Less a museum, and more an operating airbase. Many CAF aircraft are not based at Harlingen. Most there are being actively restored, so you can see the interior as well as the exterior.

United States Army Aviation Museum, Fort

Rucker, Alabama. Nice museum, primarily helicopters.

Strategic Aerospace Museum, Bellevue (Offut Field), Nebraska. Primarily post-war bombers. Large number of interesting aircraft.

Planes of Fame, Chino (Chino Airport), California. One of the better ones. Many aircraft, including Zero and P-26 in flying condition. Examples of very rare aircraft.

Pima County Air Museum, Tucson, Arizona. Large outdoor museum, primarily AAF post-war. Well preserved in dry desert climate. Adjacent to Davis-Monahan airbase where surplus aircraft are stored. Base may be toured by prior appointment.

Experimental Aircraft Association Air Museum, Franklin, Wisconsin. Large museum, primarily civil aircraft, including many unique one-off homebuilts. Has only surviving Stuka. Bradley Air Museum, Hebron (Bradley Airport), Connecticut. Wide range of types. Some lost in recent tornado.

Henry Ford Museum, Dearborn, Michigan. Small aircraft collection, but all rare types. Remainder of museum almost overpowering in the scope and breadth of displays. Very poor labeling and description of exhibits.

Fredrick C. Crawford Auto-Aviation Museum, Cleveland, Ohio. Small, but very interesting aircraft collection.

Harrah's Automobile Museum, Reno, Nevada. Small aircraft collection, including JN-4 and

Ford tri-motor. More cars than you have ever seen.

Old Rhinebeck Aerodrome, Rhinebeck, New York. Older aircraft, dating back to WW-I, most in flying condition.

SST Aviation Exhibit Center, Kissimmee, Florida. Small collection built around Boeing SST mockup. Some rare types.

USS Alabama Battleship Commission Mobile, Alabama. Small number of WW-II aircraft, including rare Kingfisher, Battleship and submarine a definite plus.

Airpower Museum, Ottumwa, Iowa. Small collection of primarily civil aircraft, very informal and friendly atmosphere. Home of the Antique Airplane Association.

Hill Country Transportation Museum, Morgan Hill, California. Small collection of all types, including flying Ford tri-motor. Plan to lunch at adjacent restaurant, decorated with at least 100 exquisite scale R/C models around a real Bleriot.

Staggerwing Museum Foundation, Tullahoma (airport), Tennessee. Primarily Beech Staggerwings and Travelairs, all immaculate and in flying condition. Hard to find but ask for airport, then ask at hangars.

Chanute Air Force Base, Rantoul, Illinois. Post-WW-II aircraft, sited along main road through base.

Don't forget that there are many airports, both large and small, that are virtual museums. It may take a bit of poking around to find which hangars have other than Cessnas and Pipers in them, but they are there. Visit on weekend afternoons when possible, so hangars will be open while owners work on planes. Some California examples would include Oakland (Hangar 5), Van Nuys, Santa Paula, Palomar.

Continued on page 100

Nakashima



"You know, I think we ought to go back to free flight."

OVER THE COUNTER



• Carl Goldberg Models is getting its feet wet in the field of R/C soaring by offering its first glider kit, designed by the old master himself, Carl Goldberg. The model goes by the rather dainty name of "Gentle Lady" and is intended for beginners to R/C and also for competition in 2-meter glider events. Construction is as conventional as could possibly be made for the benefit of the novice builder. This, with the help of the outstanding instruction booklet (one of the best we've ever seen), should keep first-time builders from making any gross mistakes that can't be corrected.

The kit is typical Goldberg: first-rate plans, die-cut parts throughout, good hardware, shaped i.e. and other parts, etc. The airplane spans 78-1/4 in., has 663 sq. in., and weighs 25 ozs. with 2-channel radio installed. The plans and instruction book also show how to build the wing with removable tips (it's normally a one-piece wing) in case you are driving a small (really small) car and can't get the wing inside.

The Gentle Lady's contest record remains to be seen, but competition fliers shouldn't let the name put them off. The airplane is said to react very quickly to lift, can be circled tightly without dropping a wing, and will penetrate well.

The Gentle Lady kit sells for \$24.95 and is now on your dealer's shelves, or you can order direct from Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651.



Carl Goldberg's new 2-meter sailplane, the "Gentle Lady".

or wherever your parts just don't fit together like they should. The new glue is called Hot Stuff Super "T" and is quite a bit thicker (is that where the "T" comes from?) than regular Hot Stuff. It is formulated to have a cure rate of from 10 to 25 seconds, giving you at least a little time to position your parts after they are mated. Also, because it is thicker, it can fill small gaps left by poorly-fitting parts and can also be applied as a glue fillet in each joint for extra strength. How about that? Here's a cyanoacrylate that gives you the forgiving qualities of "conventional" glues plus all of the strength and most of the speed of regular Hot Stuff. And, like regular Hot Stuff, Super "T" comes in 1/4, 1/2, and 2-oz. bottles.

From Satellite City, P.O. Box 836, 695 Laguna Dr., Simi, CA 93065.

Tom Houle, who presented the construction article for that big rubber-powered Mr. Mulligan way back in the Oct. '75 issue of *MB*, is the man in charge

at Tom Thumb Sky Tracings, a small (right now, that is) plans service that specializes in 1/2A R/C sport and scale models. Three plans are now being offered, and several more are in various stages of design and building development. The three models are:

1) A stand-off scale Piper Vagabond, 32-1/2 in. span, 191 sq. in., for two channels and a Cox Golden Bee.

2) The "Cheat-Uh," a sport design for two to three channels, Golden Bee or Tee Dee power. Span is 36 in., area is 250 sq. in., trike landing gear.

3) The "Soar-Head Six," a 72-in., V-dihedral glider for high-start, slope, or .049 engine power. Area is 520 sq. in., weight is 24-26 ozs., wing loading 6.6-7.2 oz./sq. ft.

The plans are drawn full size and include all necessary patterns. They sell for \$5 each, or all three for \$12. Best bet would be to send for the free catalog, which describes each design in more detail and which also gives full ordering info. Write to Tom Thumb Sky Tracings,

Satellite City has a new type of Hot Stuff, for use on less-than-perfect joints



New type of Hot Stuff glue from Satellite City.



A Piper Vagabond built from plans available from Tom Thumb Sky Tracings.



Two new kits from Sterling; above, the "Kris Kraf" cruiser, and right, the "Viper" 1/2A C/L stunt model.

11333 N. Lake Shore Dr., Mequon, WI 53092.

Our own Bill Hannan has written a book that could be accurately called the "Bible of Peanut Scale." The book is called *Peanut Power!* and covers in great detail anything and everything you could possibly want to know about the tiny fliers. Subjects include history, scale research, construction, prop carving, covering, finishing, detailing, design, flying, troubleshooting, contest flying, and a lot more. In addition, the book features full-size plans and complete building instructions for a BD-IV, a good choice for first-time builders because of its all-straight-lines design.

Bill has spent about 2-1/2 years on this project, and I think anyone who sees it will agree that it was time well spent. *Peanut Power!* is on an 8-1/2 x 11-inch format, 80 pages, over 140 photos and 85 illustrations, and all presented in Bill's unique, informative, and always entertaining style.

The book is being published by Paul Matt, of Historical Aviation Album fame, and sells for \$7.95 plus \$1 postage (California residents add 6% sales tax). You can order from Historical Aviation Album, P.O. Box 33, Temple City, CA 91780.

Sig's sport scale Cessna 172 Skyhawk is finally being released to the modeling public after many months of development. The model was designed by Hank

Pohlmann, as a replica of his own full-size 172. It's already a proven contest winner, too; among other meets, Hank used it to place first in Sport Scale at the 1979 Mint Julep and also at the 1978 Gateway Championships.

The new Cessna uses the same type of "Kwik-Bilt" fuselage construction employed on some of the other Sig scale kits, in that the *real* fuselage consists of a solid balsa center profile, reinforced with plywood doublers, to which the engine, radio, landing gear, and tail are all mounted. The 3-dimensional shape comes from molded ABS plastic shells which are attached to the keel. The shells carry no flight loads and are in fact only for decoration, to add the scale shape. The rest of the model is of "regular" construction and is designed for quick assembly.

Some of the other features in the new Cessna kit are cut foam wing cores, molded plastic cowl and wheel pants, formed clear windows, simulated corrugations for the flaps, ailerons, and elevators; formed aluminum main gear, coil spring nose gear, full hardware package, aluminum engine mounts, decal sheet, and even a factory 3-view of the full-size aircraft.

The model spans 65 in., weighs 7-1/2 to 8 lbs., and requires a .60 and 4 to 5 channel radio. Going price is a mighty reasonable \$89.95.

From Sig Mfg. Co., Montezuma, IA 50171.

Specialty Models is producing a kit for

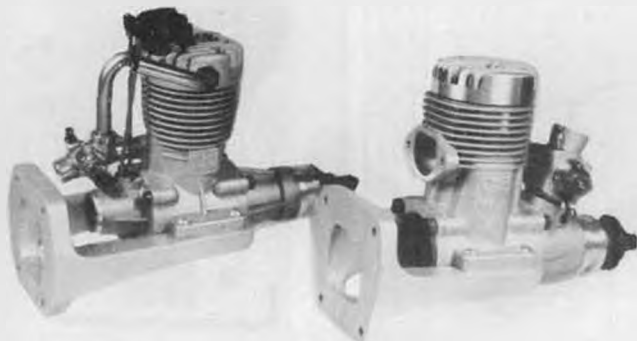


"Peanut Power", Bill Hannan's new book dealing with all phases of Peanut Scale.

the "Sparrow," a two-channel (ailerons and elevator) R/C slope glider. It uses the 36-in. Ace tapered foam wings, a two-piece molded plastic fuselage, and a wood horizontal stab. Aileron hardware, a nylon clevis, and nylon elevator horn are also included, as is a set of minimal building instructions (to keep kit production costs down). Retail price is \$19.95.

Specialty Models, P.O. Box 1819, Canyon Country, CA 91351.

Sterling Models has two new kits designed for .049 size engines. One is the "Viper," a 1/2A control line sport/



Two new engine mounts from Tatone, for the O.S. .60 4-cycle (left) and most modern Pattern type engines.



Another addition to MRC-Tamiya's line of R/C cars, the Ligier JS9 Matra Competition Special.



Aeromarine's new "Super Drive" gearbox for chainsaw type boat engines.

stunt model that looks like a perfect step up from beginners' type profile models. The kit features "on the board" wing construction, due to the diamond-shaped airfoil, and a simple built-up fuselage to provide valuable building experience. A good-looking fun machine, the Viper kit sells for \$12.95.

The other model is a boat, a realistic-looking cabin cruiser, called the "Kris Kraf." It is 19 in. long, 6-3/4 in. across the beam, and is well suited to .049 gas or even better yet, electric power. The hull is molded plastic and is strengthened with an easily built inner framework. Going price on this one is \$19.95.

Both from Sterling Models, 3620 G St., Philadelphia, PA 19134.

MRC-Tamiya is bringing out yet another electric R/C car kit, this one being a Ligier JS9 Matra Competition Special used in Grand Prix racing. The model is 1/10 scale and features the same fine detailing and quality to be found in the other MRC-Tamiya kits.

Some of the car's more noteworthy features are the Mabuchi RS-540 motor, the same one used in the other MRC cars; the proportional speed control for both forward and reverse; the ball bearings in all four wheels; the servo saver in the steering linkage, which protects the steering servo from damage in case of a crash; and the sandwich type front wheels. These have a hard rubber middle for good traction in the straights, with soft sponge rubber on both sides for a good grip through the turns. The rear tires are solid sponge rubber. Suggested retail price is \$89.98.

You can find out more from MRC, 2500 Woodbridge Ave., Edison, NJ 08817.

Bavarian Precision Products has a new R/C carburetor designed especially for the HB .40 PDP, HB .50 PDP, and HB .61 PDP. The new carb is a single-jet, two needle valve type that is easily distinguishable from the older carbs previously supplied on these engines. Features include a barrel which, as it rotates toward the idle position, moves axially across the carb throat toward the fuel jet and high-speed needle. The low-



Sig's latest kit is a Sport Scale replica of Hank Pohlman's Cessna 172, for .60 engines.

speed needle is located in the barrel itself and moves across and partially obstructs the fuel jet as the barrel is closed, thereby reducing the fuel flow. This type of carburetor is claimed to be very easy to adjust and makes for no hesitation when going from idle to full power.

Bavarian also has a new powerplant designed especially for our rotary-wing friends, the Model 7000 Chrome HB .61 Helicopter engine. Highlights of the brute are Perry Directional Porting, double ball bearings on the shaft, chrome-plated sleeve, large heat sink cylinder head for good cooling, and the new carb described above. The whole thing comes complete with extra screws, Allen wrench, prop balancer, and instruction manual.

For more info, write to Bavarian Precision Products, P.O. Box 6, New Canaan, CT 06840.

Tatone Products is announcing two new additions to its fine line of aluminum engine mounts. The Model 3200 is a low-profile mount designed for the new-generation .60 size Pattern engines, and Model 3300 fits the popular O.S. .60 4-cycle engine. Both are molded from tough "X-100" aluminum, are hand polished and have a satin sand finish. These mounts are normally shipped undrilled, but you can get them drilled for your particular engine if you request it, and they will do it for the best possible price: free for nothin'!

The new mounts are now in most hobby shops; the No. 3200 sells for \$10, and the 3300 will set you back \$14. See your dealer or contact Tatone Products, 1209 Geneva Ave., San Francisco, CA 94112.



"Sparrow" slope glider from Specialty Models.

The "Super Drive" is a new gearbox from Aeromarine Enterprises that is designed especially for use with large chainsaw type engines, to take advantage of their low operating cost while at the same time giving the same performance as a nitro-guzzling racing .60. The Super Drive turns the prop at 2-1/2 times the engine speed (for example, 4,000 rpm at the engine gives 10,000 rpm at the prop) and is said to be ideally suited to the Quadra, Super Hustler, Sea Tiger, and other large ignition engines currently in use.

The Super Drive uses an aluminum case for light weight and is anodized to prevent corrosion even in salt water. The two 1/4-in. stainless steel shafts are each supported by two stainless steel double-shielded ball bearings, for smooth and easy running. The unit measures 5 inches wide by 2 inches deep by 4 inches

Continued on page 102



New carb (top) and .61 Helicopter engine from Bavarian Precision Products.



Flight INSTRUCTOR

Conducted by
DAVE BROWN

8534 Huddleston Dr.
Cincinnati, OH 45236



• With the number of unanswered letters I have this month, I'd better not soapbox too long in this issue, but rather get to answering a few letters. But before I do, I'll answer the most common question asked of me lately. Yes, I have gone into business for myself and have bought the Southern R/C accessory line and will be manufacturing it and selling it through distributors and dealers across the nation. Check with them if you need any of these products. The answer to the next most common question is Yes, I am still closely associated with World Engines and am continuing to do engineering work for them on a consulting basis. Now, with that out of the way, I'll get on to some letters.

Dear Dave,

I am presently 15 and my first R/C is a Hobby Lobby Recruit. Although I love F/F, I would like to try more R/C. I have a two-channel set. Could you recommend a more contest winning plane for two channels? Also, I would like to know the hazards of flying in winter... damage to radio? Does the weather affect the plane's flyability? Should I mount skis on my plane? How will my engine (Cox Golden Bee) be affected, or should I change from standard Cox fuel to something else? I enjoy your column and always look forward to reading it. Jeff Hamilton.

Other than some standard class gliders, very few competition airplanes use two-channel radio systems. However, a two-channel system can be used for many high performance airplanes, such as the Mach-None and the Fun-X 1/2A Pattern models. Cold weather creates some problems when flying R/C and requires some caution. The batteries in your radio system lose capacity in cold weather and cannot be expected to safely fly as many flights as in warmer weather. As far as the airplane and engine are concerned, they tend to perform better in cold weather, but you can expect the engine to be harder to start and should be particularly careful in inspecting any plastic parts, such as control horns, as they break far more easily when cold. Your normal fuel is fine in cold weather, but a little automotive starting fluid or lighter fluid for priming may be helpful to aid starting.

Dear Dave,

Let me first say that I enjoy your column a great deal, and I hope it has a long and productive life in **R/C Model Builder**.

My problems do not directly deal with the flight aspects of our favorite pastime, but are associated with the construction of our planes. First, I would like to know the proper procedure for applying dope over films such as Solarfilm or Monokote.

I started flying on a Sig Kadet, which performed fairly well, until a bad landing on asphalt tore the fin and half of the stab off. After repairing these, I decided to apply a color trim over the previously solid white Solarfilm finish. I applied some Aerogloss dope over the intended portions and let it dry.

When the dope had dried, I noticed that the dope was starting to peel off. The surface had been cleaned prior to doping, but the humidity was somewhat high. Now I wonder if I should employ the same method when finishing my RCM Trainer, as I already have the materials for doping over Solarfilm.

If you know a good way of applying dope over films, please let me know. I

would also like to know the limits for planes to be entered in the Pre-Novice or Novice classes in Pattern. What engines, planes, equipment, etc. are allowed? Would a Dirty Birdy 40 fill the bill?

Keep up the good work, and good luck in your upcoming contests. Kevin DeVenny.

I don't know offhand of any way to make dope stick to most covering films, but I do know that epoxy paints can be made to work reasonably well. I'd recommend that before trying to get any paint to stick to plastic films, you roughen the surface slightly with some steel wool before primer and paint is applied.

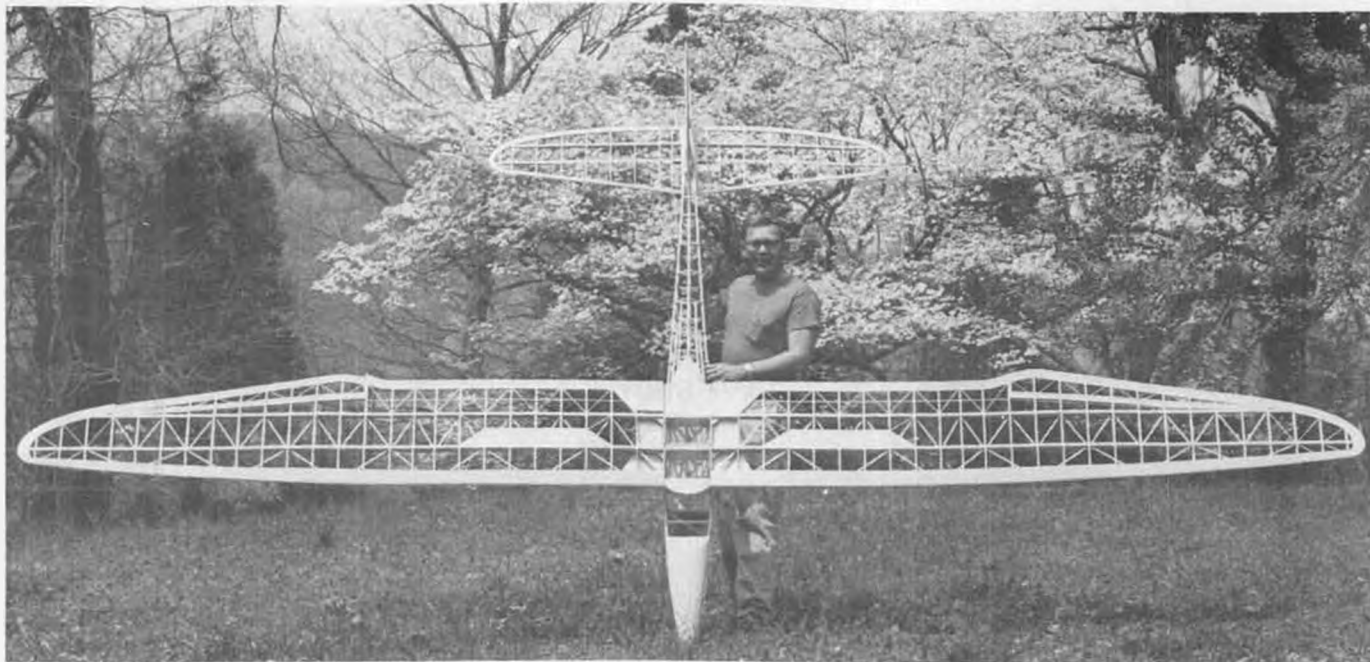
Dear Dave,

Congratulations on your 2nd place at the World Championships. I have been flying R/C models for two years now with a great deal of enjoyment. Right now I am flying an Ugly Stick and feel rather comfortable doing so. My plane flies well and is very predictable. I would like to learn to fly Pattern airplanes and compete in Pattern competitions, but I have been steered away from low-wing

Continued on page 83



"When you're facing the plane, did you say left was right?"



Chris Van Deventer III, Rockford, Tennessee, with his Thermic 210, a three-times blow-up of the classic Thermic 70, designed by Frank Zaic. Not evident in this photo are the built-up ribs for all flying surfaces. Only design change is addition of spoilers and ailerons. Flight report to come.

WORLD

By **BILL NORTHROP**

PHOTOS BY AUTHOR

• Radio control, over the years, has had many prominent leaders whose names, faces, and accomplishments have been known to most everyone, past and present. However, we venture to guess that one of the most effective R/C leaders, a person who has done more for the hobby for a longer period of time than most anyone, is relatively unknown to the modeling public. We're referring to Paul Runge (pronounced Rung-gee), and for the past 27 years, he has been the owner and operator of Ace Radio Control, Box 301, Higginsville, MO 64037, the same address as the day he founded the company back in 1953.

Ace has always been the "Heathkit" of R/C modeling, as Paul has specialized in producing kits for many of the electronic ideas developed by modelers and/or published in the model publications. With his help, R/C'ers were able to turn construction articles into working reality. As examples, Paul made up and marketed complete kits for Walt Good's famed TTPW system, the forerunner of proportional radio control, and Phil Kraft's single tube receiver and companion transmitter, both of which launched many a modeler into successful control of models by radio. Even today, when the percentage of design-

it-yourself R/C'ers (speaking in terms of R/C systems) has dwindled to a very low number, Ace R/C's receiver, servo, and transmitter kits continue to be popular, both for money savings and for those who wish to learn a little more about their radios than merely how to charge them and turn them on and off.

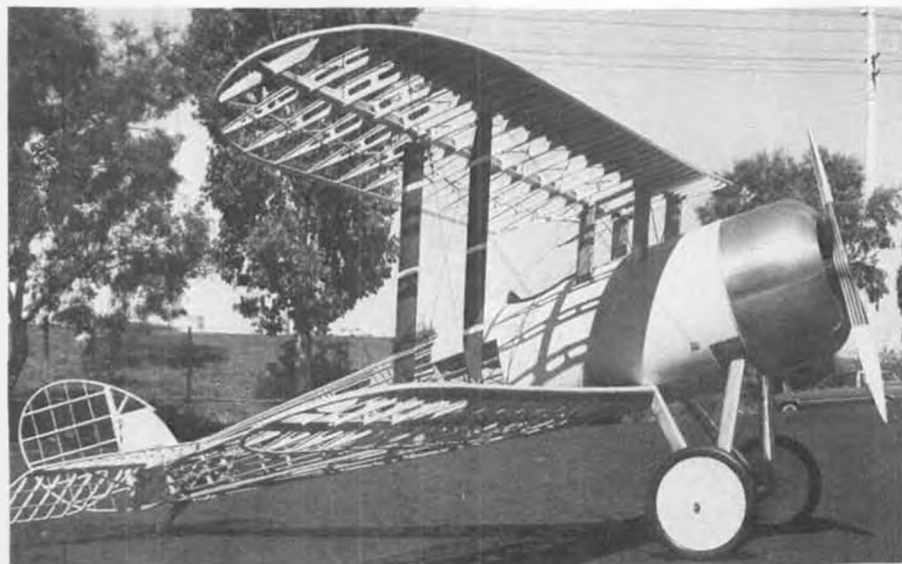
In recent years, Paul's son Tom has been moving more and more into the left seat of Ace R/C, and so it was not that much of a surprise, but still a significant occasion, when Tom and his wife, Donna, took over complete command as of the first of the year.

If we were to discuss all the R/C type things Paul, with the help of his charming wife Bobbie, has accomplished, including the publication of the famed "Grid Leaks" memos, which became newsletters, which became a slick magazine, we'd run out of space in no time. Better that you should ask someone who was around for the first Vari-Comp escapement, the first hand-held transmitter, and remembered how to wire up a Gem relay, four pencils, and a Mighty Midget motor for real honest-to-God Galloping Ghost.

Enjoy your retirement, Paul and Bobbie, and please come to see us!

OUT OF THE WOODWORK

Attending the WRAMS show in White Plains is always like a home town reunion to us, as most of our active years in modeling, and particularly R/C, took place on the mid-East Coast. Seeing some of our OFB's (Old Flying Buddies) every year is always a kick, but this year it was just a little extra special, as who should come by the RCMB booth but



Framing shot of the fabulous new Nieuport 28 as kitted by Lou Proctor and described in last month's "Over the Counter". Note that only right hand wings are mounted in this photo.



Don Brown, with Quadruplex transmitter, and Tom Brett at a DCRC Symposium about 1962 or 63. Both were on the U.S. 1962 FAI R/C Aerobatic team. Tom became World Champ, and Don placed 5th. Team was 2nd. Willis Robinson placed 9th. See more in text.

Don Brown, former manufacturer of one of, if not the first, proportional system, Quadruplex. Don still lives in the Pitman/Woodbury area of New Jersey, and has been getting back into the old game after many years' layoff.

Doug Spreng, Don, and Tom Brett placed 1st, 2nd, and 3rd at the 1961 Philadelphia Nats, to become the U.S. FAI R/C Aerobatic team to compete at Kenley RAF base outside of London in 1962. Doug was later replaced by 4th place winner Willis Robinson, of Las Vegas, when Doug had to withdraw. Tom Brett, now deceased, won that World Champs, and the U.S. team was 2nd, with Don in 5th place, and Willis in 9th. At the time, Don's was the only proportional system at the Championships, and it stirred up a lot of interest, as it was engine problems that kept him from being the probable winner.

After many successful years of developing and producing the Quadruplex systems, Don retired from R/C to pursue another interest for which he had a strong desire . . . full-size inboard boat racing. His decision was to "take a fling at it before I get too damned old to drive the things." His usual thoroughness brought him a string of successes. . .

Now, looking as slim and trim . . . and not a day older than when we last saw him about 12-15 years ago, he's re-discovering the fun of flying again, with a Mach 1 pattern bird.

Son-of-a-gun . . . forgot to ask him what radio he's using.

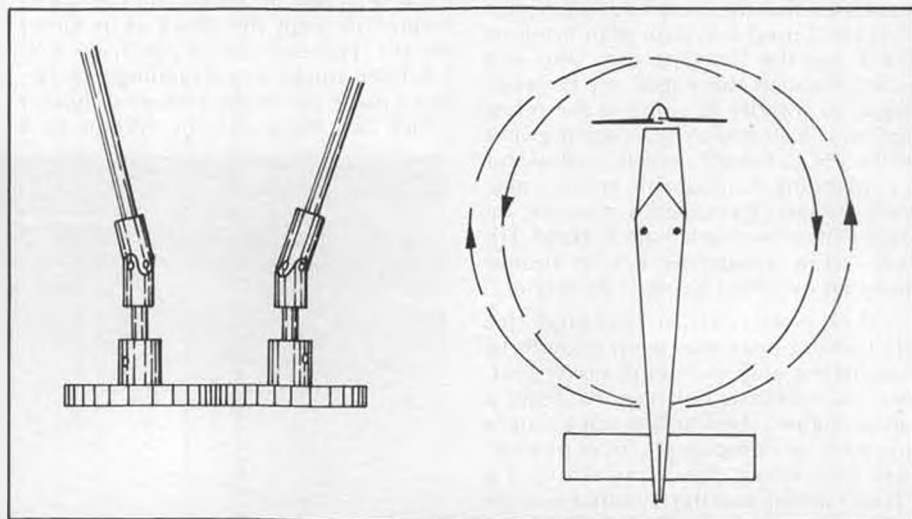
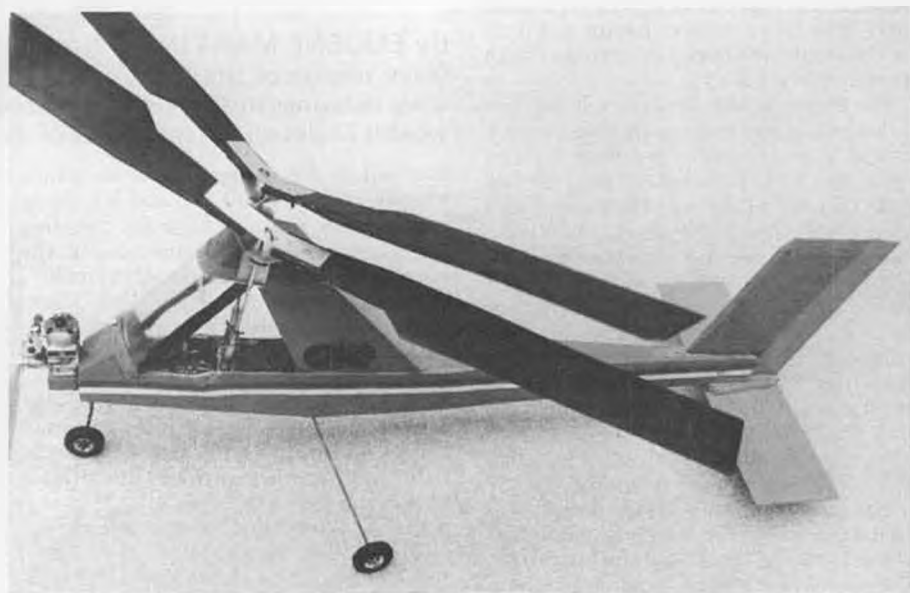
BROOKE MODEL PRODUCTS

Ralph Brooke, two-time R/C Aerobatic World Champion and well-known

Continued on page 104



"Jersey" Jim Martin, former U.S. FAI R/C Aerobatic team member (1973) makes first test hop of the Executive Engines (now Technopower) 7-cylinder radial in a 12-1/2 lb. biplane.



Sketch shows alternate flat gear set-up for synchronizing rotor blades in the Synchrogyro (Sept. 79), also shows suggested change of rotation direction for improved performance. See text. Photo above is of first experimental free flight Synchrogyro by designer Georges Chaulet.

• Who doesn't know of the flamboyant Curtiss P-6E Hawk fighter, with its talon-decorated wheel pants? What a sexy airplane! Unfortunately, this is not the story of this colorful AAF pursuit ship, but rather its all-silver, not-so-gawdy granddaddy, the Curtiss F6C-1 Hawk (alias P-1A).

The fighters of the mid-twenties were virtually monopolized by Curtiss and Boeing, and many of the designs looked so similar that it is a wonder that the pilots of the day could keep them straight. But it was Curtiss with his racing expertise who set the trends of the early decade, with the characteristic ever-sharp pencil nose of his biplanes being the trademark of the early Hawks. The last of the double-bay biplane fighters, the Curtiss PW-8, won acclaim with Lieutenant Russell Maughan's dawn-to-dusk transcontinental flight of 1924.

From the PW-8, it was a quick design shuffle to the Army's P-1A. A tunnel radiator replaced the wing skin radiators, and tapered wings were fitted for greater maneuverability. While the Army was getting all the glory with the P-1A, the Navy seemed content to play "follow the leader," and the P-1A became the Navy's F6C-1. The -1's were only five in number, being used as evaluation prototypes. Production models were F6C-3's.

The Hawk flunked its catapult test, but it did prove to be a reasonable carrier-based aircraft. (See the Red Ripper Squadron in *U.S. Naval Fighters 1920 to 1980*, by Loyd F. Jones.) The Navy didn't particularly favor the Curtiss V-1150-1 twelve-cylinder inline water-cooled engine. It was too heavy and the vulnerability of the chin radiator was disconcerting. So, the Navy Hawks were re-engined with the P&W air-cooled Wasp. With this transformation to the radial engine went the distinctive deep chin and the beauty of the needle-nosed streamlined cowling . . . lost for the sake of a mere 1-mph gain in speed.

The genius of my Hawk model was actually a spinoff from an old "Giant Kit" of the F-11C-2. I had built the kit, only to discover when I went looking for documentation that the model was totally out of scale. I used a Wylam plan book to check out the discrepancies, and as I leafed through the pages, my fantasies began to wander to some of the other biplanes illustrated. A two-page drawing of the F6C-2 caught my eye, and soon I was planning its probable success as a scale subject. I recalled a mention by Dave Platt in his book *Scale In Hand*. He said, "How about the P-1? It should make an excellent flying scale model."

Further examination revealed the streamlined cowl was deep enough to conceal the engine and exhaust system, and I would also not have to detail a radial engine. The fuselage was a simple box with no compound curves or intricate structures. The wing sported a Clark-Y airfoil, and the tail surfaces were extremely generous. The landing gear had large wheels (to help avoid nosing over) and the gear was mounted well



PHOTOS BY AUTHOR

Curtiss F6C-1 HAWK

By EUGENE MARTIN . . . A highly detailed 2-inch scale model of the Navy version of the Army's distinctive P-1 Hawk (see Pete Westburg's scale drawings in this and the preceding two issues). Text includes a wealth of detailing techniques of use to all scale modelers.

forward of the center of gravity, which usually means good ground handling. Finally, the amount of scale detailing required would be simple and at the same time interesting enough to make a very competitive model.

Since my building practices were totally oriented to kits, I decided to keep the structure of my Hawk as much like an out-of-the-box kit model as possible. The plans, therefore, are just like something you would find in a kit. You can be sure there are no surprises in store for you if you build this model.

One of the most important design features of my Hawk is its light weight. I set 7-1/2 pounds as my goal. The judicious selection of woods and the use of Monokote kept the Hawk at its target weight. However, since the *Scale R/C Modeler* article, a new landing gear has been made (full scale, including shocks) which has increased the weight to 8

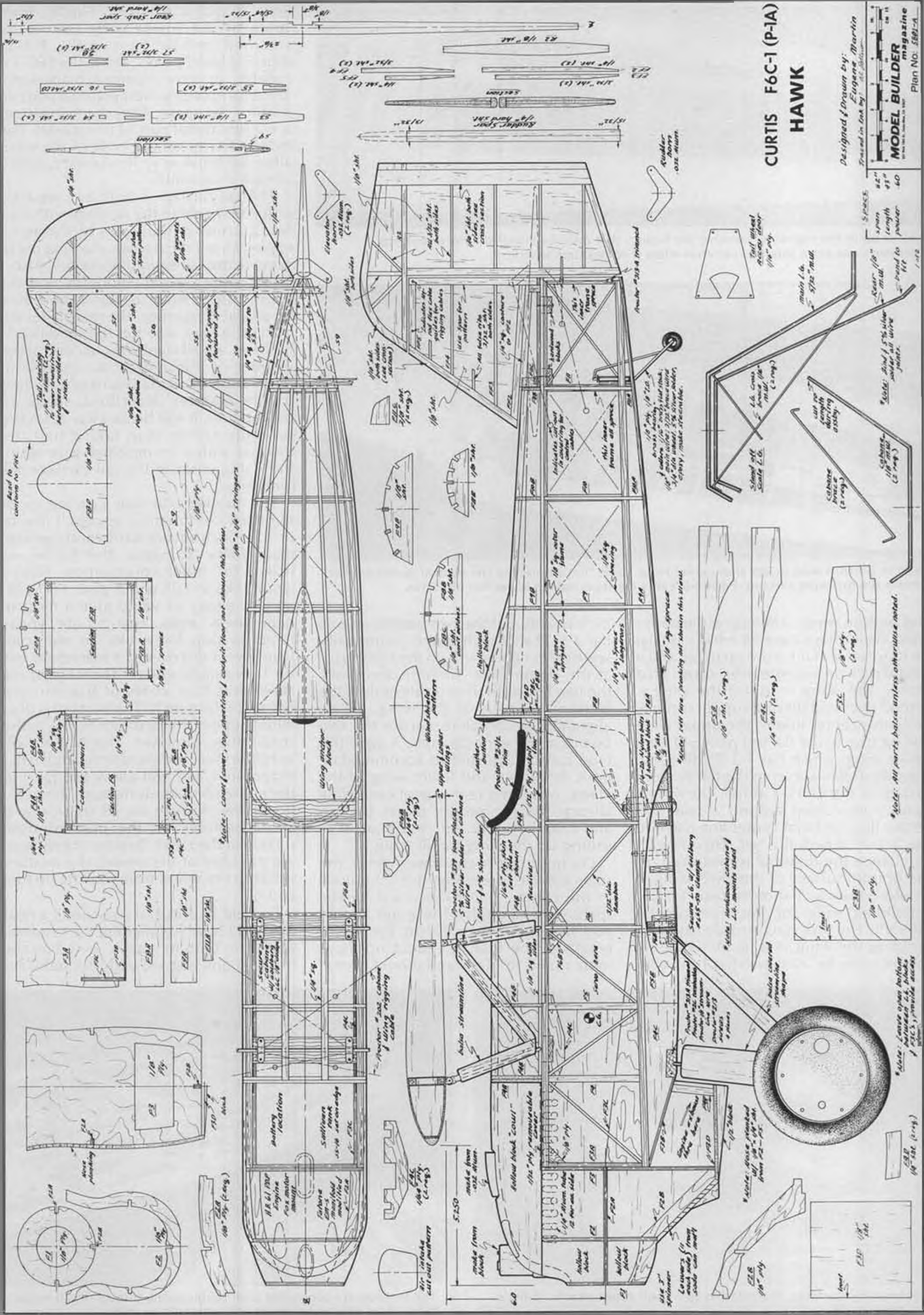
pounds. Interestingly, the extra weight had no effect on the performance of the model.

RCMB's editor asked me to include some construction and finish notes on building the Hawk. After restudying the plans and retracing my building steps, I decided there are only a few areas worthy of comment. Being an all-balsa airplane, there are no exotic materials to chat about, and I'm not about to tell you scale buffs how to glue wood together. It is an honest model to build for anyone who can follow a set of plans. The materials and hardware are called out by manufacturer and item numbers. All required patterns are also on the prints and called out by name or number, or both.

It should be noted that the wings get progressively thinner toward the tips. This thinning happens equally on the upper and lower surfaces of both the top

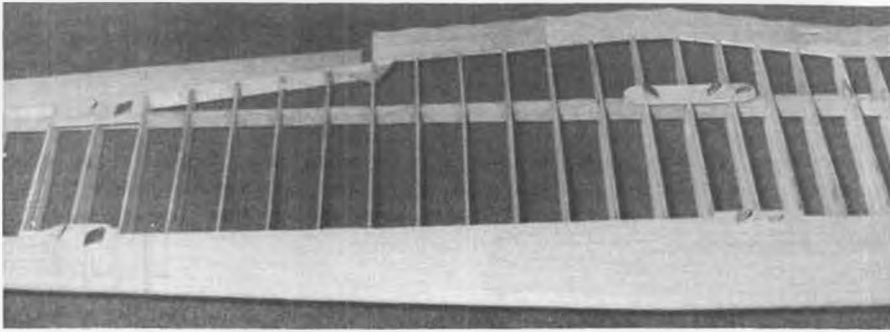


All set for touchdown at Mile Square Park, Fountain Valley, California, during a recent "uncontested" held there. Well-known scaler, John Lockwood, was at controls for this shot.

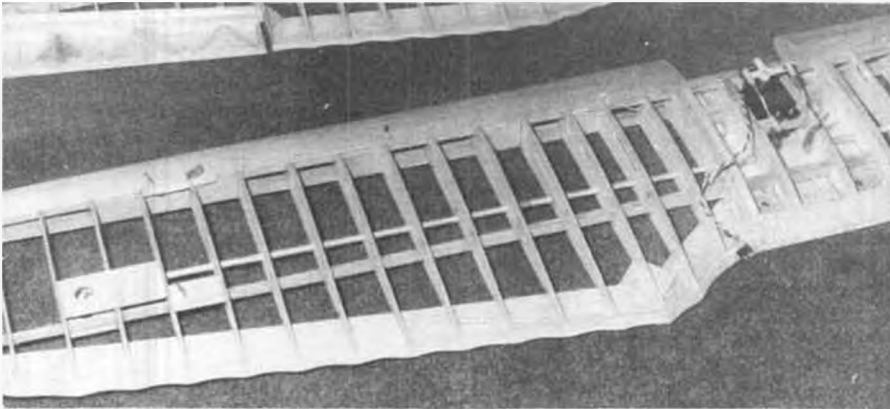


**CURTIS F6C-1 (P-1A)
HAWK**

Designed & Drawn by:
Fitzgerald Martin
 Model Builder magazine
 Plan No. 587-A



A close-up of the top wing, showing the fittings that must be installed before covering. Requires some extra care and patience when it comes time to cover.



Servo in bottom wing drives aluminum torque tubes that connect to the vertical pushrods that actuate the top wing ailerons. Pushrods exit wing from hole in lower left of photo.

and bottom wings. Therefore, the upper wing, which hasn't any dihedral, isn't flat on its lower surface from tip to tip, and it would rock on its center rib if set on a flat plane. The same is true if the wing is turned over and set on its upper surface. Only the center line of the upper wing will be true to the flat test plane. On the lower wing, which has 1-1/2° dihedral, the dihedral is not set to the flat-bottom surface of the Clark-Y airfoil. The wing is again constructed around a common center line, and that center line is where the 1-1/2° dihedral is set. Therefore, if by chance the dihedral is measured on the bottom surface of the lower wing, it would be somewhat more than 1-1/2°.

Building wings of this type can be difficult. The task can be made easier by building the wing in a jig. A simple jig can be made by using two flat 1 x 12 x 36-

inch boards. Set the two boards on one flat 1 x 12 x 72-inch board. Using nails, secure the two boards to the baseboard at the center only. Then lift and block the two boards at the outside ends to the bottom contour of the wing. When alignment is complete, secure the two boards at the wing tip ends. A jig of this type can be adjusted to accommodate both the upper and lower wing of the Hawk. Note: the rear spar of each wing already has the proper tapers built in and can, therefore, be used to assist in setting up the wing building jig.

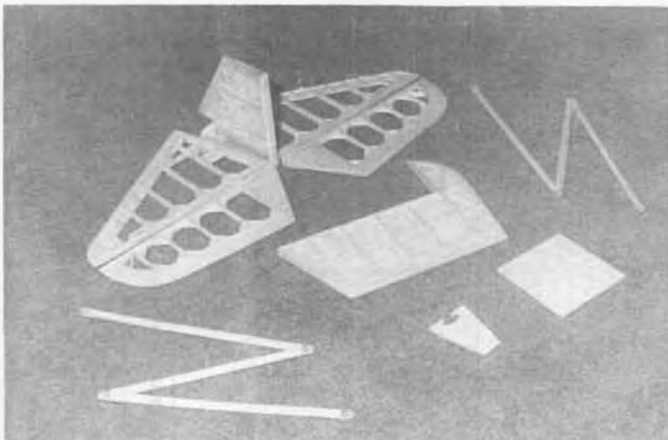
On both upper and lower wings, the spars are one piece. They are not spliced in the center. Select the wood for the spars very carefully. The grain should not vary more than 15° in the entire length of the spar. It should not have more than a 10° slash, and should have at

least 20 grains per inch. Finally, front spars of the lower wing should be steamed and jig bent at the 1-1/2° dihedral bend points. Note: the F6C-1 is capable of very vigorous maneuvers. Therefore, use the best material you can find for the spars. Also, the flying wires are a functional part of this model. The nylon clevises on the ends of the wires allow for breakaway, if necessary, as well as ease in assembly.

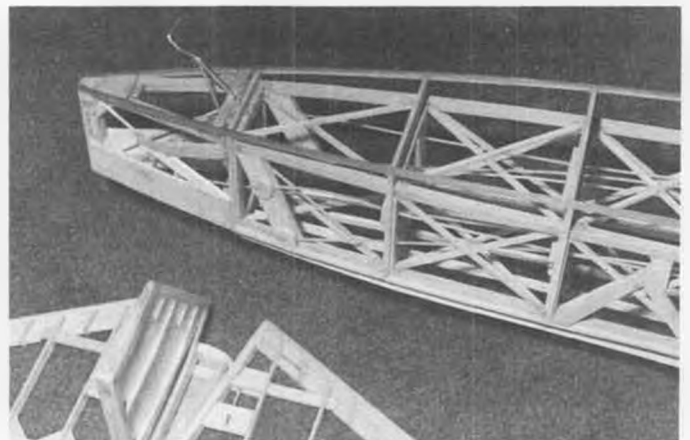
The tail carriage is built as a separate unit and is held to the fuselage with four No. 2 screws or four spots of 30-minute epoxy. I used the screws, allowing me to remove the tail easily if necessary. Also, I find it easier to build a model in modules which can be built separately and then be plugged together. The real planes are made this way, why not the models? As builders, we all want ways to control the amount of damage to our models in minor mishaps. If a tail carriage, attached in the manner described, snags an obstruction, it will break away from the fuselage rather than taking half the fuselage with it. Let me emphasize again, the flying wires in the tail carriage are functional.

The fuselage, as you can see, is of standard construction, except I like to use 1/4-inch square hardwood (spruce) main frame stringers. The hardwood makes for stiffer construction. Here I would like to talk about glue. I find 30-minute epoxy or white glue a must in high stress areas. Five-minute epoxy tends to pop loose like an old scab. However, I discovered a marvelous use for five-minute epoxy. The nose of my Hawk has four coats of five-minute epoxy mixture on it. The mixture is five-minute epoxy thinned with M.E.K. to the consistency of water. The M.E.K. will keep the glue from hardening until it has evaporated and will allow the glue to penetrate completely through the balsa. Brush the mixture on all outside and inside surfaces on the planked nose section of the Hawk. Besides strengthening the nose of the model, the mixture will stop the wood from soaking up fuel and oil.

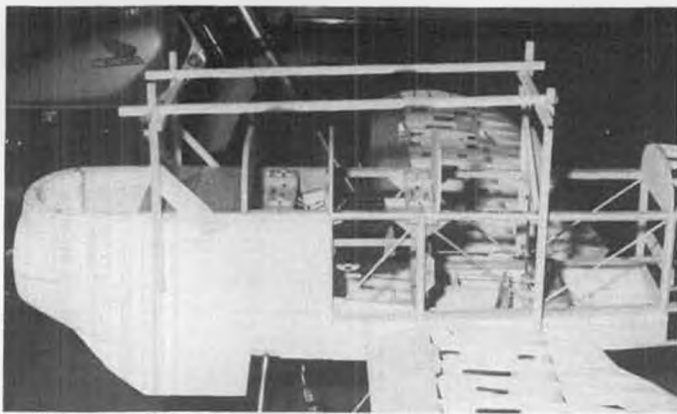
I would also like to pass along a neat method I have for aligning the cabanes. Once the bottom wing is seated on the fuselage and aligned with the stabilizer



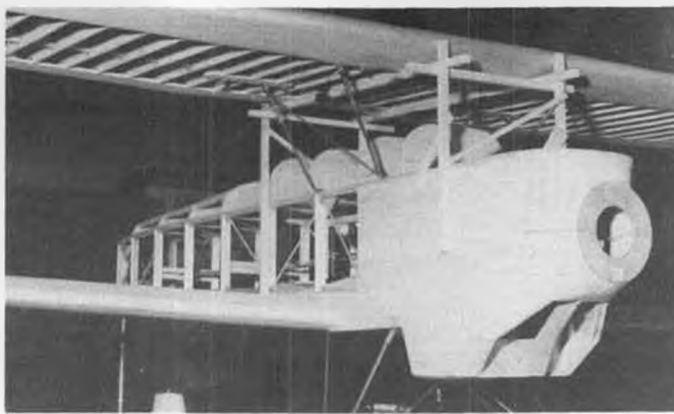
The basic tail surfaces, N-struts and two small access panels. Simple structure in tail.



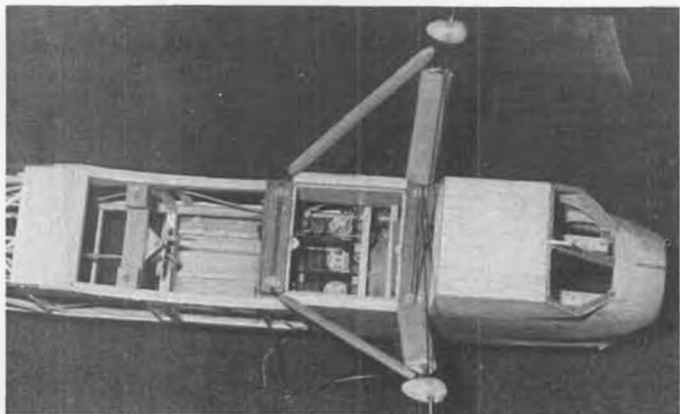
Tail surfaces are controlled with cables strung through small nylon tubes. Also note short lengths of cable tube in stab.



A simple jig is necessary to hold the top wing so that the cabane can be mated to it accurately. Note 2° slope in top rails; see text.



The wing jig in use. Proctor wing attach fittings are silver soldered to cabane wires when everything lines up properly.



Rudder and elevator servos are connected to quadrants which drive the control cables. Standard Nyrod used for tailwheel.



The basically complete fuselage structure. Not really as difficult as it may first appear.

and thrust angles, the cabanes are fitted to the fuselage and left extra long. Then a box-like structure, much like a scaffold, is temporarily tack-glued to the fuselage sides. This is simply four balsa uprights with longitudinal crossbars onto which the wing can be set. These horizontal bars are pinned so that they are parallel to the fuselage crutch, which serves as a datum line. The wing is placed in the cradle, checked for trueness, then the Proctor clevises are soldered to the trimmed cabane wires. Now the scaffold is removed and presto! Instant wing alignment. I would also like to state at this point that the incidence angle of both wings is a negative 2°. This incidence is set on the flat bottom of a Clark-Y airfoil wing; not through the center line of the wing. *Again*, when designers using the Clark-Y set the incidence they use the flat bottom as the datum plane. The incidence of both wings on the Hawk must be set at a -2° on that datum plane.

The landing gear (standoff version) is shown on the prints. The static scale version is on the second sheet. Both are interchangeable and are attached to the fuselage as a module. The gear can therefore break away if snagged by some obstruction. I find that silver solder is the best way to assemble the landing gear. However wire-wrapped 60-40 solder joints will work also. They are just bulkier.

The controls of my Hawk are set up just like the real plane. I use servo-

controlled quadrants, which operate the control surfaces through flexible cables. However, most builders have their own system of controlling a model, therefore I do not show a control installation.

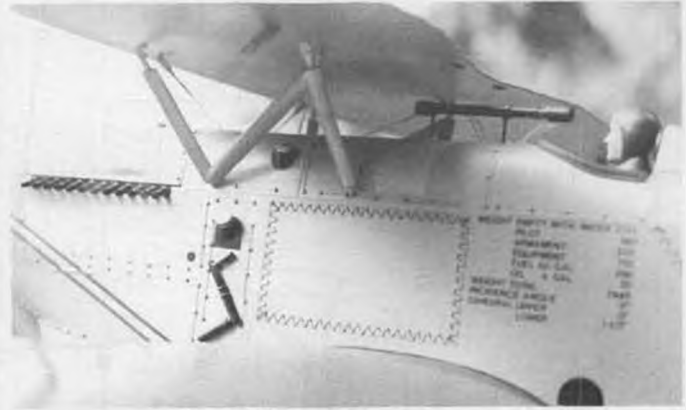
I do, however, show how to make and install the aileron torque rods in the lower wing. These rods have been carefully tested. Do not make your rods from plastic or music wire, as it will twist too much and cause aileron flutter. Also, do not change the size of the aluminum tubes. If you must change something, change to brass tubes instead of aluminum. The weight will not affect the model, and the wear factor of brass is superb.

As for finishing, I chose Monokote as the covering. It is light, easy to handle, and reasonably strong. However, before I covered the model, I completely assembled all components including all controls, wires, wheels, motor, etc. After everything is checked and adjusted as required, disassemble the model for covering. The wood is prepared by careful sanding, the last sanding being with No. 400 paper. Then the entire model is painted with two coats of Balsarite. First I cover the lower panels of the wings. I used one piece of Monokote for each wing. The lower wing is easy; however, on the upper wing, the location of the wing attach points creates a problem. Carefully cut rectangular slots in the Monokote to accommodate these attach points. Then slowly stretch and work the covering over the attach

points. Tack and seal the Monokote around the attach points first. Then pull and stretch, tack and seal the balance of the lower surface of the wing. When I attach Monokote, I stretch it, cold, almost to the point of breaking balsa. That way, when it is heat shrunk, the Monokote will resist sagging in the sun.

The tops of the wings are done the same way, except the cutout situation is reversed. After the wing is covered, make small Monokote rectangles with slots in them. Make them just large enough for the attach point lugs. Carefully attach and seal these rectangles at each attach point lug on both wings. The fuselage and tail are covered much the same way, by stretching, heating, expanding, using cold, wet cloths, and finally heat shrinking. All surfaces of my Hawk are covered with Monokote. This means even the cabanes, fairings, blisters, and cowl. Even the fire extinguisher is covered with Monokote, except for the red handle and black ends. The only paint I used was on the wires, spinner, wheels, cockpit detail, and final trim.

Raised panel lines on the upper portion of the fuselage and at the access doors on the wings can be made by outlining the panel with 1/8-inch white striping tape. (If you use a darker color, it will show.) The tape bond can be straightened by passing a sealing iron over it. Set the iron at lowest heat. Then cut a piece of Monokote from a pattern to the exact size of the panel. Next, lay the Monokote over the tape and seal it



The author put considerable time into the detailing of his Hawk, as these photos show. Monokote covering was used throughout, then the model was given two coats of clear epoxy paint as a sealer. Text tells how to make Monokote look incredibly like a fabric covering.

to the tape. Now start at the center of the panel and touch seal it down. Work slowly toward the striping tape, sealing as you go. Be careful not to overheat, especially next to the tape. Finally, wet, cold cloth in hand, quickly pass the sharp point of the iron along the inside edge of the tape, and just as quickly pat it with the wet cloth. When repeated on all sides of the panel, the result will be a beautiful raised-edge panel. If the panels are set progressively one on top of the other, start with the lowest and work to the highest. The results will be impressive. One other point. *Monokote has a grain.* When simulating panels, rotate the grain. Light will then reflect differently from each panel, enhancing the beauty of your model.

The wire studs simulating the panel hold-downs are made from small wood

beads cut in half. Each half is Hot Stuffed to the model, then a .020 aluminum wire is slid into the remaining half-holes of the beads. The wire is cut to length and bent over on the ends. Finally the beads are painted the same color as the model. It looks just like the real thing. The panel screws are common pins with a black slot painted on them. The hooks for the lacing are common pins Hot Stuffed into the balsa backing. The lacing is black upholstery thread Hot Stuffed to the pins. Finally, the laced panel outline is defined by a very fine black thread. The crank is made from balsa painted black, and the handle is covered with black friction tape. The bomb sight is made from an old ballpoint pen and its cap. All the holes or cutouts that are not functional are simulated and are made from black trim sheet and outlined with 1/8-

inch black trim tape to give the illusion of depth. Flush panels are made from trim sheet the same color as the model. Then, before the backing is removed, the edges are colored with a black felt-tip pen. This gives the illusion of a seam instead of a line.

I made my own instruments, however, it would be easier to buy them from Tatone. The gas caps are made from a 3/8-24 thumb-nut, the kind that holds the glass to your bedroom light fixture. If you set up your model for the slipper tank, the rivet detail on the tank is the old white glue routine. However, I find it works much better with the sharp point of a toothpick. The lettering on my Hawk is done with dry transfers purchased at the local stationery store, and

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Two more closeups showing the cockpit and tail surface details. Stab wires are functional and can be easily disconnected for stab removal, if necessary. Note elevator control cable passing through stab.



Head-on shot of the original P-1B tested by McCook officials in 1927. Tapered wings show up well, as does the experimental Hamilton Standard adjustable blade prop. Color is khaki overall with aluminum wheel discs.

CURTISS P-1B

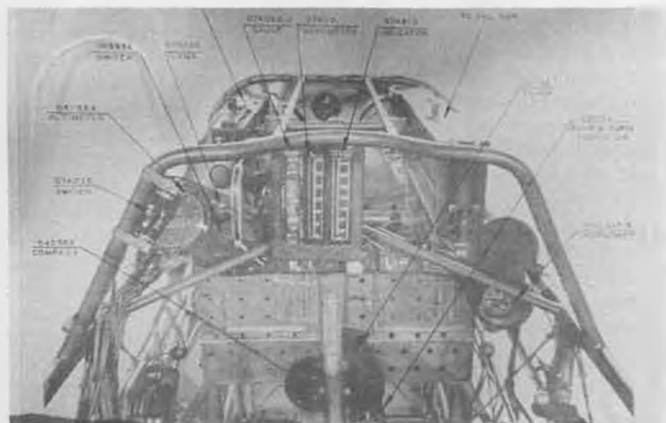
By PETER WESTBURG



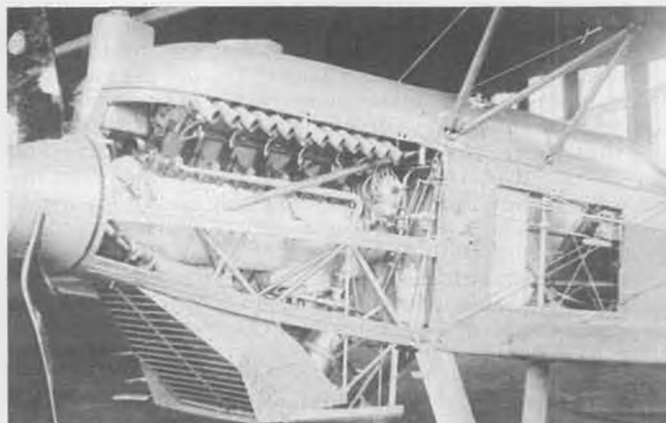
(Conclusion)



XPW-8A borrowed the tunnel radiator design, had thicker, shorter wings with a single bay of struts. Aircraft was still less maneuverable than the PW-9.



Instruments on the P-1B were mounted wherever there was room, as shown in this handbook photo.



Tunnel radiator on P-1A was different from that of the P-1B. Prop on Curtiss D12 engine is twisted from an aluminum plate.



Radiator on PW-8 was hundreds of small brass tubes laid chordwise on top wing. Faster but far less maneuverable than PW-9.



This is a Curtiss P-1C, easily recognizable because it was the only Hawk without a headrest.



Sten Dal (left) and Greger Martenson with their 1/4-scale Bristol Scout. That's not a dummy engine in that aluminum cowl, but a seven-cylinder Damo radial!

1 TO 1 SCALE

By BOB UNDERWOOD

• Some years ago one of the publications here in the good old U S of A formulated a list of model kits and provided a sort of grading system indicating the degree of "scaleness" that those kits offered. While I had not had experience with most of the kits, several were known to me. Recently I came across that listing and reflected upon the degree of accuracy those early scale efforts offered the modeler. I couldn't help but smile a bit at the comments that were reflected there and in some of the ads that those kits generated. Such phrases as "100% true scale" and "absolutely accurate" could be found. Very often, however, the "scaleness" left much to be desired. Stabs were enlarged, wing tip airfoils were thickened drastically, and a myriad of other changes crept into the accuracy consideration in order to make the models flyable.

It is so wonderful to note what has happened to the kits in general the last few years. A much stronger emphasis has been placed on not only the accuracy but the completeness of the kit as well. In addition to the increase in the material advantages offered, many of the kits now include some form of at least a rudimentary documentation for the model. This may also include further sources of information that can be obtained by the modeler.

A whole wide range of available aircraft has developed as well. Of course, certain time periods seem to dominate the offerings, such as WW-II, but almost any era can be discovered. WW-I (and prior) has probably developed the slowest.

The average modeler might wonder where or how these kits develop and

eventually become a product on the market. To picture a bevy of engineers and designers huddled over desks and drawing boards in the manufacturer's complex is an exciting thought. Here we would see these experts translating the fluid lines of some great aircraft into the reduced proportions of a model. While it is a great-sounding concept and the kit makers do indeed have to work at laying out the model, very often it is a modeler in some far-off corner of the modeling world who has first translated the aircraft into a flyable model, by scratch-building it. The model then comes to the attention of the manufacturer through competition at contests and magazine articles and photos. The builder is then contacted and the process begins, usually with a considerable amount of work required to bring the plans (if they even



A reduced-size version of the colorful 3-inch square patch being sold by NASA to help support the U.S. scale team that will compete at the '80 World Champs.

exist) to a workable level.

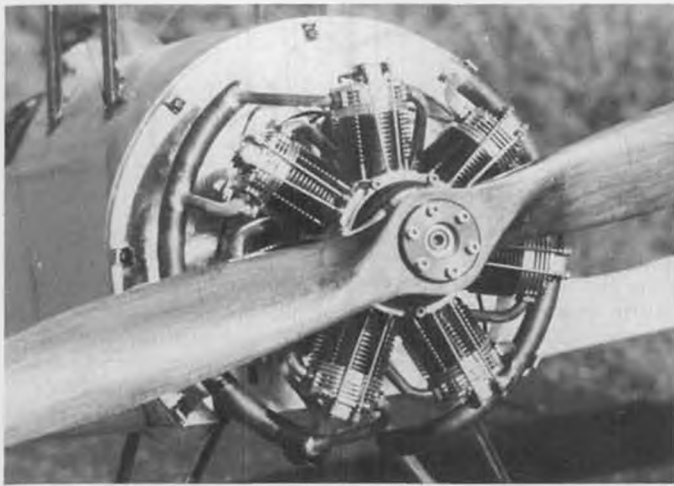
The decision on the part of the manufacturer is very often a difficult one. His judgments for the selection of the model must be predicated on what kind of impact the model will have on the building public in the form of sales. He must consider not only the model, but to some degree the credentials of the modeler who has designed it. Some models, while they are extremely appealing in some ways, may lack the potential to generate large enough sales due to the flying characteristics, extreme construction problems, or just plain old production costs.

The compromises necessary to translate the scratch-built model into a practical kit to produce are complicated as well. The scratch builder may well be content to spend fifty percent of his time seeking the solution to knotty problems in equipment placement, structural details and the like. The kit must level these into a simple workable solution. The kit manufacturer must consider basic costs and ease of construction for a wide range of ability levels. These factors and others will often dictate the changes necessary. While it might be great to create the ultimate model, in most cases he cannot limit the sales to a few talented persons.

Since many of you are seeking kits, let's spend a moment or two speaking to the problems and compromises that might be found in kits. Perhaps they can help you develop guidelines that will aid in your selection of the "scalest" kit available.

First and foremost, you must be prepared *before* you look for the kit. If you do not have a *very good* idea of what the aircraft actually looks like ahead of time, you can't even start to tell how accurate the model is. If you have followed every good scaler's advice, you already have some or all of the documentation you need. If you are going by pictures of the model provided by the kit manufacturer, make certain that they are pictures of *the model* and not photos of the actual aircraft or a very nicely done artist's rendering of the subject. You might also want to consider that you could be viewing the original scratch-built model *before* certain changes were made to put it into kit form. I can't honestly say how you are going to answer some of the problems, but at least you may want to make an effort.

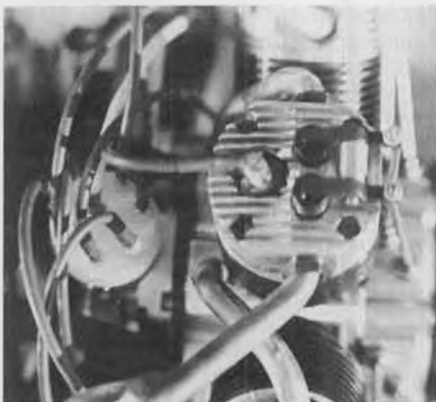
Look for very obvious dimension or outline changes. These often include increased wing chord and span. The widening may show most often in aircraft that have very narrow, tapering wing tips. Enlarged stab areas will probably be even more noticeable. Check for stretched nose sections to help with balance and equipment placement problems. Landing gear position often is changed, and you may be able to spot cowl, canopy, and wheel pant changes. These last three may vary to accommodate more than one model in the manufacturer's line, or they may be subcontracted by other makers and sold to



A closeup of that incredible Damo. Uses standard Damo cylinders for a total displacement of 63cc (3.78 cu. in.).



Yes, it do run, and very smoothly, too. Swings a 24x8 prop at just under 7000 rpm. Plenty of power for the Scout.



Distributor is hidden behind a cylinder, and is virtually invisible when cowling is in place. Spark plugs for this beauty must cost a fortune.

several manufacturers. Often, slight variations will occur to accommodate available commercial items, such as wheels, spinners, etc. Logic dictates this as a practical matter unless, of course, the manufacturer wishes to produce the item specifically for the kit. Sometimes they will do this.

You may note some of the economy moves made in the interest of holding down the kit cost and reducing building problems. These can include such things as the use of flat stock for the stab and fin, where the full-scale ship of course utilized an airfoil section that was much thicker and would require ribs and sheeting. Fuselage cross-section may be compromised for the ease of using slab sides rather than a full circular or oval section. If it's an older type aircraft, little things like wing rib placement, undercambered airfoils, and scalloped trailing edges may fade in importance to the designer of the kit. It is common practice in many kits to use solid or sheeted surfaces in place of built-up for such things as fabric-covered ailerons, elevator, rudder, etc., which are often found in aircraft well through WW-II. The obvious advantage in doing this is to facilitate construction and help with strength.

There are other considerations that you may wish to develop, but in reality, all this is quite academic if you simply

want a scale type plane to fly around on Sunday afternoon. If, on the other hand, you are aiming at either competition or the rigors of creating the "most scale-like model," you may need to consider these types of factors. If they are important to you, plan ahead by determining how or if you can alter the basic kit to make it more scale-like. The common fault, as we have mentioned before, is to build the kit before looking for the documentation, and then moan about the fact that what you have done is proven that what you've built is incorrect. A little analysis ahead of time can result in a more accurate model with little or no additional work.

A closing thought concerns a comment I read some years ago about the ability to scratch build more economically than to purchase a kit. If one considers time as an ingredient, I would suggest that such a thought is very much out of the question. If you are considering materials only, *perhaps* it is possible if something other than balsa is utilized and the modeler has a large scrap box of items. Remember that you probably will have to buy a 36-inch piece of stock to get a shorter amount, while the manufacturer can cut down on waste overall. Check out the kits available and you'll find some really nicely designed and packaged items.

WORK FROM SWEDEN

One of the most lasting effects of participating in international competition is the development of many friendships. In Sweden, in 1976, the Underwoods had the pleasure of meeting Greger Martenson and his wife during the competition. While they were not officials at the meet, as is so often the case, they provided many services and friendship.

Greger has sent photos which I feel might interest the readers. The quarter-scale Bristol Scout in the photos sports a most unique engine. His good friend, on the left in the photo, is Mr. Dal, who is one-half of the Damo Company which is presently manufacturing the twin that is imported into the U.S. The seven cylinder engine uses standard Damo cylinders and has a total displacement of



Plugs are fired by a magneto, apparently contained inside the radial engine mount.

63cc. (That's a little more than the size of six .60's.) It is a four stroke, uses a distributor, O.S. .40 carb, and a magneto for ignition. The 9kg model uses a 24 x 8 Grish prop which it turns at 6900 rpm. Idle is in the 1700-1900 rpm range. Greger states, "The most impressive thing is, of course, the authentic sound." I'll bet that's true!

ANOTHER PATCH PLEA

The commemorative patch designed by Mike Gretz and being sold by NASA for Scale 80, the Canadian Internats, is going great. The colorful patch is three inches square and sells for \$2, with the proceeds to be used for the team fund. One disheartening bit of information has been received, indicating that the five teams necessary for official competition in control line has failed to materialize. This will result in control line missing two successive competitions and casts grave doubts on the future of the event. Considering the increased activity in control line at the '79 Nats, it is indeed unfortunate.

Team Manager, Monty Groves, is presently working toward molding the R/C teams into a winning crew. They are going to make a very determined effort to see that those two trophies do not

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Pattern Flying

By DICK HANSON . . . Part Two: The Stall Turn and Immelman Turn.

THE STALL TURN

This maneuver is really beautiful when properly executed, and the way you present it can make or break the mental image of complete control which you have been trying to establish with the judges.

Let's analyze it carefully.

The rulebook stresses exactly level entry, exactly vertical apex, a tight yaw (does *not* say stall), and a close parallel return path.

We can liken it to a 1/4 section of a loop, where the model reaches a vertical position, then stops and returns nose-first along the same path.

The worst condition for making the maneuver look good is a gusty crosswind. If your luck is anything like mine, you better get comfortable with flying in adverse winds.

We will assume that the plane we are using is a properly set-up pattern type which does not suffer from a diving tendency when rudder is applied. Many models do respond this way, and it makes the stall turn much more difficult to do properly.

What happens is that the nose pitches down when you apply hard rudder even though you were almost vertical when the rudder was applied. While we're at it, a design which rolls with rudder application is also difficult to coax into a nice tight turn.

Start the approach at a moderate altitude, say 50 feet, and position it so that any crosswind will work *for* you. For example, if the wind is at your back, fly about 200 feet out on a heading parallel with the flight line. When the stall turn is executed it should be *into* the wind, *not* downwind. This allows the model to apparently come back down the same line it climbed on. Also, the plane will almost always stall turn into the wind more easily than downwind.

It is important to keep air moving over the rudder if you expect good results. We set the throttle for a very fast idle as we climb into the stall and let the plane rapidly lose momentum. As the stall approaches we simply push hard rudder momentarily, just long enough to start the turn. Immediately we reduce throttle to a low idle and ease the rudder to neutral. The plane should drop hard and tight without a lot of wiggle and waggle.

If you leave the throttle at a high idle, the stall turn will widen and the nose may not drop to vertical. If you hold the rudder too long, the model may overshoot the vertical dive and wiggle badly. If the wind is blowing toward your face, make sure you start at least 200-300 feet out, and again, make the turn into the wind.

It is very easy to let a slight crosswind shove the model over the flight line if you accidentally stall turn downwind and that maneuver was done at 200 feet altitude. The judges invariably yell "DUCK!!" and your image fades noticeably.

Practice the maneuver in all wind conditions, and pay particular attention to the use of rudder to hold position during the approach as well as the vertical climb and return path. Remember, you will get docked points for tilting the wings to hold position, so get used to using that rudder!

In order to get maximum points, the judges must be able to easily see the entire top of the model as the turn is executed. Here's a technique which we like: Establish the heading (remember to allow for wind drift), and call the maneuver just before the plane passes in front of you. Pause about a second and start a deliberate smooth climb of constant radius (1/4 loop). The vertical position should occur at a point in space about 45° to the side of the judges stand and horizontally positioned to allow for wind drift. The altitude is arbitrary and is typically determined by the climb (1/4-loop radius). Execute the turn as previously described and call the maneuver complete at about the same point in space where the start was announced.

No discussion of stall turns is complete without an answer to "What makes the model flop on its back?" Usually this occurs when the model reaches exactly vertical (plus a degree or so past vertical in some cases) and the engine is not at

good fast idle to keep the nose up and the rudder was not applied soon enough. Or, if you hold up elevator after you have reached the vertical position, the plane will simply drift over on its back.

Every design requires a slightly different technique for the stall turn, so just sort out the tricks one at a time.

THE IMMELMAN TURN

Here is a maneuver that will give you a chance to use your aileron dual rate switch. Most models lose speed when they are turned or are climbing. The Immelman requires both, so the aileron sensitivity usually decreases noticeably. The tendency is to get a droopy rollout because the ailerons are not as efficient when the plane is flying slowly.

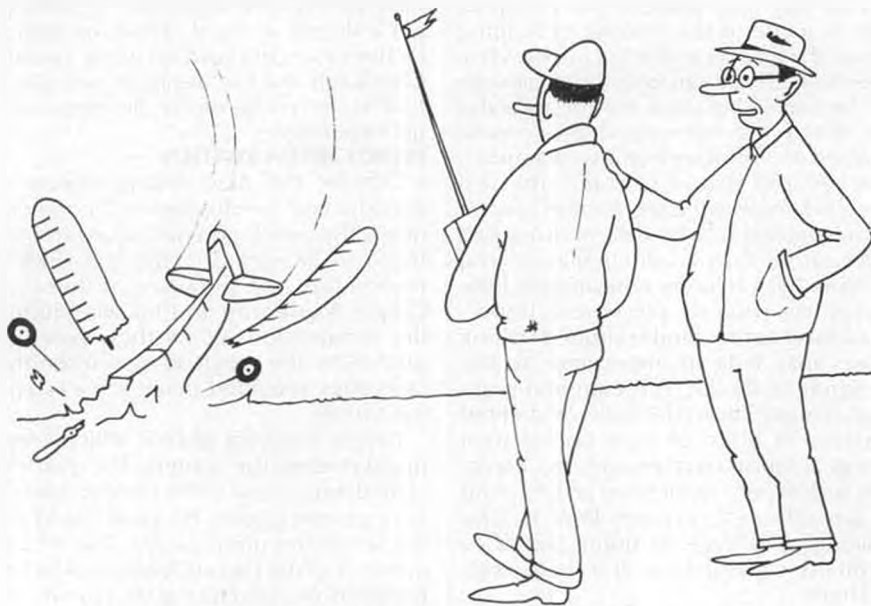
The positioning on the entry is the same as for the stall turn.

We prefer a plane which flies a moderate pace and has good vertical performance, so our positioning is closer than normal for high speed stuff. Again, approx. 300 feet out is just fine.

You will get docked points for wing wiggles, so make certain that you are locked on course before announcing the maneuver. Also, call the maneuver soon enough to allow approx. one second to elapse before the plane is directly in front of you and the judges.

Make the pull-up deliberate and constant, watching for wind drift all the time. If there is a crosswind you can add rudder on the entrance and vertical section of the half loop. Do not hold the rudder in as the model starts over on its

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"Just great, Harold! The top half of that loop was perfect!"

FUEL LINES



JOE KLAUSE

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Laguna Hills, CA 92653

OTTO BERNHARDT

17119 S. Harvard
Gardena, CA 90247

HENRY NELSON

729 Valemont Drive
Verona, PA 15147

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

NELSON

• This month's column is going to be a mixed bag of odds and ends. First off, back a couple of months ago, when I gave you the Rossi diesel/glow comparisons, I sort of promised some similar data from a "large" engine. Last month I ran out of room before I got close to talking about that subject. At least it gives me a place to start this month.

For as long as I've been acquainted with him, I've heard Bob Davis promoting the "dieselization of every glow engine known to man, plus your lawnmower, dirt bike, etc." Despite his claims, it was "known" that big diesels didn't run well. Therefore, all the talk of dieselizing .40's and .60's for general use had to be a study in futility.

Well, I was wrong. It isn't futile. Of course, I didn't discover this independently, as Pete Chinn had published some results in M.A.N. which showed the O.S. .40 with Davis head to be a pretty good diesel. This was especially true on very large props. Keeping those results in mind, I wanted to find out what the story was on smaller props.

To digress a bit, a common and probably never ending confusion exists in modelers' minds over the meanings of torque and horsepower. There have been accurate and helpful explanations of the terms published in modeling literature. Nevertheless, I still read about the "brute power" of a diesel. Compared to what? The refined power of a glow? Hogfeathers!

Any time you read something like that or hear someone say that horsepower doesn't matter because "it has a lot of torque," tune it out. The speaker doesn't know what he's talking about. Horsepower *always* counts. There may be some conditions associated with its extraction from a particular engine which you will find unacceptable to your needs, but this is one reason gears were invented.

The point of the above is this. In Chinn's tests, the dieselized .40 would swing a monster prop at about the same rpm as would the stock glow .40. However, this was at well under the rpm that the glow engine developed its peak horsepower. I wanted to know if a dieselized "big" engine could develop a comparable peak horsepower.

Unfortunately, for comparison's sake,

I didn't have an O.S. .40 or a Davis head. What I did have was one of my HP .36's, which is an HP .40 destroked to a .36 for Slow Rat or Combat use. Since Davis doesn't make a head for the HP, I made my own, which was a scaled-up version of the Nelson 15D head.

I used two props: a cut-down 9x6 TF maple and a TF 10x6. The cut-down 9x6 is the bench test prop for .36's and .40's in Slow or Fast Rat or Combat form. With 60% nitro, rpm's of 20-24K are appropriate depending on the engine and venturi. For this comparison I used the same 15% nitro fuel and the same diesel fuel I'd used with the Rossi. I also used the stock HP throttle. Below are the results:

Prop	7x6	10x6
rpm-Glow	19,700	14,500
rpm-Diesel	19,200	14,100

Since I'd already done the Rossi tests, I wasn't really amazed. It also confirms the reports of a few people using dieselized S.T. .35's in Slow Combat with good results.

The only misleading number is the 19,200 rpm for the diesel with the small prop. The engine wasn't really too happy about running there. Probably it would be very difficult to put on a diesel head and go fly Slow Rat at 21K. However, under the present rules, it would be futile anyway, as you'd be fighting 60% or 70% nitro rather than 15%. As I've stated before, to go fast you need horsepower, and for horsepower you can't

beat nitromethane.

In the idle department (for those so inclined), I only got the diesel down to about 4,500 with the 10x6. I don't know how a stock HP .40 would compare, but suspect that some of the sub-3,000 figures people believe have some wishful thinking in them.

One point I have kept referring to but haven't actually tested is the capability of the diesel to swing a really big prop. For this I'll accept the data from Pete Chinn that the diesel does have that ability. However, I have to put in my 2¢ worth here too.

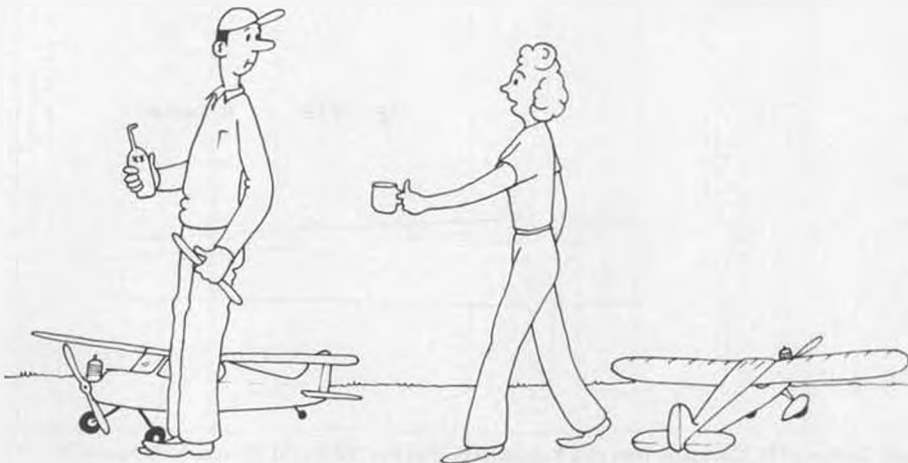
It certainly is true that for some applications, an airplane will fly "better" with a 16-inch prop rather than a 10-inch prop. This is why so many full-size airplanes have reduction gear driven propellers. That is, for the chosen operating conditions, the optimum propeller diameter and pitch require an rpm which is not optimum for the engine. The same holds true in models, especially for the very large R/C planes.

There are three approaches for solving this problem. The constant horsepower approach is to use one of the speed reduction units (usually belt driven) which allows the screaming .60 to turn the required prop at a reduced rpm but with a large increase in static thrust. I haven't seen figures quoted for horsepower lost through the belt, bearings, etc., but it must not be too bad. I wouldn't be surprised if the losses were around 10%.

Then there is the Quadra approach, which uses an engine which develops the necessary horsepower at the slower rpm. For various reasons, which I may talk about in the future, this will always be an engine of larger displacement. It may or may not be heavier than reduction systems.

The third approach is to just bolt the big prop on the engine. The rpm will drop and you'll end up somewhere lower on the horsepower curve. However, there is a possibility that the increase in static thrust will be what is needed and the decrease in top speed won't be missed. Clearly, this is the

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"May I borrow a cup of fuel, please?"

KAM

PLAIN
TALK
ABOUT

FAI SOARING DESIGN PART TWO

By DAVE THORNBURG . . . What's it going to take to make America competitive once again in world R/C soaring competition?

• Last month we talked about the fact that FAI soaring is moving steadily away from any emphasis on thermal flying; that duration is now worth only 26% of the score, while speed and distance are each worth over 33%. Most of the countries participating in the program seem to favor fast, heavy airplanes that perform not *because* of the air, but *despite* it. The Americans' love affair with the thermal is simply not shared by very many of those strange and unpredictable folk who inhabit foreign countries.

The problem is one of geography. Only countries with warm, sunny, mild climates can ever really come to know the joys of thermal hopping; the endless afternoons spent playing tag with vultures, circumnavigating fat cumuli as if they were islands in a soft blue sea, or having mini-contests with a flying buddy with one-hour maxes. How many modelers in Northern Europe would take a chaise lounge to the thermal field?

Look at a globe and the picture becomes clear. London is further north than Newfoundland or Vancouver, B.C. Gibraltar, at the southernmost tip of Spain, is barely as far south as Oklahoma City. And Torino, where the sunniest contest of the whole European FAI circuit is held, lies at latitude 45° north, approximately in line with Portland (Oregon), with Minneapolis, and with Montreal. If a European falls in love with

thermallings, it has to be a postal romance!

That's why I said, last month, that we've got to unhitch our egos from the thermal event and start designing for the two "mechanical" events, distance and speed, if we want to play the FAI game. That's why the three-views this month are not of polyhedral floaters (which I still love best) but serious go-fast airplanes from 1979 that will hopefully still be competitive in '81.

Now let's look at the distance event.

Distance is still the most luck-prone of the three events; the pilot is restricted both as to time (eight minutes) and place (between imaginary planes A and B). But the luck factor in distance has, in the past, been largely a negative one; bad air could hurt you far more than good air could help you. Most competitive, well-flown ships could pull nine or ten laps out of average air (whatever that means), so it didn't take much of a boost to hit the magic twelve. But *really* bad air could push even the best pilots under five.

The November 1979 CIAM meeting took some of the sting out of this situation by removing the single-attempt rule in distance. Now you can relaunch and re-enter the course as often as your heart desires within your eight-minute working time. No doubt this rule is a direct result of the Austrians (and others) having eaten dirt a few times on the distance course in Belgium . . . dirt with

just a touch of crow flavor to it. Still, I feel this is a change for the better. Anything that helps eliminate the luck factor can't be all bad.

Of course, this rule plays right into the Northern European philosophy of FAI, so as an American I should oppose it on principle. The Europeans wish to (and ultimately will, probably by '81) reduce distance flying to the same mechanically precise pattern that speed has become. In Belgium, the Austrians, for example, made no attempt to search the course for the best air; they launched and flew in the same narrow band of air they used for speed. When they picked their air badly, or when the gods frowned suddenly and unexpectedly, they fell far short of their vaunted 10.76-lap average.

This multiple-attempt rule in distance is just one more sign that the days of the floater are over. Relaunching gives all the advantage to a fast plane; if you use up your entire four minutes on the first launch, you'll be lucky to have three flying minutes on your second attempt. But if you finish your first attempt in, say, 2:40, then you have plenty of time to relaunch and take another crack at it. This may strike you as a minor point, as you read it lying there in your Strato-lounger, but I've seen times in FAI contests when I'd gladly trade a month's vacation for an extra thirty seconds of working time, straight across. When the working clock is running, leisure time is hard to come by in an FAI contest.

Distance is a pure penetration event, and the physics are right out of your high school textbook. How much work (in the form of pushing air molecules out of the way) can your model perform in the process of falling 492 feet? Answer: an amount of work directly proportional to the weight of the model.

Discussions of the distance event always get bogged down in the L/D formula. Theoretical L/D ratios are marvelous and awe-inspiring, and I believe every model should have one. But they don't . . . *can't* . . . consider the *local turbulence* a model encounters in flight; the little updrafts and down-drafts, the creases and wrinkles and knots air gets itself into when it isn't inside a two-million-dollar wind tunnel. These are the things that sap a model's energy, that make its actual L/D vary on every flight. Of course, if the local turbulence happens to be mostly rising air, then a lighter ship has the advantage. But only an optimistic American would expect lift on the course; a sober, realistic European would expect (and get) the usual creases and wrinkles and knots.

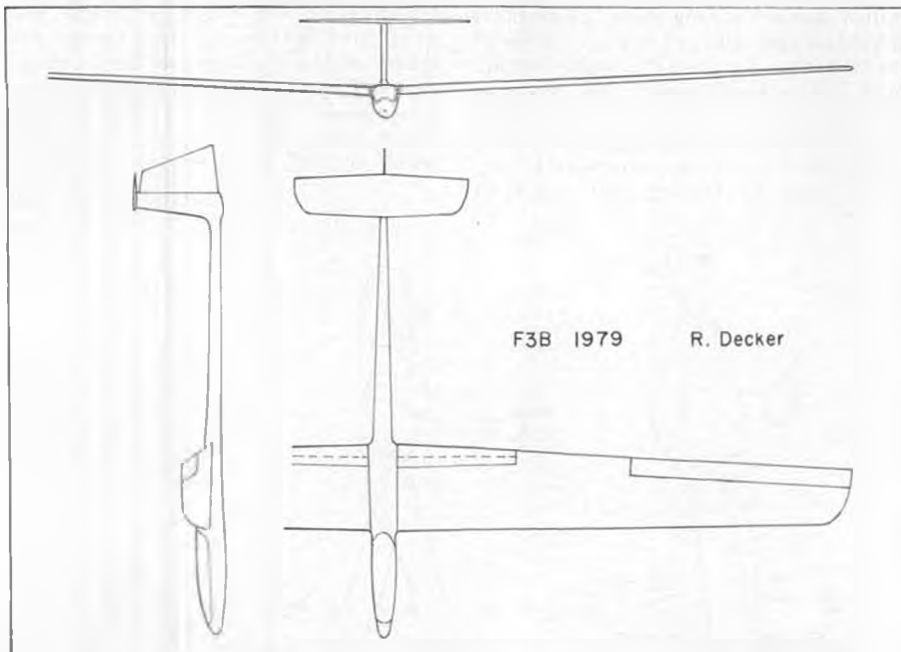
Question: Which flies further, a five-pound model with a 12:1 L/D or a ten-pound model with a 12:1 L/D?

Answer: (Textbook) They both fly the same distance.

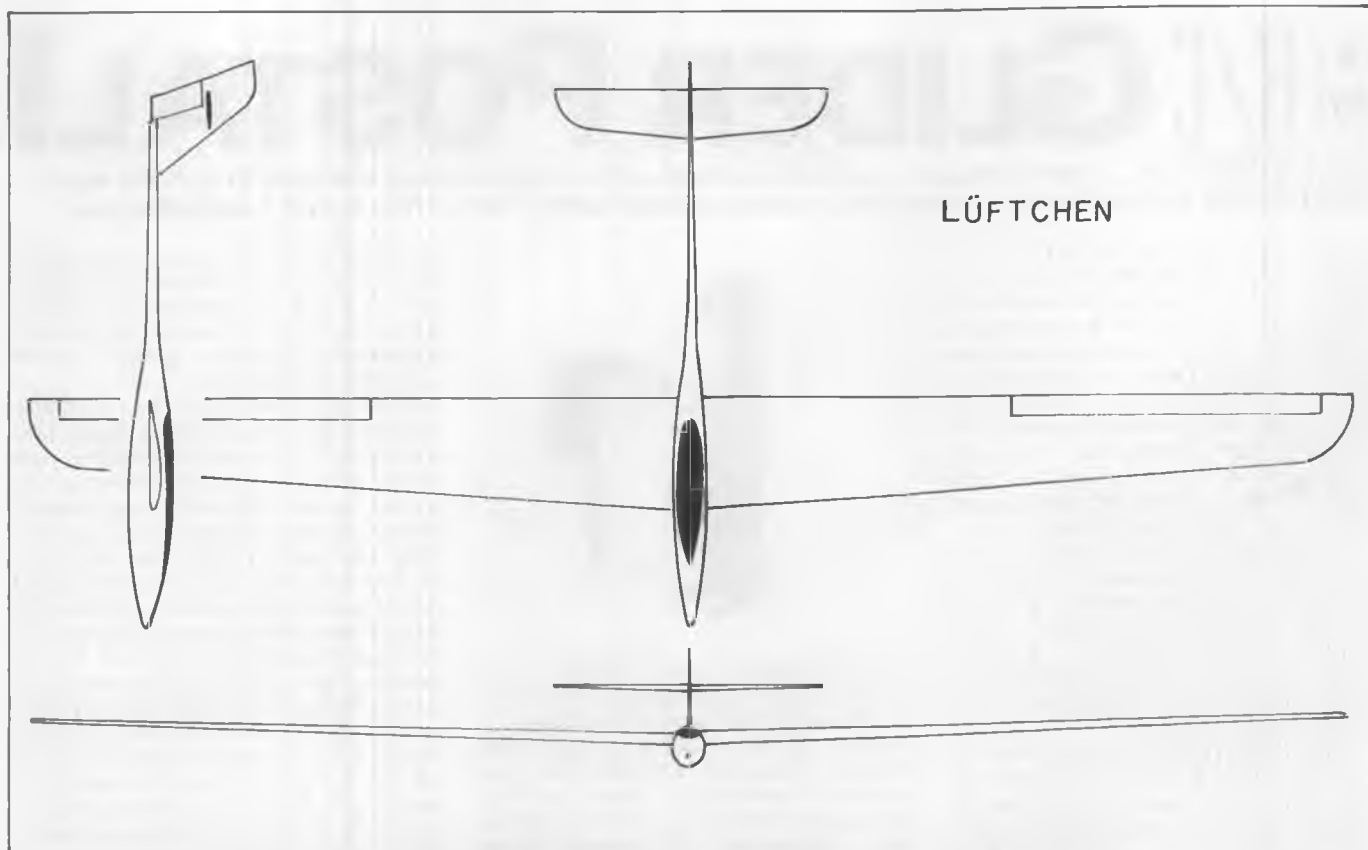
Answer: (From experience) The heavy model, four times out of five.

• • •

Whenever I deliver this build-big-and-heavy sermon somebody always



Ralf Decker of W. Germany flew this 4-channel bird at the '79 World Champs in Belgium. It spans 110 in., has 818 sq. in. wing area. Wing loading was 11.4 ozs. minimum to 17.6 ozs. maximum. Ralf's plane wasn't as fast as similar ships without dive brakes built into wings. Airfoil varied from an E-193 at the root, to an E-180 at the tip.



The Luftchen, by Norbert Luka of W. Germany. Has 107-in. span, 714 sq. in. wing area. Minimum wing loading was 9.3 ozs., max was 20.2. Airfoil was an E-193. Luka's poor scores on distance (the luck event) kept the German team in 3rd place.

asks, "OK, OK, but how are we gonna launch these eleven-pounders? Do you really think we can get a plane this heavy up to 500 feet without a Saturn booster?" Sure. The Europeans are already doing it. There were a number of models at the Belgian contest that carried twenty ounces a square foot, and some of these were hand-towed!

Here's how the Austrians hand-tow the Dassel (650 square inches, up to 17+ ounces per foot). They use monofilament fishing line of around 150 lb. test, and they stretch the sin out of it! One helper drags plane and towline off into the bush, while the tow-man chitchats with the pilot at Base A. At the launch signal, the tow-man trots off in the direction of Base B. The other helper hangs onto the plane until 40 pounds of tension is built up on the line. That's right, 40 pounds! (Take a set of pull-scales and measure forty horizontal pounds . . . it'll pull you right off your feet! These Austrians are built like Oldsmobiles.) When the helper finally turns loose, the plane goes up the line like a missile, releasing at around 75° into a climbing turn that has it back behind Base A again almost instantly. The tow-man has covered less than 300 feet, including the line stretching. Only in zero-velocity or actual downwind conditions did the Austrians attach the line to the ground and use a hand-held pulley.

How high were they getting? Over 500 feet. Observers agreed that the Dassel, at nearly 18 ounces a foot, was out-launching the much larger American floaters, at 10-12 ounces a foot (we were

using the winch almost exclusively). There was simply no energy in our launches, compared to theirs. That's why I've been preaching, to anyone who would listen, that we need one-piece wings for serious attempts at the '81 Champs, one-piece wings that will take 60 pounds or more of pull. Don't worry about portability . . . if you make the team with a 110-inch wing, America will get you to the World Champs!

* * *

So here's the challenge: You're allowed 176 ounces of total weight. Your maximum permissible wing loading is . . . oh, well, might as well admit it . . . over 27 ounces a foot. That's right, 27. The FAI surface loading max is 24.51, but we Yanks usually talk in terms of wing loading, right? So figure an 11% stab. That means about 90% of the weight is "carried" by the wing. Divide 24.51 by .90 and you get . . . call it 27 ounces even and you'll be safely within the limits.

Now divide 27 ounces into 176 and you get 6.5 square feet, or 936 square inches for the maximum size of your wing. That's IF you want to push the limits, the 27 ounces a foot. If you're not ready to live quite that dangerously, then divide 176 by whatever figure you think you can design to . . . say, 22 ounces per foot. This will give you an even 8 square feet, or 1152 square inches.

But here's the kicker: if you plan to divide by 20 or less, you'd better go back to AMA flying. If you're not prepared to fly at least 20 ounces a square foot, you're going to lose, my friend. And I'm

going to be at the Finals, rooting against you. Virtually all of the competitive ships at the '79 meet were carrying 18 to 20 ounces in speed; by '81 some of these folk will have enough practice to hit the high eights occasionally in speed. Or maybe less. There is no natural barrier in speed. Remember that 6.7 seconds through the course is only a 100 mph average speed. And there's at least one glider in the world that's hit 243 mph.

Does an airplane of this caliber have to be built in specially machined molds costing thousands of dollars? I don't believe it does. Mike Reagan in L.A. is having good luck covering foam cores with sheets of fiberglass, using only a large sheet of aluminum creased across the center to the shape of his leading edge for a "mold." It's an ingeniously simple system, compared to milled molds. A source of carbon fiber for spars and webbing is Bill Mueller at Hi-Flight, the folk who kit the Mirage. And don't overlook Kevlar.

But a clean/fast/heavy airplane is only half the answer to the FAI battle. Equally important is the team you put together to fly it. The lone wolf is at a terrific disadvantage in FAI today; there's just too much to do and too little time to do it, both on the field and in the workshop. I think there's no question that what allowed the South Africans to slip past the Europeans and win the team trophy, in spite of the handicap of their airplanes, was their incredible teamwork. I've never seen five people function so selflessly as a single unit when the

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TRY AN R/C GLIDER POSTAL!

By KEN CASHION . . . Many modelers are thinking twice before travelling long distances to contests nowadays. One way to get fliers to compete is by holding a postal contest. Here's how to run a successful one.

• The other day, while sitting in a gasoline line, I started making one of my lists. I am a compulsive list maker. It helps me organize my time, and though I may not do more, I end up doing most of the things that I want to do instead of a lot of the things I do not want to do. Some of the things on the list were "Turn down hot water thermostat," "Turn off air conditioner vents in unused bedrooms," "Start driving 50 mph to and from work" (instead of 65 mph), etc. It was then that I realized that I was defining my 1980 lifestyle and more should be added to the list. "Keep 10 gallons of gasoline in safe place," "Limit sailplane contest trips." . . . WHAT?! What can I be thinking?! Is the world really running down so much that I have to limit my modeling?

After I had recovered from some of my shock, the cars behind me honked, and I moved up two places in line. So what am I going to do about my modeling? How can I keep the gasoline situation from impacting my modeling?

First, I decided that smaller airplanes cost less. They also can fly in smaller areas, and I have more small areas near me than big areas. For instance, three blocks from my home is a school ground and a football field from which the light poles have recently been removed. For H.L.G., Peanut, 1/2A R/C, electric, and small high-starts with a turnaround pulley, it is just fine. With the wind in the right direction, the field is OK for light standard class sailplanes . . . a little tight, but I could handle it. The small stuff I can take on my bicycle, now that I have made a model carrier on the back. (NO control line . . . I am dizzy enough as it is.)

That will take care of 75% of my sport flying. The rest of my sport flying requires more room for my .35 R/C power, scale sailplanes, and unlimited sailplanes. So I have cut quite a few miles off, but not any flying. But what about my contests? What about the two or three 16-hour round trips to Houston; or the 6-hour round trip to Mobile; or two 9-hour round trips to Pensacola; and 18 hours to and from Huntsville, Alabama? Now, for an idea whose time has come. A Postal Contest. Yes, I know that that wonderful magazine, **R/C Model Builder**, sponsored the world's biggest postal Peanut contest, and the AMA has a Jr. Postal, but this postal contest is for sailplanes. (No, you don't mail in your sailplanes.) I have recently conducted a sailplane postal contest.

There are two basic disadvantages to a postal contest. One is that it seems as cold and impersonal as a letter addressed to "occupant," and second, the "heat" of competition is missing. The Picayune



Postal contest was an invitational contest which concentrated on gulf (of Mexico) coast area fliers who have flown in contests in New Orleans, Picayune, Mobile, Pensacola, and Panama City. Everyone knew each other, and the invitation extended to their friends in their respective flying groups. Some people who wouldn't go somewhere else to fly would fly in a postal, and beginners get to fly on their own field with their usual flying buddies.

Most areas have different kinds of fields, but by using two consecutive weekends (or a month), each group of fliers could optimize his field's flying conditions. Tape measures and stop-watches do not require subjective judgment . . . you just read it and write down the numbers. Of course, timers (witnesses) must sign the score sheet beside each score.

How did mine go? I wrote an invitation and explanation to each person I could think of. In the same mailing I included the usual contest announcement with the rules. For our contest we flew four flights of five minutes duration (no overtime penalty; not necessary). Landing bonus was one point per foot, measured up to 50 feet from landing spot. Task IIa with landing bonus was also flown. Duration scores were added and plaques given through fifth place. Since there would be few cases of frequency conflict and everyone had plenty of time (and Dave Thornburg can inspire me with diabolical plots), we had an R/C Hand Launched Glider event. The winner would be the one with the most air time of nine launches. No spot landings. Plaques were awarded through third place. Plaques were used because you can mail them in padded envelopes. One of the nice things about a postal contest is that you know how much money you have for awards before the awards are purchased, and you can have the winners' names, place, and number of entrants engraved on the awards. Doesn't "1st of 21 entrants" sound

better than just "1st"? (I once got a third place trophy for a three-plane pylon race in which all three planes crashed within two laps of the start. It is a cute conversation piece but not much pride is taken in owning it.)

Those fliers who wanted to compete sent their entry fees and I sent them their score sheets. To make it easy, there were no envelopes, but the sheets were folded so all addressing was already done and return postage was attached. They just had to fold it so the right address and new stamp was showing. I would accept reasonable facsimiles of score sheets, but not unless the entry fee had been postmarked the day before the first day of flying. All score sheets were to be postmarked for return within a week of the last flight day; ten days after that, the scores were declared official. The plaques would be engraved and mailed. Scores were tabulated and a letter about the interesting aspects of the contest was mailed to each entrant who sent in a score sheet. All others were marked as DNF.

Such a contest permits trying a new task, but the C.D. shouldn't burden the local fliers with complicated flight and landing schemes. The flier must declare an attempt before launch for the flight to be official. Usually other fliers on the field were the timer/witnesses, so I believe everything was run on the up-and-up. The duration portion of the contest was LSF applicable. On the score sheet there was a place to specify if the flier wanted LSF credit and for what level. I sent each who requested it, certification showing the necessary scoring information and delegation of authority to sign my name to the LSF flight achievement voucher.

The entry form had blanks to fill in, so it became a survey of equipment, capability, experience, etc. of Gulf Coast fliers. It is always difficult to get this information on the flying field. It has been suggested that there be a series of postal contests to determine area "champs." I do know that you cannot determine the "king of the mountain" from one contest. Now, I know that there are spearchuckers in California who can throw a Mirage into orbit and that the ground there is one big thermal generator, but did you know that a 2-meter Lite Kite was thrown by Melvin Duval of and in Pensacola, Florida, to flights of 2:05, 1:30, 0:54, and 0:41? That may not be too good in some areas, but that is fine flying for around here. Disregarding the two longest flights, the average of all flights (H.L.) was 24 seconds. Don't laugh. This was a first-time effort for all of these fliers. The

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R/C SOARING

by Dr. LARRY FOGEL

• I'm often asked to recommend a model. It's really a difficult question. First, who's the model for? Then, there's the ease of construction, adequacy of the kit (if one is available for that design), the beauty of the finished product, its flight performance, and of course, the handling quality. Note that handling quality is not the same as flight performance. You might have a very efficient sailplane that's difficult to control, or one that responds well to your commands but simply can't "hack it."

Flight performance can be described in terms of efficiency (lift-to-drag ratio), speed range, maximum roll rate, the stability margin, and other characteristics. The particular combination you want depends on the task to be performed. For aerobatic performance you want to sacrifice stability for maneuverability. For thermalling you need that stability, especially in the face of turbulence, but too much stability may prevent you from staying in that tiny low-altitude thermal.

In contrast to flight performance, handling quality concerns the ease with which you can put the plane through its paces. If the flight performance characteristics closely match the task to be performed, it's easy to achieve good

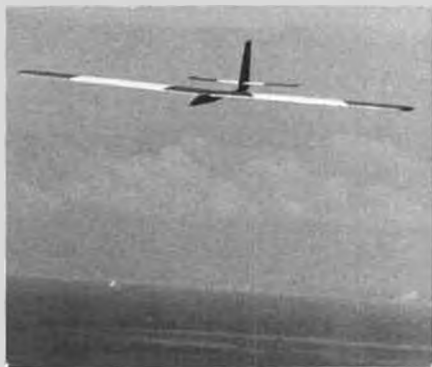
handling quality. If, however, you're trying to make a grape look like a plum, you indeed have a challenge.

Handling quality has long been of interest in the design of full-scale aircraft. First, planes were described as being simply "good," "bad," or "impossible." In 1957, G.E. Cooper proposed a finer scale ranging from 1 to 10, as follows: 1 is excellent; 2 is good, pleasant to fly; 3 is satisfactory, but with some mildly unpleasant characteristics; 4 is acceptable, but with unpleasant characteristics; 5 is unacceptable for normal operation; 6 is acceptable for emergency conditions only; 7 is unacceptable even for emergency conditions; 8 is unacceptable, dangerous; 9 is unacceptable, uncontrollable; 10 is catastrophic. Have you ever flown an 8, 9, or 10?

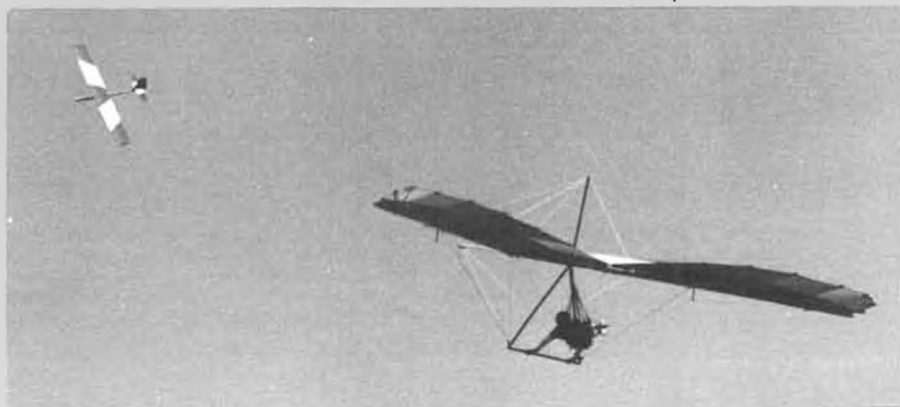
But, for our purposes, it might be more appropriate to examine handling quality in terms of its components. First, you want the flight control to be predictable; that is, you want the same response, given the same command to the same aircraft in the same environment. If you have ever experienced a severe double-neutral, you know exactly what I mean. Excessive friction in the linkage causes the neutral position to depend upon the last direction of control movement. The result is unpredictable flight performance . . . a bad scene if ever there was one.

You'd also like the response to be immediate, if not sooner. The quicker the reaction, the better your ability to monitor the plane's acceptance of your commands. Naturally, big heavy birds are likely to respond slower, but let's not have more lag than necessary. You can't imagine how excessive lag can compound the problem of a double neutral.

Cross-coupling also has an impact on handling quality. It would be nice if pitch and yaw remained independent of bank angle, but there's some cross-coupling in all aircraft. The trick is to minimize this complication.



Rick Schrameck's "Mach Schnell" FAI thermal ship makes a fast pass at Torrey Pines. Has also been used in slope pylon races, where it really lives up to its name.



Rick's "Mach Schnell" mixes it up with an Antares hang glider, one of the new-generation bowsprit Rogallos.



Similar to last month's stand-'em-up-on-a-wingtip photo, is this one of Bill Winans and his 200-inch Carrera SB-10, imported from West Germany.

Where does all this lead? To the design of aircraft with handling quality in mind, having adequate control surfaces in positions least affected by wing wash and the turbulence caused by other parts of the plane, making the ailerons a little thicker than the wing at the hinge line so as to ensure sensitive control near neutral, providing non-linear controls to compensate for non-linear aircraft response, and perhaps even to electronic compensation for the cross-coupling.

Meanwhile, there's a growing interest in the design of F3B (FAI) competition sailplanes. Ken Raymond of the Torrey Pines Gulls has come up with a 100-inch span craft. The wing has ailerons rather than dihedral. The 10-inch constant chord goes out 20 inches, then the wings taper to a seven-inch chord at the tip.

The 877 square inches of wing area carry 52 ounces with an optional pound of ballast. The airfoil is only 8% thick with Phillips entry and 2% camber. The high point is at 35% of the chord. The small rudder is coupled to the ailerons for smooth turning. Ken uses a nylon clevis



Ken Raymond is also into the design of F3B competition sailplanes, shown here with his original design 100-incher. Uses coupled ailerons and rudder, Futaba radio.

to lock the two halves of the wing together in the fuselage. This provides automatic quick disconnect . . . a safety measure should there be a hard landing.

The fuselage is also of clever design. Ken uses two 3/16-inch square spruce spars which are held together by 1/32-inch plywood sides to form the vertical box frame. The elevator control rod and antenna are carried within this box. The soft balsa, glued to the sides and top, is sanded to make an oval cross-section. There is a notch in one side of the fuselage so that the rudder control cable goes straight from the servo to the control horn without a bend. Two-ounce-per-square-foot fiberglass cloth covers the fuselage to provide strength. K&B epoxy paint completes this beautiful bird. It flies fast and is very maneuverable . . . almost aerobatic . . . but the primary intent is thermal flight, speed, and distance. We look forward to seeing this plane in F3B competition. Isn't it remarkable how the new flat land competition planes look more and more like slope ships . . . even aerobatic slope ships!

Rick Schrameck of Carlsbad, California, continues his development of the "Mach Schnell" for this same event. This 100-inch span aileron controlled glider operates at 60 to 90 ounces; that is,

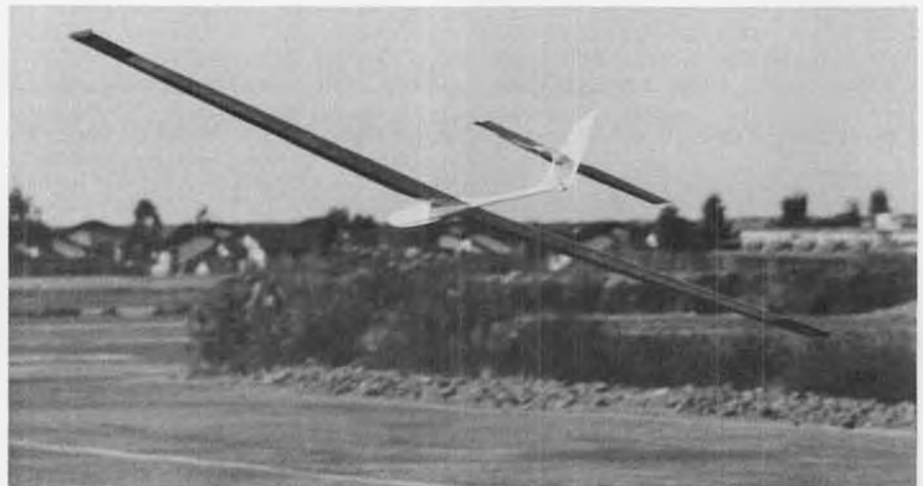
from less than nine ounces to about 16 ounces per square foot wing loading. The airfoil is an Eppler 193 with the ailerons electronically coupled to the rudder. This fuselage was built-up to facilitate changing the design, but the final fuselage will be epoxyglass strengthened with carbon fiber material.

In the latest configuration, Rick traded the ailerons for some polyhedral (to eliminate aileron drag). The wing is now

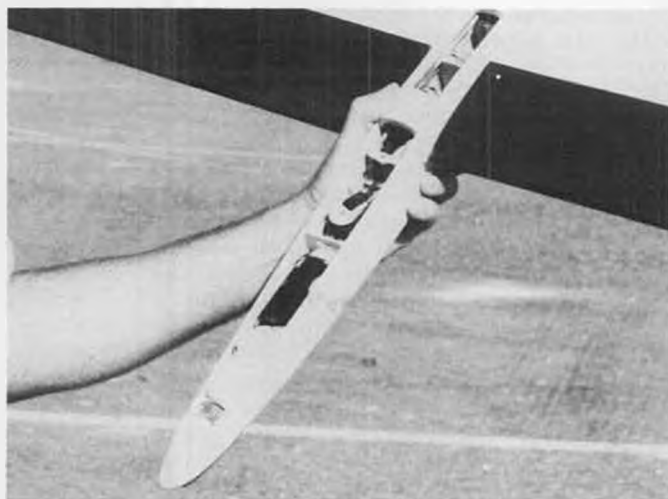
an Eppler 205 section. The root chord is 11 inches without taper out to the polyhedral joint. It then tapers to an eight-inch chord at the tip. This new wing has 1050 square inches of lifting surface. The stabilizer has 140 square inches; the rudder six square inches. Rick claims the performance is now sufficiently good for a pilot kit; that is, for 20 similar aircraft to be built and flown to work out the bugs and finalize the design. It's been fun to watch this plane mature from a gleam in his eye.

Judge John Menard of Bonita, California, gets his kicks out of designing and building very light thermal machines. His latest creation is of two-meter span. The wing fits in a forward notch and is held secure with a dowel that locks the trailing edge in place. The plane weighs about 20 ounces all-up and ready to fly. The airfoil has Phillips entry, allowing it to penetrate far better than might be expected for such a light craft. I asked John, "Why not build larger birds?" He answered that there are enough problems in making small birds fly really well. In fact, there might even be more problems with small-span models.

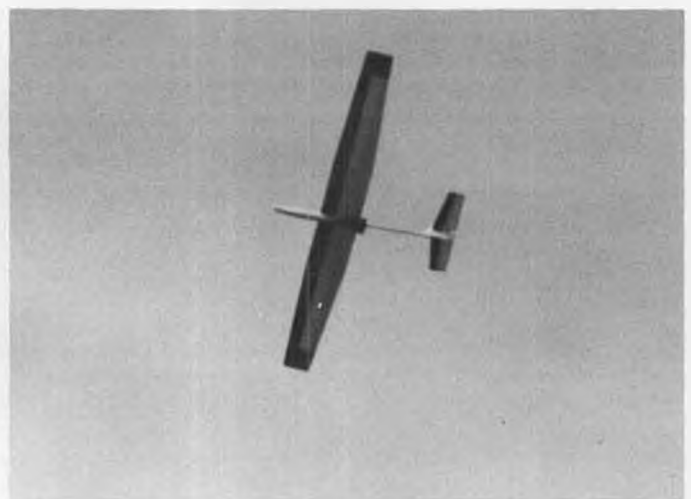
Hans Weiss, the proprietor of Wilshire Model Center, 3006 Wilshire Boulevard, Santa Monica, California, is an enthu-



Ken's model shows its ultra-clean lines in this photo. Compare area and wing loading (in text) with that of the FAI ships shown on pages 26 and 27 of this issue.



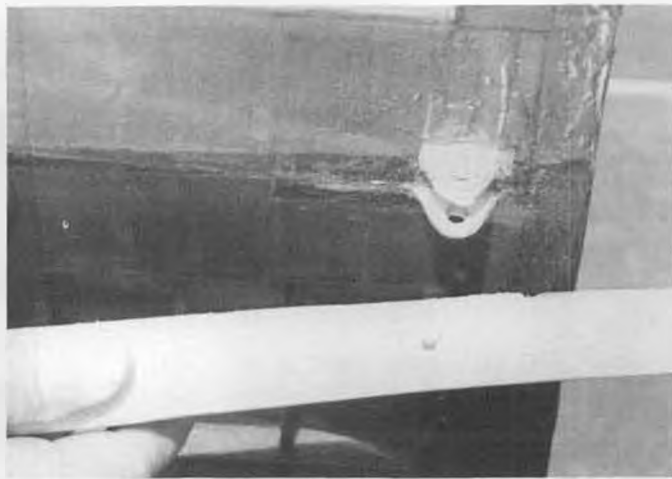
Radio components in Raymond's model are arranged in line to keep the fuselage as narrow as possible.



Wing and stab planform of Ken's F3B model show up well in this photo. Constant-chord part of wing appears to be fully sheeted.



Judge John Menard displays his latest project, a 2-meter original that weighs a mere 20 ozs. ready to fly.



Neat method of wing attachment on Menard's glider. Ply tongues at t.e. fit inside fuselage, are held in place with a dowel. Leading edge uses familiar dowel-through-a-bulkhead.

siastic glider pilot who flies off the coast of Malibu. John Hill of Los Angeles flies his KA-6E at the same site. This 12-pound, 12-foot span fiberglass flier cruises smoothly, even through considerable turbulence. The weight ensures speed and efficiency. Bill Winans of Pacific Palisades flies his Carrera SB-10 there, too. You really appreciate its size when he holds the 16-foot wing vertically.

Recently, I had a chance to chat with Phil Kraft, who is no longer connected with the organization he created. We went for another ride in his two-place Fournier motorglider. The task was to calibrate the stall performance of his full-scale Super Fli in upright and inverted flight. I was happy to be in the Fournier!

After landing, we talked of many things. Finally, I asked him to pass on any advice on how to become especially skillful in R/C soaring. He suggested that you should spend considerable time with your transmitter in hand, even while away from your soaring site. "Visualize your plane as it moves through various maneuvers in accordance with your movement of the controls." At first, I thought he was joking, but he assured me that he was dead serious. He emphasized the importance of planning and practicing maneuvers long before they actually occur in flight. This way you clearly see the necessary ingredients of each maneuver.



With all that wing and such a light loading, Judge Menard's model goes straight up.

Once the basic stick movements are clearly in mind, you can "fine tune" the maneuver as you watch the airplane respond to your commands. This technique may be less valuable for thermaling than aerobatics, but it should be particularly worthwhile for improving your launching and landing. The better your imagination, the more you'll learn. Try it, you'll like it.

Some hints: Stan Watson, editor of *Soaring Flight* newsletter, suggests that about a pound of ballast is required to fly speed events with a two-meter model, while one or two pounds are required

for standard class ships, and two to three pounds are needed for unlimited sailplanes. "And in flying distance events, you'll also need weight, perhaps half as much as you need in speed events. Practice will tell you how much to use, and you should fly a few test flights, varying your weight, before you come out for the meet."

The *Pacific Breeze*, newsletter of the Pacific R/C Soaring Association, addresses those who are "tired of having your Hot Stuff bottle bouncing around inside your flight box. Take the plastic cap off a spray enamel can, glue or screw it upside down to the top of your flight box, and insert the Hot Stuff bottle in the center portion . . . it's a perfect fit." Chuck Welman, editor of this journal, goes on to point out the usefulness of empty 35mm film containers for holding small parts and lead shot to hold down items on your building board. He also points to the use of a carpenter's wood rasp for rough shaping prior to sanding, and the value of a small piece of solder embedded in the wing tip to balance the wings before completing the covering.

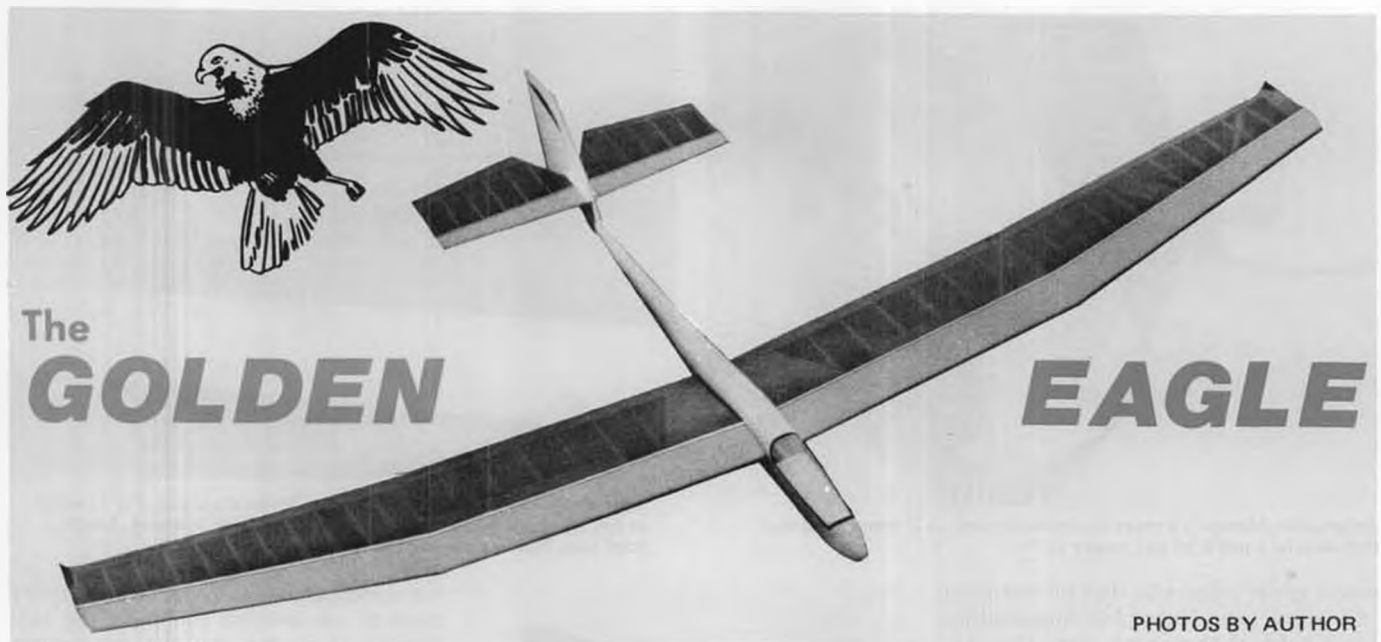
If you enjoy reading about our hobby, make note of a new book entitled *Getting Into Radio Control Sports* by Jerry Murray (G.P. Putnam's and Son, New York, 1979). This book is especially for the novice. It portrays various kinds of radio control, ranging from cars, boats, planes, and, of course, references our particular joy . . . radio control sailplanes. This book includes a picture of Mark Smith, who designed the Jonathan Livingston Seagull model (for the movie of the same name), the Windward, Windfree, Wanderer, and other notable planes. I'm proud to say that the jacket of the book shows a colored photograph of my Legionair.

Again, I want to call your attention to *Model Aircraft Aerodynamics* by Martin Simons (Model and Allied Publications, Argus Books, Ltd., 14 St. James Road, Watford, Herts, England, 1978), which offers a very complete and sophisticated presentation for those who are



Phil Kraft's Super Fli during inverted stall tests. Not really an appropriate photo for the Soaring column, but it was taken from Kraft's Fournier RF-5 motorglider, so it's okay.

Continued on page 89



By TOM WILLIAMS . . . The latest effort by one of the top R/C sailplane designers in the U.S., the Golden Eagle is a real floater, yet has as much speed and penetration capability as most heavyweight FAI models.

• The state of the art in high-performance R/C sailplanes is advancing more rapidly than any other phase of R/C modeling. It is indeed the most exciting part of my entire engineering career to be a professional sailplane designer at such a time in model aviation history. I am proud to present to you, here in the pages of this outstanding modeling magazine, my latest design. I hope it will contribute to the advancement of the sport and to your trophy case.

The Golden Eagle is by no means a trainer. On the contrary, it is a high-performance contest type sailplane designed to make good pilots do even better.

DESIGN PHILOSOPHY (sometimes called BULL)

It has occurred to the designer that you may build a better sailplane or at least derive more enjoyment from it if you know some of the design philosophy behind its creation.

Without burdening you with engineering formulas, suffice it to say that the lighter (lower wing loading) a sailplane is, the faster it will go up in lift and, conversely, the slower it will come down in dead or down air. In other words,

you'll get more flight time per launch. However, the forward velocity is also proportional to weight (size being fixed), and the lower the forward speed, the lower the Reynolds number (Rn). You need not understand this term; just accept what its effects are. The airfoil efficiency in the lower regions of Rn (below 1,000,000) goes down as Rn goes down. Gadzooks! A dilemma! What is needed is an airfoil that will perform well at very low forward velocities. To meet this need, I designed the FB1151. It first appeared on the Windrifter, then the Sailable (by the way, the Paragon has an almost identical airfoil). Unfortunately, this airfoil flies so slowly at 6-1/2 oz./sq. ft. that it becomes ineffectual on windy days. Yet this same slow speed makes it outstanding in the landing circle and as a trainer.

NEW DESIGN GOAL

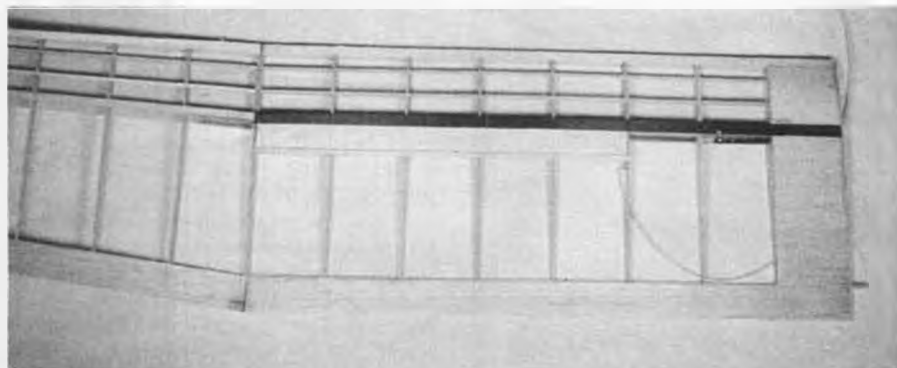
What if we could design an airfoil that would fly faster at light wing loadings? The sink velocity is proportional to weight and has essentially nothing to do with the airfoil. Therefore, we may still have the unexcelled thermal performance and super-high launches (if the winch goes fast enough), and yet be able

to penetrate upwind hunting for or returning from thermals. The only drawback would be that the landing velocity will be higher, which will hurt us older men with slower reflexes. But wait! If we fully turbulate the airfoil, as on the Golden Eagle, we can reduce the stall speed without any noticeable effect on high-speed performance.

PERFORMANCE

Your results are going to depend a lot on how you build and how you fly, but if you can't wait to finish yours, we can tell you that the prototypes performed in every respect beyond the most optimistic dreams of this old designer.

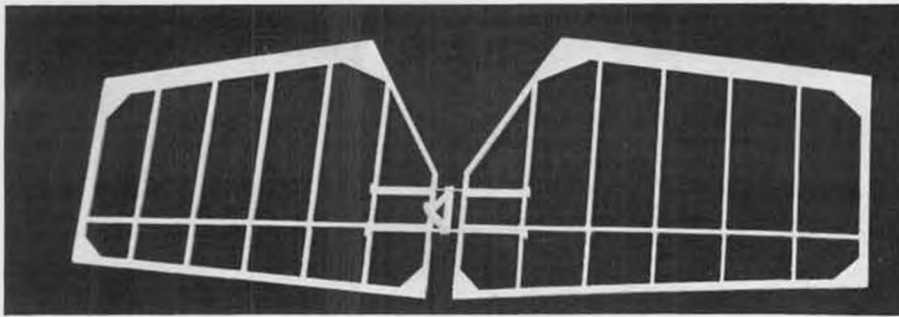
The Golden Eagle thermals as well as a Windrifter, has an impressive launch angle (almost straight up), yet has demonstrated extremely fast times in F3B speed runs . . . less than 11 seconds at 42 oz. flying weight. At this writing, no all-out tests have been made because no wings with carbon fiber spars are yet



Wing structure follows standard practice; only unusual feature is that bottom of i.e. is sheathed, top is not. This particular wing uses experimental carbon spars, recommended for FAI.



Fiberglass tube is fastened into the wing root with epoxy, and lots of it. Note 1/4-sq. plug at end of tube.



Stab structure is about as simple and light as you can get. The forward stab tubes are glued in place first, then the stabs are aligned on the wires and the rear tubes glued in.

flying. The L/D has not yet been measured, but it is believed, from observations, that it is at least as good as the Sailaire (21:1).

This sailplane was not designed for FAI competition, but as a Standard Class sailplane that would penetrate the winds which are the norm east of the Rocky Mountains.

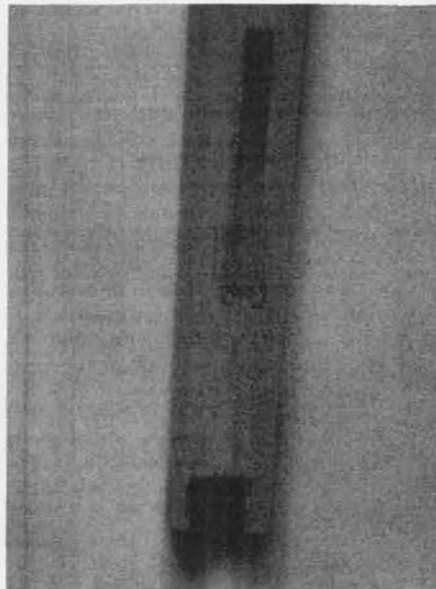
The Golden Eagle will be competitive on the typical Southern California calm day, but, when the wind blows, it will be in a class all by itself.

DECISIONS

SPARS: As airfoils are made thinner, the stresses in the wing spar go up by the 4th power. The spars on the plans are sufficient for all lightweight (no ballast) maneuvers and all but the most taxing ballasted maneuvers. If you intend to use this sailplane for F3B type speed runs with heavy ballast, put in carbon fiber spars (about \$20, available from Hi-Flight Model Products, 43225 Whittier Ave., Hemet, CA 92343).

WEIGHT: A sailplane built light can fly light or, by adding ballast, heavy, but one built heavy can only fly heavy. The 1/32 ply sheeting used on the fin is a heavy building material but needed for rigidity. You can cut out some of it, as well as the 1/4 x 9/32 center separator and save one ounce in the process. Don't complain if your wood is light (soft); complain if it's rock-hard (heavy). You're not building an outhouse!

WING ROD: If you're going all-out for F3B speed with lots of lead, a second wing rod could be added just ahead of the spar.

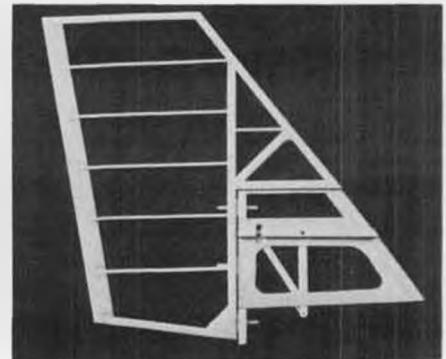


Top view of rear end of fiberglass fuselage shows how bellcrank notch is offset to the right to clear rudder pushrod on the left.

ANTI-VORTEX TIPS: Make them! They're not hard to carve, they're easy to cover, and they are aerodynamically effective. Follow the instructions one step at a time.

CONSTRUCTION

Use of the proper adhesives is just as important as using any other proper building material. I feel that this is so important that I have specified the proper adhesive for each joint in the step-by-step building procedure which



Completed fin and rudder framework. Big rudder requires only a few degrees of travel for quick turns.

follows. Where more than one cement type is acceptable, the preferred adhesive is listed first.

A) Aliphatic Resin (Titebond, Wilhold Aliphatic Resin, etc.).

B) Butyrate Cement (Ambroid, Aero Gloss 40% Stronger, etc.).

C) Cyanoacrylate (Hot Stuff, Jet, etc.). Use micro balloons or baking soda as fillers. If structures are fabricated with type C, each butt joint must have a fillet of type A added before covering.

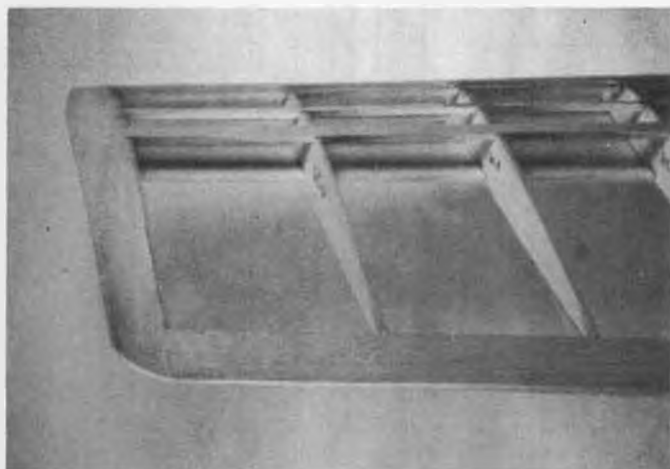
D) Contact Cement: volatile solvent latex, the type used to bond plastic counter tops. Has strong odor (toluene). Water base contact cement is not to be used on the Golden Eagle.

E) Epoxy: Any brand of 5-minute or 15-minute epoxy is acceptable.

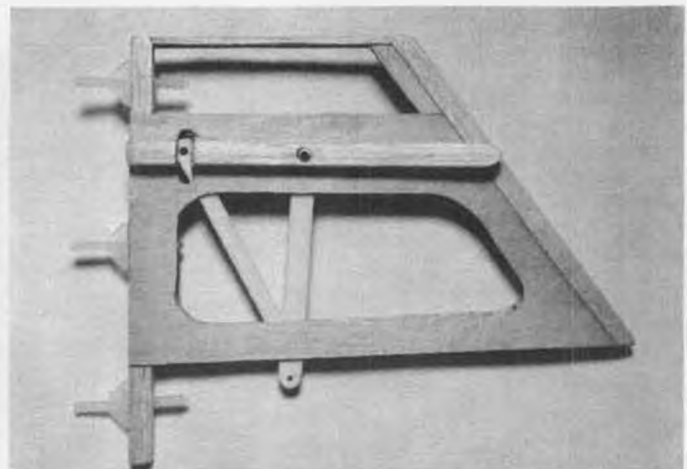
WING

The relative performance of your sailplane is directly proportional to how accurately you built your wing. The airfoil shape of the ribs you cut may be within .005 inch of design shape, yet the best of us do well to build a wing within 1/16 inch of being true and the best we can hope for is .015 inches. After you finish all four panels, lay a straightedge across all the ribs on each panel and you'll see what I mean. To minimize this problem, make sure you have a building board that is flat and firm, yet soft enough to take pins without pushing the heads through your thumb. A board

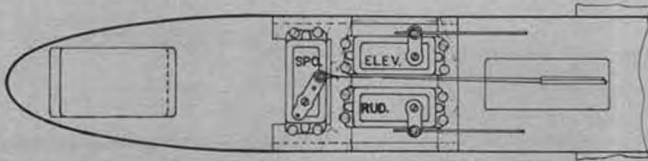
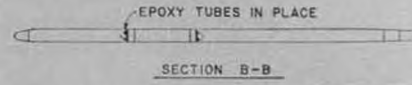
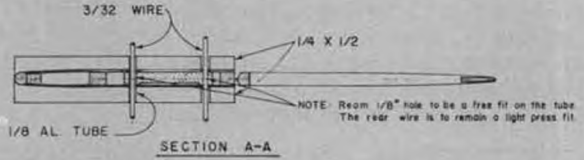
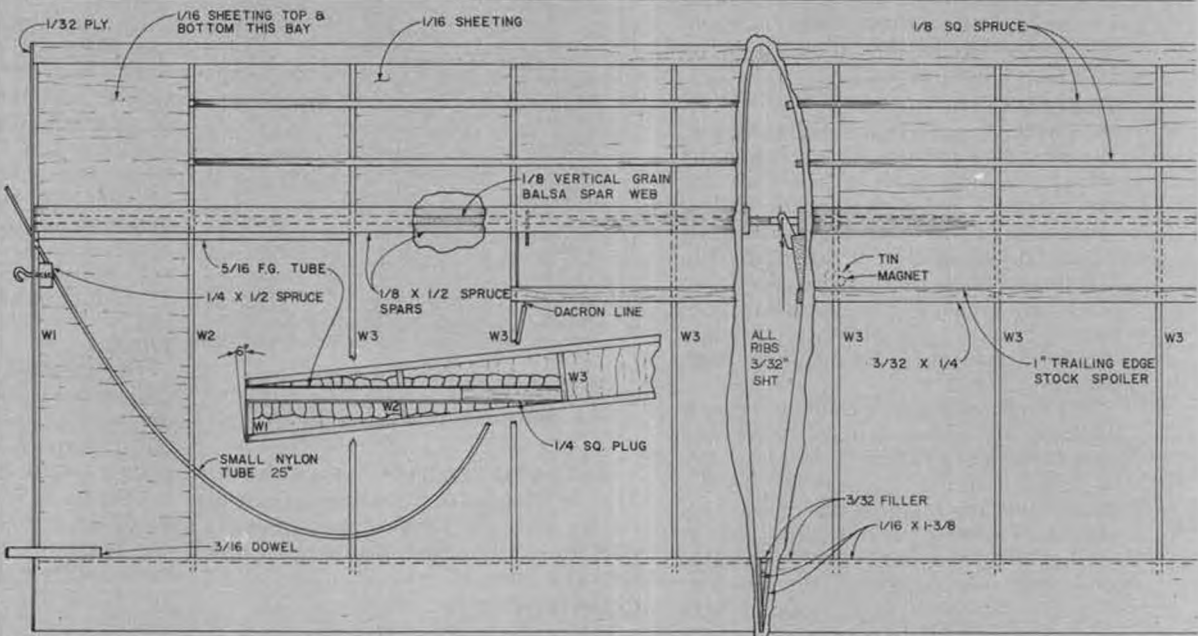
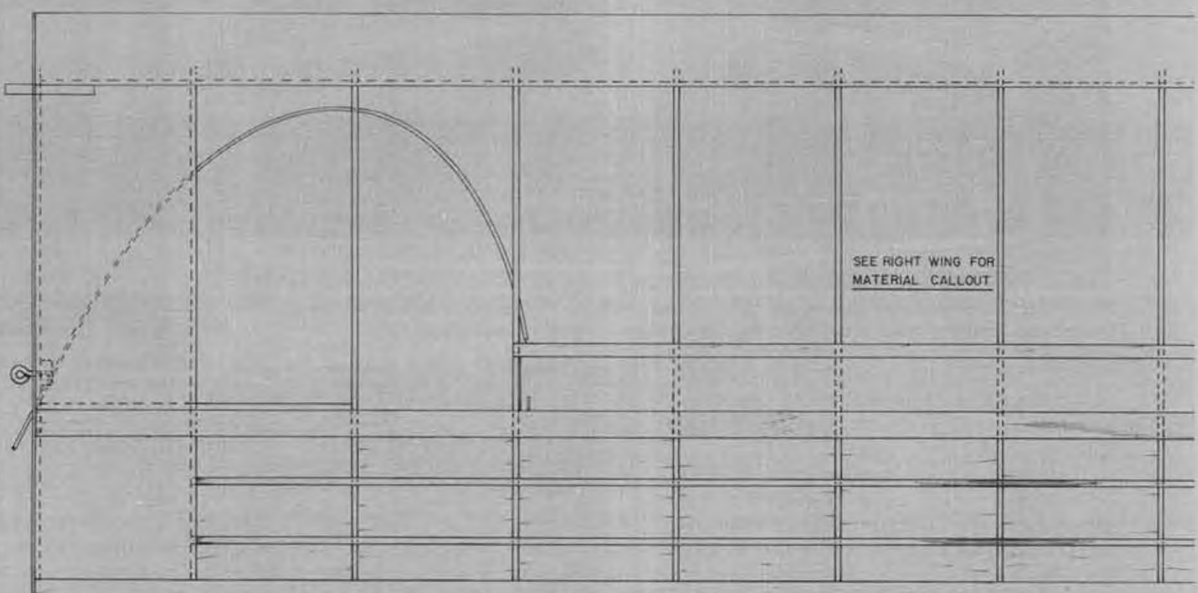
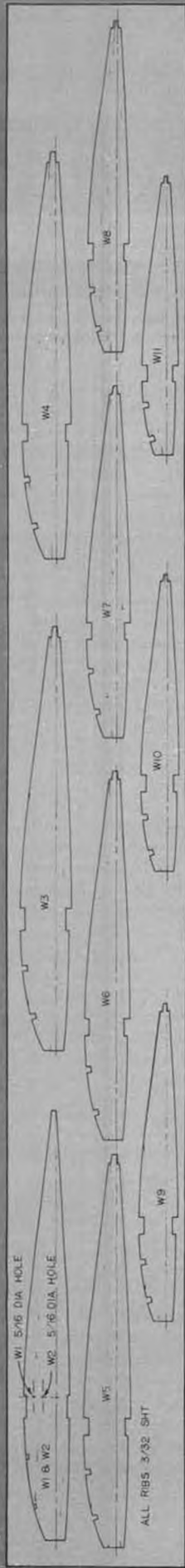
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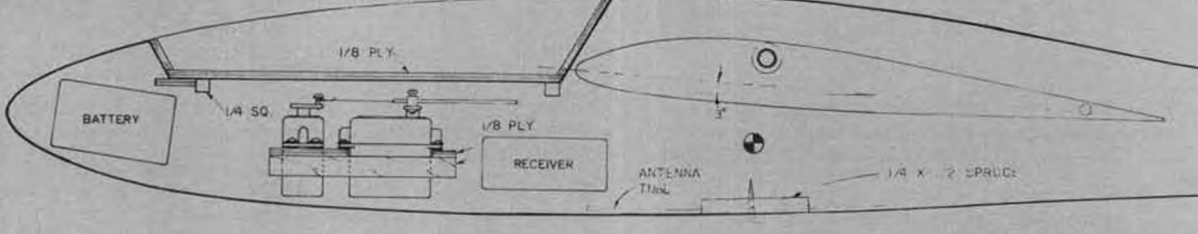
Rear view of the wing tip, showing what the Hoerner tip should look like when finished. Not that hard to carve.



Fin makes extensive use of plywood, heavy but necessary for strength. Cutouts help get rid of some of the excess weight.

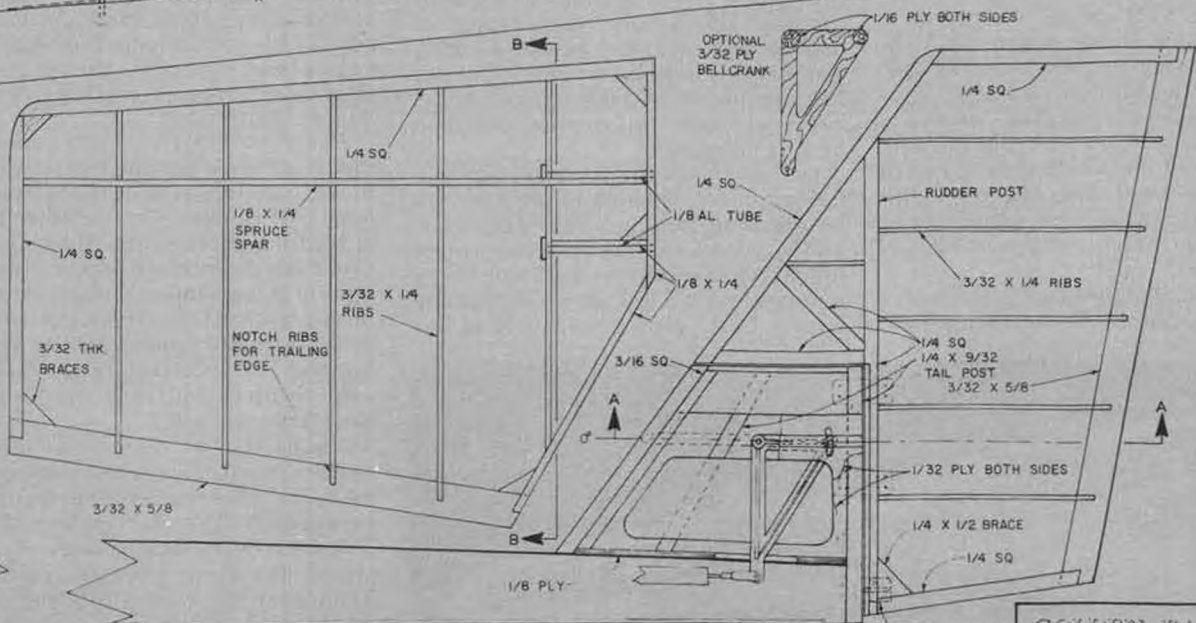
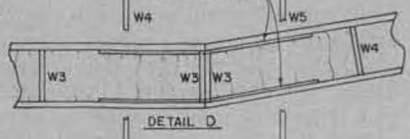
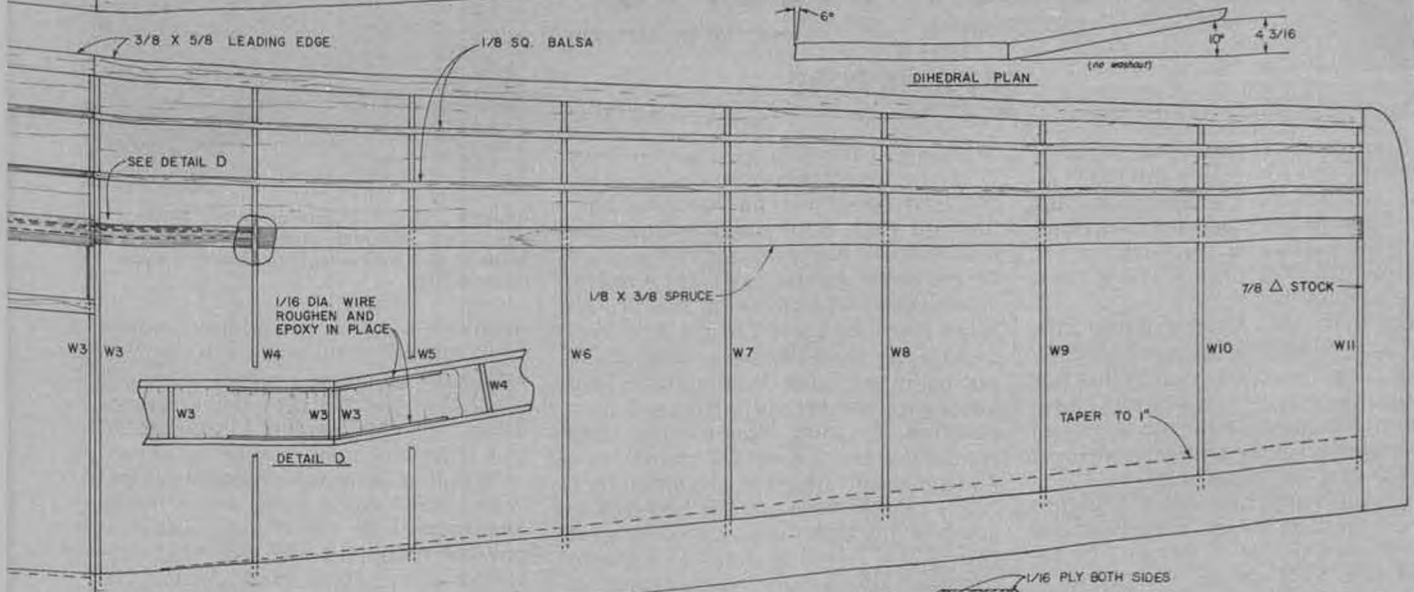
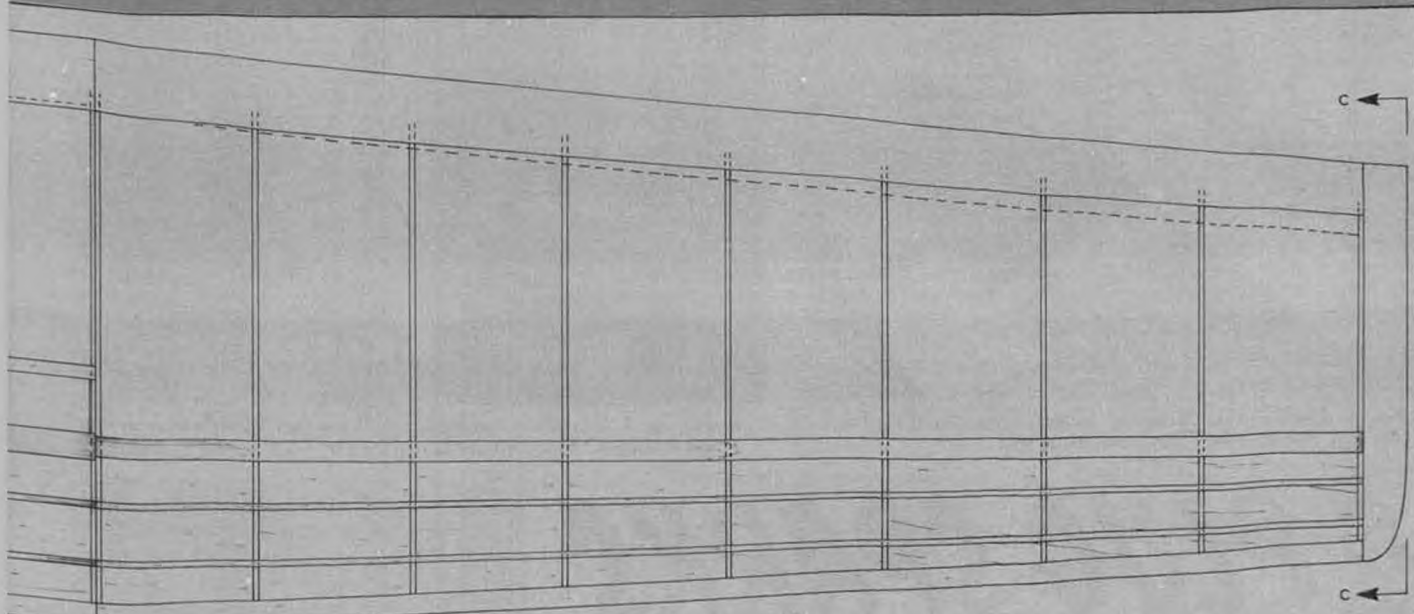


BEFORE STARTING, READ THE INSTRUCTIONS CO
Decisions must be made. Special building techniques
in a better flying sailplane. GOOD FLYING!



TOW HOOK

VIEW C. ANTI-VORTEX WING TIP



46° TO NOSE

MODEL BUILDER
magazine

GOLDEN EAGLE
DESIGNED BY TOM WILLIAMS 12/76
Plan No: 5802



Photo No. 1. A rare Ehling "Triangle" build by John Pond for the new 1/2A R/C Texaco event. An ultra-stable flier.



Photo No. 2. Jack Alten and Playboy Jr., another 1/2A Texaco ship. At 54 inches, it's bigger than the majority of 1/2A's.



PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• This columnist knows that a lot of modelers don't remember the old "Gas Lines" column started by *Model Airplane News* in 1935, but any Old Timer worth his salt truly treasures these columns with their photos and accompanying writeups.

This month, for a change of pace, this writer would like to embrace the format of that early 1935-1942 column that was so popular with the modelers. As a matter of fact, many of the modelers can still be reached at the addresses given in those 40-year-old magazines.

This month's column will also feature the spectacular rise of a new simple event known as "1/2A Texaco" in the Old Timer R/C circles. Photo No. 1 shows a Frank Ehling design, the "Triangle," as built by John Pond of 4269 Sayoko Circle, San Jose, CA 95136.

Pond states this model, originally designed and flown with the Ohlsson .23 in 1938-39, flies very well with one of the Cox .049 reed valve engines, in this case a Black Widow. His best flight to date has been fifteen minutes, in January of this year.

Photo No. 2 shows Jack Alten with a Playboy Junior of 54-inch wingspan.

Although rather large for the 1/2A Texaco event, Jack reports it is probably the best sport flier he has ever had. Blessed with a long motor run, the model slowly gains altitude to the point where a very satisfactory flight is made.

Jack Alten, who resides at 3027 Pruneridge Avenue, Santa Clara, CA, is very enthusiastic over this new event, going out to fly every lunch time in the field adjoining the Hewlett-Packard Corporation. By using slow-turning large propellers and a Cox QZ muffler, no noise is readily heard at a hundred feet. Many people have approached Jack to ask how his glider stays up so long, as they have failed to hear any motor running! This is truly the way to go, as most people will put up with a hedge trimmer or a loud lawn mower, but just let someone try to have fun with a model airplane! Under this method of flying, no one complains!

Jack also has been extremely active in trying out various fuels to see what can be obtained in long motor runs. Normally, with Cox standard fuel, most Black Widow motors will run three minutes, using a 6x3 propeller. Starting with a basic glow fuel, such as Fox



Photo No. 3. A.P. Wilson of Tokyo, Japan, built this nifty Junior Clipper from memory as no plans were available to him. Has single-channel R/C.

Missile Mist, Jack has added gasoline and a few other ingredients to come up with some spectacular results. His latest, which the columnist uses, employs Davis diesel fuel, gasoline, and Missile Mist to give a startling eight-minute motor run!

Of course, it must be recognized that large, slow-turning props are in order. At present, both the Triangle and Playboy are equipped with 8x5 Y&O propellers turning about 5,000 rpm. Jack has actually bench run some Cox reed valve engines with nine or ten-inch propellers that have given as much as twelve-minute motor runs!

This, then, gives forth to a tradeoff. If the propeller is turning too slowly, the model is unable to take off, regardless of length of runway. On the other hand, fast-turning motors make for such a fast climb that the model is practically out of sight in three minutes. This is one of the problems that faces Ted Kafer with his half-size Ehling Contest Model. Weighing only 13 ounces, this model takes off very snappily and in a short time is almost out of sight.

This has led SAM 21 to hold a meeting devoted primarily to the promulgation of rules where everyone would be competitive. The main points of consideration were weight rules and fuel types. The first, a weight rule, was adopted so the average modeler would not have to purchase any of the special lightweight airborne R/C packages. In short, any standard R/C set can be used.

Because of Jack's amazing research into fuels leading to extremely long motor runs, the club decided to limit all

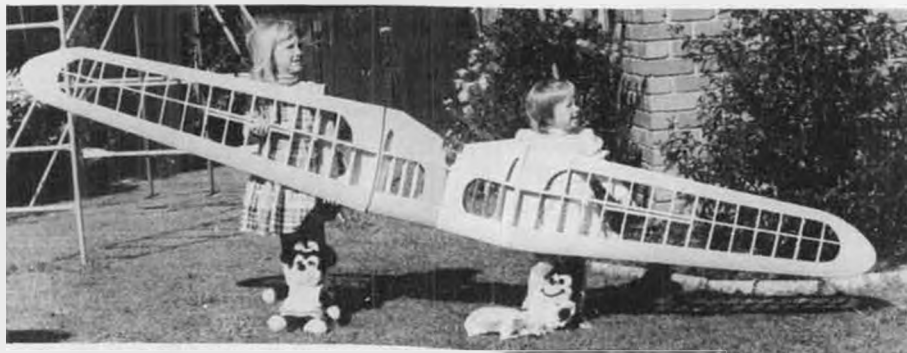


Photo No. 4. Lynette and Judith Buckmaster, daughters of *Airborne* model magazine editor Mervin Buckmaster, show off the wing of their Dad's latest project, a Shershaw XP-3.



Photo No. 5. The campaign hat is Ken Sykora's trademark on the flying field. Model is a Red Ripper with O&R .60. Hatrak photo.



Photo No. 6. Ted Kafer, Bob Sliff, and Ross Thomas just before electric flyoff at Pond Commemorative. All used Playboys.

exotic fuels and those altered to produce economy. After considerable discussion about the exact wording, the word for fuels was "unaltered."

In the future, unless it is found that the rules have again been found to be deficient, these are the rules SAM 21 will use at all its contests:

1) All models must be powered with Cox reed valve engines (Babe Bee, Golden Bee, Black Widow, QRC, etc.). No modifications to engines are permitted.

2) Fuel allotment consists of filling the tank.

3) Any unaltered commercially available fuel may be used.

4) Any Old Timer design conforming to the December 31, 1942 cutoff date may be used.

5) There shall be no size limitations.

6) All models shall weigh 8 ounces per square foot of wing area.

7) Flights under four minutes shall be considered attempts unless declared an official flight by the contestant.

8) Three attempts will be allowed to obtain two official flights. The longest single flight wins. Any flight over four minutes shall be an official flight.

MOTOR OF THE MONTH

This month's motor is truly a rare one; one, this columnist will bet, that 50% of the engine collectors are unaware of. The writer is indebted to Karl Carlson for the use of his rare motor (complete with motor mounted on wood skids similar to a Brown Jr.) and to Dick Dwyer who supplied the information sheet written by Dwight Hartman.

The Luxor engines bear a very marked resemblance to the popular Brown Junior motor; however, the engine we are featuring is a .48 cu. in. displacement. Actually, there were two sizes of Luxor motors built, the smaller being .30 cu. in.

Designed and built by Stephen R. Feiler of 451 Lake Avenue, Bridgeport, CT 06605 (present address), only one of the smaller engines was actually completed by Feiler. Later on, Dwight Hartman acquired parts for 14 more of the .30

size Luxor. Hartman later put these together.

Feiler manufactured 36 of the .48 size Luxor engines, of which 33 were sold through the Bridgeport Model Shop during the summer of 1939. With sales at a very low rate, it was no surprise when manufacture of these engines was discontinued.

The Luxor engines feature a cast aluminum cylinder head and crankcase, utilizing two machine bolts for attachment. For those who want the exact

specifications, the .48 has a bore of 7/8 in. and stroke of 13/16 in., giving a cubic inch displacement of .48.

Continuing with the specifications of the Luxor motor, the rear crankcase covers were turned from 24ST aluminum. Installation and removal were facilitated by two spanner wrench holes drilled in the cover. A steel liner of heat treated 4140 steel was used for both engine designs. Pistons were cast from cast iron, machined and ground to a lap fit with the cylinder liner. No rings were employed. The 4140 steel provided the strength for the crankshaft counterbalance. The wrist pin was also made from drill rod. As with most motors of the day, the crankshaft bearing was a bronze bushing.

The engine came mounted on a wood skid quite reminiscent of the early Brown Jr. motor packaging. A Champion spark plug and Smith "Firecracker" spark coil formed the basic ignition components. The timer featured construction of 1/16-inch brass stock and tubing with an adjustable stationary point.

To round out the assembly (and again, make it look like a Brown Junior), a tinplate gas tank of 2 oz. capacity was provided on the wooden skid. The tank was neatly fitted with a Gits filler cap over a 5/16-inch fill tube.

One interesting feature of this engine was the provision of knurled faces on both the propeller drive and prop



Photo No. 7. Art Watkins did a very nice job on this Michael Roll Berryloid Winner.



Photo No. 8 W.W. Wilson sent this photo of his Flying Quaker, complete with GHQ engine, built in 1937. Heavy aluminum prop acted as a flywheel, necessary for the engine to run at all.



Photo No. 9. Frank Tlush's original 1936 Texaco winner is still in remarkably good shape and still sports a Tlush Super Ace under that streamlined cowl. An advanced design for its day.

washer to insure a good grip on the propeller. Only the prop drive was splined to the crankshaft, and the rear face was machined for the timer cam flat.

No performance figures are available on this motor; however, the motor appears to be well made. As pointed out before, the look-alike motor offered nothing new except for displacement size, so was known only locally, never gaining national recognition.

MORE PICTURES

Picture No. 3 shows a Junior Clipper as originally marketed by the Comet Model Airplane Co. This model was built from memory and appears to be quite accurate. A.P. Wilson, residing in Toyko, is to be commended upon his ingenuity.

Wilson states the model flies nicely with a Cox .020 engine and Ace Pulse Commander single-channel R/C. Covered with transparent Solarfilm, this model has attracted considerable attention from the Japanese R/C group in Tamagawa.

Wilson wants to say hello to Larry Boyer and the rest of the San Diego boys he used to fly with at Kearney Mesa flying site (before the houses gobbled it up).

Picture No. 4 shows the wing construction of a Shereshaw XP-3 (an R/C Model Builder plan) as built by Mervin Buckmaster, Editor and Publisher of the Australian model magazine, *Airborne*.

Mervin, who can be reached at 11 Cornwall Close, Gladstone Park, 3043, Victoria, Australia, has been extremely active in Old Timers. He is presently flying a Comet Sailplane, designed by Carl Goldberg. He states this model flies superbly.

In news from Australia, Buckmaster notes there was a special Old Timer event at the recent Australian Nationals for the Walden Skyrocket. This design, an almost dead copy of the Thermal Thumber and used as the only model

design in this special event, was a great success with over a dozen models showing up. This was a great promotion stunt to encourage Old Timer activity. As Merv sez, "No question about it, the boys over here are gradually spreading the good word and I reckon there will be twice as many Old Timer models at the end of this year."

We are indebted to Carl Hatrak for the next photo, No. 5, of Ken Sykora, the dynamic newsletter editor of the SCIFS newsletter, *The Flightplug*. Ken is shown here with a rather rare airplane, the Red Ripper (featured recently in *RCMB*). Not too many of these are seen on the field.

As of this writing, we do not have any reports of the model's flying capability.

As a sidelight, those interested in

receiving the SCIF newsletter can become a subscriber by writing to Ken Sykora, 6716 Noble Avenue, Van Nuys, CA 91405. Cost is \$3.50 per year.

Picture No. 6 was taken at the Cal Poly Flying Field during the 1979 Pond Commemorative. These three finalists, Ted Kafer, Bob Sliff, and Ross Thomas, all had Playboy Senior models. It is to be noted that Sliff has the cabin version. This head-to-head competition is just another form of Old Timer enjoyment. All models were launched at the same time.

The last man down wins (in this case Ross Thomas). Could anything be simpler?

All three are very active in Old Timer flying. Ted Kafer, 1979 SAM 21 President, has a regular stable of models besides his Playboy. These include the

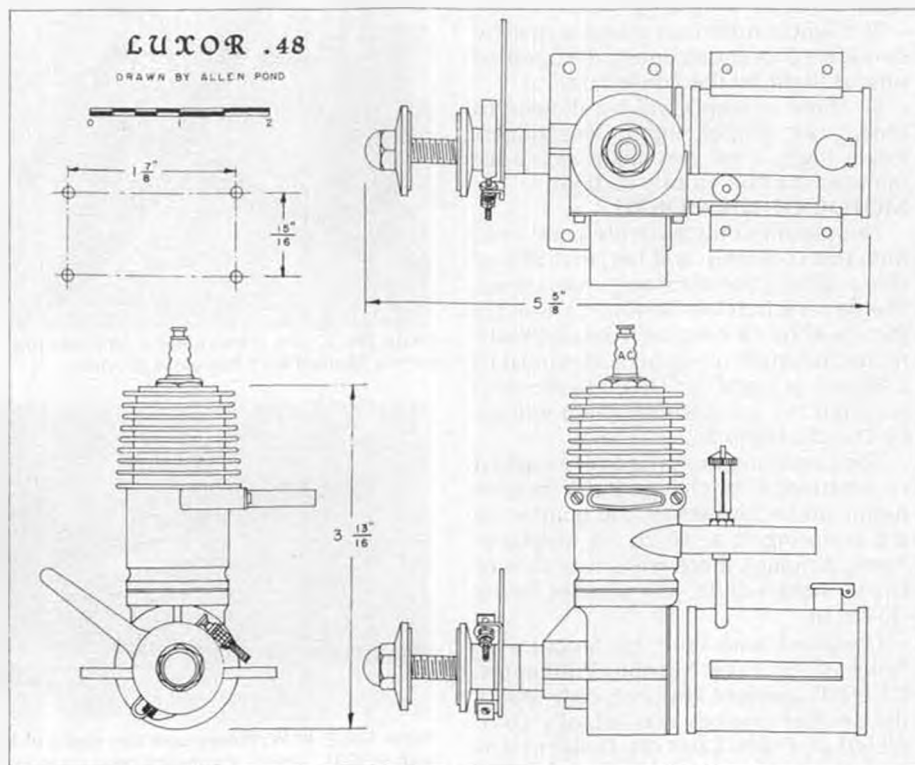




Photo No. 10. Gordon Coddling's highly modified Pacific Ace, which he calls "Mr. McCaw". Shown here before painting.



Photo No. 11. Phil Bernhardt's Ehling Contest Gas Model has a real snarl to go with the roar of its Anderson Spitfire.

Flamingo, PB-2, Lanzo Stick, several .020 models, and now a new 1/2A .049 Texaco model. A real active administrator.

Bob Sliff was the Editor of *The Arcing Point*, the official organ of SAM 49, the Southern California club for O.T. R/C. Sliff also runs a business known as Hobby Horn, which specializes in Old Timer supplies. He also helps Jim Adams get out the SAM publication *SAM Speaks*. Between these jobs, he does military duty with the National Guard. Kind of a busy guy!

Ross Thomas, a relative newcomer to the Old Timer game, has made spectacular advances. In less than two years he has emerged as one of the competitors to be reckoned with. He has recently recovered from a complete loss of all models and equipment in a destructive fire. Once a modeler, always a modeler!

OBIT NOTICE

While sitting in the booth for John Pond Old Time Plan Service at the '79 IMS Show, I was approached by Dan Davis who reported that Steve Kowalik died several months ago.

Old Timers will recall that Steve had his moment of glory in *Model Airplane News* when he won the Consistency event with his Miss Delaware design. Impressed by his win, the Ideal Model Airplane Co. asked Steve for his design, hoping to kit it for popular consumption. However, as reported earlier, the Ideal Co. found the market had changed somewhat, as the trend was towards smaller models. Kowalik obligingly scaled the model down to five feet plus. The new model was called the Air Chief, a kit that sold well for several years.

In later years, Steve became heavily involved in Shriner work and did no model work to speak of; hence, his passing did not impress the bulk of modeldom. We're going to miss that gabby soul!

Picture No. 7 shows Art Watkins, of 325-11 Sylvan Avenue, Mt. View, CA 94041, with a beautifully built Michael Roll 1937 Berryloid Winner. This elegant twelve-foot model is the first that we know of to be constructed since Cliff Silva's, successfully built and first flown several years ago and still going strong.



Photo No. 12. Texaco activity at the SAM 49's Texaco meet in December of last year. Kraft Systems' Jack Albrecht (left) was the winner this time.



Photo No. 13. Al Hellman, prolific in both F/F and R/C Old Timer events, working on the innards of his Eastern States Gas Champ.

Unbeknownst to Cliff, the SAM 32 boys (Perssons, Watkins, et al) decided to build a series of these models to surprise Cliff and at the same time put a little more fun into the competition. Unfortunately, Art was the only one to show at the SCIF Year Ender meet at Taft, and even more sadder was the fact that the model was not trimmed out. The boys have promised that 1980 will be the year to oust Silva and his Roll model!

Photo No. 8 comes from W.W. Wilson, 1432 Babilon Lane, Nassau Bay, Houston, TX 77058, showing his original Flying Quaker back in 1937. To be noted is the GHQ engine with a left-hand prop. Not

too many fellows know it, but the Loutrel engine, which was the forerunner of the GHQ, was designed to run clockwise. When the engine was taken over and renamed the GHQ, no one bothered to explain the engine ran this way; hence, the many stories of how poorly the engine ran (counterclockwise!).

JUNIOR BIRDMEN DAZE

Just received a letter from Sears McCarrison of 29 Wheeler Circle, Apt. 189, Stoughton, MA 02072, who sent us a whopping bunch of Xerox copies of the old Junior Birdmen days.

Among the literature (which was primarily devoted to three-views, called Ship Shape No., Model Builder's Scrap Book, etc.) was the announcement that the big New England Championship Model Plane Tournament was to be staged at Franklin Field, Blue Hill and Talbot Avenues, Dorchester, beginning at 9:30 on June 28, 1937. Glider, hand-launched stick rubber and R.O.G. cabin rubber make up the three events. High scorer will win the Silver Wing trophy and an all expense paid trip to Atlanta, Georgia, to compete in the National Title and \$400 in prize money. This plus all sorts of entertainment, sightseeing tours, Army demonstrations, etc., formed part of the weeklong trip. Were those ever the days for rubber powered flying!!

Sears remembered this meet quite vividly. Doesn't remember who won, but does recall that two modelers

showed up at the edge of the field with a gas model. The Junior Birdmen Official who was directing the contest immediately got on the public address system and announced that anyone who went near the gas model would be disqualified immediately. This action was taken because Lawrence Shaw, the National Director of the Junior Birdmen movement, became convinced that gas models were dangerous and did everything in his power to discourage their development. No question about it, this attitude led to the demise of the Junior Birdmen shortly thereafter. By contrast, the Scripps-Howard contests openly embraced gas models and proved to be outstandingly successful.

Photo No. 9 was submitted by Mike Granieri, 3 Dryden Road, Box 78, Potteryville, NJ 07979, showing the original 1936 Texaco Winner as built by Francis Tlush. This photo was sent by Mike to show what the original looks like.

Mike does apologize for the right-hand prop on it, as Tlush Super Ace engines were made to run clockwise. The model is in excellent shape and has won several awards at recent trade shows. Of particular note is that Frank Tlush set up all his ships for clockwise rotation of the motor.

Mike Granieri is well known for his "MG" design which has been highly



Photo No. 14. A mighty rare photo is this one by Bruce Lester, showing Maxwell Bassett's original Miss Philly VI taking off on its Nats-winning 70:02 flight at Wayne County Airport in 1937. These old photos are really neat! Any more out there?

successful in Old Timer radio control events. Mike can be justly proud of the number of wins and places taken by this design during the 1979 season. Incidentally, plans to the MG are available only from Mike.

CONTEST NOTICE

We published what we thought was the complete Old Timer schedule for the West Coast, but it was no great surprise to hear from Robert Wubben of SAM 31. He states that "Cactus" Contests will be held on April 26-27 and May 3-4. These two-day free flight

contests will feature the following events: Pylon Class C, Cabin Class C, Pylon Class AB, Cabin Class AB, .020 Replica Pylon, .020 Replica Cabin, Combined Rubber, and 1/2A Texaco.

For further information and site location, contact Robert Wubben, 4222 W. Waltann, Phoenix, AZ 85023.

Photo No. 10 shows a model which Gordon Coddling calls "Mr. McCaw" (macaw, one of the parrot species), a highly modified 66-inch Pacific Ace gas job. He has taken off the cabin, installed

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SKY ROCKET

OLD TIMER Model of the Month

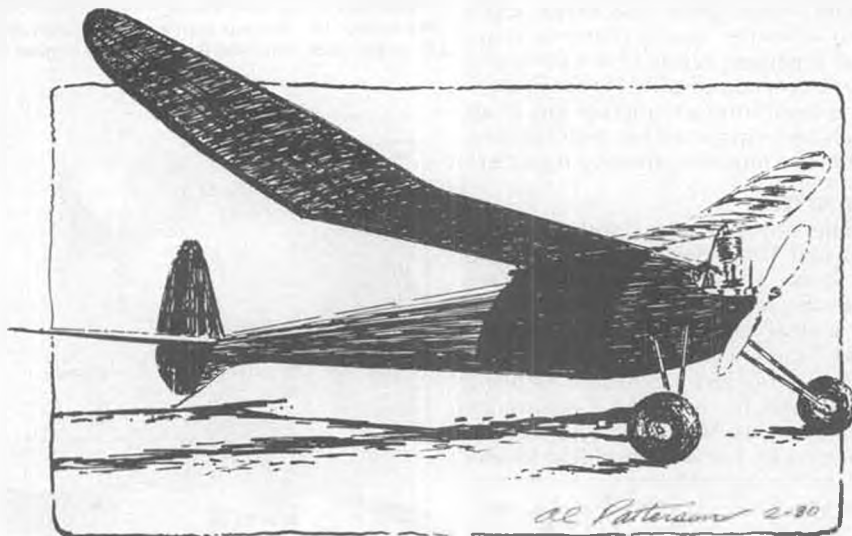
Designed by: Larry Eisinger

Drawn by: Al Patterson

Text by: Phil Bernhardt

• Larry Eisinger's "Skyrocket" from the January 1940 issue of *Flying Aces*, is another of those oldies that looks like a winner, yet is very seldom (if ever) seen on the O.T. contest circuit nowadays. In fact, after eight years or so of active O.T. flying, first with F/F and then R/C, I've never once come across one of these ships, not even in a photo... a real puzzler, as the Skyrocket does look like it could be made to fly with the best of the O.T.'s now being flown in competition.

Eisinger's Skyrocket was powered with a Brown Jr., which is actually a lot of power for a model this size (62-in. span, 500 sq. in.), so the wing was designed with plenty of dihedral and the tail moment was made extra long to keep the power pattern under control. (Even the stab has some dihedral, a trick intended "to make the model more stable." You figure it out!) The wing

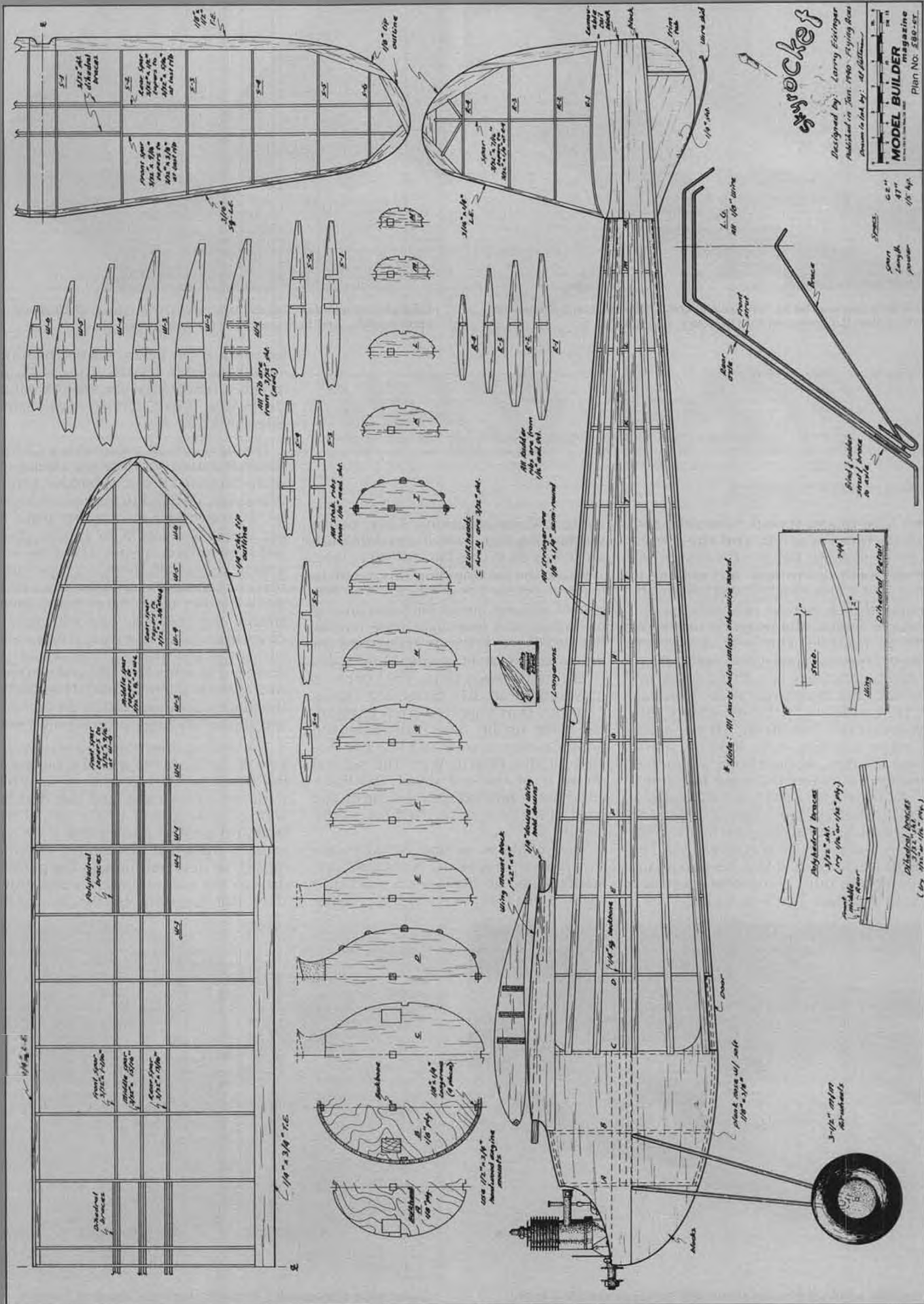


features an RAF 32 airfoil, chosen because of its good flight performance and also because it is thick enough to accommodate a nice, deep spar. And not just one spar, either, but *three* of 'em, grouped closely together and located more in the center of the wing chord than towards the l.e., as is usually seen.

The fuselage has an elliptical cross-section with 12 half-rounded stringers around its perimeter. This type of structure is usually a bit of a pain, but is made somewhat easier in this case by the fact that everything is a straight line aft of the wing t.e., making it easy to get the stringers lined up properly. Also, note that the bulkheads have a 1/4-in. square hole in the center. The construction sequence called for the bulkheads to be

glued to a piece of soft 1/4 sq., then the top, bottom, and side longerons (1/8x 1/4) were to be added, and finally the stringers. Just how straight a piece of soft 1/4 sq. is going to hold everything while you glue on the sticks, is hard to say. A more accurate and easier way to do it would be to make a crutch, glue the bulkheads to it, then add the stringers. A crutch certainly is not going to bend and twist like a single stick would.

For Old Timer events, the Skyrocket has to weigh at least 28 oz. to meet the wing loading requirement in both F/F and R/C. Also, for R/C, a .22 is the biggest engine allowed. Either way you make it, the balance point specified in the original text is at 38%, or 3-1/2 inches aft of the wing l.e. •



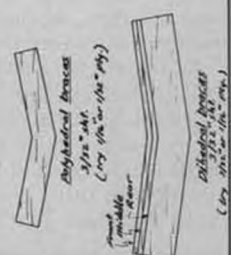
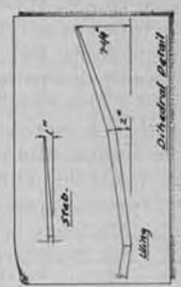
Styrochoke

Designed by: Larry Estinger
Published in Jan. 1980 Flying Boat
Plans to be by: adair

MODEL BUILDER
MAY 1980
Plan No. 580-51

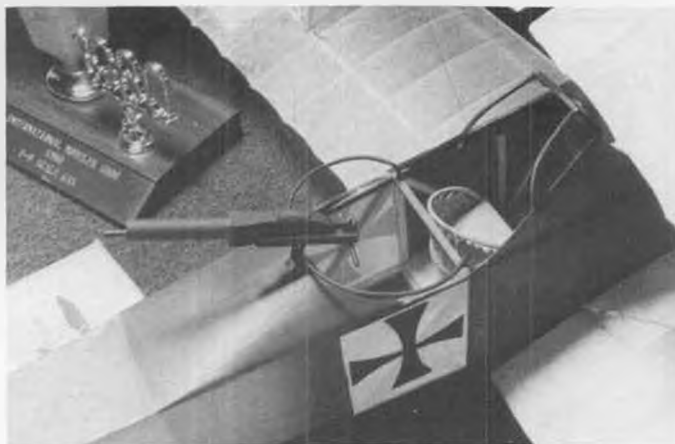
Span 62"
Length 47"
Power 1/8 hp

NOTE: All parts unless otherwise marked.





Bill Stroman was 1st in F/F Scale at the 1980 IMS Trade Show with his Lohner C-1, powered by D.C. Dart .035 diesel.



Cockpit and gun detailing on Stroman's C-1 is typical of all of his scale models. And he fears not to fly such gems.

The 1/2-A SCENE

By LARRY RENGER

PHOTOS BY AUTHOR

• I love model shows! When the IMS Show hits Pasadena and the MACS comes to Long Beach, it is one of the high points of the year. It is exciting to see all the new goodies, and I especially enjoy the chance to talk with the real people behind the products that make things possible. This year at the IMS Show, for example, you could talk to Mark Smith, Duke Fox, Bill Cannon, Bob Novak, Bill Northrop, Walt Schroder, Carl Goldberg, John Brodbeck, Bill Wisniewski, Joe Bridi, Hi Johnson, Charlie Cannon, Rose Rehling, and a host of others whom I hope will forgive me for not calling them out by name.

As a sidelight to this year's show, a new and unbelievable electric powered indoor R/C world record of nearly 1-1/2 hours was set by Tony Naccarato Jr. The flight was so long that it precluded any attempts by other competitors to make a flight that day! That's one way to win a

contest. Congratulations, Tony, on an outstanding feat, even if you didn't use an .049 to do it. (Prejudiced? Who, me?)

I'll cut the yakking short this month to leave room for lots of photos. The first pair of pictures are of Bill Stroman and his Lohner C-1 free flight scale model. Bill took first in F/F Scale at the show for the second year in a row, using a different model each time. The Lohner is powered by an .035 diesel, the Davies Charlton Dart imported from England. He made up his own plans from the book *Reconnaissance and Bomber Aircraft of the 1914-18 War*. The second photo is of the seat detail. Bill has a completely detailed scale engine on the cowl which he removed to show me the diesel.

Next photo is of Bob Novak's new two-channel receiver. Although primarily aimed at the race car market, it seems to me that this is an ideal receiver

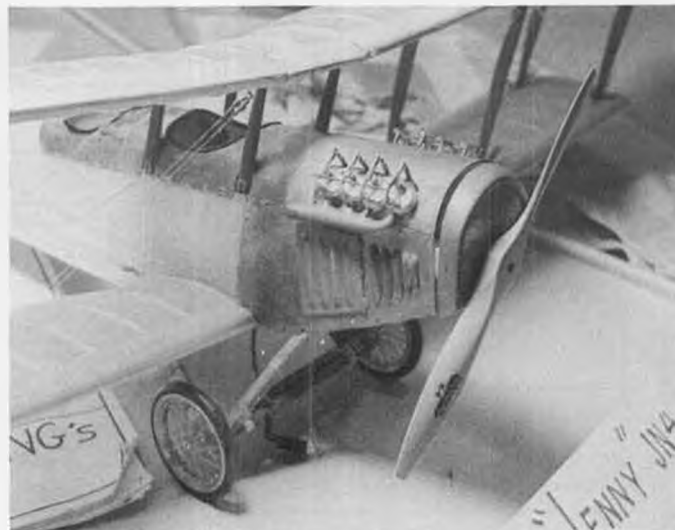
for use in 1/2A Pylon, since it features interchangeable crystals. For details on this gem, send a legal size SASE to Novak Electronics, 2709-C Orange Ave., Santa Ana, CA 92707.

The next aircraft pictured is a Curtiss Jenny. It started out to be just a build-up of the Sterling kit, but its builder, Lenny Waronker, decided to improve things a bit. He reworked the Sterling plans to get better agreement to factory plans and then started to work. That cowl and engine are metal! There is a super-fine brass screen for the radiator, brass shim stock for the cowl, hardwood veneer around the cockpits, wire wheels, silk covering, bracing wires, rivets, and various scale fittings. The model is powered by a Tee Dee .020 and carries a two-channel Cannon radio. The scale of the model can be judged by the fact that the apparently huge prop is only a 6x4!

The smiling chap holding a seaplane is Ken Willard, and the model is his latest, the "Poolboy." Ken got turned on by Bill Cannon's latest radio and decided he wanted a seaplane to fly out of his backyard pool. (I don't know if he has actually tried that takeoff yet, but the model has definitely flown.) The gentleman in the background in none other than Bill Cannon, by the way. The



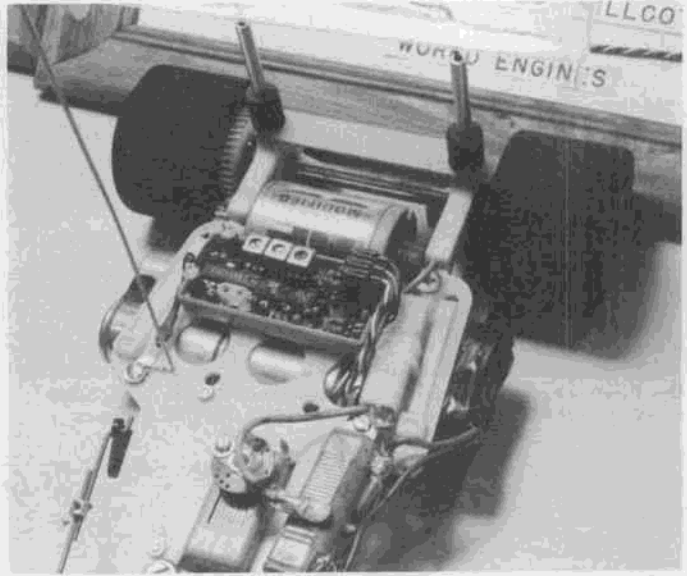
Another small scale model at the IMS Show was this JN-4 Jenny, built from a Sterling kit by Lenny Waronker.



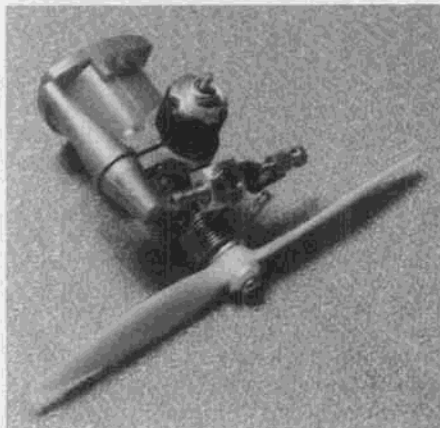
Closer inspection reveals a fantastic amount of detail on Lenny's Jenny. Uses a Cox .020 and two-channel Cannon R/C.



Ken Willard's latest mini-model is the "Poolboy" .010 seaplane for tiny Cannon radio (that's Bill Cannon in the background).



Bob Novak's new two-channel receiver was designed especially for cars, but could also be used in aircraft and boats.



The R/C version of the G-Mark .03 engine being imported by Cannon Electronics.

Poolboy is Tee Dee .010 powered with two channels. Ken is thinking of adding throttle, too!

At the IMS Show, Bill Cannon was showing off his now complete Super

Micro radio system. As a sales gimmick, he had the new servo cases mounted as tie tacks. For a good idea of the real size of this new unit, see the comparison with Cannon's old Super Mini and the Kraft KPS-18 servo on the same card. That receiver in the foreground is Cannon's latest; it weighs a scant 1/2 ounce. You can see why Ken Willard was enthusiastic.

Just the thing to go with Cannon's new radio is the G-Mark .03 throttled, muffled engine being imported by Cannon Electronics. Unlike most very small engines, this one sports a for-real throttle and muffler. Bill says it performs and idles very well. How about schoolyard scale with four channels?

Final photograph for the month (there are plenty more for about two more months, then there will be the MACS stuff after that, I expect) is of Kraft's exhibit of what goes into the KPS-18 servo. My goodness, I see it but I don't know how they stuff all that in the case.

They do, and it works, of course. I have a new Kraft system with five of the little wonders, so eventually I'll be able to report on their actual performance in a model. (I have a new job and am commuting two hours a day, so building is at a standstill for the moment, but soon to resume.)

Until next month, send pictures of what you are doing. We won't know about it any other way.



MODEL



BUILDER



The shrinking size of servos is graphically illustrated by this display showing the old Cannon Super-Mini, Kraft KPS-18, and Cannon Super-Micro. New Cannon Rx in foreground.



All of the parts that make up a Kraft KPS-18 servo. How do they get it all in the case?!



Our Electric Power columnist's Grumman Widgeon was 3rd in Scale at Astro Flight Champs at Mile Square. Twin Astro 020's, 36 ozs.



Bill Wendt brought his beautiful 1/4-scale Farman Moustique but wisely decided not to fly it in the gale force winds. Astro 15.

ELECTRIC POWER

By MITCH POLING

PHOTOS BY AUTHOR

• The Electric Championships sponsored by Astro Flight were first started in 1974, and have been an annual event ever since. This is definitely my favorite contest, partly because it gives me a chance to get together with other electric enthusiasts, swap stories, and generally have fun. The other reason, I've got to admit, is the beautiful weather that prevails in Los Angeles in January. I got on the plane in Seattle in freezing drizzle, enveloped in a down parka,

gloves, cap, sweater, and all the other northern accessories, and stepped out two hours later into balmy, summertime, blue skies, 70° weather. Off with the down parka! It's lucky for Southern California that the summers are hot and smoggy, otherwise the whole USA would be living there!

Saturday I went to T&A Hobby Lobby in Burbank to visit Tony and Addie Naccarato and admire their winning indoor planes, which did nearly 30 minutes on ni-cds and an hour and a half on lithium cells at the indoor R/C record trials at the IMS Show in Pasadena. I also saw their good-looking Astro 020 U-control WW-II planes built from Guillow kits. On Sunday (Jan. 20) I got to Mile Square early and tried some practice flying. The wind was really strong, out of the east. The skies were clear and the temperature balmy, but my Berkeley Brigadier was practically hovering, and the Widgeon was blown backwards on its takeoff run! The wind was in the 18-20 mph range, with gusts up to 25. When everyone else arrived, we all stood around, hoping the wind would go away, but of course it didn't. I could see that the contest was on the verge of being cancelled, so I flew my Cox S-Tee with a prototype Astro 035 to show that it really was possible to fly. The little S-Tee practically hovered, but I finished the flight and got a score in sport pattern; then everyone else plunged in too. The flying was rough at times, but every event was flown and completed (sport

pattern, glider, Old Timers, and scale).

The free flight events were cancelled due to the possibility of flyaways, but in all the R/C flying there were no crashes or major damage. This speaks well for both the caliber of the fliers and the ability of electric to handle wind. I had the most exciting flights with the Brigadier; on one flight I caught a standing wave from the mountains and finally had to trim in full down plus down on the stick to get it down after 8-1/2 minutes, well past the 5 minute max. On its last flight, the winds were so strong that the Brigadier lost ground even headed straight into the wind, and I landed it 500 yards downwind! The Brigadier earned its first place in Old Timer, no doubt about it. Bob Sliff came in second with his Cabin Playboy, and Ross Thomas came in third with his Playboy Sr. These planes flew very well, but were handicapped in the wind with their geared systems (the Brigadier was direct drive).

Steve Neu won the glider division handily with his original design Astro 15 sailplane. This glider follows the European philosophy of lots of power, streamlining, and not too much concern about weight. The plane has superb climb and wind penetration; just what was needed for a day like this one. The wing loading was actually quite reasonable; at 60 ounces and 1000 square inches, it comes out to 8-1/2 ounces per square foot. Bob Sliff came in second with his Super Monterey powered by an Astro 05, and Bill Calen came in third



Second place in Glider went to Bob Sliff's Super Monterey, held here by Ross Thomas.



Gorgeous Bird of Time with Astro 15, built by Craig Christensen, was another model not flown because of high winds.



Steve Neu's original design glider that cleaned up in its event. Astro 15, weighs 60 ozs. Good penetration really paid off.



Unusual Bleriot VII by Ferrell Papis was one of only two free flights that flew before F/F events were cancelled due to wind.



Bill Stroman and his Stinson Jr. for F/F Scale. Astro 020, 234 sq. in., weighs about 10 oz.



Ron Duly has been experimenting with electric C/L models built from Guillow kits, showed up with this really nice Zero.



Bob Sliff's Rearwin Speedster was built from an old Cleveland plan, spans 64 inches. Astro 15 with belt drive.

with his Electrolite (Astro 05, kitted by Midnite Models) which was very good looking. I would have to award the most beautiful glider to Craig Christensen, who came all the way from Minneapolis, Minnesota, with his Bird of Time powered by an Astro 15. Craig wisely decided not to try the high winds so that his model would live to fly another day. Craig got honorable mention for being the farthest travelling entrant. His travel box for the Bird of Time is quite compact. Travel boxes are a subject all by themselves, as I well know, since I bring at least three planes in such a box

to the contests!

Steve Neu, not content with showing us all how it is done in glider, brought out his scale Cessna Conquest, much to the dismay of those who remembered its first place in scale and sport pattern last year. Well, he did it again, easily. The Conquest stomped the competition. It flew like it was on rails, the wind didn't exist for it, and I had to give it an 85 out of 100 in sport pattern. Nobody else got even close, not even the 05 pylon racers. So, it had to be a twin 15 or 25, right? Wrong! It was powered with twin Astro 020's with 200 square inches! It had four channels packed into its tiny fuselage, and five instead of four cells driving the motors. All-up weight was 30-32 ounces.

Steve says that though it is fully aerobatic, it is hard to fly in schoolyards because it is so fast. Half a dozen of us were pleading and begging for the plans, but Steve says that he just made a few marks on butcher paper and that plans don't exist. What a pity; the plane just begs to be published. Anyhow, Steve got first in scale and first in sport pattern with it. Everyone hopes he won't bring it next year! I would like to include a photo of it, but that will have to wait until the next column, as I took a color slide of it and have to convert it to black and white. Second in pattern went to Bill Calen with his Quicksilver Astro

Continued on page 90



Ross Thomas again with another of Bob Sliff's models, this one a Cabin Playboy.



Not too many Red Zephyrs are being built these days. Dale Black's nicely-built version uses a geared Astro 15, has an incredibly light structure. Not flown at the meet.

HELICOPTER ~~INVERTED~~ FLIGHT

By MIKE MAS . . . Inverted flight with R/C choppers was considered impossible a few years ago, but our national champion has been doing it since late last year. Want to try it? Here's what's involved.

• For years, there have been many comments about what helicopters would or would not do. Sure, they fly around and hover well, but that is about all. But then they were made to loop and roll and do a split-S and even do dead engine autorotations. Even with all of this, the die-hard fixed-wing types would always say, "I'll get interested when you show me a low inverted pass." Indeed, that did seem like a formidable challenge and maybe even an impossible one. However, great things are never accomplished without a challenge or the setting of a goal.

About eighteen months ago, I made up my mind to be the first one in the world to fly an R/C helicopter inverted. So, after determining in my mind just what had to take place, I made the necessary set-up changes to my machine and began to try inverted flight. You see, there were quite a few things to



PHOTOS BY AUTHOR

Seeing is believing! Yes, it can be done, and by using a radio with reversing switches on all flight controls, only a few mods to the chopper are necessary for any experienced chopper pilot to do the same. Model is a Schluter Heli-Boy.



Reports have it that Mike can fly so low you couldn't get your foot under the blades!

overcome. First of all, the collective, fore and aft, and rudder were all backwards as soon as the machine was rolled over. To get past this problem, I would hook up one control backwards at a time and practice upright flight until I had it mastered. This took a great deal of time and was nerve-wracking to say the least. However, the practice paid off, and I was able to fly around safely with the controls backwards.

With this mastered, I again tried to do inverted flight. Now I had an opportunity to study the machine, and I was determined to fly the helicopter stock so that I could experience the true feeling of inverted flight. I practiced as much as possible. Now my reverse control practice paid off, and the Heli-Boy managed sustained inverted flight on Thanks-

giving Day, 1979. In fact, on the second flight that day, I was able to demonstrate over 12 minutes of sustained inverted flight, inverted outside climbing loops, and even hover. Even though I had won every major U.S. helicopter competition in 1979, this was the greatest thrill of my life!

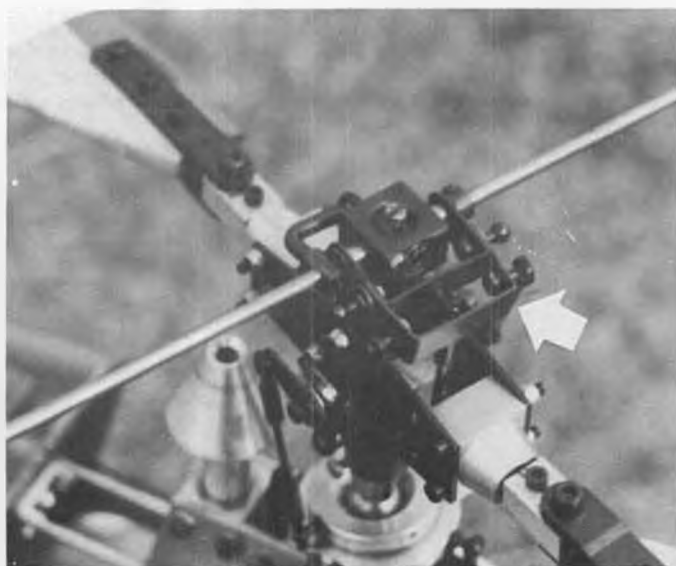
These first successful flights were made with a stock coning angle on the head to prevent boom strike in the event I got into trouble and had to give a hard rear cyclic command.

Now I will try to acquaint you with the servo set-up and what to expect from yourself and the machine. I used five servos and a standard Futaba 6-channel radio. The collective and throttle each had a separate servo, and a sixth servo

Continued on page 89



Tank has to have an extra vent and also a clunk pick-up for inverted flight. If the engine quits when you're upside down. . .



Arrow points to extra bracket on rotor head, increases pitch travel from normal - 10°, + 5° to - 5°, + 5°.



Most obvious change, of course, is the addition of polyhedral to the wing tips. This is the biggest single factor in increasing the model's stability.

the **MODIFYING COX CUB**

By LARRY RENGER . . . The single-channel Cub from Cox Hobbies is a good flier, but can be made into an even better trainer for first-time pilots by making some simple modifications. Why not give it a try?

• The new Cox Cub single-channel trainer has a lot going for it. It is inexpensive, requires only an hour or so to assemble even if you never saw a model airplane before, and is reasonably easy to learn to fly.

Several people have been making changes in the basic model to further improve the trainer characteristics. The basic Cub model is designed as a semi-scale model, and as such, has some design limitations. In order to make improvements, I wanted to increase the spiral stability and also get rid of a slight tendency to build a stall into more and more violent stalls until the model loops. (This can be trimmed out per the instructions with the kit, but I wanted even further improvement.) In addition, I made a few minor structural changes to improve the durability.

The most obvious change in the Cub model is the addition of polyhedral to the wings. Besides that, I also cut down on the total area of the vertical tail by trimming the leading edge 1/4 inch and trimming the top 3/4 of an inch lower than the original rudder height. These two changes greatly enhance the spiral stability.

Trimming the model longitudinally required a bit of experimentation, but

eventually was improved by a combination of downthrust and wing incidence change.

Finally, the wing was strengthened and the rudder rehinged to reduce the servo load. Control sensitivity was significantly reduced by cutting the rudder in half and using the inner servo arm hole and outer rudder horn hole.

On to details! The wing is cut on both panels ten inches from the center line. Be sure to use an accurate right angle to



A little downthrust helps too, and is added by inserting a couple of thin washers between the engine and mount.



To get the least amount of rudder travel, insert the pushrod wire in the innermost hole in the servo arm and the outermost hole in the rudder horn.

get those cuts precisely in line with the wing center line, as an off-angle here acts as a warp! Take each of the four sides of the two cuts and carve or sand a dihedral angle in them. I blocked mine up 1/2 inch at 3-1/2 inches from the edge of a board and then carved the panel ends parallel to the end of the board. The resulting angle was 17°. Anything from 15° to 20° will work just fine as long as both wings have the same dihedral angle within a couple of degrees. Different angles on the two tips would give the same effect as different length wings, and the model would tend to turn strongly in the direction of the higher tip.

The final step of this procedure is, of course, to bond the tip panels to the main wing panels. I suggest that you use only epoxy for this joint. White glue can be used, but several days are required for the joint to reach full strength. Epoxy will set up quickly and forms a very strong bond even in a "closed" joint such as the sealed cell foam in the wing. I prefer a 30-minute epoxy such as Devcon or Hobby epoxy, since it allows a leisurely pace in mixing, coating, and alignment.

Mix your epoxy thoroughly and smear a very thin coat on each half of the joint. Slide the two panels together to avoid trapped air. Very carefully align the bottom surfaces of both panels. Pin the joint together with at least six pins from both directions to stabilize it. Here again, misalignment will result in a poorly trimmed or even untrimmable model. Allow all the joints to set up at least four times the "time" of the epoxy; that is, 1/2 hour for 5-minute epoxy, two hours or more for 30-minute epoxy, etc. The specified time on an epoxy is its "pot" or workable life, not the set-up time.

The wing may be strengthened by adding a strip of fiberglass package tape from tip to tip on the bottom surface at the 1/3 chord line. In addition, I used about ten inches of tape centered on the 2/3 chord line.

Trim the vertical tail as specified earlier. Cut the rudder control surface loose along the hinge line. I used figure-8 thread hinges to reduce servo loads. You could use tape hinges or inset pinned hinges as an alternative. On my Cub, I found that the pushrod was dragging on the fuselage where it exited, so I carved a bit of foam away to smooth out the servo loads still more.

Final change to the model is the addition of more downthrust. Unscrew the two cowl screws and loosen all four engine screws. I added two thin washers under the top engine mounting lugs to give about a 1/32-inch shim. Gently retighten all four screws and reinstall the cowl.

I found the Cub to be stable, but very responsive with the modifications given above due to the increased dihedral. What I wanted, however, was an extremely stable and docile model which

Continued on page 94



Those who were into boating 15 or so years ago will remember the Octura "White Heat" hydro. Here a White Heat on the inside, races another hydro down the backstretch during a multi-boat race in the Chicago area during the mid-60's. All photos this month courtesy of Octura Models.

R/C POWER BOATS

By JERRY DUNLAP



• Back in the March issue, I began this column with a discussion of the weather outside my window as I wrote that column. Well, I'm going to lead off another column with a weather report. As most of you regular readers (all half-dozen of you) know, I live out here in Washington. The Puget Sound region, where Tacoma is located, is probably best known weatherwise for its dampness. And we definitely do get our share of "liquified sunshine." In sunny climates, a model boater could get sunburned enjoying this hobby. Out this way, we just get rusty. I would have settled for getting a bit rusty last weekend, when we had planned to hold a little fun type event at the local pond. Instead, the weatherperson threw us a real cold front and the pond up and froze over on us. Now, there aren't too many things that keep us "crazies" off the water even during the winter months; however, when the pond freezes over, you're not going to do much model boating unless it's with an iceboat or icebreaker. With any luck, the pond will thaw by this August in time for the NAMBA Nats. I can just about guarantee there won't be any ice on the pond come August. I won't make that guarantee about rain, however.

AND SPEAKING OF THE NAMBA NATS

The Puget Sound Model Boat Club has been busily planning the 1980 NAMBA Nats to be held August 3-9 on beautiful Wauhup Lake in Fort Steilacoom Park near Tacoma, Washington. Initial responses from manufacturers has been most encouraging. As of the end of January, we are lacking only four event sponsors.

Equally exciting is the number of questions that have been asked about the 1980 NAMBA Nats. This is a good indication that interest is high for this summer's premier model racing event. (The reader must remember that the author is only slightly biased, since he is the Director of the meet.) In hopes that some of you half-dozen regulars might be planning to attend, some of these questions are answered for you.

Q: Why only one day for the Dumas

Deep-Vee Classic?

A: Deep-Vee racing is a rather small event in District 8. It would take 40 deep-vees from outside the district to warrant two days of deep-vee racing.

Q: Suppose those 40 deep-vees register, then what?

A: Deep-Vee heats not completed on Wednesday will be concluded on Thursday.

Q: How long will the Deep-Vee Classic race last?

A: Four heats of 10 minutes will be offered.

Q: Will you use an irregular course for the Deep-Vee Classic?

A: We hope to be able to use the proposed Deep-Vee course as developed by the Deep-Vee Committee. An irregular course will be used.

Q: Will you race all Deep-Vee classes together?

A: The A Deep-Vee class will run together. Depending on number of entries and frequency mix, we may run the B and C Deep-Vee classes combined.

Q: Will there be time for testing?

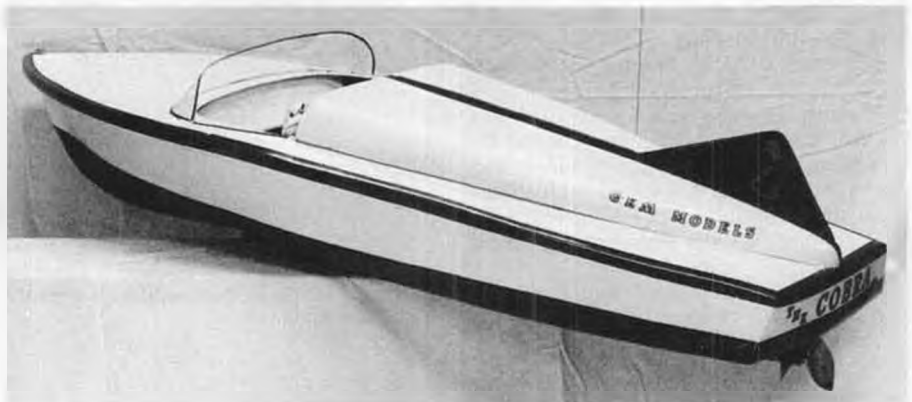
A: The course will be open for controlled practice on Saturday, August 2. The water will also be open after each day's racing until 6 p.m., and depending on time, it may be open briefly each morning between 8 and 8:30 a.m.

Q: When will the entry forms be mailed?

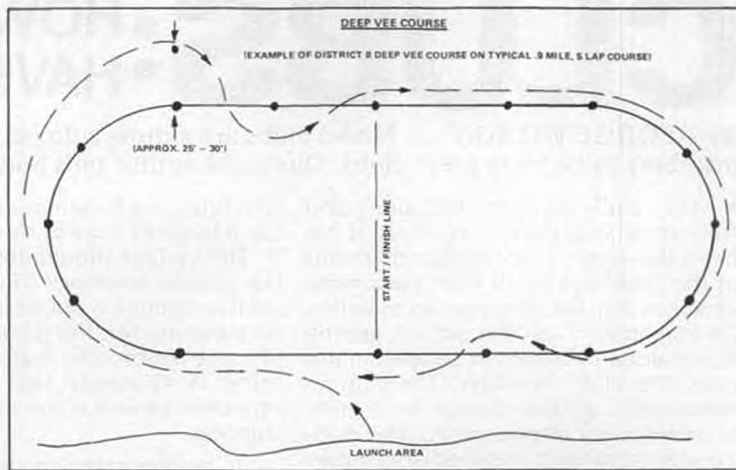
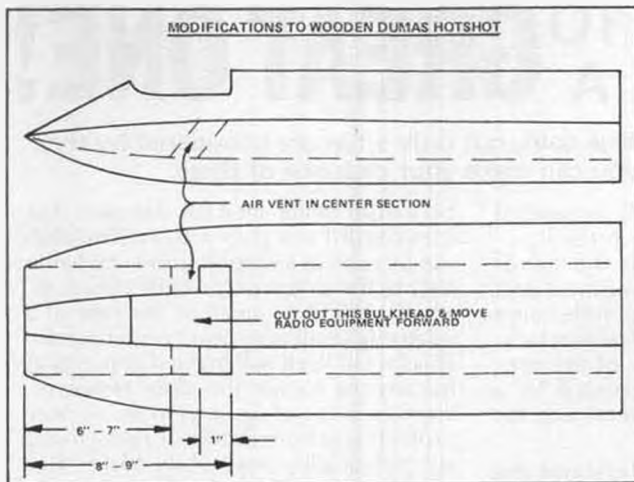
A: Entry forms will be sent to all club contact persons around the middle of February.

Q: What is District 8 "Sport 40"?

A: The differences between District 8 "Sport 40" and District 9/19 "Sport 40" are: 1) the length can be from 32 to 40 inches, and 2) any type B Class engine can be used along with a tuned pipe.



Top photo shows Gary Preusse's TAS powered Cobra, typical of the boats raced in the larger engine classes. Bottom photo shows the Cobra and White Heat about to do battle.



Q: What type of race format will be used in Scale Hydro?

A: As stated in the R/C Unlimited rules, each Scale Hydro will be scheduled into three heats. These three heats will serve as qualifying heats. The top six qualifiers and one alternate will qualify for the Championship Heat. There will also be at least two consolation heats.

Q: Will RV's be allowed to park overnight at the running site?

A: RV's may park overnight at the running site. However, there are no provisions for light, water, or sewer hookups and the gates to the park close and lock at dark.

Q: Will boats entering the Dumas Deep-Vee Classic be required to have drivers and hatch covers?

A: Although we would encourage boats entering this event to use drivers and hatch covers, the national rules do not make this mandatory. For its district events, District 8 deep-vees are required to use drivers and hatch covers. But this is not a national rule . . . yet.

Q: Will retrieving of boats be allowed in the 100-lap Team Marathon and in Enduro Racing?

A: Because of the new safety rule about having a chase boat on the water while the boats are racing, no retrieving of boats will be allowed while boats are operating on the water. This applies to all events and practice times.

AND LET'S NOT FORGET THE IMPBA INTERNATS

From the IMPBA 1979 4th Quarter Report, the following information was provided about the 1980 IMPBA Internats. The 1980 IMPBA Internats will be held at Bartow, Florida, August 11 through 16. It will be hosted by the Florida Associated Speed Team, better known as FAST. Bartow is located in central Florida, about 12 miles from Lakeland, Lake Wales, and Winter Garden. It is within a one-hour drive of such attractions as Disney World, Sea World, Circus World, Busch Gardens, and Cypress Gardens, as well as many other attractions. Jay Maguire will serve as Contest Director. For more information, contact Jay at 2210 Maple Hill Dr., Lakeland, FL 33803.

GOING BACK TO THE QUESTIONS ABOUT DEEP-VEES

Deep-Vee or Offshore Racing is becoming a somewhat heated topic in NAMBA. There are a couple of items related to this hull type that are rather unique and interesting . . . at least to this writer's viewpoint. The deep-vee design is a dual purpose design. That is, the same boat can race in both Offshore Racing (and this type of event is rather open to discussion) and it can race in monoplane class heat racing (usually five laps, using a mill start and starting clock).

Another rather interesting circumstance that is now occurring is the same deep-vee holding records in both Deep-Vee and Monoplane classes. I don't know if this is happening in IMPBA, but it is in NAMBA. In the example I'm about to cite, I'm not being critical of the record holder, boat manufacturer, or

anything else. I just wonder if anyone else thinks it a bit unusual. I'm certainly not questioning the validity of the records.

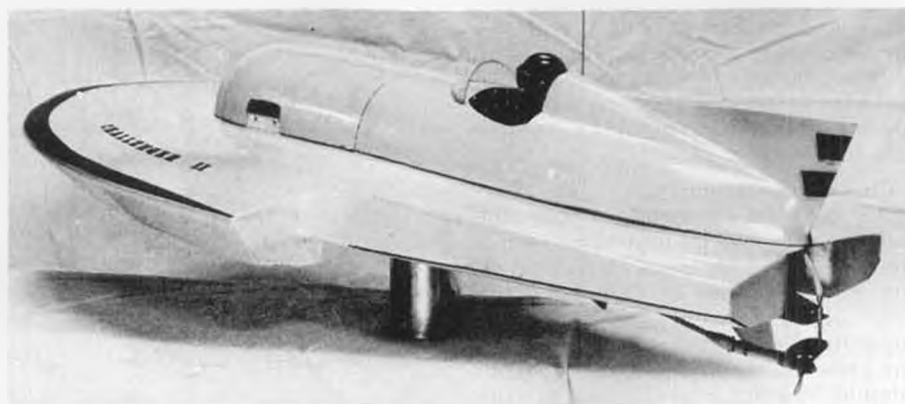
In the NAMBA oval competition records for X Mono and X Deep-Vee, Bob Finn, from Texas, holds both records with a Rossi .69-powered Super Streaker. The record is for the fastest time around the NAMBA .9 mile competition oval. It is my belief, and maybe no one else's, that Deep-Vee records should be different from what we are doing in our heat racing format.

This belief is supported in the NAMBA Rulebook in the section dealing with Deep-Vee Class. The following statement is rather pertinent to my contentions: "This race (Type 'V' Offshore Racing) is intended to simulate full-scale

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A White Heat hydro under construction. Certainly appears to have sufficient structural strength! An O&R Compact industrial engine (1.3 cu. in.) was used.



Another mid-60's photo, this one of Gary Preusse's TAS powered original design hydroplane. Model boat design sure has come a long way in 15 years!

CLUBS: HOW TO HAVE A GREAT ONE!

By GEORGE WILSON . . . Model clubs are a dime a dozen these days, but only a few are considered by their members to be truly *great* clubs. Our guest author tells how you can make your club one of these.

• Many clubs seem to drift along and frequently struggle to stay afloat. It has been the writer's observation that most of the problems result from poor management. For this purpose, let us define "management" as the art of getting things done by means of people; in this case, the club members. There is no reason why a club cannot be a great experience for all concerned; the management concepts required are simple. This article covers some of the ways that can help to make any club a *great* club.

The purpose for a club's existence is probably the most important factor in making it successful. The purpose and the closeness with which the membership sticks to this purpose can determine success or failure. It is better to have a small group of dedicated members than to have a large group of members complaining that their interest is being neglected. This is not to say that a club's catering to the many facets of the hobby will not work. But it does say that the purpose of this type of club must be clearly known and its members must be well diversified in their interests. Such a club may well serve as a council for the specific interest clubs in the area. Here, its purpose would be Public Relations and the exchange of information between specific interest clubs. Its members should consist only of those interested in its purpose.

Even in the specific interest clubs, there is generally a division of interest between contest fliers, sport fliers, and the technically inclined members. It is my conjecture that many clubs have failed primarily as a result of wrangles over contests. If your club is really a forum for contest planning, admit it and have at it. Do not be surprised if the Sunday fliers are not interested in membership.

A brief set of by-laws calling for the use of Robert's Rules of Order as guidelines for conducting meetings is a necessity. The by-laws should state the club's purpose and requirements for membership, such as dues structure; typically, full member, associate member, and newsletter only. A complicated set of by-laws is an invitation to wrangles during meetings and should be avoided.

Here is the place to warn you about "Charlie Parliamentarian." This character is always a member of your club but usually uses a pseudo-name such as John Smith or Eddy Jones. He is an expert on Robert's Rules of Order and will interrupt your meetings at the slightest opportunity if you deviate from the rules or order. This is why Robert's rules should be used as guides, not as iron-clad requirements. If you expect this sort of problem, write into your by-laws that

the rules may be temporarily suspended by a majority vote of those present.

The by-laws should define the format for regular meetings. The business part of the meeting is not what people come to meetings for. Keep it short! Similarly, do not overdo the feature of the evening. A 45-minute talk followed by a question period is the general rule for success.

It is important to understand the proper use of committees and a Board of Directors. Most controversial matters are best handled by a small group of people. The annual contest, changes in the by-laws, selection of a new meeting location, and similar topics are best handled by committees. Do not use valuable meeting time discussing the specifics related to subjects that are best handled by a group of experts within your club. Once delegated to a committee, a matter should be handled entirely by the committee unless it involves the long-term operation of the club or a substantial financial obligation. Again, *the goal is to make your meetings of general interest and to avoid tedious details.*

Many successful clubs handle essentially all of their business through use of a Board of Directors. This small group can meet relatively informally and make decisions that would use hours of meeting time if handled by the club at large. Again, long-term obligations and/or substantial financial commitments should be voted by the club.

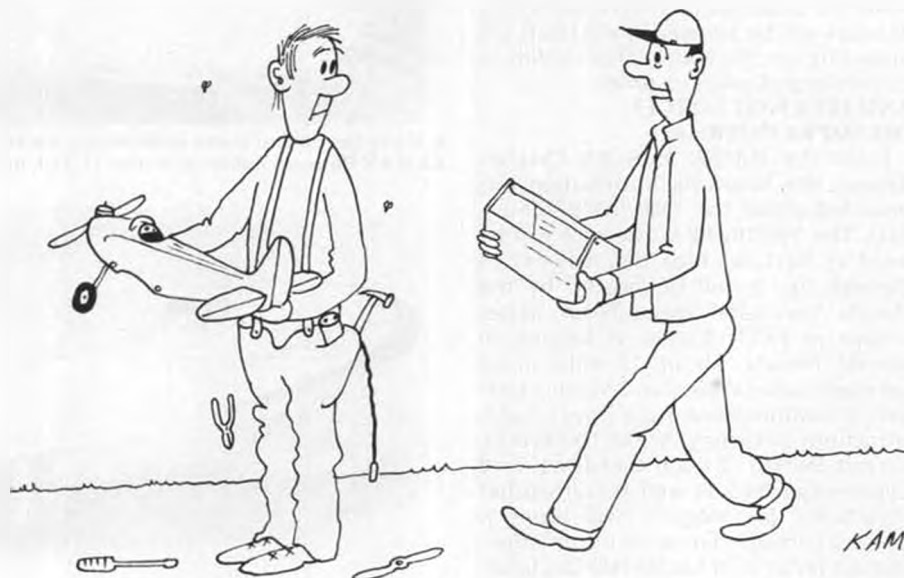
If the club can in any way incur liability for damages, it should be incorporated. This will protect the officers and mem-

bers from being sued for damages that may result from club activity. The club can be sued as a corporation but is liable only to the extent of the club's finances, which should be small in the case of a relatively small non-profit organization. This fact in itself will make it impractical for anyone to sue the club. However, incorporation of your club in no way protects you from liability for which you are personally responsible. Make sure you are personally covered by insurance if you can be liable for damages to others.

The cost of incorporation for a non-profit organization is generally less than \$100 and may be well worth it to the membership and/or officers if some wild-eyed claimant decides to be unreasonable. After incorporation, make sure the proper reports and fees are filed in a timely manner. These are minimal for non-profit groups but insure the continuation of the protection afforded by incorporation.

Club officers should remember two important things when they select people to be a slate of officers for next year, the members of a working committee, or do any other task for the club. Whatever it is, *select people who are talented along the lines of the job to be done and who want to be involved in such a job.* Sounds simple, but many times the popular contest winner is proposed for President when he has no talent or desire for running things. It is by far better to re-elect a good President who enjoys his job than to put a new man in office who does not really want

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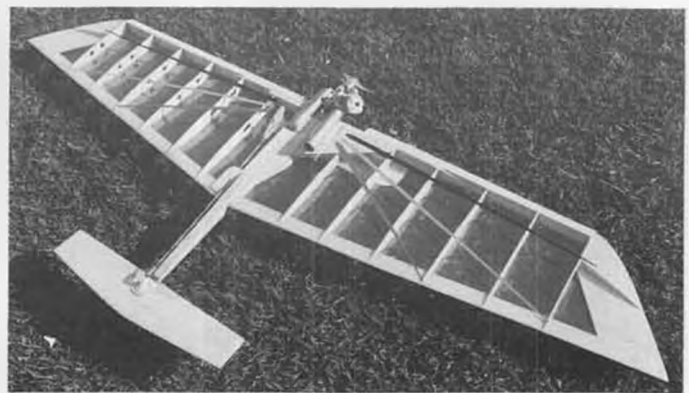
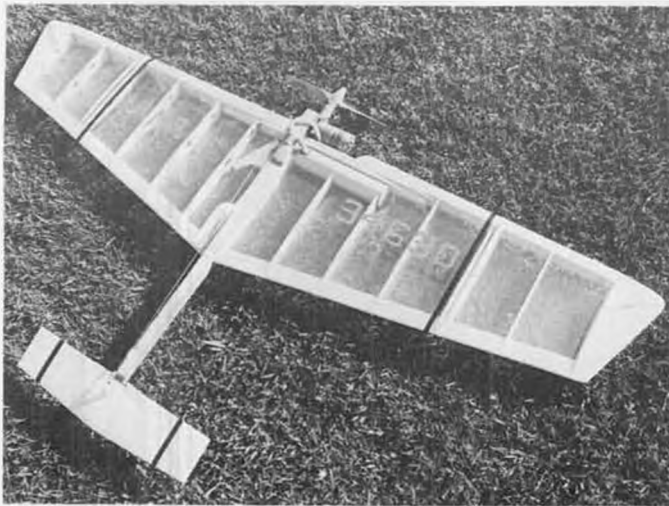
"The guys in the club decided to chip in and buy you a field box, Joe!"

FREE FLIGHT AND CONTROL LINE



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From master modeler Bill Noonan, San Diego, California, comes this photo of his latest Peanut, a rare 1924 Martinsyde Semiquaver racer. Bottom wing has a symmetrical airfoil and just goes along for the ride; top wing does all the lifting. Of special interest is that the original aircraft was flown by race pilot Frank Courtney, who is now pushing 85 years of age and living in San Diego.



At left is a Combat ship that Steve Wright is selling ready to fly. Can be had in this tapered version or with Voodoo style straight wing. Both are real good Sunday fliers and good enough for most contests. Above, a different design by Steve, features K&B .21 and minimum of parts.

PHOTOS BY CHARLIE JOHNSON

Control line

By "DIRTY DAN" RUTHERFORD

ABOUT THE NON-EXISTENT (SO FAR) NATIONAL CONTROL LINE SOCIETY

Got a few interesting letters right after the writers of said letters read over the column in the March 1980 issue of **RCMB**. Several pointed out that they had expected more and better answers to the problem of promotion of C/L and the formation of a National Control Line Society in particular. One even pointed out that the closing statement of that particular piece was lacking.

Now, I don't mean to be super tricky in my writing, even though I will once in awhile form thoughts and words into a mass (mess?) that somewhat parallels the subject. At the slightly less-than-conscious level, that is what I did with the writing on the as yet unborn NCLS.

With C/L, we have all of this latent potential for outstanding growth; C/L just happens to be a form of modeling that is easily promoted. But without an NCLS, C/L as a modeling form doesn't have any specific direction in which to go, which results in a few of us going off in all sorts of directions, some of which lead to dead ends. And without the NCLS, C/L itself doesn't seem to have either an opening or closing statement of any kind. That was the thought floating around in my head when writing a few months ago, and so the bit on NCLS ended the way it did.

SAVE YOUR TIME. . .

To those rushing about, finding back issues of **RCMB** and planning on digging out the "hidden message" in past C/L columns, you probably would be well off to just save your time. I don't do it that often, although a couple of times two years ago did it so well that even WCN had the thought go straight past his head, as evidenced by the parenthetical comments Bill used to slip into everybody's text, not just mine.

A thought. With the F/F column

having all of the Mystery Model features, maybe in the C/L column we ought to have a Mystery Message contest once in awhile. I could give you the particular magazine to look for, you would read the C/L stuff more carefully and then turn in your version of the underlying thought. The person who was correct, or the most imaginative, would get a freebie of some kind.

It would be a lot like the old word battles we used to hear around the Combat circles and newsletters about how easy it was to go 120 mph with a Combat model . . . imagination and creative thinking would play a much larger part than the actual feat.

STEVE HELMICK

That's the name carried by the fellow



Ron Hester about to release son Russell's 1/2A at San Diego fun-fly meet.

who first fired up the letter writing now going on, some of them being published in this magazine's "Three if by Air" column . . . you know, how the F/F guys say that the new title for the mag is contradictory or that the title is OK, keep the content good and all of that.

Steve has always had a talent for stirring things up and is one of the most enjoyable people I have ever run across. Now he is at it again. The newsletter that Steve is involved with is entitled *The Bat Sheet*, and being a free-thinking soul, he and several others are always coming up with plays on the title of the newsletter, references to Bat Man and so on. Terrific newsletter.

Now there has been another title change, to more accurately reflect the newsletter and its audience of readers. It is now called the *R/C Bat Sheet*, with R/C standing for "Really Cool" . . . maybe that is not funny to you right off the bat, but the *R/C Bat Sheet* is a newsletter devoted strictly to free flight modeling with heavy emphasis on the high-technology FAI events. Now it's funny, right?

MACA NEWSLETTER BACK IN BUSINESS

Word is that Ben Sanett, who had edited the MACA (Miniature Aircraft Combat Association) newsletter for quite some time, finally had to give it up. After a lapse of about two months, Frank McCune has decided to give it a shot and is now into cranking out the good word on Combat and all related happenings.

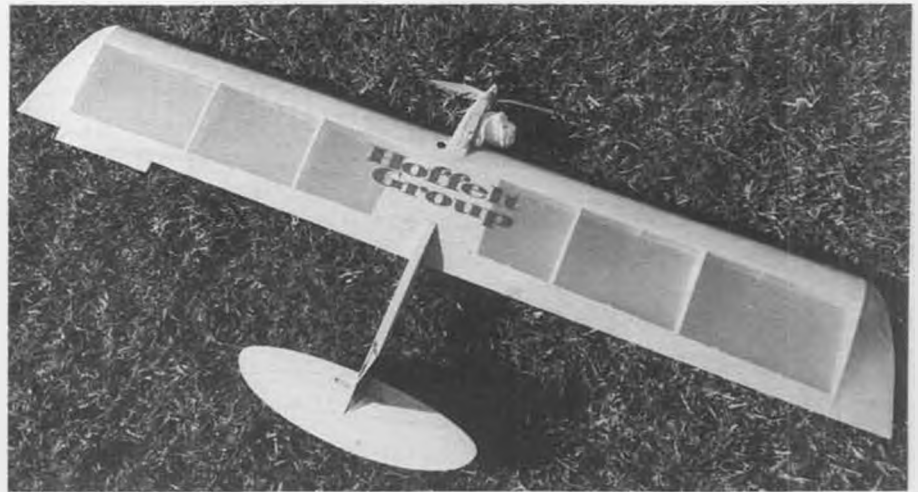
If you would like to know, you can contact Frank at Box 141, Blane, PA 17006. To join MACA, an act that will see you getting the newsletter as well as being a part of all the things MACA does to promote Combat, send the \$6 annual dues to Jordan Segal, 8314 W. Oak Ave., Niles, IL 60648.

'79 BLADDER GRABBER

Actually, I could have written about this contest a lot earlier, but never remembered to do it each time I was trying to meet another deadline. How easy it is to forget when you don't win. . .

However, Mike Petri won't forget this big meet, one of the legendary Fast Combat contests taking place annually. Mike and team partner Rich Brasher flew up for the Big One and disappointed all of the northwest Combat fliers by working their way up to the final match, although neither was unscathed by the time they got there. Rich had some bad luck in an early match, so had one loss going into the final shoot-out (double elimination contest, so one loss does not put you out). I had gained (very) slight revenge using trickery in the form of a slow start, getting in the air second against Mike. A bit of super timing on the part of the pit crew in launching the model helped surprise Mike with a quick kill before he even had a chance to come out of level flight.

So, going into the Final, both Mike and Rich had one loss, meaning that their first match was to be the deciding one. And they both went for it. Mike started out fast, while Brasher seemed to wait patiently for a shot at the kill, getting down a couple of cuts pretty quickly. It was a super match to watch, as Mike seems to take every opportunity to get a cut, even if while doing it he has to lose the following position. Mike is aggressive, yet his flying is solid and smooth with only occasional wiggles or super-low passes made. Brasher, on the other hand, only seems to bother with taking a cut if he thinks his opponent might try to get ahead on cuts and then punch the model in the ground. Rich is there for one thing only and that is to get the kill; he can often be seen to get in the streamer only to completely disregard it, instead working his way up to the knot. As Mike is a flier who wants to win or lose in the air and with a kill, not by adding up the cuts scored, Rich didn't have to worry about his opponent "Chicken Crashing" on him and so



Mike Hoffelt's new 1/2A Monoboom with a new style Tee Dee .049. Note trim tab for fine tuning. Is said to turn even better than a certain Dirty airplane.

simply went for the kill. Another thing that made it so interesting was that while Mike is smoother, Rich has all of these wiggles and really low passes at the ground to toss into the action. Just when you think you have Brasher dead, behind and above him with his model fairly low, he will tuck inverted. Even if you can make the outside loop without crashing, he will then shake you off with a few flicks of the wrist, all of a sudden being right on your tail.

So the final was really super. They both went at it hard and heavy for a full load of fuel and Mike was almost exhausted. I suppose Rich was feeling it too, but he wouldn't show it. With the score about 3 cuts to 1 (I think) in favor of Mike, they went back up for some really hot flying, as both knew it was past time for the match-ending kill and neither wanted to be on the receiving end of it. It ended up being a mid-air, which was almost predictable. Sometimes you get two guys flying and they have each other pretty well dialed in, so know how to avoid the kill. As the match goes on, each tends to take more and more chances, trying to come up with the quick hit, and the result is often a mid-air.

By the time of the final match we had a pretty good crowd of spectators who appreciated super flying, and so both Mike and Rich got a tremendous round of applause with the contestants themselves probably applauding the hardest, as they knew better than anyone what a fantastic match it had been. Mike had won it, his earlier cuts coming in very handy, but matches like these don't promote cheering for just the victor.

As usual, the Bladder Grabber prizes were outstanding. Mike went home with a complete Phase Linear system; amp, pre-amp, receiver, and ultra-trick speakers. I think the total retail price in this package is something like \$2500, so it is a big-bucks thing. Rich took home another set of speakers, to go with the ones he had already won as part of complete system at an earlier Bladder Grabber.

In the future we will probably pass a supplemental rule to the Bladder Grabber, preventing export of B/G prizes to the Northern California area. . .

BEFORE THE BLADDER GRABBER

Going into the B/G, I had not flown a competitive Fast Combat model for several months, and so was real con-

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Dale Long, Leonard Ascher, and Dave Braun pose with Dave's latest design for Slow Rat. A real screamer, it turned 14.9 first time out.



Dave Braun calls his racer the "Super Fli"; looks like it would make Combat types at home in the racing circles. Uses O.S. .36 with Nashville type tank/filler assembly.



"A man is not old as long as he is seeking something."

• Our lead-in quote this month, by Jean Rostand, ought to be reassuring to model builders. Seeking that elusive "perfect" design should keep all of us youthful!

Scale modelers have a special obsession in this continual quest for the ideal subject, since they are concerned not only with flight performance parameters, but also the much more difficult-to-define static scale points gathering capabilities. Of course, one's scale specialty can affect the decision-making processes. While the mammoth scale clan is proclaiming "Big is Beautiful," Peanuteers might well counter with "Small is Super." Meanwhile, a certain segment of builders, regardless of size preference, have a different formula for subject selection. They are attracted by easy-to-duplicate configurations, as pointed out by Frank Scott's motto: "Square is Beautiful!"

A NEW CHALLENGE OFFERED

In the entire history of model aircraft competition, few events have gained the prestigious status of the Wakefield. Certainly there has not been any direct equivalent in the world of scale modeling to attract the sort of international

striving that the Wakefield Cup has attracted. However, the sponsors of a new award are aiming at exactly that status and lofty goal with the introduction of the Ray Berens perpetual trophy. Conceived and donated by Loren A. Williams, Cliff McBain, and Richard Seifried, the award is intended to "promote competitive flying scale models of ever-increasing quality of subject selection, fidelity to scale, construction design, workmanship, and flight duration capabilities."

The imposing trophy, a 14-inch-diameter German silver bowl mounted atop a two-foot high walnut base, features individual nameplates for each of the winners for its ten year projected competition life. The event rules are sealed in plastic on the back side of the trophy and have been written in a specific and unique way, whereby certain design parameters are changed over a period of years.

By way of a brief sampling, entries will be limited to Jumbo rubber-powered scale models with a minimum monoplane wingspan of 36 inches or minimum multiplane span of 30 inches. These span limits will be increased slightly after two

years. Plastic propellers are specifically excluded. More than one model may be entered by each contestant, but only one may be selected for final judging and scoring purposes. Non-modelers will not be eligible for judging duties, incidentally.

The competitions are intended to be conducted each year in conjunction with the U.S. F/F Championships held at Taft, California.

Certainly this award honoring outstanding competitor and Jumbo scale enthusiast Ray Berens represents a most imposing inducement to competition-minded model builders.

AND SPEAKING OF CONTESTS

Interest is growing in the First World Peanut Gran Prix, being held in conjunction with the World Indoor Championships during June. West Baden, Indiana will be the site for those fortunate enough to attend in person, but proxy Peanut entries are anticipated, including some from foreign countries. Volunteer proxy fliers and helpers are needed, and additional details may be obtained from Mike Arak, 10900 SW 61 Ct., Miami, FL 33156.

THE GOLDEN GOOSE

Ten bucks per head! That's the fee announced locally for gaining admission to view the Howard Hughes wooden flying boat, which has been the subject of mystery and controversy for so many years. However, a cliff-hanger to the bitter end, no official opening date for public admission has been set as of this writing (late January). Perhaps "Summa these days" we will finally have a chance to peek at the big bird.

CONGRATULATIONS!

To Tony Naccarato, of T&A Hobbies, for establishing a new indoor R/C fixed-wing aircraft endurance record of 1 hour, 29 minutes, 33 seconds during the recent IMS Show. Certainly that was a remarkable demonstration, not only of electric power system efficiency and model aircraft stability, but of Tony's stamina!

GOLD FLIES

The rise of gold prices has astounded even the most optimistic "gold bugs." A

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George James (left) and Ray Berens with the new Jumbo Rubber perpetual trophy presented in Ray's honor.



George Chaulet's wife, Leone, shows off his latest creation, an R/C vertiplane with O.S. .40FSR.

• In the January '79 issue of **MB**, Peter Westburg referred to the Stearman 4E as one of the "sexiest biplanes of all time." I couldn't resist turning his excellent scale drawings into Peanut plans and building my own replica of this Depression era beauty. This included duplicating the red, blue, and silver Standard Oil of California paint job shown in the two-part series. The result was very gratifying and I think you will enjoy building the "Bull Stearman."

My approach is not for beginners, but if you've built a few Peanuts you should find some of these techniques interesting and simple enough to achieve. The primary challenge, if you're after realism (and with scale you should be), is to keep the structure light so you can afford the extra weight of the paint. My solution is to use 1/64 sheet balsa, condenser paper, and Floquil paints. The completed model weighed 16 grams less the motor. The weight prior to finishing was 14 grams, so surprisingly, the finish and decals added only two grams. The total weight of the craft, including the 1/8-inch rubber motor, was a shade under 5/8 of an ounce.

A good Peanut design will require little to no added weight to achieve balance. Of course, the choice of subject has a lot to do with this, but there are ways to maintain the balance problem of a short-nose airplane. Choice of structure helps, keeping heavier elements toward the front. Another is to move the center of lift aft by increasing the amount of lift in the tail section. The best way I have found to do this with Peanuts is to increase the surface area of the stab and elevator 15 to 20 percent. Balance is attained when the center of lift and the center of gravity coincide. This approximate location is shown on the drawing. On my model, no additional weight was required.

CONSTRUCTION

Before you start, assuming you don't already have one, get a cork-surfaced bulletin board for a building surface. These are an excellent aid to construction, as they take pins easily and remain



PHOTOS BY AUTHOR



STEARMAN 4E

By TOM CADOGAN . . . The "Bull Stearman" is one of the most colorful and best looking of the 1930 era biplanes, also makes an interesting Peanut for builders with some prior building and flying experience.

true. You'll especially need one for the fuselage formers and other curved pieces, as I'll explain later.

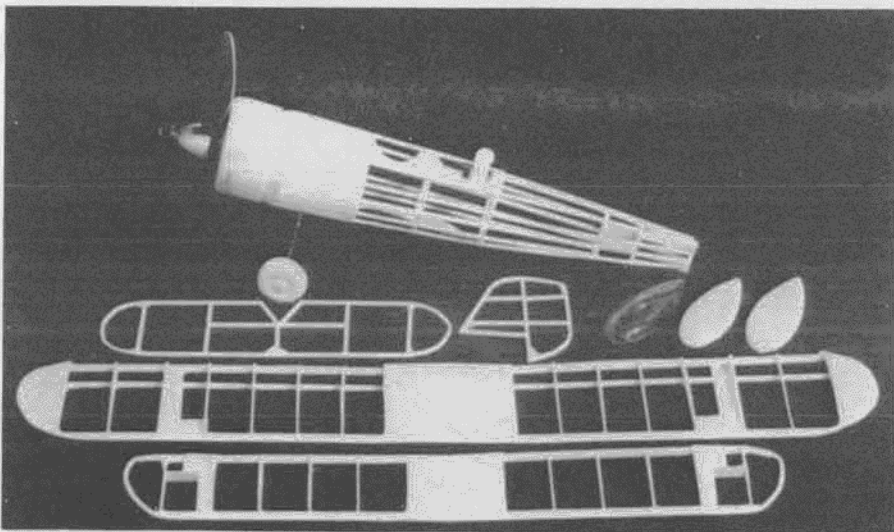
Begin with the wings by cutting the ribs from 1/64 sheet using a 1/32 plywood template. The use of 1/64 sheet is perhaps the only unusual thing about the wing construction, and a few precautions are necessary. Make sure you use a *non-shrinking* adhesive, such as Titebond, and don't try to force the ribs into position. I used sheet at the wing tips, around the strut connections, and at the center to provide an extra measure of strength at key places. I feel this is necessary when condenser paper covering is used because of the paper's low tensile strength. I would also suggest sheeting the leading edge of both wings,

though I didn't do this. Before you set the wings aside, make sure the angle of incidence is the same throughout each panel. Corrections can be made when you shrink the wing covering.

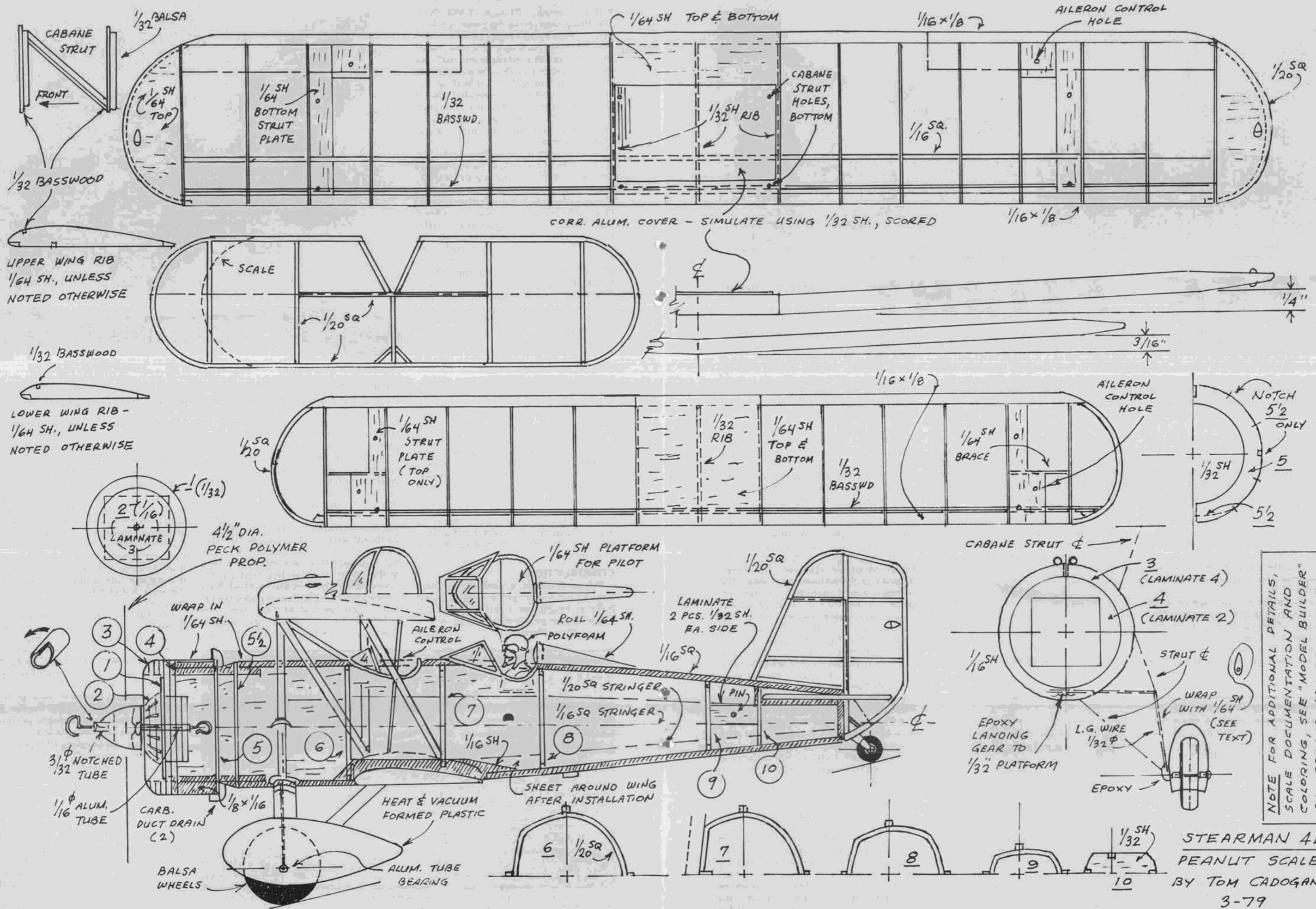
The tips of the wings and stabilizer and the outline of the fin are constructed from 1/20 square balsa. The balsa is soaked in laundry ammonia, rolled around a row of pins embedded in your building board, and pinned down to dry. For me this technique is simpler than cutting cardboard templates or making intricate laminations, but again, the cork bulletin board is essential for success.

The fuselage is begun by pinning down the 1/16 square outlines shown in diagonal shading on the plan, and cementing on formers 5-1/2 and 10, both cut from 1/32 sheet. The center 1/16 stringer is added next, leaving a 1/4-inch overhang at former 5-1/2. When this is dry, formers 6 through 9 can be slipped into place under the stringer and cemented in an upright position. These formers are also made by soaking in ammonia and bending along a row of pins. The remaining stringers are cemented in, extending each across former 5-1/2. Formers 4 and 5 are added, and the stringers broken, bent and cemented to the bottom of former 5 as shown on the plans. The fuselage half is removed when thoroughly dry, and the other side added in similar fashion. The landing gear wire is inserted, followed by the 1/64 sheet covering at the nose and around the cockpit. The landing gear shown is scale, but if you wish the Peck-Polymer prop to clear the ground,

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Basic structure is actually quite conventional, makes extensive use of 1/64 sheet. Standard Oil paint scheme is the most attractive, but is also a lot of work.



NOTE FOR ADDITIONAL DETAILS,
SCALE DOCUMENTATION AND
COLORING, SEE "MODEL BUILDER"
DEC 78 AND JAN 79 ISSUES

STEARMAN 4E
PEANUT SCALE
BY TOM CADOGAN
3-79



Ron McBurnett getting set to fire up his "Megabucks" (that's telling it like it is!) FAI model.



A brand new and very attractive Coupe d'Hiver by Bruce Kimball flown at WMC Silents Please contest last fall.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

A MODEST PROPOSAL (FOR THE FAI TEAM SELECTION PROGRAM)

Our U.S. FAI Team Selection Program has followed essentially the same format since 1965. A flier enters the program, puts in a qualifying time at a local site, competes in a regional semifinals, and the next year, about 35 survivors compete at a Finals to determine the U.S. team for the World Championships the year after. The goals for the program are twofold: to produce better U.S. teams and to stimulate participation in FAI competition. However, the U.S. has produced a grand total of exactly ONE team or individual champion in the seven World Championships since this type of program began. In addition, the number of people participating in the program has dropped about 50%. Such a manifest failure to achieve these two goals suggests that it may be time to try something else.

There has been no shortage of ideas about ways to improve our team selection process. The problem has been that most of the controversy has centered on details of the Finals format, while I feel the root of the problem is in the earlier part of the process. I've been mulling over ideas for correcting what I perceive to be glaring weaknesses in the program, and am now ready to commit them to print, after several years of discussing them with other FAI program participants.

The key point to remember is that the World Championships is a model airplane CONTEST. It may be a little bigger than most U.S. FAI contests, but the purpose is still to find out who can put up the best series of flights on a given day. The U.S. team members who have been most successful in World Championships competition have been those who have been the most active contest fliers. Test flying has its place, of course, but the best practice for flying in one particular contest (like the World Champs) is to fly in many contests

beforehand. Our most consistent contest winners should be the ones to represent the U.S. at the World Champs, yet our current program ignores a competitor's contest record except for two contests held over a two-year period.

The "sudden death" aspect of the semifinals is a major negative factor in our present system of selecting teams. A flier may do well at every contest he flies, except the semifinals, and is excluded from participation for one or two years, until the next program cycle begins. No matter how good a flier he is, he can only go to the Finals if somebody in his region drops out so he can participate as an alternate. (If he lives in the same region as the Finals site, his chances are very slim for this to happen.) An illness, job or family emergencies, a military tour of

duty, etc., may prevent a good flier from entering the semifinals and he is similarly facing a one to two-year layoff. We're not doing so well in World Champs competition that we can afford the luxury of having some of our best potential team members sitting on the sidelines at the Finals.

I would like to propose a flier's contest performance as the sole means of advancing to the Finals. Here's how it would work:

The FAI Committee would designate six to ten Team Selection Contests in each region, to be held between September, 1980 and August 1982. The regions would correspond to current semifinals locations: Northwest (Galeville), Southeast (Pensacola), North Central (Bong), South Central (Ft. Worth), Rocky Mountain (Denver), Southwest (Fresno) and Northwest (Tacoma). The contests would include important regional FAI or AMA contests now held, plus new contests designated by the Committee. In addition, the 1981 and 1982 U.S. Free Flight Championships and AMA Nationals would also be designated as Team Selection Contests. Team Selection Contests in a region would be scheduled at least three weeks apart, to avoid concentrating all the contests in a short period of time.

A flier would enter the program at any time by sending a \$15 entry fee for each event to AMA HQ. He would receive a Program Qualification Form to serve as his record of progress through the program. (Forms would also be available at a Team Selection Contest, for a \$20 fee on the field.)

Each participant would earn points for advancement to the Finals in this way:

- 1) One point will be awarded for each contestant he places ahead of at a Team Selection Contest, "contestant" defined as any person who flies three official flights. (Example: Placing 3rd in an event with ten contestants earns seven points.)
- 2) Five additional points will be



Keiichi Kibiki of Japan launching for his final flyoff flight at the F/F World Champs. Missed a max by only 15 seconds to wind up in 2nd place overall.

awarded for placing first at a Team Selection Contest.

3) Three additional points will be awarded for maxing out at a Team Selection Contest.

4) The maximum number of points that may be earned in one event at any Team Selection Contest will be 15.

5) The CD of the Team Selection Contest will verify the participant's placing and points earned, enter them on the Program Qualification Form, and collect a \$5 fee to be sent to AMA HQ with the contest report.

6) The participant is eligible for the Finals when he accumulates 25 points in Team Selection Contests and sends a copy of his Program Qualification Form to AMA HQ.

7) Members of the 1981 Free Flight Team are also eligible for the Team Finals, provided they obtain a Program Qualification Form and fly in at least two Team Selection Contests.

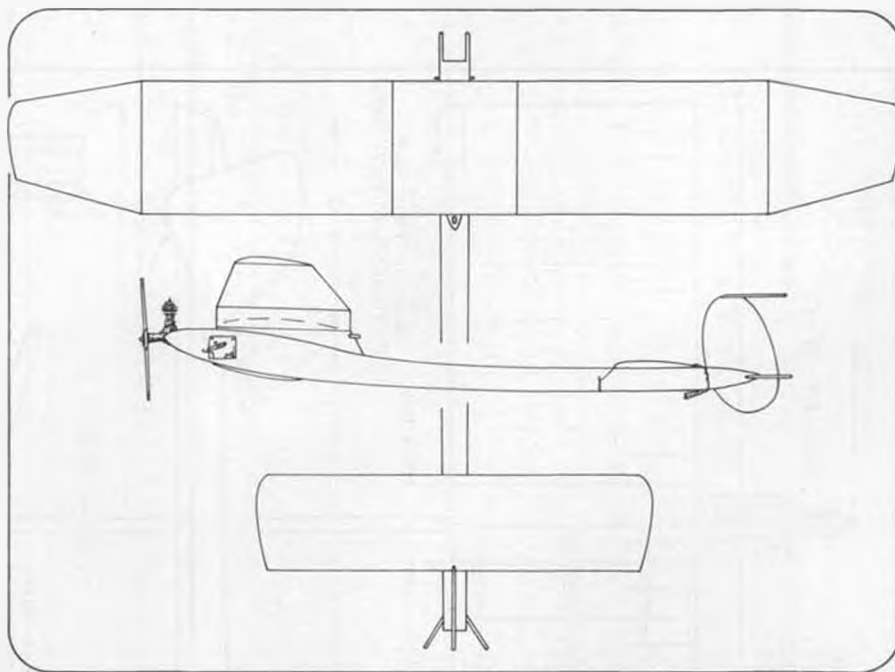
This method of Finals qualification would be a vast improvement over the current system, in my opinion. It would eliminate the "sudden death" semifinals. Contest participation in FAI events would increase, with activity continuing throughout the entire Team Selection cycle. New faces could enter the program at any time, without having to wait for the next cycle. The Nats and USFFC would be important parts of the program, since large contests would be worth more possible points. The year of the Finals would see more activity, with additional people trying to qualify. Most importantly, this method would select Finals participants for the most important trait of a team member: contest flying ability.

I arrived at the figure of 25 points to qualify for the finals, based on a flier finishing in the top five at an event with ten contestants at five contests. I feel that this kind of performance would be sufficient to demonstrate the consistency and quantity of contest flying desired in a Finals participant. The 25 points could also be earned in these ways:

A) Maxing out and winning two contests with five entries each, plus beating one other contestant at a third contest.

B) Winning three contests with a minimum of five contestants.

C) Finishing ahead of 12 or 13 contestants at two large contests. Each of these examples would be the type of flier who deserves a place in the Finals, I believe.



MAY MYSTERY MODEL

It might be argued that those who live in regions where there are a lot of fliers would have a much better chance of qualifying for the Finals than those in other parts of the country. Well, that is the current situation, since the number of fliers advanced to the Finals from a semifinals now depends on the number competing at the Semis. This proposal allows bonus points for winning or maxing out at Team Selection Contests so that the better fliers in a sparsely populated region can still accumulate points as rapidly as those in other areas. In addition, the Nats and USFFC are large contests with nationwide representation. Those from isolated areas could compete there in addition to contests in their own region. These would be good opportunities to accumulate points and gain experience in national competition at the same time.

It might also look like a lot of travel would be required. Since most of the Team Selection Contests would be regional, the longest trip to any one contest would not be longer than a trip to the present semifinals site. Most of the Team Selection Contests would be established regional contests that the FAI competitor would probably attend anyway. The better fliers in a region would probably take no more than three

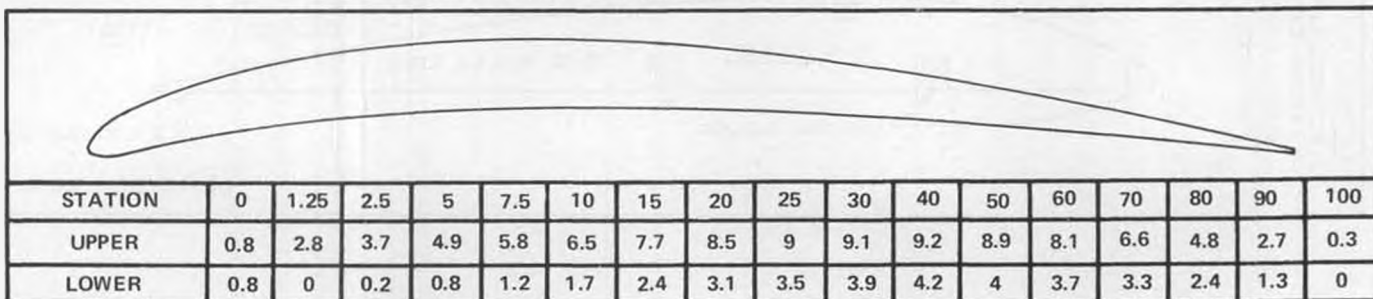


Don Zipoy launches his "Crispy Critter" FAI model at Harts Lake Semi-finals. It's this month's featured 3-view.

contests to qualify for the Finals, so the number of miles traveled would increase only slightly. Those who would need a lot of contests to qualify would benefit from the practice, and Program funds would increase each time they flew.

I don't think there will be a problem with too many people qualified for the

DARNED GOOD AIRFOIL – GOTT. (MVA) 342



NOTE:

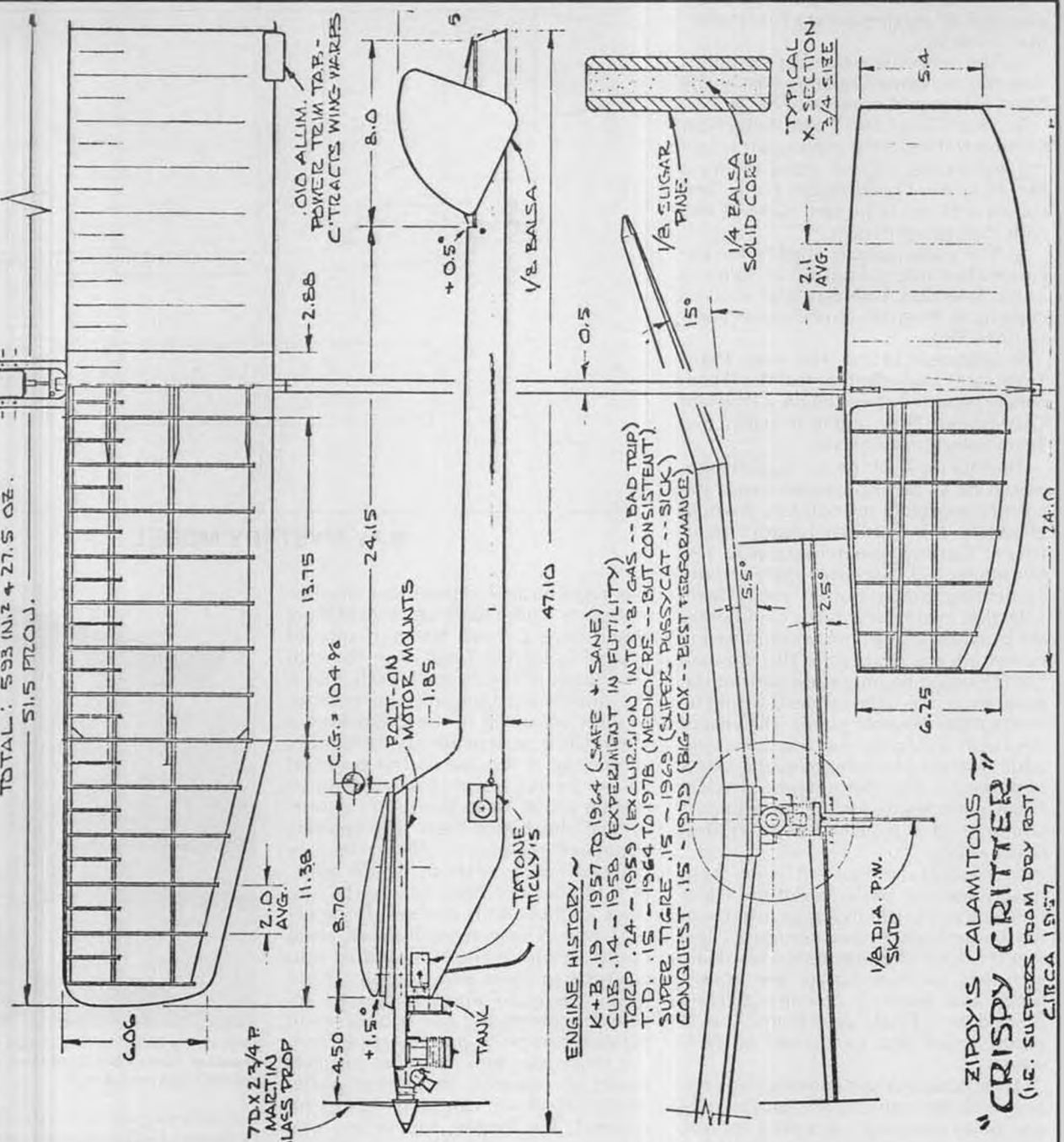
VSHEDS COVERING FOR NEW SKINS EVERY 10 YEARS.
VSEELS DOWN AIR -- AVOIDS THERMALS.
VREFUSES TO GET LOST

WINGS: MANY ... AND ALL UNINTENTIONAL

WING - 418 IN² @ 5.7 OZ.
STAB - 175 IN² @ 2.3 OZ.
FUZE - 0 19.5 OZ.
TOTAL: 593 IN² @ 27.5 OZ.
51.5 PROJ.

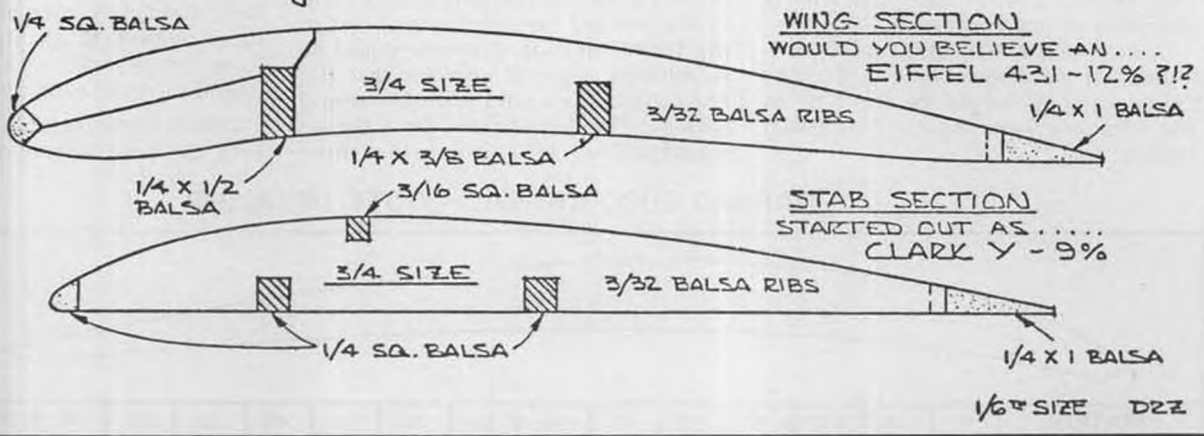
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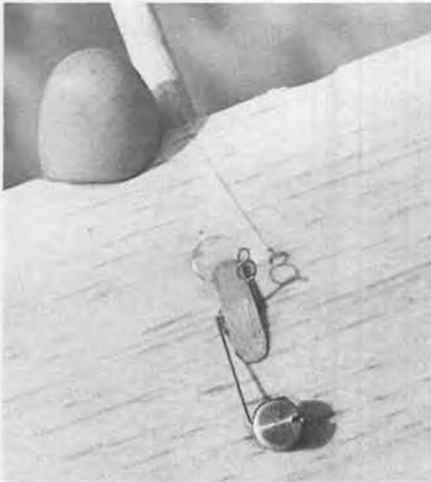
THRUST 0-0



ENGINE HISTORY ~
 K+B .15 - 1957 TO 1964 (SAFE + SANE)
 CLUB .14 - 1958 (EXPERIMENT IN FUTILITY)
 TOPP .24 - 1959 (EXCURSION INTO 'B' GAS -- BAD TRIP)
 T.D. .15 - 1964 TO 1978 (MEDICINE -- BUT CONSISTENT)
 SUPER TIGRE .15 - 1969 (SUPER PUSSYCAT -- SICK)
 CONQUEST .15 - 1979 (BIG COX -- BEST PERFORMANCE)

**"ZIPOY'S CALAMITOUS"
 "CRISPY CRITTER"**
 (I.E. SUFFERS FROM DRY ROT)
 CIRCA 1957





Dale Segle took a lightweight clockwork mechanism from a bathtub toy and made it into a DT timer for HLG's. Photo on right shows how it mounts into the fuselage, left photo shows DT line, release mechanism. Shaft made by soldering brass discs to brass tube, a la Seelig.

Finals. If as many as half of all the current semifinalists qualified, that would be only about 40 per event at the Finals . . . not a lot more than at present. The FAI committee could adjust the number of points to qualify for the Finals up or down before the start of the next selection cycle, if this is a problem. (They could also decide to select only a certain number of top points qualifiers, but this would be a more complicated system to administer. The idea of a minimum points total for qualifying makes it easier for the participants to know when they've qualified, rather than relying on a final tabulation.)

FINALS FORMAT

Nearly every program participant agrees with the idea of a Finals in one location. Here are some ways the Finals could be run, listed in order of preference:

A) Select one team member in each event on each day of a three-day Finals. Fly seven rounds under thermal condi-

tions, followed by a flyoff in light-lift conditions, for the top three at the end of seven rounds (or all those within 98% of a perfect score, whichever is the greater number). Three flyoff rounds, to 4, 5 and 6-minute maxes, would be flown. The winner (with the highest ten-round total) would be a team member.

B) Select three team members on the basis of total score at the end of a three-day, six-round per day, contest. One round each day would be flown to an increased max, in light-lift conditions.

C) Select three team members on basis of a one-day contest, with seven thermal rounds plus three forced flyoff rounds, as in A. In this case, the top six at end of seven rounds (or all with 98% of perfect score, whichever is the larger number) would fly off, with the top three becoming the team.

DISCUSSION/RATIONALE

All three methods would provide for a combination of thermal and light-lift rounds to select the team. At the last Taft Finals, the winners were the ones who did best when there was light lift (the latter part of the early morning round, when there was enough lift for a max; not the pre-dawn, dead-air conditions), as there would be in a World Champs flyoff.

Format A would serve to select those who can come through and *win* on a given day. I emphasize winning, because there's a big difference between coming out on top and merely placing in the top three in an event. A team made up of three fliers who came through by making the big play and winning the contest they *had* to win would be the kind of team most likely to do well at the World Champs. They would be the real competitors, particularly the ones who would win their team place on the last day. All who fly in the Finals would have earned their places by virtue of their consistent contest success, and the added pressure of having to *win* to make a place on the team would allow the cream to rise to the top.

Format B is similar to that used at the

1978 Taft Finals, except for the use of light-lift instead of dead-air rounds. It emphasizes consistency above all else and relies on picking the top three rather than the three winners. In such a contest the top three tend to be the survivors of an endurance contest, particularly in bad weather.

Format C was used in Hastings. It is easier to administer than the other formats, and resembles the World Champs in format, but has the disadvantages of B without any real advantage.

MODEL OF THE MONTH: Don Zipoy's "Crispy Critter"

Don is the epitome of a perfect contest director, running the best-organized meets in the country. He's been the perennial C.D. for the Northwest Regional FAI Semifinals since 1965, since nobody can imagine anyone else doing the job half as well. However, his secret ambition has been to FLY at one of these Semifinals, not just sit behind the table. This year, he succeeded in qualifying in FAI Power by putting up five straight maxes with the design shown here. When the big day arrived, however, Don was bugged with timer and tank problems, registering four consecutive overruns. The biggest cheer of the contest arose when he finally got in a flight, followed by another that maxed. FAI contests are not always grim competitions, I guess.

As is obvious, the model follows none of the current FAI trends, although it has a vague resemblance to Horcicka's 1973 Power winner (I don't know, all these high-thrust line power models look alike to me). The wing and tail date back to the early days of the Pan American International Class Payload event. But you'll have to admit that you don't see many 20-year-old FAI Power models. (You don't even see too many one-year

Continued on page 74



The USSR FAI Power virtuoso, Eugen Verbitski, in action at the '73 World Champs. Russians boycotted W/C in U.S. last year. Word has it that Verbitski is now in Cuba, training the Cuban national team.



Gene Jensen in a Mt. Rushmore pose, holding his Korda. Seen at Silents Please meet.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• In last month's column, I briefly mentioned Bill Hannan's latest effort, a book entitled *Peanut Power*. Since then, I have had a chance to review it, and I consider it a must for any F/F modeler, even though he may not be specifically involved with the building and flying of Peanut models.

Bill is not only a fine writer, but also an excellent artist and photographer. These talents are well expressed throughout the pages of this outstanding publication. One quick glance at the table of contents and you will know that this subject area is well covered. The items include a brief history of Peanut Scale, selecting a subject, materials that can be used, adhesives, research, flying, a problem-solving chart, plus many more.

The cost of this book is \$7.95 plus \$1 for postage (California residents add 6% for tax), and can be ordered from the Historical Aviation Album, P.O. Box 33, Temple City, CA 91780. This fine effort reflects 2-1/2 years of hard work!

On the "what's new" scene, I received a sample of Flyline's latest project, the .020 version of Megow's Flying Quaker. The kit is of the usual Flyline quality, and the plans are typically Herb Clukey . . . super! The drawings show an R/C installation, but I plan to make mine a sport F/F model. This kit makes an easy introduction to the world of Old Timers at a minimum cost and with either F/F or R/C. Check it out at your local model shop.

Radial engine aircraft are, for the most part, tough to model due to the complexity of the dummy engine. Even with the use of Williams Bros. cylinders, it is still a chore, particularly since crankcases aren't provided in the smaller scales. So, what is an easy approach to making radial engines? Well, I would



Well-known rubber model expert, Ray Berens, as he appeared in 1940. Unidentified model is typical of the type being flown at that time.



Ray Berens today, with the beautiful trophy for the new Jumbo Rubber event commemorating Ray's achievements in large rubber scale models. See text for details and rules for the new Jumbo event. NFFS calls it the "Wakefield of Scale Modeling."

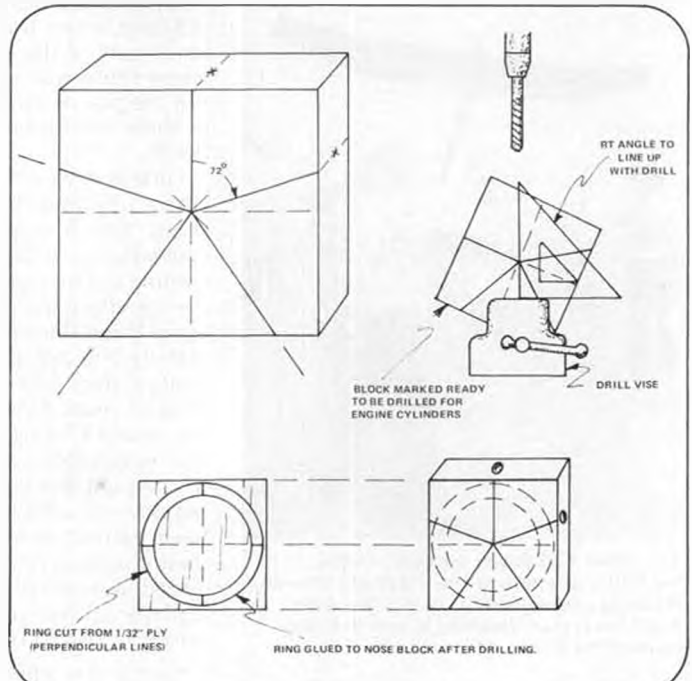
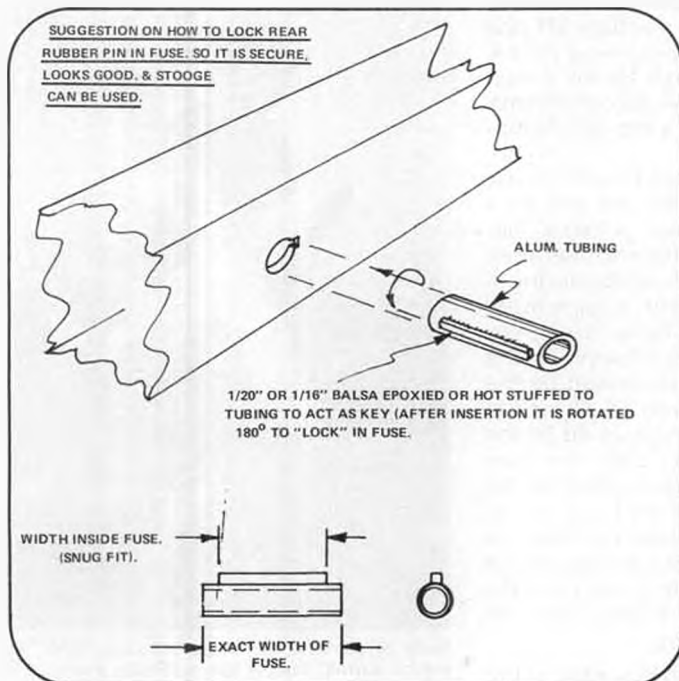
like to outline briefly the method I used on Flyline's Kinner Sportster. The first step, and one that gives me a bit of a pain, is drilling the five holes (five cylinders on the Kinner) in the block that will support the cylinders. My method is certainly an easy one (see sketch). I first locate the center of the block by the old traditional way of drawing lines from corner to corner so that you end up with an "X" in the center of the block. I then draw perpendicular lines which intersect the exact center. These perpendicular lines will be used a bit later.

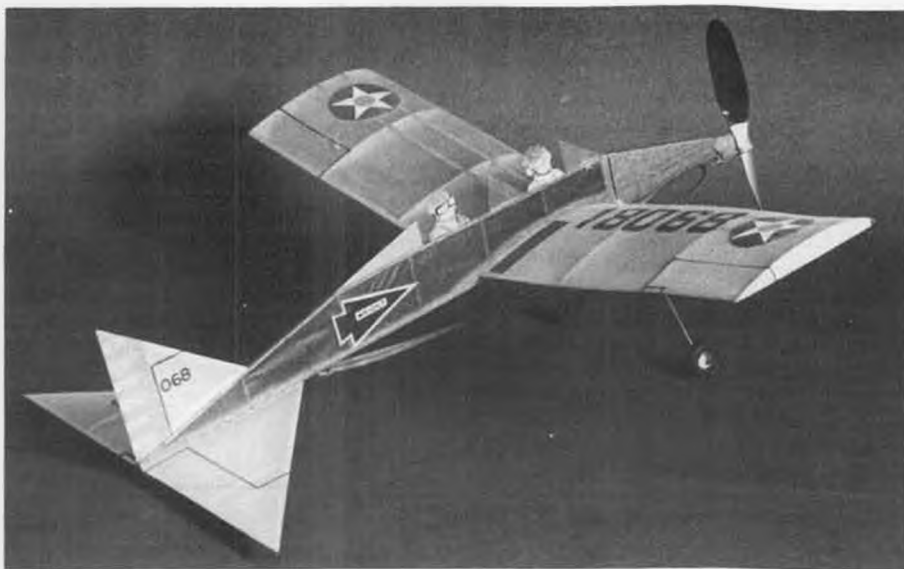
The next step is to find out at what angle each cylinder is set. Since radial engines usually have one cylinder at top dead center, this becomes the starting

point. By dividing 360° by 5, each cylinder, in this case, will be set 72° from each other. Therefore, by using a protractor, I will make five separate angles indicating exactly where each of the cylinders will go. These angles, represented by lines, are continued to the edge of the block. I might add that I will use a different colored pen from the one I used to draw the perpendicular lines. This way, I will not make a stupid mistake by drilling on the wrong line . . . I hope!

The block is now ready to drill. This should be done, if at all possible, with a drill press. I use a drill vise, and with the aid of a 90° triangle, I set each line so that it is vertical with the drill. Each cylinder hole is drilled, drilling all the way to the middle of the block. Sometimes one of

Continued on page 80





F.A.C. TRAINER

By FRANK SCOTT . . . Named after the famous Flying Aces Club, this appealing little rubber job is the next logical step up from the Delta Dart and AMA Cub models so popular with Juniors. Great flier!

• There is a magic in flight, and nowhere is this more evident than in a rubber-powered model wheeling silently high overhead, the sunlight dancing through tissue wings. Fortunately, such a ship can be quite easy to build and inexpensive too, if it's our F.A.C. Trainer. The F.A.C. Trainer (named for the famed and far-flying Flying Aces Club) is, because of its simplified, straight-line design, eminently suited for the beginner, but its flying qualities will more than satisfy the veteran modeler.

To build your own F.A.C. Trainer, begin by tracing the wing rib and fuselage nose piece onto thin paper. This paper pattern is then glued (rubber cement is good for this) to thin cardboard, and then carefully cut to shape. These resulting patterns, or templates, are then used to guide the knife while the balsa nose pieces and wing ribs are

cut to shape. Remember that it is usually more satisfactory to cut such parts using several light cuts with the knife, instead of trying to cut through the wood in only one pass. With these parts cut out, the hardest part of the ship is done.

Now lay the plan (traced, photocopied, or ruthlessly slashed from your magazine) on a flat board and cover the plan with a piece of clear plastic food wrap. This plastic covering is important to prevent the workboard from becoming a part of your model. The wing leading edge and trailing edge spars are then pinned in place over the plan and all ribs and gussets (except the very center) are glued in place. When the glue has thoroughly dried, remove the pins and cut or carefully crack the leading and trailing edge spars exactly at the center. While holding the center of the wing on the building board, prop up

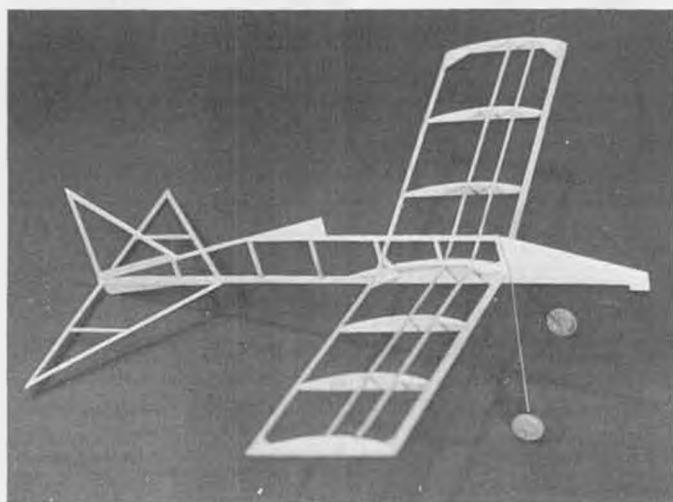
each wing tip 1-1/2 inches and glue the center rib and its gussets in place. The wing structure is completed by adding the two upper spars.

The frames for the tail surfaces are simply flat structures built of strip balsa, much like those of the popular "Delta Dart" and "AMA Cub" airplanes. When dry, the stabilizer and fin can be removed from the building board and lightly sanded with fine sandpaper to remove the lumps and bumps of glue and such. The leading and trailing edges of all of the flying surfaces may also be rounded with sandpaper at this time.

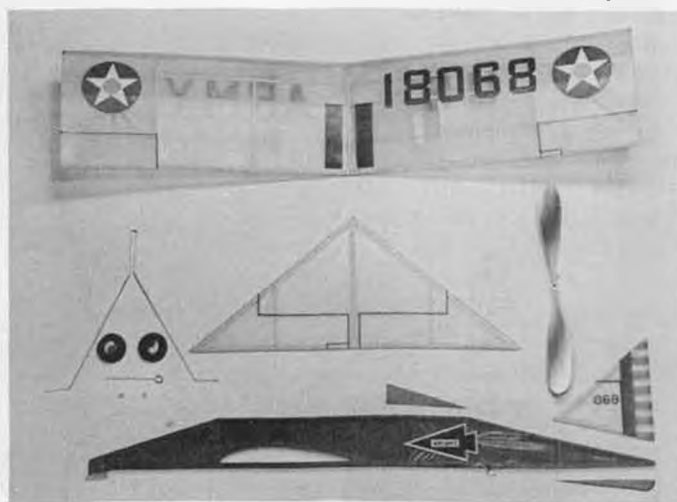
The fuselage, being of the built-up profile variety, is built much like the other flat parts. The nose piece and upper and lower longerons are pinned down and the uprights glued into place. When dry, the fuselage too may be smoothed with sandpaper, though the edges are best left square. The propeller thrust bearing is cut from a length of aluminum tubing (Know how to cut tubing? Roll it under the blade of a hunting knife), then glued in place under the nose and bound with wrappings of cotton sewing thread. The rear motor hook, formed from wire, is glued and bound in similar fashion to the lower longeron.

Now the various assemblies will be ready to cover with lightweight model tissue. This operation is not at all difficult if you give the bare structures a coat of clear dope along those areas where the tissue is to be adhered, and allow this to dry. Lightly sand off the resulting fuzz and apply another thinned coat of dope. When this has dried, begin with the fuselage and cut a piece of tissue about an inch bigger in all directions than the part to be covered, and lay the tissue in position upon the frame. Now, using a brush dipped in dope thinner, brush the thinner right through the tissue and onto the doped frame. This will make the underlying dope sticky, and the tissue is attached to all parts in this manner. After covering, lightly spray (as with a Windex spray bottle) the parts with water and pin or weight them carefully to the building board while

Continued on page 66

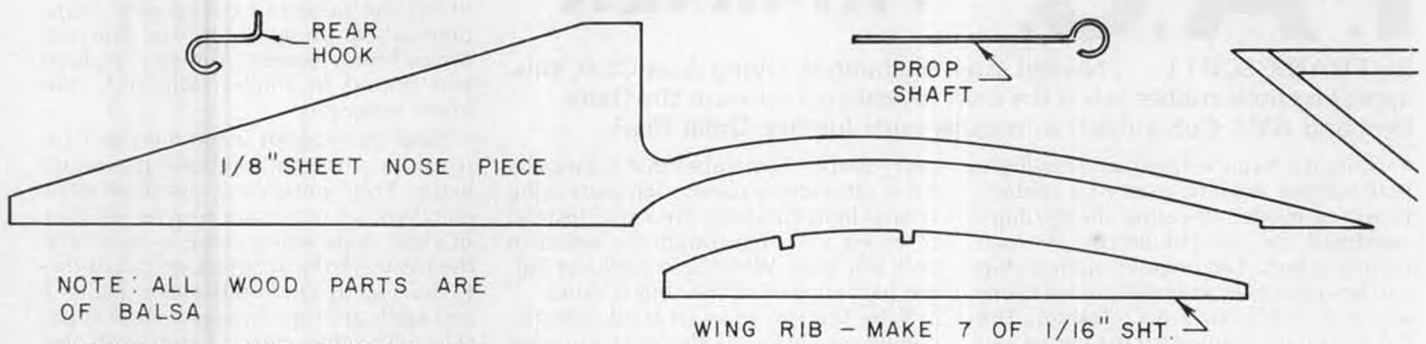


What could be simpler? The only curved parts are the nose piece and wing ribs. Uses triangular tail surfaces similar to Delta Dart.



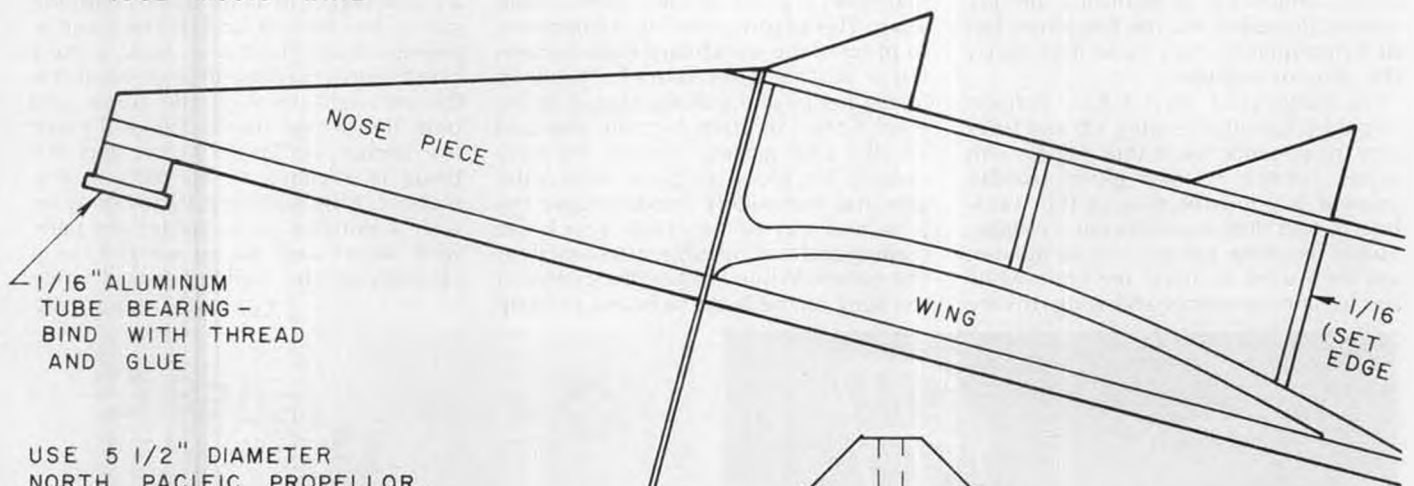
All the components, covered and ready for assembly. Trim is cut from tissue and doped on, really adds to the model's appeal.

	1/8" SQ. LEADING EDGE	
	1/16" SQUARE SPARS	
	DIHEDRAL : PROP UP EACH WING TIP 1 1/2"	<u>WING</u>
	1/16" X 1/8" TRAILING EDGE	

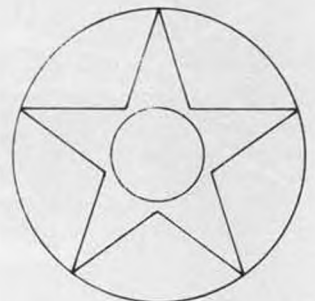
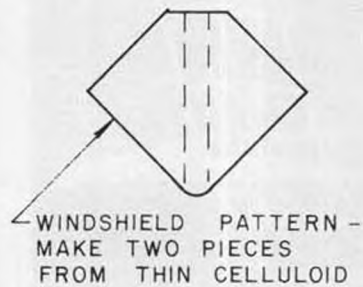


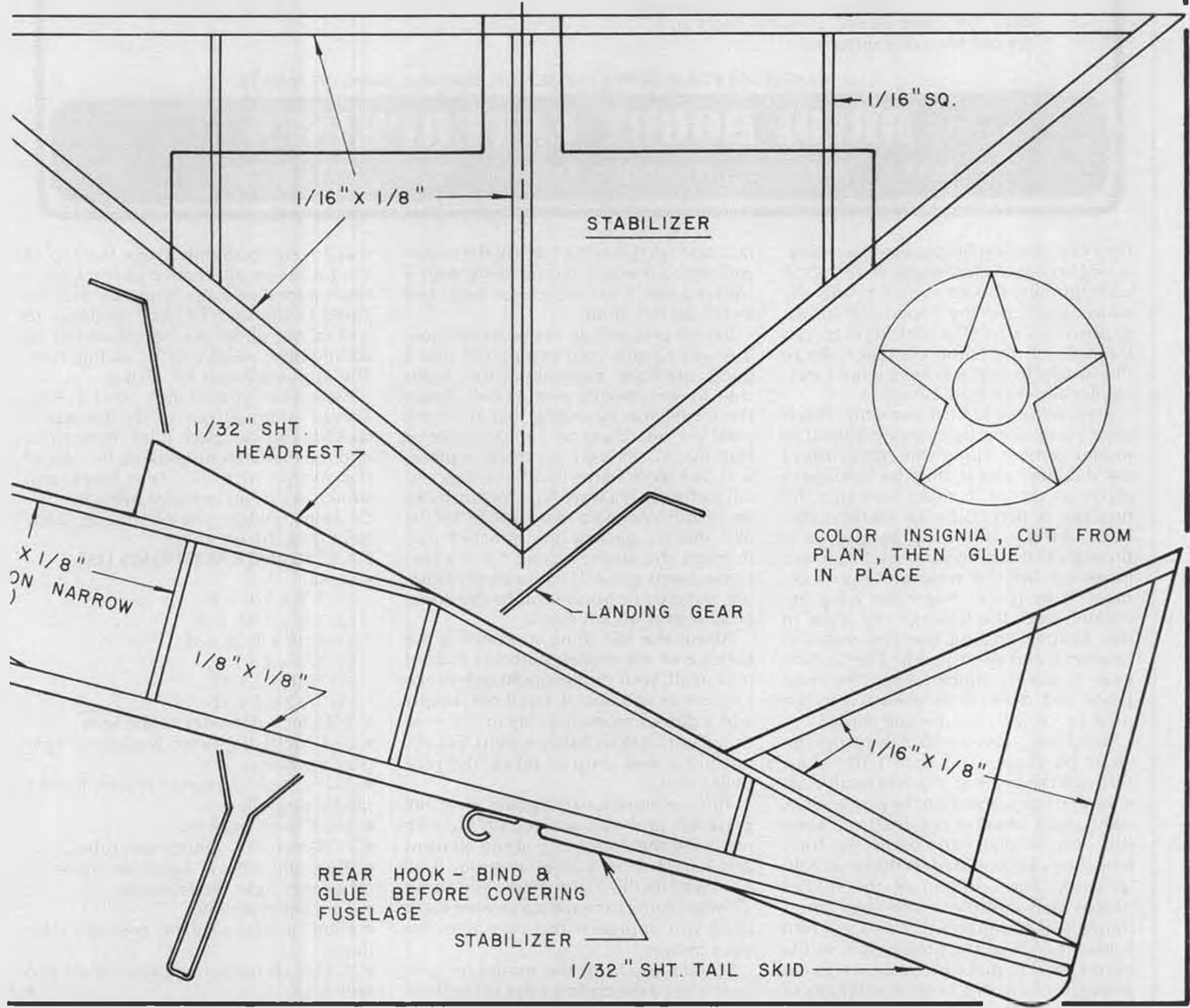
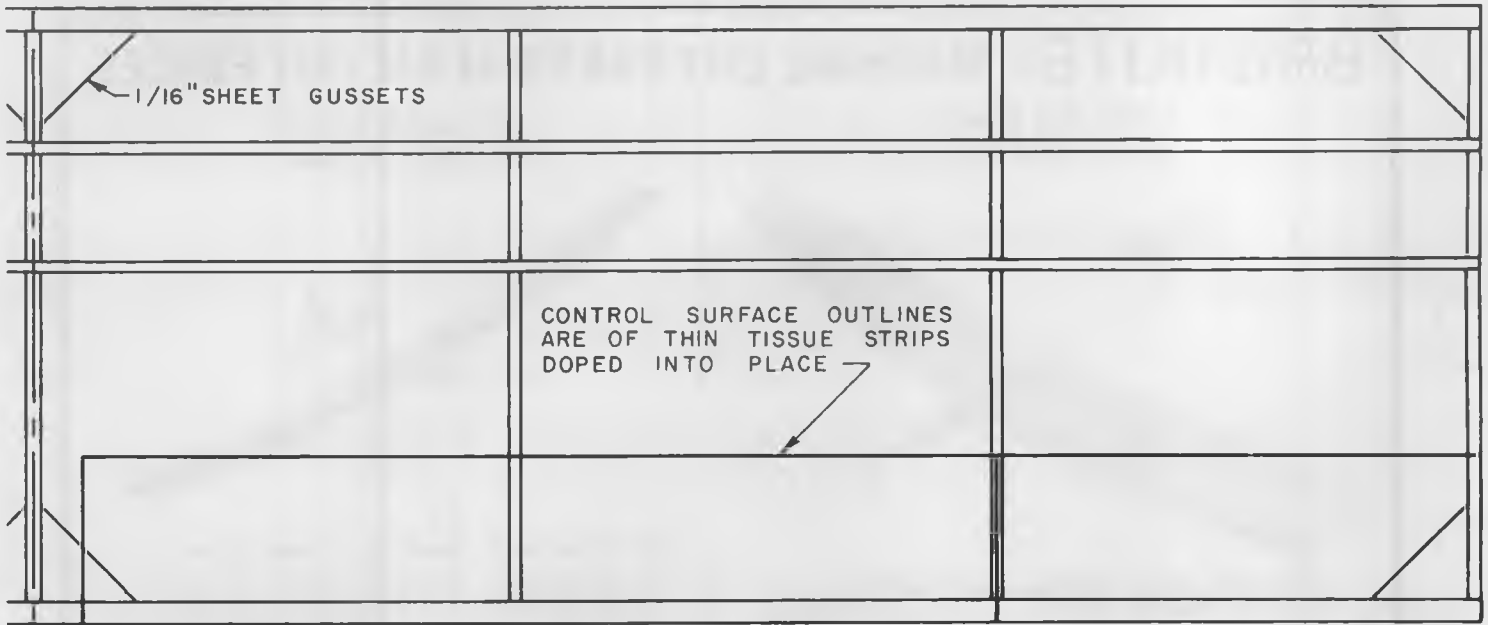
NOTE: ALL WOOD PARTS ARE OF Balsa

NOTE: ALL WIRE PARTS ARE OF .032 MUSIC WIRE



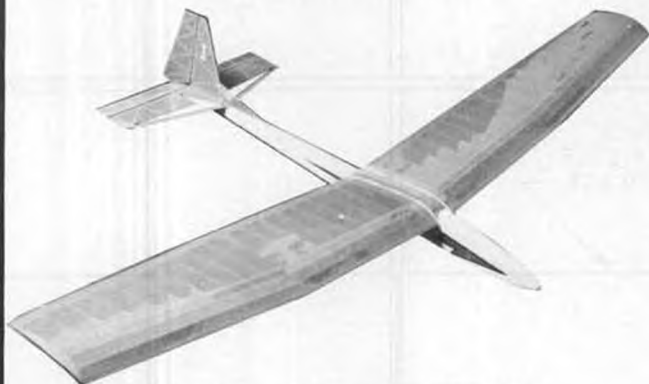
USE 5 1/2" DIAMETER NORTH PACIFIC PROPELLOR, POWER WITH ONE 10" LOOP OF 3/16" RUBBER





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Two Meter Sailplane



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they dry. This will help prevent warping. A single coat of clear dope, mixed 50-50 with thinner, should suffice to seal the tissue; again, pin the doped parts down to prevent warps. (The trick here is to pin them down right after the part is dry to the tough. In that way they'll not catastrophically stick to the board.)

Precede now to final assembly. This is most easily done by applying a bead of model cement along the center rib of the stabilizer and setting the fuselage in place on top of it. Make sure that the fuselage is perpendicular to the stabilizer. Attach the wing by sliding it through the slot formed by the lower longeron and the nose piece, and cement it in place. Align the wing accurately with the fuselage and allow to dry before adding the fin, sub-fin, headrest, and windshields. The landing gear is simply slipped over the nose piece and secured by sewing it to the nose piece with needle and thread.

Bend the hooked end of the propeller shaft to shape and insert the shaft through the bearing, slip on a small brass washer or two, and then the propeller. A right-angle bend of the shaft will keep the prop in place and allow the free-wheeling cam (molded on the prop hub) to work. The addition of the rubber motor will complete the ship. Incidentally, it is unlikely that you will find rubber bands of the proper size, so the correct way to make up a motor is to cut a length of rubber twice the length of the loop, plus about four inches to

facilitate tying the knot. Wash the motor well in cool water before tying with a square knot. Trim the excess ends and install on the model.

Before proceeding to the areodrome, it is well to give your completed ship a good preflight inspection (this holds true for any model, new or old). Begin the inspection by seeing that all of the parts are intact (no broken structure or torn tissue), securely mounted in place, and free from warps (twisted wings and tail surfaces). If a warp has crept in, it can be readily removed from a light model like this by passing the affected part through the steam issuing from a teakettle (wear gloves!) while gently twisting the part in opposition to the warp. Hold it thus until it cools.

About the last thing to check is the balance of the model. With any kind of luck at all, your model ought to balance just fine as you built it, but if not, simply add a dab of modeling clay to the nose or tail until it does balance right. Finally, put just a wee drop of oil on the propeller shaft.

The customary hand glides over tall grass will probably accomplish little, so just wind the Trainer up about 50 turns and launch it in a level attitude. If all goes well on this flight, simply add about 25 more turns for each successive flight until you approach the maximum for your motor.

Should you wish the model to turn, gently bend the trailing edge of the fin in the appropriate direction. To do this,

you'll have to slightly crack the top of the fin. As an alternative to cracking, a small paper or balsa trim tab may be glued to the fin's T.E. Any tendency to stall in the glide can be countered by adding nose weight, or by adding turn. The opposite holds for diving.

Now that you've got your F.A.C. Trainer trimmed out to fly the way it should, you can pack a lot more turns into the motor by unhooking the rear of the motor from the rear hook and stretch-winding the motor with a winder. Of course, when you do this, be ready for a long, happy chase.

F.A.C. TRAINER MATERIALS LIST

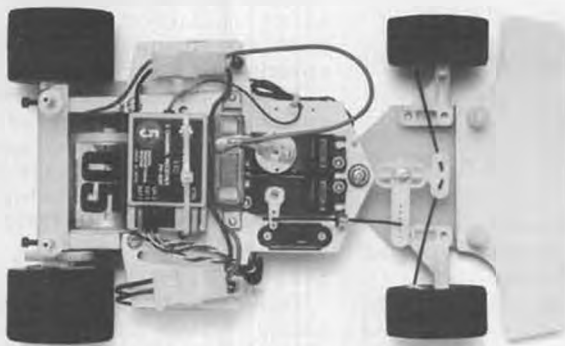
- Balsa:
 - (1) 1/8 x 1/8 x 36
 - (2) 1/8 x 1/16 x 36
 - (1) 1/16 x 1/16 x 36
 - (1) 1/8 x 2 x 7
 - (1) 1/16 x 2 x 12
 - (1) 1/32 x 2 x 12
- 1/32-inch diameter music wire.
- 3/4-inch diameter wood or light plastic wheels.
- 5-1/2 inch diameter North Pacific plastic propeller.
- Small brass washers.
- 1/16-inch O.D. aluminum tube.
- Blue and yellow Japanese tissue or other very light model tissue.
- Thin sheet acetate.
- Glue, model airplane cement, clear dope.
- 3/16-inch rubber, approximately two feet long.



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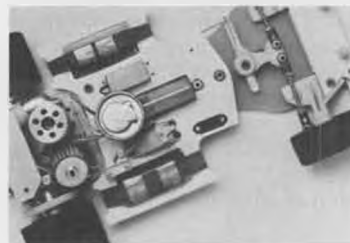
The Nats-winning RC12E features die-cut fiberglass chassis, lightweight racing wheels and tires, tough glass-filled nylon pillow blocks and complete, detailed instructions including racing tips from Gene Hustling and Roger Curtis. Approved for ROAR competition.

THE RC12E'S TRACK RECORD AT THE NATS

ROAR Nationals Expert Class 1:12 Scale Electrics				
		Production	Stock	Modified
1978	4cell	No event	MRP	RC12E
	6cell	No event	RC12E	RC12E
1979	4cell	No event	RC12E	No event
	6cell	RC12E	RC12E	RC12E

*4 cell cars run indoors, 6 cell cars outdoors. Chart shows all expert class main events under official ROAR sanction since the RC12E was introduced.

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PIONEERS IN SILENT FLIGHT

Golden Eagle . . . Continued from page 33

made by hinging two particle board shelves together, covered with Celotex ceiling tiles, is recommended.

A wing with a curved bottom is a little more complicated to build than a flat-bottom wing, so follow the steps in the order given below.

1) Cut the ribs out of 3/32 sheet. Don't try to drill the holes in W1 and W2, just cut square holes with an X-acto. You're going to fill them up with epoxy anyway.

2) Taper the tip trailing edge stock. Pin down the lower half of the T.E. and the lower main spars. Pin down the L.E.

3) Glue rib W1 to the T.E. Lean the top outward 6°. Do not glue ribs to the main spar or L.E. The L.E. and main spar are in place to aid in rib alignment. Type A.

4) Laminate two W3 ribs together. Type D. Cut notches for the dihedral wires.

5) Cut notches for the spoiler in four of the W3 ribs.

6) Attach all the ribs to the T.E. Type C or A.

7) Complete the T.E.: i.e., add the top piece. Type A or C. When the glue is dry, remove the pins and block up the T.E. 1/4 inch in the root section, tapering to 1/8 inch at W11. Block up all ribs 1/16 inch just ahead of the main spar to allow for sheeting.

8) Glue all ribs to the main spar and to the L.E. Type A or C.

9) Roughen the 5-inch pieces of 1/16 diameter steel wire (not music wire) with the edge of a flat file and bend 10° in the

center. Slip one through the lower notch in the double W3 ribs.

10) Slip in (don't glue) the fiberglass wing rod tubes and fit and glue in the spar webs. Type A. Remove the tubes.

11) Add the spruce spar top pieces. Type A. Set the prepared 5-inch wire spar splice piece in place before putting on the spruce.

12) Put in the spruce turbulator spars from W2 to the polyhedral break and the balsa ones in the tip section. Try to get these exactly flush with the rib tops. Type A or C.

13) Install the spoiler framework. Type A.

14) Install the 1/4 x 1/2 x 1/2-inch spruce screw eye base in the root rib. Type C or A.

15) Install the plastic spoiler horn. Type B.

16) Route the 25-inch nylon spoiler cable housing, as shown, through the ribs. DO NOT CUT THE TUBE SHORTER. Type C with soda.

17) Cut a 1/4-inch square piece of tin from a coffee can lid, or what have you, and cement to the spoiler. Type E.

18) Epoxy the magnet to the rib. Type E. Install the dacron cable and check out the action of the spoiler. Use Scotch Magic Transparent Tape as a hinge.

19) Remove the wing from the board and sheet the bottom of the first bay. Type A or C.

Repeat these 19 steps on the other half of the wing. When finished, proceed as follows:

20) Slip the fiberglass wing rod tubes in position in both wing halves. Check

their alignment. Cement the tubes to the ribs and spars with epoxy. DON'T ECONOMIZE ON THE EPOXY. Apply large epoxy fillets around the tubes to insure that the stress in the tubes is transferred to the spar. Plug the tubes with 1/4-inch sq. balsa forced in. Leave four inches unplugged for the wing rods. Type E.

21) Epoxy the dihedral wires to the upper and lower main spars.

22) Sheet the underside from L.E. to the spar. Make sure the underside is as smooth as you can make it. In spite of what you may have guessed, been told, or may seem logical, THE SMOOTHNESS OF AN AIRFOIL BOTTOM IS MORE IMPORTANT THAN THE SMOOTHNESS OF ITS TOP.

23) Sheet the top of bay one. Type A.

24) Reinforce W1 with 1/32 plywood. Scissors cut the 1/32 ply nicely. Type D.

25) Attach the tip block flush with the top of W11. Type D.

26) Plane the bottom flush with the rib and radius the bottom surface.

27) Trim ends to continue L.E. and T.E. lines.

28) Carve and/or sand top surface from spar forward to continue top contour of W11. This will form the tip profile.

29) Rough carve the top rear surface to approximate shape (no material is removed from the extreme tip [out-board] from the spar back).

30) Wrap a piece of 60 or 80 grit sandpaper around a piece of broom handle, a dowel, a piece of pipe or what have you, about 1-1/2 inches in diameter, and sand in the convex shape. The T.E. of the tip should be square and 1/16 inch thick. See View C on the plans.

31) Sand the L.E. to the proper contour. It's a good idea to make a template.

32) Sand the top of main T.E. to continue the rib contour and to achieve a square T.E. 1/16 inch thick.

33) Cover the wing with Top Flite Super MonoKote. Make sure the MonoKote adheres to every rib and spar. My designs are "stressed skin" and require the superior strength of MonoKote, properly applied. Our tests have proven, to my satisfaction, that MonoKote is both the strongest and the lightest covering commercially available.

34) Cut out the spoiler. Reseal the covering to the spoiler and all around its frame. Hinge the spoiler with Scotch Magic Transparent Tape 3/4-inch wide. This acts as a return spring. DON'T LEAVE THE SPOILERS OPEN IN THE SUN.

STABILIZER

Divide the 1/8-inch O.D. aluminum tubing into four 2-inch lengths and one 7/8-inch length. Using a knife, cut the five pieces by rolling the tubing with the knife (knife 90° to the tubing) back and forth until the tube severs. The 7/8-inch piece is the bellcrank axle. Ream the hole in the bellcrank with a drill until the tube is just free in the bellcrank, not sloppy. Ream the 3/32 hole until the stab wire is a light press fit.

1) When building two stab halves,

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considerable time can be saved by cutting two sets of parts at once. Cut a notch 3/32 wide by 3/8 long in the center of the aft end of each rib and the tip block so that the trailing edge piece will be in the center (top to bottom) of the ribs. Cut all parts.

2) Glue the frame pieces together, including L.E., T.E., tip, root rib, braces and spar. Type A or C.

3) Glue in all ribs. Type C or A.

4) Remove the partially completed stab half from your building board. If you used type C cement, apply the type A fillets now.

5) Drill a 1/8-inch hole through the root rib and the next one for the 1/8-inch aluminum tube. Glue in the 2-inch long tube, using type C with soda or type A.

6) Go back NOW and repeat the first five steps on the other stab half.

7) Use the bellcrank to locate the correct position for the rear tubes and drill for the tubes. Before you glue in the rear tubes, set the two stab halves together with the bellcrank in between. Use the bellcrank axle, otherwise the wire will be too small for the hole in the bellcrank. Glue in the tubes. Type A or C with soda.

8) Sand the rib contour to a symmetrical shape (see Section B-B).

FIN

1) Pin the 1/32 x 5-1/2 inch square ply piece, grain horizontal, so that the back edge is coincident with the trailing edge of the tail post.

2) Using a straightedge and a pencil,

continue the rear edge line of the leading edge onto the plywood.

3) In a similar manner, continue the top line of the fiberglass fuselage.

4) Use your steel straightedge and your X-acto knife and cut out the fin side. Check its size and duplicate it.

5) Cut the tail post from the 1/4 x 9/32 balsa piece and slot for the hinges. Note: The tail post is 1/4 inch front to back, 9/32 side to side.

6) Now is a prudent time to cut the 1/4 sq. rudder post and fit the hinges.

7) Cut the 1/8 x 9/32 ply fin base to length.

8) Mark the extremities of the slot for the bellcrank.

9) Cut away 1/4 inch of the bottom of the bellcrank stiffeners so as to require only a narrow slot for it to pass through the fin base.

10) Cut the slot (or notch) in the fin base. Note: The notch will be off center. It is 1-3/16 long x 1/8 wide, all on the right side.

11) It is wise to drill a new 1/16 dia. hole 1/4 inch up from the old 1/16 hole in the bellcrank to raise the elevator control rod clear of the rudder control rod to prevent interaction. Cut 1/4 inch off the bottom of the bellcrank arm.

12) Cut the center 1/4 x 9/32 separator.

13) Mark the place where the center separator is to join with the fin base and taper the width of the fin base forward of this point symmetrically to 3/16-inch wide.

14) Cut the 3/16 sq. forward separator

to length.

15) Locate and drill a 1/8-inch hole for the bellcrank axle in the left side only.

16) Cut the slot for the rear stabilizer wire in the left side.

17) With wax paper over the plans, pin down the left side and glue on the tail post. Type C or A.

18) Glue on the 1/4 x 9/32 center post and the fin base (slot on left side). C or A. DO NOT ATTACH THE 3/16 sq. OR THE TOP RIB YET.

19) Glue on the right side. Type C or A.

20) Remove from board and squeeze the forward end of the sides together and glue in the 3/16 sq. separator. Type C or A.

21) Drill through the left side to locate the axle hole in the right side. Ditto for the slot. Use a drill press if you can, but make sure the hole is perpendicular. Complete the slots with knife, Dremel, or file.

22) Set in the bellcrank. *It can't be done later.*

23) Glue on the 3/32 x 1/4 top rib. Type C or A.

24) Glue on the 1/4 sq. leading edge. Type C or A.

25) See Section A-A on the plans. Cut the 1/4 x 1/2 stabilizer roots to fit the fin. Make the roots in one piece and, after gluing on, cut out the sections covering the slots. Glue on the roots one at a time, each time drilling through for the axle. Type C or A.

26) Trim the stab roots so that the overall width is 7/8 of an inch. Insert the axle (7/8-inch tube) through one side, through the bellcrank and through the other side. Check that everything is square and true; IF NOT, FIX IT! You don't want to go to the flying field next weekend with a crooked airplane. (The difference between a good builder and a poor one is not that the good builder doesn't screw up, the difference is that the good builder fixes his screw-ups.)

27) Shape the leading edge and the stab roots' leading edges.

28) Glue in the axle. Use Type C.

RUDDER

1) Pin down the rudder post previously made.

2) Cut all the 1/4 sq. pieces and glue in place. Type C or A.

3) Fit the 3/32 x 5/8 trailing edge into slots in the 1/4 sq. top and bottom frame pieces. Type C or A.

4) Install the ribs. Type A or C.

5) Install the corner brace. Type A or C.

6) When dry, sand to an eye-pleasing symmetrical airfoil shape.

FUSELAGE

Note: Fiberglass fuselages and other hardware for the Golden Eagle are available from Craft-Air, 20115 Nordhoff St., Chatsworth, CA 91311. Send SASE for a complete list and ordering information.

1) If you wish to tint your canopy, here's how. Get a pot full of hot water (hot tap water is about 135°-140°, which is ideal; boiling water will ruin your canopy) and add one package of Rit dye

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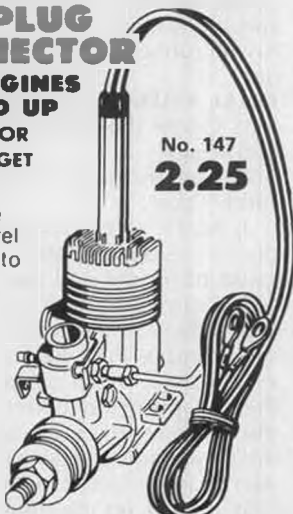
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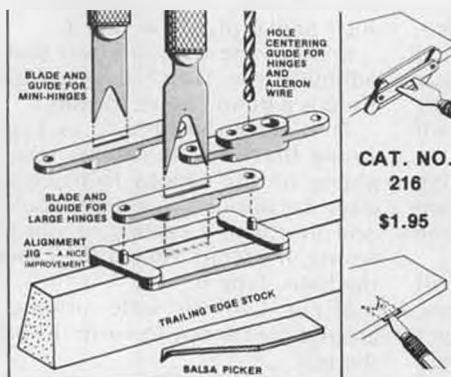
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(dark blue, dark green, maroon, etc.). Dip in your untrimmed canopy and check it frequently until it is the shade you desire. Now, freeze in the color by rinsing in cold tap water. Dry it off promptly to prevent water spots.

2) Sand the fuselage at the parting line with 100 grit, then 320 grit. Take care not to round off the flat area where the fin attaches.

3) Use a letter P drill bit to drill through the wing tube indentations. (Letter drills are almost as scarce as hen's teeth — you can use a 5/16-inch bit and a little persuasion).

4) Install the 2-1/2 inch fiberglass tube and fill the indentation to flush. Type E. Sand flush.

5) Fabricate the canopy tray from 1/8-

inch poplar ply. Type A or E.

6) Paint the tray, or cover with self-adhesive trim. (Top Flite's new Sparkle-Kote is a good choice for this.)

7) It's a good idea to tack-glue a strong brace to the canopy tray while gluing on the canopy to make sure it stays flat during the gluing. You've got one shot with a canopy; if you glue it wrong, it's scrap. Attach the canopy to the base. Type B.

8) Put 1/8-inch wide striping tape around the canopy to cover the edge of the tray.

9) Cut the notch in the aft top of the fuselage to accept the tail post.

10) Cut the slot in the top of the fuselage to allow the bellcrank to work freely.

11) Decide exactly where your radio must be put; namely, AS FAR FORWARD AS POSSIBLE. Install the servo rails. Type E.

12) Install the antenna tube. Antennas that hang out not only look amateurish, they add considerable drag. Type E or C with soda.

13) Install the towhook base, 1/4 x 1/2 x 2 spruce. Type E.

14) Towhook. There is only one correct place for a towhook. If you know where that is, an adjustable towhook simply doesn't make sense. The one on the plans makes the best towhook money can buy. Screw it in and glue it in place with epoxy. It's cheap (about 15¢ each), but that's not why it's on the plans; it's there because I don't know how to design a better one. Captured releasable towhooks are all right in theory, but you're going to have to learn the proper technique to get a better launch from one. I know a lot of pilots who think captured towhooks are great, but they can't outlaunch me. I've met one pilot who knew how to use one. I don't! Do your own thing.

15) Fashion the control rods from 3/8-inch sq. balsa, rounded. Make the wires as short as practical. Use the 1/16 wire in the front and the threaded control links aft. Slot the fuselage on the left side for the control link to exit. Wrap the rods to the wires with thread and glue. Type B or C with soda.

16) Install the servos and temporarily fit the fin and rudder.

17) When everything works smooth and free, attach the fin to the fuselage . . . VERTICAL. Type E.

18) Fit the wing halves to the fuselage. Make sure the wing incidence is correct and identical on both halves. Robart makes an incidence measuring tool that should make this an easy job. Drill 3/16-inch holes through the sides for the incidence dowels.

19) Sand and paint your fuselage (white, I hope). Remember, the prettier a sailplane, the better it flies.

20) Fashion hooks from paper clips and attach to the canopy tray back piece and the fuselage floor. Type E. Use two No. 10 rubber bands to hold the canopy on.

FINAL ASSEMBLY AND TRIM

1) Cover the fin, rudder, stabilizer, and wings.

2) Glue the hinges to the tail post and rudder post.

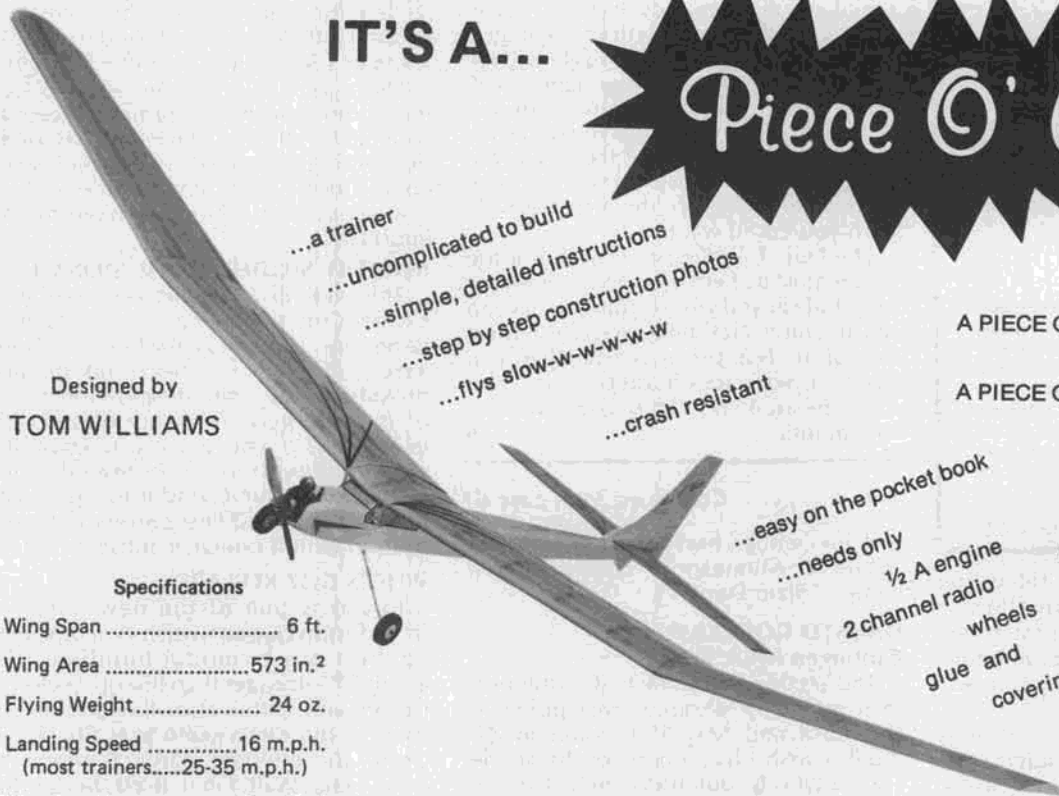
3) Make sure your control rods are positive. Sloppy controls are the prime cause of rudder and stab flutter.

4) Cut oval-shaped holes in the fuselage sides for the screw eyes and the spoiler cable. Put a flat washer on a No. 2 x 5/16 sheet metal screw and install in the last hole in the spoiler servo arm. Slip the looped ends of the dacron lines over the screw and check that both spoilers start to open simultaneously.

5) Initially set the trims to zero, using a 7/16-inch servo arm on both elevator and rudder and a 9/16-inch arm on the servo. The Golden Eagle is very responsive to the controls.

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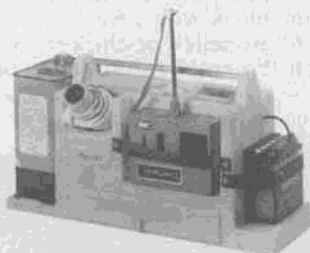
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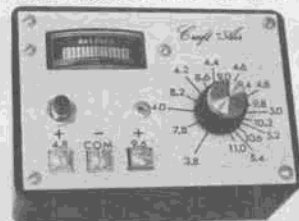
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6) Balance your ship from the center of the spar at first. After you have flown it a few times, move it back as far as you can before the ship becomes unstable. This will vary from plane to plane and especially from pilot to pilot.

7) I believe you will be pleasantly surprised at how well the Golden Eagle will penetrate, but for all-out speed runs, ballast will be required. It takes at least one pound of lead to make any noticeable difference in the speed of a 980 sq. in. sailplane. You may wish to add much more.

8) It is not easy to find all the warps in a semi-symmetrical airfoil wing. That incidence gauge mentioned earlier should help, but it is imperative that the wing have NO WARPS . . . no washout, either. If a sailplane is a turkey in the air and/or does unpredictable maneuvers, the chances are 1000 to 1 that it's got an untrue, warped wing. **FIX IT BEFORE YOU FLY IT THE FIRST TIME.** Your first impression of a new ship determines, in large measure, how well you will fly it later.

FLYING

Keep the speed up! This is a high-speed airfoil. If you slow it down, as you may be used to doing with your Paragon or Windrifter, the Golden Eagle will fall out of the air. On the other hand, it will do some cute tricks the aforementioned cannot do. With sufficient control movement, it will loop so tight that if you bat your eyes, you'll miss it. It can thermal inverted and it will do the nicest outside loop you could want.

The launch is almost vertical, but the speed must be kept up. This is a different breed of cat and you're going to have to put in some stick time to get the most out of it, but the more familiar you become with its characteristics, the more pleased you will become with its capabilities. ●

F/F Continued from page 61

old ones, either. Maybe that's why Clyde White of Minneapolis named his FAI design "Slam Dunk"!)

DARNED GOOD AIRFOIL: Gottingen MVA 342

This section first came to my attention in an article by Alexander M. Lippisch in the April and May 1950 issues of *Air Trails*. I wish I had a copy of the article (can anybody out there help?), since this is the first reference I can find in American publications to the problem of low Reynolds number aerodynamics. Along with discussing the importance of Reynolds number to model airfoils, he presented some results of wind tunnel tests done at low Reynolds number by the Prandtl Institute at Gottingen, during World War I. The Gottingen 342 gave one of the highest L/D ratios of those tested. Before giving a blanket endorsement to this airfoil, however, it should be realized that the turbulence level in the tunnel was not measured. (The NACA tested the NACA 6409 and other widely used airfoils at an alleged Reynolds number of 42,000 in 1940 or so, but the turbulence factor was so high that the actual Reynolds number was almost

three times that figure, making results useless for model work.) The ordinates to the Gott. 342 may be found in a 1961 book by F.W. Riegels, *Aerofoil Sections*.

This a very thin section, about 5.5% maximum, which may require sheeted surfaces for stiffness. Bill Hartill has used this section since 1951 for Nordics with good success. The calm-air times of his low-aspect ratio Nordics have been impressive.

MYSTERY MODEL OF THE MONTH

This looks like a smaller version of the Crispy Critter, and dates back to the same era. The sway-backed fuselage gave a high-thrust effect and should provide an easy identification for those of you with good reference files of old magazines. If you think you know it, send your guess to the **RCMB** office in Costa Mesa. Don't send it to me! That just delays things. First correct identification wins a one-year subscription.

WHO'S GOT KEVLAR?

Kevlar is one of the new miracle fabrics from Dupont with lots of possible applications in model building. It's about 50% stronger than fiberglass cloth, lighter and stiffer also. Kevlar can be used in the same manner as fiberglass cloth, for molding parts, reinforcing areas, etc. Walt Ghio used Kevlar to make the motor tubes for his fabulous World Champs Wakefields.

The only problem with this new miracle ingredient is where to get it. Most places that have Kevlar have such a high minimum order, and the price is naturally more per square yard than glass cloth, that an individual would find the cost prohibitive to obtain a small quantity to experiment with. Jim Thornberry did a bit of digging, however, and found an outfit that will sell Kevlar in quantities as small as one square yard.

If you're interested in being the first kid on your block with a Kevlar motor tube, or FAI propeller, or chicken stick, write to Hi-Pro-Form Fabrics, Inc., 962 Devon Drive, Newark, DE 19711, and ask for a price list. They have Kevlar in



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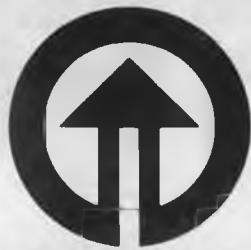
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Japanese tissue (try Sig of NFFS Supplies for Plyspan), DT fuse (available from Sig or in bulk from Champion Products), and nitrate dope are items that your local R/C emporium probably doesn't have on his shelves. The Scale Staffel Squadron Flyer gives these hints: "As for nitrate dope, I've bought cans of Randolph clear dope and thinner from Wag-Aero, Box 181, Lyons, WI 53148. They'll send you a catalog of aircraft equipment, an interesting catalog, if you write. It may be possible to obtain clear nitrate dope and thinners from some local airport, but I'm happy with this approach, having the cans delivered to my door about once every two years or so!"

F/F Scale Continued from page 62
the lines which needs to be drilled comes out right on the corner of the block; this can make drilling a bit difficult. If this should happen, simply

sand away the corner. This will simplify drilling without affecting the overall shape of the block.

The next step is to take a piece of 1/32 plywood and draw perpendicular lines on it. Using the center of these two lines, I will draw a circle, the diameter dictated by the front of the engine cowl. Another circle is drawn about 1/4 smaller than the first one, making concentric circles. These circles are cut out using a circle cutter on the drill press. When finished, I end up with a neat ring with four marks on it. This plywood ring is then glued onto the front of the cowl block, using its marks to line up with the perpendicular lines previously drawn on the block. By using Super Jet, you don't have to wait until the glue dries. Next, I tack-glue the block onto the fuselage using the Super Jet glue near the center of the block, keeping the top cylinder perfectly aligned. I prefer to tack-glue away from the edge so that when removing the cowl later, if the balsa splits, it won't leave a ragged edge. Once the block has dried, it is shaped and sanded as required. You will note that the transition from the shape at the firewall to the front of the cowl is greatly simplified due to the plywood ring. At this point, the block will not be hollowed out; this will come later.

Fitting the cylinders to the block is the next step. Care is required here. By using the plan, you have to determine how much each cylinder sticks out above the cowl block. The Williams Bros. cylinders I used to simulate the Kinner were the Wright J-5's turned around. These cylinders have a taper to them, so that the holes previously drilled have to be reamed a little to accommodate them. I start with the top cylinder and work around. By using a pair of dividers, I measure from the center of the block to the top of the cylinders. This assures me that each cylinder is the proper height from the thrust line. (Now you know why the block wasn't hollowed out earlier.) You will find that some cylinders go into the block a bit more than others, due to the shape of the cowl.

The cowl block is carefully removed from the firewall and hollowed out. At this stage, the engine, a D.C. Dart diesel, was installed so that the cowl could be trimmed to fit neatly around the engine cylinder. I used dress snaps to hold the cowl onto the fuselage. It wasn't until I had the fuselage covered and painted that I mounted the cylinders permanently onto the cowl. One extremely important item here is to make certain that each cylinder is in line with the others when viewed from the side; it is very easy to misalign them. Nothing looks worse than to see one cylinder leaning one way and another leaning the other.

One disconcerting problem arose when I realized that the needle valve was smack in the middle of one of the cylinders. Now what? I couldn't have the needle valve coming right out of the top of the cylinder. The first thing I did was to cut off the wire from the needle valve

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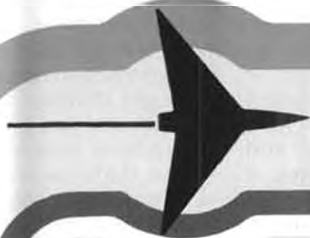
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which extends beyond the body of the needle valve. I filed a screw slot on the end of the body of the needle valve. Next, I mounted a small hook on the left engine mount and another hook inside of the dummy engine cylinder affected. By stretching a small rubber band between hooks, the cylinder stays snugly in place. When I have to make an adjustment on the needle valve, all I have to do is pull the cylinder out and back, and adjust the needle valve using a small screwdriver. When the engine has been adjusted, place the cylinder back into the slot. This really conceals the otherwise obtrusive but necessary needle valve.

The Flightmasters have a rather busy schedule for 1980. Here is a list of dates.

On April 20, a Stahl/Lindberg contest at Dominguez Hills College for aircraft designs by these men . . . one against the other, event for any racing type aircraft. They must take off from a card table and fly an 88-foot course. Great fun!

On May 18 the Scale Staffel is holding a scale contest at Lake Elsinore.

May 4, the Flightmasters semi-annual using the Flying Aces rules. There will be the following events: Rubber, Peanut, Power, WW-1, Mass Launch, WW-II, and

Thompson Trophy Mass Launch any Thompson racer OK.

On June 22, there will be an R.O.W. Scale event for rubber and power plus special Embryo R.O.W. No R/C!!

September 20 and 21, Flightmasters annual with multi-engine, a special added event. Lastly, on December 7, the annual Jumbo/Peanut with a special WW-II event for any aircraft involved with the December 7 Conflict. This will be a mass launch special event.

* * *

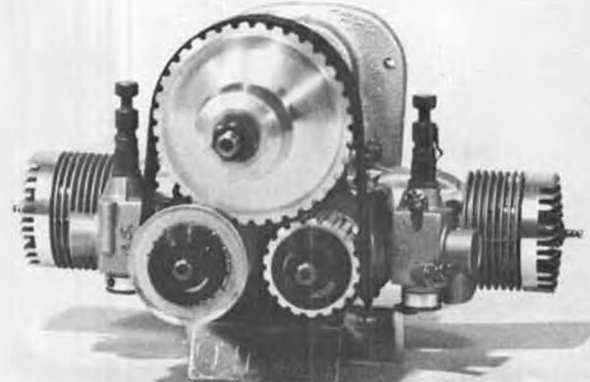
At the January meeting, the Flightmasters presented a beautiful trophy commemorating Ray Berens. Ray is an "old time" rubber modeler, avid competitor, and the winner of most of the Flightmasters Jumbo Rubber Scale contests. This trophy will be a perpetual type trophy to be circulated for a period of ten years. This will occur starting with the F/F Champs held at Taft, California this year and every year thereafter for the ten years. Along with the usual events held at the F/F Champs, the event (called "Ray Berens Perpetual Jumbo Rubber Scale") will also be a regular event for free flighters to consider. The scope of this particular event is a ten-

year series designed to promote competitive flying scale models of ever-increasing quality of subject selection, fidelity to scale, construction design, workmanship, and flight duration capabilities. Also, to perpetuate the sportsmanship and camaraderie which distinguishes scale free flight modelers from competitors in any other form of model aircrafting. The rules are as follows:

GENERAL

- 1) Scale definition: same as AMA Rubber Scale.
 - 2) Model to be powered by twisted or extended elastic strands.
 - 3) Scale pilot is optional but preferred.
 - 4) No plastic propellers.
 - 5) Wing(s) span: projected span shall be used to determine minimum requirements.
 - 6) C.D. shall verify span for correctness and make sure model meets all other requirements prior to registration acceptance.
 - 7) Model is to be flown and judged with gear in down position.
 - 8) Multi-engine, seaplanes, or float equipped models may be hand launched all years.
 - 9) No model having placed 1st, 2nd, or 3rd may be flown in more than three contests in this series, wing(s) span permitting.
 - 10) A contestant may enter more than one model in flight competition. However, only one model may be selected for final score and only that model may be used for scale judging.
- (There is an eleventh rule where the minimum span of the model increases about every other year until the year 1990, when the minimum span will be 50 inches for monoplanes and 36 inches for multiwing. Plus the model can use a free-wheeling prop when the span reaches 44 inches. At the 48-inch span, models can be hand launched.)
- FLIGHT TIMING:
- 1) Flight time shall be an average of

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4) Unlimited flight time.

5) Position will be assigned from number one through last place.

6) Flights will be timed between 8:00 a.m. and 12:00 noon.

SCALE JUDGING:

1) Mooney style, with severe penalty for models not meeting the scope of this series.

2) Position will be assigned from number one through last place.

3) Scale judging will only be on a flight qualified model.

FINAL SCORING:

1) Lowest total of scale and flight position decides winner.

2) In case of a tie(s), scale position prevails.

3) Winner shall retain trophy until next event.

The National F/F Society has termed this event the "Wakefield of Scale Modeling." Maybe some of the pure rubber competitors will give Jumbo Scale, as presented here, a go. Flightmasters Cliff McBaine, Richard Seifried, and Loren Williams contributed monetarily toward the purchase of this noteworthy trophy. This in no way affects the regular Jumbo contest that the Flightmasters hold every December.

Classic Models, P.O. Box 681, Melville,

NY 11747, is alive and well and has come out with a fine new catalog (cost \$1.00) listing all of their kits and accessories. One area in particular should be of interest to most scale modelers: an Air Pix catalog listing all of their photographs, from antiques to jets. This catalog is also \$1.00, plus you receive a 4 x 5 photo sample.

Last but certainly not least is the neat suggestion by Bob Peterson of Youngstown, NY, who sent in the excellent idea on how to anchor the motor peg in a very clever way. The sketch says it all. ●



Instructor . . . Continued from page 11

airplanes because they are so-called "unpredictable." Is this really true? And if it is not, could you recommend a good low-wing aircraft that I could fly and not have to worry about unpredictable maneuvers such as snap rolls and spins? Mike Haas.

If you are comfortably flying an Ugly Stick, I would not hesitate to recommend some low-wing airplanes to you. The Kaos, Kwik-Fly, and Taurus are the first to come to mind and all are very "predictable." I don't happen to agree with those people who say that low-wing airplanes are harder to fly; take, as

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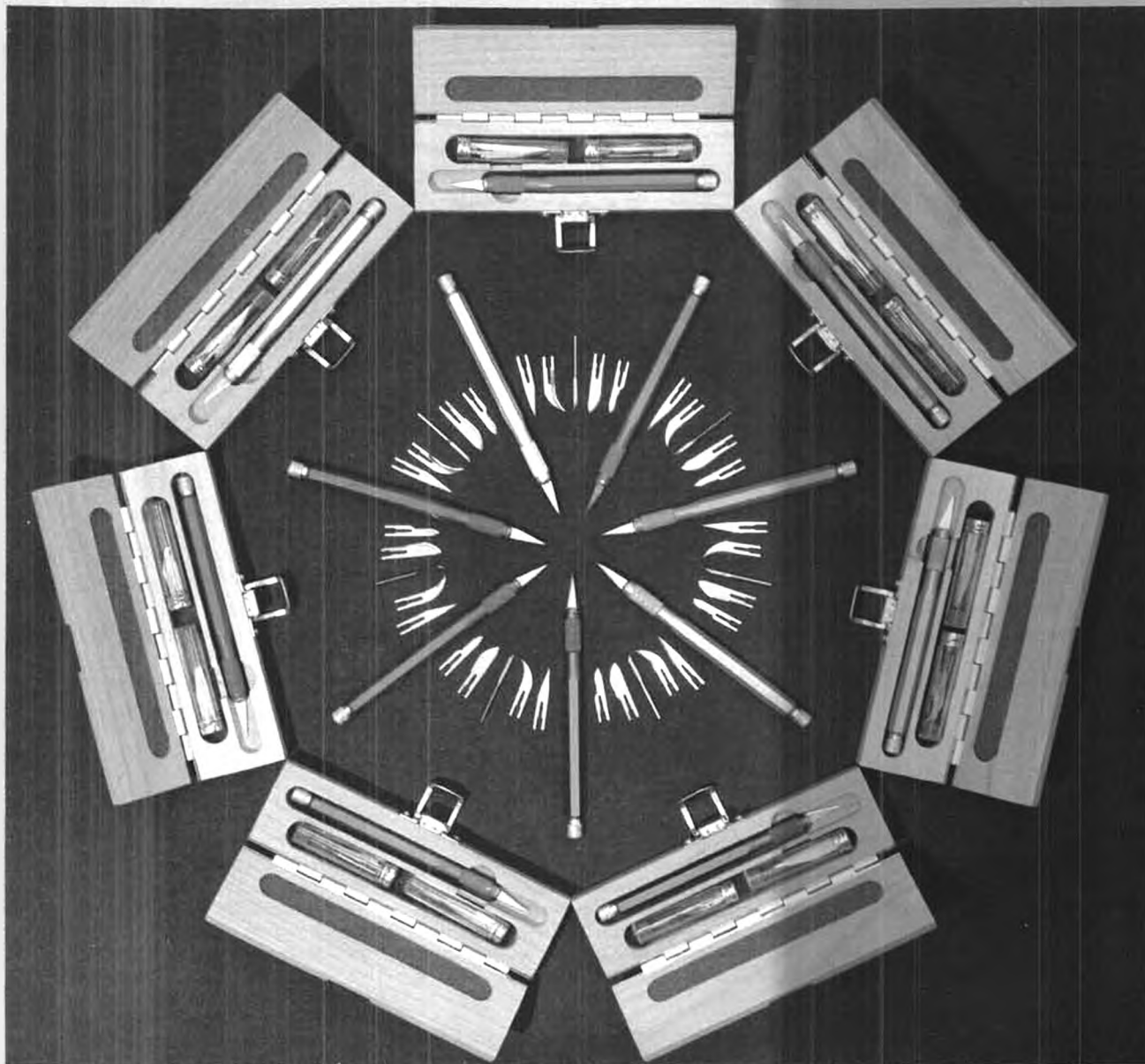
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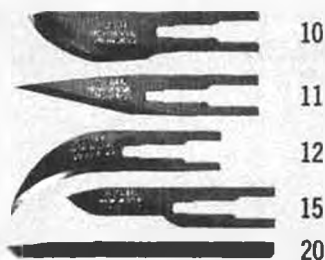
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an example, the Skylark 56, which is simply a low-wing Falcon and retains all the nice tendencies of a trainer.

Dear Dave,

I have a few questions that I think might interest some of your readers. I have noticed in the last few years that more and more Pattern ships, especially on the World Champs level, have been sporting flaps/dive brakes, and I am wondering if the added weight in the plane will be offset by a good amount of added performance? I would be putting them on three new Bridi UFO's that I am preparing for this coming season, and will be powering them with O.S. .61's. Also, I have been wondering about the UFO's wing area. While most ships have 730+ square inches, the UFO has only 692, and since they usually push ten pounds I am a bit concerned about the heavy loading, although I have flown them for the past year and have no complaints, only praise. Any ideas? One last question. Are variable pitch props, as far as Pattern is concerned, only a passing fad, or are they worth the \$125 price tag? I enjoy your column, and look forward to it each month. Brian Beck.

The use of flaps/dive brakes on championship level Pattern airplanes has been common lately in an attempt to make the spot landing easier and more predictable. Now that the takeoff and landing are eliminated from the FAI pattern, I expect to see fewer of these devices due to the weight disadvantage. The current trend is to slightly larger

airplanes, as we now have more powerful engines, but the 692 square inches on the UFO is sufficient if you keep the weight down. Ten pounds is excessively heavy; you should be able to build and finish (paint) a UFO at eight pounds easily. (I once built a Phoenix 6, which is similar in size, at 6 lbs., 14 oz. ready to fly, with retract.)

Variable pitch props look like they have some potential for the future, but are on the frontier of technology and are probably best left to the experts for now. Dear Dave,

I'd like to inquire about your impressions on how to achieve a true (i.e., tumbling nose over tail) lomcevak. For five years we have tried several different approaches to the problem in order to accomplish a genuine lomcevak. Our experimentation to date has employed the use of aft CG's and increased control surface size with maximum throw in an effort to "muscle" the airplane into the maneuver, but all this yields is a series of violent consecutive outside snap rolls and flat spins, a few of which have been impossible to recover from. Damage from these always has been minimal, however. We felt that we were beating a dead horse in our obsession until this past summer, when I put together a styrofoam Midwest Super Chipmunk powered by an O.S. .20, which would perform the lomcevak perfectly (i.e., tumbling) each time. 'Twas wondrous to behold. It was built for four channels, had the CG as shown on the plans, and I

incorporated a lot more rudder deflection although it had little effect when used for normal spin recovery, which was ultimately the demise of the aircraft. I suspect that airflow distortion caused by the bubble canopy may have contributed to the poor spin recovery, but I'm not entirely certain.

Armed with this information, our present consensus is that the design of the aircraft is far more critical to the performance of a successful lomcevak than pilot-induced responses, with perhaps the exception of entry speed. At present, in order to pursue this line of reasoning (would you believe guesswork?), I am constructing a scratch-built O.S. .35 powered (unmuffled) 2-inch

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scale Stephen's Akro which will utilize what we feel are the necessary design characteristics: higher wing loading, double tapered wing, symmetrical airfoil, and a surplus of power (torque). This should influence scale effect as it relates to mass/inertia, although creating some less desirable flight characteristics such as high stall speed and landing approach speed.

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Now if I may take the soapbox for just one more moment. The lomcevak, as seen in full-scale aerobatics, is rarely properly performed by miniature aircraft. There have been articles written describing techniques of entry procedure, however, none I'm aware of expound on the proper design for the maneuver, as we feel that design is the single-most important factor determining success of the maneuver. Well, Dave, there you have a few of our theories. We would appreciate hearing some of your thoughts on the lomcevak. Dave Mallett.

Your observation that models don't do this well or often is correct, and I have some theories of my own on why. On most models the stab area is large enough to prevent this tumble, and the

mass of a typical model is too low to overcome this. A large model with a small horizontal stab will usually do a lomcevak fairly predictably, as proven by Mark Radcliff's Super Fli T.O.C. airplane. I'd guess your Chipmunk does it so well due to its small stab size. This is also the reason it is marginally stable and spins easily.

Dear Dave,

Please instruct me as to why flat spins occur. Entry as follows: normal upright spin entry, but possibly with excessive rudder. When spin reaches rotation speed, slowly start feeding in down elevator while still holding left rudder, left aileron and moderate to full power. As elevator passes through neutral, the spin rate accelerates. As you reach full down the model goes flat and you can hear the engine lug down, the opposite of unloading. If right aileron is added the spin is even flatter. That is the entry for four-channel flat spins.

Three-channel ships without ailerons do the same thing. I own 1/2 of a Cox two channel T.D. .049 powered Cox Q.T. and we've spun left, applied down elevator slowly and spun the thing flat as can be.

The other day I got a beginner's Q.T. to go flat on the very first flight... and it never came out. No damage. My Andrews H-Ray with three channels has spun all the way to the ground with nil damage. My Quickie 500 will do it upright or inverted. We've spun the Southern R/C Alley Cat the same way.

Recovery, when controls are neutralized, seems to always take three turns or more; some don't recover... spectacular.

Why does down elevator make models spin flat? Please instruct me why it happens. It has me stumped completely, and no one yet has come up with a good answer. Stuart Richmond.

The flat spin is one that has always stumped me also, but I must admit to being a little light on knowledge of the aerodynamics of spins in general. I theorize that the flat spin occurs when the inertial effects of the airplane completely overcome the aerodynamics, but this is only a guess. Try this one on Harold deBolt or Don Lowe, as they can probably give you a much better answer than I can.

Dear Dave,

I look forward to reading your column every month. You have many helpful hints which are very useful in my flying and building. I am building my first Pattern plane and have one question for you. I would like you to explain what anhedral in the horizontal stabilizer does to a plane, its advantages and disadvantages, etc. Jerry Hunt.

Anhedral in the stab of a Pattern airplane is used to counteract the natural pitch down when hard rudder is applied. This is its primary advantage; the disadvantage I've found with anhedral is that the airplane tends to bounce around in pitch in a turbulent crosswind. There are other theories on how to counteract this pitch down, including lowering the

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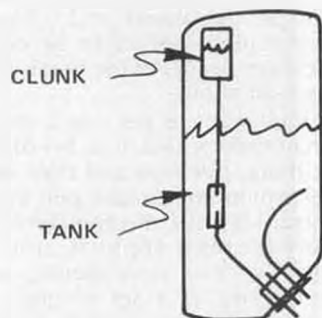
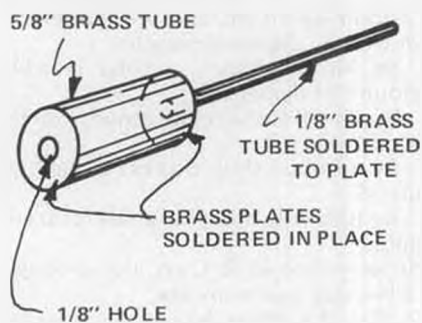
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stab, and I have been thinking of another which involves slanting the rudder hinge line back considerably.

Dear Dave,

Here is an answer to a problem I was having a while back and hope you or some of your readers can use. Whenever I did a square loop or an Inverted Top Hat, the engine would go lean and burble or sometimes even stop at the bottom of the maneuver. It took a while to find out what was going on, but I finally figured that when the airplane was coming straight down, the fuel would flow forward in the tank and leave the clunk exposed to the air. Even at idle, the engine would burn enough fuel in the line to leave an air bubble big enough to kill the engine when it was advanced to full throttle. So here is the solution. Instead of using a regular clunk, I made a small reservoir clunk from brass tubing like so:



This reservoir holds enough fuel to run the engine until the maneuver is completed. I've never had an inconsistent run since.

I sure hope you keep writing your column. It is really interesting and one of the few articles that is aimed toward the more experienced modeler. Henry Piorun.

This is probably the best solution I've seen for this problem. All I can say is, "I wish I'd thought of that." Thanks.

Dear Dave,

I was surprised to see my letter in your column when I received my February issue today. Since I wrote you, I learned a very valuable lesson that you might pass on to your readers.

When having trouble with an airplane, try and call the manufacturer. They're delighted to assist a fellow modeler who is flying their plane.

I called Mile High Models and explained about my problem of the plane not responding to rudder command and



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requiring right rudder to fly straight. He immediately knew of the problem (not enough washout in the left wing panel). I put extra washout in the panel and the plane flew like a completely different plane.

I saved myself a lot of grief trying to fly an unflyable plane by a \$2 phone call to the guy who designed, flies and knows the specific problems of a design. I also saved myself the possibility of rekitting \$20 to \$30 worth of airplane, engine and labor.

I called Bridi about the problem I was having with the T-10. I talked to the plane's designer. I had added washout to both wing panels to insure extra stability. It seems that the airfoil design required NO washout to fly properly. So, after talking to the manufacturer, I solved another problem.

Again, an inexpensive telephone call saved me a lot of headaches and problems in trying to get a plane trimmed out.

This is such a basic solution to many problems that I am surprised we don't suggest that we all try it when we're having difficulty building or flying a new model. Cox and Bridi now have "hot lines" and I'm in favor of this concept to assist us all.

Keep up the excellent column and an excellent magazine. Steve Benjamin.

This is one of the great things about our hobby/sport. Almost all our industry people are active modelers themselves and are anxious to help.

Dear Dave,

One thing that really bothers Novice fliers is the right turn syndrome. Don't know why, but it really gets to fliers. There seems to be a certain point in the right turn that results in a violent split-S that doesn't occur in the left turn. Don't know if you have ever experience this, but it is there. Could you give some help in this? And how, when you were a novice, you overcame this. Cal Lane.

The right turn syndrome is very real,



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all right, and I must admit that the first time I tried one was at my first contest, when a right-hand traffic pattern approach was required, and I darn near crashed. The only way to overcome this is to practice shallow right-hand turns at high altitudes until you feel comfortable before trying anything steeper or lower. Why this syndrome exists has baffled me for many years, and after talking to an English friend who commented that in England they have the same problem with left-hand turns, I'd guess it must have something to do with driving on the right-hand side of the road. It sounds crazy, but I can't think of anything else that is different.

That is about all for this month, and I still have quite a few letters left unanswered, so we are in good shape for at least one more month.

Hannan Continued from page 54

parallel, if less spectacular increase has been taking place in the philatelic community, with surprising appreciation in the value of air mail postage stamps. For example, a British commonwealth stamp commemorating the first non-stop aeroplane flight across the Atlantic has risen in value 184 times since issue. Now the Commonwealth of Dominica is issuing a new series of aviation theme stamps virtually guaranteed to "fly," since they are made with 23 karat gold! Included in the run are examples depicting the Wright brothers, a Zeppelin, the Concorde SST, and Neil Armstrong with his moon lander. The asking price? \$19.59 each! Let's see now . . . how much balsa would that buy . . .

SPEAKING OF AIRMAIL

The U.S. Post Office is now in the mailing-carton business. The one which caught our attention was sized 15x12x10 inches . . . perfect for transporting a Peanut! Price is a very reasonable 50 cents.

THE MYSTERY SHIPS

According to the Associated Press, a couple of U.S. Navy fighter planes are missing in Durham, North Carolina. Not missing on a mission, but missing . . . period! The Navy says that two F2H-2 Banshee aircraft were presented to the city during 1968, and they wanted to find out how the craft were being cared for, displayed, etc.

But the Durham Mayor and City Manager have no record of ever having received the Banshees at all, and have asked the Navy to produce a receipt proving actual delivery. So far, the city has not located the fighters and the admirals have not found the receipt.

DO WE REALLY NEED A NEW IMAGE?

Modelers are a minority group, let's face it. While still unable to settle among ourselves whether we are engaged in a hobby or a sport, some seem even more concerned about the way we are viewed by the general public.

Chris M. Matsuno offers these thoughts on the matter, prompted by published efforts to eliminate the term

"models" in favor of "miniature aircraft": "Gramatically and Webster-wise, I guess 'model' is not really accurate, but it sure is simpler to say 'model' or 'modeler' than 'miniature aircraft' or 'miniature aircrafter' or 'miniature aircraft builder/flyer.' Nothing wrong with keeping things simple!

"Some people will always think of models as toys. So who cares? Beating them over the head isn't going to change their opinion.

" . . . I have always felt that there seems to be a basic difference in the philosophy of Free Flight vs. R/C. R/C'ers seem to be more image-conscious. In a sense, that's understandable, since they have a noise and space problem, and if they can impress the right people, it can mean flying sites in city/county parks, etc. I don't know exactly what some R/C'ers are looking for, or what they want from the general public. I'm reminded of that cartoon which showed the modeler as viewed by different people:

By his neighbors: a baby crawling around in diapers.

By his wife: shoveling money out the window.

By a hobby shop owner: all talk, no spend.

By himself: a dashing silk-scarved pilot.

Anyway, not all R/C'ers are so image-conscious, but many are.

"On the other hand, the average F/F'er seems to be in it primarily for the fun and challenge. That, plus (for some) the competitive aspect, and (a big part) the camaraderie seems to be enough justification. Seems to me that is what a hobby is all about.

"I don't want to get into a shouting match or make it an R/C vs. F/F or F/F vs. AMA thing, but now and then certain things prompt me to take pen in hand. And frankly, our models/miniature aircraft are toys! Sophisticated toys, maybe, but toys nevertheless, in the same manner as a set of golf clubs, fishing gear, sports cars, etc. Again, (if) the guy seems to have an image problem, I can't help but feel it stems from a lack of self-esteem on his part. That's a nasty thing to say, but it often applies to those who try to impress others with the things they do.

" . . . it is much more important to try to raise the general public's awareness and esteem of what modeling really involves, rather than to try to come up with a fancy name for the hobby/sport which we enjoy. I would be willing to bet that if you told someone, 'I fly miniature aircraft,' he would be no more impressed than if you were to say, 'I fly model aircraft.'

"Public respect can come only through a better understanding and knowledge of what is involved, and changing the name is one of the least effective means of doing so."

Chris also pointed out that we should try to upgrade the understanding of all aspects of modeling, regardless of any personal preferences.

IN A SIMILAR VEIN

Bill Warner, writing in the Flightmasters newsletter, offers food for thought from which we have abstracted the following: "This is the time of year to mull. But then, I mull often. . . .at my age, I have decided that building and flying models as we do takes on a new and changing significance with the passing of time. Each model represents not only the obvious challenge that everyone knows, but it also represents an increment in time, a measure of your own mortality. What you see (flying) is the culmination of a labor that may have started three weeks, three months, or three years earlier. You are watching something beautifully tangible, something you chose to invest your time in. That element is gone forever, but the result is something to contemplate. . . .it may be that this heavy contemplation as to the symbols one reads into modeling is misplaced. But what does cause up to keep up this seemingly inexhaustible pursuit? Perhaps if the answer were known, then we would cease to pursue."

Which sort of brings us full-circle back to our lead-in quotation, doesn't it?

DOUG McHARD'S CARS

Readers of *WW-II FLYING MODELS*, marketed by **RCMB**, will be familiar with the name Doug McHard, as the designer of three of the featured models. In addition to his model aircraft, Doug has long been involved with the production of model automobiles, to the extent that they finally have become his full-time means of support. His company, Sommerville Models, now produces a fascinating line of cast-metal car kits as well as finished collector's models, each exhibiting the degree of detail for which Doug is renowned.

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HOW'S THAT AGAIN?

Los Angeles newspaper columnist Jack Smith, regarding man's opposable thumbs that supposedly separate him from the apes who have otherwise similar hands: "This leads to the idea that if apes had opposable thumbs we would find them building motels and model airplanes." •

Soaring Continued from page 31

interested in understanding aerodynamics. Then there's *The Encyclopedia of Model Aircraft*, edited by Vic Smeed (Octopus Books, Ltd., 59 Grosvenor Street, London W 1, 1979) with its account of R/C soaring within a larger perspective. Those interested in scale might care to reference *Basic Glider Criteria* as published by the Flight Standards Service, Federal Aeronautics

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Administration, Government Printing Office Stock No. 5011-004. This guide describes the 1962 revised standards for structural examination of full-scale gliders.

Eric Lister's *Sailplane Designer's Handbook* is still in print and is worth your time and effort. He describes fundamental aspects concerning the stability criteria and other aspects of sailplane design. He compares various well-known models in different regards, and presents a step-by-step procedure for the design of R/C sailplanes ranging from those that are easy to fly all the way to those that promise really high performance.

See you next month. •

Chopper Continued on page 46

was used to lock out the throttle servo at a predetermined position while in flight. This took some doing in order to have the proper blade speed as the machine rolled to inverted. To add inverted collective, I had to pull back on the collective, and to go forward, pull back on cyclic . . . all the time giving reverse rudder commands. This is somewhat like driving in four o'clock traffic with all the car's controls backwards!

Using this method, I was able to fly the same Heli-Boy to first place in the Expert Helicopter category at the 1979 Tangerine Internationals in Orlando, Flori-

da. Also, to prove a point about helicopters, I flew in fixed wing Novice Pattern at Tangerine with this same machine. I was able to do all of the maneuvers and scored rather high, considering that all the odds to do so for the first time were against me . . . and with no practice!

Or conversed, there is a much easier way to fly inverted, and using this method, I am sure that anyone who can fly around with a good collective helicopter can do so inverted with good concentration and practice. The method that I am referring to makes use of reversing switches on the transmitter. These switches will simultaneously reverse collective, fore and aft, and rudder. The end result will be that inverted flight then requires the same transmitter controls as upright flight. You will need a transmitter with reversing capabilities in the board that can be brought outside to a conveniently located set of switches. An example is the Kraft seven-channel, 1976 or newer. Some mechanical changes must also be made in the transmitter to accomplish the splitting of throttle and collective.

You should now prepare yourself to see the helicopter from a totally different and unfamiliar point of view. You will have to select a part of the machine to watch while inverted. You should also be prepared to react to a machine that responds "backwards"; for example,

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turns to the right while upright will be left turns while inverted, and if you get in trouble, you will have to climb out inverted and not just set it down. You will also need to practice entry and exit from a safe altitude.

The flipping of the reverse switches must come in at the proper point of roll so that the reversed controls are at the right time, especially the collective. I would suggest that you "dry fly" your transmitter until you feel mentally comfortable before trying to actually fly inverted.

Should you wish further information on inverted flying write to me care of RCMB.

With inverted flight now a practical reality, many people are taking a different look at R/C helicopters.

Good luck flying inverted! •

Electric Continued from page 45

05 pylon racer, and third went to Bruce McAviney with his Astro 05 Electra Fli.

Bob Boucher and I tied for second in scale with one flight each on our planes. I flew a twin Astro 020 Grumman Widgeon, a small amphibian seaplane used by the Coast Guard. This model weighed 36 ounces and had 300 square inches. It flies rather slowly, and in its one flight it could not make headway against the wind; on its landing approach it stalled, fortunately with no damage. Bob's Porterfield flew well, but

also had problems with the wind (Bob later found he had a bad cell), so we decided against a flyoff and flipped a coin instead. I lost, so Bob got second in scale and I got third.

That wrapped up the contest. We all had fun, and we also had a sense of accomplishment by beating the odds imposed on us by the wind. In retrospect, I think the best strategy for contests is to assume the wind will blow, and build planes that will handle it. However, Hank West, my flying buddy, and I have found that for some reason electrics generally do better in wind than their gas-powered counterparts of the same size and wing loading. This is especially dramatic in the 020 size, where we both have had a lot of experience with both gas and electric. Neither of us like to fly gas 020 in the wind, but electric 020 does very well, maybe because of the smoother power.

Some of the planes that did not fly were very interesting. Dale Black's Red Zephyr was beautiful, with a geared Astro 15, and Ron Duly's U-control Zero with the Astro 020 F/F unit was a work of art. Bill Wendt's quarter-scale Farman was most impressive, using a geared Astro 15. The pilot came complete with a real leather flying cap and fur scarf! Ferrel Paptic's Bleriot VII with an Astro 020 F/F system was an unusual subject and one of the two free flights that did have a successful flight in the wind.

Until next time, enjoy the electrics and don't let the wind keep you down! •

F6C-1 Continued from page 19

the insignias are, would you believe, made from Monokote. Finally, the fire extinguisher is made from balsa, Monokote covered. It has a bamboo handle and a fire extinguisher label from a Sears catalog.

An excellent source of detail and documentation on the Army version (the P-1) can be obtained from Peter Westburg. My documentation on the F6C-1 came from Wylam book 2. After I had all the detail on my Hawk, I used steel wool and sort of burnished the simulated metal panels. I then took No. 400 wet-or-dry and lightly scratched the Monokote, first one way, then at 90° to the first way. This scratching is done to simulate fabric. Scratch it only at carefully selected points. We are only going to create an illusion of fabric, and it's very questionable that fabric threads could be seen with heavy dope paint on it.

Now I was ready for the last step in completing the finish on my model. After cleaning the model with Hobby Pox thinner, I mixed some Hobby Pox with satin finish catalyst. Instead of adding one part thinner, I added 1-1/2 parts. Thus, the Hobby Pox will dry faster, and two coats allows for better coverage. Using an airbrush, I gave the entire model two coats, one right after the other. The effect was stunning. The bonus was that all trim details were

sealed and stuck in place, and all the Monokote seams were almost completely hidden.

After assembly, the finished Hawk is an impressive model. It's large for a biplane, with a 63-inch span (top wing) and a 44-inch fuselage. My F6C-1 Hawk handled very well in its ground test. It was much better than any of the other biplanes I have flown. The forward gear and the big tires made even crosswind handling an effortless affair. In the air the Hawk is a rolling fool, and it's no slouch in the other departments either. The light wing loading really paid off in several significant areas. The model could be slowed down to a very realistic speed without fear of stalling. In maneuvers such as an immelman, square loops and Cuban eights, the power-to-weight ratio helps pull the model effortlessly over the top.

No, the F6C-1 Curtiss Hawk isn't as colorful as the P-6E Hawk, but it makes a contest-winning 2-inch scale model. It was my first scratch-built effort. To date, my F6C-1 has placed first in every contest it's been in except one. In that contest it placed second only to my own Sparmann P-1. Its highest honor so far is 1st place in team scale at the 1979 Western Scale Nationals. If you choose to build the Hawk I am sure it will bring you all the pleasure it has brought me. ●

C/L Continued from page 53

cerned about not being able to handle the speed and turning abilities. Went out on Saturday for a few test flights and had my hands full. I used my best model and best engine, although I did consider tying a streamer on to slow things down a bit. Ended up not using a streamer, as there were other fliers there and I certainly didn't want them thinking that Dirty had any doubts about his ability to handle a Combat model!

The first flight was really scary, the model was about 20 feet ahead of me all the time and I had to keep it at least one mistake high. The second flight was a little better. By the fourth I was starting to feel much more comfortable, but during that flight I finally got an appreciation for what happening-by spectators, even those who are into modeling, see when they stumble onto some for-real Fast Combat action. They just can't believe their eyes and usually say that it has to be impossible to actually fly the models in any kind of control. Some even go on to say that winning must be based on sheer luck.

The problem, of course, is that they cannot see what each flier is doing, or at least can't see why he is doing it. They see somebody like Brasher tuck inverted, just barely missing the ground and seem to think he just go lucky. What they don't know is that he and many others can do it every time, and in fact purposely get that low, trying to scrape the other guy off on the ground.

It has been my experience that spectators don't even start to appreciate the

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skill involved in Combat flying until they have either spent a whole day at the circles or have gone to several meets. Everything is so fast that they can digest it only in small chunks, possibly picking up a little from each match. Of course, if they first get the chance to watch some Slow Combat, there is less of a problem.

Even though Combat is in general a healthy event, I wonder if this overpowering speed and action is keeping potential fliers from joining in on the fun. Even in Slow Combat the speeds are pretty good and the models turn quite tight; in fact, current Slow Combat models would kick the tail off earlier Fast Combat models, back when there was only one Combat event.

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IS A ONE-DESIGN COMBAT EVENT THE ANSWER?

The direction I am going with all of this rambling is that possibly it is time for a one-design, one-motor event for Combat. The model should be easy to build, fly slow yet turn relatively well. The easy-to-build part is pretty simple, as many Combat fliers have put their mind to developing simple structures, and the techniques are well-known. What is not quite so well-known are the ways to get maximum use from each

piece of balsa, but that should also be an important consideration.

Let me tell you who I personally would ask for help in designing a one-design model. I'd ask Dick Mathis, commonly referred to as "Fast Richard." He knows his way around C/L models, both from a flying standpoint as well as design. He has flown Combat, so knows how the model should perform for a novice flier. Most important of all, F/R is in the business of kitting models. Let me tell you, this is probably the best way to learn how to get a lot of parts out of each piece of balsa. Many kit manufacturers have swept the profits off the floor and thrown them away, which is probably why we keep seeing so many new manufacturers replacing those that were "new" only months ago. Looks like an easy business to get into, and probably is, as many models can be kitted with only a few power tools, but the passing of so many manufacturers has to be a big hint that turning a profit is not easy.

For the model itself, we would no doubt have to stick with all-wood construction, as foam techniques are still not universally accepted in Combat. Wing construction would need to be simple, yet strong. The airfoil should probably be kinda fat, as this drag will slow top speeds down, yet can give more lift to get the model to turn well. Most novice Combat fliers seem to be able to cope with fairly tight turns, even after minimal practice, but the speed between maneuvers does mess them up. The tighter turns also help in panic situations where full up or down is cranked in, not knowing which to do first.

Before getting off the subject of the model itself, any talk about one-design needs to be backed up with a proven model that will be around, without changes, for some time. Bringing up the name of Mathis was not an accident, as he is one of the manufacturers who would be interested in kitting a one-design model. But if the Combat fliers

can't convince people like Mathis that the one-design event will be around for a long time, not subject to yearly changes in model design, then the manufacturers will not be interested at all. Having a couple of one-design kits available off the shelf of local hobby shops would be of tremendous value when promoting the event. Don't ever forget it.

For the motor, I'm not too sure about what to do. It would be real nice to pick out one consistent, super strong, readily available and fairly cheap motor to specify, but look around and tell me if you see one. The K&B .35 plain bearing would have been a candidate, but it was discontinued a year or so ago; any now found in shops are leftovers. The plain bearing Fox .36 is another choice, but I just heard that it too has been discontinued, although that is a rumor that I have not confirmed with Fox.

From there we can pick on a couple of motors, but I started with the K&B and Fox because their availability was always quite good; most any shop had one or the other at least. Easy availability of the required equipment is another big factor in this talk about one-design, so has to be carefully considered.

Most have realized the good old standby, the Fox .35 Stunt motor, has not been mentioned. Although I still like that motor for light and small Stunt models, I'm not sure that it makes a very good Combat motor. It is designed to alternate between a two stroke and a four stroke, something it does quite well, but when asked to stay on peak power for a long time, as in the constant maneuvering of a Combat match, it has a tendency to go lean, sometimes quitting and then being very hard to get restarted.

I will admit to having seen some Fox .35 powered Slow Combat models that worked well, but then the people setting the needle valve usually knew what they were doing and were able to get that setting that gave peak power in turns, yet was just slightly fast in straight and

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level. We should by now know that novice Combat fliers, the people bound to be most attracted to a one-design event, tend to screw the needle in until the motor slows down and then to run it back, but just enough to get peak revs back. This setting sounds great on the ground, but at the first loop the motor screams out in pain and then suddenly goes silent.

This discussion about motors should point out what might not be so obvious, and that is that any one-design event will probably be set up by the experts of Combat. Hopefully these experts can look back far enough into where they came from to realize that equipment (models, engines, tanks, etc.) specified in any one-design event must be easy for the novice to work with and must also be somewhat tolerant of the typical mistakes that are bound to be made.

Performance can be tailored to suit the requirements; let's just remember that we also must consider ease of successful operation.

Any comments about one-design Combat are welcome, especially from anybody who has had experience with such a scheme. Anybody out there ever have a Flite-Streak-only Combat meet, for instance? ●

1 to 1 Continued from page 23

spend any more time on that foggy isle off the coast of Europe, but are left on this continent, south of the Great Lakes. The dates for the competition are July 19-26. The site is the Rockcliffe Airport in Ottawa, Canada. The airport is the property of the Department of National Defense and is the site for the National Aeronautical Collection. You have an opportunity to not only visit the FAI Internats and a beautiful area, but an aircraft museum as well.

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span. Eight engines of 400 hp each, designed for trans-Atlantic flights. Book didn't say if it ever made it. Prospective builder should own a balsa grove in South America and buy stock in K&B.

Dornier DO-X: 157-foot span, 12 engines, range 1740 miles. Idea scrapped due to "limited height capacity." Builder should own K&B!

Supermarine PB-31E: Quadruplane, WW-I multi-seater, anti-airship fighter equipped with two machine guns and a 1-1/2 pounder cannon. Scrapped in 1917 due to poor performance. Couldn't keep its powder dry, no doubt.

O'Neill Pea Pod: Tail-first monoplane with pylon-mounted engine at rear. An excellent choice for the non-flying scale modeler, since the prototype never made it off the ground. (Sounds like it would be easy to trim out.)

Rotobuggy: From WW-II, standard Jeep mated to a special aerodynamic tail fin and rotor blades. Would glide to ground after being released from an aircraft. Perfect subject for converted plastic model car buff.

And last but certainly not the least: For

those interested in the larger model, how about Hiram S. Maxim's \$46,000 giant built in 1894? (What would it cost today!) Wing area was 4,000 sq. ft., with two 18-foot propellers. Weight was 3-1/2 tons. It did lift itself off its takeoff rails, but it crashed. (The ultimate scale function!) Strangely enough, further tests were abandoned.

(Lest you think I made these up, I suggest you check out a copy of *Weird and Wonderful Aircraft* by Graeme Cook from your local book lending place.)

In a more serious vein, you might like to check out copies of two much more conventional aircraft books. They are from Crown Publications and the editors are John Taylor and Kenneth Munsion, whose fame is connected with *Jane's All the World's Aircraft*. The two books I have, courtesy of my daughters and some birthdays, are *History of Aviation* and *The International Encyclopedia of Aviation*. They contain many beautiful pictures and illustrations (almost 3,000 between them) and historical data which seems to never end. They are not inexpensive, so check with your library for a copy to browse through to see if you'd like it. Even after a comprehensive speed reading course, it would take a heck of a lot of trips to your local bookstore to read them, since between them, the 10 by 13-inch books contain about 1,000 pages.

Well, back to my flying. Keep them flying!

Pattern Continued from page 21

back; the judges will spot it immediately. Also, you will exit at an angle. As you reach the inverted position, release all up elevator stick pressure and hit the ailerons.

If you watch and practice carefully, you will find that it's best to start the roll a split before reaching level inverted flight. This should eliminate any dipsy doodles as you roll. (A trick we learned from former AMA President and FAI team member, Cliff Weirick, many years ago. wcn).

If you are having a lot of trouble with the Immelman, check these points:

1) Has the plane been laterally balanced so that one wing does not constantly drop?

2) Have you sealed all hinge lines so that lift doesn't change as you pull up?

3) Do you have the plane trimmed to fly absolutely hands off? NO up or down stick pressure should be required for level flight.

4) Is the model balanced properly? If not, it may drop off heading during the rollout. This is because as you reach knife edge, the fuselage does the lifting and a badly balanced model (usually nose heavy) will drop the nose a little.

5) Are you using dual rate ailerons? You need a lot of aileron power to roll smartly at the top of the half loop, much more than desired for smooth rolls and loops.

Practice makes perfect, but first, analyze your mistakes and work out the corrections one at a time. It will reward you with a feeling of satisfaction you won't forget.

Cub Mods Continued from page 47

could be flown by my 5-year-old. In order to tame the enhanced control response, I used the innermost hole on the servo arm, cut the size of the movable rudder in half (the upper half is now fixed and only the lower profile is movable). Even so, the model flies nicely while using the outermost hole in the rudder control horn.

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You are ready to go flying! The exact longitudinal trim will have to be found by experiment. Try the model as is. If it won't climb well due to the downthrust, add about a matchbook cover shim under the wing leading edge. If the model stalls in the glide, add a bit of noseweight. Whatever you do, do it only a very small amount at a time.

Well, you now have a model which should recover from practically anything your beginning modeler will get into. It's back to the days of "If you get in trouble, let go of the stick and shut your eyes."

I started out very impressed with the capabilities of this pre-built model. It proved to be a good trainer in the hands of Pam Miller, a young lady I know. After the modifications, the performance as a trainer is as good as you can get. ●

Postal Continued from page 28
average will get better, but I don't expect it to double.

Our winners were:

DURATION	MAX SCORE	% OF PERFECT
	= 2433	
Trey Wood, Mobile, AL	2363	97%
Clell Dildy, Panama City, FL	2292	94%
Melvin Duval, Pensacola, FL	2274	93%
Don Olson, Metairie, LA	2251	92%
Henry Waltman, Mobile, AL	2240	91%
R/C HLG		
Melvin Duval	1st	
Don Olson	2nd	
Rae Fritz	3rd	

Trey Wood has been in modeling for only one year. The contest was well received with 21 entrants and I know by name at least 15 others who will fly in the next one . . . now that they know what they are missing.

I must give the San Fernando Valley Silent Fliers credit for an international postal contest held about eight years ago, but it suffered from being too large and taking too long from invitation (or announcement) to award mailing.

Why not give it a try? ●

Power Boats . . . Continued from page 49

Offshore racing, where a number of boats race a fixed distance." The rule goes on with more information, but the phrase "to simulate full-scale Offshore racing" is the key to my contentions. It should also be pointed out that a similar statement is found in the IMPBA Rulebook pertaining to Offshore Racing.

I don't know how many of you have ever witnessed a full-scale offshore race, but I had that opportunity during August of 1975. I was visiting with Steve Muck when he lived in Los Angeles. Steve arranged for us to observe the 1975 Marina del Rey/Hennessey Cup from one of the press boats covering the race. It was a fantastic experience and one I'll not soon forget. I'm sure it doesn't come

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as any big surprise that this event wasn't conducted as a heat race. Like most full-scale offshore events, the boats ran about 150 miles all over the ocean and came back to the finish line.

Here's my point: deep-vees shouldn't race heat races for records in an event called "Deep-Vee." If a deep-vee can establish a record in heat racing, that's fine with me. I just feel it's time we started recognizing that Deep-Vee or Offshore Racing Class should be something different than just another "whip it around the buoys for .9 mile" event.

If you're one of the people who gets tired of hearing how NAMBA District 8 did something, you'd best skip to the next topic area, "Letters From Readers." In 1979 and again in 1980, NAMBA District 8 decided to attempt to conduct a Deep-Vee event that wasn't an extended heat race. The guidelines were drawn up by Bill Hornell and adopted by the district at a regular district meeting. The rules are as follows: 1) The hull must qualify under those rules covering Deep-Vees in the NAMBA Rulebook;

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2) The engine must meet the specifications of A, B, and C engines as stated in the NAMBA Rulebook; 3) The race shall be at least three (3) 5-minute enduro type races employing a countdown start.

The course shall be irregular in shape. It shall have at least one left turn in the front chute; and 4) Special rules: a stand-off scale appearance is required, paint schemes are to reflect an attempt to make the hull appear like a full-scale boat, drivers are required, and no retrieval of boats will be allowed.

I raced in this event with a .21 and .40 size vee last year and really had a good time. Having to make some left turns put a new wrinkle in model boat racing out this way. It made for very exciting races,



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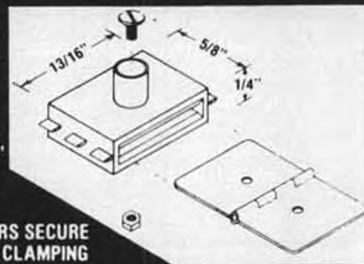
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- ALL THAT SHOWS IS A 2/56 BOLT HEAD, FLUSH WITH THE SURFACE.

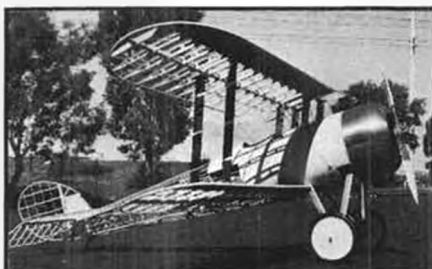


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and the spectator appeal was greater than the 10-minute race around a regular oval that we had done in the past. The handling characteristics became just as important as top-end speed. The need to make left turns placed increased demands on driving techniques. The required drivers added realism to the boats and didn't slow the boats down. A diagram showing a typical course has been enclosed in this article. The course is based on the NAMBA .9 mile competition oval using five laps. We didn't use the exact same course each time, but for purposes of records it could be standardized.

NAMBA's new president, Stuart Russell, has stated that resolving the problems in the Deep-Vee class is one of his

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most important goals for 1980. To accomplish this goal, he has appointed national and district chairpersons for Offshore Deep-Vee and Deep-Vee Enduro to attempt to resolve the problems in the event. It will be most interesting to observe the progress of these groups during the following months. Theirs will not be an easy task. Hopefully, some of these issues can be addressed and resolved.

LETTERS FROM READERS

Harold P. from Butte, Montana, wrote, "I recently purchased the wooden version of the Dumas Hotshot. Before I start construction I thought I would ask you for your ideas on any modifications you may have seen."

I have seen a couple of valuable modifications made to the Dumas wooden Hotshot that can be relayed. The first modification that seems to help is relocating the radio equipment farther forward than what is shown in the plans and directions. This can be accomplished by cutting open the bulkheads in front of the suggested radio compartment and moving everything farther forward. The second modification that has proven very effective is cutting air vents in the forward part of the center section. This bleeds out some of the air going under the hull and seems to improve the riding characteristics of the boat. The information on this modification is shown in the sketch.

Roger S., of Des Moines, Iowa, inquired, "I am a new boater, but have been very active in R/C airplanes for over 10 years. The last 5 years have seen me very active in all forms of pylon racing: QM, Q-500, Form 1, etc. The point here is that I have quite a number of engines that would be right at home in a boat if only the exhaust pointed the right direction! In several of your columns over the years, I have seen pictures of your own boats with a nice, neat bit of plumbing to couple the front facing exhausts to a pipe. A U-bend is what it appears to be. As you commented in one column, it's nice to have the pipe off to the side, out of the way of the starting belt.

"My question is a simple one. Where did you get these pipes? Are they a commercial product? Does someone make them to special order? If so, who?"

"Oh yes, being new to boating, I built a Deep-Vee. But it just didn't quite 'turn me on,' not at all like Formula 1 racing! So my next boat is a rigger. It's like learning everything all over again, but it's exciting."

The U-bends that I use on my .21 and .40 K&B engines are fabricated from copper plumbing fittings found in plumbing supply outlets. It is necessary to make an adaptor plate to bolt onto the exhaust flange. The U-bend tubing is then silver soldered to the adaptor pipe using high temperature silver solder. (With the rapidly escalating price of silver, I understand the price of silver solder is getting quite expensive.) Although Ron Erickson made my exhaust headers, I have seen many made by

model boaters without a great amount of experience in the hobby. The secret is getting a good solder job. In some cases, two 90-degree elbows are silver soldered together to get the U-bend.

HAS ANYONE OUT THERE BUILT AND RUN AN EXCALIBUR II FROM THE PLANS IN RCMB?

I'd be greatly interested in receiving photos and reports on any Excalibur II outboard tunnels built from the plans featured in the December '79 issue. These can be sent to: Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. And remember, this column is always looking for contest reports, pictures of boats, opinions, and comments. ●

Peanut Continued from page 55

the gear should be extended at least half an inch. I personally prefer the low-slung, racy look of the prototype.

The wheel pants really add class and can be built from balsa or vacuum formed from plastic. I used balsa wheels purchased from Oldtimer Models. These balloon type wheels can be easily sliced at the center and sanded on a block so that the assembled wheel is slimmed down to scale. A neat trick for forming the wheel struts is to roll moistened 1/64 sheet to an airfoil shape and pin down until dry. Pry them open, coat the inside with Titebond, and set into position around the wires. The pilot's headrest is made the same way.


The pilot is carved from polyfoam plastic, one of those small curlicues you find in cartons as packaging material. Paint with acrylic tube colors, mixing a small bit of burnt sienna and white for a flesh tone. Finish with a bead of 5-minute epoxy for the goggles and a touch of Floquil silver. Make sure you don't get dope or Floquil paint on the polyfoam.

Sand and dope the framework and cover with condenser paper. Cover the sheeted portions by applying the glue or dope to the border areas only. Shrink the tissue with a fine mist of water and set each piece aside for finishing. It's much easier to do the finishing prior to assembly.

FINISHING


Now's the time to hunt up the December '78 and January '79 issues of MB. I know you have them, because no dedicated subscriber ever throws away a copy. You'll need the scale drawings and photos for the details and little touches of authenticity. Multiply the Westburg drawing measurements by 1.37 to scale up to Peanut size. A small calculator is handy for this.

The sight of sunlight glinting through a tissue-covered frame may be a free flighter's dream, but it's not scale realism. Scale model aircraft finishes should be as close to opaque as possible. For the most part, Floquil paint fills the bill. It covers beautifully in one coat and is fairly dense, yet light. Floquil dries with a flat finish, however, so an additional step is necessary to obtain a semi-gloss or gloss surface. My solution is to use acrylic



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spray coating. This material is used to preserve artwork, such as charcoal drawings, and is ideal for our purpose. The windshields must be masked or the spray will make them cloudy. Spray a small puddle on wood scrap and brush the coating into the smaller spaces or touched-up areas. The results are quite impressive.

A No. 2 red sable brush is very expensive, but certainly a worthwhile investment in your hobby if you want the satisfaction of great detail work. As you gain skill in working with this brush you can expand on the details you wish to include on your models. If you print neatly with a pen, you can learn to do it with a No. 2 brush and Floquil. The Standard Oil of California fuselage stripes and eagles were duplicated with

Floquil on Sig decal paper. When soaked in water, the paint skin remains fully pliable and slides off for perfect application on the model.

As a final detail, small blobs of 5-minute epoxy were used to simulate wing and taillights. Plastic model paints provided the tiny spot of color needed.

ASSEMBLY AND FLYING

By this time, let's hope you tried the fit of the lower wing in the fuselage. Cuts and adjustments are more difficult after the finishing stage. Aside from this, the most difficult part of assembly is the attachment of the upper wing. Begin by cutting a balsa or plywood template with four holes to match the basswood inserts on the cabane struts. Cement the struts to the fuselage and carefully center the template. When the cement is set,

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remove the template and attach the upper wing, cementing it at the proper incidence angle. The interplane struts are installed in pieces. First bend the basswood strips into place, then add the 1/32 balsa sections. Sand, dope and paint silver (for the Standard Oil of California version).

Flying should present no unusual difficulties. The model has good proportions and looks great in the air. Experiment with different motor lengths. I'm going to try some Pirelli when I get it, as my luck with the wind-up has been disappointing lately. It should be noted that the Stearman has withstood two motor breaks with no skin or fuselage damage by the flailing rubber. Since I

don't want to risk the third time just yet, the 4E now sits in my son's room, holding its own in the company of some fine (ugh) plastic models.

FAI Soaring . . . Continued from page 27
pressure was on.

If I were making an assault on the '81 Champs, I'd start putting my team together right now. Ideally, I'd pick two other philosophically compatible pilots to team with, and then sign on at least two non-flying helpers as well. Within this five-man team I'd start to build a fanatical *esprit de corps*, an absolute determination to put all three pilots (and both helpers, of course) on the next

American team.

Then I'd build a 24-volt self-retrieving winch, like the Austrians use for speed practice, and I'd wear out at least one set of batteries practicing speed and distance (but mostly speed) every weekend between now and the semi-finals, weather be damned. And I'd start putting a lot of thought into my competition launch system.

Once this sort of team has shown up at the Finals and blitzed their way into first, second, and third . . . and I hope it happens this year . . . we'll be on our way to restructuring our selection process. What we're ultimately going to need, to stay competitive as a country, is a "team selection finals" that does just that: selects the best of maybe ten or twelve *three-man teams* who enter from different parts of the country. Guys who fly together, practice together, maybe even design and build together the way the Austrians do. Such people are always going to have a tactical advantage over a group of three guys who are separated by thousands of miles, and get together for two expensive, hectic, 10-hour practice sessions before winging off to a World Champs together to represent their country in a competition that's getting tougher and tougher, more and more team-oriented, and less and less hospitable to Lone Eagles.

The question is, how much individuality is it necessary to give up in order to compete at the very top of a sport that is, at the grassroots level, a sport of loners and individualists? And the answer, like most good answers, is another question:

How badly do you want to win? •

Clubs Continued from page 50
the job.

It should be kept in mind that certain people enjoy doing a particular thing and are complimented when they are asked to do it again. A mild complaint should not be read as outright rejection of the job; frequently, the incumbent is too polite to appear eager to be reappointed. Do not let the old complaint that the same people do all the work make you lose the talents of someone who does a good job *and enjoys it*. Some people are competitors and some people like to run contests. And once you have learned how to run a contest well, it is a shame to put a new person in charge who has to learn the ropes from the beginning. Rather than replace a man who is doing well, see to it that he gets the help necessary to make his job a pleasure!

To be sure, a *talented group of organizers will end up doing most of the work*. How many talented auctioneers can you find in one club? The best way to reward these people is continued recognition by the club. Should not the Contest Director get an award along with the competitors? How about a standing round of cheers for a committee's work? Enthusiastic praise by the President for a job well done is always in

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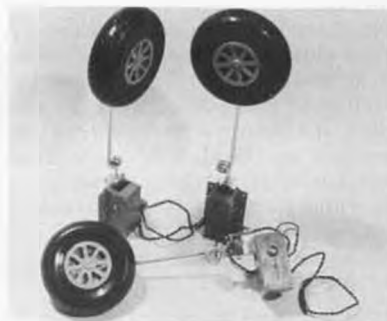


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order. How about rewarding the President with a dinner out for him and his spouse?

Many clubs suffer from the presence of a member who makes things unpleasant for the other members. Typically, he may monopolize the meeting time, insist that his subjects get first priority, criticize even those who are doing a great job, fly dangerously at the club field, or he may do any number of things that set the general membership on edge. An interesting solution to this problem has been devised by one club. Their experience over a couple of years indicates that it effectively solves the "Joe Obnoxious" problem without resorting to kangaroo courts or parliamentary means of solution. Their method is quite simple: require each member to be sponsored by another member each time he renews his membership and when he joins initially. Even the meekest member thinks twice before he sponsors Joe Obnoxious, realizing that if he does, he may not get a sponsor himself the next time around. If you expect any problem with two obnoxious members who could sponsor each other, require two sponsors.

Clubs function best by minimizing the business conducted at meetings and by featuring a presentation that is of interest to the members and in keeping with the club's purpose. A frequent mistake made by Program Committees is to review the *membership* rather than the *subject matter* to see what can be

arranged for future meetings. A better way is to determine what would be of interest and then go looking for a speaker from inside the club or from outside. It is surprising how many people are pleased when asked to speak. The availability of a movie projector is an asset. Even better, the availability of a viewgraph projector and capability to

make viewgraphs will make your programs easy to prepare and enjoyable to listen to and watch. The cost of viewgraph materials is small today and many businesses have projectors that can be borrowed with a little finagling.

A great place to find subject matter for meeting discussions and presentations is to review the magazines that publish

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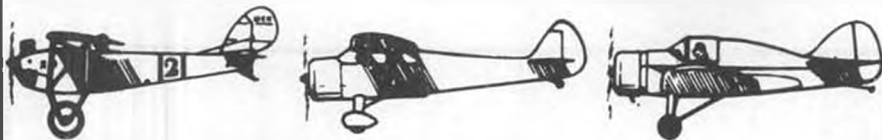
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not have a person who will accept the job on a long-term basis; this type of talent is not easy to find. The newsletter is best omitted if it is not done well.

CONCLUSION

Good organization, a well adhered-to purpose, and minimum debate make for a healthy club. Enthusiasm is the real spark. This can be provided in large measure by actively recognizing jobs well done. Don't wait until the wheel squeaks. Use plenty of praise as a lubricant!

Fuel Lines . . . Continued from page 25
lightest approach.

It seems that the diesel conversions are being promoted as capable of swinging a bigger prop than the glow engine. However, I wonder if it's true. Remember, if I allow you to bolt on a diesel head, you have to allow me a new glow head. I'm sure that the glow can be modified to produce more power at 7,000 rpm, if that is what everyone requires.

The fact is that the manufacturer designed and built his engine to operate under a given range of conditions. If you operate outside that range, such things as the cylinder timing, intake valve timing, and the head configuration probably should be changed. Of course, the engine could be redesigned to be a

better diesel, too. The punch line is, "There ain't any free lunch." Diesel isn't synonymous with miracle.

BRICKBAT OF THE 70'S AWARD

If you listen to me very long, you'll find that I usually take the side of the engine manufacturers when someone gripes about prices. Basically, model engines are a real bargain, and I suggest that anyone who wants to dispute that point should try to build one himself. (The exception I'll occasionally make is, "junk at any price is still junk.")

Who should I name as recipients of the "Brickbat" award but the brothers Rossi. They can take pride in having built the best (in design and construction) production .15 engine of the 70's. But they deserve to be run out of town on a rail for making many of those engines too large for legal competition.

I had personal experience with the "large" Rossis, as they sent me two pre-production diesels in 1974 (prior to the C/L World Champs in Czechoslovakia), which I found to be oversized. A letter to them in the fall of '74 discussing this condition brought a denial of its possibility. However, a package did arrive later with two crankshafts which had a reduced stroke.

The first disaster that I know of occurred at the 1976 C/L World Champs when the Swedish team of Larsson/Rylin lost their 2nd place in Team Race due to an oversized Rossi. The latest major incident was the disqualification of Doug Galbreath at the Taft F/F World Champs last fall.

Of less devastating importance, both Cliff Norman and Bob Hemingway were DQ'd at the FAI Speed Trials in Dayton in '79. That they were not in the top three places hardly matters. In the '76 case, Rossi claims that examination of the engine in Italy by a certified laboratory found the engine to be within the 2.5cc limit. Regardless, it is foolish to push the limits to the point that officials of normal ability, using conventional means, could find the engines to be oversized.

It is unconscionable that a modeler can buy an engine or even assemble an engine using all factory parts and have that engine found to be of illegal displacement. The potential power advantage gained by crowding the displacement limit is trivial when compared to that gained from a better-than-average piston/sleeve fit. It is accepted that in a sample of engines, some will perform better than others, but be illegal? Never!

So for all those DQ's and scrap parts, Rossi, here's to you.

Letters Continued from page 7
and Flabob.

Hope the above can be of some use. It would be great if a directory could be built up and kept current, with your subscribers acting as stringers so there would be a good source.

Sincerely yours,
Jack F. Sweeney
La Honda, California

Dan Lakenmacher's letter has stirred up considerable response, witness the above. We published Sweeney's letter because the

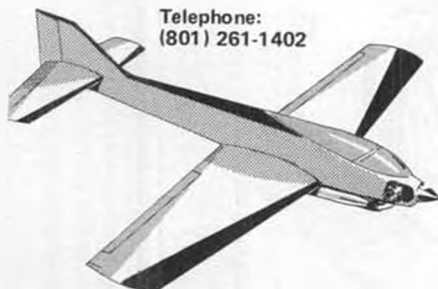
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material of interest to your club. Do not be afraid to stray somewhat afield of your immediate purpose; a talk by a full-scale pilot would be most interesting to most model airplane enthusiasts. A couples' night is always in order at least once a year; combine it with a catered dinner and it is money in the Peace-on-the-Home-Front Bank!

In most clubs there is a person with some writing and editing talent who can handle a newsletter. With costs being what they are, make sure you can afford the printing and mailing costs. Better still, use the finagling technique again; many businesses are very tolerant if the cause is a decent one. In any case, it is best not to attempt a newsletter if you do

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format of naming the museum and its site, plus giving a brief description, is a good one to follow. As promised in the March issue, we will compile a list, trying to break it down by states as new ones come in. The more of you we hear from, the more complete the list.

Here are some other listings from Cam Pringle, Edmonton, Alberta, Canada.

Air Museum, Rockcliffe Airport near Ottawa, as well as the Canadian War Museum and Canadian Science Museum, in Ottawa All feature restored World War I and II aircraft.

Ontario Science Museum Excellent collection of museum quality model ships and aircraft

Museum of Science and Industry, Chicago, Illinois Small collection of full-size aircraft.

Western Canada Aviation Museum, Winnipeg, Manitoba Collection of early aircraft used

in western Canada.

Western Development Museum of Transportation, Moose Jaw, Saskatchewan has a collection of aircraft, automobiles, and locomotives.

Assiniboia, Saskatchewan A Mr Wheratt is restoring a Lysander, a Fleet Finch, Barkley Grow, (Serial No. 1) Fairchild 24, Lockheed Lodestar, etc. Located just west of main runway at Assiniboia Airport.

Dear Mr. Northrop,

"Free Flight" . . . Mystery model competition. It was a very pleasant surprise to receive the February copy of R/C Model Builder this morning and find that I've got a year's free reading ahead . . . in fact a great appeal to anyone of Scots ancestry

Although my main interest is in small scale and sports models, I very much appreciate the overall coverage that you provide in R/C Model Builder. It's a thorough page-by-page read the minute the magazine arrives.

With particular thanks to Bill Hannan, Walt Mooney, Fernando Ramos and Bill Noonan.

Yours faithfully,
John Birnie

Gloucester, England

P.S. Ref page 93 "Coals to Newcastle" . . . if Bob Boehme gets in touch with John Oliver of "Oliver Tiger" fame he will get the best Brit diesel made Handmade, not advertised, and with a waiting list . . . but very worth the wait. Contact John Oliver (Engineering), 248 Ringwood Rd., Ferndown, Dorset, England Tiger Cub 1.5cc, Tiger 2.5cc, Tiger Major 3.5cc

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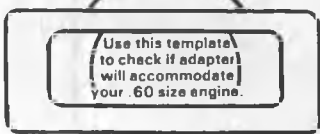
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To Ron Roberti . . . in brief. . .

...I have to admit that I had to learn to fly R/C before I could learn to trim a Peanut Scale model, which I think is the ultimate in model flight. In fact, go to any indoor or free flight meet here on the East Coast and I'll bet half the fliers there are R/C fliers. Mr. Roberti, we real model builders do it ALL.

Thank,
Ed Ballera
Absecon, New Jersey

Well, keep up the good work, and I don't care if you put (R/C) on the cover as long as you keep free flight inside and alive.

Yours truly,
Russ Backer
Orange, California

Dear Bill,
Just got through reading "Three if by Air" February issue referring to the letter from Ron Roberti and others about the subject just turns my stomach.

Who cares what you call your magazine? Just keep up the good quality as in the past.

Who cares what area the aero modeler participates in as long as he enjoys it and does it as well as he can.

What we should care about is being critical of one another and propogating separation. For God's sake, let's extend our energy toward togetherness and good fellowship and stop bickering, which only destroys. Support one

another, we are modelers — fortunate to have the interest and need one another regardless of whether we're RC'er, Free Flighter, Control Liner, Indoorer, Quarter Scaler, etc., etc., etc. We need to stick together. After all the family is not that big.

Happy landings,
Joe Beshar
Oradell, New Jersey

... And so, on to other things
Dear sir,

I would like to find Roy C. Clough Jr. Roy was a model designer and had several designs published in the old Air Trails magazine.

Mr. Clough lives in the Los Angeles area, and I don't know if he is still active in model airplane work or not.

I would like to correspond with him on several of his designs.

Maybe someone in your office may remember him and his work back in the '50s.

I would appreciate your helping me finding him.

Thanking you,
Harry W. Hess
Mt. Vernon, Indiana

We also recall quite a few of Roy's designs in *Flying Models* magazine, particularly, his many out-of-the-rut aircraft. So far,

we have not been able to find Roy Clough. If anyone knows of his whereabouts, Los Angeles or otherwise, let us know and we'll check to see if he wishes to receive correspondence.

Counter Continued from page

high and comes completely assembled and ready to run. All mounting bolts and universals are included.

Sounds to us like a good way to cut down on the considerable cost of running a temperamental racing .60 while at the same time enjoying the reliability and ease of operation that a large ignition engine offers. Retail price on the Super Drive is \$100. Optional cable connectors for 3/16 or 1/4-inch cable are available for \$5.95 each.

Also new from Aeromarine is a new type of stuffing box for flex cable drives. It consists of a thinwall brass tube with an internal teflon tube liner, a combination that provides a rigid, almost friction-free unit. The stuffing box will handle both .150 and .187 flex cables. It comes 12-1/2 inches long and can be cut and bent as required. List price is \$6.

From Aeromarine Enterprises, 709 Longboat Ave., Beachwood, NJ 08722. ●

Plug Sparks . . . Continued from page 37

a cockpit, put in gull wings, and increased the fin area slightly.

Gordon has powered the model with a McCoy .35 glow engine using an Austin timer located in the head and the exhaust cleverly coming out of the eye. Color is black, yellow, orange, red, green, and corsair blue. (The photo shows it before painting.) Wow! The feather outlines were done using felt-tip pens and a paper pattern.

Codding runs a small plan service for Old Timers located at 3724 John L. Avenue, Kingman, AZ 86401. He has quite an assortment of plans, ranging from full-scale drawings of WW-I airplanes such as the SE-5, Sopwith, etc., to a selected group of Old Timer gas models. Gordon is always trying new ideas such as converting old gas jobs to rubber, making biplanes out of standard monoplanes, and drawing up planes like those that appeared in the old Bill Barnes pulp magazines.

Photo No. 11 shows RCMB's Phil Bernhardt's entry in the Texaco event, an Ehling Contest Gas Model. Notice the snarl on this airplane to match the snort of the Anderson Spitfire. No fooling! The model really does perform superbly. Its ability to fly in extremely tight circles has led to more than one win on days when the lift was spotty. As if Phil didn't have enough to do as Assistant Editor of *R/C Model Builder*, he is the new Editor of the SAM 49 newsletter, *The Arcing Point*. Like the old saying goes, "If you have a job for someone, never give it to the guy who isn't doing anything. Instead, give it to the guy who is real busy; he'll work it into his schedule somehow."

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Arcing Point, write to Phil Bernhardt, 17119 So. Harvard, Gardena, CA 90247.

Photo No. 12 shows a typical lineup of Texaco models at a California contest. In this case, this is the SAM 49 Texaco Meet held at Taft in December. Jack Albrecht, the QA man at Kraft Systems and eventual winner, looks over Don Bekins' (bending over) Lanzo with Dave Brodsky between. Models to be seen in the photo are a Lanzo Record Breaker, Shereshaw Eaglet, GHQ Sportster, Fiske Hanley, Flamingo, and Gas Bird.

Photo No. 13 is of Al Hellman, a member of the Southern California Ignition Fliers (SCIFS) and the SAM 49'ers. Al is pictured here working on his Russell Simmons Eastern States Gas Champ. This design flies extremely well as a free flight or with radio control.

Al Hellman will be remembered for the outstanding job he did as Contest Manager of the Las Vegas SAM Champs. Despite the hot weather, this was a thoroughly enjoyable meet with all the entertainment available in the evenings. Having an international airport within several miles allowed many of the eastern contestants to come out and truly enjoy Las Vegas. SAM needs more workers like Al!

Bruce Lester is responsible for photo No. 14. Bruce took many valued pictures of the Nationals in the 1936-39 era and still has the negatives. We hope to run one of these ever so often to show what the original designs looked like. The model pictured here is Maxwell Bassett's Miss Philly VI taking off on its winning flight in 1937 at Detroit's Wayne County Airport.

Bassett's winning time of 70:02 topped Goldberg's Valkyrie time of 52:45. Interestingly enough, the first six competitors in this event all had times over 40 minutes! Tough competition.

Bruce Lester, a Canadian, is now retired.

SAM 40 FUN-FLY

Among the many ideas we receive for events in Old Timers, SAM 40 has come up with the latest idea in fun-fly type contests, this one for R/C models.

The first five rules have to do with contestants being required to time each other, only one class of flying is involved, models must conform to SAM rules, and the BOM rule is waived. Here's what the fun is about:

Rule 6. You have 5 minutes (300 seconds) to do the following: Take off and circle for touch-and-go in 25-ft. circle. Climb for balance of sixty-second motor run, cut motor, and glide for balance of 300 seconds and land with wheels in 25-ft. circle.

Rule 7. Touch-and-go in circle is worth 50 points.

Rule 8. On touch-and-go, wheels must not be over three feet above ground at circle or contestant must try again.

Rule 9. Each second over 300, deduct one point. Each foot away from circle edge to wheels, deduct one point to a maximum of 100 points.

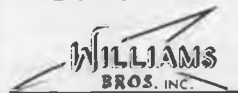


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The balance of the rules give the timing procedure, motor overruns as zero, five attempts, and the one best score wins.

Think you are pretty good at flying Old Timers? Try the event above and see just how good you are. We are anxiously awaiting the report from SAM 40 to see how the contestants did.

REQUIEM FOR BUDDY

Received a very long eulogy by Bob Hartman to Buddy Equitz, who passed away on November 29, 1979, at the early age of 46.

Buddy was extremely active in the Model Engine Collectors Association, having a very good stable of engines himself. Buddy also, as a member of the

Chicago Aeronuts, flew Old Timers with an enthusiasm that seemed to know no bounds.

Probably the best epilogue anyone could write for Buddy was neatly summed up by Bob Hartman: "He was a man who loved and lived life to the full extent of his person; a character who touched the lives of many in our Old Timer activities, one who will be greatly missed by all."

THE WRAP-UP

This month's column has been patterned after the old "Gas Lines" column that was a regular feature of *Model Airplane News* in the late thirties and early forties. We solicit your opinion as to whether you like this format or not.



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WINDSPIEL MOVES AGAIN

"The remaining inventory and tooling of Windspiel Models has been acquired by Mr. Keith Smith and Mr. Doug Klassen. A new company, Pacific Sailplanes, has been formed to reintroduce the updated product line to the marketplace."

Quoting further from a news release just issued, "While Pacific Sailplanes' main thrust will be scale sailplanes to satisfy the growing interest in that facet of soaring, the first kit to reach sailplane enthusiasts will be an entirely new sport/competition thermal glider called the Red Tail 100, named after California's well-known soaring hawk. The Red Tail has been under development for over two years by its designer, Dr. Terry Hovey, and has evolved into one of the sleekest of the new generation sailplanes. The wing is balsa/spruce construction spanning 100 inches. The fuselage is hand layed-up epoxy fiberglass.

"The first of the scale sailplanes to be reintroduced will be the Windspiel Kestrel 19, with the Fokker FK-3 soon to follow after careful redesigning and re-tooling. A full lineup of high performance scale sailplanes will be released through 1981.

"For additional information Pacific Sailplanes can be contacted at 18930 Soledad Canyon Rd., Canyon Country, CA 91351, or call (805) 252-2644."

SYNCHROGYRO ADDENDUM

Still more ideas on the popular Synchrogyro (Sept. '79 RCMB) by the designer himself, Georges Chaulet. Modelers have had problems finding the proper gears to synchronize the overlapping twin blades for this 2-channel R/C autogyro. The accompanying sketch shows another way to accomplish this, and also suggests a change in blade rotation.

George says, "An alternate solution is to use standard parallel gears (about 2 inches diam.) and two universal joints, like the ones employed on the prop shaft of boats. I used that system on the first Synchrogyro I built, a small F/F model powered by an O.S. Pet. It works great, with an added advantage, which is that the angle between the blade shafts

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The only advantage this type column has over the other is that names, addresses, and a short resume of each modeler is given. Sometimes we do like to hear what the other fellow is doing.

R/C World . . . Continued from page 13

pattern competitor for many years, has retired from dentistry and gone into the model import business. His goal is to handle only quality model products that have not been available in the United States. In accordance with this policy, his first product line is the excellent Practi-

cal Scale kits by Toni Clark of West Germany.

The following airplanes will be offered: 72-inch span Tiger Moth for .60-.90 engines, 106-inch span Tiger Moth for Quadra power, 80-inch span BE-2e for .60-.90 engines, and a 109-inch Piper Cub for Quadra power. Plans and rib sets for the large Tiger Moth and Piper Cub will also be offered.

Ralph has already taken his first step in promotion as he was an exhibitor at the Pasadena I.M.S. Trade Show in mid-January.

Name and address of the company is Brooke Model Products, P.O. Box 3714,



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can be chosen according to your wish (about 25°).

"Note: The lift of the rotors can be slightly improved if the rotors turn according to the direction indicated on the sketch. When you are ready to launch the S/G 4 . . . which is more easy than R.O.G. . . . keep the motor at idle until the rotors build up turns. This is because at full revs, the prop may produce a reverse airflow around the rotors, which impede their efforts to start turning.

"Hold the model slightly nose up until you 'feel the lift.' Some more incidence may be added to the 10° indicated on the plans, and I suggest 12°-15°. In case of a stall, a little more down-thrust should be added to the engine.

"And remember, as said Lilienthal, the Wright Bros., Ader, Caproni and Sikorsky, that building is only 10% and trimming 90%."

Another Synchrogyro was brought to our office recently which used Bolink 1/12 Electric R/C car drive gears. Although the shafts were angled, approximately one-third of the gear tooth area overlapped, providing plenty of strength to do the job.

WARBIRDS UNLIMITED

In case you didn't notice the ad in our last issue, we'd like to tell you more about the Stand-Off Scale Pylon Race, "Warbirds Unlimited," to be presented by the Spirit of St. Louis R/C Flying Club, on June 14 and 15, St. Louis, Missouri.

This Scale/Pylon contest calls for static scale and pylon competition limited to models of World War II military prop-driven aircraft flown between the years 1939-1946. The contest will be divided into two phases: static scale judging and pylon racing. Each aircraft must complete a qualifying flight to compete, and then will be scored on total accumulation of scale and racing points earned.

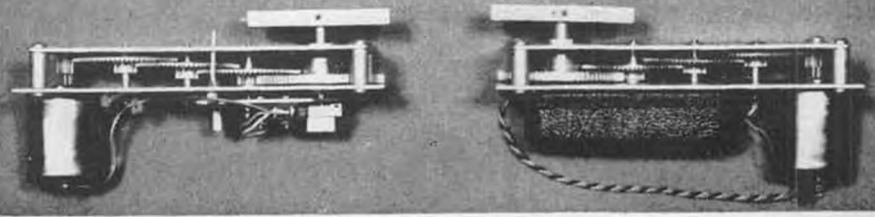
This event really grabs us, because as a member of the R/C Contest Board some years ago (and still) we remember when a proposal was made for a similar competition category to be an AMA event. Unfortunately, the proposal got revised and watered down to become the colorless Formula II pylon category, which fell by the wayside for lack of interest. If only to satisfy our "I-told-you-so" feelings about it, we'd like to see this "Warbirds Unlimited" succeed.

Briefly, up to 100 points can be earned for accuracy of outline, craftsmanship, and finish/color/markings in static scale, and up to 100 points for pylon racing (in each of 4 rounds of racing, 1st wins 25 points, 2nd — 20 points, 3rd — 15 points, and 4th — 10 points). Engine requirements are: .38 cu. in. minimum (cumulative if multi-engines used), and 1.25 cu. in. maximum. Wing areas vs. displacement requirements vary from 1000 sq. in. for 1.25 cu. in. down to 440 sq. in. for .38, and wing root must be 10 percent of chord.

Write or phone C.D. Don Hoelting, 110 Castle Dr., Florissant, MO 63034, (314) 921-4983.

This should be a great one!

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TONGUEINCHECK

The following was published in the August 1979 issue of SAARF, newsletter of the South African Association of Radio Flyers. The author's name was disguised.

Good afternoon madam, I'm interviewing families in this area and would be pleased if you and your husband would possibly give me a few minutes of your time.

Well, I'm sorry but my husband is out for the afternoon. However, maybe I can help you, and anyway you may as well come in and have tea, I'm alone and it will help to pass the time. What sort of questions are you wanting to ask?

Well, you see, we are doing research on a new series of information manuals for a large publishing company.

You mean you are selling encyclopedias? How do you like your tea?

One sugar and a dash of milk thank you. Your husband's out on the golf course I suppose?

No, he's out flying.

Oh, he's a pilot?

Well, not exactly, he flies radio con-

trolled model gliders.

You mean those toy aeroplanes made of balsa and tissue paper. Good heavens, he leaves a pretty little girl like you alone at home while he goes out and plays with toys.

Oh, I don't mind really, but it's just that I get bored some times. Anyhow, you can talk, what's a good looking man like you doing out on the street selling books?

Oh, it's only a side line. I'm trying to raise some extra cash towards a post graduate course I'm wanting to do. Does your husband go out every Saturday afternoon?

Yes, and Sunday mornings!

I see . . . When does he usually return?

Invariably late on both days. Why do you ask?

Oh, I just find it rather interesting . . . and you say you don't mind all this?

Well, I didn't object in the beginning, but I must say it's starting to get me down a bit. Are these the questions you came here to ask?

No, it's just that . . . well . . . if you were





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my wife, I don't think I could leave you alone like your husband appears to do.

Thank you, you will make me blush in a second. Are you married?

No, I will only think of that when my studies are completed.

What about girlfriends?

Not much time, you know.

Like some more tea or would you prefer something else ... sherry perhaps?

Thanks very much. You know you have the most beautiful eyes I've ever seen.

Your's aren't bad either. Excuse me, I'll just wash the tea things. Have another drink.

No, come now, let me do those. Where is the kitchen?

Don't worry, let's leave them, what about those questions you wanted to ask me?

Oh, I can't be bothered with that now, let's just talk. I have enjoyed this afternoon so much already, let's not spoil it now. Do you mind?

No, I must say you are helping my boredom! Will you be coming around again after this to try to sell me your books?

Would you like that? Little toy aeroplanes ... indeed some people don't realize what they're missing.

Oh, they're not so little you know ... why don't you come through to the bedroom, I'll show you.

Good heavens! What on earth is that on top of the cupboard?

That's his latest creation. A one-seventh semi-scale model of the F239 subsonic low level strike fighter bomber.

And your husband flies this thing?

Yes, it's a slope machine utilizing four radio channels with the option of two more for bomb dropping and tail 'chutes.

But how on earth does one control one of these?

It's a special kind of radio like this one. Each direction one moves these sticks is a different control movement on the various flying surfaces.

I suppose all this is rather expensive?

Oh, I don't think so. I don't really know ... my husband will know all the details.

When did you say he would be returning?

I didn't say because I don't really know, but does that really matter?

Well it's, it's just that I'd like to ask him how to go about starting. Well, um, I'd just prefer that he was here so that I could talk to him about ... do you mean that this really flies ... without an engine? How does one get it airborne? I must have a chat to your husband. Look I must rush off, now, please tell him I called and, uh, tell him I'll pop by later this evening, I'd like to ask him a few questions!

Workbench ... Continued from page 6

close cooperation with AMA. Complete details of event dates and places, along with all related information, will no doubt appear in the AMA magazine.

ANOTHER MILESTONE

There doesn't seem to be any hard, fast rule in magazine publishing as to how individual issues are numbered, and for that reason, we at **R/C Model Builder** chose the one most logical to us ... the volume represents the first, second, third, etc. year of publication ... we're into our tenth. The number is simply a count-up of the issues published ... a continuous count. So, if you haven't noticed, this is our number 100! Who'da thunk we'd still be at it 100 issues later as we struggled over that little volume 1, number 1 issue of 40 pages back in mid-1971?

We wish to thank everyone who has stuck with us during the first 100, and hope we can offer enough to hold your

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loyalty and interest until number 200 is reached. Meanwhile, when this issue reaches you, join us in a toast to the future, as we will do the day it leaves for the printer!

REASON NUMBER TWO

Yes, another reason for celebrating when this one "goes to bed." You've

heard about the California rains in February of 1980. We were kinda smug about our level location in Costa Mesa, as the mudslides in Los Angeles suburbs made the TV and newspapers. However, we didn't count on one, wayward tennis ball!

We were in White Plains, New York, to

attend the WRAMS Trade Show, when the news came by phone on Thursday night, February 21, that the heaviest and steadiest downpour of all had backed up on the flat roof of our one-floor office building, putting so much water pressure on the seal (we were lucky the roof structure held!) that we suffered heavy

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020 REPLICA KITS Playboy Sr. Strato-Streak, Brooklyn Dodger, So-Long Free price list J & R MODELS, 5021 W. Sheridan St. Phoenix, AZ 85035

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CUSTOM MACHINE WORK by active modeler SASE with your sketch for quote Roy B Stewart, Zimmerman Dr., Princeton, IN 47670

UNIQUE, versatile, constant current ni-cd battery charger U-build it from my plans. Free details. Send SASE to Electro-Motivation, Box 892, Montara, CA 94037

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- No. 1801 CESSNA 310 \$5.75
This compact R/C scale twin spans 52" and flies on .19 power. D. G. Prentice.
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An .020 mini-pattern ship for 2 or 3-ch. radio. Span only 22". Bengt Lundstrom.
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Highly refined version of 1937 Moffet winner, from 1941 A.T. By Jim Cahill.
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leakage into the office portion. The area hardest hit was the graphics department, where the layouts for this issue (number 100, yet!) were completely saturated and ruined.

Our on-the-ball staff called the fire company, which arrived almost immediately (no kidding) and went to work. It was necessary to relieve pressure on the two-by-four-foot sub-ceiling panels that were sagging under the water load by punching holes in several of them.

Meanwhile other firemen went up on the roof and pulled . . . you guessed it . . . a tennis ball out of the downspout opening! They also hooked up a pumping system to pull an average of ten inches of water off of the 5,000 square foot flat roof. The resulting avalanche flooded 19th Street!

Before leaving, the firefighters vacuumed 15 gallons of water out of the

office carpeting. Assistant Editor Phil Bernhardt and graphic artist Chuck Blackburn set up temporary headquarters in dry areas of the office and went to work on new layouts. Fortunately, none of the photographs, drawings, or typeset copy were affected by the water. What a way to celebrate number 100!

THINGS TO DO

Short notice on this one, the 8th Annual Mint Julep Scale Meet, also Quarter Scale Fun-Fly, April 26 and 27. Located at the picturesque Rough River Dam State Resort Park, Falls of Rough, Kentucky, about 70 miles southwest of Louisville. For information, call C.D. Dale Arvin at (812) 283-5719 or Co-C.D. Don Childers (812) 283-7638. Events include Sport Scale, Precision Scale, and

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Quarter Scale. There's a Saturday night banquet, too.

A new club, the Indianapolis 500 Radio Controlled Model Airplane Club, has been formed with the express purpose of holding a championship Pattern and Sport Scale contest in the Indianapolis area. The first contest will be on June 14 and 15, with Novice, Advanced, Expert, and Masters Class Pattern, plus Sport Scale being presented. The site will be at Indianapolis Raceway Park, on the National Drag Strip. Verbal commitments have been made by Dave Brown, Mark Radcliff, Don Lowe, Tony Bonetti, Dan Kowallek, and others. For more info, contact Contest Director Leo J. Dickey, 1028 N. Illinois St., Indianapolis, IN 46204. P.S. . . . \$2,500 in cash prizes.

The 1980 NAMBA National Model Boat Regatta takes place on August 3 through August 9, Wauhop Lake, in Fort Steilacoom Park, near Tacoma, Washington. The Director of this meet is our own Jerry Dunlap, and for further info, you can contact him at 119 Crestwood Dr. S.W., Tacoma, WA 98498. Also, Jerry has more about this meet in his column in this issue.

Hobby '80, Canada's largest hobby and craft show, takes place October 24 through 26, 1980, at the International Centre, Toronto. This year, the show has been expanded to include crafts, with about half of the nearly 100,000 square feet being set aside for displays and demonstrations of crafts, ranging from macrame to pottery. Other demos include the Grand Prix R/C race track, Metro Marine Modellers' indoor pond, live steam, model railroads, and slots, plus static displays of cars, boats, airplanes, model miniatures and soldiers, and the largest plastics display in Canada. For further info, contact Ted Curl, 924 Brock St. North, Whitey, Ontario L1N 4J6, or phone (416) 668-8231, (416) 683-7766 (Toronto line).

ARE YOU TIRED?

The above title headed up the following item found in a recent edition of the Ship Modelers Association of So. California newsletter, edited by Tom Palen.

We have run across some absolutely

When you build your model around the best engine, doesn't it deserve the best exhaust system?

If you chose Quadra as your engine, then you already know quality. And quite frankly, it means you should choose Quadra Charger by Cosmocon as your exhaust system.

The Quadra Charger is the only system authorized by Quadra. It increases power by 26.2% at 8,000 r.p.m.'s and has the best power-to-

weight ratio available anywhere. And equally remarkable, the Quadra Charger reduced fuel consumption by 25.7% while reducing noise by approximately 75%. Of course, a system this good is fully guaranteed. Its price is \$68.80 U.S. plus \$2 postage. For complete specs and to order, write:

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irrefutable statistics that show exactly why you are tired. And brother, it's no wonder you're tired either! There aren't as many people actually working as you may have thought, at least according to this survey recently completed.

The population of this country is 200 million, 84 million over 60 years of age, which leaves 116 million to do the work. People under 20 years of age total 75 million, which leaves 41 million to do the work.

Then there are 22 million who are employed by the government, and that leaves 19 million to do the work, 4

million are in the Armed Forces, which leaves 15 million to do the work. Deduct 14,800,000, the number in the State and City offices, and that leaves 200,000 to do the work. There are 188,000 in hospitals, insane asylums, etc. so that leaves 12,000 to do the work.

Now it may interest you to know that there are 11,998 people in jail, so that leaves just two people to carry the load. That's you and me brother, and I'm getting tired of doing everything by myself!

Well, right or wrong, that makes us tired enough to quit for this month. ●

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Complete Kit Concept

Like all Byron Originals kits, the MiG and F-16 are designed with our "complete kit concept" in mind. This simply means that every item needed to complete the project, except propulsion, radio, paint and glue, is included in the kits. Only the finest state-of-the-art construction methods and materials are utilized. This is our way of making sure that both construction and flying are fascinating and pleasant experiences.

Authentic Scale Features Include •split rudder •wing fences •gear doors •antenna •cannons •accurate canopy frame outline •closed hinge lines •molded in speed brakes & gunsight camera

The First Practical Ducted Fan Propulsion System!

After years of research, testing and improvements, the new Byro Jet propulsion system from Byron Originals signals the beginning of a new and exciting era in ducted fan performance, simplicity and affordability. Now modelers the world over can experience the thrill of realistic jet flight **without** the prohibitive expenses and hassles of temperamental racing engines, high nitro fuels, complicated fan systems and incomplete semi-kits that require untold hours of building and countless trips to the hobby shop.

The Byro-Jet is designed specifically for today's dependable schnuerle ported .60s, and low nitro fuel mixtures. And unlike other fan systems, its unique "pusher" design provides a unmatched degree of thrust efficiency. By mounting the engine ahead of the fan and not behind it, a totally uninterrupted air stream is achieved within the thrust tube. Static thrust performance in the 6 to 10 pound range is common with the recommended schnuerle .60s and our Custom Byro-Jet Pipe Systems.

In operation, the Byro-Jet is as practical and convenient as any prop-driven installation. The entire engine, fan unit and fuel tank are within easy reach thanks to the combination access/intake port in the fuse bottom. This makes refueling, carb adjustments and glow plug replacements a snap. The engine is extracted simply by removing four bolts.



1. Chinese

"Wings easily removed for transporting."

Wing Span - 57"
Length - 55"
Wing Area - 600 sq. in.
Ready-to-fly weight - 8½ lbs.

Authentic Scale
MiG-15
Factory Direct Price
\$136.55

plus \$8.00 shipping & handling
Byro-Jet and Starter assembly not included

Spectacular Flight Performance!

With 600 sq. in. of wing area and a ready-to-fly weight of only 8½ lbs., this world famous, swept wing fighter is an impressive aerobatic performer. Thanks to a generous power-to-weight ratio, vertical performance ranks with most prop-driven aircraft. The relatively low wing loading and swept-wing design combine to make a surprisingly stable craft. In many respects, it handles much like a trainer. Anyone who has witnessed the many exhibition flights across the country will agree the pitch stability of this aerodynamic configuration allows the MiG to hang on indefinitely in a slow flight, nose-high attitude. Take offs are just as impressive. Even from ordinary grass strips, the MiG-15 will leap off in 100 feet. Landing characteristics are much the same as any pattern ship. Recent radar checks have indicated top speeds in level flight of just over 100 mph. All things considered, the MiG-15 is a fascinating ducted fan accomplishment...a modeling experience you can't afford to pass up.

Items Included in kit: •Hinges •12 oz. fuel tank •Detailed canopy •Cockpit floor •Nose cone •Armament •Special tools •Wheels •Nose wheel fairing •Landing gear •Control horns •All required fasteners •Balsa & plywood die-cut parts •Decal set (choice of 4 available) •Hand-layed fiberglass fuselage •Necessary linkage •Control surface (injection molded polystyrene) •Premolded wings with all pivots & torque rods molded in •Shock-absorbing nose wheel assembly •Pre-cut trailing edge stock •Detailed & fully illustrated assembly book •Three view with detailed painting instructions

Fuselage consists of hand-layed fiberglass (polyester) with the following items factory installed:
Combination fan bulkhead & wing mounting spar
Sealed radio compartment
Ny-rods
Control rods
Vacuum-formed jet intake
Aluminum vertical fin spars
Thrust tube
Aileron bell crank mounts
Locating marks for armament

Kit includes any one of four decal sets!

In addition to your choice of decals, you will receive a matching set of painting, Econokoting instructions, 4 view for both proof of scale and decal location and a complete materials list outlining the recommended thinners, primers and paints.



2. Russian Aerobatic Team



3. Russian



4. Czech Aerobatic Team

A FANtastic Concept in Authentic Jet Flight!

NEW!!

Items included in kit: *Wheels *Hinges *Landing gear *Control horns *Special tools *12 oz fuel tank *Nose wheel fairing *Necessary linkage *All required fasteners *Three complete decal sets *Balsa and plywood die cut parts *Scale flying stab assembly *Shock absorbing nose wheel assembly *Hand layed fiberglass fuse (polyester) *Detailed canopy and cockpit assembly *Detailed and fully illustrated assembly book *Pre-shaped control surfaces (injection molded polystyrene) *Thru-view with detailed decal and painting instructions *Injection molded wings with aluminum extruded wing spars already molded in and ready to plug into fuselage.



Model shown with optional rockets and fuel tanks.

Wings easily removed for transporting.

Wing Span 47"
Length 74 1/2"
Effective wing area 750 sq in
Ready to fly weight 9 1/2 lbs
(less opt tanks & rockets)

Hand-layed fiberglass (polyester) fuselage consists of the following items factory installed:
Combination fan bulkhead & wing mounting spar
Ny-rods
Control rods
Thrust tube
Scale, detailed exhaust cone
Molded in armament

Authentic Scale
F-16
Factory Direct Price
\$196.55

plus \$10.00 shipping & handling
(Fan and starter ext. not included)

Anyone who has witnessed the deluxe caliber of our Pitts and MiG-15 kits will testify to the superb quality and complete nature of Byron Original products. The new F-16 promises more of the same quality materials, expert engineering and craftsmanship. This exact scale replica of General Dynamics' lightweight fighter has been painstakingly designed with scale details, quick assembly and performance in mind. In fact, the only deviation from true scale is a slightly thicker airfoil. Every last detailed marking has been reproduced in decal form to ensure scale authenticity. Even the detailed cockpit interior is supplied at no extra cost. Every effort has been exerted to make sure this freedom fighter of the '80s is a mirror image of the original.

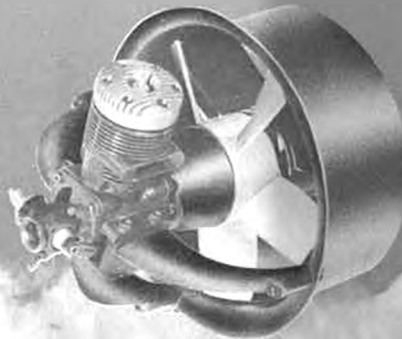
Extraordinary Fight Characteristics!

Ever since our first public demos in Vegas last Fall, modelers across the country, and even overseas, have been raving about the unbelievable performance of this recent addition to the Byron Originals line. The verdict seems unanimous. From the standpoint of power reserves, landings, short grass field take-offs, slow flight abilities and overall stability, the F-16 outranks any other jet model on the market.

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PATENT PENDING

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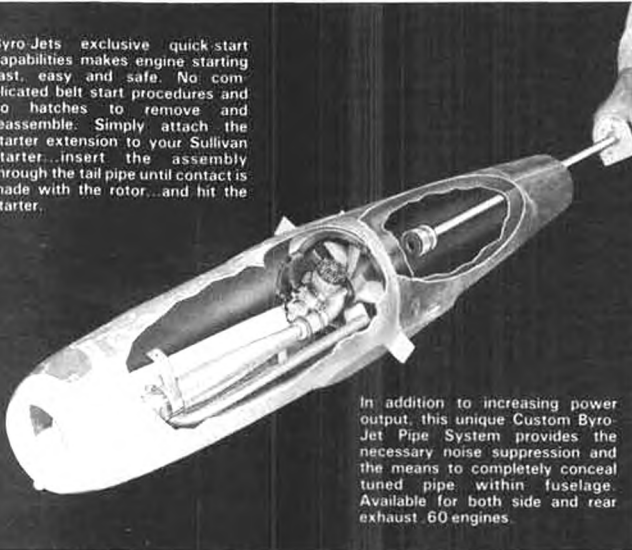
plus \$2.50 shipping & handling



The cutaway below clearly illustrates the uncomplicated yet highly efficient Byro-Jet ducted fan system. Entire unit is constructed of rugged, glass-filled nylon and weighs only 11 oz. Removal of entire unit is achieved simply by removing four bolts. Switching the fan from the MiG to F-16 is a quick and easy operation. Notice the unique tuned pipe configuration and the convenient starting method.



Byro Jets exclusive quick-start capabilities makes engine starting fast, easy and safe. No complicated belt start procedures and no hatches to remove and reassemble. Simply attach the starter extension to your Sullivan starter...insert the assembly through the tail pipe until contact is made with the rotor...and hit the starter.



In addition to increasing power output, this unique Custom Byro-Jet Pipe System provides the necessary noise suppression and the means to completely conceal tuned pipe within fuselage. Available for both side and rear exhaust 60 engines.

IMPORTANT: You must check an engine below (B) to receive proper Byro-Jet Pipe and/or Fan Unit
Send me:

- MIG-15 Kit(s) @ \$136.55 ea. plus \$8.00 Shipping & Handling (Choice of four decals see below)
- F-16 Kit(s) @ \$196.55 ea. plus \$10.00 Shipping & Handling (Three decal kits included)
- F-16 Tank & Rocket option @ \$26.95 (includes shipping and handling)
- Byro-Jet Fan Unit @ \$49.95 ea. plus \$2.00 Shipping & Handling
- Sullivan Starter Extension @ \$11.50 ea. (includes Shipping & Handling)
- Custom Byro-Jet Pipe System @ \$48.95 ea. plus \$1.50 Shipping & Handling
- Epoxy/fiberglass Covering Kit @ \$22.50 plus \$1.50 Shipping & Handling

Foreign Inquiries
Contact:
Exportation, Ltd.
1200 Sky Park Circle
Suite E
Irvine, Calif. 92714
U.S.A.

- A. Check one MiG-15 Decal Kit:**
- 1. Chinese 2. Russian Aero. Team 3. Russian 4. Czech Aero. Team
- B. Determine engine to be used and check accordingly.**
- Webra .61 Speed #1030 Front Valve, R & S Exh. H.P. .61 Gold Cup Rear Valve, S. Exh.
 - O.S. Max .60 & .61 FSR, Front Valve, S. Exh. O.S. Max .61 VF Front Valve, R. Exh.
 - Rossi .61 & .65 ABC Rear Valve, Rear Exh. O.S. Max .65 RSR Rear Valve, S. Exh.
 - Webra .61 Speed #1024 Front & Rear Valve, S. Exh. Undrilled Mount Also Available
 - O.P.S. .60 & .65 Speed, Rear Valve, R. Exh.

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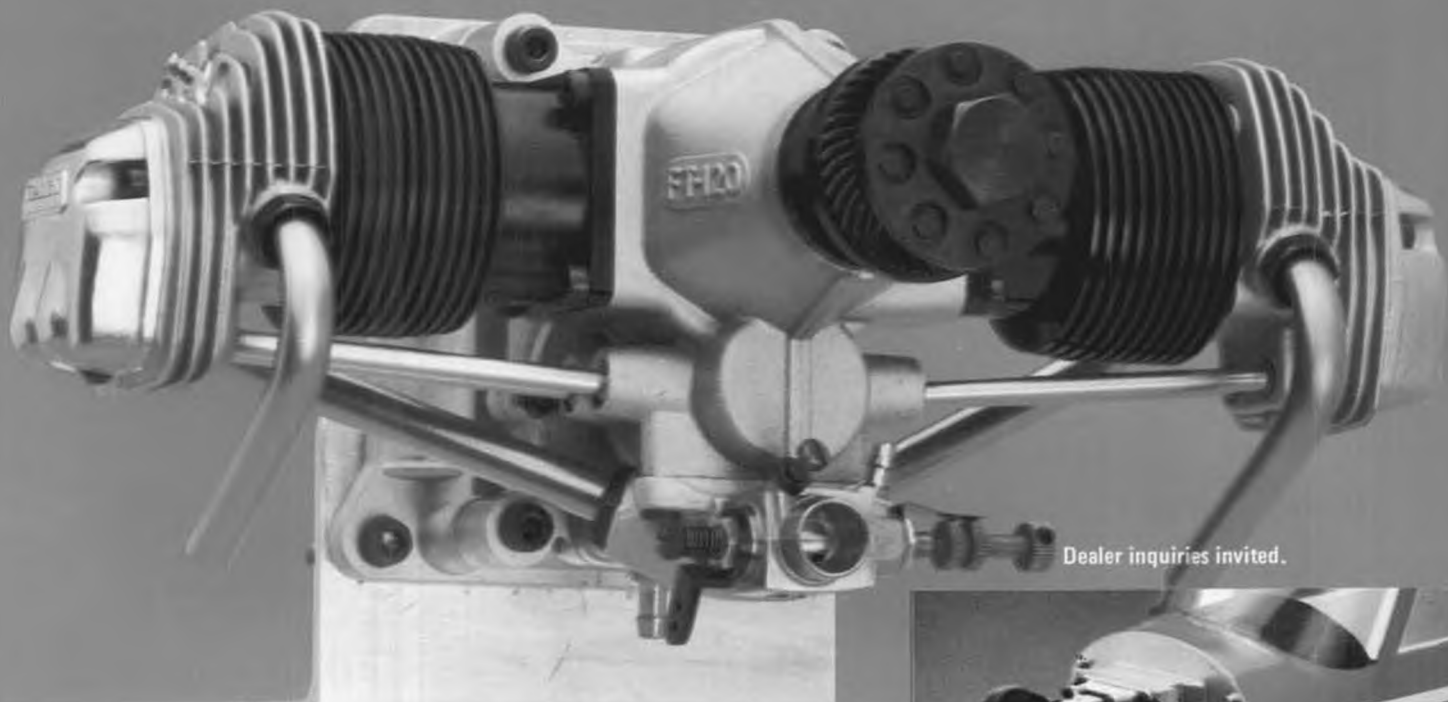
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Gemini
 9.95cc x 2
 FLAT TWIN FOUR-STROKE CYCLE

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Gemini

O.S. FT-120 FOUR-CYCLE TWIN

Peter Chinn, in cooperation with O.S. engineers, has produced a beautiful 20-page instruction and parts manual for this fine engine. It is recommended for aircraft from 9 lbs. to 15 lbs. and for moderate acrobatic flight. Manuals are available for \$2.00 postpaid.

The O.S. FT-120 'Gemini' is a horizontally-opposed twin-cylinder overhead-valve fourstroke-cycle engine of 20cc (1.2 cu.in.) displacement. As with all O.S. designs, a long period of technical development and prototype testing preceded its introduction to the market and we are confident that this is an engine that you will be proud to own and operate. Scale model enthusiasts, in particular,

will be pleased with its resemblance to the typical full-size horizontally-opposed light-aircraft engines widely in use and also with its quieter, more realistic sound.

Mr. Ogawa, Mr. Mihara and Mr. Sawada of O.S. are extremely proud of this engine. This is evident in the execution of every part, a gorgeous carton, wrenches, feeler gage, radial mount and, in particular, the decal sheet.

The Gemini FT-120 weighs 34.6 oz. RPM range is from 2000 to 9000 on a 16x6 or 17x6 prop. The twin powered Citabria is modeled after a real one owned by Cincinnati's Flying Neutrons, complete to the same paint scheme and N number.

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Electronic noise is the bane of every flier. Almost without exception, every flying field has its share of signal interference that plays havoc with the most skilled flier and the best of radios. However, having already proved our R/C Guidance System was built for unparalleled reliability, we decided to put it through a severe interference test.

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The actual test was performed at Lakehurst Naval Air Station, N.J., December 5, 1979. We show here just a few of the interfering devices that our equipment operated against.

Result: We flew glitch-free. Output signal strong, receiver selective.

