ICD 08545

R/C MODEL BUILDER

volume 10, number 99 $2.00 APRIL 1980

ISSN 0194 7079

- BRUSHFIRE - Ken Bonnema's Pattern Ship
- CURTISS P-1B - Westburg Scale View
- SUNBIRD - Thornburg's R/C HLG!
- AERONCA TANDEM - Scale O.T.
- BLACKJACK - F/F HLG

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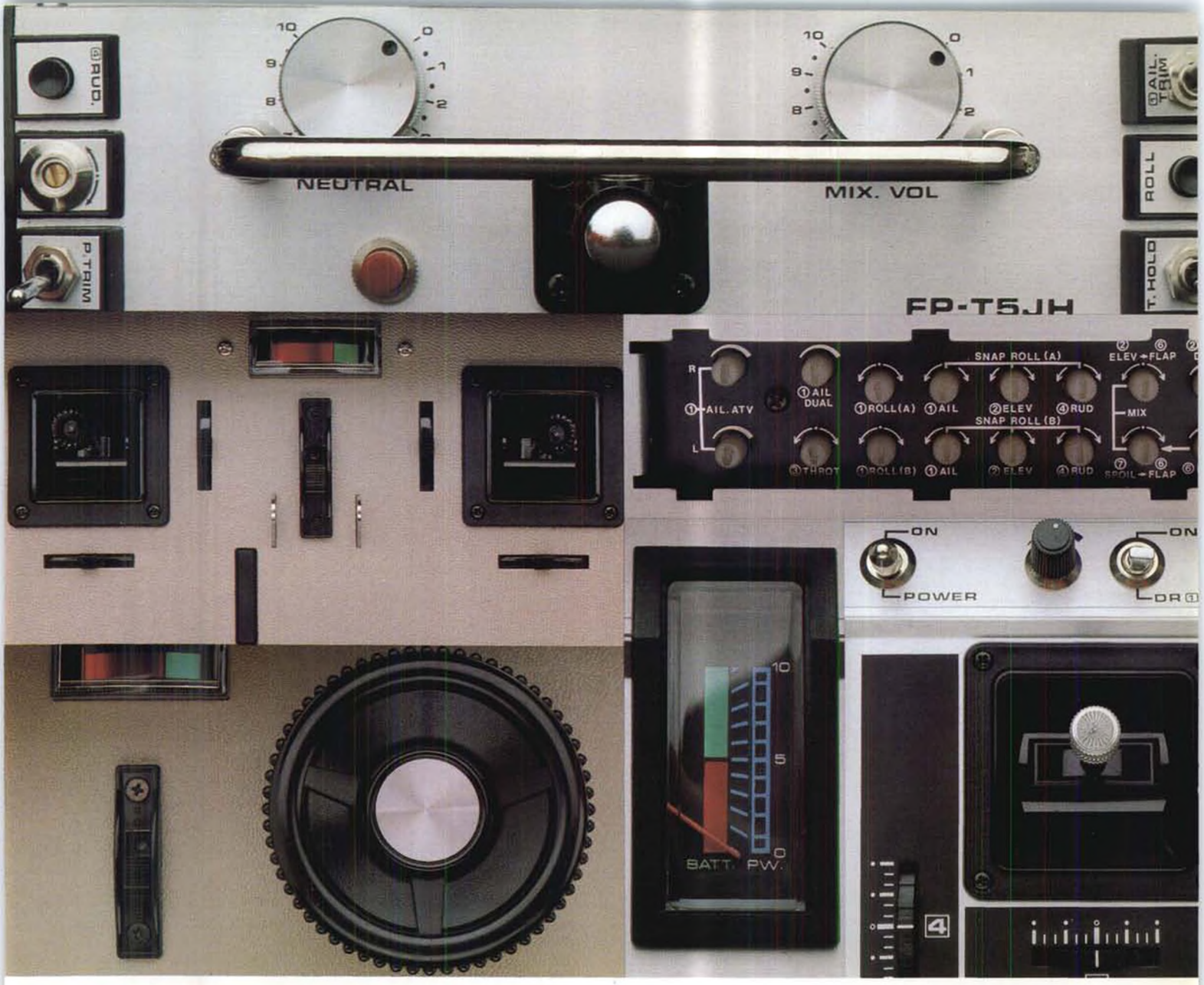

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R/C MODEL BUILDER

APRIL

1980

volume 10, number 99

621 West Nineteenth St., Costa Mesa, California 92627 Phone: (714) 645-8830

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FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Miss Nevada 1979-80, Jeannie Cangemi, from Incline Village, Nevada, is a pleasing companion for a Japanese "Zero" built by Bob Vaillancourt, Reno, Nevada, from a Royal kit. Power is a Webra, and radio is Kraft. Both Bob and photographer Tom White are members of the Reno R/C Club.

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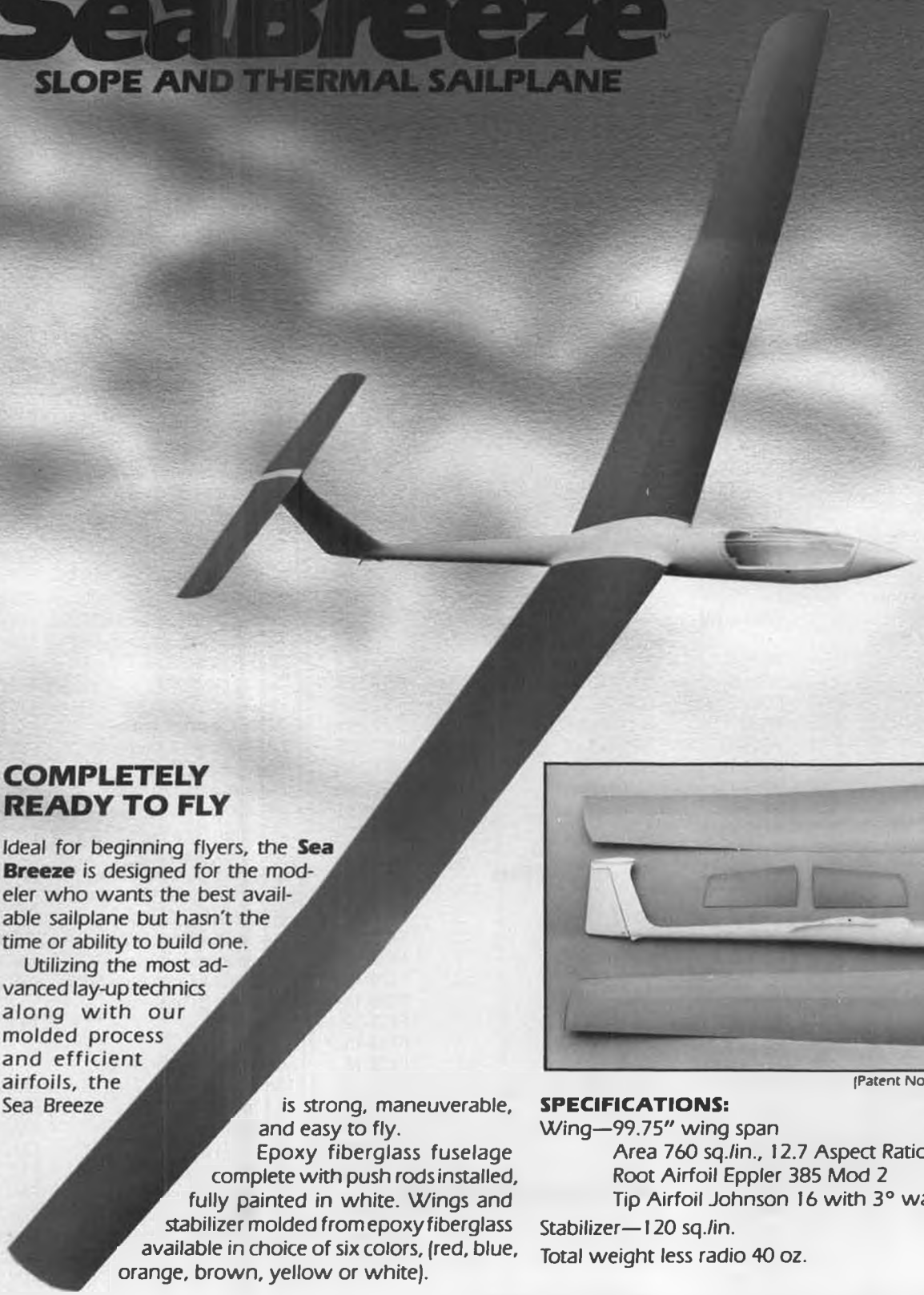
SeaBreeze

SLOPE AND THERMAL SAILPLANE



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Utilizing the most advanced lay-up technics along with our molded process and efficient airfoils, the Sea Breeze is strong, maneuverable, and easy to fly.

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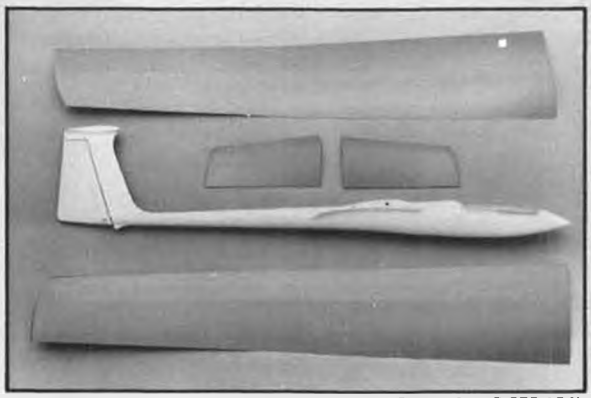

(Patent No. 3.873.654)

SPECIFICATIONS:

Wing—99.75" wing span
Area 760 sq./in., 12.7 Aspect Ratio
Root Airfoil Eppler 385 Mod 2
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For S20 servo only	
T-Shape	FSH-20W

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S11	FCS-11
S12	FCS-12
S15	FCS-15
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DOWN MEMORY LANE . . . We built this one around 1963 or '64. It's a combination of two famous R/C designs of the time, and turned out to be a real comfortable machine to fly. Can you guess what those designs were. The answer is at the end of this column.

from Bill Northrop's workbench . . .

MUSINGS

After reading through the many letters generated by Ron Roberti's letter in February's ". . .Three If By Air," we began thinking about the overall picture of the modeling hobby and the people who take part in it. We visualize the whole hobby/sport as a huge, nebulous ball in space. In the center of this ball there is a hard core of the so-called "true" modelers, who invent, create, innovate, and develop everything new that comes into the hobby.

The first outer layer surrounding that hard core consists of the kit and plans builders who do not have the basic creative ability to originate, but nevertheless enthusiastically enjoy using the ideas emanating from the hard core, ideas that have been turned into reality by model manufacturers and publications.

The next outer layer, which completely surrounds the hard core and first layer, consists of those who merely enjoy the final results of the snap-together and ready-built manufacturers, and the build-'em-to-sell modelers. These hobbyists like to operate the ready-built creations of others, but do not enjoy and/or cannot or will not go to the trouble of building from anything less than partially completed projects such as ARF and ERF (Almost and Entirely Ready to Fly) models.

Finally, there is a vast, almost unlimited outer layer. This consists of the completely unknowledgeable public which purchases from whatever source it may find, the ready-built, ready-to-operate (minus batteries) toy which imitates a model but is not really a model.

Obviously, each succeeding layer of this nebulous ball consists of a much greater mass of humanity, beginning with a hard core which probably numbers less than a few thousand. Furthermore, we visualize these layers as not firmly separated by distinctly defined shells or walls, but by loose and intermingling grey areas, where modelers, non-modelers, and even toy buyers, blend together as they progress or regress, in or out of the hobby.

Large masses in the outer layer exposed to toys, which a few recognize as coming from *somewhere*, and those with the curiosity to investigate move into the second layer. And a small portion of these discover the intriguing pleasure of building what they "play" with, thus moving them to the first layer. Occasionally, a member of this inner layer discovers a heretofore hidden talent for originating and creating, and thus a new member joins the rather exclusive hard core of modelers.

We're not exactly sure of what we're trying to prove with all this visualizing, but it's kinda fun to think of our many acquaintances in the hobby and try to imagine in which layer they would put themselves. Have fun!

NOTICE:
Dear Owner of a Top Flite 110 volt Heat Gun:

All Top Flite Heat Guns (110 volt only) manufactured prior to January 1978 contained an asbestos liner in the metal hood. *This may pose a health hazard.* If your heat gun was purchased prior to this date, send your name and address to Top Flite or call customer service at (312) 842-3388 and we will send a free replacement mica liner with simple instructions for replacement of same.

To determine whether your Top Flite Heat Gun has an asbestos liner, look inside the metal hood after removing the nozzle (used to deflect the air). If the inside liner appears shiny and smooth (as against dull white and rough), then you have a *mica* liner which does *not* need to be replaced. On the other hand, if you determine that it is or *may be* asbestos (dull white and rough), you should write or call Top Flite for the free replacement mica liner. Should there be any doubt, or if you are unable to replace the liner, you can send Top Flite the entire heat gun. Top Flite will make the substitution and pay all postage cost.

VERY IMPORTANT: *Under no circumstances should you operate the heat gun without a liner.* Your free replacement liner will be accompanied by simple instructions for replacement. Wait for these instructions before attempting to remove the liner in your heat gun. We appreciate your cooperation in this matter.

TOP FLITE MODELS, INC.
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CHICAGO AERONUTS 45th

The famed Chicago Aeronuts club, boasting such member's names as Goldberg, Lidgard, Vacco, and Obarski, will have its 45th Annual Banquet and Homecoming on Saturday, April 19, 1980, at Heck's, 5149 N. Milwaukee Ave., Chicago, Illinois. Contact Rudy Schuh, Banquet Chairman, 267 E. County Lane Rd., Barrington, IL 60010, and make it fast. The seating capacity is 140, and your intentions must be known.

WHITHER "STRICTLY SAIL"?

We received an angry comment from a *former* reader, written on his subscription renewal notice and returned to our office (without check). "Unfortunately, you stopped 'Strictly Sail,' which was the only reason I bought your magazine for 3 years! You didn't even let your subscribers know why! Gross!!!"

Well, excuuuuuse us! Actually, we should have explained to our readers that it was not our decision to suspend "Strictly Sail." Rod Carr, who titled the column when he took over the helm about 5-1/2 years ago, recently changed employment and moved from Annapolis, Maryland to Seattle, Washington. Soon after taking the new position, he was advanced even further in title and

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"...THREE if by AIR"

(Letters to the Editor)

Dear Editor,

After reading the February, 1980 issue of RCMB, *I would like to make a few comments about the letters-to-the-editor.*

Too bad about Mr. Roberti. Anyone with the Gall (Gaul is in Europe) to buy a magazine and then cut out what he doesn't like must be kin to the censors of World War II. I can sympathize just a little about someone stepping on a model, since, many years ago, I had a next door neighbor come in and sit on a model and mash it flat! I really don't think that the R/C added to the name of the magazine changes it much, since R/C has been a part of the contents all along. It just confuses things a little when writing for plans, etc.

As for the spelling of Schnuerle or Schnurle, my German-English Dictionary doesn't list the word. It lists Schnur, meaning string, and Schnurband, meaning lace. I assume that the word got coined to describe a cutaway picture of an engine with arrows to show the gas flow out of the ports and into the cylinder. Now, something which I think would add to the magazine would be some such cutaway drawings of the engines presently available, to show their port arrangement and internal parts.

In answer (?) to the wish of Mr. Abbot, I have a photograph of an 0-47 which was parked at Flying Cloud Airport, near Minneapolis, Minnesota in July, 1968, which at that time appeared to be in flying condition.

I enjoyed reading the article by Harry Murphy, Now Ya See It, Now Ya Don't. Recently, I was unable to find any colored silkspan tissue to cover a Zipper, which I built from MB *plans. I tried dyeing some white silkspan using Rit dye. I found that if the directions on the package are followed, using hot water, that the tissue would disintegrate. By dissolving the dye in a little hot water and then pouring the solution into a large pan of cold water, and then just crumpling up the silkspan sheet and immersing it, the dye will take just as well. Let it soak for 30 minutes or so with an occasional poking and stirring and then carefully spread it out on some wrapping paper to dry. Any shrinkage of the tissue at this time will be taken care of later when the model is covered. My normal procedure is to wet the tissue and apply it using clear dope as an adhesive. Finish with clear dope and the result is a beautiful translucent covering which allows the framework to be seen.*

Finally, how about publishing the plans to a model which is like the little airplane silhouette you use on the cover and elsewhere in the magazine?

Bill Burgin
Birmingham, Alabama

You didn't find Schnuerle in the German/English Dictionary because it happens to be the name of the individual who developed the porting system by which it's known.

It just so happens that we have given thought more than once to having a design contest based on our logo silhouette. As we are interested in all types, there would have to be at least 4 categories including F/F Gas, F/F Rubber, R/C, and C/L. One of these days. . .

Dear Bill:

Re Mr. Ron Roberti's letter in the February issue of R/C Model Builder. *I simply cannot allow his comments to go unchallenged.*

It appears that Mr. Roberti attempts to make two points.

1) All RC'ers are self-centered, egotistical SOB's.

2) All RC'ers are non-modelers, i.e., only free flighters are true modelers.

To be honest about it, there may be an element of truth in the first point. I'm sure we have all known RC'ers whom we considered to be SOB's. But, that is the exception rather than the rule. By Mr. Roberti's philosophy, all lawyers are bad because of one crooked ambulance chaser (the comparisons could go on across all professions). As for ego, it seems that Mr. Roberti has cornered the market.

As to who is and who is not a modeler (or modeller if Mr. Roberti prefers), modelers come in all sizes, shapes (some with fat heads even), and flavors, with talents and skills sufficient to "do their thing," whatever phase of the hobby their "thing" happens to be. I submit that it does not enhance your "thing" to belittle someone else's "thing."

I remember a sign on the back of a friend's transmitter (yes, I am an RC'er) in Huntsville, Alabama, which I think summed up the message. It said simply: SMILE — IT'S A HOBBY!

Milt Woodham
Colorado Springs, Colorado

Dear Bill:

I was in the middle of writing my column for the monthly newsletter of our local dog obedience club when I read Ron Roberti's letter in the February, 1980 issue of R/C Model Builder.

I dropped everything to get in my fifteen cents worth.

I think that Ron Roberti, and others like him, would make good Communists. They seem to have the same philosophy in common — you like what I like and you do what I do, or else!

Also, I would suggest that he buy a good dictionary and learn how to use it. I could spell better than he can when I was down in grade school! And if his model building is as sloppy as his grammar, his models must be a sight to behold!

This is a free country and I, along with quite a few million other Americans, have not only the privilege but the right to like what I like and do exactly as I please as long as I don't break the laws of this country or infringe upon the rights of others.

The R/C people he speaks of are infringing upon the rights of others, but there are a few "rotten eggs" in any group of people. It is these few who cause the loss of flying sites for modelers and the loss of show sites and the use of motels for dog fanciers.

Most of the dogs at a dog show are handled by professionals. I bought, trained and handled my Belgian Tervuren dog to his Championship in the show ring myself. I also trained and handled him to two AKC obedience titles. Ron Roberti would probably claim that because I didn't build him and he didn't do all this by himself, that he is not a true dog!

As for what Ron Roberti says about you and Walt, I'd lay even money that each of you has built as many free flights as he has. After all, Walt lost twenty-three *of them in one year alone with their Bantam and Ohlsson & Rice engines, if I recall correctly.*

In Walt's case, especially, the chances are that he has designed more free flight models than Ron has built. He has certainly had a lot more free flight plans published than Ron has.

I'm a sometime Sunday flyer and I built my first model back in 1928. It was Merrill Hamburg's Baby R.O.G. kit from the old American Boy *magazine, if I recall correctly.*

Living in a small town where nobody had ever even seen a model airplane, I had to struggle through the plans and the building by myself. I built four of the little fellows before I finally got one to fly.

I have built and flown all types of free flight models and quite a few control line models, including three of Jim Walker's A.J. Fireballs when they first came onto the market. I still have my Ohlsson "19," #298, and I used it in both free flight and control line models until it finally wore out.

I would love to try building and flying R/C models, but due to deteriorating eyesight I'm now limited to control line models and schoolyard type rubber models that aren't likely to fly beyond the range of my vision.

Ron Roberti's statement that free flight and control line were around before R/C is false. Free flight was first and control line did not come along until years later, and R/C models were being built and flown at the same time control line was developed, if not before. Jim Walker, a pioneer in control line, was also one of the pioneers in R/C and he built, flew and demonstrated both *types of models at the same time.*

Also, when it was mainly free flight and control line, A.M.A. membership never got over 20,000. The last I heard, it is now over 70,000 and I'm sure that it was the development of reliable R/C equipment that sparked this tremendous growth.

While it is true that many of these new members have never built a model airplane before, Ron Roberti's statement that none of the R/C modelers have ever built a model or don't build their own models is certainly false. I know several local R/C fliers who build their own models and the fabulous R/C scale models that I saw at the Nationals here last summer also give the lie to this statement.

My one big disappointment at the Nationals was that I knew that there were many famous modelers there who I had read about, but there was no way in the world to identify them.

Most of the people who I have met in both the modeling and dog worlds are courteous, friendly and helpful, including those in R/C.

I met and talked with your "Dirty Dan," in his disguise as Rich von Lopez, at the Nationals, and even he courteously answered my questions about how to start an engine using a pacifier tank.

In conclusion, while I subscribe to and enjoy other modeling magazines, I like yours the best as it covers more aspects of modeling.

Also, this is a long letter and if you use it in your "...THREE if by AIR" column, you are free to correct and edit it as you please.

While my spelling is generally accurate, there may be typograhical errors (you certainly know about those, in your business!) and I realize that my grammar isn't impeccable, especially since I started writing my dog column, "Canine Chatter," over three years ago. It makes me wish I'd paid a lot closer attention to my English teachers when I was in school!

Ray Golden
Lincoln, Nebraska

What is a *good* Communist?

Actually, Ron is an excellent model

Continued on page 105

OVER THE COUNTER

• Mammoth Scale enthusiasts will be happy to learn that Lou Proctor's much talked-about 1/4-Scale Nieuport 28 kit is finally being put on the market. Proctor really went all out on this one, the result being a magnificent 100% scale model that duplicates the full-size aircraft in every detail, inside as well as out. Construction is of birch plywood, spruce, and aluminum, and of course it goes without saying that the materials, workmanship and hardware are of the same first-class quality that has become synonymous with Proctor kits.

Features listed in the press release are as follows:

• Landing gear duplicates the full-size plane in looks and shock absorbing capability.

• Engine is enclosed in a heavy gage, hydro formed aluminum cowl of 10-inch diameter.

• Wing panels are easily removed for transportation.

• All hatches and side panels are removable for control accessibility.

• Flight characteristics are smooth and stable.

• Full-size highly detailed plans furnished, plus a complete construction manual with over 30 construction photos.

The Proctor Nieuport spans 80 inches, has 1708 sq. in. of wing area, and weighs just 15 lbs. despite all that hardwood. Recommended engine is a .90 or a .60 with a reduction drive. Going price is $329.00, which certainly seems reasonable.

Scalers who decide they want to tackle this impressive project can order a kit from Proctor Enterprises, P.O. Box 9641, San Diego, CA 92109.

Gorgeous 1/4-Scale Nieuport 28 from Proctor, spans 80 inches.

* * *

Kraft Systems is answering the call for a heavy-duty servo for use in 1/4-Scale models and other applications where an extra-powerful servo is comforting, if not absolutely necessary. What they've come up with is the KPS-20 and KPS-20H, both waterproof and both with ball bearing outputs. Both are identical in size and fit the same mounts as a KPS-15II, but are approx. 3/16 of an inch taller. They will work with all Kraft radios made after 1972.

The KPS-20 puts out 38.7 oz.-in. of static torque and takes 1/2 second to go through its full 100 degrees of travel. The KPS-20H has even more torque (just how much was not specified) and features a 6-ohm motor and a high-output amplifier. Both servos weigh an even two ounces. Retail price of the 20 is $49.95, while the 20H goes for $54.95.

Both servos are available now, either through your dealer or from Kraft Systems, P.O. Box 1268, Vista, CA 92083.

* * *

Still another item intended for Mammoth Scale and large-engine advocates is being introduced in the form of Sullivan's new "Super High Tork" electric starter. As the name implies, this biggie has a lot more torque than conventional starters, and gets it from a powerful 24-volt motor (got room for two 12-volt batteries in your field box?). The starter is designated as Model HTD-24 and is the same size as the regular 12-volt Sullivan starter, but is blue in color. The HTD-24 is equipped with an "instant-on" strip switch and safety guard to keep an oily hand from slipping into the prop. Each starter is guaranteed for two years, too.

Kraft's new KPS-20 servo, designed for heavy-duty applications.

The new Sullivan starter is already being shipped to dealers across the nation. For more info, write to Sullivan Products, 535 Davisville Rd., Willow Grove, PA 19090.

* * *

Our friends at Du-Bro unloaded a whole bunch of new goodies on us, their first releases for 1980. First, there are three sizes of modeler's T-pins, made of stainless steel and packaged 100 to a bag. The small ones are one inch long and sell for $1.50; the medium ones are 1-1/4 inches long and go for $1.75; and the big ones are 1-1/2 inches long and retail for an even $2.00.

If that four-way wrench in the photo looks familiar, that's because it's the same old Austin Craft wrench we all know and love. Du-Bro has acquired the wrench and has made only one change, that being the addition of a rubber insert in the 5/16-inch socket to hold glow plugs in place when changing plugs. The wrench is also brightly plated for a more attractive appearance. The sockets fit 5/16, 3/8, 7/16, and 1/2-inch hex sizes; just right for glow plugs, prop nuts, nylon bolts, etc. Price is $2.95 each.

Du-Bro is also manufacturing four sizes of spring steel axle shafts for mounting to sheet dural landing gears . . . a much-needed item among

Midwest's newest kit is this attractive clipped-wing Taylorcraft, intended as an aerobatic trainer.

R/C'ers. The steel axles are pressed into threaded brass adapters and come complete with lock nuts. These axle shafts are available in 1-1/4 inch lengths, 1/8 or 5/32-inch diameters; and in 2-inch lengths, 5/32 or 3/16-inch diameters. Retail price for all sizes is $2.00 per pair.

Lastly, due to popular demand from both dealers and modelers alike, Du-Bro is making available separately the little exhaust port plugs for the K&B .40, which were previously supplied only with the Muff-L-Aire II muffler. The plugs are used to close up the holes left when the exhaust baffle is removed from the engine, which must be done when attaching a muffler of any kind. The plugs are made of aluminum and sell for $1.00 per pair.

All from Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.

• • •

Most all beginners in R/C who learn to handle a trainer competently are next interested in learning basic aerobatics. To meet the need for an airplane that will do the basic maneuvers well and still handle easily, Midwest Products is offering a kit for a "looks like" clipped-wing Taylorcraft, designed specifically as an aerobatic trainer. This is really a great looking little airplane, especially when done up in a sporty color scheme such as that in the photo. Wing span is 55-1/2 inches, area is 615 sq. in., and you'll need a .29 to .45 size engine and a 4-channel radio to get her into the sky.

The kit itself contains Midwest's first-class balsa and full-size plans, plus a one-piece ABS cowl, ABS wheel pants, and a molded clear plastic windshield. A metal motor mount and full hardware package is also supplied, and a section of the instruction manual is devoted specifically to performing the basic aerobatic maneuvers. The only thing the kit *doesn't* provide is an instructor to help you out on the more difficult maneuvers . . . you'll have to find one on your own.

The Midwest Taylorcraft is avilable now in hobby shops or direct from Midwest Products, 400 S. Indiana St., Hobart, IN 46342.

• • •

Back in the Nov. '79 issue we wrote a blurb on Coverite's then-new "Graphics," precut thin vinyl pressure-sensitive numbers for decorating your bird. The obvious next step would be to produce an alphabet to complement those numbers, and that's exactly what Coverite is doing now. The Graphic Alphabets are made in one and two-inch sizes and can be purchased in white, black, or red. Two full alphabets are included, plus some extras of the more commonly used letters.

Water Trap from Aeromarine soaks up water that gets into your boat's radio box.

Graphics are precut from very thin vinyl, and the sticky on the back is claimed to be totally fuel-proof. The vinyl material is very pliable and goes over any reasonable compound curve easily. Also, the material is paintable in case you need something other than the white, red, or black.

Graphics are a product of Coverite, 420 Babylon Rd., Horsham, PA 19044.

• • •

Old Timer enthusiasts who like to have something a little bit different should take a look at the new "Golden Eagle" ignition engine being produced by old engine buff Karl Spielmaker. (Somehow that doesn't sound right. What I meant is that Karl likes old engines, not that Karl is old and likes engines.) The Golden Eagle is a medium size Class C engine, .53 cu. in., and although it is an original design by Karl and is not intended to be a replica of any particular antique powerplant, certain features of various old motors seem to have found their way into the design. For example, the lower section of the case looks quite a bit like a Vivell or Madewell, the points are very Orwick-ish, and the engine is side ported and has a rear intake just like the old Ohlssons.

The Golden Eagle features a sand cast crankcase, clear plastic tank, and open points (makes for easy cleaning). To correspond with its name, the engine has a polished brass intake tube and timer advance arm, and the cylinder head is gold anodized. It even comes in its own colorful box similar to the ones used by the old Forsters, Ohlssons, and Cykes. Claimed performance is 7500 rpm with a 13x6 prop.

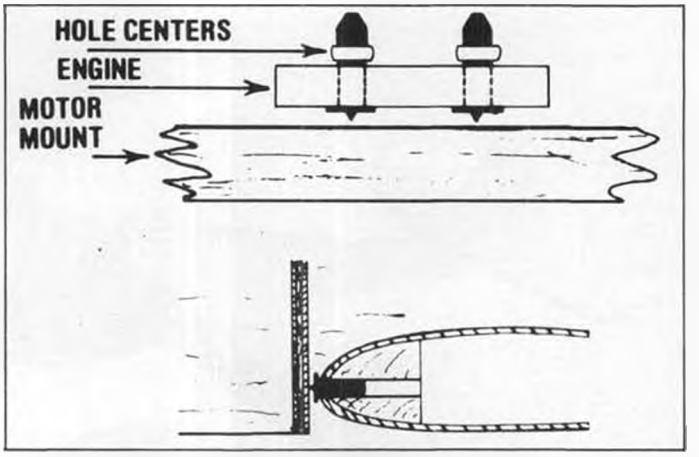
The Golden Eagle sells for $140.00 plus $4.00 postage and insurance. You can get one direct form Spielmaker Engines, 4690 Burlingame S.W., Wyoming, MI 49509.

• • •

Giezendanner USA is adding an interesting digital tachometer to its fine line of R/C accessories. The tach features a liquid crystal display with numbers 1/2 inch tall, an rpm range of 100 to 40,000 (!), an accuracy of plus or minus 50 rpm over the entire range, and a sensitive optical pickup. The unit is supplied with batteries, which are said to be good for 50 hours of use. List price is $129.95. Sounds high, but if the old maxim "you get what you pay for" holds true, you'll have one of the best tachs available at *any* price.

Du-Bro's new goodies include T-pins, exhaust port plugs for K&B .40's, spring steel axle shafts, and the good old Austin Craft 4-way wrench.

Nicely-made digital tach from Giezendanner USA.



Vortac's new precision steel Hole Centers.

Giezendanner USA, P.O. Box 818, Pottstown, PA 19464.

* * *

Aeromarine Enterprises seems determined to keep your boat's interior nice and dry. First it was the "Easy Bailer," which automatically drains any water that enters the hull; now it's the "Water Trap," which soaks up any water that gets into your supposedly watertight radio box. The Water Trap is a small cloth bag containing a chemical compound that physically attracts and absorbs moisture that finds its way into or condenses inside the radio box. Water will do a job on *any* radio, given enough time, and even the little bit that may condense on the box walls can cause big problems. (Condensation is especially prevalent in installations where the exhaust or tuned pipe pass close to the box.)

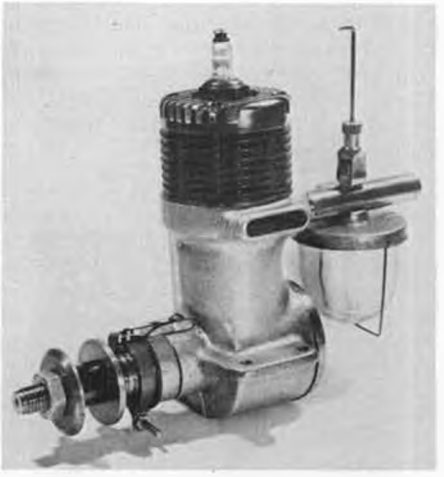
The compound in the cloth bag (feels like lots of little rocks) has a natural blue color. It can absorb up to 1/2 ounce of water, at which point it turns pink. The next step is to throw it out, or it can also be baked in an oven for several hours until it dries out and returns to its blue color.

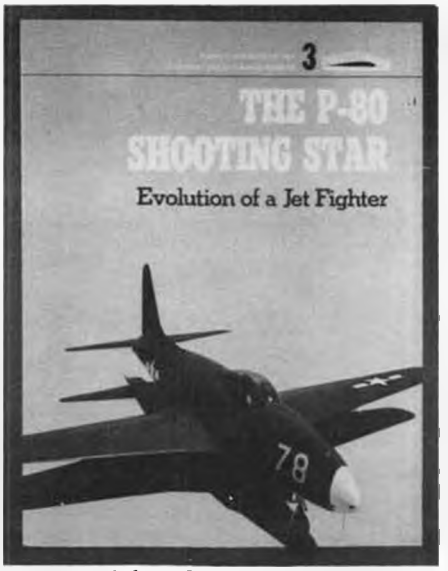
Water Traps sell for $2.50 each, which sounds like a darn cheap price to pay to protect your R/C investment and eliminate a potential hazard. Check with your local supplier, or order direct from Aeromarine Enterprises, 709 Longboat Ave., Beachwood, NJ 08722.

* * *

Vortac has solved the problem of accurately locating engine bolt holes in mounts, and leading edge dowel holes in bulkheads, with its new precision steel Hole Centers. The drawing at the top of page 10 shows how these clever things are used. When placed in the engine's mounting lugs and pressed into the mount, the points leave marks that show where to drill the holes. Likewise with the wing leading edge dowels. It's so simple, it's a wonder no one has thought of it before.

The small centers are the same diameter as a 6-32 bolt, so if your engine's mounting holes are too small they will have to be drilled out. The large centers for the wing dowels are 1/4 inch in diameter, this being the most popular size of dowel for this application. Each set of centers contains ten pieces: four small centers, four retainers (to keep the centers from falling out of the engine lugs), and two large centers. Retail price is $2.98 per set.


The Golden Eagle, a .53 cu. in. ignition engine from Spielmaker Engines.



Newest book from Smithsonian, all about the P-80 Shooting Star.

From Vortac Mfg., P.O. Box 469, Oak Lawn, IL 60453.

* * *

The Smithsonian Institution Press has released its third in a series of books covering the history and restoration of various aircraft in the National Air and Space Museum. This one deals with the development of the Lockheed P-80 Shooting Star, the first operational turbojet fighter to undergo full production in the U.S., and describes in fascinating detail the various techniques and difficulties involved in restoring the prototype XP-80, nicknamed "Lulu-Belle," to museum standards after spending some 25 years in storage at the museum's storage facility.

Like the two books that preceded it, this one is very well-written and captures your interest entirely, even if you are not particularly taken up with the airplane being discussed. Lots of good photos and personal accounts by designer Clarence "Kelly" Johnson and Lockheed test pilot Tony LeVier make this an interesting enough book that no scale modeler or aviation history buff should pass it up.

The book is officially titled *The P-80 Shooting Star* and sells for $5.95. Copies can be ordered from Smithsonian Institution Press, 900 Jefferson Dr. S.W., Washington, D.C. 20560. •

Flight INSTRUCTOR

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

• Sorry about missing a column last month, but the purchase of a new business, along with a hospital stint for some dental surgery caught up with me and I couldn't make the deadline. Fearless Leader didn't chew me out too badly anyway.

The lead-in to this month's column will be on pushrods and was suggested by Paul Manaris, of New York. There are a few cardinal rules to making pushrods work the best, and almost all of them are KEEP THEM AS STRAIGHT AS POSSIBLE. This applies to all types of pushrods, whether they be nylon tubing, fiberglass, balsa, spruce, or whatever. Each type of pushrod has its advantages as well as disadvantages, and due to this there are places where each is best.

Nyrod type pushrods are very easy to install and have the advantage of working well in those situations where an absolutely straight installation is impossible. The typical disadvantage is that they expand and contract considerably with changes in temperature, which causes trim changes. Fiberglass tubes are very strong and rigid but are a little heavy and a little difficult to attach the wire rods to, but are excellent in fiberglass fuselages as the expansion/contraction of the pushrod matches that of the fuse. Wood pushrods are best in wood fuselages, where the expansion/contraction again matches; balsa is good for smaller, lighter models and spruce for higher performance models.

In all cases it is important that you support the pushrods in the middle of the fuse to prevent bowing when you pull high G's. I went crazy with this once on a rudder pushrod which was bowing and changing the rudder trim in tight loops! Fastening the clevises to the ends of the pushrods is another situation which changes with the type of pushrod selected, and I personally recommend the following: On Nyrod type pushrods a threaded stud should be threaded at least 1/4-3/8 of an inch into the inner tube and the clevis threaded onto the remaining stud. Fiberglass tube pushrods are best terminated by bending an "L" bend in the clevis rod and bringing it out through a hole drilled in the tube about 3-4 inches from the end after sliding the rod into the inside of the fiberglass tube. Then a 1/2-inch long piece of dowel with an O.D. equal to the I.D. of the tube is drilled for the clevis rod and epoxied into the end of the tube. On wood pushrods an "L" bend is again inserted into a hole about 3-4 inches from the end of the pushrod, but this time the clevis rod is on the outside of the pushrod and is held in place by wrapping it with string or putting a piece of heat shrink tubing around the whole thing. I personally use 1/4 sq. spruce pushrods with heat shrink tubing to hold the clevis rods on, but I am taking a serious look at some carbon fiber arrow-shafts given me by the late Matty Sullivan.

Other things that are desirable on pushrods are the use of a "Z" bend on one end to prevent the pushrod from turning and unscrewing the clevis at the other end. A lock nut, used to jam the clevis, and a short length of fuel line slid up on the clevis after it is hooked up is a good idea to prevent vibration from loosening the threads and insure that the clevis doesn't open.

Well, I better answer some letters, as my stock is growing. I apologize for being late on some of them.

Dear Dave:

On the final leg in the landing approach, should I use the rudder to steer it in or the ailerons? I asked several local modelers and everyone has a different idea. I have been using rudder and it seems a little slow in response, but I never tried ailerons on final as I'm afraid I may stall it a few feet above the runway. Frank Kramer.

Your question is a common one, the reason for your diverse answers is that you should in fact use both in a coordinated fashion. If this proves to be too difficult to get used to, I'd recommend you use primarily the ailerons until you can get the hang of coordinating both controls.

Dear Dave:

I have been trying to fly models (R/C) for about three years now. I have finally gotten enough confidence to move to a pattern plane. I picked a Curare kited by Kato as my first full-blown ship.

I really haven't had too much of a problem with the plane except the flaps. I built it to the print, without the spoilers.

That's where the problem is. I set them up to have 30 deg. of throw. But on about the twelfth flight I finally tried to use them. I was coming over the runway to check the gear so I started to lower the flaps when BOOM the plane went nose high, so I started feeding in down elevator. I can't recall how much, but it was too much. There was no way that I could land giving it that much down, so up came the flaps and I landed with no flaps.

By talking to some people in our club I've come up with no good reason for the massive ballooning. I'd like to thank you for your time. Roy Simpson.

The line in your letter "without the spoilers" is the tip-off here. The version without the spoilers is intended to be used with the flaps and elevator coupled, and in this use they are commonly called "Snap Flaps." When the intent is to be able to lower the flaps to slow down the landing approach, the spoilers are necessary to kill off the excess lift created by the flaps and avoid the ballooning effect you describe. I use the "Snap Flaps" set-up on my Curare/Tiporare and have been very happy with it.

Dear Dave:

I have a few questions. We are looking for a new field and have a width of 30 feet, but we can't decide on a safe length. Safe, meaning for aircraft from 1/2A to 1/4 Scale and especially for test flights of just plain heavy wing loaded planes.

How can a person find out where and when different events are taking place? Is there any problem using a standard engine for a pusher, or must it be designed for it? Greg Blank

I personally feel that while 300 feet is sufficient, it is better to have 400 feet particularly if larger, faster airplanes are to be flown off it and if beginning pilots are anticipated.

The schedule of events is listed in the AMA News section of *Model Aviation* magazine, which lists virtually all contests to be held in the U.S.

The only thing I would recommend here is that you use only a ball bearing engine for a pusher application, as a plain bearing engine is not designed for thrust in this direction.

Dear Dave:

Here is one for you to chew on. I fly at a site with a very short landing area. As a result, many an experienced pilot has had a sudden surprise with his plane. The problem occurs when the plane is brought in at a steep angle of attack at slow speed. For some reason, just before ground contact, the plane will appear to go into a spin. The pilot loses all control, and the plane usually does a cartwheel. It is called a "multipoint landing." These fliers always blame the wind for their trouble. I suspect they are stalling their planes. The story goes that "a poor workman always blames his tools." Any comment? Pat Rose.

You guessed right, it sounds like the airplanes are stalling, and as the saying goes, "he who stalleth, falleth." The fact that they tend to cartwheel indicates that a little washout in the wing would help the problem, but the real solution is to learn to slip the airplane to lose altitude rapidly without increasing airspeed by dropping one wing with ailerons and keeping the nose up with opposite rudder, then leveling out at the last instant to land.

Dear Dave:

I have been enjoying your column in **R/C Model Builder** *and meant to send in this first question sooner. What are the proportions/dimensions of your standard paint job used on your Tiporare? Is the pattern the same on the bottom of the wing and stab? I copied this color*

Continued on page 88

Bill Watson's blimp purrs quietly along over the heads of spectators at the 3rd annual International Modeler Show, in Pasadena, California, January 12 and 13. Area in the center was kept open for R/C demonstrations and for landing of the indoor R/C models.

R/C WORLD AT THE 1980 INTERNATIONAL IMS MODELER SHOW

By BILL NORTHROP

PHOTOS BY NORTHROP AND SCHRODER

• There was almost no International Modeler Show in Pasadena this year! Try this one on your nervous system and see how it measures on the panic scale . . . In a casual conversation with one of the Pasadena Convention Bureau officials on the Wednesday before the show opened for the weekend, we were told that the Exhibition Hall would be occupied by a computer trade show through Friday! Our contract called for exhibitor move-in all day Friday, with Thursday for the decorator to set up the pipe-and-curtain booth dividers. The Bureau had goofed, issuing overlapping contracts!

Obviously, lawsuits, monetary compensation, and the like, were ridiculous, as none of them would solve the problem at hand. A last ditch meeting of Bureau officials with IMS and computer show representatives brought about the only solution . . . full cooperation by all, plus a lot of frantic juggling of schedules.

One unfortunate result of the overlap was the loss of pre-show TV coverage that was to be based on the Thursday night qualification of the pilots and aircraft for the indoor R/C record trials. These trials were scheduled for Thursday night, supposedly in the Exhibit Hall, with the booths set up to duplicate the conditions under which the contestants would have to fly during the weekend. Unfortunately, the trials had to be switched to the Pasadena Auditorium, scene of last year's Emmy awards, and the CBS-TV news crew missed us completely. We'll explain another major disaster that resulted a little further on in the story.

Friday was like a kindergarten fire drill. Computer show exhibitors, IMS exhibitors, computer show decorators, IMS decorators, plus assorted Convention Bureau personnel, were all going at it simultaneously. It was no place for the weak of heart!

By some miracle, the show did open on Saturday morning at 10 a.m., but even so, exhibit tables and displays were still being set up as the first spectators started streaming through the entrance doors.

One thing sure . . . no more Unlimited Class Indoor Record Trials during and/or in the same exhibit hall as the Pasadena International Modeler Show!

Inaugurated last year as a special spectator attraction to the show, the first Indoor R/C Record Trials resulted in a 23-minute flight by Hal Cover, setting a first-time record. The rules for last year specified a 4 oz./sq. ft. wing loading maximum and batteries for electric motor (no "infernal" combustion engines allowed) limited to common dry cells or nickel-cadmiums. This year the loading limit was reduced to 3 oz., and a maximum total weight of 24 ounces was also imposed.

Eddie Morgan, Las Vegas, Nev., won 1st in Precision Scale with his 1/4-size P-6E. Ship also a winner at Las Vegas 1/4-Scale meet.

Bob Seigelkoff, Hayward, Calif., built this Kawasaki powered Ag-Cat from Model Builder plans (12781). Beautiful flying machine!

One more rule change was made from last year, and this proved to be the fly in the ointment . . . as far as combining the trials with a trade show was a concern. Because of numerous queries into the matter, and because some similar indoor flights had already been made under the suggested rule change, a second category was established . . . *Unlimited* Indoor R/C. In this case, the model specs are the same, but the battery source becomes unlimited, and the use of indoor sites with greater than 30 foot ceilings is allowed . . . if available.

A flight of 38 minutes had already been made by Woody Blanchard, of Hampton, Virginia, using silver cells, and in a huge coliseum. Although we did not want to hinder progress by holding to the 1979 rules, it was felt that the '79 rules should remain in effect; thus separate Limited ('79 rules) and Unlimited classes were established.

And so the scene was set for the 1980 Indoor R/C Record Trials at Pasadena. Three modelers entered the trials with a total of 5 aircraft. Hal Cover had his 23-minute Pace-setter from last year and a new, magnificent biplane totaling 1900 square inches. Tony and Addie Naccarato entered two aircraft of similar appearance: one nickel-cadmium battery powered for the Limited Class, and one lithium battery powered for the Unlimited Class. Lithiums are extremely long-lasting, but also very expensive (around $40 each in the size Tony used), are not easy to find, and they are one-shot (not rechargeable)! Larry Jolly entered a . . . let's see . . . tractor canard. The tail-first aircraft, with engine forward, was actually two-in-one. Larry built one set of flying surfaces and two fuselages; one for nickel-cadmium and one for lithium battery power.

Bill Watson, Tony Avak, and Bob Peck brought helium-filled R/C blimps with which they would attempt to fly the most distance in 30 minutes, over the same figure-8 course flown by the aircraft.

Hal Cover did beat his own 23-minute record with a flight of 24 minutes, 29 seconds on the super-light Hy-Tork powered biplane, which had a surface loading of just under 2 ounces. However, the joy was short-lived, as Tony Naccarato flew his Limited Class "Astro Turtle N" ('N' for nickel-cadmium) for 28 minutes, 16 seconds. This 88-inch span aircraft was designed by Addie Naccarato, Tony's mother, and was a shared building project between customers at their Hobby Lobby Shop in Burbank.

Larry Jolly's "Asender," so-named because of its flight direction, was exceptionally smooth and stable in the air, but the hand carved prop apparently was not the right match, overloading the Astro motor and shortening the flight to 7 minutes, 46 seconds, using nickel-cadmiums. Later, he made an attempt with the lithiums, and this terminated after 22 minutes, again possibly because of the overloaded motor.

Meanwhile, Bill Watson, one of the builders of the famed Gossamer Condor and Albatross man-powered aircraft, flew his well controlled, 11-foot long "Watson Flyer" blimp for the specified 30-minute period, covering 42-1/2 laps of the course. At 400 feet per lap, this amounted to 17,000 feet, or almost 3-1/4 miles. That works out to around 6.4 miles-per-hour . . . better than a fast walk! By comparison, Tony Avak's 7-1/2-foot blimp covered 11 laps, and Bob Peck's huge 16 foot commercial blimp, needing more room to maneuver, made 14 laps.

A high spot in Saturday's show was the appearance of NBC's Channel 4 news crew, headed by commentator Judd Rose. At first, Judd explained that they were in kind of a hurry, but could we give them some action to shoot. We explained that the biplane in the air was attempting a record, and might not be down for 15 minutes (this was Cover's 24-minute flight).

"We'll wait," Judd commented, "this is interesting. Meantime, we'll look around at the exhibits."

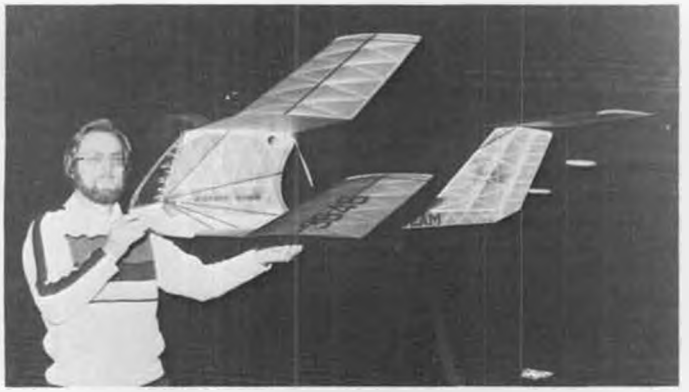
Taking advantage of the time, we

Bill Wisniewski proudly holds his Hall of Fame award, presented at the IMS Exhibitor's party by AMA President, Earl Witt, who took this photo. Other Hall of Famers present were (l to r): Ken Willard, Bill, Walt Schroder, John Brodbeck, and Carl Goldberg.

Pasadena's not that far from Hollywood! The tam and leotards were bright orange, the jacket Navy blue, and the boots pure white. Wow!

Tony Naccarato set a new indoor R/C record of 1 hour, 28 minutes, 15.9 seconds. With him (l to r) are Astro Flight's Bob Boucher, Tony's mother, Addie, and C.D. Bill Stroman. See text.

Larry Jolly's indoor R/C canard was a smooth flier, but it's battery duration kept official flights too low in time.



Hal Cover and his 24-1/2-minute biplane. This super lightweight had only a 2-ounce wing loading. Flight was slow and majestic.

Bill Watson balances his 11-ft. blimp on his head. The gold-plated Capton bag holds about 50 cu. ft. of helium. Control is excellent, flies as well backward as forward. More in text.

lined up Bill Watson with his blimp, Mike Reedy and his crew of 1/12-scale electric R/C car racers, and some of the Kraft contingent with the sensational new R/C motorcycle.

Incidentally, in addition to R/C car champions Bill Jianas and Kent Clausen, we had full scale driving champ Dick Barber of the World Manufacturers Championship Racing Class Porsche factory team. He and his team members, which include movie star Paul Newman, won the 1979 Sebring 12-hour, the Watkins Glen 6-hour, and the Le Mans 24-hour races.

The TV gang ended up spending over an hour at the show, and our reward was an excellent, over 2-minute spot on the 5:30 p.m. news broadcast Saturday evening. The resulting ticket sales on Sunday drove the total two-day attendance to more than 6,000.

Kraft Systems booth had grandstand view of demonstration area. Their motorcycles, driven by Tony Bonetti and Dave Shadel, provided lots of thrills and laughs for the spectators.

What the Sunday spectators saw was the flight that literally put an end to record attempts during the show. At around 1:30 in the afternoon, Tony Naccarato launched the Tony and Addie team entry "Astro Turtle L" (lithium battery powered) aircraft. Using power for only about half of each figure-8 lap, then shutting off to conserve batteries, Tony surpassed Woody Blanchard's 38-minute record and kept going! At one hour, it became a human endurance test. For Tony, it was nerve wracking to keep the aircraft above the 8-foot booth backdrops and under the 30-foot roof beams, all the while making constant left and right turns. For the spectators it was becoming increasingly uncomfortable, as the air conditioning and exhaust fans had to be turned off during the flights, to avoid knocking the lightly loaded aircraft all over the place. However, everyone was with Tony to the end, which came at 1 hour, 28 minutes, and 15.9 seconds. The cheer that went up was gratifying to Tony, and the second cheer, for the blast of cool air that came on moments later, was just as gratifying . . . to all.

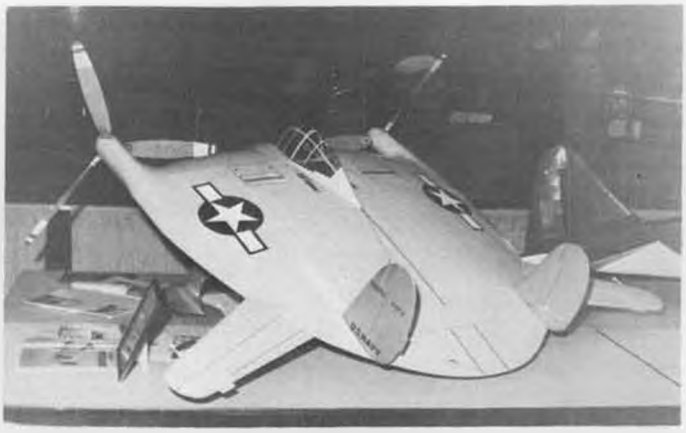
As we put down our M.C. microphone to catch a picture of the victorious Tony and Addie team, the realization of that other major disaster mentioned earlier suddenly struck us between the eyes. PICTURES!

Amidst the frantic last-minute rush to save the show from oblivion, it had completely slipped our mind to arrange to have someone cover the show photographically, something we have automatically done ourselves for the past 15 or more years. Now, the show was just about over, and all we had shot were the test flights on Thursday night! As Bill Bendix used to say in his role of TV's Riley, "Whatta revoltin' development!"

We promise to feature our exhibitors products when we cover the WRAMS, Toledo, and Dallas shows. The least we can do now is list the 1980 IMS exhibitors, in alphabetical order:

Academy of Model Aeronautics
Astro Flight
Bavarian Precision Products
Black Sheep Squadron
Bridi Hobby Enterprises
Ralph Brooke Models
Byron Originals

Interesting electric powered helicopter shown by World Media, of Japan. No radio was installed, so we could not see it demonstrated.



Vought Sikorsky "Flying Pancake" just recently completed by Skip Ruff, Taft, California. Those are the intended flying props!

Cannon Electronics
CB Associates
Craft Air
Duran Corp.
Eastcraft
Electronic Model Systems
Fox Mfg. Co.
Heli-Center West
Hill Country Fliers
Hobby Horn
Bob Holman Plans
Hi Johnson
K & B Mfg.
Kraft Orange County
Kraft Systems
Lind Co.
Mac's Products
Markel Services
Mark's Models
Bob Martin R/C Models
Mattel Inc.
Midnight Models
Midway Models
Model Airplane News
R/C Model Builder
Model Machine Co.
Modeler's Mansion
Novak Electronics
Pasadena Soaring Society
John Pond Plans
Pro Line
R.A.M.
R/C Modeler
R/C Sportsman
Rosie's R/C
S.A.M.
77 Products
R. Shettler Enterprises
Bob Smith R/C Aircraft
Sonic Systems
Tatone Products
Tony & Addie
World Media

Several additional major manufacturers were there to observe, and on the basis of what they saw, have signed up for the 1981 show.

As we pointed out earlier, the all-out record attempts have progressed to the point that they are no longer practical to run during and in the same hall as the model show. Flights of a half-hour plus are now the rule rather than the exception, and simply handicap the regular show activity.

Several possibilities are being discussed for 1981, all with the idea of keeping flights down to the 15-minute time region, or less. A separate record trials date and place is being considered for all-out record attempts, to be held prior to the show, with show flights being limited to demonstrations by the winning aircraft.

One thing for sure, indoor R/C is now ready for a scale event, and we'll have it at the 1981 Pasadena show. At this time, the tentative rules will stay with the 3-oz. wing loading and 24-ounce total weight maximums, same as for the endurance ships, plus some effective static scale fidelity judging. Obviously, the scale models won't have to carry the long-range batteries, so a little more weight can go into the structure and details.

This year's C.D., Bill Stroman, an expert F/F scale modeler and a Flightmaster member, will work with us on the scale rules. He is currently in favor of the above tentative specifications. We'll make the official announcement within a few months so that modelers can start making their selection of subjects. Remember, you will have to qualify your aircraft and you or your R/C pilot prior to the competition because of the flight conditions . . . in the exhibit hall, during the trade show! •

R/C MODEL BUILDER

Louise Cummings, Reseda, Calif. won 4-channel Cannon radio in raffle. With Heli-Center!

Sharon Langer, El Cajon, Calif., won this R/C robot by Mattel. Two were raffled.

Bob Stoner, Long Beach, Calif. was the happy winner of a 5-ch. Pro Line radio. Nice prize!

PHOTOS BY AUTHOR UNLESS NOTED

BRUSHFIRE

By KEN BONNEMA . . . Fine contemporary Pattern design being used by several of the top aerobatic contenders. Can be all balsa constructed, or go your own way with foam wing cores and glass fuselage.

• AMA pattern rules have remained unchanged for quite some time now, and as such, pattern designs have evolved into a fairly small group of highly refined, successful aircraft. Because the event has remained stable, there has been time to refine the promising designs and to weed out the less spectacular performers. In a situation like this, where contest proven, winning designs prevail, it is extremely difficult to inject originality into a new design without sacrificing contest winning potential.

There are two things working against the original design. First, the existing designs are proven. They fly extremely well. If an original design is different from the norm in some respect, then the chances are probably better than 50-50 that the difference will not result in a performance improvement. Secondly, and probably an even greater disadvantage, is that the judges are used to existing designs. They are accustomed to the size and speed of maneuvers as performed by the "in" designs. A new design performing the same maneuvers will look different to the judges, and until the new design has become established, the difference in the maneuvers' appearance will probably result in lower scores rather than higher.

A case in point is Wayne Ulery's EU-1, flown in recent years by Dean Koger. The EU-1 is a radical departure from the pattern aircraft standard. It is large, different looking, and slow, yet it flies beautifully. But Koger, an established flier, struggled for more than a year with a reluctance on the part of the pattern community to accept an alien design. Persistent excellent performance finally earned a niche for the design, and Dean and the EU-1 went on to earn a spot on the U.S. international team this year.

So what does the would-be pattern designer do? If he values originality, he's reluctant to turn out a cosmetically altered carbon copy of someone else's design. If he wants his airplane to stand a competitive chance in its early stages, then he dare not stray too far from the accepted standards. The designer can only hope to be lucky enough to arrive at a compromise that flies well, is different enough to satisfy his creative urges, and conventional enough to gain entrance to the pattern arena.

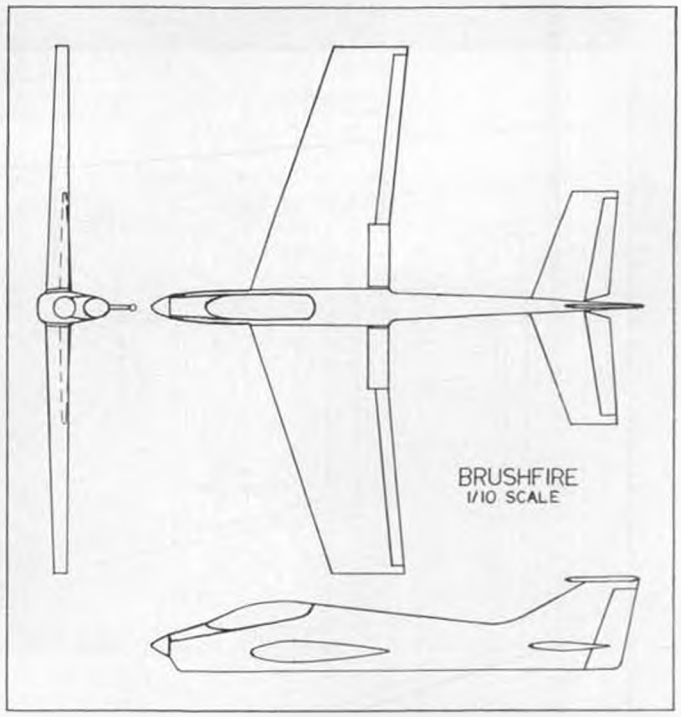
The aircraft presented here, the Brushfire, is one designer's attempt to achieve that elusive compromise.

The Brushfire was designed late in the summer of 1978 as a result of an inquiry by Steve Rojecki. Steve was a successful Novice pattern flier at that time, and he wanted an original new design to fly when he entered Masters class competition the next year. He had some ideas on airplane size and general layout, but no experience in pattern aircraft design. We were discussing Steve's concepts one day, when he casually asked if I'd like to design the kind of airplane he had in mind. I had been mulling over a serious attempt at modern design for a couple of years, so I agreed to the project.

Steve's basic idea was for a large airplane, with flaps, and with a swept wing configuration like the Phoenix 8 he had been flying. From these guidelines, the Brushfire took shape. It was sized at 860 square inches, approximately halfway between the Phoenix 8 and the EU-1. Wing aspect ratio and sweep angle were also selected midway between the EU-1 and P-8. The fuselage was configured similar to a Phoenix, but

On the flight line at Wright-Patterson AFB, the Brushfire shows off its exceptionally clean lines. The airplane won 3rd place in the Original Design competition at the last Toledo R/C Exposition, was the highest placing Pattern ship.

Fred Kugel (left) and Steve Rojecki with Brushfires at the Grand Lake R/C Championships in Sept. '79. Fred finished 2nd, Steve was 4th. Photo by Chuck Shade.



with increased depth and a larger vertical fin to enhance knife-edge performance. A 16 percent airfoil was selected with a sharpened leading edge toward the tip to improve snap roll characteristics. The wing structure was designed to concentrate its weight toward the center, thus reducing the airplane's roll angular moment of inertia. Low roll inertia results in an airplane that starts and stops rolling very crisply, and does not require "leading" by the pilot. The wing was located one half inch below the thrust line, and the flat (no anhedral) horizontal tail was set right on the thrust line. The tail volume is high due to the large horizontal stab (26% of wing area) and healthy tail moment (2.4 average wing chords). This produces a strong pitch stability and an airplane that rolls very axially without any corkscrewing of the tail. The flaps were added for square maneuvers, but the low wing loading and powerful horizontal tail make them virtually unnecessary. Early flights produced very sharp square corners that were heart-stopping. The probe on top of the vertical fin is a strictly cosmetic, personal touch.

From a designer's viewpoint, the test flights of the first Brushfire were an outstanding success. The only modification to the design to come out of the flight testing was an increase in the dihedral from 0.8 to 0.9 degrees. This change eliminated a very slight tendency toward adverse roll with rudder inputs. Otherwise, the performance was as good or better than hoped for.

The first airplane was built as shown on the plans with a balsa fuselage and foam wing. It weighed 8 pounds, 14 ounces, and was equipped with a flying tail for packaging purposes. A Webra .61 provided the power. It flew remarkably well for a first generation airplane, with the slight adverse roll being the only exception. The second and third airplanes had fiberglass fuselages, foam wings, and conventional elevators. One had a fully sheeted wing and was painted. It weighted 10 pounds. The other had a cut-out, Monokoted wing and weighed 9-1/4 pounds. Both had the increased dihedral. The lighter one

Brushfire designer Ken Bonnema with Steve Rojecki's model At Wright-Patterson AFB.

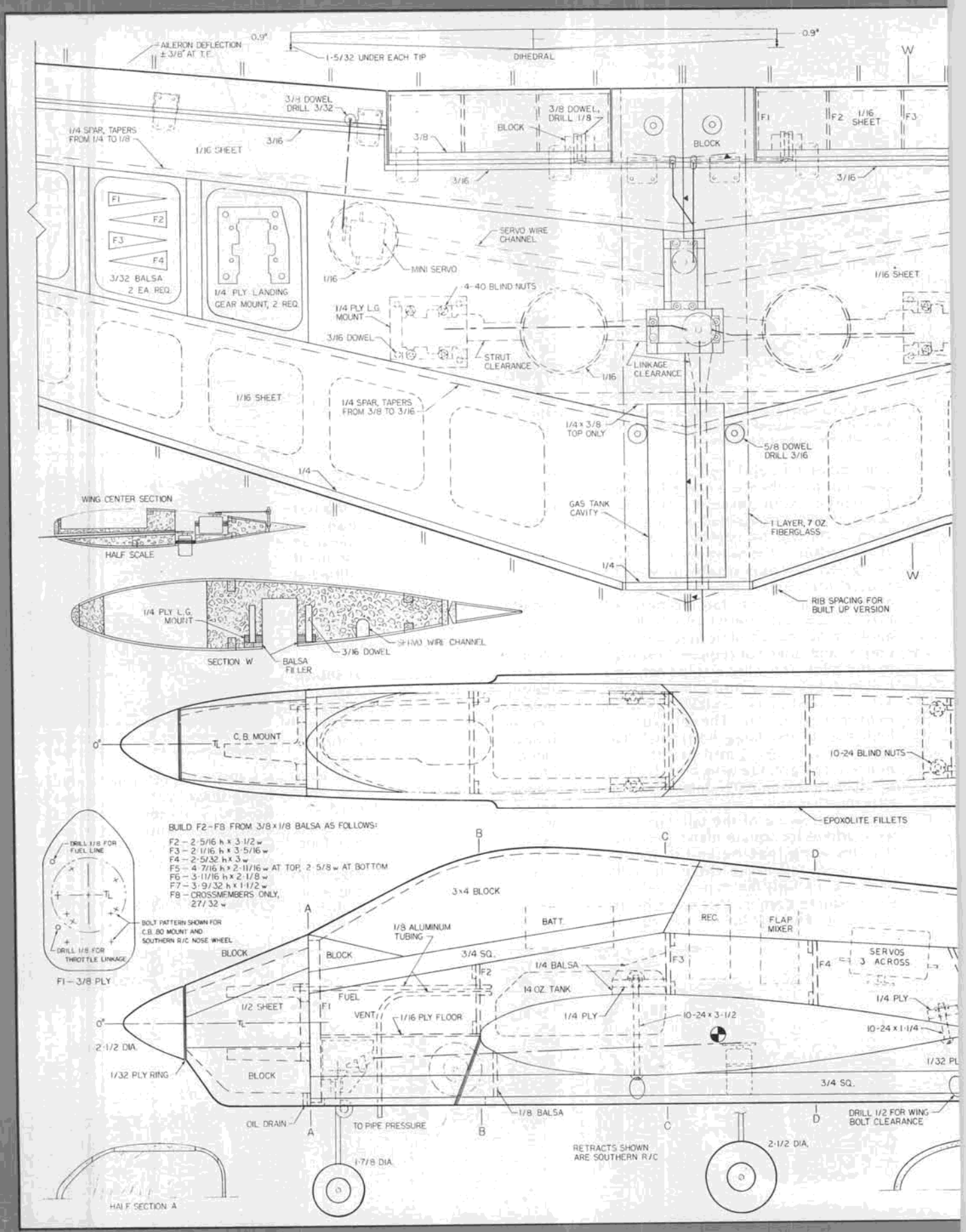
is a first rate performer and is currently being flown with Rossi power by Steve Rojecki. The other, which is O.S. powered, suffers somewhat from its higher weight, but it is being flown quite successfully in competition by Fred Kugel.

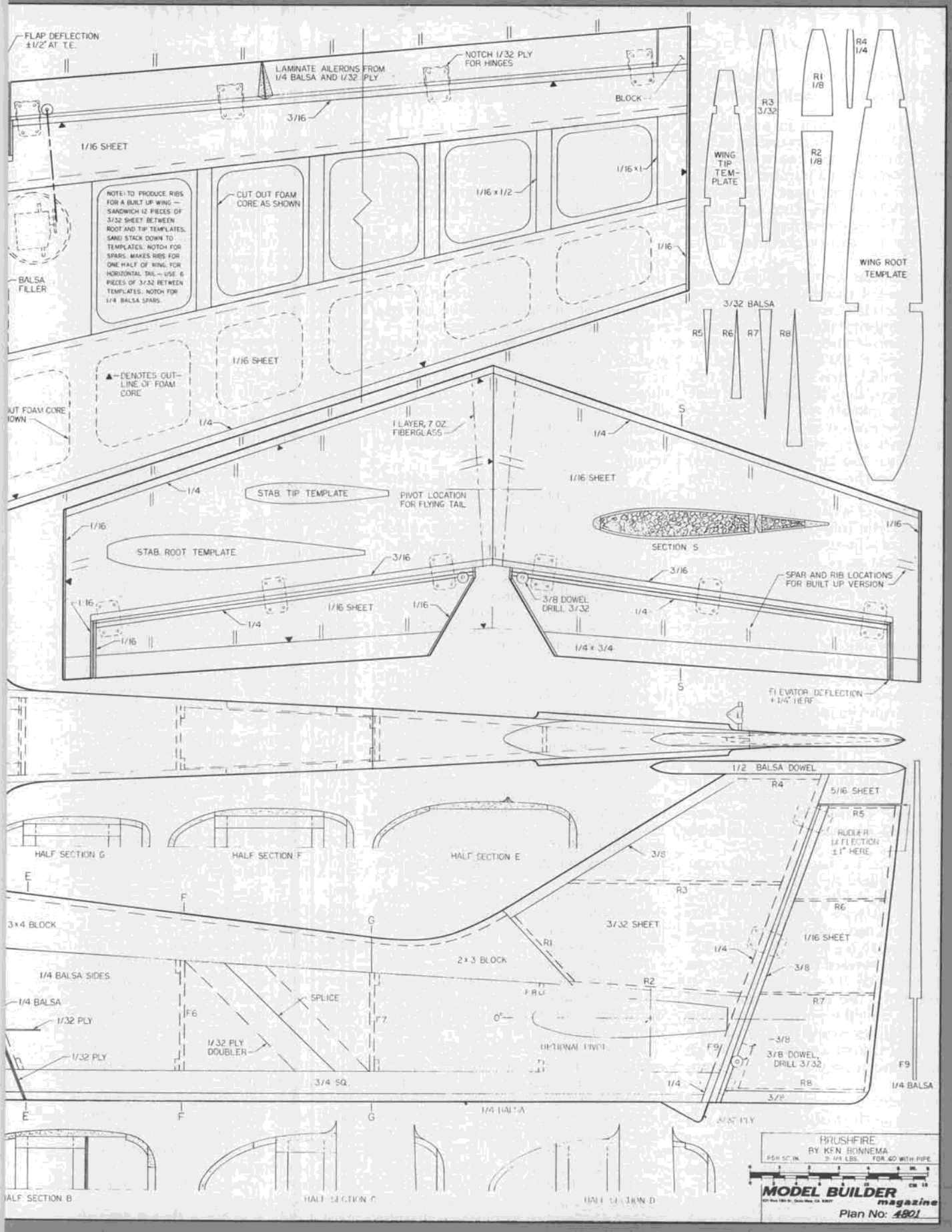
The outstanding performance fea-

Continued on page 68

Rossi installation in Rojecki's ship. Fox conical spinner fairs nicely into fuselage. Fiberglass bodies may become available; see text.

Underside shot shows Southern R/C retracts, pipe mount, and aileron pushrods. Monokote on wing and stab saves mucho weight.


AILERON DEFLECTION ±3/8" AT T.E.
0.9°
1-5/32 UNDER EACH TIP
DIHEDRAL
0.9°
W
3/8 DOWEL DRILL 3/32
3/8 DOWEL, DRILL 1/8
BLOCK
F1
F2
1/16 SHEET
F3
1/4 SPAR, TAPERS FROM 1/4 TO 1/8
3/16
1/16 SHEET
3/8
BLOCK
3/16
3/16
F1
F2
F3
F4
3/32 BALSA 2 EA. REQ.
1/4 PLY LANDING GEAR MOUNT, 2 REQ.
SERVO WIRE CHANNEL
1/16
MINI SERVO
1/16 SHEET
4-40 BLIND NUTS
1/4 PLY L.G. MOUNT
3/16 DOWEL
STRUT CLEARANCE
1/16
LINKAGE CLEARANCE
1/16 SHEET
1/4 SPAR, TAPERS FROM 3/8 TO 3/16
1/4 x 3/8 TOP ONLY
5/8 DOWEL DRILL 3/16
1/4
WING CENTER SECTION
HALF SCALE
GAS TANK CAVITY
1 LAYER, 7 OZ. FIBERGLASS
1/4
W
RIB SPACING FOR BUILT UP VERSION
1/4 PLY L.G. MOUNT
SERVO WIRE CHANNEL
3/16 DOWEL
SECTION W
BALSA FILLER
0°
TL
C.B. MOUNT
10-24 BLIND NUTS
EPOXOLITE FILLETS
BUILD F2-F8 FROM 3/8 x 1/8 BALSA AS FOLLOWS:
F2 – 2-5/16 h x 3-1/2 w
F3 – 2-1/16 h x 3-5/16 w
F4 – 2-5/32 h x 3 w
F5 – 4-7/16 h x 2-11/16 w AT TOP, 2-5/8 w AT BOTTOM
F6 – 3-11/16 h x 2-1/8 w
F7 – 3-9/32 h x 1-1/2 w
F8 – CROSSMEMBERS ONLY, 27/32 w
DRILL 1/8 FOR FUEL LINE
TL
BOLT PATTERN SHOWN FOR C.B. 80 MOUNT AND SOUTHERN R/C NOSE WHEEL
DRILL 1/8 FOR THROTTLE LINKAGE
F1 – 3/8 PLY
B
C
D
3x4 BLOCK
A
1/8 ALUMINUM TUBING
BATT.
REC.
FLAP MIXER
SERVOS 3 ACROSS
BLOCK
BLOCK
3/4 SQ.
1/4 BALSA
F2
F3
F4
14 OZ. TANK
1/2 SHEET
F1
FUEL
VENT
1/16 PLY FLOOR
1/4 PLY
10-24 x 3-1/2
1/4 PLY
10-24 x 1-1/4
0°
TL
2-1/2 DIA.
1/32 PLY RING
BLOCK
1/32 PL
3/4 SQ.
1/8 BALSA
OIL DRAIN
A
TO PIPE PRESSURE
B
C
D
DRILL 1/2 FOR WING BOLT CLEARANCE
RETRACTS SHOWN ARE SOUTHERN R/C
2-1/2 DIA.
1-7/8 DIA.
HALF SECTION A



FULL SIZE PLANS AVAILABLE — SEE PAGE 108

Pattern Flying

By DICK HANSON . . . This will be a continuing series, guiding you through all of the AMA Pattern maneuvers. With this and a well trimmed aircraft, there's nothing left to stop you but plenty of practice.

• This article is the first in a series on flying the AMA Pattern according to the book. Over the past years we have attended contests in a number of states and noted, in some cases, deviations from the rulebook. This is not surprising, but it is a bit exasperating to have to guess what local interpretation is in effect.

One particular contest sticks in my mind because I couldn't get a decent score on takeoff. It finally dawned on me that the longest takeoff roll got the highest points. I then used the entire runway (approx. 300 ft.) and got 9's.

The local club that was running the event and providing the judges felt that a very long takeoff was more "scale-like." The excessively long roll made the actual liftoff very difficult to judge because it was too far from the judges, who were on the opposite end of the runway.

My point here is that individual interpretation of the rules can make things confusing for visiting contestants. It also puts the local guys at a disadvantage when they visit other contests and try to fly by their own rules.

The rulebook is constantly changing to provide new interest and make competition more enjoyable to the majority of active contestants. Rules are also changed or clarified from time to time as the need arises.

The 1980 rules include some new rules which will require a few moments of reviewing before you begin practicing for the 1980 season. The one change we find of particular interest is the dropping of "intent of scalelike performance." I say *Hooray!* to this change because scalelike performance is just too broad a yardstick.

For instance, we have full-scale man-carrying ultralight aircraft which fly near our R/C field and fly so slowly that they seem to defy scale performance. The planes are called "Weedhoppers" and have a typical flying speed of 26-30 mph.

If we look toward the mountains we see commercial jet traffic traveling at 500-600 mph. The only way we could arrive at a scalelike performance using these guidelines would be to imagine a hypothetical airplane which had an average performance of the two examples!

Well, then, if you don't attempt to copy scale performance, what do you use as a criterion for performance?

Simply put, "Fly it by the book." Also, we will add "Fly it so that it can be judged by the book."

I'm certain some people will be unhappy, because if you do it by the book the guy who flies accurately and smoothly will have an advantage over those who place flashy style first.

TAKEOFF

Before we get into the actual takeoff sequence, we would like to pass along some guidelines on setting up your plane to make the takeoff as simple as possible.

1) On tricycle gear models, the main gear should be as close as possible to the aircraft C.G. This permits a smooth application of elevator forces as the airspeed (or the speed of the air) increases over the stab and elevator.

2) The propeller should have lots of ground clearance and the model should sit slightly nose high. This will prevent chipped props and lawn mowing exercises, plus allows the wings to gradually assume the load from the wheels and the actual point of liftoff will appear very smooth.

3) The nosewheel should castor slightly and have only a very slight turning capability. This will help you handle crosswinds because the rudder can be used to control direction without the nosewheel getting into the act.

4) A drag brake is not recommended, but a controllable brake (from down elevator control) is advantageous. The drag brake can cause some funny surging and shaking as the model starts to roll.

5) The engine should transition rapidly without loading up and sputtering.

6) The main gear should have a little toe-in, but do not preset the nosewheel to one side. The best is a set-up that coasts straight and true.

7) Wing balance and aileron trim must be properly sorted out or the heavy wing will dip as the model climbs out. This is because the plane is accelerating and climbing at the same time, and the heavy wing will drop just as it would in a loop.

Now that the plane is ready, let's do the takeoff in a manner that will give the judges the best possible view of the entire sequence.

Here are some hints:

1) If possible, start the takeoff from a position which will permit liftoff to occur just as the model is passing in front of the judges.

2) Have your assistant place the model at this predetermined starting point and line it up exactly in the desired takeoff direction. If you have the model properly set up you may take advantage of any visible straight lines, such as a white line down the center of the runway, by placing the model exactly on line. This shows the judges you are capable of a perfectly straight takeoff.

3) Have your assistant signal that the model is properly aligned and sitting still.

4) Announce takeoff, count to one, then start the fun!

The technique which follows works better for more people than any technique we have seen.

Hold in some up elevator and bring the throttle up fairly quickly. The secret to control is to get the tail feathers working by keeping plenty of air rushing over them so they are effective at low ground speed. As the plane starts to move, add rudder only if necessary. You will probably be able to slightly back off the throttle now; the plane will continue to accelerate as it overcomes initial rolling resistance and the engine warms up and clears its throat.

The nose wheel will be effectively in the air very shortly and the rudder will be doing all the steering. Add power gradually and if possible, have the nose wheel slightly elevated as you approach the judges.

If your plane is set up right, another click of power will add just enough speed to allow the liftoff to occur without any additional elevator trim. Watch for any crosswind and add rudder if required.

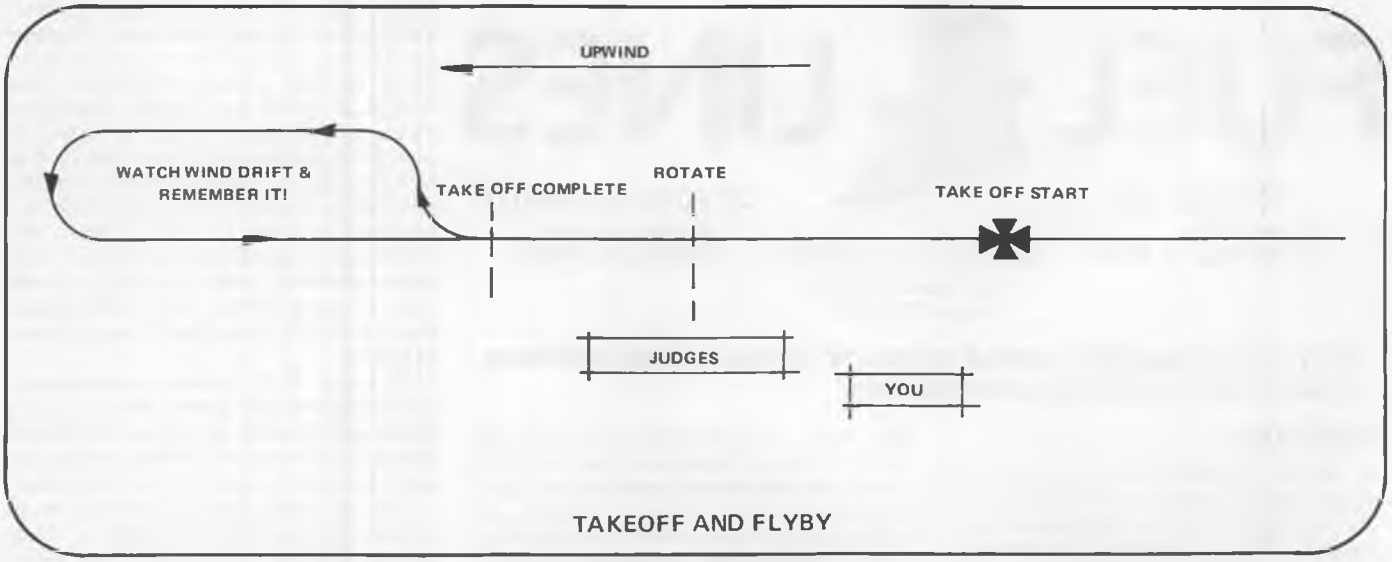
Let the model climb gradually to six feet, then call "complete," wait a second, and turn your plane away from the flight line, smoothly and deliberately. Although this last suggestion is not called for in the rules, it further shows the judges you have completed the takeoff.

The recommended procedure for tail-draggers is identical, except we obviously can't hold a slightly nose high attitude as we accelerate toward liftoff. Now, if you are trying to fly a Fokker triplane with a tail skid and you want a smooth, straight takeoff from an asphalt runway, try this: Hook a great big bungee cord to the axle and stretch it out about 1000 feet. . .

STRAIGHT FLIGHT OUT, PROCEDURE TURN, STRAIGHT FLIGHT BACK

We have just taken off, called "maneuver complete," and banked away. The judges are quickly reviewing their mental images of your takeoff performance and are fighting back their urges to give you 10's. While they are thusly occupied, you can now use the next minute to a real advantage. If your model is well trimmed, you've done your homework well, but if it isn't trimmed, remember that you can make any circles, rolls, loops, etc. you feel necessary during your set-up for the first announced maneuver . . . providing you remember a few vital rules.

1) Once you have flown past the judges going upwind or downwind, you may not go back past them to attempt



TAKEOFF AND FLYBY

the maneuver again.

2) You may run out of flight time and/or fuel from "extra flying."

3) Even though the judges are not supposed to allow this to affect their score on the next announced maneuver, it really does tend to affect the overall mental image you make.

Let's assume you have your model trimmed correctly and have just completed the takeoff manuever as previously described. After you turn out, turn deliberately back upwind until you are parallel with the flight line. Fly upwind, watching carefully for any wind drift, then make a 180 degree turn back downwind and again note any wind drift through the turn. This information can be used to give you a definite advantage over the contestant who has to figure the wind drift as he is being judged on the procedure turn. If you look at the rulebook, you will notice that the wings do not have to remain level during the straight flight out and back portions of the three-part maneuver. Further, there is no downgrade for speed changes, so we can alter throttle settings as desired to give a smooth appearance to the entire sequence. You may choose to establish your heading for the upwind (straight flight out) maneuver by one of two methods:

1) Make another 180 degree turn and line up at moderate speed, or;

2) Split "S" into position and hope for the best.

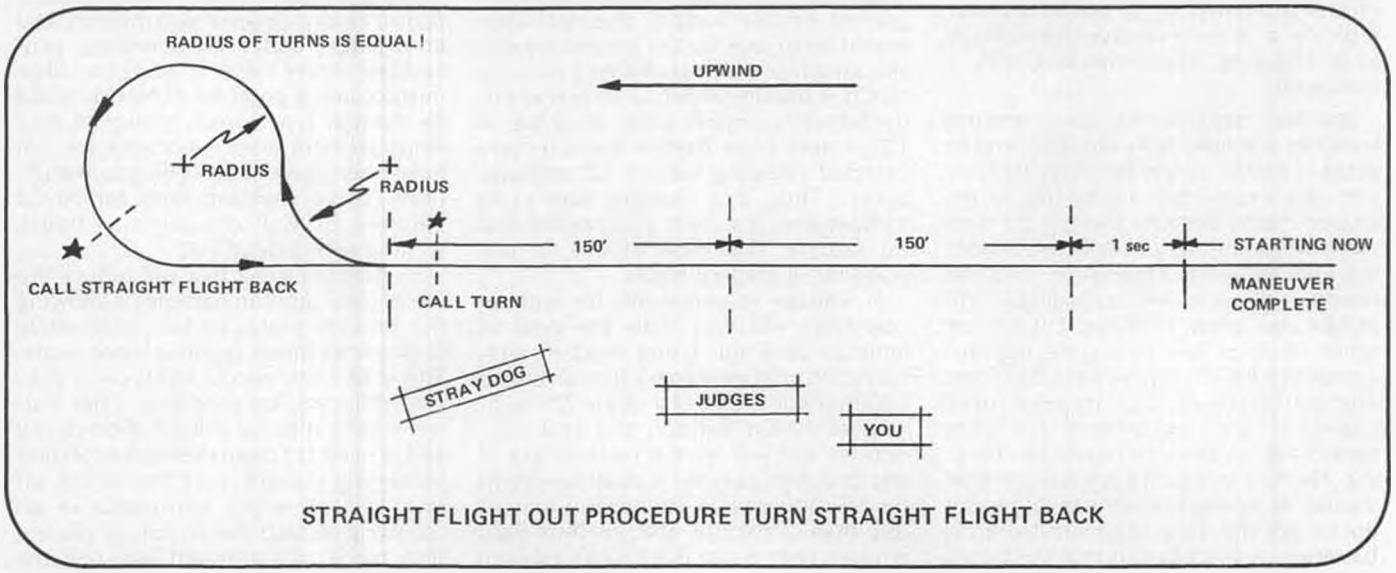
I recommend the 180 degree turn approach because it eliminates the speed buildup associated with the split "S." Also, you can juggle your speed much easier. Remember, the model is being placed very close to the judges, and they do not like the idea of being hit with an airplane any more than you do.

If you are proceeding at a moderate flying pace you give the impression of being a safe, smooth flier, which will hopefully relax the judges. Wind drift may be compensated for by flying with the appropriate wing dipped as required. Rudder may be used to hold the heading, but it can cost you points if you make wiggly corrections. Also, it takes more rudder to hold a line than aileron trim to hold the same line. We are not condemning the use of rudder; on the contrary, it is of the utmost importance to use the rudder to make corrections in maneuvers later in the pattern (looping maneuvers, most commonly). If there is a lot of wind, you will need a little more speed and a smaller procedure turn to eliminate the inevitable and possible buffeting.

We have mentioned in previous articles that you definitely need a pattern ship which flies hands off in level flight. You *can* fly these three maneuvers with a badly trimmed model, but you will really have to work to make the procedure turn look smooth. According to the book, you must call out each section of the three-part maneuver separately. You can also call "complete" as you complete each section. In my opinion, this is an oversight in the rulebook and should be clarified. We suggest calling "three-part maneuver," then calling each by just their names during the maneuver and finally calling "complete." The rules committee probably has this under control even as this is being written.

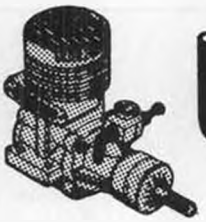
Let's go on to flying the maneuver itself. Establish your heading and call the maneuver early enough so that when you have finished calling "starting now," you will still be approx. 150 feet shy of the judges stand. The judges will now watch for approx. 300 feet of straight flight. Announce the turn prior

Continued on page 92



STRAIGHT FLIGHT OUT PROCEDURE TURN STRAIGHT FLIGHT BACK

FUEL LINES



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

BERNHARDT

• "When operating on ignition, how much flying time can I expect before having to recharge or replace the batteries?" This question will invariably be asked by every modeler engaged in flying with ignition, and it really has many answers. Before an intelligent answer can be given, some very important facts must be known, such as:

A) The type of batteries (zinc carbon, alkaline, Ni-Cds, etc.)

B) The size of the batteries, usually expressed in ampere hours (ah).

C) The voltage requirement.

D) The load that the batteries will be subjected to.

E) The duty time. This is usually expressed as the percentage of the total time that the batteries are expected to deliver energy.

F) The environmental temperature that the battery must operate in.

Once you know the answers to all the above questions you will be a little bit smarter, but you still won't know the full answer to your basic question. Additional information is necessary, such as the general condition of the batteries in question. Are they in excellent shape, or fair or poor condition? Have they ever been abused or damaged? How old are they? Many fliers will continue to use a set of batteries until they become unreliable before discarding them. This is indicated by an engine that starts to miss too soon after being operated by freshly charged batteries, or batteries that indicate a lower-than-average voltage after charging when checked with a voltmeter.

But let's assume that your ignition batteries are new, fully charged, and in good condition. How much flying time can you expect before having to recharge them? Because there is no concrete information, I can only relate from my own personal experience, and the results can vary widely according to the model and mode of flying. Engine run times of over two hours are not uncommon with 1.2 ampere hour batteries, and batteries of .225 ampere hour capacity have performed for over twenty minutes before requiring charging. The key question each ignition flier should be asking himself is what he can do to get the very most life from his batteries, as it is obvious that the better the care you give your batteries the better the performance they will give you. Here are some things you can do to prolong the life of your batteries and give optimum performance on the field. Every one of these suggestions is important and will contribute toward good performance.

1) Except for free flight flying, where the engine run is relatively short, avoid the use of carbon or alkaline type batteries. Some of these are not worth bringing home from the store. If you must use them, only purchase reputable brands. Bargain hunting usually results in trouble and frustration. Good Ni-Cd batteries of respectable brands are well worth the little extra they may cost. Avoid buying surplus batteries, as there is no way of checking on the quality. Always make up battery packs from batteries of identical brands, and all purchased at the same time and at the same place. The object is to purchase batteries that are as closely matched as possible.

2) The ampere hour rating is what determines how long the battery will perform at a given rate before requiring recharging. Now, a word of caution: The physical size of the battery should not be used as a measure of its power output. I am using a Ni-Cd battery the size of a "C" cell that has one-and-a-half times the energy of a popular "D" size Ni-Cd battery. Don't let size fool you. Insist on being shown an ampere hour rating before making a purchase. If no rating is printed on the battery, the next clue would be to look for the recommended charging rate. Normal charging rate of a Ni-Cd is usually shown as 10 precent of the battery's ampere hour rating (i.e., a 1.2 ampere hour battery has a recommended charging rate of 120 milliamperes). Thus, if a charging rate of 80 milliamperes is shown, you can bet that the battery, regardless of size, is only good for .8 ampere hours.

3) Voltage requirements for ignition operation will vary with the type of ignition hook-up. Using modern ignition coils, an ignition package can be put together consisting of a single 225 milliampere Ni-Cd battery, coil and condenser, and will have a total weight of less than two ounces. A small free flight model requiring an engine run time of less than a minute and an ultra-light ignition system can put up half a dozen flights with this system before experiencing low voltage problems. Modern ignition coils require no more than three volts to operate efficiently. Two Ni-Cds in series will usually overcome minor problems in the electrical system and give ample spark for good operation, and this is the usual recommended amount of batteries for operating the ignition system. For free flight, the minimum alkaline battery size for efficient operation is the standard pen cell size. If using Ni-Cds, 225 milliampere hour cells are considered the smallest practical.

In some R/C ignition installations, three batteries in series are necessary when using some of the transistorized ignition systems, the third cell being used to power some of the transistors.

Do not hook up Ni-Cd batteries in parallel to increase the ampere hour rating. Don't ask me why; only the battery manufacturer can give you the technical reasons for not doing it. I understand it has something to do with the uneven discharge and charging characteristics of the cells and the possibility of ruining them.

It is considered good practice to use as large as ampere hour rating battery as possible. This represents quantity of energy, and the more you have aboard the longer you can fly without recharging.

4) Many are the questions asked about charging rates and the wisdom of field charging Ni-Cd cells. Reputable manufacturers of these cells will always print recommended charging instructions on each cell. To ignore these instructions is somewhat foolish, and you would be taking the responsibility for the performance of the product. Plug-in wall chargers are available for just about any size battery, and the recommended charging rate as listed by the manufacturer is such that the battery can be left on charge indefinitely *at that charging rate* without doing harm to the cell. I have yet to see a battery manufacturer submit in writing a rapid charge specification for his product. I am well aware that rapid charging can be performed without harming the cells, but it requires the proper equipment and knowledge, and a conscientious procedure every time it is done. One mistake and a good set of Ni-Cds could be ruined. I personally prefer to take along an extra set of fresh batteries that have been charged according to instructions. Usual charging rates for Ni-Cd batteries by wall charger is 14 hours, starting with a dead cell.

5) Another habit that will reduce the life of your ignition batteries is allowing the breaker points to be closed while some other minor repair is being made. This is like leaving the lights on in your car while you go shopping. Your batteries look at this as a direct short circuit and proceed to drain themselves of their remaining current. Turn the switch off immediately when you pause in attempting to start the motor, or place a thin piece of cardboard between the

points. This will also tend to keep your points clean and free of oil.

6) Many are the batteries that have been accidentally ruined while being assembled into a pack by bad soldering practices. Batteries will not tolerate a long exposure to high temperatures without deteriorating internally. Dirt is the biggest enemy of a good, clean, fast solder joint. I recommend that the area of the battery to be soldered be cleaned with fine emery cloth or sandpaper. *Do not touch this area after cleaning.* Immediately tin this area with a hot soldering iron to reduce the soldering time to a minimum, which should not exceed two seconds. Also, tin the wire or tab that you intend to join to the battery. Now, with both parts having been pretinned, final joining would consist of applying heat to the two parts using a minimum of additional solder. This should result in a clean, strong joint without overheating the battery. •

NELSON

• Last month I described some tests I had run with a glow and diesel Rossi .15 and the surprising (to me) results. In spite of the good showing of the diesel, I said that there were institutional reasons that a diesel might not be a good choice for the sport flier, these being that you would probably have to convert your glow engine (instead of buying it as a diesel in the first place) and, if you were using the cheap "club" fuel, you would now be faced with finding diesel fuel and maybe paying a far higher retail price.

Unless the major manufacturers look at the market and decide to offer their own diesels, you're going to be stuck with the conversions. Whether you do it yourself or have someone do it for you, you'll have the extra cost of the conversion parts ... after you've paid for a complete glow engine. In the fuel department, there is no miracle either, but you can mix it yourself and save. As with glow fuel, some ingredients are cheaper in larger quantities, so if your club goes diesel, there are savings.

Two months ago I listed the following "standard" diesel fuel:

Ether	30%
Kerosene	48.5%
Castor	20%
Amyl Nitrate	1.5%

This month I'll go over this in some detail and try to give some how-to-get-it information. Starting at the top:

1) ETHER (Ethyl ether $C_2H_5OC_2H_5$):

The really smelly stuff that does a quick vanishing act if you leave the cap off the bottle. Depending on where you live and who you know, ether can pose an availability problem. There are available four grades that I know of: Anesthetic, Anhydrous, Technical, and Solvent. I have used the first three types and have seen no difference. Depending on the impurities, solvent grade could be okay, but I'd check out the label carefully. I use technical grade, which is considerably cheaper than the first two.

I buy ether from a laboratory supply house for (at last purchase) $63 for a 4-1/2 gallon pail. Unfortunately, about five years ago some nut walked in and bought some cyanide, put it in capsules, and ate them ... with predictable results. Now they don't sell any chemicals to individuals, so if you can't have a business account they won't talk to you. I know this to be the case with many such firms.

If you are friendly with a local druggist, he can get ether for you. Otherwise, you'll just have to scout it out for yourself.

2) KEROSENE:

This is pretty easy. It used to be that most every gas station had kerosene for sale. That's no longer true, but somewhere in your town there should be a station that still sells it. There are also lots of variations on the kerosene theme with comments:

No. 2 Diesel: I've tried it and found it a bit less power, it smoked more than kero and would probably build up more carbon.

No. 1 Diesel: Haven't tried it, but is lighter than No. 2, so it should work.

3) "PEARL":

If you are on the West Coast, have your local Chevron dealer get you 5 gal. of Pearl. Chevron says it's their normal grade of kero, but it smells different than my eastern gas station kero. It also builds up less carbon in the engine.

4) CASTOR:

Another easy one. If you have no other source, go to your drug store and buy their cheapest brand. Baker AA is the standard at under $10/gal., but I think you have to buy a four or six-gallon carton from Baker.

If your club is mixing fuel with a synthetic (Ucon, Klotz, X2C, etc.), go ahead and use whatever they're using. At 20%, you'll be safe with almost anything, and if carbon buildup is a problem, the synthetics will run a lot cleaner than castor. Remember to shoot some WD-40, 3-in-1, or LPS into your engine after running with the synthetics or the steel parts will take on a coating of rust.

5) AMYL NITRATE:

Two months ago I mentioned that a diesel fuel's ability to self ignite was given a value called the "cetane" rating. Just as tetraethyl lead is an octane rating improver for gasoline, amyl nitrate is a cetane rating improver for diesel fuels. Actually, you probably will have a really tough time finding pure amyl nitrate. However, the Ethyl Corporation makes a blend of various nitrates called Diesel Ignition Improver (DII). They've gone through a number of iterations and are currently peddling DII-3 for about $10 a gallon. That's the good news. The bad news is that they'd really love to sell you a tank car of the stuff and won't even consider less than five gallons, which, at 1.5%, goes a loooong way.

If you want to buy from Ethyl (and I hope you do), call their Houston Chemical Division at 713-654-4400. Maybe you can find somebody with a hard starting Rabbit or something who'll buy your excess. However, if you only want to mix up a gallon or so of fuel, send me $10 and I'll find a way to send you a pint of the stuff. That's about $1 for the DII and $9 for aggravation, but I foresee a lot of aggravation. Show up on my doorstep if you want to save on the aggravation costs.

Okay, now you've mixed up some fuel and you have a diesel of some kind. How do you run it? Most engines are packaged with some sort of instructions, and I assume Davis Diesel includes running instructions with their conversion heads, but I haven't seen them. If I say anything here that contradicts these instructions, you'll have to sort out the difference for yourself.

As I mentioned last month, one vote against the diesels is the requirement to adjust its compression in addition to the carburetor adjustments also required of the glow. Since too many fliers can't properly adjust the needle, adding an extra variable won't help matters. However, all you have to do is learn to

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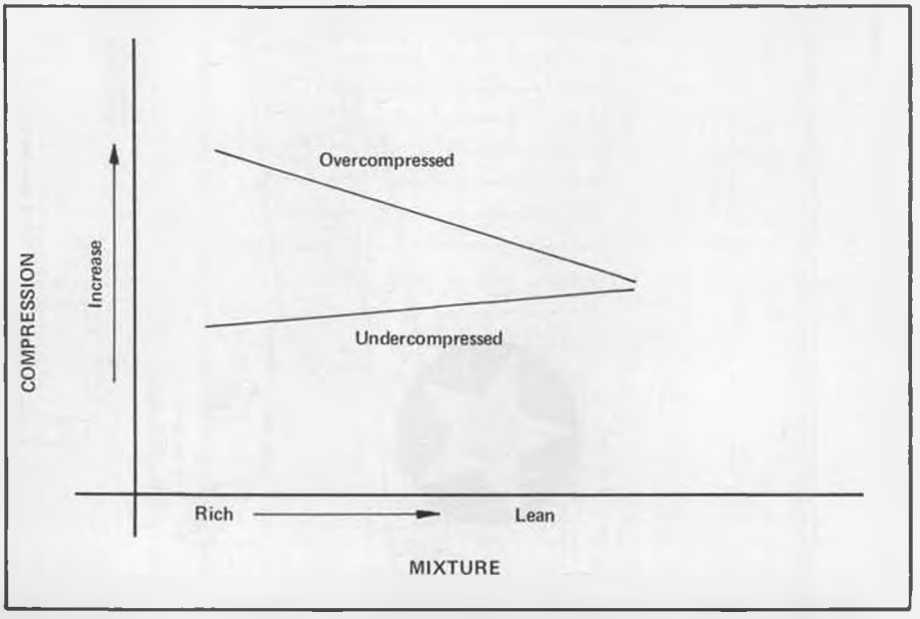
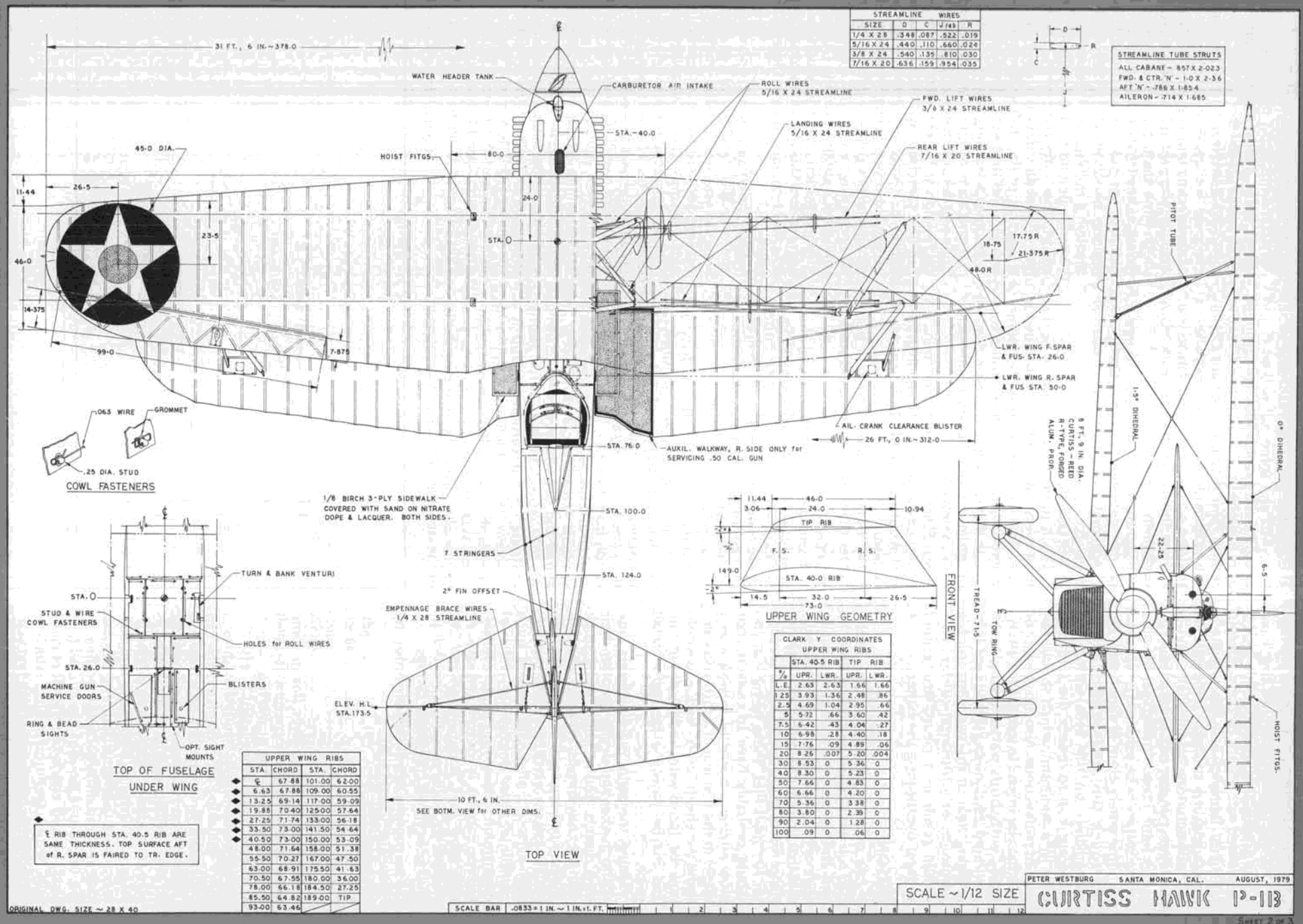




STREAMLINE WIRES				
SIZE	D	C	J Tab	R
1/4 X 28	.348	.087	.522	.019
5/16 X 24	.440	.110	.660	.024
3/8 X 24	.540	.135	.810	.030
7/16 X 20	.636	.159	.954	.035

STREAMLINE TUBE STRUTS
ALL CABANE ~ .857 X 2.023
FWD. & CTR. 'N' ~ 1.0 X 2.36
AFT 'N' ~ .786 X 1.854
AILERON ~ .714 X 1.685

UPPER WING RIBS			
STA.	CHORD	STA.	CHORD
℄	67.88	101.00	62.00
6.63	67.88	109.00	60.55
13.25	69.14	117.00	59.09
19.88	70.40	125.00	57.64
27.25	71.74	133.00	56.18
33.50	73.00	141.50	54.64
40.50	73.00	150.00	53.09
48.00	71.64	158.00	51.38
55.50	70.27	167.00	47.50
63.00	68.91	175.50	41.63
70.50	67.55	180.00	36.00
78.00	66.18	184.50	27.25
85.50	64.82	189.00	TIP
93.00	63.46		

◆ ℄ RIB THROUGH STA. 40.5 RIB ARE SAME THICKNESS. TOP SURFACE AFT of R. SPAR IS PAIRED TO TR. EDGE.

CLARK Y COORDINATES UPPER WING RIBS				
	STA. 40.5 RIB		TIP RIB	
%	UPR.	LWR.	UPR.	LWR.
L.E.	2.63	2.63	1.66	1.66
1.25	3.93	1.36	2.48	.86
2.5	4.69	1.04	2.95	.66
5	5.72	.66	3.60	.42
7.5	6.42	.43	4.04	.27
10	6.98	.28	4.40	.18
15	7.76	.09	4.89	.06
20	8.26	.007	5.20	.004
30	8.53	0	5.36	0
40	8.30	0	5.23	0
50	7.66	0	4.83	0
60	6.66	0	4.20	0
70	5.36	0	3.38	0
80	3.80	0	2.39	0
90	2.04	0	1.28	0
100	.09	0	.06	0

ORIGINAL DWG. SIZE ~ 28 X 40

SCALE BAR .0833 = 1 IN. ~ 1 IN. x 1. FT.

SCALE ~ 1/12 SIZE

PETER WESTBURG SANTA MONICA, CAL. AUGUST, 1979

CURTISS HAWK P-11B

SHEET 2 OF 3

Marine version of the Boeing PW-9 was the FB-1. Tunnel radiator and tapered wings were "copied" by Curtiss engineers at request of officials at McCook Field. Photo by Marion Hoblit.

CURTISS P-1B

By PETER WESTBURG

PART TWO

During the next eight years, a total of 196 Hawks through the P-2, -3, -5, -6 and P-23, plus 75 U.S. Navy Hawks, all with the same wing, were built by Curtiss. Boeing did not go away from the competition empty handed. Over the years, they received contracts for 113 PW-9's and 43 Navy FB's. Boeing F2B's with tapered wings and F3B's added up to another 107 aircraft, and 500 of the well-known P-12/F4B series were delivered. Strangely, the P-12/F4B had constant chord wings but still outmaneuvered any of the Hawks.

The color scheme of the early Hawks, including the P-1B, was khaki over the entire airplane with vertical red, white and blue stripes on the rudder and "U.S. ARMY" in white on the bottom surface of the lower wing. Khaki is not olive drab; it is a yellowish brown, red-yellow in hue. Olive drab is green-yellow in hue.

In 1926, the Army Air Service became the Army Air Corps and the wings, horizontal tail, and fin were finished in the familiar chrome yellow with black markings. The blue vertical bar and 13 horizontal stripes on the rudder were adopted in November of 1925. The serial number prefix was also changed from AS to AC in 1926, but some early Hawks had both the AC serial and vertical rudder stripes. Best bet for modelers who wish to be accurate is to stay with a particular photo. You may have to use that photo and others to convince the judges that you are on the ball.

More changes on the McCook P-1B. Disc wheels with brakes were developed and the tailskid has been faired with wood. Fire extinguisher was still standard equipment . . . presumably for mechanics to put out ground fires. Pilot sure can't get to it in the air!

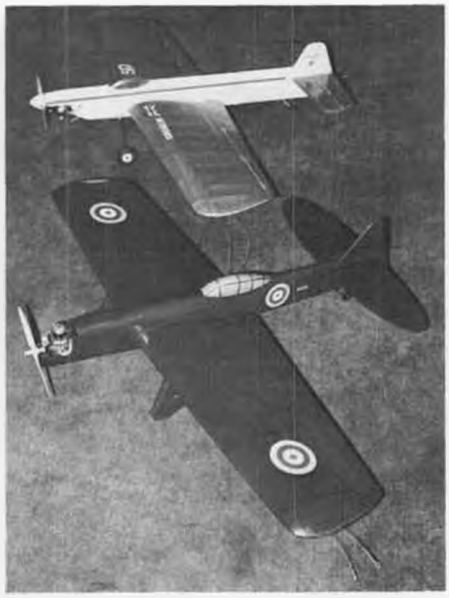
It would take a dedicated aerobuff to keep track of all the numerous variations of the Army and Navy Hawks. For those who are interested, Profile Publications No. 45 on the Army Hawks and Profile Publications No. 116 on the Navy versions are the best sources. They also give good color and markings information.

Speaking for myself, the Hawk P-1 was one of the very first airplanes I saw a picture of. I fell in love with it then, drew countless pictures of it, and it will always remain in my memory like the memory of a first love. •

P-1B was delivered to McCook in Dec. 1926. Tunnel radiator is experimental, windshield is new. Tubes on lower wing contain fireworks for a Fourth of July celebration.

The 1/2-A SCENE

By LARRY RENGER



Two 1/2A ukies built by Alan Callaghan of London, England, are a Martin Baker MB-2 (foreground) and a Gremlin (from MB plans). Note that both feature mufflers, a legal requirement in England.

• Awright gang, listen up and listen good, I'm only going to say this once! Once again the great "who are the real modelers" controversy has raised its ugly head. This pile of ludicrous garbage reappears in the magazines every five years or so, and is now, as always, both destructive and pointless. Various self-appointed spokesmen for the various phases of *our* hobby vent a bunch of vitriol over the phases *they* aren't in, and succeed in doing nothing worthwhile.

Who am I to stand on *my* soapbox and belittle the opinions of others? Well, I fancy myself a modeler. Generally but not exclusively an Airplane Modeler, definitely not exclusively a Radio, Free Flight, Control Line, Indoor, Glider, or whatever flier. Trust me, I have been involved either competitively or professionally with all of the above. I would like to think that I can take a rational overview of the interrelationships between the people in modeling.

First, from where I sit, models are ALL good! There may be a few "bad" modelers, but then there are creeps, finks, and cheaters in *any* activity. Each phase of modeling has its own intriguing aspects and advantages, also some disadvantages. I wish I had the time to build and fly everything. I really get off on flying microfilm models, and practically wet my pants with a hot R/C aerobatic model, and get some real kicks wringing out a hot half-A combat U/C. A well-built Peanut scale model turns me green with envy, and I get a catch in my throat at the sight of a graceful R/C sailplane, Nordic, or F/F wheeling overhead. I even turn on to boats, rockets, and cars.

Second, antagonism between the various segments of modeldom is harmful to all; no one benefits. If we don't stick together we will lose it all . . . flying sites, supplies, cooperation from the various governmental bodies, etc. How about the way the Nats used to go when they were sponsored and manned by the Navy? Would that kind of support ever happen again if we were at each other's throats? Sure, each group could stand alone, but the result would be a reduction in what everyone now has. There would be no benefit.

Third, R/C manufacturers keep getting accused of driving F/F and U/C off the market. Come on guys, what do you think they are doing, sneaking in and stealing Japanese tissue and control lines off the dealer's shelves in the dead of night? I sure don't think that Uncle Bill or Big Daddy Walt are telling Peck-Polymers, Satellite City, or Hobby Hideaway that they can't advertise because they sell the wrong type of product. They will take anybody's money (for modeling ads, anyway). It is a well known marketing axiom: you can't sell

Continued on page 96

Ralph Cooke showed up at the last Flightmasters Annual with an old Dumas/Veco T-Craft, powered by a Pee Wee .020.

Jim Scarborough sent this photo of his stepdaughter Kristy and his big 1/2A Texan 300. TD .049 pulls it just fine, says Jim.

"Andy Clamp" is imported by Hermosa Hobbies. Clamps hold flat parts, alligator clip holds everything else. "Andy" is handy.

Almost indistinguishable against the grass is Larry Renger's Pilot QB-10L, used as a flying test bed for different engines.

From Czechoslovakia comes this photo of Pavel Rajchart's beautifully built Sopwith Tripe, winner of FAI C/L Scale at the Czech Nationals. Read Pavel's very interesting letter in text.

1 TO 1 SCALE

By BOB UNDERWOOD

• One of the great rewards that come from this hobby of ours is the discovery of modeling aquaintances from all around the world. Much like music and the arts in general, modeling transcends borders and other artificial political considerations. I would like to share with you a letter which was received at the Underwood household during the Christmas holidays. It not only serves to reveal this bond or kinship but also reveals how lucky many of us are in pursuing our modeling activities.

Dear Mr. Underwood,

I have read about the activity of your NASA group in one U.S. model magazine. I know your name and your models from magazines, reports from the World Champs, etc. So I decided (to) write to you. I would (like) to have more information about your organization and perhaps if it is possible, be a member of NASA. There are problems with it, of course, (since) I am not (an) AMA member and I cannot pay the member dues. I cannot change our Czech money for the U.S. dollar or for other West European value. I hope to find another way, how to manage it. I can pay you some information from my country, etc.

In (a) few lines (here is) something about me. I am forty, married, (and) we have two daughters. I have been building models from age 13, for a long time. I flew F1A gliders, later C/L stunters, and now C/L scales. I would like to start with R/C scales but I feel I must (have) some time learn(ing) R/C flying. This year I won our Czechoslovak Federal Championships in F4B (FAI C/L scale) with my latest scale Sopwith Triplane. My model is in 1:6.8 scale, powered by a Czech Tono 10 engine. With that model I started too in Poland and in the USSR. I took there 3rd and 4th place. I dream about the start in the World Champs but for many reasons our National club has not sent the scale team on previous world champs and the next year will not be send(ing) any team too. I think we would eventually place good there. I can compare with the Soviet and Poland models. Their top models (Ostrowski, Yugov, etc.) have higher standard than ours, of course, but the other we can compare.

Do you know our magazine Model-air? *I have drawn some scale drawings for that, the latest was (a) Tipsey Junior. One of my drawings (Colibri MK II) was printed some time ago in your magazine.*

Perhaps you would (be) interest(ed) from our Czech scale categories, etc. The next time I'll try to write more and perhaps prepare some photos. There is a great interest now for the R/C scales, however the R/C accessories aren't here available. There are single channels only on the market here. (A) lot of people build their own R/C transmitters and receiver but such a work takes a lot of time and each cannot manage it. The R/C sets are sold here only by advertisements in model magazines. (A) four channel set cost(s) some 6 to 8,000. It is too expensive for most of us (e.g. my income is some 2800 per month).

Perhaps you can help me. I have found the scale documentation of famous biplane Liberty Sport. I tried to write (to) EAA and (to) Sig factory but with no answer yet. Perhaps you can help me or advise me where shall I turn for it. I like the biplanes.

So, I hope you will understand my poor English and I am looking forward on your answer. Yours Sincerely, Pavel Rajchart, Krimicka 9, 31805 Plzen, CSSR.

I have included a photo of Pavel's model (even if it has lines and this is supposed to be a crash-by-radio column) for your consideration. A letter like Pavel's always makes me feel a little guilty for several reasons. First, I realize how fortunate I am as a modeler to have such a fantastic variety of materials and resources at my command. Of course, this often reduces the creative aspect of the hobby/sport and slows one's development as an innovator, but it tends to bring enjoyment to a much larger group. Secondly, I am struck with the concept of freedom to pursue my hobby/sport without the political entanglements of worrying about even such elementary things as monetary exchange problems. Lastly, I always feel somewhat guilty when a world friend says "pardon my poor English." Generally, as in Pavel's case, it is not poor English, and when one considers it is perhaps a second (or third or fourth) language, I often feel that the apology should indeed be mine. I listen or more commonly read the terrible things that are done to the English language by supposedly English-speaking "United Statesians" and I am greatly embarrassed.

So much for the monthly sermon. Is there anyone out there who can help Pavel or who might care to write to him? I have sent him a note enrolling him in NASA and a new FAI Scale 80 patch.

SPEAKING OF PATCHES

Do you have your FAI team support patch for 1980? A U.S. flag imposed on the bright Maple Leaf background points up the 1980 team we will be sending to our gracious hosts to the north. The dates of July 19-26 will find our Canadian friends hosting the Scale World Champsionships in Ottawa. It would appear at this time that there will be enough teams present in control line to make this a complete championships, including R/C Sport Scale.

Our Sport Scale team of George Buso, Ralph Jackson, and Harold Parenti will represent the U.S. for the first time in international competition using the FAI Sport Scale rules. Since it is not yet an official FAI event, there is some question in regard to the complete financing of the team by AMA. Therefore, the sale of the patches by NASA will help to defray any expenses not covered. The bright, colored patches are 3 inches square and were designed by scale modeler Mike Gretz. They sell for $2.00 each and may be obtained by contacting your writer at 4109 Concord Oaks Dr., St. Louis, MO 63128. NASA members interested in obtaining a quanity to sell to local clubs, etc. should contact me as well.

KEEPING A WATCHFUL EYE

Following a conversation with a modeler at a pattern/scale meet at the end of last season, I did a little investigating concerning a Davis Diesel head for an O.S. Max .60. I wound up buying one and am currently pursuing the possibility of utilizing it in my new Hiperbipe. At this juncture only some bench running has

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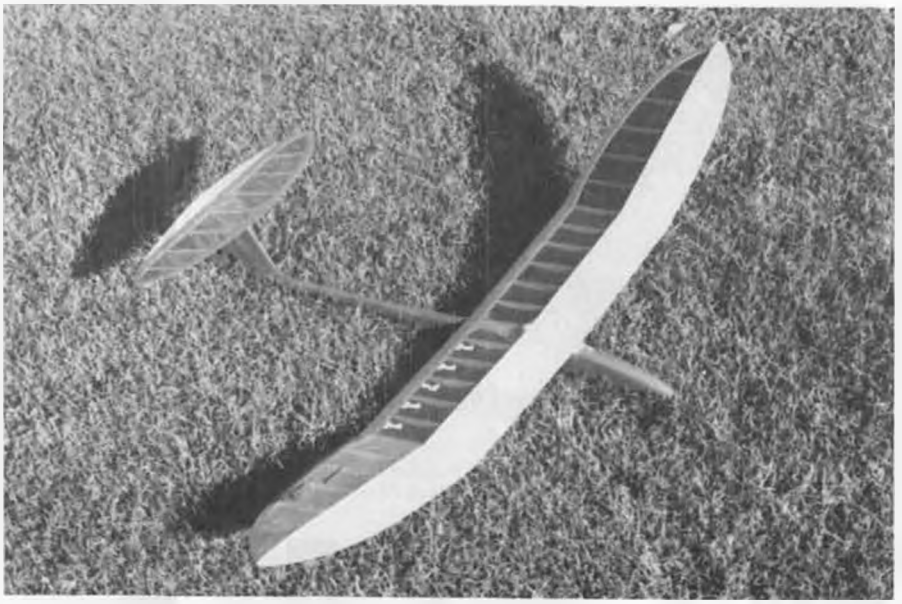
PHOTOS BY AUTHOR UNLESS NOTED



SUNBIRD

By DAVE THORNBURG . . . What's this? A 54-inch *hand launch* R/C glider? Sunbird combines the best of both worlds, F/F and R/C. A baseball pitcher's arm is not required, but a light radio is.

• Here's the built-up version of the sheet-winged glider I took to Europe last summer to help sell the idea of handlaunched R/C sailplanes. It's appearing first in **R/C Model Builder,** then later in the year in the French publication *Radiomodelisme*. Thanks to Tom Kikuchi of Santa Rosa, California, eight Sunbirds have already been built for a special one-design contest in Japan . . . so the little bird already has something of an international reputation.

If you've never seen a glider handtossed into lift, you may well be a bit skeptical. Doesn't it take a javelin thrower's arm? How often can you actually catch a thermal? Isn't a 54-inch plane too small to see? How important is it to build light? These are some of the first questions people ask.

As far as muscles go, I've got good legs for running, but only mediocre arm and chest muscles. I can throw a Sunbird to 25 or 30 feet of altitude, at most. But this is more than enough height to catch ground thermals anywhere in the U.S., provided the conditions are right. Ground lift requires only two conditions to be ideal: intense sunlight and low wind velocity. Low humidity helps, but you can live without it. Not that you can't fly handlaunch in the wind, but the bubbles will be smaller and tougher to ride. (Don't worry about penetration; Sunbird has flown unballasted in 22-mph slope winds.) Still, I wouldn't waste much time on cold, overcast, wet, or windy days . . . unless you just need the exercise. It's called SUNbird, see?

Next question: how often can you expect to "go out" on a thermal? I'm averaging three thermal flights for every five launches, at the schoolyard where I fly regularly. But I only go flying on warm, calm mornings, between 9 a.m. and noon. And I take time picking my air. I can't overemphasize the importance of *conditions*: knowing *when* to throw is a hundred times more important than throwing hard. When the air is coming down, as it must do sometimes, tossing a handlaunch glider can get pretty discouraging. That's the time to take a break until the weather changes.

True, the Sunbird is small for a thermal glider. But visibility isn't a problem, as long as you stay close! Sunbird is designed to exploit lift under 100 feet of altitude. Once you get her (or, for that matter, any sailplane) up above 150-200 feet, all the sport goes out of thermal hopping. For this reason, we hold RCHL contest maxes to two minutes. If you can keep her airborne for 120 seconds, you're almost always "over the hump," high enough to be out of trouble. This agrees with my personal philosophy about R/C soaring: you learn more about thermalling *under* 200 feet than over.

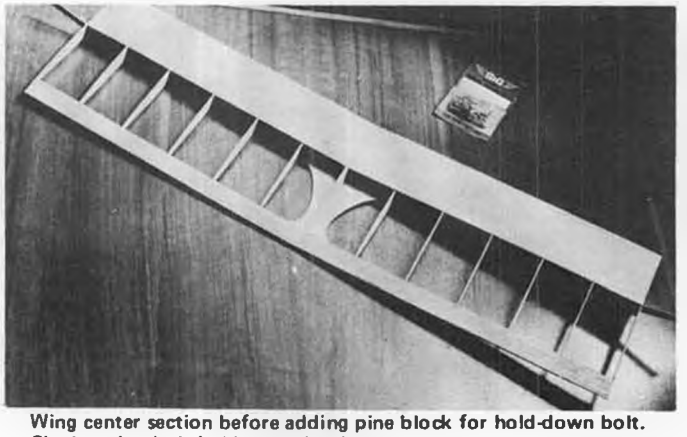
The final question is weight: how important is it to build light? If you have to ask this, you'd better think twice about building a Sunbird. The design is STRICTLY for lightweight radios and careful builders. My Futaba equipment weighs under five ounces, and this could be further shaved by eliminating the switch and some of the excess wiring. As it is, the radio is a stock 2-channel with receiver case and switch cover removed. I haven't even clipped the antenna to a pigtail and soldered it to the elevator cable, as I usually do. (This may or may not work with other brands of radio.) Don't even think about building a Sunbird if you don't have subminiature servos and a 225 mah battery pack. If it's a button-cell pack, you'll have to rewire it to fit the fuselage; I don't recommend widening the fuselage for any reason.

CONSTRUCTION TIPS

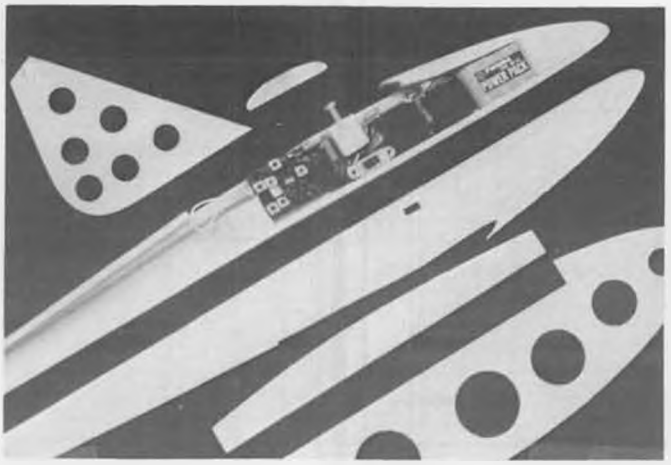
When you're building a ship this size, you need to learn to think in grams. No, not even in grams . . . in *percentages*. For example, if your raw stab weighs 12 grams, and you can sand 3 more grams off of it, that's a whopping 25% weight reduction, and well worth it! (If you don't own a gram scale, the post office will sell you one for under three bucks. Just ask for their "marijuana dealers' scale.")

The wing is conventional in structure. If you've had some experience with small free flight, rubber or control line

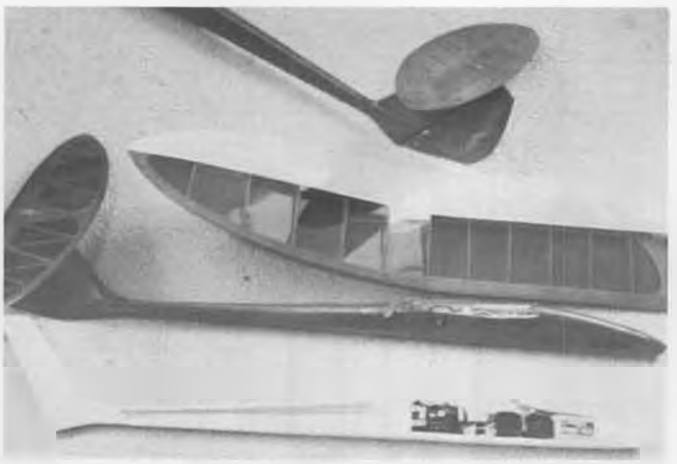
Wing is basically built from 1/16 sheet, sanded to 1/20. Careful wood selection is important to avoid excess weight.



Wing center section before adding pine block for hold-down bolt. Single nylon bolt holds wing in place.



Stripped-down radio is installed on left fuselage side. No, Dave won't be kitting the Sunbird; balsa selection is too critical!



Dave has built five Sunbirds so far. Monokote or Solarfilm covering is heavier than tissue, but much more puncture resistant.

models, you won't find any surprises. Pick your wood with care. I use C-grain Sig balsa for the D-tube sheeting, sanded to around 1/20 inch. If you want to taper this sheet even thinner towards the tips, it will be worth your time. Epoxy the pine wing bolt block to the center dihedral brace. I used white glue for the other dihedral and polyhedral joints, then switched to cyanoacrylates for ribs and sheeting. (Goldberg Super Jet is great for sheeting, as it doesn't dry till the parts are pressed together.)

If laminated leading and trailing edges are new to you, here's how I do it. Cut a piece of 1/8-inch cardboard to the shape of the inner curve. Pin it over the plan and bend each strip of wood around it slowly, gluing the laminations with cyanoacrylate. If the wood requires moistening to bend without breaking, chances are it's too heavy. I like to laminate decreasing thickness of 1/8 stripwood to form the trailing edge . . . saves a lot of heavy planing to get the tapered cross-section. You can feather these trailing edges to zero thickness at the back and probably pick up a little extra performance from the airfoil, but it makes them awfully vulnerable to "hangar rash." Incidentally, Sunbird needs no washout.

Note that the last three tip ribs are shorter than the main rib pattern shown. Just snip two or three pair of main ribs down to the proper lengths, then reshape them until they match the leading and trailing edges. Don't worry yourself sick over absolute airfoil precision on these ribs. I don't.

Close-up shot with wing removed shows Rx mounted for easy access to crystal. No case on switch or Rx. Subminiature Futaba S-20 servos used; anything bigger is a no-no. Check Cannon's mini. Photo by Al Kindrick.

Lay the radio components out on the left fuselage side. Servos are mounted with 1/16-inch thick servo tape. Be sure the controls are not reversed before sealing everything in place. Note that the servo mounting lugs have been removed. (Who the hell would pay $40 each for subminiature servos and then mount them on a bunch of bulky rails and heavy plastic trays?) I like to run both cablerods down the left fuselage side, tacking them every two inches or so with Hot Stuff and baking soda. You'll need a miniature (1/16 O.D.) eyelet to get a slop-free fit of the cable to the output arm; the solder joint calls for a light iron and an even lighter touch. Forget adjustable clevises; they're too bulky. (You aren't planning to build in any warps that will require gross trim adjustments anyway, right?) If you don't use the elevator cable for an antenna, run your regular antenna parallel to it, clear to the top of the fin.

Your radio installation, cablerods, and wing hold-down should be virtually complete before adding the right fuselage side and the right fin sheeting. Be sure to leave the last 1/2 inch or so of elevator cable free, so it can flex fore and aft as the elevator moves. Use the copper tube Sullivan provides to make the little elevator connector: solder 1/16 inch of cable into 3/16 inch of tube, flatten the remaining 1/8 inch of the tube and drill a hole through it just large enough for the straight-pin axle that mounts in the elevator. (The hole in the elevator needn't be as large as shown. A narrow slot is plenty.)

On one of my Sunbirds I got lazy and failed to hollow out the stab . . . just left it solid sheet balsa. That ship took over 1/2 ounce of lead in the nose to balance! Built as shown, your plane should be pretty close to trim without adding noseweight. You could probably save another 10 to 20 grams by covering her with Japanese tissue instead of Monokote, but personally, I'm too lazy for that anymore. Besides, the plane in the pictures has well over 1000 tosses on her, without a single puncture. That alone makes Monokote or Solarfilm worth its weight, to me.

FLYING

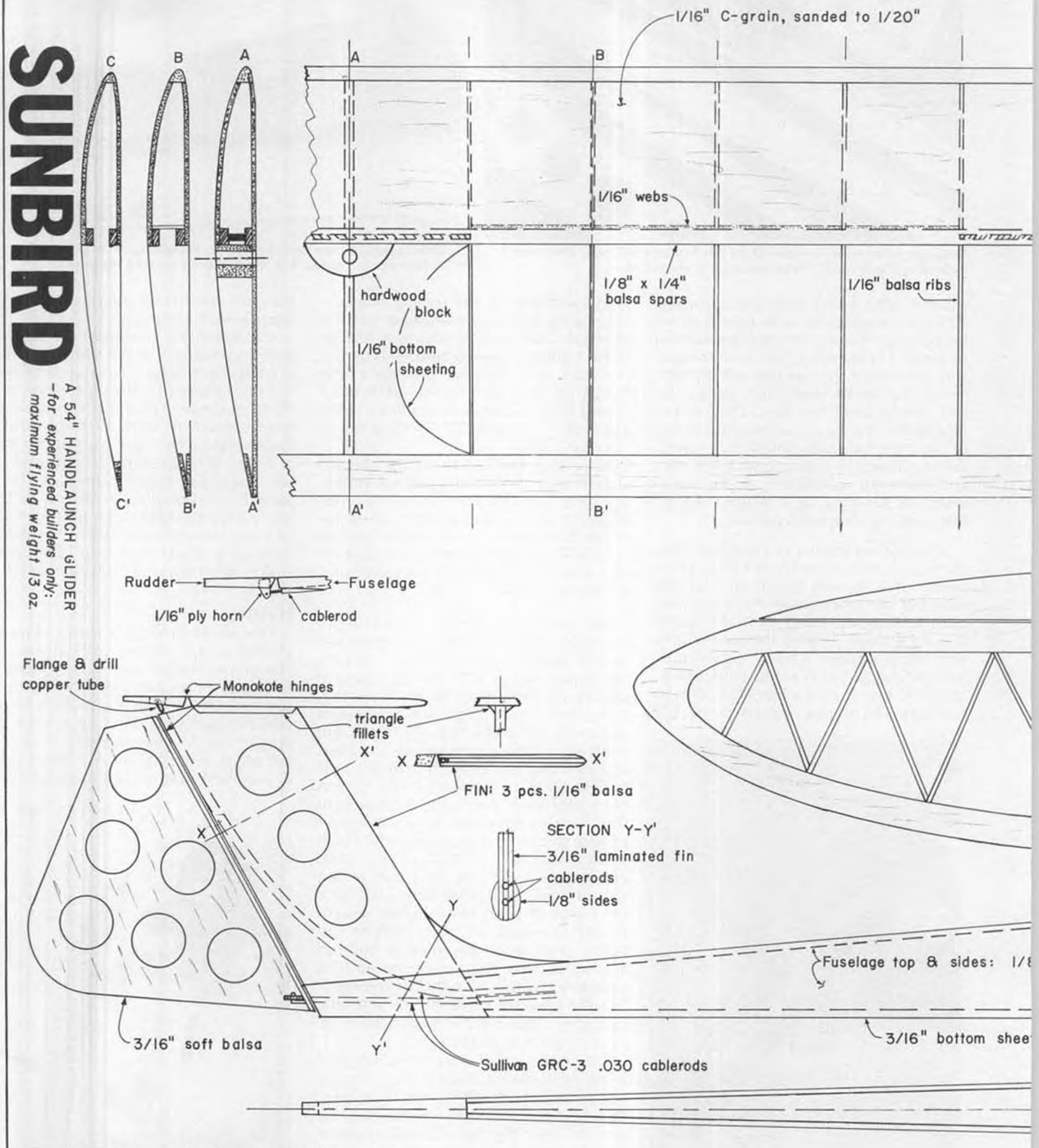
One of Al Kindrick's lovely close-up photos (thanks again, Al!) shows the aluminum finger grip in my favorite Sunbird. It's on one side only (remember, I'm left handed) and mounted flush with the bottom of the wing. I prefer this skeg to the double-sided one shown on the plans, as it's lighter and less draggy. (If you think drag isn't important on little

Continued on page 91

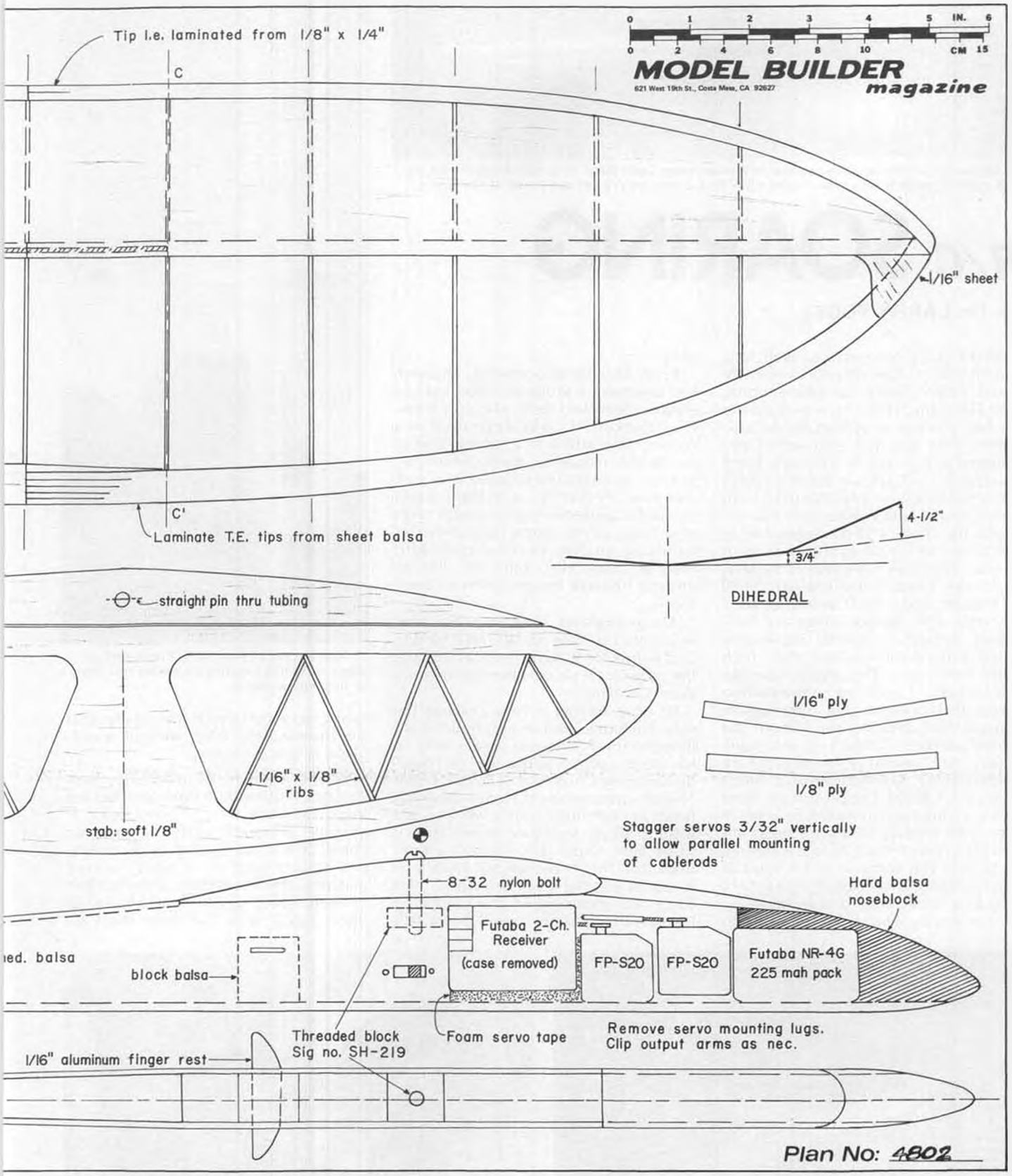
No matter what Dave says in the text, the *real* secret to flying RCHL is wearing the proper headgear. Sunbird weighs only 5 oz./sq. ft., performs well on the slope, too. Photo by Al Kindrick.

SUNBIRD

A 54" HANDLAUNCH GLIDER
- for experienced builders only:
maximum flying weight 13 oz.



Designed & drawn by D. Albert Thornburg, Esq.



FULL SIZE PLANS AVAILABLE – SEE PAGE 108

Big soarers are becoming quite popular in Europe. Here Tony Baker of England poses with his huge AS-W17, built from a West German kit. And in case you're not convinced of the size . . .

R/C SOARING

by Dr. LARRY FOGEL

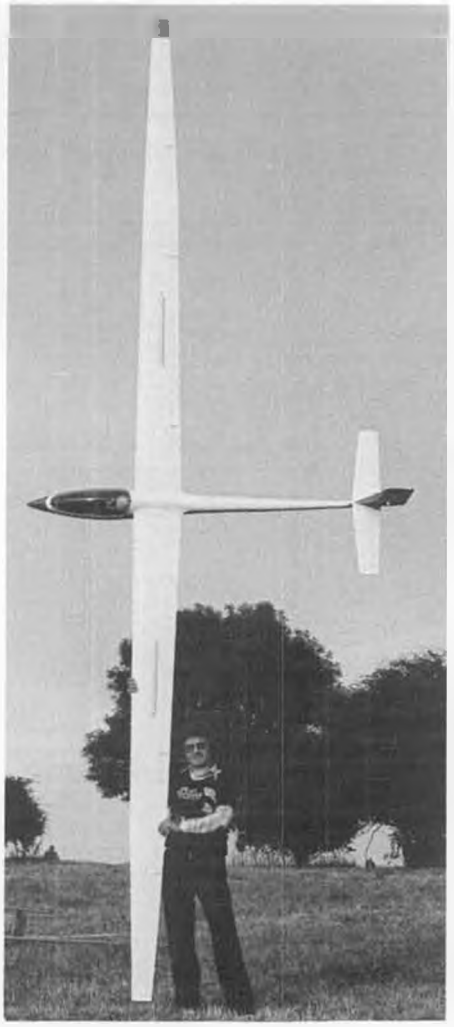
• What's going on overseas? Well, lots.

John Hill of Los Angeles recently visited Ralph Maurer of Steinenbonn, West Germany. There he witnessed the German interest in serious model sailplanes. They are well engineered and designed to look and fly *a la* scale. Some are scratch built, such as Ralph's Pilatus B-4, while others are available in kit form from Carrera and Wanitschek. For example, the Carrera SB-10 comes ARF in two sizes: the 3200 millimeter span version requires only two channels, while the even more realistic 5060 millimeter span craft requires four channels. The 16-foot wings are controlled through a special framework which protects the fuselage under high stress conditions. The plastic fuselage also includes a pushrod compensation device that prevents any temperature change from affecting the trim of the control surfaces. These kits, and many others, are available from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, CA 90403. The proprietor, Hans Weiss, a long time modeler, believes in large scale models. In fact, he has an all-fiberglass French-built 20-foot wingspan AS-W20 in the window of his store. It weighs 21 pounds and uses five channels, including retractable landing gear . . . but I'm getting away from the overseas story.

Keith Thomas of Somerset, England, has designed a series of slope soaring elevon controlled delta winged planes. His "Pecker III" was described in a construction article in a recent issue of the British magazine, *Radio Modeller.* But he's not satisfied to leave it at that, and now "Pecker IV" is in flight. Keith strives for perfection. The model takes new form as he learns to improve its handling quality. Keith also designs thermal ships. His "Tallis IV" has an unusual fuselage and performs on command.

Also in England, Tony Baker has been flying his 1/3 scale AS-W17. It's hard to find words for such beauties as this and the other scale models he imports from West Germany.

It's now summer in New Zealand. I'm sure that Snow Fenn and his buddies are flying in the Wellington area. Lately he has been exercising the "Force Four," designed by Chris Foss of England. This 61-inch span aerobatic slope soarer has flown in everything from a whisper of a wind to a forty-knot gale. Snow claims it to be very responsive. He uses a Kraft brick for this two-channel sailplane. Flying in that region of the world must be a real experience. The landscape leaves nothing to be desired. Snow tells me he has some special soaring sites that are breathtaking even without a sailplane to grace the sky.



. . .here's what 21 feet, 10-1/2 inches of sailplane looks like standing on a wing tip! Truly an impressive model.

Wayne Thomas, of Auckland, New Zealand, is flying both slope and thermal ships. His Mark IX is a 72-inch span, 3-channel aerobatic craft that uses an Eppler 374 airfoil loaded to 16 ounces per square foot . . . a neat looking machine. He chases thermals with a Bird of Time. It isn't hard for him to find wide open grassy fields that make this Cali-

Mark Chung has an eye for the unusual. His eyecatching original design is a surprisingly good flier, has ailerons and flaps.

Jim Martin developed this winch using a plywood reel and a gasoline engine from a washing machine. Looks like an antique!

fornian jealous.

Ralph Learmont of Melbourne, Australia (designer of the famous quarter-scale Kestrel 17 kit) keeps coming up with new designs. He was a member of the Australian National Team in the International R/C Soaring Championship held in Belgium last year. His Sunbird is now very popular in Australia, and his new 100-inch V-tail design, the Vantage, has rudder, elevator, flaps, and ailerons. He uses a sliding servo mixer to provide variable camber. These controls offer a "landing flap" when desired. The Eppler 176 wing section is built up of 1/16 balsa over foam with internal fiberglass reinforcement at the higher stress points. The empty wing loading is just under 10 ounces per square foot. By the time you read this, Ralph will be kitting the plane. You can learn more about it from him by writing Southern Sailplanes, 31 Queens Parade, Burwood 3125, Melbourne, Victoria, Australia.

In Czechoslovakia, Jaroslav Lnenicka maintains his interest in R/C soaring in spite of his building a new home. This summer he plans to attend some of the contests in his part of Europe and will surely keep us informed. You may remember that Jaroslav and his colleague, B. Horeni, recently wrote the book *Aeromodelling and the Aerodynamics* that treats technical aspects in great detail. Unfortunately, the book is in Czech.

The PIK-20E is a full-scale single-seat high performance self-launching sailplane manufactured by Eiri Avion of Finland. The "E" version of the PIK-20 includes an auxiliary powerplant that allows the plane to take off and climb to a suitable "release area." The engine is then stopped and retracted so that soaring can begin. According to the PIK catalog, "if weather turns bad and an out landing is imminent, the engine is extended and the sailplane flown out of the trouble area."

This full-scale craft uses carbon fiber and sandwich construction which lowers the weight to make up for the extra weight of the powerplant. When retracted into the fuselage, there is no drag. The engine is stowed behind the wings with the propeller in proper position to allow the doors to close. Thereafter, the PIK-20E looks exactly like the PIK-20D. All this is of particular interest because the Eiri Company also offers R/C kits worthy of note through Hobby & Technik, Box 18, SF-02361 Espoo 36, Finland. The PIK-20D glider kit is a scale model designed for competition. It includes air brakes for precision landing and an Eppler 387 airfoil in the built-up wings which accompany the fiberglass fuselage that closely resembles the full-scale version. This kit also contains the canopy, canopy tray, and all required hardware. The wingspan of the completed craft is 2800 millimeters. Its length is 1210 millimeters. It weighs 1200 grams and requires a three-channel radio. But this $76 kit is no longer in production in view of their wanting to concentrate on the PIK-20E model motor glider. According to their announcement, "The full-size PIK-20E is the first type certified motor glider with retractable engine. So this scale model of the PIK-20E is also the first of its kind

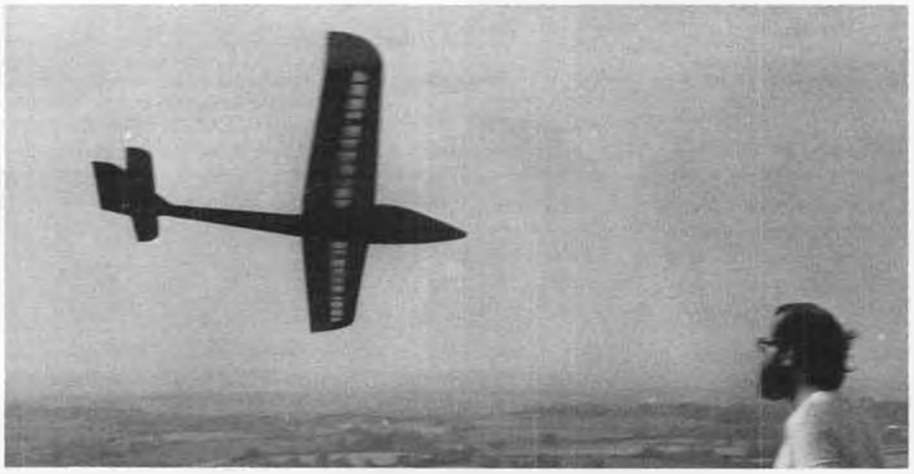
This photo, taken by John Hill at a soaring site near Stuttgart, W. Germany, typifies the excellent conditions and beautiful scenery common at European sites. Not many like this in the U.S.!

Eiri Avion of Finland, makers of the full-size PIK-20E motorglider, will also be doing a kit for an R/C version, scheduled to be released soon. Engine retracts into fuselage.

Keith Thomas's latest is the "Pecker IV" delta for high-performance slope soaring. Keith hails from Somerset, England.

New Zealand's Wayne Thomas with his six-foot "Mark IX" slope ship. More beautiful scenery!

Photos at left and above show the "Tallis IV" by England's Keith Thomas. Model is equally at home on the slope or on a winch. Note the unusual cross section of the fuselage.



Keith's Tallis IV makes a fast pass for the photographer. A mighty quick model and fully aerobatic with aileron/elevator/rudder controls.

. . . a glider that can take off from the ground, climb, cruise for thermal, cut the engine, retract it . . . then remain a glider of high performance."

Instead of ailerons, this plane uses a wing warping mechanism. This further improves the very nature of this flying machine. (Wing warping was also used by the Wright brothers before ailerons were invented.) The wings and stabilizers are manufactured from epoxyglass material with construction similar to that of the full-scale aircraft. The fuselage is an epoxyglass laminate of the same raw materials as the full-scale aircraft. The wings include built-in Schempp-Hirth air brakes and fuselage.

Another photo from New Zealand, this one of Snow Fenn's "Force Four," designed by English modeler Chris Foss. Spans 61 inches, said to be quite aerobatic with only two channels.

Snow Fenn also sent this photo of his friend Knut Neumann, a German modeler now living in New Zealand, flying his "Mini Alpha" at their local coastal site, located right at the southernmost tip of New Zealand's North Island.

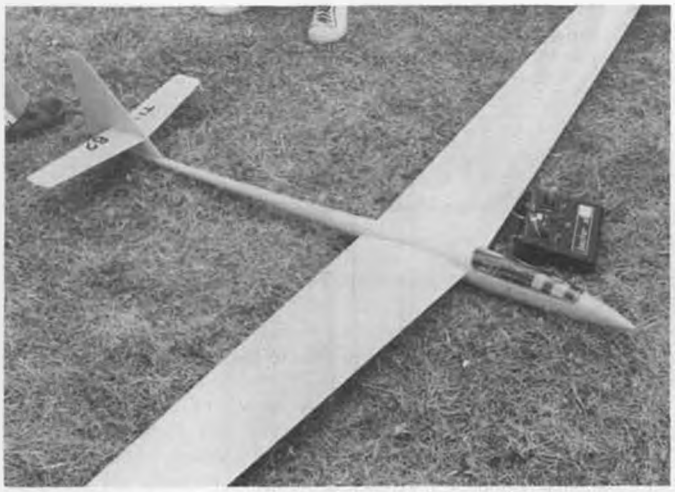
All the parts have already been painted with primer. It also includes the engine mount with the retracting mechanics, the wheel, the wing warping mechanism, the canopy, canopy tray, and plywood parts for the fuselage as well as foam for the stab and rudder. When complete, this model will span 3500 millimeters, weigh from 3100 to 3500 grams, and use four channels. The instructions and drawings are in English. The PIK-20E is priced at $330 FOB.

Closer to home, Mark Chung, a medical student in Honolulu, Hawaii, still finds time for designing rather exotic-looking thermal craft. Wish we could all share the action on Oahu.

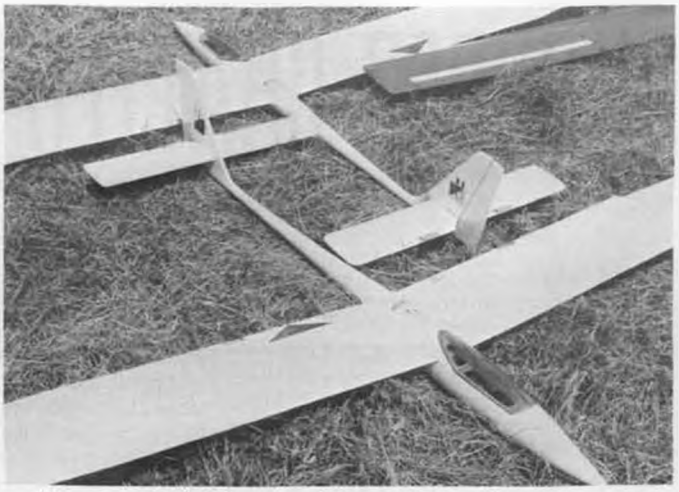
Jim Martin of Pukalani, Maui, Hawaii, continues to fly at the famous Poli Poli site halfway up Mount Haleakala. Recently he created a convenient flight box suitable for the trek from the closest parking site to the launch point. He also developed a gasoline-powered winch using the engine from a Maytag washer. The reel is made of plywood. The brake assembly works well.

Later this year I'm hoping to visit some of our overseas friends. I'll then be able to give a firsthand report. Wish we could all go together.

See you next month. •



The Swiss TU-62 flown at the World Champs. Extremely clean, functional lines. Wings pivoted for aileron effect.



These two slick-looking racers belong to Franco Givone. Fast, clean, and efficient, Franco managed a 25th place with them.

PHOTOS BY AUTHOR

PLAIN TALK ABOUT FAI SOARING DESIGN

PART ONE

By DAVE THORNBURG . . . The U.S. is far behind the Europeans in terms of FAI glider design. Can we catch up in time for the '81 W/C?

• March again. Another soaring season is upon us, and we're once more faced with the task of picking a three-man team by September (only six months away) to represent America at the 1981 World Champs (at least 15 months away). We were beaten badly at the '79 Champs in Belgium, and it's going to take some hard-nosed thinking to keep it from happening again.

The first thing we've got to think hard about is the thermal event. If American soaring pilots share any single character flaw, it is this: we all pride ourselves on being the best damned thermal pilots around. Even after the Belgium fiasco last July, we all came home saying, "Most of those Europeans *still* don't know how to thermal. Not one out of five has the nerve to really cover ground looking for lift. They just park up there at the top of the launch and wait for Allah to send them a bubble." This kind of mutual backslapping made us all feel better at the time, and just about then we needed *something* to feel good about.

But all that's behind us now, and before we get too deep into another competitive cycle we'd better take a hard look at this peculiarly American fixation on thermaling. I'm getting quite a few phone calls from folk around the country who are designing for FAI, and that's great, because we need some new blood in the design program; everything available now is pretty much outdated. But I keep hearing a disturbing theme song in these calls, and it goes something like this: "I'm shooting for around 8 ounces a foot. Do you think that's too heavy?"

Gentlemen, you're designing for the past. If you're still thinking about how *light* you can make your ship, you're focused on the wrong end of the spectrum. *Item: every plane that kicked our tail in Belgium weighed close to ten ounces a foot, unballasted.* This includes the little 84-inch Dassel flown by the Austrians. The raw Dassel is 10.6 ounces; for distance they ballast up to 15, and for speed to 17-plus. This on an 84x8-inch wing, remember . . . a model about the size of a Drifter II. But that's not the most important thing to remember about the Dassel. The most important thing to remember is this: *the Austrians themselves consider the Dassel passe.* It's too small and too light for future FAI competition. About their new design they're naturally a bit tight-lipped, but they hint at it being closer to three meters in span.

What they don't hint at, but what's obvious to everyone who's reading between the lines, is that the new ship will be capable of coming much closer to the maximum permissible FAI surface loading, which is 24.355 ounces per foot. That is the significant limit for future FAI design: 24 ounces a foot, 11.023 pounds total weight. These are the figures the Austrian team is likely to be shooting for. These are the limits, and anyone

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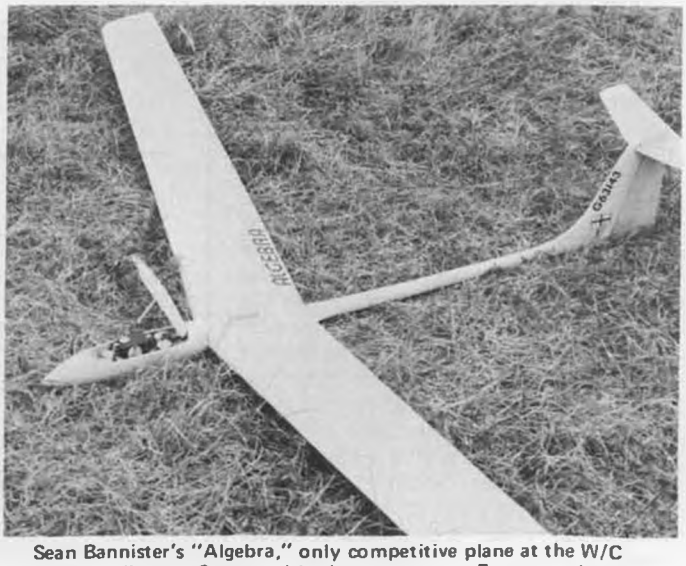
Highly unusual "Allure" by Italy's Eugenio Pagliano was built in three weeks preceding the World Champs! Very fast and clean.



Sean Bannister's "Algebra," only competitive plane at the W/C without ailerons. Canopy airbrake common on European designs.

CHOPPER CHATTER

By JOHN TUCKER

HOVER DATA

Every R/C model helicopter pilot who has attempted to hold his new machine in a steady hover for the first time knows what it's like to grab an angry tiger by the tail. Overhead at the flying field last month was one such pilot with a gift for descriptive language: "It was like trying to ride a pogo-stick over a floor covered with greased bowling balls!" There may be other ways of describing your first flight experiences but the above pretty well tells the story. Most modelers feel that choppers are too hard to fly and give up long before they have given themselves a chance to learn the fundamentals.

Flying a helicopter is not really any harder than flying an R/C airplane . . . in many ways it is even easier, and certainly not as restrictive as far as available flying sites are concerned! The probable reason the above pilot was having difficulty was that the machine he was trying to fly, like most R/C model helicopters, was inherently unstable in hovering flight. Other contributing factors might include a slower response to control motions (than most model airplanes he was familiar with) and the fact that the chopper "manufactures" its own gusty air condition. Hovering over a spot is a precision maneuver comparable to making a spot-landing in an airplane . . . it doesn't come easy. Leaving the aerodynamic reasons for the inherent instability of a hovering helicopter to the mathematicians, let's look at the picture from a student pilot's viewpoint and try to understand why that tiger is so mad, and how we can go about taming him.

SWING AND SWAY

Imagine a chopper hovering perfectly level in calm air conditions when suddenly a gust of wind makes it nose down ever so slightly. Even with no control inputs on the part of the pilot, the helicopter starts to drift forward because the rotor blades have been tilted in that direction by the gust. About one second later, that forward motion causes the rotor system to tilt backwards (as in aft cyclic control input). Another second later and the helicopter body follows the rotor and assumes a slight nose-up attitude, eventually stopping the forward movement as a result of the change in direction of the lifting forces on the rotor system. Now the rearward tilt starts a rearward motion and the previous series of events starts all over again, but in reverse fashion. About every five or six seconds, the cycle repeats itself, but with ever-increasing displacement from the original point of hover. The very fact that the helicopter has rearward speed as it comes backwards over the original point on the ground means that it has somehow gained energy. This is a sure sign of instability. Had it slowed down and returned to its original hover, then it would be considered a stable helicopter. As it is, the model will continue back and forth with an ever-increasing movement until the pilot manages to stop it (or another wind gust starts it off in another direction). The swinging motion has a constant time period that is determined by the size and weight of the helicopter and by the rotor system characteristics, much like the pendulum on a grandfather clock, which also has a constant time period.

TAMING THE TIGER

If that isn't enough to worry about, consider the fact that the chopper will also exhibit the same oscillations in roll as well as pitch. Additionally, any control inputs which the pilot gives in correcting may also initiate this rocking motion. These characteristics mean the pilot must be constantly moving his controls to "tame the tiger." In learning how to correct for drifting away from the hover spot, he must anticipate the motion and put in just enough control without overreacting, a task complicated by the helicopter's failure to react instantaneously to his commands. The time lag

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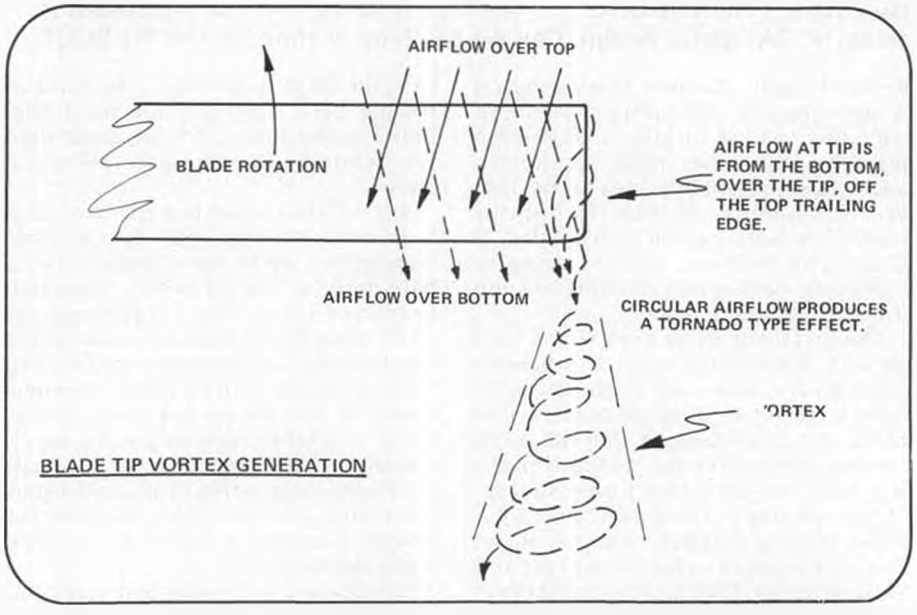
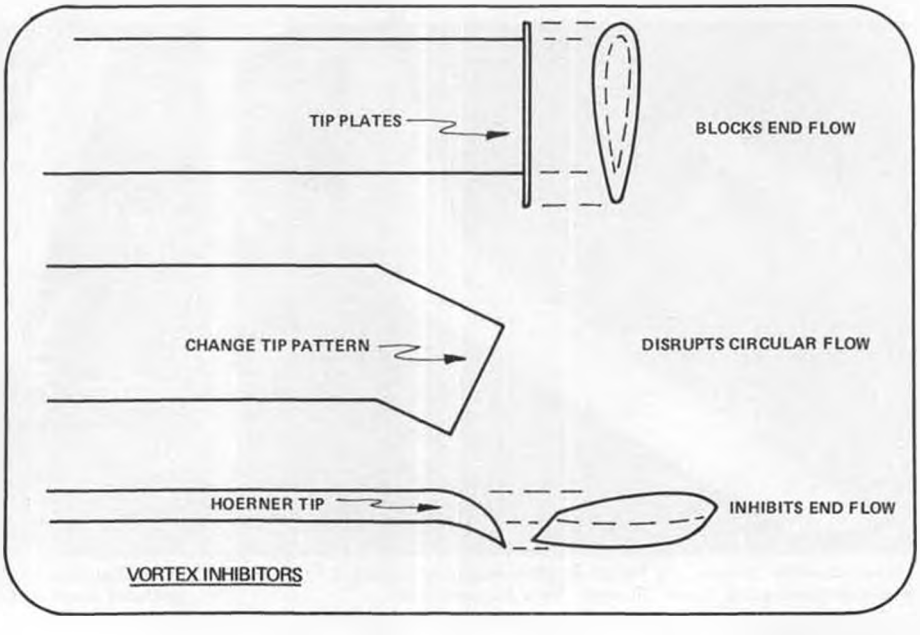




Prolific O.T. builder and flier Cliff Silva shows off his monster 13-ft. "Big Gull," the only one we've ever seen built. Flies in F/F Texaco events. Carl Taylor took this photo at Taft.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• This month we are going to talk about a fairly new O.T. R/C club, the 49'ers, of the Los Angeles area. Despite what the purists say, when you don't have a field suitable for free flight, the average modeler will naturally gravitate to whatever form of flying will allow him to enjoy the hobby.

Ever since the Los Angeles free flighters lost Sepulveda Basin, the flying field problem has become more acute every year, with only two sites available: Taft and Lake Elsinore. These locations, of course, are both over 100 miles away from the L.A. area.

Naturally, it was only a matter of time before an R/C Old Timer club would be formed. Starting as a schism of the SCIFS, Otto Bernhardt decided to form an Old Timer R/C oriented club called the 49'ers. This met with many derisive remarks from the Northern Californians, as the 49'ers were originally based from San Francisco. Matter of fact, the NFL football team, the S.F. 49'ers, enjoy the worst won-lost record which also added to the fun.

A North-South rivalry has developed in a very short time, with the "Bent Prop" Trophy being the highly prized award. This perpetual trophy came as a result of one of Jack Jella's fleet of airplanes going down in a dry lake and bending an expensive metal prop. Rather than discard the prop, Jack had the idea to cut off one blade, mount it on a suitable walnut base, and then polish the blade. This novel award has since been a highly coveted prize, indicating superiority in the Texaco event for that section of California.

So far, winners have been Bob Von Konsky (North), Don Bekins (North), Phil Bernhardt (South), and Jack Albrecht (South). As one can see, things have pretty well evened out over the past few years, as the North initially enjoyed an advantage with three clubs over one.

The SAM 49 club has been rather conservative in the number of "official" contests staged. By official, we mean those that are on the regular calendar of the West Coast SAM O.T. R/C Association calendar. The only purpose of this calendar is to protect regularly scheduled contests from being interfered with by other local meets. In that respect, SAM 49 (besides its regular club contests) can devote all its energies to put out a first class meet.

The 1979 Annual, held at Taft on December 2, was another fine Texaco contest. In these meets, only fuel allotment events are held, in most cases only the regular Texaco event. This year featured a new wrinkle spearheaded by Bob Sliff, Newsletter Editor of the SAM 49 "Arcing Point": a so-called Half-A Texaco.

In an effort to encourage more sport type flying, the SAM 49 members proposed an event that would feature the use of Cox reed valve .049's (Golden Bee, Black Widow, Babe Bee, etc.). Fuel allotment would be simplicity itself; simply fill up the standard tank with your favorite glow fuel and let'er go!

The original idea was to have a half-size Antique event similar to the one this columnist used to stage at the AMA Nationals before the .020 Replica event became so popular. (This idea, incidentally, was generated by Frank Ehling.) This would make for model sizes in the range of 36 to 48 inches, which gives the modeler the option of climbling high and gliding poor with the smaller model or vice versa with the larger model.

Well, this idea got shot down before the notion left the ground. It was announced that anything could compete, meaning any late design such as a Blazer, Ramrod, etc. Still, the interest was there, but much to this columnist's chagrin, no weight limitations were imposed. This immediately put a premium on the use of super lightweight receivers and servos, something to be avoided if the event were to remain a fun event.

Regardless of the foregoing developments, quite a few 1/2A Texaco models did make their appearance. The most spectacular of all was Don Bekins' nine-ounce Strato Streak which climbed out

Tom Keppler showed up at the '79 SAM Champs with this neat Scientific Coronet. Flew in Class B Cabin with Ohlsson .23.

Loren Schmidt has the first full-size Kloud King we've seen with R/C. Uses an old Forster .29 glow engine, no throttle.

Here's a rare one, a Stanzel Interceptor with Ohlsson .23, by Ray Black of Las Cruces, N.M. SAM Champs.

Would you enter this one in Stick or Cabin Rubber? A Stahl Hurricane by Ramey Hayes, flies even better than it looks.

of sight under power. (Compare this with the writer's "Triangle," which only gained 500-600 feet). Results for that event looked like this:

1) Don Bekins (Strato Streak)
2) Ross Thomas (Varsity)
3) Bob Sliff (Simplex)
4) Bill Cohen (Lanzo)
5) John Pond (Triangle)

As for the rest of the contest, Don Bekins, in the SAM 21 newsletter, describes the contest as a marvelous, low keyed, fun event where no amount of "sandbagging" did any good. This was due to the weather, which was bright and beautiful, no fog and very little haze. And get this . . . no lift! This has to be considered a first for Taft.

Jack Albrecht, QA man at Kraft, came up from Vista and snuck away with the Bent Prop Trophy. Using an O.S. .60 4-cycle converted to ignition in his Dallaire, he lost it twice in the haze before he realized he was flying the wrong model! General opinion is that here is a real threat to the reputation of "Weak Eyes" Nick Nicholau. We may have a successor!

To put some spice (that's a pun, man), Marge Bernhardt, Maxine Thomas, Pam Cohen, and Lois Hellman whipped up a weenie roast around 1:00 p.m., much to the delight of the modelers. This is what makes the Old Timer radio control contests such fun; i.e., simply becau e they are fun oriented!

Results for the regular Texaco event shaped up like this:

1)	Jack Albrecht (Dallaire)	23:00
2)	Ross Thomas (Lanzo)	20:00
3)	Don Bekins (Gas Bird)	18:00
4)	Ernie Payne (Lanzo)	15:00
5)	Jim Adams (Laurie Exp.)	14:30

Another 1/2A Texaco event will probably be scheduled early in 1980, so this column will carry the developments of this new event. Earliest opportunity appears to be the SAM 21 Texaco meet in April. Watch for announcements and rules.

Might also mention that photos of this meet were delayed coming through the photographer's shop. All is not lost, though, as we will run photos of the models in successive issues. Wait until you see the writer's "Super Clipper," a ten-foot monster!

ENGINE OF THE MONTH

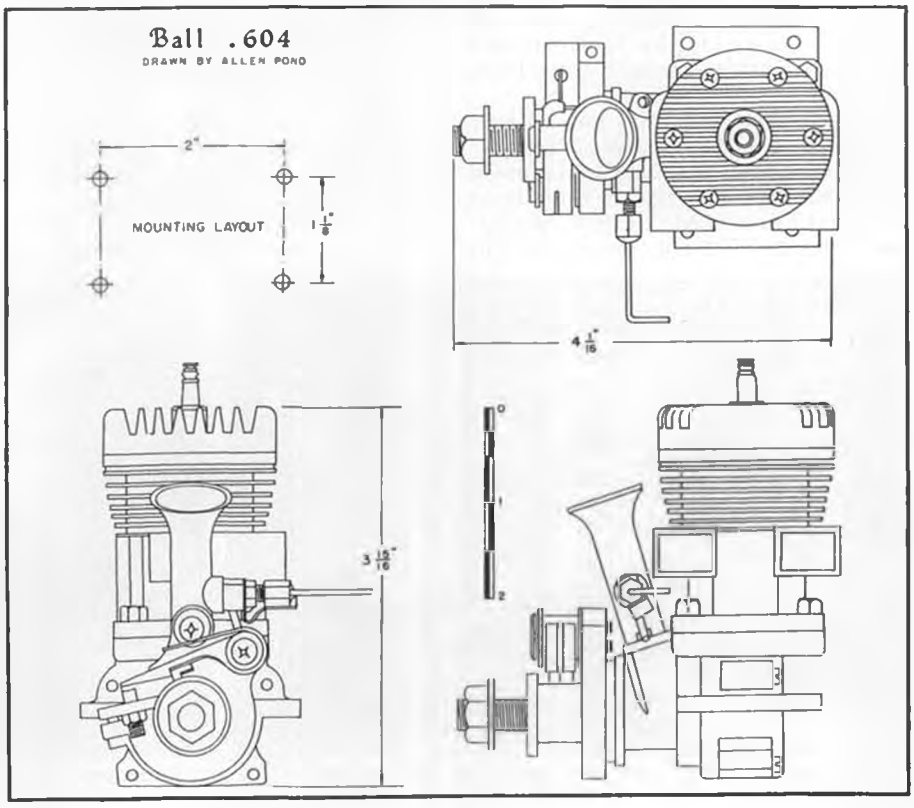
It was 1946 and the control line craze was at its zenith, with Ernie Babcock Jr. and Sr. winning fantastic first place prizes . . . such as a full-size Piper aircraft!

The emphasis was on the big motor at this time, so it was no great surprise when a new racing engine, the Ball 604, was announced in the November 1947 issue of *Model Airplane News*.

Built so that the engine could be used in all phases of modeling, i.e. airplanes, boats, and race cars, the promised performance was speeds in excess of 20,000 rpm. The engine was initially priced at $35.00, which seemed to be the going price at that time for all big .60 engines (Hornet, McCoy, etc.).

The engine advertised was an outgrowth of the original 1946 design, which featured spoke type cooling fins on the cylinder head. However, the final production model, as marketed by B&D Racing Engine Laboratory, P.O. Box 262,

That's a real gold plated Wahl Brown Jr. in Bud McNorgan's Ehling Contest Winner.



Al Heinrich flew his nicely decorated Mercury at the SCAMPS Texaco at Taft last April. Ohlsson .60 power.

Walt Parker's Ehling Contest Winner has been around a long time, seems to fly better every time. Flew at SCAMPS Texaco.

Drayton Plains, Michigan, featured machined fins as shown on our three-view.

Of course, all fads either fade out or undergo subtle changes over a period of time that makes the trend for the manufacturer to recognize.

With the astonishing successes enjoyed by the Arden .19 and K&B Torpedo .29 engines, it was no great surprise that most of the subsequent kits and magazine construction articles featured these engines. The real indicator was at the 1948 Nationals, when the Class A and B events enjoyed twice the entry of Class C and D models. And all of this before the 1/2A engine craze!

Well, it wasn't long before the price on the Ball engine was dropped to $29.95 in the June 1948 *Model Airplane News* issue. Although designed and still supplied as an ignition engine, the advertisement tried to take advantage of the new glow plug development by stating "the engine operates to perfection on glow plug ignition."

The handwriting was now on the wall. Only those .60 engines such as McCoy were able to survive the tremendous competition for the modelers' pocketbook. In the April 1949 *Model Airplane News*, the price was again dropped, this time to $21.50. This was a last-ditch stand, as advertising in *Model Airplane News* ceased for all practical purposes in the August 1949 issue.

The engine from which we have produced this three-view was kindly loaned by Dave Brodsky, a relative newcomer to the collecting game who is rapidly gaining an enviable reputation and collection to go with his fair dealing. This particular engine was in excellent shape and looked like it could run right now!

For the technically minded, the Ball engine featured a displacement of .604 cu. in., a size pitched for the model race car fraternity. With a bore of .924 and stroke of .900, the compression ratio was a startling 10 to 1. Initial performance claims were 1.1 hp at 20,000 rpm. Weight of the base engine was 15 ounces (seems like all hot .60 engines were in this weight bracket). Notable features of this engine were the double bypass, double exhaust porting, rotary inlet shaft, double ball bearing supported crankshaft, aluminum piston, and lightweight connecting rod. All in all, a well-built engine that failed to catch on in those late fabulous forties.

FORTY YEARS AGO I WAS. . .

It's been a few columns since we had this little section to brighten things up. The writer was perusing the May 1913 issue of *Aerial Age*, Vol. I, No. 12, when he ran across the following letter to the editor of that magazine. W. L. Butler of Vista Grande, California, wrote as follows:

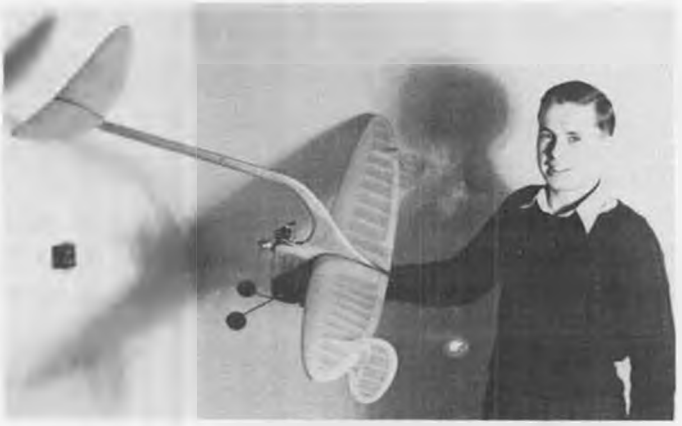
"Received the Spring Season number of Aerial Age and all I can say is, It can't be beat! Everyone I showed it to says it is a fine journal. Many thanks for publishing my letter. When I saw the heading, I thought someone else was urging for a National Club. It's just what I meant and just what we need.

"Last Saturday, I took first place in every event at the Bushrod Park Model Meet. On Sunday my latest racer (a twin pusher) made 3,100 feet in 92 seconds, beating R. G. Robinson's Pacific Coast record of 2,900 feet in 84 seconds.

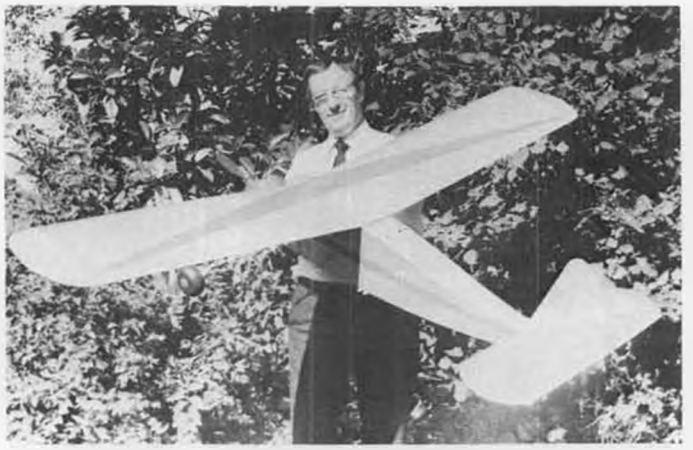
"The machine weighs 2-1/2 ounces complete, is 36 inches long, 8 inches wide 'A' frame with power of 6 strands of 3/16 rubber, 1200 turns, 750 rpm, and 10-inch propellers (whoever said those old clunkers wouldn't fly?). For altitude, I have a new kind of method of placing the vertical rudders which holds her in the wind, and she *climbs*. I am now building a scale model of the Curtis Flying Boat for exhibition purposes.

Looking down the runway at Mead Missle Base, at the '79 AMA Nats. Jim Rummery with Korda and girlfriend, C.D. Pond issues card.

Carl Hatrak, perennial right hand man at the desk, recording times, collecting entry fees, hunting up time cards and in general the best help a C.D. could ask for. AMA Nats.



Bob Knutson was truly an innovator! His first canard, with Ohlsson .23, was built in 1940. Canard surface looks like a wing from a smaller model. Boom was vulnerable.



Alex Imrie, noted WW-I English writer, is also an O.T. flier, this Cloud Master being one of eight models in his stable.

"Enclosed find the latest plans of my hydro (twin pusher). they are better than the others, being the same machine you described."

Columnist's note: Many years later, Frank Zaic picked up this design and featured it in his 1938 Jasco Yearbook. If you are interested in possibly constructing a real antique, plans are available from John Pond O.T. Plan Service.

PLANS

Talking about plans, when this columnist went abroad to Europe, he visited Dave Baker, the impressario of Old Timers in Merrie Olde England. The writer was lucky to get about 20 old Czech gas and rubber plans. Some are pretty nice designs. Big questions here is, do we have any interest from the readers to run one or two?

SINCERE CONDOLENCES

Just received word from Pete Vano, former SAM Speaks Editor, that Don Hartman has suffered the loss of his son. Don, as most of you know, has a heart as big as a barn and it is truly tough to express our feelings at a time like this.

Don's boy was finishing up at Arizona State in Aeronautics (Dad is a TWA Flight Engineer) and at the same time was doing quite a bit of flying. Glen took a crop dusting job in Mexico in a patrol bomber, misjudged a ridge and perished in the crash.

We all extend our sorrow to Don at a time like this (right at Christmas) and wish him and his family the best of the New Year.

MORE BAD NEWS

Just heard Ray Bowles, former operator of PICO Model Shop in the thirties, now of Bishop, California, has gone into St. John's Hospital in Culver City for another operation. Hope he makes it okay.

SAM 41

George Wagner reports that enthusiasm for Old Timer activity is running high in San Diego and that SAM 41 is gaining members like a one-day sale. In short, this revival of the old San Diego

Continued on page 106

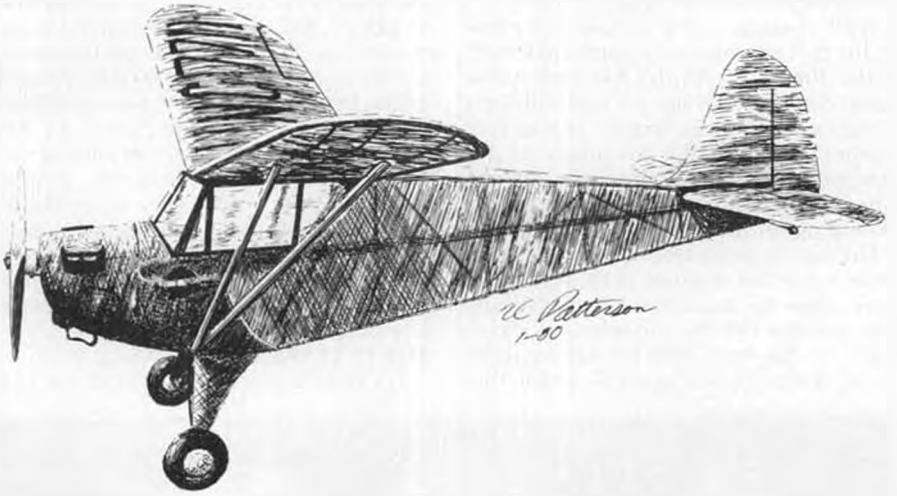
Aeronca Tandem

OLD TIMER Model of the Month

Designed by: Ronnie Albert

Drawn by: Al Patterson

Text by: Phil Bernhardt

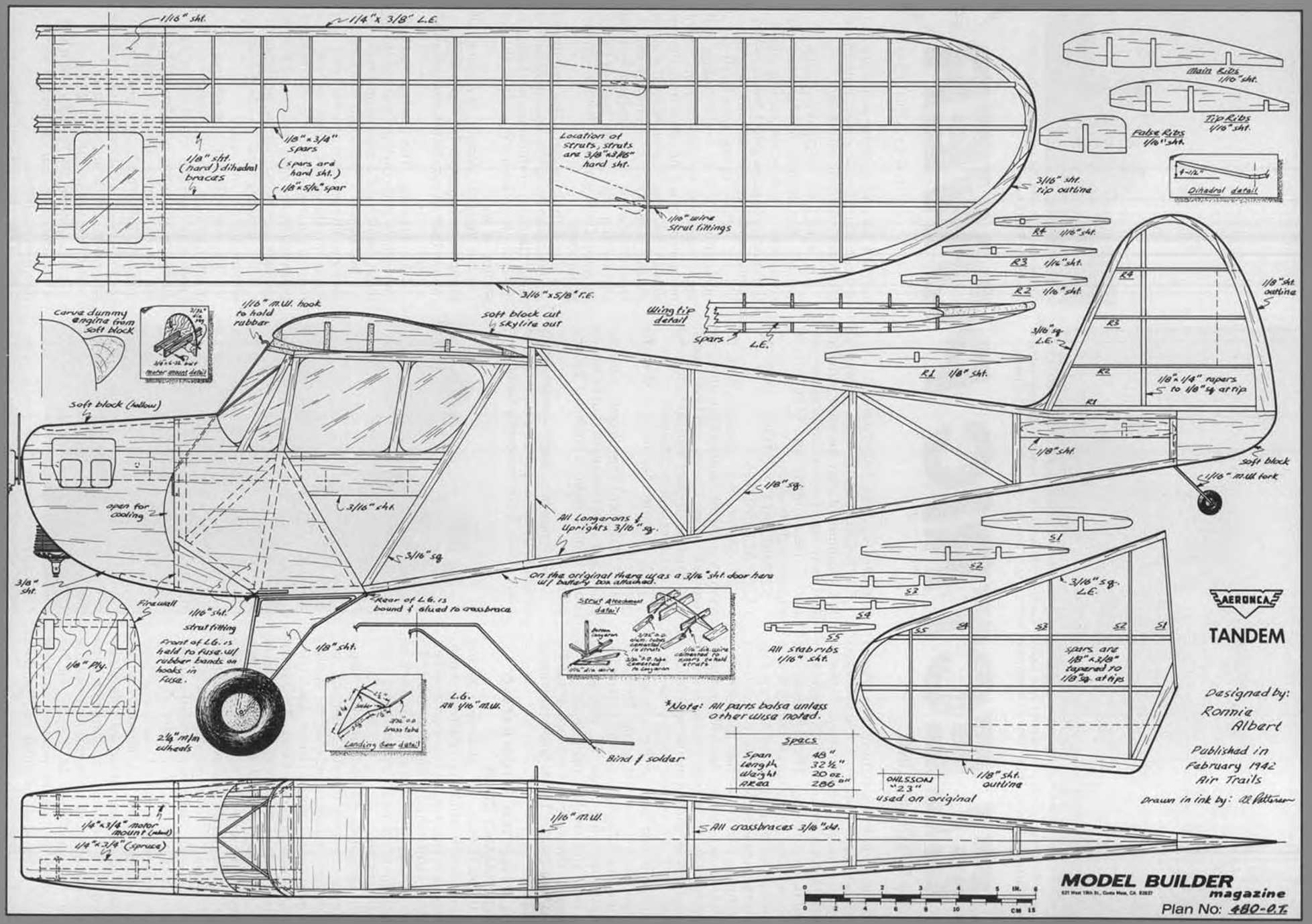


• Scale models rarely find their way into **RCMB** as the featured Old Timer, so this month we're presenting plans for a 48-inch Aeronca Tandem that appeared in the February 1942 issue of *Air Trails*. The model was designed by Ronnie Albert and was touted as being of contest caliber, although we doubt that anyone would want to pit one of these against a Ranger or Playboy or similar type model. (The climb must have been pretty rapid, though, as the original used an Ohlsson .23.) Instead, we thought the Aeronca would appeal to those looking for a good, realistic flying scale model that is also a genuine Old Timer.

We tried to find some details on the model's full-size counterpart, but didn't have much luck. All we know is that the real Aeronca Tandem (also called the Tandem Trainer) was built in 1940. Very few were made; the Aeronca factory concentrated instead on building L-3's and 0-58 Defenders for the military. At least one full-size Tandem is active, having been restored in 1977.

The model Tandem utilizes very simple construction and would make a fine F/F sport model with a good .049 glow or .09 ignition engine. It would also be a fun little R/C job with three channels and an .09 or .10 in the nose. For control surfaces, try putting the elevator hinge line at the rear stab spar and the rudder hinge line at the front of the tail block on the fuselage; this way the rudder can be continued to the bottom of the fuselage.

The original article included a separate sheet of drawings that showed how to adapt the model to control line. Basically it was similar to modern C/L linkage systems, but with a bellcrank rigged with rubber bands to return it to neutral in case the lines went slack and control was lost, hopefully keeping the model on an even keel until the panicking flier could sprint backwards and regain line tension. Just how much of a pullout he could make is questionable, as the recommended elevator throw was only 3/16 inch up and 1/8 inch down!•


1/16" sht.
1/4" x 3/8" L.E.
1/8" x 3/4" spars (spars are hard sht.) 1/8" x 5/16" spar
1/8" sht. (hard) dihedral braces
Location of struts, struts are 3/8" x 3/16" hard sht.
1/16" wire strut fittings
3/16" x 5/8" T.E.
3/16" sht. tip outline
Main Ribs 1/16" sht.
Tip Ribs 1/16" sht.
False Ribs 1/16" sht.
Dihedral detail
R4 1/16" sht.
R3 1/16" sht.
R2 1/16" sht.
R1 1/8" sht.
Wing tip detail
spars
L.E.
1/8" sht. outline
3/16" sq. L.E.
1/8" x 1/4" tapers to 1/8" sq. at tip
Carve dummy engine from soft block
1/16" M.U. hook to hold rubber
soft block cut skylite out
Soft block (hollow)
open for cooling
3/16" sht.
All Longerons & Uprights 3/16" sq.
1/8" sq.
1/8" sht.
soft block
1/16" M.U. fork
3/16" sq.
On the original there was a 3/16" sht. door here w/ battery box attached.
3/16" sht.
Firewall
1/16" sht. strut fitting
Front of L.G. is held to fuse. w/ rubber bands on hooks in fuse.
Rear of L.G. is bound & glued to crossbrace
1/8" sht.
Strut Attachment detail
1/16" ply.
2 1/4" m/m wheels
L.G. All 1/16" M.U.
Landing Gear detail
Bind & solder
S1
S2
S3
S4
S5
All stab ribs 1/16" sht.
3/16" sq. L.E.
spars are 1/8" x 3/8" tapered to 1/8" sq. at tips
1/8" sht. outline
*Note: All parts balsa unless other wise noted.
Specs
Span 48"
Length 32 1/2"
Weight 20 oz.
Area 286 sq in
OHLSSON "23" used on original
1/4" x 3/4" motor mount (inlaid)
1/4" x 3/4" (spruce)
1/16" M.U.
All crossbraces 3/16" sht.
AERONCA
TANDEM
Designed by: Ronnie Albert
Published in February 1942 Air Trails
Drawn in ink by: Al Pattison
MODEL BUILDER magazine
Plan No: 480-0.7

Lineup of fliers just before the start of a heat of electric pylon racing. Event was sponsored by the "Watts Up Fliers" of So. Cal. This promises to be a very popular event at future contests.

Three racers round the far pylon together at Watts Up Fliers race.

ELECTRIC POWER

By MITCH POLING

PHOTOS BY JOHN SCZARY

As electric flying matures, the urge to compete gets stronger. A few years ago it was enough to say, 'Wow, it flies!" Now that is all routine, and so competition is the next step. The Europeans, of course, have many major contests, but contests for electrics in the USA are few and far between. Recently the Southern California fliers have had some electric pylon races using the Astro 05, and John Sczary sent me a copy of the rules he proposed for the event, the Sportsman's Class R/C 05 electric pylon racing. I think this just may be the way to start some electric contests going. The basic rules are simple: use the Astro 05, minimum wing area of 250 square inches, and no less than 26 oz. flying weight. The race has ten laps around a 460-foot course. The detailed rules are as follows:

R/C 05 ELECTRIC PYLON RACING SPORTSMAN'S CLASS

1) OBJECTIVE. To provide a racing event which employs relatively small, inexpensive, and easily-constructed radio controlled model aircraft. To encourage the average R/C flier to participate in basic pylon racing type competition.

2) GENERAL. All AMA and FCC regulations covering the R/C flier, his aircraft, and equipment, shall be applicable except as noted herein. Each contestant will be allowed two (2) planes in this event. The second or alternate aircraft may be used only after it has been determined by the Contest Director, or his designated assistant, that the first aircraft is no longer safe to fly. Only the contestant who has entered the aircraft may pilot in this event. Any unsportsmanlike conduct, such as repetitive unsafe flying, any attempt to gain unfair advantage, or actual rule violations, shall be cause for disqualification of the contestant at the discretion of the CD. The decisions of the CD or his designee relating to interpretation of these rules shall be final and binding on all contestants.

3) DETAIL SPECIFICATIONS.

3.1. RADIO EQUIPMENT. Any type of R/C equipment may be used provided that only two control surfaces are actuated, i.e., aileron and elevator, or rudder and elevator.

3.2 AIRCRAFT MOTORS AND RELATED ACCESSORES.

3.2.1. Motor. Any aircraft Astro 05. Motors must be production units, assembled from factory-available parts, and must be of stock configuration. No ball bearings will be allowed.

3.2.2. Throttle. No throttle shall be required.

3.2.3. Cut-Off. The aircraft must be equipped with a means to shut down the motor upon radio command by the pilot.

3.2.4. Propellers. Only commercially available wood or plastic props may be used. Aside from removing flashing or burrs or balancing, these props are not to be modified in any way. Handmade props are expressly forbidden.

Paul Loghry was 2nd in Pylon, used a "Jackrabbit" designed by John Sczary.

3.3. AIRCRAFT REQUIREMENTS.

3.3.1. Appearance. Model need not resemble a full-scale racing plane. Canopies, cockpits, pilots heads, wheel pants, cowlings, etc., are not necessary.

3.3.2. Wing. Wing area shall be a minimum of 250 sq. in., including that area displaced by the fuselage. Area measurement will be taken from the top side of the wing. The wing itself may be of any planform, i.e., constant chord, tapered leading edge, tapered leading and trailing edge, swept back or swept forward. Delta wings or flying wings are prohibited.

3.3.3. Airfoil (wing). The minimum airfoil thickness at the root shall be 1/2 inch. The ratio of thickness to chord, at the root, must be maintained at the tip section as well.

3.3.4. Weight. Weight, including all equipment necessary for flight, shall be no less than 26 ounces nor more than 48 ounces.

3.3.5. Fuselage. The fuselage, including canopy and cowlings, but excluding fillets, shall have a minimum height of 2.5 inches and a minimum width of 2.0 inches. These dimensions need not occur at the same cross-section, but must occur in that length of the fuselage bounded by the wing root chord. Profile canopies and cowlings are prohibited.

3.3.6. Landing Gear. Landing gears or wheels are not necessary.

3.3.7. Identification Markings. I.D. markings will consist simply of the contestant's AMA number, or as an alternate, the letter N, followed by the last two or three digits of the AMA number, followed by the first letter of the contestant's last name. Location and size of the I.D. is not important.

4) OPERATION OF THE RACE.

4.1. NUMBER OF PLANES PER RACE. A maximum of four (4) aircraft will be flown in each heat.

4.2. TYPE OF LAUNCHING. Unless

advertised in advance, all launching will be by hand. Launches of all aircraft will be as close to simultaneous as possible.

4.3. NUMBER OF LAPS. Each race will consist of ten (10) complete laps of the racing course.

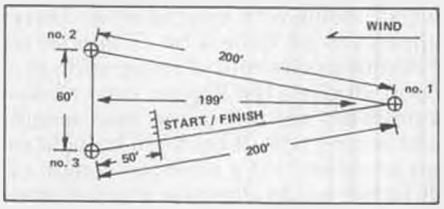
4.4. CUT PYLON. If a pylon is cut by a contestant, that lap will not be made up. The pilot should continue to complete the race. With one cut he will be awarded an automatic point for that heat. If two pylons are cut, the contestant will receive no score for that heat, and shall pull up and out of the race until the heat is over.

4.5. ALTITUDE. Pilots must intentionally fly above the height of the pylon.

4.6. MOTOR START-UP. Any contestant not launched before the lead aircraft completes its first lap, shall receive a zero, and shall not be launched. If no aircraft are launched when the starting flag is dropped, all contestants in that heat shall receive a zero for that heat.

4.7. ROTATION OF THE RACE. All laps will be flown in a counterclockwise direction of rotation, with all turns being to the left.

4.8. RACE COURSE.



5) SCORING. Points shall be awarded after each heat to those pilots who have completed the 10 laps. Note: pilots who have not cut will be advanced in the order of finishing the heat. Pilots with cuts will be given their respective points.

First Place ..... Four Points
Second Place ..... Three Points
Third Place ..... Two points
Fourth Place ..... One point
Did not finish (DNF) ..... Automatic 0
One Cut ..... Automatic 1 point
Two Cuts ..... Automatic 0

The winner of the event is the contestant who has accumulated the most points after the conclusion of all heats. All contestants must be given an equal number of opportunities to race.

There you have it, the whole layout for running an electric pylon race! The advantages of the Astro 05 event are the low noise, relatively low cost, and equal competition. The contests will amount to a test of pilot skill, not mechanical or hop-up genius. This is what has made 1/12-scale electric car racing so popular, and I'll bet the same will hold true for the airplanes.

Lineup of racers at Watts Up Fliers meet. Four Jackrabbits, one Quicksilver (flown to 1st place by Larry Jolly), Bob Boucher's new ship (top right), and a Pilot model.

Jackrabbits were by far the most popular, with four of them being flown by John Sczary, Bill Coleman, and Paul Loghry. John will be offering a kit soon.

The first (as far as I know) electric pylon race in the USA was held in November 1979 at Garden Grove, California. John Sczary sent photos of the contest in which he, Larry Jolly, Phil Bernhardt, Bob Boucher, Bill Coleman, Bob Sliff, and Paul Loghry competed. The most popular design was John's, the Jackrabbit, with four entries. Bob Boucher used his new sport design, and Larry Jolly entered a modified Quicksilver. This took first place, with Paul Loghry and John Sczary in second and third, both with Jackrabbits. John is kitting the Jackrabbit and sent me a set of plans for it. I am very impressed by the design; it is easy to build and looks good. It uses the Astro 05, two channels (elevator and aileron), spans 36-1/2 inches, has 310 sq. in., and weighs 29 to 31 oz. all-up. The airfoil looks quite speedy; it is an 8% semi-symmetrical. Landing gear is shown as an option, and is handy if you have to land on pavement. John will have the Jackrabbit kit ready by the time this is printed, at $26.95. For orders or information, write John at Summit Enterprises, 3034 E. Meadow Grove Rd., Orange, CA 92667. Thanks, John, for all the information and photos. It's good to have some

Continued on page 88

Before and after covering photos of Bob Boucher's latest scale ship, a Porterfield Collegiate. Span is 72 inches, power is an Astro 15 with prop speed reducer. Uses lightweight structure throughout to keep the weight down to a reasonable 4 to 4-1/2 lbs. Watch for the kit.

This month Jerry presents some photos of full-size unlimited hydros racing at the 1979 Seattle Seafair Regatta. Shown above is the Circus Circus hydro making a practice run during qualifications.

R/C POWER BOATS

By JERRY DUNLAP

PHOTOS BY AUTHOR UNLESS NOTED

WHAT IS A "SPORT 40"?

Out here on the West Coast, and possibly in other areas, there appears to be an increasing amount of interest in racing a class of hydroplanes that are known as "Sport 40's." To the best of my knowledge, this particular class, although not officially recognized by either IMPBA or NAMBA, received its initial beginnings in California. The intent of the class, at least in California, is to provide an alternative for the new model boater who wishes to race a hydroplane but isn't particularly interested in the outrigger hydros that dominate model hydroplane races.

The "Sport 40" event in California used these rules at the 1979 NAMBA Nats held last August at Monterey. The boat was to be of the general hull configuration of a past or present full-scale hydroplane. The minimum length was to be 36 inches and no outriggers were allowed. The engine was to be from 3.51 cc to 7.509 cc, front intake, cross flow scavenging. No Perry ported, Schnuerle ported, or rear rotor engines were allowed. Speed control was to be through the use of a carburetor with a maximum venturi bore of .241 inches. The carb was to be of a type that was available to the general boating fraternity and could not be modified in any manner. Tuned pipes were not allowed. A single propeller with the drive dog in front of the transom was required. Twin rudders and outdrives were not allowed.

Although I was unable to attend the event myself, I was informed by friends who attended that the class really wasn't very exciting from a spectator viewpoint. According to my sources, the problem was that the boats suffered from poor performance due to insufficient power. However, those attending from my area did think the class had real potential if racing type engines could be used for a power source. What they saw in California prompted some northwest model boaters to draft up a set of rules for a "Sport 40" class here in NAMBA District 8, the only major difference being that any type of 3.51 cc to 7.509 cc engine could be used, and tuned pipes were also allowed. This article is being written three months prior to our first District 8 race, when the class will be first officially raced for District 8 points for 1980. However, there does seem to be a good deal of interest in the class and a number of these hulls are being prepared for the approaching racing season.

As NAMBA District 8 director, I've already begun receiving a number of questions and some criticism from individuals outside our district about what we are doing with or to Sport 40. There appears to be quite a bit of interest in NAMBA to give official recognition to a Sport 40 class. The biggest areas of disagreement seem to be in boat length and engine type. It has been brought to my attention that a minimum length of 36 inches would eliminate approximately five hundred Sport 40 type boats that one manufacturer has already sold. Others have pointed out that the original intent of the class as a place for the beginner would be lost if Schnuerle ported, tuned piped engines were allowed. I'm sure that both of these concerns have merit, but I don't plan to spend a bunch of words justifying what District 8 is planning to do with a Sport 40 class. Since a majority of model boaters in District 8 voted to accept the event, it doesn't have to be justified to anyone in some other section. A copy of the District 8 Sport 40 rules can be obtained

Bill Bennett, of Las Vegas, is one of the co-owners of the Circus Circus unlimited.

Dave Knowlen, technical advisor and designer of the Circus Circus hydro. Dave has supplied our author with design ideas for models.

Still the man to beat in 1980, Bill Muncey (right) talks things over with a member of the Atlas Van Lines team.

Returning to the pits, the C.C. is framed by the rear stabilizer of the Miss Budweiser, which unfortunately was destroyed in a straightaway record run later in the year.

Steve Reynolds, driver of the C.C., waits to be roped into the berth. Note the unusual rear stabilizer, and how low the boat sits in the water as compared to photo at left.

The Mutt and Jeff Racing Team, Dick Norsikian in black cowboy hat calls for Jack Garcia during a heat at the '79 NAMBA Nats. Photo by Les Smith.

by sending me a self-addressed stamped envelope. The address is: 119 Crestwood Dr. S.W., Tacoma, WA 98498.

If the engine requirement is a big issue, it might be that we can learn from the 7-Litre Class sanctioned by the American Power Boat Association. The 7-Litre Class has been divided into two groups: Division I and II. The difference between a Division I and Division II 7-Litre Class boat is the engine. Division II boats must run with more restrictions to the engine and carburetor. The Division I boats are the "full blown, super trick" jobs. It might be that this could be a possible solution that would allow the intent of the Sport 40 class to remain. Each district could then decide if it wanted to offer Division I or Division II of Sport 40.

AND SPEAKING OF "SPORT 40"

My old boating buddy, Steve Muck, has released a fiberglass version of the 1979 Circus Circus unlimited hydroplane for use in the Sport 40 class. Designed by Dave Knowlen, technical advisor and designer of the Circus Circus, the boat is 36 inches long with a beam of 16 inches. The instruction booklet features lots of photos and technical information. I've managed to get my hands on this new boat and will be doing a complete PRODUCT$ IN U$E review in a couple of issues. Check with your local hobby dealer or write directly to Steve Muck's R/C Model Boats, 6003 Daven Oaks Dr., Dallas, TX 75248.

I should also mention that Steve's deep-vee "Streaker" hulls are doing very well. They were used to win a couple of classes at the IMPBA Internats held in Dallas last September, and they also established some NAMBA records in heat racing and straightaway speed. The latest record came last November at a NAMBA straightaway record trials held at Monterey, California. Ed Fisher used a K&B 3.5 powered "Lil Streaker" to set records in the A Mono and A Deep-Vee classes. The same boat set two records? Right you are. When Ed set the A Deep-Vee record he used a deck cowling with drivers to record a two-way average of 47.28 miles per hour. Without the drivers and cowling, he averaged 47.84 miles per hour and beat his old record that he held with his Northwind 21. Look for Ed to establish a new A Mono oval record once he gets an opportunity to heat race the boat.

WHILE ON THE TOPIC OF NEW RECORDS

At that same record trials at Monterey, Frank Ward and Howard Power set new records in C Deep-Vee and X Deep-Vee. Frank used a Rossi .64 for the new C Deep-Vee record of 62.66 mph. A Rossi .80 provided the power for Howard's X Deep-Vee record of 64.05. Both Frank and Howard were using Wardcraft deep-vee hulls.

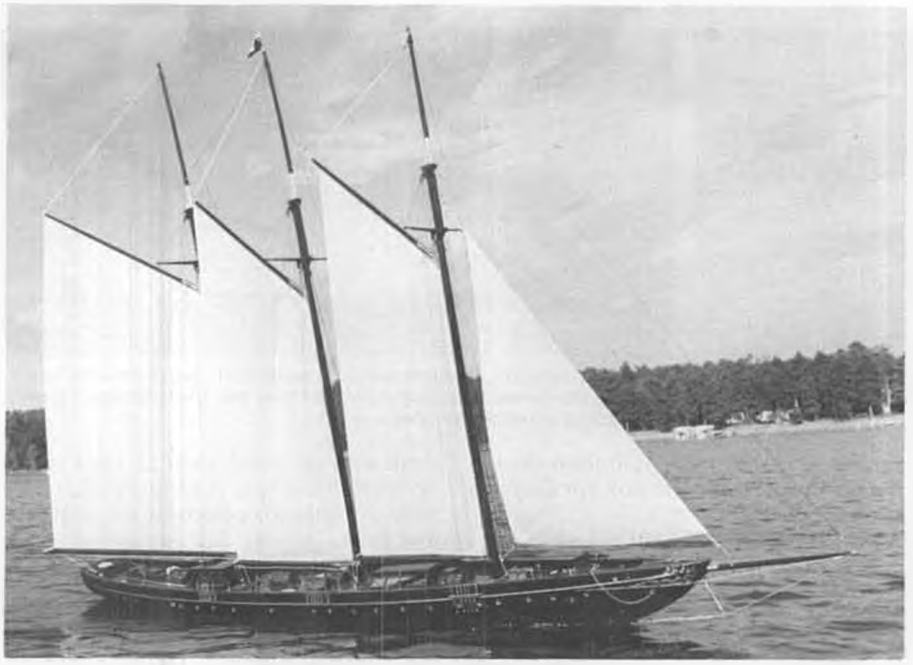
An interesting sidelight to the record Frank set was the assistance Howard provided. While Frank was making a record attempt on the first day of the time trials, he experienced radio failure and ran his boat into the beach at over 60 mph. The impact rendered the front one-third of his boat severely damaged. Howard, who owns a hobby shop in Monterey, gave Frank a new Wardcraft hull off the shelf. With the assistance of Ed Fisher, the damaged boat and new hull were taken back to the motel and repairs commenced. The splintered bow section was cut away and a matching section was cut from the new hull. This new front end was then grafted onto the existing hull with resin and glass cloth.

The repairs proved adequate and Frank set the new record the next day with the patched-up hull. How's that for cooperation between competitors?

Continued on page 99

Ken Riley, with the saw, makes some minor mods to his Mongoose outboard tunnel, while Charlie Pottol offers some friendly assistance with hammer and channel locks.

Bev Power, 1979 NAMBA Nats Contest Coordinator, is flanked by NAMBA's recording secretary, Don Coad (rt.) and new NAMBA President, Stuart Russell. Les Smith photo.



PHOTOS BY AUTHOR

The author preparing to make sail. That he is a master craftsman is evident from the fantastic detailing on the Atlantic's deck and interior.

ATLANTIC

By DWIGHT BROOKS . . . No matter what your modeling interest may be, the pure enormity of this project has to capture your imagination. Original ship still holds the record for fastest Atlantic crossing by sail.

• October of 1978 seemed to come sooner that year than in previous years. I had completed a seven-foot tugboat the year before called "Toot Toot" and enjoyed countless hours of enjoyment with it in Northern Minnesota, where I have a cabin located on the most beautiful lake you can imagine. Large in size and free of other R/C'ers and water that would make R/C boaters' mouths water. Sand beaches and easy access made launching large models a delight.

It was time, however, to decide upon a production for the summer of 1979. I'd looked in all the local hobby shops for something to grab my imagination, but, as usual, there was nothing which attracted me. I thought to myself that such great strides have been made in the model airplane field, what with quarter scale now on the upswing; why don't they do this with boats? Either there's no market for them, or else the boating field doesn't hold much imagination. You can tell me all day that size is the problem with large boats, but you'll never sell me on the idea. Guys get 8 and 10-foot planes and gliders to the field, so how come boats are any different? Someone usually has a truck, which may be necessary.

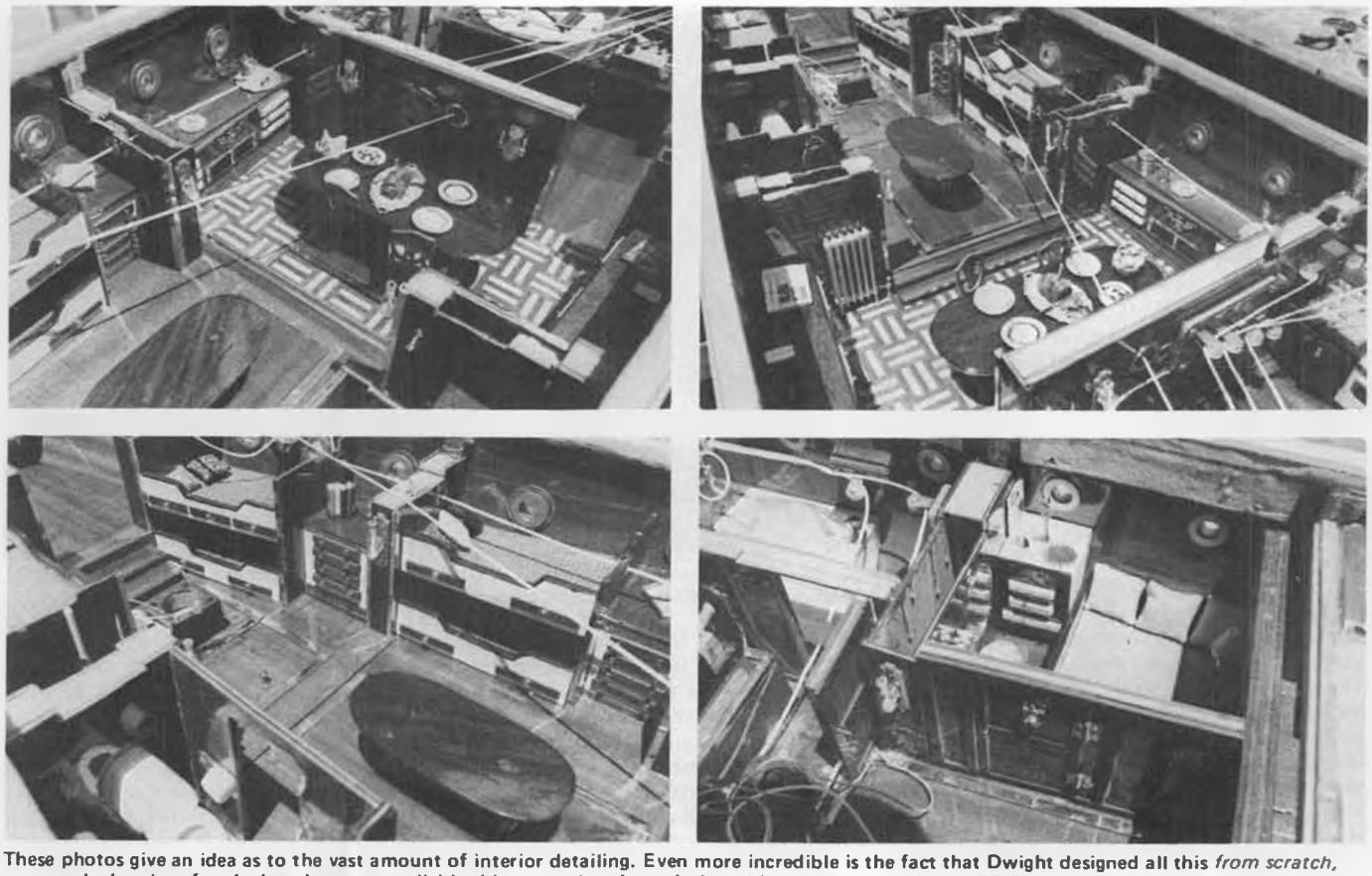
I found nothing in the hobby shops and even less in the various publications that I felt was large enough and provided the scale I was dreaming of. Then one day I was in downtown Los Angeles having lunch with my old friend, Al Wood, and griping about my predicament. He showed me a built-up model of a schooner called "Atlantic" and, while small and built of plastic (Revell, I think), it did have very definite eye appeal and the most beautifully designed hull I'd ever seen for a sailboat. Thus, the idea for the upcoming production was born. Her gleaming black hull with white boot top and green bottom seemed so beautiful I couldn't resist the temptation to get busy and lay the keel. Further research made the whole idea even more exciting. Built in 1905 in New York, the real boat had set a record for crossing the Atlantic in record time: 12 days, 4 hours, 1 minute, and 19 seconds, averaging 10.4 knots for the 3,014 miles, a record which, to this day, is unbeaten, although several attempts have been made. She carried 18,500 square feet of canvas during one sail "set" which nearly broke her in half, and the books which have been written of this fantastic episode are enough to get your attention. No, I thought to myself, it would be worth the effort to try and recreate such a schooner in model form.

I'd decided on a length of ten feet and didn't care what it ended up weighing. It had to be complete right down to coffee cups, bunks, galleys, staterooms, etc., complete with electric lights so one could see the interiors easily.

My biggest concern was the method of controlling seven sails. Vortex Engi-

The keel and all bulkheads were cut from 1/2-inch mahogany plywood, later planked with balsa strips, then fiberglassed.

How would you like to build models in here?! The author's spacious and well-equipped shop is also his place of business.



These photos give an idea as to the vast amount of interior detailing. Even more incredible is the fact that Dwight designed all this *from scratch*, as no scale drawings for the interior were available. Lines running through the cabin connect to a Vortex SC-3 sail control unit.

neering of Santa Barbara convinced me that their well-proven "SC-3" unit could handle the job. It had 90 pounds of torque, and I immediately put my order in, as that section of the boat would have to be built around the unit and designed to be watertight. The unit arrived safely within a week.

PLANS

Plans were eventually located and purchased from Bluejacket Shipcrafters, located in South Norwalk, Connecticut. These provided the bulkhead cross sections as well as a good general drawing of the real boat. Portions of the plans were enlarged to provide a scale arriving at a length of ten feet. It worked out to just under 3/4"=1'. In addition, the plans provided excellent detail of the sail arrangement.

SAILS

I had to make darn sure that I could locate someone who would sew sails and subsequently called my good friend, Rod Carr, back in Springfield, Virginia, and discussed the production with him. He agreed to handle that part of the task for me when I was ready. Rod has since moved to Washington State. His workmanship turned out to be flawless in the end product. Two sets of sails were ordered of different materials and different weights, inasmuch as we didn't know what to expect. After looking over the plans, he strongly suggested I reduce the sail size by 20%, which I did.

THE HULL

Once enlarged, the cross sections were traced on 1/2-inch mahogany plywood and cut out on a bandsaw. The same was done with the keel, which was built in three sections for strength. The keel was also cut from 1/2-inch mahogany and gussetted, glued, and screwed at each break. The bulkheads were glued to the keel with the usual alignment method of blocks and straightedges nailed to the ten-foot work table. Planking commenced several weeks later, utilizing 1/8x3/8 balsa strips for the most part. Some steaming was required to assume various shapes throughout the hull and each strip was then glued and nailed to the bulkheads. The entire process was performed with the hull inverted. Once fully planked, the model was put in an upright position and all the nails removed and later filled with Bondo and sanded, etc. At this point the hull seemed far too light.

For strength and watertightness I utilized fiberglass cloth "matt" on the entire inside of the hull. Two coats of resin were applied to give good strength and smoothness. At the same time the 12-volt motor mounts were installed. The next step was to float it in the pool, where it immediately rolled on its side, which, at the time, seemed humorous to me. After the addition of nine common bricks, she floated close to the imaginary water line I'd drawn. At this point I realized weight was a factor. I was going to need lots of it, and with the eight-foot masts, this weight would have to be kept low in the hull.

Anyway, back to the shop dripping wet she went, and the floorboards were fitted, cut and installed with the necessary cutouts so as to be able to gain access to the motor area and the two bilge pumps I'd installed fore and aft. Wiring for these units was installed and completed prior to final floor attachment. I utilized 1/8 mahogany plywood for the floors and coated both sides with resin prior to assembly to ensure a good seal. Fitting the floor and the numerous cutouts took weeks and a lot of wasted plywood. I decided from then on to use cardboard templates for all the fitting. These would then be traced on wood and cut out.

THE GENERAL INTERIOR

With the flooring in place, work began on the numerous bulkhead walls, steps, doors, tables, etc., using 1/8 aircraft mahogany plywood, stained and sealed and varnished prior to final glue-up. I counted over 55 pieces of fitted plywood during this period, and it took several weeks just to make things look presentable. It seemed endless. I suppose the most difficult part of the entire production was the interior, because I had nothing to work from, plan-wise. The entire below-deck arrangement came out of my head, inasmuch as I was unable to locate anyone who knew what the original layout was. After all, the original boat was built way back in 1905. No one remembers, although I have had some contact with a man who was involved with her construction back in those days. He simply can't recall except to say it was 'most elegant.' The decks, he said, were solid 3-inch teak.

In any case, once completed, the interior was given a final varnish coat and readied for main deck attachment.

At the same time, all the wiring for the stateroom lights, galley areas, and crew quarters was finalized, tested, and sealed with proper waterproof materials. Just to create some expensive taste, I utilized parquay flooring in the Main Salon area, which I purchased from a local dollhouse shop.

Items such as working crystal lights, coffee cups, decanters, books, silverware, bottles, sugar bags, flour bags, flower vases, plus a myriad of other incidentals were all acquired from miniature dollhouse suppliers. This took a lot of searching to try and locate the correct scale-like appearance from several suppliers, but it did work out nicely in the end. Finally, the entire interior hull sides were covered with 1/16 mahogany plywood of aircraft grade and glued in place. This gave the effect of "paneling" to the ship's interior.

CONTROL UNITS

The SC-3 sail control unit along with its battery and the servo are located in a waterproof box mounted amidships in a watertight compartment. In addition, the forward, neutral, and reversing switch for the 12-volt electric motor with its own servo is located in the same area as the SC-3 unit. Standard Kraft servos were utilized throughout the boat with a heavy-duty servo operating the rudder itself. The heavy loads from that massive rudder demanded a heavy-duty servo and, I believe, this particular servo is rated at 60-pounds thrust. Further, all electric switches for the mastlights, interiors, bilge pumps, and deck lighting are located in the aft watertight compartment. Illuminated switches indicate which one is on, just in case one forgets.

THE MAIN DECK

After producing a good cardboard template, the main deck was cut from 1/8 birch plywood and strip-planked with teak strips measuring 1/4-inch square, leaving gaps between each which were filled with Bondo to which I added black dye. Once dry and sanded smooth, this provided a "caulking" effect between the teak strips. Nails were used to attach the teak strips to the birch plywood and were later removed (after the glue dried) and the holes filled with Bondo. Once completed and having ensured a good overall fit of the deck, I proceeded to make the necessary deck cutouts so as to gain access to the interiors for viewing and for access to the motor, bilge pumps, and various radio control units, as well as the electrical system switches. I utilized a "lip" method of seating the deck cutouts to the deck itself. The top of the wooden lip was covered with sponge rubber seating tape and secured with contact cement. The cutout was then held in place with blind nuts and hex bolts.

MASTS

The three masts were produced from clear Sitka spruce and sent out for tapering, as I didn't have the equipment to accomplish this. The masts are "stepped" through the main deck to the hull bottom. Rubber hose rings were used to provide a tight fit for the through deck attachment. Nylon-covered 120-pound steel fishing line was used for the mast stays. This was wonderful material to work with, and no kinking resulted. Cross bars located near the tops of the masts were also made of spruce and glassed into the masts themselves for strength. A small 1/8-inch brass tube was mounted on the forward side of each mast through which electrical wires were fed up to the "spreader" lights located on the cross bars themselves.

Dwight shares the water with his creation at Gull Lake, in northern Minnesota. Overall length is 10 feet, weight is 148 lbs. Sails were made up by Rod Carr.

Once stepped, the masts were secured to the outer sides of the hull by utilizing a turnbuckle arrangement. All in all, 174 feet of steel line for the stays was used. The tops of each mast are removable through the use of a tube-within-a-tube arrangement. This is needed just to get the boat under cover during rainstorms and heavy weather.

Rigging the boat takes upwards of one hour, assuming the masts have been removed. However, daily use without mast removal only requires about 20 minutes to get the mast tops seated and only two turnbuckles need to be threaded to seat the tops of each mast. Stays are coded so as to provide easy assembly if masts have been removed for shipping, etc. Each mast is secured, through a stay line, to the next mast so as to provide the proper "set." This is accomplished through fore and aft main turnbuckles located at the extreme ends of the boat. Each mast has 14 stays to properly secure it to the hull.

Cruising majestically, the model Atlantic is impossible to distinguish from the real thing.

CABINS, TOPSIDES, ETC.

All cabins were made from 1/8 aircraft mahogany plywood along with some sections of solid mahogany to eliminate that miserable edge grain offered by plywood generally. Grating both fore and aft was hand made and was by far the most difficult part on deck. I built both units much the same as an egg crate, and it took days just to get one section which looked good enough.

Cabin windows are made from 1/16 lucite, glued into position. Anchor chain was a standard item, as was the nylon string used to simulate ropes, etc. Portholes were purchased from a local washing machine store, where brass flanged washers are used in the units. These make perfect portholes, especially since they are flanged. All portholes were polished and coated with clear urethane and glued into position. The portholes were covered on the inside of the hull with clear lucite glued into position, after which the model was laid on her side and clear casting resin poured into each porthole so as to ensure watertightness. I didn't want to do this, as it obstructed the view of the ship's interior to the searching eye, but it seemed to me this would be a natural place for a multitude of leaks which would send her to the bottom. The boat will not float full of water, I'm sure, as it weighs 148 pounds.

No section provided enough room to employ the use of foam, so I simply used ping pong balls attached to a nylon string, which supposedly would float to

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FREE FLIGHT AND CONTROL LINE

Latest compressed-air powered model by Walt Winberg, Richmond, B.C., Canada. Designed around a one-cylinder engine driving an 8-1/2" prop and using a 12" aluminum tank, the span is 31" and the weight is 3.65 ounces (!) on wheels, and 4 ounces on floats. Wheels are built up from laminated balsa and wire, cowling is the end of a beer can. Ship will R.O.W. on as little as 70 lbs. pressure in calm air.

Charlie Johnson's photos from the World Champs show two European combat fliers just before . . .

. . . and after a line tangle. Hammersley helps get the snafu straightened out.

PHOTOS BY CHARLIE JOHNSON UNLESS NOTED

Control line

By "DIRTY DAN" RUTHERFORD

THE REPLACEMENT IS ALSO EXCELLENT

I see that George Aldrich has stepped down from doing his part of **RCMB's** "Fuel Lines" column, and that is especially unfortunate, as he is recognized as *the* engine expert in America, due in no small part to being able to successfully modify engines for hire as a full-time job and without any other income. Anybody who has tried doing engine work for others will realize the significance of that. Also unfortunate was the fact that George had hinted at going deeply into what makes an engine go fast in future columns, but these columns are still floating around loose in his head.

I assume that the reason George is not able to do the column is his fuel brewing business. He makes an excellent line of fuel, let's hope he doesn't fall in a mixing vat or something. . .

The reason for discussing this change is that now none other than Henry Nelson will be doing a regular column, and WCN didn't exactly give him the introduction he deserves. In case you missed it, the intro was about like saying, "Here is Dave Brown, well-known R/C flier."

Henry's latest and probably best known feat is the fact that he can provide Team Race fliers with an engine, the Nelson 15, that is of World Championship caliber right out of the box. I don't believe that any other engine manufacturer can claim that for any engine, no matter the intended event. And Henry's accomplishment is all the more significant, having been done in an event that is extremely competitive and where the powerplant is all-important. When you see World Class Team Race guys buying Nelson 15's to replace their much breathed-upon Bugl, Rossi diesels and converted glow Rossi's, you know the Nelson is hot.

However, Henry is not limited to familiarity with diesel motors only, as the pictures this month prove. It was almost a year ago that I had been down in Monterey, California, and on the way back to the airport in San Jose we stopped in to see Ron Sheldon at his hobby shop. It was only a few minutes later that in through the back door came Tim Gillott and Henry Nelson. And guess what Henry was looking for? Nitro. I was stunned . .

That was the time when the nitro shortage, or news of an impending shortage, had hit those in the know. Henry was on the West Coast to buy a new Porsche, planning on driving it back East. Of course, a Porsche has a lot of room for luggage (snicker, snicker), so he was going to haul as much nitro back as he could.

The man of the hour, Duke Fox, holds a plaster fox made just for him by Debbie "Sign My T-Shirt" Imhoff. Photo taken at '79 Nats.

As soon as I realized what Henry and Tim were up to, it was a mad dash for the rented car to get the camera. And here in this issue of **RCMB** is presented photographic proof that Nelson, world-famous designer/manufacturer of the Nelson 15, is also a nitroholic, just like the rest of us.

FLYING LINES

That is the name of an excellent C/L newsletter presently being published by Mike Hazel and John Thompson. Being based in the Northwest, the newsletter does have a lot of stuff about people you will probably never meet, but then again, each issue also has columns on Combat, Carrier, Racing, and Precision Aerobatics, and the information in these columns is all quite good. There are also classified ads which you can use to sell that old pile of a motor, regular ads for places like Chop's Products, Inc. (lots of good racing items), a hobby shop directory, and so on.

This is a newsletter that is so good, the renewals for 1980 subscriptions started coming in even before Mike and John had asked for them! And at a recent large contest, every single entrant was a subscriber to *Flying Lines*. If you would like to subscribe, send $6.00 to Flying Lines, 1411 Bryant Ave., Cottage Grove, OR 97424. You won't be disappointed.

OF NEWSLETTERS AND PROMOTION

In the past I have done a large, comprehensive newsletter and also worked hard in promoting C/L flying. The results were very positive and we had excellent contests with large turnouts. But like all things, it got to be a bit much for me, and with other things (like a family) demanding more and more of my time, I had to drop the newsletter and also could not do so much work in promotion.

I don't mean to try to take credit for all

of the work that was done by many, but the whole effort did tend to revolve around a good newsletter and a couple of us who gently pushed people in the best directions. When that particular era in Northwest C/L flying ended, the C/L modeling took a definite slide. Still had a lot of activity and competition was good, but the numbers of people weren't the same as before, so interest was off some.

Now Mike and John are once again proving my theory that activity in any modeling event is helped immensely by the publication of a good newsletter, distribution of contest dates and results, staging of Series Races where points are kept and a Series winner given something special, and a newsletter where certain things can be openly discussed, all readers seeing what the other guys want to do.

Doing a newsletter is also a great opportunity to nudge C/L activity toward various activities. Although *Flying Lines* addresses all flying activities, the primary vehicle for promotion right now is Northwest Sport Race, as this event tends to draw a lot of modelers who otherwise would have never competed. In your area you may want to do something else. I know that when I was doing a newsletter the two big events around were Combat of most any kind and Goodyear Racing, so that newsletter tended to deal with them a lot, although other events were also included.

What a newsletter is worth to the promotion of C/L in your area is hard to predict. In this area of the country it has proven to be all-important; at least half of the entries at each contest can be traced to being there because of the newsletter. In fact, it goes further than that. Mike and John have already taken advantage of the thought in the previous paragraph by staging a Drizzle Circuit, a five-contest schedule featuring Sport Race along with secondary events like Mouse Race, Goodyear, and so on. At each contest, points are earned toward a season championship trophy and the

Dick Stubblefield and Eddie Thomas get set to fire up a Fast Combat ship at '79 Nats. Neal Rose holds his head while Paul Curtis counts the number of ants running up Neal's leg.

contests are staged up and down the Northwest from Seattle to Portland to Eugene, Oregon. If it were not for the *Flying Lines* newsletter, all of this activity would simply not exist.

The point is that for proper promotion, you just can't beat a well-done newsletter. It gets people to thinking about flying, it can be used to guide activities toward a desired result, increases communication several times over, and so on. If you see your area lacking in C/L flying, get together a newsletter. It is your best shot at getting something worthwhile going.

BUT FIRST, THINK. . .

One of the potential problems when promoting C/L flying is the promotion of too many events at once. It is best to pick up on just one or two events that are known to be popular in other areas and then go with them. Not to the exclusion of other events, of course, but you must identify your primary events and be ready to shift with the flow on the secondary events.

My reasoning here was always that if we promote a certain event, we should be able to offer those competitors who go out and build models as many contests as possible to use that equipment in. To push Slow Rat for a few months, only to have just two races for that event, is ridiculous. Next time you start promoting another event, these people who built Slow Rats and saw them gather dust are going to tell you what you can do with it.

This point can't be overemphasized. As soon as you get about 20 people active in C/L, you will be hearing some of them wanting to add their own pet events to contests. The best thing to do is to get your primary events covered, and then if there are dates or extra times at other contests, these events can be tried, just to see what kind of response you get. Just don't detract any more than necessary from the primary events, because they are the base upon which you are trying to build.

Again, using this area as the example, Combat is strong still and probably always will be. Also strong is Northwest Sport Race, and both of these events get their share of contests. But we need a few more events, and once Sport Race was covered with the Drizzle Circuit, as well as upcoming summer contest days, some different events were added to each DC schedule, and they are secondary. By doing this, nothing has been taken away from the primary event, yet it was found that there seems to be a lot of interest in Mouse Racing, both classes. If Mouse (yecchh, let's call it "small-bore" racing instead) catches on, it can be promoted more, added to a few contest days, and we have one more solid event.

Then the process can start again. Sounds like a slow battle, but it is much more effective than trying to promote all events at once, each having only a few active followers. •

SAFE FLYING

IS NO ACCIDENT

Our new Fuel Lines writer, Henry Nelson, gets the pump primed and ready to . . .

. . . dispense a few gallons of nitro into jugs held by Tim Gillott. More in text. D.D. pics.

Flightmasters Prexy George James with his good-flying Boulton-Paul Defiant at Flightmasters Jumbo/Peanut contest.

Another low-winger, a Turbo Thrush Commander crop duster by Walt Mooney. Long-nose turbos make good rubber models.

PHOTOS BY AUTHOR

FREE FLIGHT SCALE

By FERNANDO RAMOS

• On December 2nd, 1979, the Flightmasters held their Annual Jumbo/Peanut contest. Rather than go into detail as to what went on at the contest, I would like to give you a brief impression that I received from this fun event. First of all, the evolution of the large rubber model has come a long way as far as performance is concerned. With few exceptions, each model flew exceptionally well. It is interesting to note that the conventional models were the top runners in the contest. Conventional in the respect that they were the usual cabin type models. I know that the fliers of these machines will probably disagree, but what I'm leading into is that I appreciate modelers building airplanes that are not conventional cabin types. This is where the Flying Aces rules really come into their own. They encourage a modeler to build the unusual by giving the model additional points, and penalizing the cabin or parasol types for their conventionality.

Out of all of the Jumbos entered, the cabin types were the ones that were having the best times. Yet, there were several low-wing aircraft that were doing extremely well, such as Mike Mulligan's Zlin with a high time of 78 seconds. George James was getting beautiful flights out of his Boulton Paul Defiant, averaging about 50 seconds. Walt Mooney had a nifty cropduster, but Walt was having trouble with motors breaking. Even my Swiss target tug wasn't doing too badly, with a top flight of 60 seconds.

My feeling is that we should also encourage the building and flying of aircraft that aren't done frequently. Take the R/C fraternity, for example. There must be dozens of Mustang kits available in all shapes and sizes. At one time in my life, I use to like the venerable Mustang, but overexposure has done it in for me. There certainly isn't anything wrong with the Piper Cub type aircraft, and we know that they will fly no matter what, but there has to be more to modeling that a sure thing! Not only is it not challenging to build the conventional types, but one never learns how to adjust and trim low-wing and multi-wing aircraft.

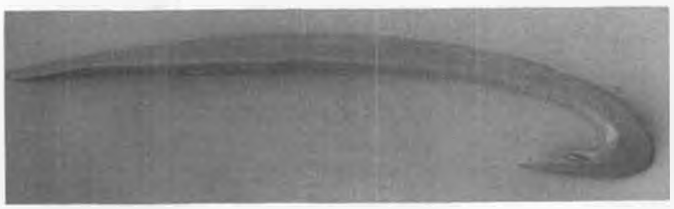
I guess what I'm saying in essence is, don't get into a rut! Come out to the next contest or fun-fly with some off-beat aircraft that will thrill your buddies. The topper will be when you wind up that jewel and send it off for a spectacular flight. You know that the satisfaction has to be greater than if you had done the same thing with a Cub or T-Craft. I am going to recommend some kind of rule change for Jumbo, which I hope will encourage the building and flying of unusual aircraft. I further hope that many of you share the same feeling I do in this matter. I'll let you know what happens.

I want to thank all of you who have taken time to write and ask me various questions that you would like answered. From reading many of these letters, it is obvious that those of us who live in areas where there is plenty of modeling activity are fortunate compared to the lone soul who has to gain all his experience through trial and error, and from reading model magazines.

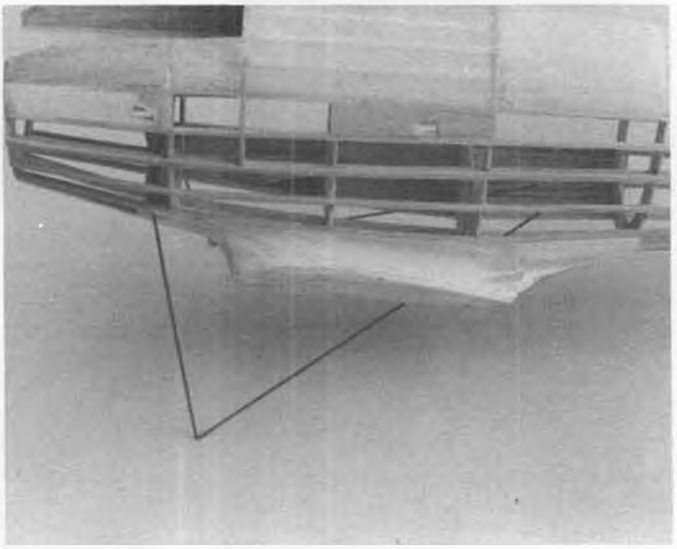
One request I have had recently is to talk about a method for making wing fillets. Some modelers deliberately refrain from building models which have nice, flowing fillets. This isn't necessary, because making wing fillets isn't that bad, so here are several different ways to go about it.

The first type I will describe is often used on gas models. These are very easy to make, but they are a bit heavy. This

The paper mache fillets, made from silkspan and white glue, on Fernando's Schoenfeldt Firecracker.

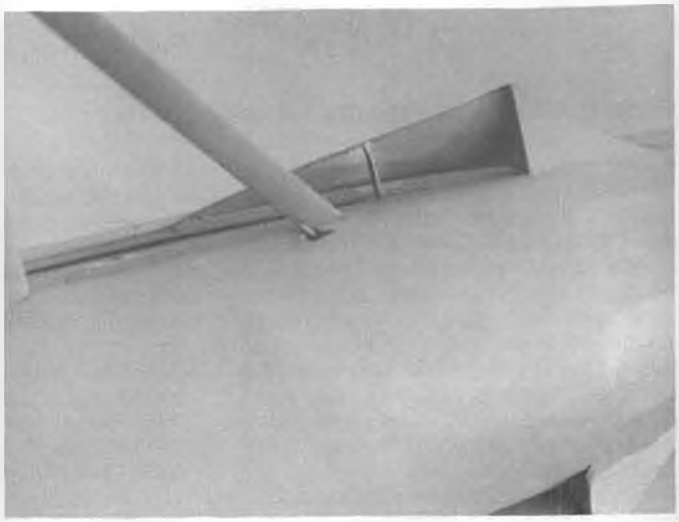


The balsa form used to make the paper mache fillets on the Firecracker.



The all-balsa fillets on Fernando's Pfalz take the longest to make but look the best when finished.

Two examples of card stock fillets. These are most commonly used on rubber scale models because of their light weight. They're also one of the easiest types of fillets to make.



Top and bottom views of the card stock fillets on Fernando's Flyline Kinner Sportster, unique in that they are fastened only to the fuselage so that the wing panels can be removed.

fillet is very common with R/C models with their removable wings. The wing saddle on the fuselage is undercut an additional 1/32 inch to accommodate a balsa sheet which will be glued onto the wing saddle of the fuselage. This sheet should extend beyond the side of the fuselage to whatever width is dictated by the fillet. A balsa triangular shape gusset is added at the trailing edge of this extended sheet of balsa so that the fillet will fair properly with the fuselage. In typical R/C fashion, the fillet is usually made with a material called "Epoxolite" (made by Sig), which is an excellent product. For those of you who may not be familiar with it, it is a two-part epoxy putty which is water soluble until cured. One can make the putty flow just the way you want by the use of a little water on your fingers.

So, the area between the balsa sheeting and the fuselage is filled with this material. It is then finished to the proper contour typical of a wing fillet using your fingers and water. It is imperative that you get a pretty good finish, because there is one thing that Epoxolite is *not:* easy to sand! If your model is an R/C, then the sheet balsa would be trimmed away for access to the radio gear. This is probably the easiest way to make wing fillets.

Next, and probably the most widely used by modelers for their rubber-

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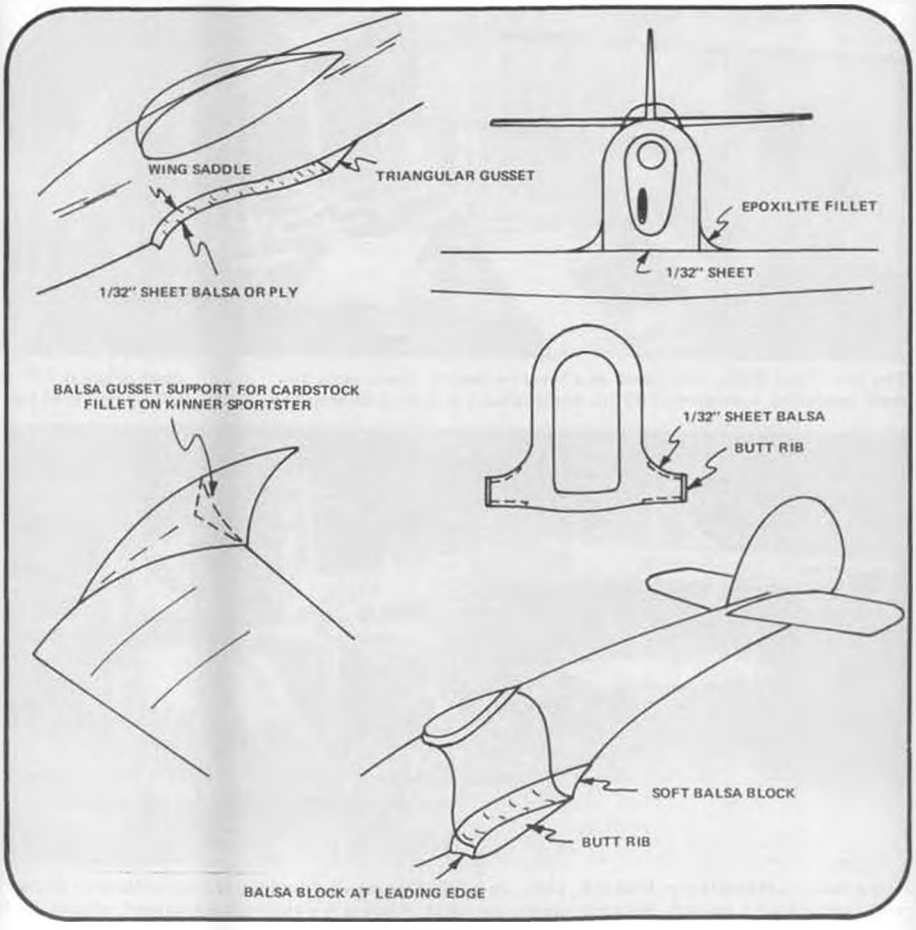

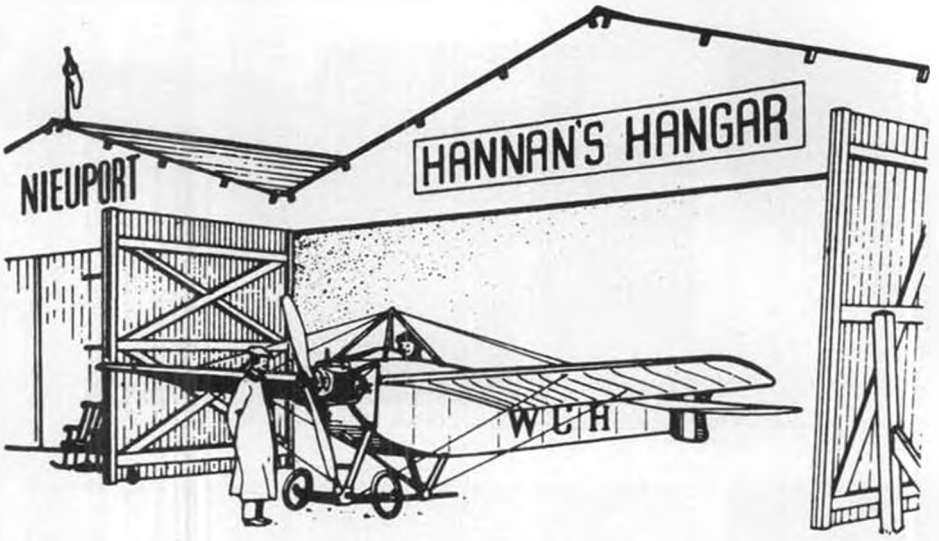

Genius: An infinite capacity for taking pains.

• We don't know the author of the above quote, but the idea could well apply to dedicated model builders!

AEROSPACE HISTORICAL CENTER

At long last, the San Diego Aero-Space Museum and Hall of Fame, which were destroyed by a tragic fire, are being reopened to the public on February 22, 1980. The site, formerly known as the Ford exposition building, has over 50,000 square feet of display area plus a central courtyard with another 21,000 usable square feet.

Museum members have already previewed the facility and have been most impressed with the amazing restoration of the 45-year-old building, which is much more spacious that the previous museum location. Some thirty aircraft are on the display list, although not all have yet been installed. Among the notable machines in the inventory are:

1903 Wright "Flyer" reproduction
1910 Bleriot reproduction
1911 Wright "B" reproduction
1917 Curtiss JN-4D "Jenny"
1917 Standard J-1
1917 Nieuport 28 reproduction
1919 DH-4
1926 Consolidated PT-1
1926 Ryan M-1 reproduction
1927 "Spirit of St. Louis" reproduction
1928 Fleet 2
1934 Morane-Saulnier 230 (ex Blue Max movie plane)
1937 Waterman Aerobile
1938 Taylor J-2
1939 Piper J-3 Cub
1940 Rearwin Cloudster
1940 Grumman J2F6 "Duck"
1943 Grumman F6F "Hellcat"
1953 Convair "Sea Dart"
1953 Convair YF102A
1957 Ryan X-13 "Vertijet"
1974 Evans VP-2
1977 Gossamer Condor no. 1

The collection also includes some 36 miscellaneous aircraft engines.

And the technical library, the real heart of any museum, is developing nicely. Special thanks to our readers who contributed to this monumental restoration effort, and be certain to visit the Aerospace Historical Center in Balboa Park if you are in the San Diego vicinity.

MUPPET MODELS?

Lucky San Diego residents had another treat in December-January with the display in the city's Museum of Art of the television Muppets. We had the good fortune to attend, and seeing these

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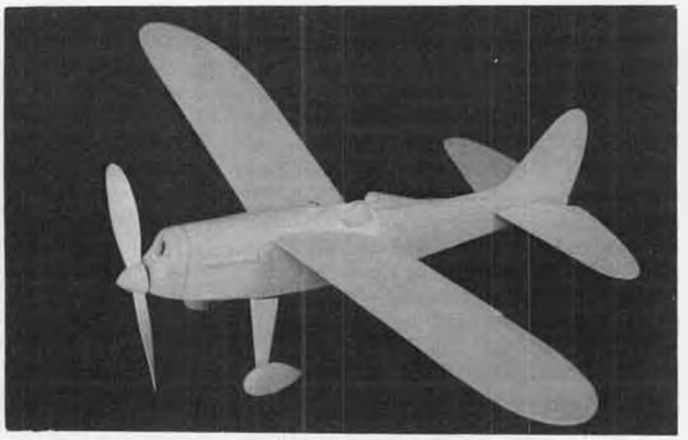
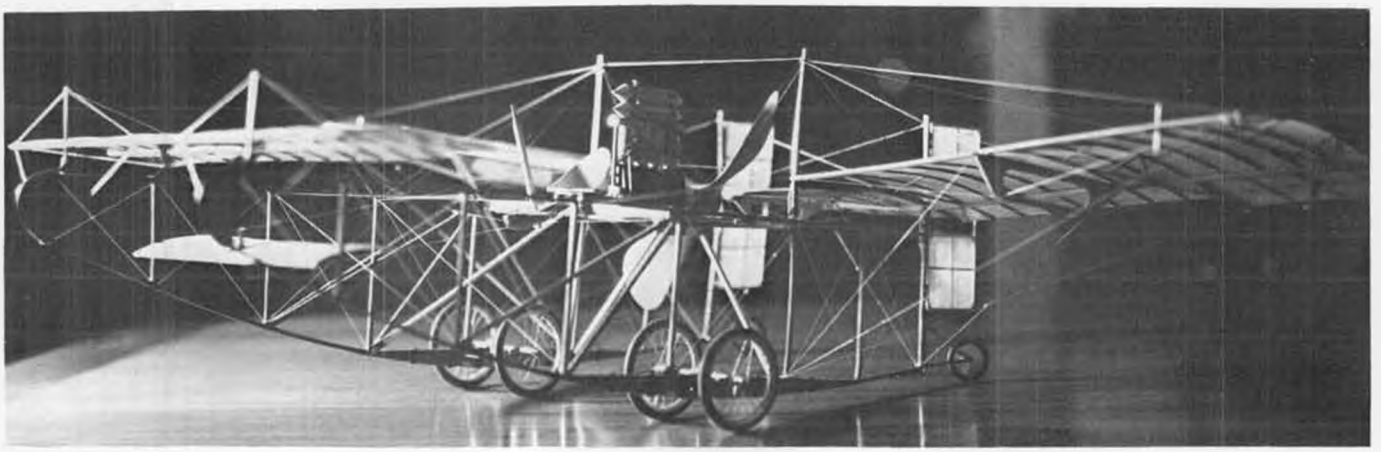
The late Doug Gillies engrossed in a favorite hobby, static scale aircraft modeling, surrounded by his comprehensive historical archives.

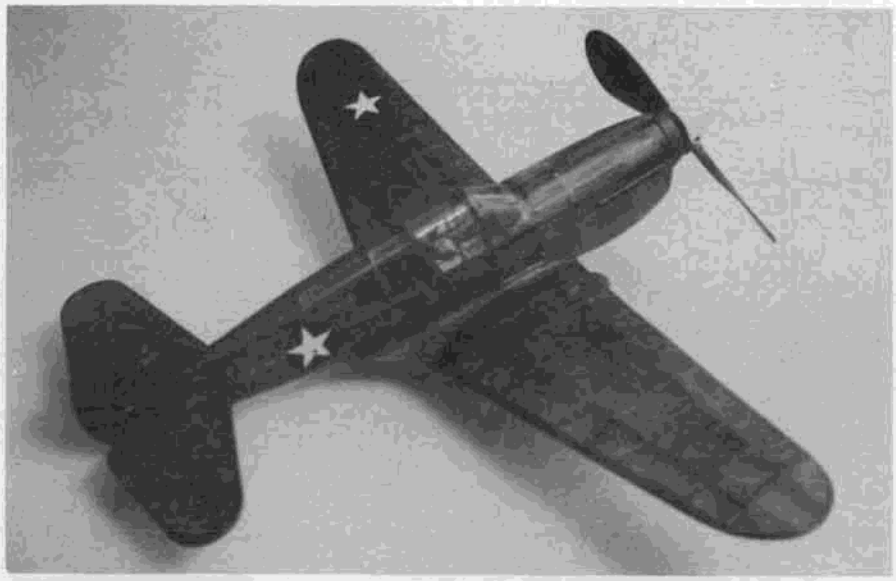


Neat original F/F design by Mort and Adam Grosser of Menlo Park, CA, is powered by a Brown Jr. CO_2 motor.



Dave Acker's magnificent Valkyrie, built from Bill Stroman's drawings in *Flying Models*. Constructed from basswood, bamboo, bamboo paper, and finished with varnish. All controls are movable. Rigging is nylon monofilament, wheels are by Fulton Hungerford.

PHOTOS BY AUTHOR



PEANUT SCALE

CURTISS P-40E WARHAWK

By STEVE GARDNER . . . One of the better-flying WW-II Peanuts, Steve's P-40 was 3rd in the WW-II category at the '79 P.P.P.P. Contest.

• In 1937, Curtiss decided to update the P-36 Mohawk to contemporary standards. To do this they used the standard method of the day: more power. The 900-horse Wright was replaced by an Allison liquid-cooled V-12 with 200 more horses and less than half the frontal area of the big Wright. This increased the weight by better than a thousand pounds and lengthened it by three feet.

The result was the P-40, a rugged, multi-purpose airplane that found work throughout WW-II with a number of different countries. Production stopped in 1944 after 13,738 were built.

Several examples are still flying today with the Confederate Air Force and other old airplane buffs.

To own one of your own, you will have to build it. Start with the tail (I do the simple stuff first to get into the building mood). The stab is started by pinning the 1/16 square leading and trailing edges down, followed by the spar and the laminated tips. The ribs are half as wide as the spar because I like to use so many of them, so they are thin to keep it light. This is important even with the long nose, so use light balsa in the tail. Build the fin in the same manner as the stab.

The wing is next. Start by pinning the leading and trailing edges down, followed by the wing tips. Now add the sliced ribs on top of the wing, trimming them to fit at the trailing edge. Flip the wings over and add the spars, which are tapered from the width shown on the side view to 1/16 at the tip. Add the rib bottoms and fill in the nose of the rib at the landing gear attachment with 1/16 balsa. Build the center section now, then add the wing halves with 3/8 of an inch dihedral under each tip and 1/16 inch of washout in the tips. Mount the landing gear tubes with epoxy at the angle shown on the plans. The tubes themselves are 3/32 O.D. aluminum tube flattened to clamp onto the .020 wire gear strut.

Begin the fuselage by cutting out the top, bottom, and side keels from medium balsa. Use care to cut the keels and formers accurately. The formers are 1/32 medium soft balsa, the grain running vertically. Pin the top and bottom keels down and add the formers, making sure they are square with the keels. Add the side keel and remove the fuselage half from the board. Glue the other formers on, including F5 (the window frame). The side keel and stringers go on now. The stringers are made from 1/20 sq. or 1/32x1/16 medium soft balsa. The stringer positions shown on the plans can be changed to straighten any stringers that are crooked. Sheet the first two bays of the fuselage with 1/32 soft sheet if you need a place to hold on to while winding the model. Add the front key plate to the fuselage and carve to fit it to the key and the nose. Make a nose plug of 1/4-inch hard balsa and carve it to fit the spinner and key plate, then add the key. Carve a plug for the spinner and key plate, then add the key. Carve a plug for the spinner and vacuum form one as shown on the plan.

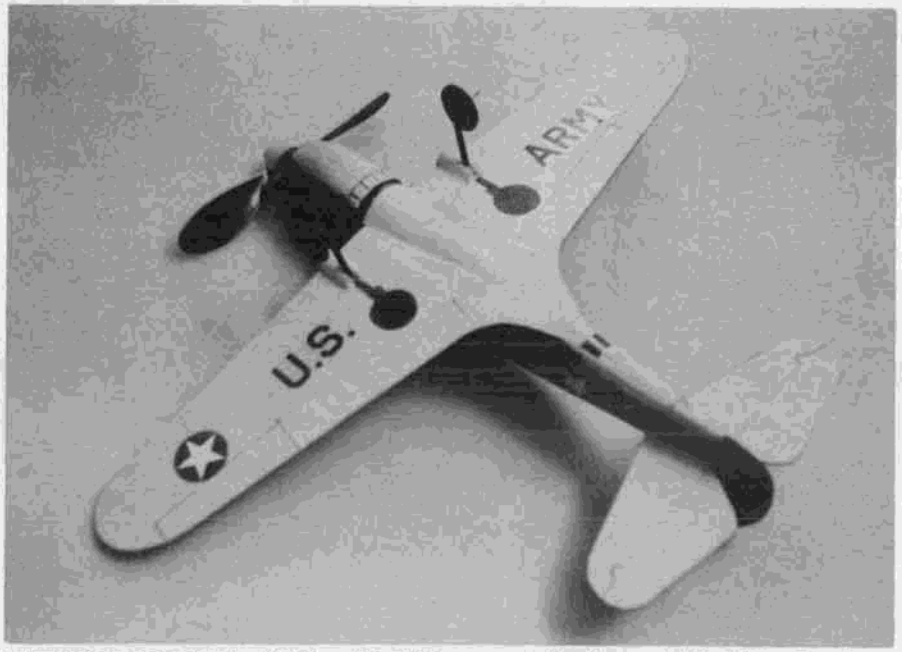
Make the wheels from 1/4-inch soft balsa, give them two coats of sanding sealer, then color with a black permanent marker.

My model was covered with Japanese tissue dyed olive green with Rit dye. The fuselage is covered wet on account of the compound curves. Be sure to jig the wing when it is drying to avoid warps and bowing. The tail surfaces are not shrunk. Coat the model with one thin coat of nitrate dope, then paint the bottom surfaces with light blue enamel thinned heavily.

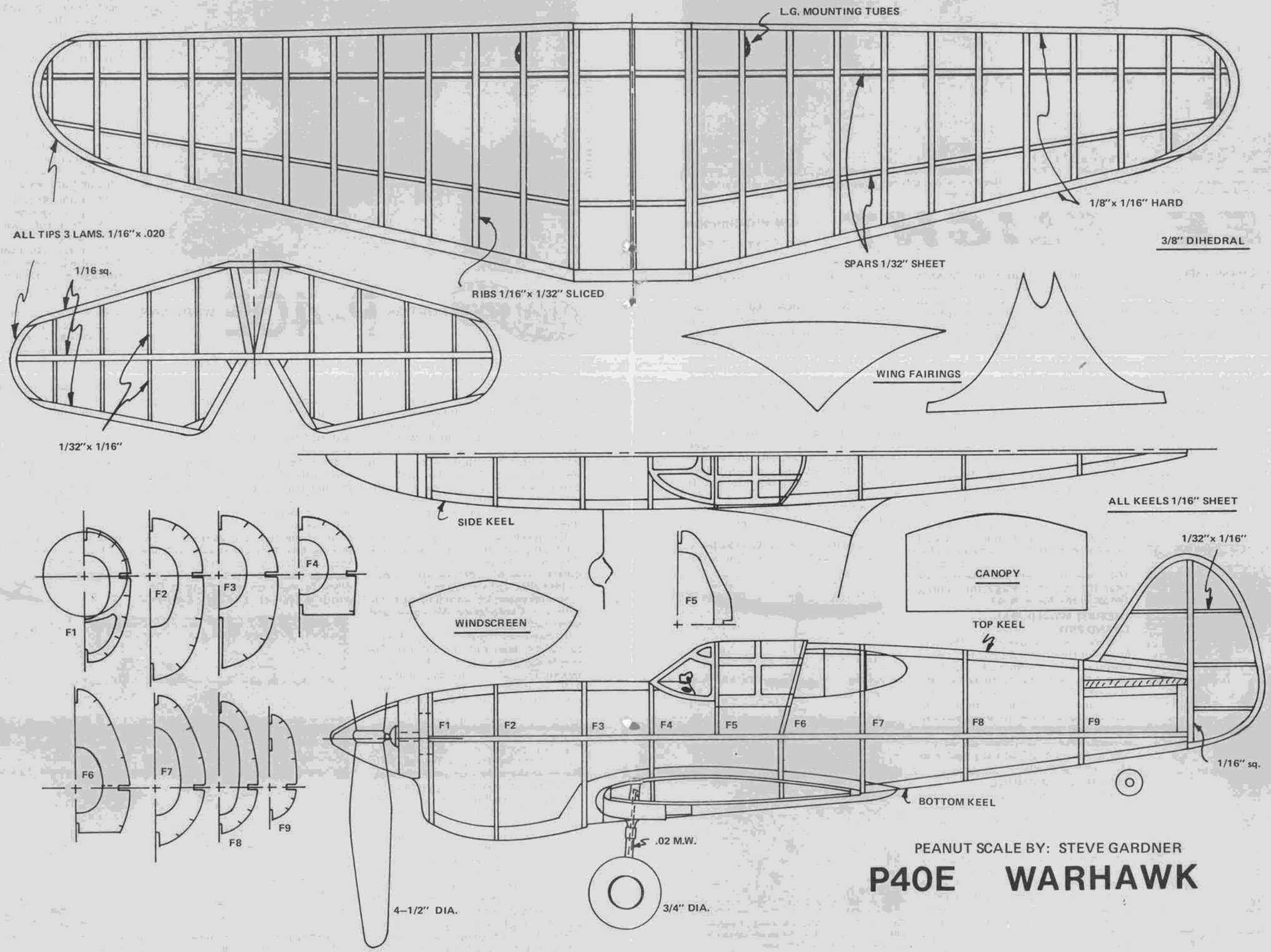
Assemble the model now, adding the fairings, tailwheel, prop, spinner, and windscreen. Add the surface outlines with ink and any other markings you want with ink, paint, or decals if you have them.

The model in the photos flies to the right outdoors with a loop of 3/32 brown rubber 12 inches long. To fly in the Proxy Peanut Contest, the model was retrimmed to fly left with a small tab bent down on the left wing to hold it up in turns. The indoor version uses 1/16 brown rubber 12 inches long.

Have fun with your P-40 and write me care of **RCMB** if you have any questions or comments. •



Undersurfaces are painted with thinned light blue enamel. Gear is removed for flying. Steve's P-40 managed a very creditable 29 sec. at '79 P.P.P.P. contest.



PEANUT SCALE BY: STEVE GARDNER

P40E WARHAWK

Walt Ghio during a practice session for the '79 World Champs. Winds with wings off, prop on. Wake does 5 min. in dead air.

Helpers hold Gao Quinfei's power ship before flyoff round at World F/F Champs.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

INDOOR WORLD CHAMPS SET FOR WEST BADEN IN 1980

• The United States will host a World Championships for the second consecutive year, when the Indoor World Champs will be held in West Baden, Indiana this summer. The CIAM has accepted the MIAMA club's proposal to host the F1D competition, beginning on June 21. Fourteen nations are expected to compete. Actually, the World Championships will kick off what Doc Martin calls "without a doubt, the biggest, best and finest indoor meet in the history of indoor flying . . . and that goes back about 60 years."

The four days of international competition will be followed by the FIRST WORLD PEANUT GRAND PRIX (more about this later), followed by the Fifth NIMAS Annual Record Trials (VNART?).

Reinhard Truppe of Austria wipes down power model before flyoffs. Placed 8th.

According to Martin, the MIAMA club will need "workers, entrants, bodies, spear carriers, proxy Peanut fliers, timers, van drivers, gophers, guidon bearers, drummers, cheerleaders, and indoor folks of all kinds" in order to pull everything off. If you fit into one of the above categories, and want to help, write to Dr. John B. Martin (3227 Darwin St., Miami, FL 33133) for further details.

[My previous mention of the Kingdome as a possible World Champs site may have been premature. Apparently, the indoor folks felt more comfortable with a site that they were familiar with, even though it was smaller. The uncertain costs of using the Kingdome probably acted against it, also, as did the fatal accident at Shea Stadium. The second flying session at the Dome had a bit more drift than the first time it was tried (when even workmen driving around in golf carts didn't disturb the models). There was an impenetrable layer of air near the top that made the ceiling almost unreachable, too.]

THE FIRST WORLD PEANUT GRAND PRIX

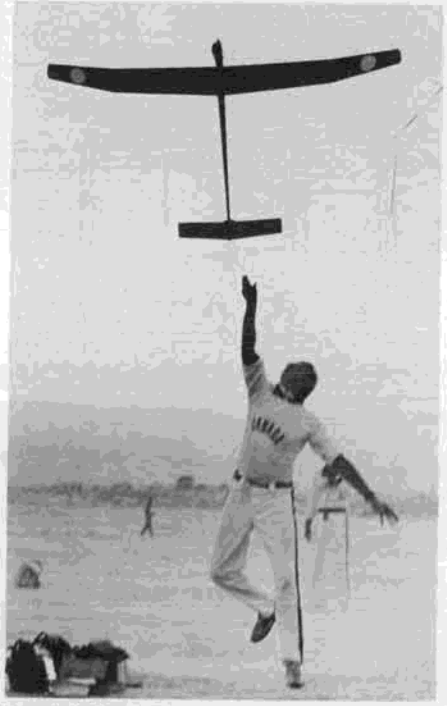
As mentioned above, this will be held in conjunction with the World Indoor Champs at the Northwood Institute in West Baden on June 25. Proxy fliers are needed to correspond with entrants, and make arrangements with them to receive, fly and return their models. Entries and proxy fliers are urged to contact Mike Arak (10900 SW 61 Ct., Miami, FL 33156) as soon as possible to make arrangements.

HOW HIGH THE CEILING

The future Indoor World Champs site has been the location for four annual NIMAS record trials, with over 20 records being set there. Now there is a tempest in the Atrium, since there is some question as to the exact ceiling height. Bucky Servaites made a measurement several years ago which made the place an ideal Category II site (96 ft, 10 inches; 100 feet is the Cat. II maximum). Then Don Lindley produced the original architect's drawings showing a roof 110 ft. above the floor, which would make it a Category III site and void all records set there.

Stan Stoy, Roy White, and Chris Matsuno went to West Baden last Dec. 9 to do some flying and make an accurate measurement of the ceiling height. They went up to the suspended bandstand in the center and dropped steel tapes down to the floor, obtaining four measurements of between 98 ft. and 98 ft. 11 in. from the girders to the floor. (The floor is not level, a spring under the building causing the floor to heave and crack in several spots.) When the height of the girders is added, the overall height to the roof comes out 109 ft. 1 in., or about 9 feet more than the Cat. II maximum. (Apparently Bucky had measured height to the girders, not to the roof, when he made his original measurement.)

But does this mean that West Baden is now a Category III site? Here's how the



Canada's Frank Schlacta had one of highest climbers in power, but flat power pattern in last round put him in 5th place.

AMA Rulebook defines ceiling height:

"14.1. The height of a ceiling shall be defined as the distance from the floor to the highest point in the building which can be seen looking vertically up from the floor. Openings in the ceiling having any horizontal or oblique measurements greater than 6 feet and of such height that they would increase the vertical dimension of the room beyond that of the heights of the ceiling as defined above, shall be measured as total ceiling height or covered in such a manner that an indoor model airplane cannot pass through said covering. Square, rectangular or irregular openings are measured on their greatest diagonal. . ."

At the center, over the bandstand, the girders are only 36 inches apart, leading Doc Martin to conclude that, since this is less than six feet, the actual ceiling height is the distance to bottom of girders. However, measuring the diagonal of the rectangular space between the girders would measure more than six feet, as spelled out in the next sentence. Sounds like the Contest Board has a thorny rules interpretation ahead of it! (The FAI defines the ceiling height as the "vertical distance from the floor to the highest point at which a circle of 15 meters can be inscribed, below the primary structure of the building.")

LOW CEILING INDOOR HLG TIPS

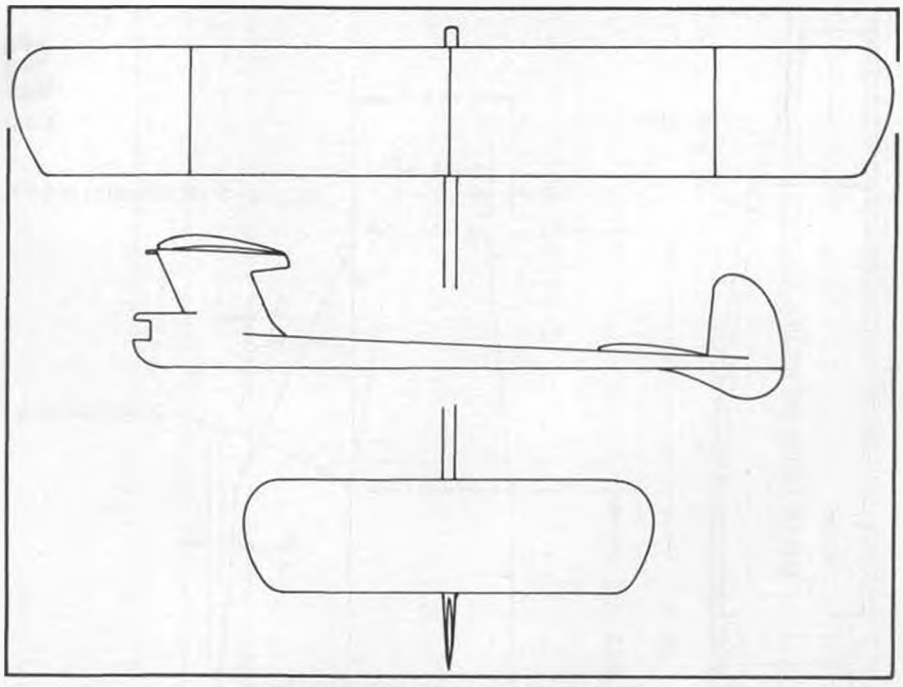
The St. Louis area appears to be a hotbed of low ceiling HLG activity. Stan Stoy's recent move to that part of the country has further stimulated interest and pushed up the prevailing contest standards. (Before he and brother Mike showed up at local contests, winning times were about five seconds a flight lower.) Here is a selection of tips I've gleaned from the *Turbulator*, newsletter of the McDonnell-Douglas Free Flight Club.

"The Stoys take HLG seriously. Stan says one step to success is to build as light as possible for a given height, but this does not necessarily mean the lightest model you can get to the roof. They don't put everything they can into a launch. Rather, they try to hold it to something like 80% of a maximum throw.

"The matter of good wood is dear to the hearts of Mike and Stan. So much so, that they go to extraordinary means to save a piece that's experienced problems. For instance, I'm sure most of us have sanded a low-ceiling HLG wing blank down to have the trailing edge develop some spanwise waves. So, you toss it out. Well, Stan tells us how you may save it.

"Since, for some reason, the sanding process has, in effect, caused the trailing edge to lengthen from root to tip, you want to remove some wood. This can be done by making some fine V-shaped cuts into the trailing edge. I didn't get a close look at one wing he had done this to, but I don't think the cuts went in more than 1/2 inch. Once the cuts are made and the trailing edge has been persuaded to lay flat, put some white glue on the seam.

"Stan likes white glue for joints like dihedral breaks, finger rests, etc., but he puts stabs on with Ambroid so they can be taken off with thinner if necessary. He doesn't have much use for epoxy, due to the weight.



APRIL MYSTERY MODEL

DARNED GOOD AIRFOILS

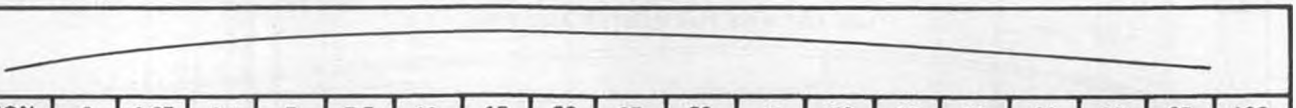
SIMPLEX 1%

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	.21	.31	.46	.57	.66	.80	.89	.95	.98	.99	.94	.83	.63	.49	.26	.13	0

SIMPLEX 2%

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	.41	.62	.91	1.14	1.32	1.59	1.78	1.90	1.97	1.99	1.88	1.67	1.36	.98	.52	.27	0

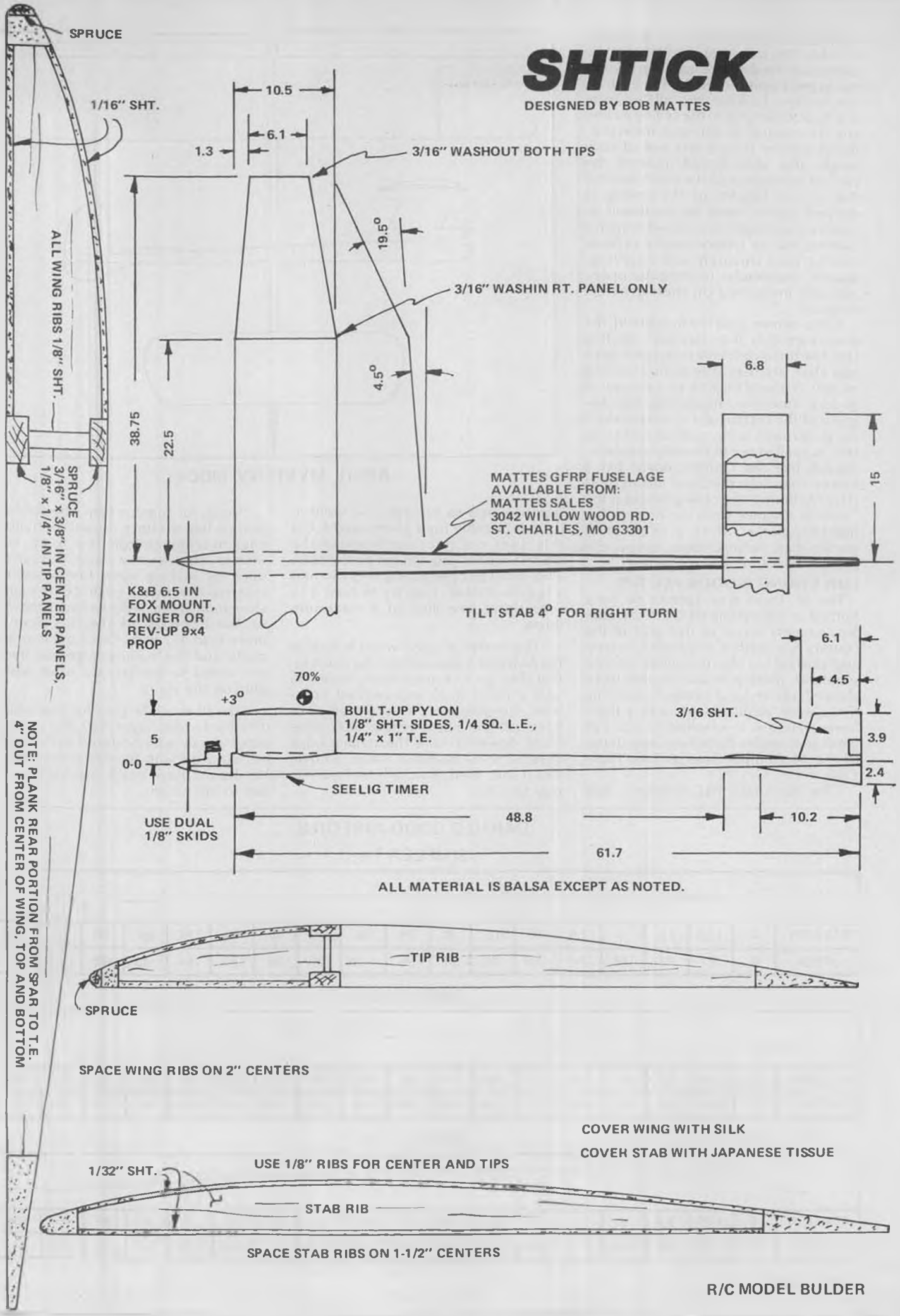
SIMPLEX 3%



STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	.62	.92	1.37	1.71	1.98	2.39	2.67	2.85	2.95	2.98	2.82	2.50	2.04	1.46	.78	.40	0

SHTICK

DESIGNED BY BOB MATTES



ALL MATERIAL IS BALSA EXCEPT AS NOTED.

SPACE WING RIBS ON 2" CENTERS

COVER WING WITH SILK

COVER STAB WITH JAPANESE TISSUE

SPACE STAB RIBS ON 1-1/2" CENTERS

Details on Peter Allnut's Nordic, flown at World Champs. Computer designed airfoil with elastic turbulator.

"Finally, Stan mentioned an affliction found in some of the really light balsa sheets. It's called checking. It seems that when trees of really light wood flex in the wind, the stresses can cause the wood to suffer. The condition appears as fine cracks at right angles to the grain. In order to use this very light wood, the Stoys insert a 1/16 plywood spar into the wing. They slot the wing and the spar extends about three inches into each panel. Stan says they've never had a wing strengthened in this manner break."

Bob Klipp, *Turbulator* editor (who wrote the above piece after Stan Stoy had talked about indoor HLG at a club meeting), also wrote the following advice on wood selection:

"Recently, Tom Croft and I were talking about how to produce unwarped stabs for low ceiling HLG's. Basically, there is no foolproof way to do this. I usually cut out twice as many stabs as wings, and sand stabs until I have as many flat (or close to) ones as I need. If you have sanded 1/32 balsa down to near nothingness, as required for low ceiling HLG's, you know that a stab that started out as straight may end up looking like a potato chip when it's sanded. Sometimes, it may be the way you sanded it; other times, the sanding created or relieved stresses within the wood, causing it to warp. Strangely enough, although we normally use C-grain balsa when we want warp resistance on outdoor F/F applications, my experience has been that C-grain for low ceiling HLG's warps *more* than A or B grain.

"All of you probably have sheets of balsa in which the grain is C-grain on one edge of the sheet, but changes to B/A grain as you move across the sheet. Well, this is exactly what I use for low ceiling HLG stabs. I cut out the blank so that the C-grain is at the front, with the B/A grain at the T.E. This way, the stiffer C-grain at the L.E. absorbs the loads on the stabs, while the B/A grain at the trailing edge (which is sanded somewhat thinner) is warp free and will also take trimming tweaks if necessary."

MODEL OF THE MONTH

After all that indoor news, let's give the outdoor fliers something to look at. This month's 3-view is of Bob Mattes' C ship, which has been running roughshod over the competition in the midwest this year. Bob has set the Cat. III Class C record in each of his last three contests! He did 13 straight maxes with it at the 1979 Nats, followed with 14 straight maxes at the CIA Fall Meet, then did 15 straight at the Vincennes (Indiana) Fall meet before stopping. That's a total of 42 maxes in a row without a miss! These records will probably be wiped out by the change in flyoff procedure in Cat. II this year, but it was an impressive performance that shouldn't go unnoticed.

The "Shtick" is powered by a K & B 6.5 mounted on one of Bob's fiberglass fuselages. He uses either a Zinger or Rev-up 9x4 (!) prop.

DARN GOOD AIRFOILS: Simplex

Last month I told you a little about the Simplex airfoil series, based on the logarithmic spiral, which keeps its constant geometric properties at all chord lengths. This makes it very useful for building tapered wings and stabs, especially when using flat bottom surfaces or sliced rib construction, since you need make only one template for all chord lengths.

Another kind of airfoil can be made by combining Simplex curves for the upper and lower surfaces. The leading edges of both curves start together, or are drawn tangent to a suitable small radius and come back together and intersect at the trailing edge. An airfoil generated in this manner will always have its maximum mean camber at 36% of the chord, since this is where the upper and lower surfaces both have their maximum height.

By reversing the bottom curve so that its "leading edge" is at the trailing edge of the upper surface, another family of airfoils can be generated. This type of airfoil will have its maximum mean camber move back as more undercamber is used. You may want to move the lower Simplex curve so it starts behind and slightly below the actual trailing edge, since you would end up with a very "droopy" trailing edge if you use much undercamber.

The 1%, 2%, and 3% sections presented this month may be combined with last month's Simplex sections in the above manner.

MYSTERY MODEL

This month's mystery model has always impressed me with its look of "functional ugliness." Maybe it's be-

Continued on page 101

Tom McLaughlan testing his "Swinger" FAI model before 1973 W/C.

Special sanding blocks for sanding framed-up wings can be made from a solid block (left) or built-up like a wing platform on a pylon.

Sanding blocks can also be used to cut slots in ribs. A stop glued to the block provides correct depth. See text for more details.

PHOTOS BY WARREN HALVERSON UNLESS NOTED

BLACKJACK

By LARRY SARGENT . . . Here's a state-of-the-art glider designed to be competitive on only a moderately high throw, by means of a superior glide. Its contest record is impressive, including a first at the '79 Nats.

• Outdoor Hand Launched Glider has too long been regarded as a pure strength event, and as such, has always attracted fliers in their youth. Later, they often turn to less physical events. However, cranking up a 16-strand rubber motor or running around the field with a 164-foot towline is hardly sedentary. Every free flight event presents its own unique demands, and *all* free flight models need to be chased.

Why, then, is HLG so often the realm of youth?

Well, not because we outgrow them. Any beginner can readily testify that hand launched gliders are not toys; they can be tricky and frustrating, just as any other free flight. Many are the would-be modelers whose first shot at free flight was HLG (perhaps because these models looked the simplest), and who are now happily back at their stamp collections.

The fact is, many modelers quit flying HLG because of severe and often permanent physical damage to their throwing arms. The list is long and the names on it might surprise you. If being competitive at HLG can do this to grown men, what will it do to kids, whose muscles and bones are still growing? Ask any little league coach how careful young pitchers should be and you'll see my point.

The author demonstrates proper launching form in this photo sequence taken by Mark Gluckman. The trick is to make your launches *consistent*, not necessarily at 100% power.

A couple of years ago, I was enjoying the wide open spaces of Taft (when you live in L.A., it can be a treat to merely see the horizon) and was preparing my 18-inch glider for the contest. When I saw Greg Sussex and Bob Boyer warming up I felt like turning around and going home. I couldn't believe the altitude they were getting! Try as I might, My rollout would be 20 feet below theirs. Finally, straining every muscle, doing my best imitation of an arthritic gorilla, I hung on an instant too long, and planted it in the dry Taft soil.

That sort of thing can ruin your whole day. But it did get me to thinking. Both Bob and Greg are younger, taller, and probably stronger than I am. Without six months of weight lifting (and maybe an arm transplant), I would never throw as high as they did.

Therefore, why not design a glider for only a moderately high throw? It would have a larger wing span, higher aspect ratio, and lower wing loading to make the most out of the lower, lighter lift. The result was the Blackjack, a contest model that can do well on a consistent 80% throw.

Of course, my 80% may be different than yours. All I can say is that my arm never aches, I don't lift weights, throw tennis balls, nor fly more than every other week. Also, I am 33 years old.

If this depressing description fits you, or you're just tired of hearing your arm snap, perhaps Blackjack is just the thing for you!

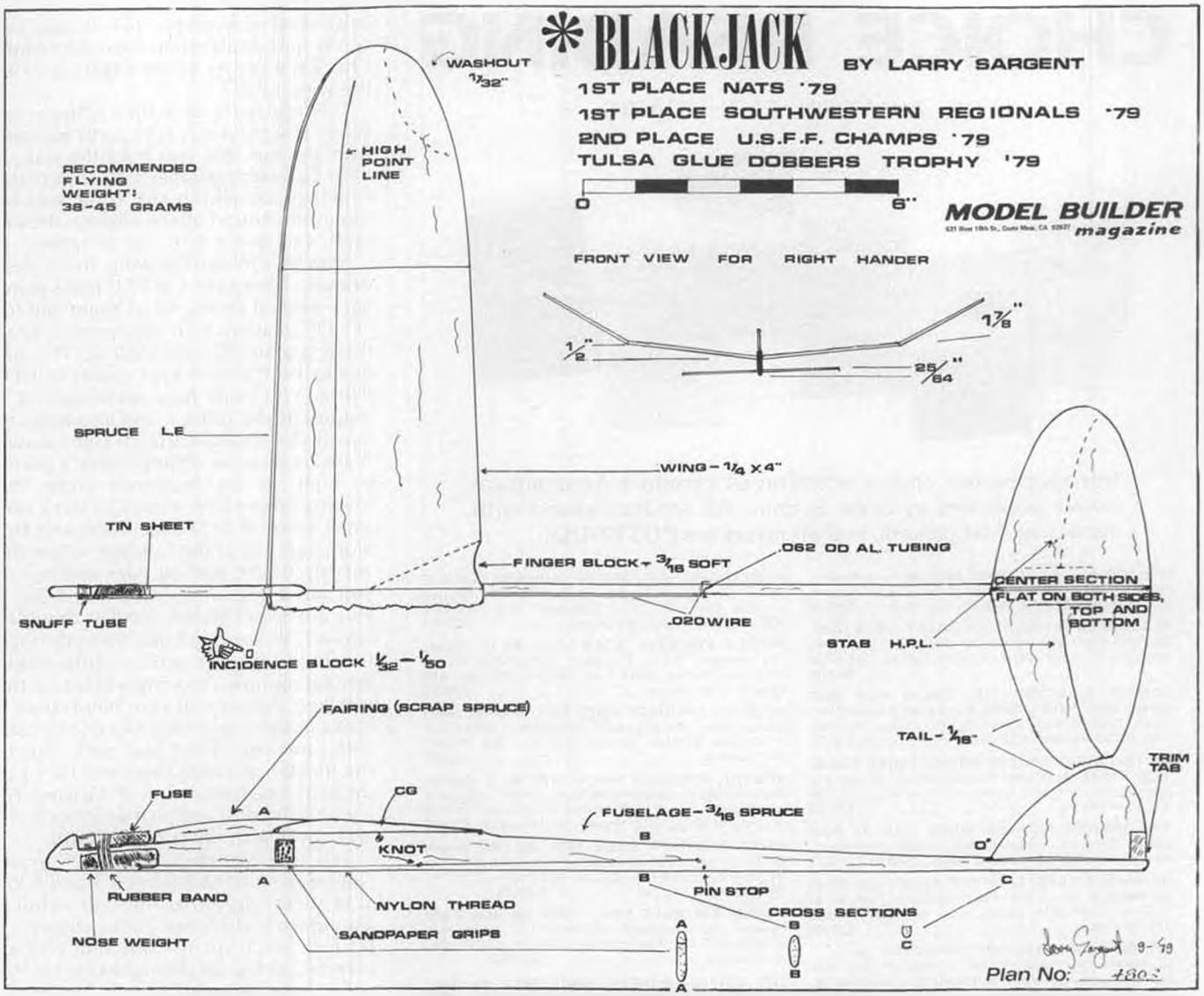
WOOD

In order to be competitive, Blackjack must be able to make about the same dead air time as the popular 18-inch gliders. They may go up higher, but Blackjack comes down lower. This means Blackjack must be built light. If you can't find the right wood, wait until you can. Remember Sargent's Law of Counterproductive Balsa Selection: *NO amount of sanding nor accuracy of shape can compensate for starting off with the wrong wood.*

CONSTRUCTION

This is the most important part, so take your time. Use a piece 1/4 x 4 x 36. Weigh it. Then get your trusty calculator and figure out it's density per cu. ft. For the wing you want to find a piece that is 4-5.5 lb. density. C-grain balsa isn't really necessary, but it helps. You can also glue pieces of 1/4x1 and 1/4x3 together to make your wing. If you do, use a glue that can be sanded.

Cut the outline of the wing and mark the exact center where the middle dihedral break will be. Next, stick pins edgewise into the leading and trailing edges at the center to check the balance. It's not too soon to consider which way the glide turn is to be: left, if you're right handed; right, if you're a southpaw. I am right handed, so all my directions will be for right handed trim. Just reverse the directions if you're left handed. Anyway, the *left* wing should be slightly heavier than the right wing. Check this before the wing is formed. If it falls to the right



FULL SIZE PLANS AVAILABLE — SEE PAGE 108

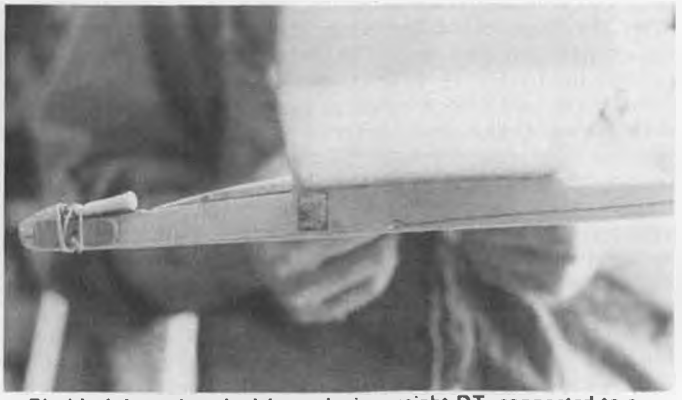
side, turn the wing over. It may be perfectly balanced; if so, worry about it later.

Soak a piece of 3/32 sq. spruce in hot water for 15 minutes and Hot Stuff it to the leading edge of the wing blank. Note that the wing outline is not symmetrical; the leading edge is swept back more, as you can see from the plans.

First sand the washout into the underside of the tip, as shown on the plans. No more than 1/32 of an inch. Next, sand in the taper on top from the outboard

Initial shaping of the wing airfoil is done with an abrader, available at hardware stores. These things take off the balsa in a hurry, so don't get carried away!

Left side should be just a little heavier than the right. Wing is completely finished and painted before adding dihedral.



Blackjack is equipped with a swinging weight DT, connected to a pivoting wire so weight doesn't beat up the tail surfaces.

dihedral break to the wing tip. It should be about 1/16 inch thick at the tip. Then draw the high point line with a felt-tipped pen and start removing material to form the back part of the airfoil. Take your time and check your progress with a straightedge. Don't get too eager, you can't put wood back on! Some guys use a razor blade for this job. Not having stainless steel fingers, I prefer to use an abrader. They can be purchased at a hardware store and are great for roughing out wings. When you finish, there will be a sizable pile of balsa dust. Scoop some up before it blows away and save it for later.

When you get the airfoil shaped, switch to 220 sandpaper, and finish up with 600. Apply two coats of sanding sealer.

Now, stick the pins back in the center and check the balance again. It should fall *gently* to the left side. If it doesn't, use *paint* to correct it. You need black paint under the wings for visibility in the air (I use spray enamel) and bright colors on top for easy spotting on the ground (I use day-glow). If the left wing still needs weight, then put paint on the left side only. If not, apply paint to both wing tips evenly.

Finally, cut the wing at the dihedral breaks and bevel the edges for a good fit. Prop up the wing tips and tack the wing tip dihedral with one drop of Hot Stuff on the leading and trailing edges. If you didn't get the bevel just right and you have a small crack, take some of the balsa dust you saved, rub it into the crack, and apply some more Hot Stuff. Check the center balance again, and set the wing aside.

The fuselage is made from 3/16 spruce. When you cut it out, take particular care with the cut that will hold the stab. It *must* be exactly parallel to the top of the fuselage on which the wing will be mounted. Round off the edges as shown, sand, and give it one coat of sealer.

Now let's mount the wing. In my desk drawer I have a stack of HLG plans going back several years. All of them call for "O-O" incidence. In my opinion, all of them are terribly misleading. This has got to be the best-kept secret of HLG flying. *You must have incidence.* It is helpful in the rollout, and also helps to avoid the straight up/straight down flight patterns of all beginners. I prefer to build in the incidence under the leading edge of the wing. Cut out a very small piece of 1/32 sheet balsa and Hot Stuff it on top of the fuselage where the very tip of the leading edge will rest. If you are a beginner, leave it at 1/32; if you are experienced, sand it down to about 1/50. Now stick pins down through the leading edge and trailing edge, simulating how the wing will set on the fuselage. Adjust it in your hands until it looks straight, then tack it front and back with one drop of Hot Stuff each. Due to the incidence block, there will be a gap under the center section of the wing. Fill it with balsa dust and hit it with Hot Stuff, and cover with fillets of Titebond.

Tail sections should be "C" grain (speckled stuff) of between 5 and 6 lb., 1/16 sheet. Note that the stab airfoil is asymmetrical in the areas shown; a normal airfoil on the left side and an inverted airfoil on the right side (or the other way around for left handers). Avoid making either of these curves too abrupt. No feather edges. The whole stab should be on the thick side, with the contrary curves blending into one another. The fin is symmetrical with a small trim tab at the rear bottom.

Run inside the house, throw open refrigerator, grab a can of beer and chug-a-lug it. Ignore your wife's glare and run back to the shop with the empty can. The aluminum beer can stock is perfect for the trim tab. Slit the back of the fin and epoxy in place. Use Ambroid or Testor's cement on the tail sections to avoid warps and make replacement easy.

A pop-up stab dethermalizer is unquestionably the best way to bring a model down. But is it the most reliable way to put a HLG up? I don't think so. When such a small model leaves your hand at 45+ mph, the slightest irregularity, especially in the tail surfaces, can cause it to go really squirrelly. Even crash. Furthermore, we've gone to a lot of trouble to get the alignment of the flying surfaces just right. I'm not going to ask you now to make some of the surfaces movable. If they work, leave 'em alone!

Blackjack uses a swinging weight DT. When the fuse burns through the rub-

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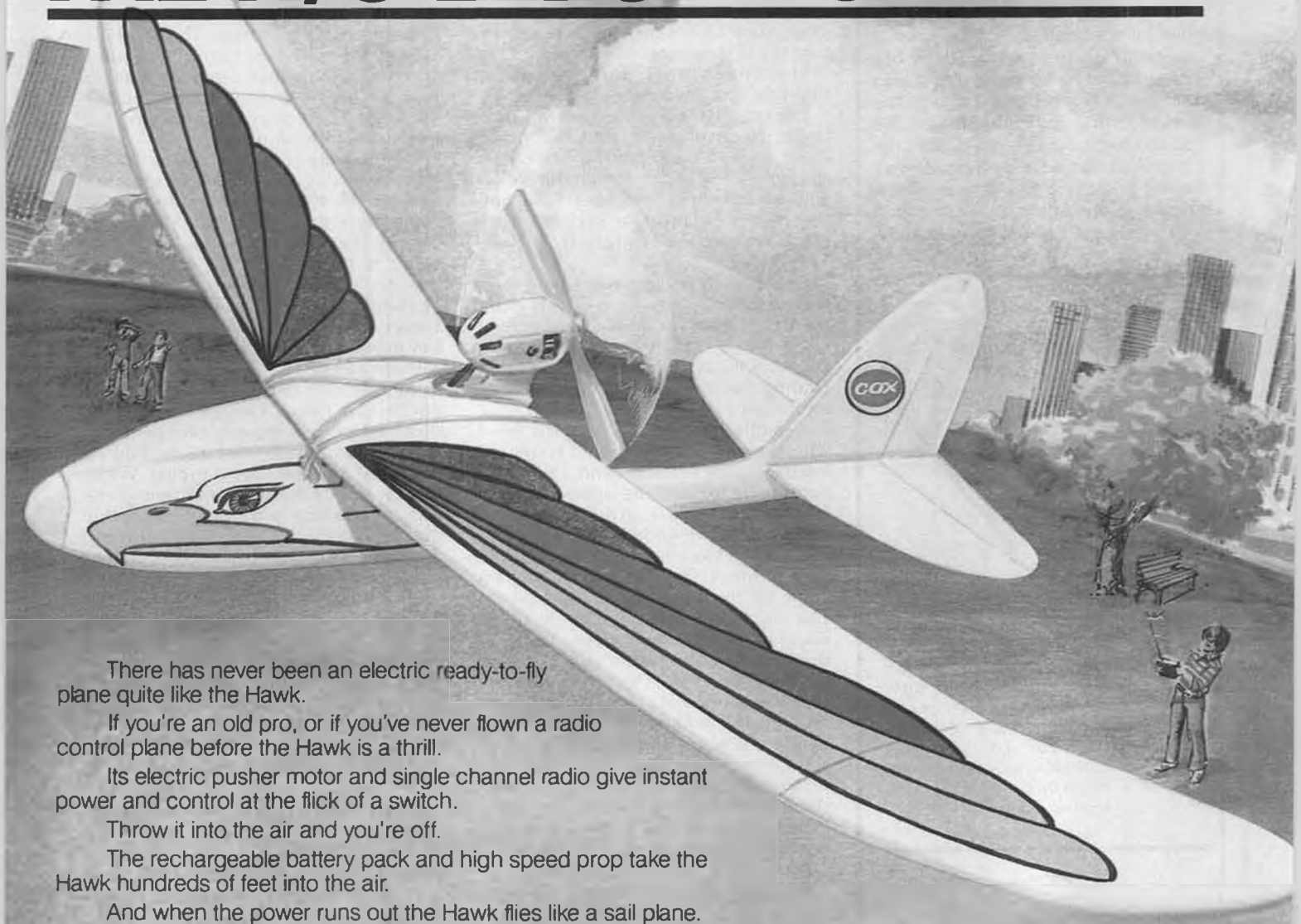

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ber band, the weight releases and swings from the rear part of the fuselage, causing the model to stall, spin, and vibrate; sort of an airborne impression of a Saint Vitus dance. It looks silly, but it works. The usual problem with this type of DT is that the weight swings on the way down, crashing into the tail section, denting the wing, sometimes swinging over the wing, enabling the model to fly off again . . . I solved this by using a piece of .020 piano wire and a pin stop, as shown on the plans. It protects the tail section and dampens the swinging motion considerably.

The fuse holder is made by soldering a small strip of .012 tin sheet to a 3/8-inch long piece of 1/4-inch O.D. brass tubing. Epoxy in place.

The finger block must be custom fitted to your own hand.

The nose weight is filed down from a larger piece of sheet lead. Sig makes these, six to a package; they even have the hole already cut. Attach the weight with a rubber band and keep filing until the model balances as shown on the plans. Now you're ready to fly.

TRIMMING

Get up early and drive to where there is grass for 200 yards in any direction and no trees. Also no dogs. They *love* to chase things that are thrown, and bring you back the biggest piece in their teeth. Finding the right place on a clam day is important.

A gentle, straight toss, into the wind, with the wings level, should result in a left hand glide to the ground. I adjust the glide circle to be on the large side, about 75-100 feet across. Add or subtract weight until the glide is smooth.

For a full launch, two angles must be kept in mind. The first is elevation: the angle of the nose above the horizon. The second is bank: the angle of the wings relative to the horizon. To begin, the elevation should be about 25° and the bank about 35°. Hold the model as if you were throwing it at arms length, nose up and banked right (if you're right handed) at approximately those angles. Hold it and look at it. Try to freeze that picture in your head. That's how it should look at the instant of release. When you think you've got the picture, go ahead and throw it with at least 50% power.

The model should leave your hand in a right bank and climb in a right turn until it runs out of energy, then at the top of the climb, circle left to the ground. The necessary trim for these two turns, the right climb and the left glide, is already built into your model. The right climbing turn, of about 270° from launch to rollout, is done by throwing it with a right bank, and at high speed the asymmetical stab contributes to this right turn. When the model slows down, the stab tilt and the heavier left wing cause the plane to circle left. Thus, these two turns are accomplished by different means, at different speeds. If you're *sure* the launching angles are correct and the model still dorks, you may need more right turn. Bend the very bottom of the trim tab over right just a little and try it again. To adjust the glide circle, twist the fuselage with heat, to change the stab tilt. Gradually increase power, but *never* at the cost of missing those two launch angles. With time, you may find that your model likes slightly different launch angles. Each of my Blackjacks vary in this respect, but never very far from the angles given.

CONTEST FLYING

Once you develop a good, reasonably high, and very consistent throw, you're ready to concentrate on what really wins contests: thermals. No other free flight event requires thermals as much as HLG. The others need only "light lift" or "air without a downer" to max. The very best Mulvihill rubber ships can do 10 minutes or more (double their 5-minute max) in dead air. But no one, not King Kong nor the Hulk, can possibly max in HLG without help from the air.

On the subject of thermals, at the '79 Nats, I was singularly lucky. I happened to drive the 4000-mile round trip in the company of non other than the original George Perryman. George has been going to these things for so long that they probably would cancel the Nats if he didn't show up. To say the least, he always does well. In fact, in 41 years, he has never walked away from a contest without a trophy! You may chalk this up to merely four decades of experience, but that isn't true. George has a secret ritual, which few mortals (*and certainly no Yankees!*) have ever seen. You've heard of Indian rain dances? Well, George does a *thermal dance*, complete with buffalo hide loin cloth. I realize this may be hard to believe, but I felt it my duty to reveal this secret to my fellow modelers.

On contest day I like to get there early, do some exercises, and make a few practice throws before I have to go through the hassle of lighting fuses. I used to wait until 10:00 a.m. before lighting fuses, but of the 14 Blackjacks I've built in the last year, 7 have "slipped the surly bonds of earth" never to be seen again. Now I start lighting fuses at 8:00 a.m.!

When I've maxed once or twice deliberately, I go sign up and start flying official. Oftentimes, your toughest competitors will turn out to be your greatest benefactors. Two days before the HLG event at the '79 Nats, I was practicing my throw when a huge boomer grabbed my best glider and pulled it up and then out over the Nebraska plains. It soon became a dot, even in my binoculars.

"Can you see it?" asked Stan Stoy, well known designer, record holder, and as of the night before, Indoor HLG winner.

"Yeah," I answered, "but I'm afraid to take my eyes off it."

I finally did lower the binoculars, ready to write off the model, but Stan was no longer there. He'd taken off on foot across the prairie to bring my model back. He did, too.

"I didn't want the competition eliminated before the contest," he said.

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Two days later, when I needed only one more max to win, Bob Boyer, a Nats winner himself, kindly offered to "find good air" with his model, before I launched mine for that last critical flight. Sportsmanship and kindness such as this is the most valuable thing in free flight.

So, if you're a beginner and you want to go to contests, that's the sort of people you'll meet, and that's the attitude you'll be expected to adopt.

HLG is a great event. The models build quickly and you don't need the Great Gobi Desert as a flying field.

The Blackjack has been a good model to me. Perhaps it can do as much for you. If you try it, I'd like to hear from you.●

Brushfire . . . . *Continued from page 17*

tures of all the Brushfires so far have been rolls, M's, and spins. The rolls are purely axial and start and stop very precisely with no overshoot. The point rolls require only moderate rudder inputs, and the knife-edge portions require little or no elevator to hold heading. Figure M's are very positive and do not require a throttle burst to bring the tail around. Tail wagging coming out of the stall turn is also minimal. Finally, spin maneuvers can be entered without falling off to either side, and spin exits are almost immediate, requiring that control neutralization occur only about 1/8 of a turn before desired exit heading.

CONSTRUCTION

The Brushfire is not a difficult airplane to build, but attention to detail must be maintained if you want yours to be a contest performer. It is a large airplane, and as such, every attempt must be made to keep the weight down. Fuselage blocks must be hollowed as shown or the weight will become excessive. A fully sheeted wing may be easier to build, but it would add weight and its higher mass inertia would definitely degrade the roll performance of the airplane. Some people don't like Mylar covering materials, but their weight saving is a fact, and painting the top and bottom of an 860-square-inch wing can easily add 6 to 10 ounces. Alignments and incidences must be painstakingly measured. A wing or tail incidence error can drastically change an airplane's pitch response to rudder inputs, making point rolls a real nightmare. Simply put, building shortcuts must be avoided if you intend to fly your Brushfire in competition. The 20% construction time you might save by cutting corners will probably degrade your airplane's performance by 50%.

Fiberglass fuselages and/or foam wing cores for the Brushfire may become commercially available in early 1980. Inquiries should be addressed to: Brushfire, c/o S. Rojecki, 1432 Devoe Dr., Xenia, OH 45385.

FUSELAGE

1) Cut out F1, drill holes, countersink blind nuts since motor mount and nose wheel unit overlap vertically.

2) Build up F2 through F8 from 1/8x 3/8 balsa. Use overlap joints.

3) Cut out fuselage sides and splice with ply doubler. Mark wing section on sides, but *do not cut out yet.*

4) Epoxy the basic fuselage box structure together on a flat surface.

5) Epoxy in F1 and F9. Check carefully for alignment.

6) Epoxy 3/4-in. square and 1/4-in. sheet balsa together to form fuselage bottom.

7) Spot glue the bottom to the fuselage.

8) Spot glue the small block in front of the vertical fin to the fuselage.

9) Glue R2 to the fuselage. Spot glue R1 in place.

10) Glue on R4 and 3/8-in. leading edge. Check alignment carefully.

11) Glue R3 in place.

12) Sheet the vertical fin, being careful not to twist or warp it in the process.

13) Trim sheeting, add 5/16 at top rear, and rough sand vertical fin.

14) Spot glue the 3/8-in. rudder leading edge to the back of the vertical fin and sand.

15) Glue rudder ribs and dowel area block to rudder leading edge.

16) Sheet rudder. Do not warp or twist.

17) Trim sheeting. Add 3/8-in. bottom block to rudder.

18) Spot glue the top block, 3/4-in. square, and nose blocks to the fuselage. Do not glue on the canopy block yet.

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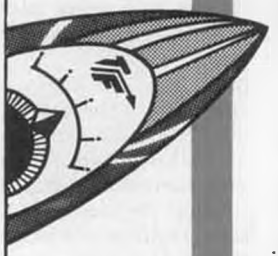

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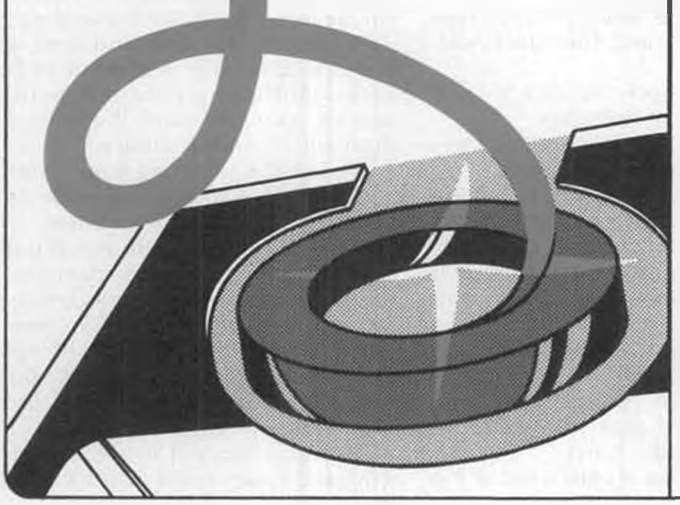

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19) Cut out the wing hole in the fuselage sides.

20) Carve and sand fuselage to shape. Use cross section templates to assure symmetry. Use a spinner to help contour the nose.

21) Fit the canopy block to fuselage. Trace front face and rear face canopy cross sections from fuselage. Shape and sand the canopy. The rear of the canopy should fair smoothly into the fuselage turtledeck. The forward part of the canopy forms a waist in the fuselage cross section. See section B on the plans. Spot glue canopy to fuselage.

22) Smooth sand entire fuselage.

23) Remove all fuselage blocks and hollow to approximately 3/16-in. wall thickness with a gouge or Dremel tool.

24) Epoxy all the top blocks permanently in place.

25) Reinforce the rear of the firewall to the fuselage sides and top with fiberglass tape and epoxy.

26) Epoxy all fuselage bottom blocks and nose blocks permanently in place.

27) Cut engine and pipe clearance holes in nose blocks.

28) Add the plywood ring to the front of the nose.

29) Cut out clearance holes for the nose wheel and strut in the bottom of the fuselage.

30) Use an X-Acto saw to cut the belly pan away from the fuselage.

31) Sand all the belly pan/fuselage interface surfaces and then face with 1/32 ply.

32) Cut nose wheel clearance holes in ply faces at front of belly pan.

33) Epoxy 1/8 balsa oil dam into belly pan just aft of nose wheel cutout.

34) Epoxy 1/4-in. ply wing mounting plates and balsa supports into fuselage. Do not drill wing bolt holes in plates yet.

35) Add fuel and vent tubes, and plywood floor above nose wheel compartment.

36) Add servo rails, and locate gas tank with balsa supports.

37) Remove the rudder, bevel the leading edge, and glue in the 3/8-in. dowel for the rudder horn.

38) Glue the balsa probe on top of the vertical fin.

39) Add a plywood box to the aft fuselage to serve as a bearing mount if you intend to use a flying tail.

WING

1) Hot wire two foam blocks from six-inch, one-pound density beaded styrene foam. Hot wire a half inch off the top and bottom of each block, so that two five-inch blocks with perfectly flat and perpendicular surfaces are obtained.

2) Locate the root template on the wide end of one block on the centerline. Locate the tip rib on the narrow end of the block on a line 0.52 inches above the root rib centerline. This establishes the proper dihedral. Make sure you shift the tip rib in the opposite direction on the other block.

3) Hot wire the wing cores, including the spar notches.

4) Epoxy the 1/4-in. balsa spars into the wing. Set the cores back in their blocks, and weigh them on a flat surface. Allow time for epoxy to cure thoroughly. Sand spars flush with wing.

5) Make two templates for the wing cutouts from cardboard or thin plywood.

6) Sandwich the two wing blocks between the templates and secure with pins or tape.

7) Poke a piece of 1/16 piano wire through the sandwich in the middle of one of the spaces to be cut out.

8) Slip a piece of dowel over each end of the wire, and connect to hot wire power supply. Adjust the current so the wire will cut foam. Holding the hot wire by the wooden dowels, trace around the template to cut out the area to be removed.

9) Repeat steps 7 and 8 for each cutout area.

10) A loop of 1/16 wire in a soldering gun may also be used to make the wing cutouts.

11) Use the soldering gun method to cut recesses in the underside of the wing for the landing gear mounts.

12) Install blind nuts on the 1/4-in. ply mounts and then epoxy them into the wing. Drill through the large holes in the mounts about 1-1/2 inches into the foam, and then epoxy the four 3/16 dowels through each mount and into the foam.

13) Use the soldering gun method to cut clearance holes for the landing gear unit. Install the unit and then glue enough balsa filler around it to build back up to the wing surface. Remove the landing gear and sand the balsa filler flush with the wing surface.

14) Use the soldering gun method to cut channels into the underside of the wing for the aileron servo wires.

15) Epoxy on all leading and trailing edge sheeting. Use glue sparingly. Put the wings back in their blocks and weigh on a flat surface while epoxy cures.

16) Join the wing halves with epoxy. Keep the wings in their blocks during the joining process to assure proper alignment and dihedral.

17) Cut a channel in the top of the wing and epoxy in the 1/4x3/8 dihedral brace.

18) Epoxy on the top and bottom

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KRAFT

center section sheeting.

19) Cut out the trailing edge area where the flaps go. Sand a flat on the front of the wing.

20) Epoxy on 1/4-in. leading edges and 3/16-in. trailing edges.

21) Install the flap linkage.

22) Glue trailing edge center section on over the flap linkage.

23) Face edges of flap area with 1/16 sheet.

24) Add cap strips, tip sheet, and fixed aileron ends at tip.

25) Add 1/16 wing tip.

26) Build ailerons and flaps. Make sure 1/32 ply in ailerons is notched for hinges before laminating. Spot glue on wing.

27) Shape and sand the wing. Be sure to sand a fairly sharp leading edge into the last 12 or 14 inches of each panel.

28) Center drill 5/8-in. dowels with 3/16-in. holes. Drill 5/8-in. holes in wing and epoxy in dowels. Sand flush with surface.

29) Fiberglass wing center section top and bottom.

30) Cut out holes for gas tank, retract servo, and flap servo.

31) Install servo rails.

32) Cut wing sheeting away which has covered landing gear mounts.

33) Use hole saws to cut wheel wells and aileron servo wells. Line wells with 1/16 sheet.

34) Cut clearance from L.G. mount to wheel well for L.G. strut.

35) Use sharpened tubing to cut channels from the retract servo compartment to the wheel wells and forward to the wing leading edge below the gas tank cavity.

36) Remove ailerons and flaps. Bevel leading edges. Install 3/8-in. dowels for control horns.

37) An all-balsa built-up wing can be constructed. Make ribs by sanding a stack of balsa between the root and tip templates. Use the same spars, sheeting, and cap strips, but add vertical web sheeting to the front spars. Add plywood dihedral braces, and beef up landing gear mount area with plywood and balsa half ribs. A built-up, fully-sheeted horizontal tail is also possible.

HORIZONTAL TAIL

1) Cut out foam cores.

2) Epoxy on sheeting. Let cure in weighted blocks.

3) Add 1/4-in. leading edge, 1/4 by 3/4 trailing edge, and 1/16 tips.

4) Cut off elevators.

5) Add 1/4-in. leading edge to elevators and 3/16-in. trailing edge to stabilizer.

6) Cap elevator ends and exposed stabilizer edges with 1/16.

7) Spot glue elevators back on.

8) Join stabilizer halves.

9) Shape and sand entire stabilizer.

10) Fiberglass center section top and bottom.

11) Remove elevators, bevel leading edge, and install 3/8-in. dowel for control horns.

ASSEMBLY

1) Level the fuselage on a flat surface.

2) Glue in the horizontal tail at 0° incidence and parallel to the table top.

3) Form fillets around tail with plastic balsa or Sig Epoxolite.

4) Cover the top of the wing with Saran Wrap. Align it on the fuselage at 0° incidence, parallel to the table top, and equidistant from the front of the rudder probe to each wing tip. Lift the fuselage, apply putty or Epoxolite to the wing saddles, and set back down on the wing. Recheck alignment very carefully before putty hardens.

5) After hardening, turn the airplane over, being careful not to move the wing at all.

6) Using a 3/16-in. bit, drill through the 3/16-in. holes in the wing dowels and clear through the plywood wing bolt plates in the fuselage.

7) Remove the wing, enlarge the holes in the fuselage plates, and install the wing bolt blind nuts.

8) Replace the Saran Wrap on the top of the wing with a piece that overhangs the leading and trailing edges at least six inches. Bolt the wing to the fuselage and recheck alignment. Sand or build up the wing saddles to correct any misalignment.

9) Trim the belly pan so that it fits the wing and aligns with the fuselage. Glue it to the wing, using the Saran Wrap overhang as a barrier between the ends of the belly pan and the fuselage.

10) Glue the 1/32 ply fillet keels to the fuselage at the wing trailing edge.

11) Form wing fillets on fuselage and

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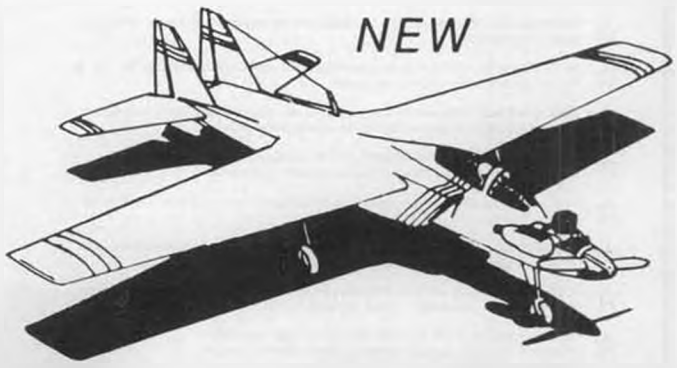

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Span: 68 in
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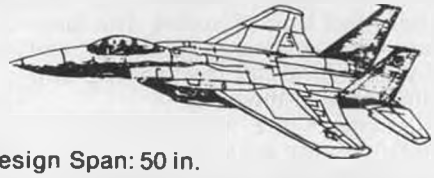

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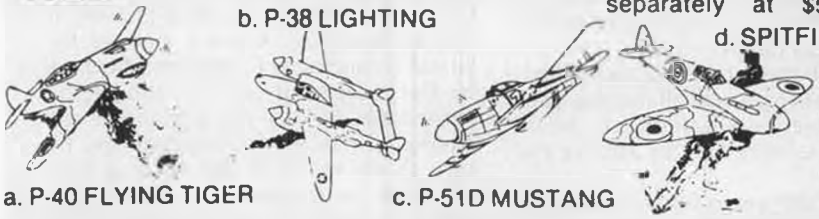

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on belly pan from Epoxolite. The Saran Wrap will separate the fuselage and belly pan fillets at the leading and trailing edge of the wing.

12) Remove the wing. Sand fillets. Fine sand entire aircraft.

13) Hinge all surfaces.

14) Remove the lower crossmember of F4 to provide clearance for flap linkage.

FINISH

1) Coat the engine and fuel tank areas with epoxy for fuelproofing.

2) Apply a layer of 3/4-ounce fiberglass to the fuselage and belly pan.

3) Monokote or Solarfilm the wing and horizontal tail.

4) Paint the fuselage and trim on the wing and tail. (Note: Epoxy or polyurethane paints will adhere nicely to Monokote, especially if the area to be painted is very finely sanded first. Two of the Brushfires shown have Monokoted wings with epoxy paint trim. The other has a fully painted wing and weighs 3/4 of a pound more than the other two.)

INSTALLATION

1) Rudder, elevator, and throttle servos sit three across in the aft fuselage compartment. Use cable steering for the nosewheel.

2) The receiver and flap mixer occupy the next compartment forward. (If air retracts are used, the valve servo should go in this compartment with the receiver, and the flap mixer may be moved above the gas tank.)

3) Flight battery may be placed anywhere from the firewall all the way back to the receiver compartment. It should be located as necessary to achieve the proper CG.

4) Use a 180° servo for the retracts, a standard servo for the flaps, and mini servos for the ailerons.

5) Install the gas tank and connect its tubes to the aluminum tubes in the fuselage with silicon tubing. (Note: The gas tank is located aft so that little CG shift occurs as fuel burns off. If you choose, you can put the tank immediately behind the firewall and eliminate the gas tank cavity in the top of the wing.)

6) Install the engine and pipe. One of the aft wing bolts may be used with a standoff to support the back of the pipe, or a separate standoff and pipe mount may be installed elsewhere in the belly pan.

7) Connect pipe pressure to the vent pipe protruding from the bottom of the fuselage with silicon tubing. Remove tubing during gas tank filling operation so overflow doesn't run into the pipe.

TRIMMING AND FLYING

(Comments by Steve Rojecki)

Ken has already discussed the design philosophy of the Brushfire, so I'll limit my comments to setting it up and trimming it for contest flight. Trimming any airplane actually starts during construction, when you are aligning the thrust and wing and tail incidence. Errors in alignment may result in flight problems that cannot be corrected by trimming. One of the fiberglass Brushfires was accidentally built with a one-degree offset in the horizontal tail incidence. This caused a very pronounced pitching in the knife-edge portion of point rolls. Nothing we tried corrected the problem until we cut the tail completely out of the fuselage and glued it back in at the correct incidence.

The original Brushfire was balanced at the point shown on the plans. This is a good location for test flying and reasonable maneuverability, but you may want to move the CG another half-inch back later on for maximum performance in spins, knife-edge, and snap rolls.

The first airplane had a flying stab set up using a Giezendanner mechanism. About eight degrees of stabilator travel in each direction provided enough pitch authority for the full maneuver range. The other two Brushfires built so far have had conventional elevators. The deflections for all the control surfaces are noted on the plans. It should be pointed out that the aileron throw shown represents high rate if a dual roll rate system is used. As always, you'll have to adjust your throws to suit your own style of flying, but the values shown are adequate for all the maneuvers if the CG is at or near the specified point.

Before your first flight you'll have to balance the airplane fore and aft. This is pretty straightforward and most modelers should be used to it. Equally as important, but not as well known, is lateral balancing. A quick method for lateral balancing is to hold the airplane by the prop shaft and the top of the vertical fin. Pick up the airplane in this manner and note which wing drops. Be sure to do this with the landing gear retracted, as the balance may change with the gear down. Add weight to the high wing tip (at the CG, if possible) until the airplane hangs level.

Another preflight trick which improves performance in all maneuvers is sealing hinge gaps. This can be done

Continued on page 80

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AIRCRAFT SPECIFICATIONS

A. Model aircraft shall be a replica of an actual full size aircraft designed for aerobatic maneuvers. Military primary trainers will also be acceptable. It is the responsibility of the contestant to document the aerobatic capability of full size aircraft chosen.

B. Maximum deviation from scale will be 20% except as noted.
   a. The following dimensions shall be within a 10% deviation from scale.
      1. Wingspan
      2. Wing chord at root
      3. Fuselage length
      4. Fuselage width
      5. Fuselage height
   b. The scale of the model will be determined by the model's wingspan as compared to full-size aircraft's wingspan.
   c. The general contours and shapes of the model shall be similar to the full size aircraft.
   d. The model's airfoils need not be similar to the full size aircraft.
   e. The control surface hinge locations and type can be different on the model as compared to the full size aircraft.
   f. The fuselage shape cross section (not width and height) can be altered on the model as compared to the full size aircraft.
   g. Additional controls and flight control surfaces cannot be used on the model unless the full size aircraft had such control or control surfaces.
   h. Any type of radio control equipment and control levers or switches can be used (except as noted in Section B.g.).
   i. Color scheme and colors need not be the same as the full size aircraft; however, the scheme used on the model shall be similar to what is used on full size aircraft.

C. Maximum size engine(s) shall be 35 cubic centimeters—total displacement 2.1 cubic inch. Effective silencer to be used.

D. Maximum weight ready to fly less fuel shall be 7.5 kilos (16.5 lbs.). Bi-planes 8.4 kilos (18.5 lbs.).

E. Minimum wing area will be 1100 square inches on monoplanes and 1400 square inches on bi-planes.

F. Model shall contain a realistic pilot and instrument panel of the appropriate scale.

CONTESTANTS

The contest is limited to twenty (20) participants and these participants have been selected by the contestant committee. The top five finishers in the 1978 Tournament of Champions were automatically invited. The other fifteen (15) were selected based upon the International Records and their ability to fly full-size aircraft maneuvers proficiently.

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MANEUVER SCHEDULE

A. Maneuvers shall consist of inside and outside loops, rolls, spins, snap rolls both positive and negative, level flight, 45 and 90 degree climbs and dives. All maneuvers will be done in continuous sequence.

B. Three different sequences will be flown.
   a. Known sequence (first day)-between 20 and 25 maneuvers to be flown in a continuous manner that will be known to the contestants six (6) months prior to the competition.
   b. Unknown sequence (second day) -between 20 and 25 maneuvers to be flown in a continuous manner that will be announced at **6:00 PM on the first day.**
   c. Free style (third day) - contestants' choice of maneuvers from list supplied to contestants.

C. A minimum of two rounds flown per day.

D. Aerobatic zone will be defined as 120 degree area in front of the judges (60 degrees high). Any maneuvers done outside of zone boundary will be severely downgraded.

E. Finals - top five qualifiers with best three of four flights counted. Sequences to be announced later.

For additional information write to: 1980 Tournament of Champions: c/o Marketing & PR Office; P.O. Box 14967; Las Vegas, Nevada 89114

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with Monokote or clear vinyl tape. As a minimum, aileron and elevator hinges should be sealed. Flaps and rudder are not as essential, but sealing their hinges can only help. Sealed hinges prevent asymmetric hinge gap leakage during maneuvering, which creates unwanted roll or pitch inputs.

During the first few flights you should concentrate on trimming the airplane for straight inside and outside loops. Several good articles on trimming have been published, so I don't plan to go into much detail here, but briefly, if the same wing panel keeps dropping in both insides and outsides, either remove tip weight from that panel or add weight to the other. If insides and outsides corkscrew in opposite directions, check the aileron trim. Finally, if the loops are pretty much wings level, but heading changes occur, retrim the rudder or check for engine side thrust offset. Loop trimming can be frustrating, since changing one thing always seems to foul up something else, but if you keep at it and you built your airplane straight, loops on a rail should be obtainable.

Roll tailoring is not often considered by many fliers, but the nature of your airplane's roll can be varied by playing with differential aileron throw. Start out with equal aileron throw up and down. Fly straight away from yourself and do a half roll to the right with no rudder or elevator inputs. If the nose of the airplane is pointing off to the left after the half roll, adjust your ailerons so they travel more up than down. If the nose winds up off to the right, set it up for more down aileron than up. None of the Brushfires to date have required any differential, but it never hurts to do this test on a new airplane.

To trim the airplane for knife-edge, roll it up on either side and apply only rudder to hold the nose up. If it rolls in the direction of the rudder input, it has too much dihedral. If it rolls opposite to the rudder direction it needs more dihedral. This should not be a problem on the Brushfire, since we adjusted the dihedral after the first airplane. If the airplane pitches up in knife-edge, roll it over to the other knife-edge position and try again. If it still pitches up, add incidence to the wing by shimming above the trailing edge. If it pitches down in both knife-edge attitudes, decrease the wing incidence by shimming above the leading edge. If it pitches up in one knife-edge direction and down in the other, check engine thrust alignment.

Flight trimming is a very painstaking process, but the rewards are well worth the effort. A well-trimmed aircraft requires only maneuver inputs from the pilot. A poorly trimmed airplane requires maneuver inputs plus corrective inputs to straighten out what it's doing wrong. All the Brushfires flown so far have required very little trimming and have exhibited no nasty habits. The Brushfire is fully capable of all AMA and FAI maneuvers, and it is truly a pleasure to fly.

ONE LAST THOUGHT

A brush fire is something that starts from a small spark, gathers momentum slowly, and eventually lays waste to everything in its path. That may be a rather optimistic definition for the "Brushfire" namesake, but a fourth, a second, and a first in its initial Masters pattern competition season would seem to indicate that the design is already a legitimate contender, and that its appearance in the winners circle will likely increase as more Brushfires begin to appear on the contest scene. •

Fuel Lines . . . . *Continued from page 23*

identify a few sounds.

Figure 1 is a graphical representation of the adjustments we can make on a variable compression diesel. The curves would apply for one propeller and fuel combination. There would be a family of curves for different props, fuel, air temp., etc. The area between the curves represents compression/fuel mixture combinations resulting in stable engine operation.

As with a glow engine, if we want the diesel to go faster it has to be "leaned out." But, look what happens. The operating band gets narrower. This means that a small external change . . . say a long climb or dive . . . which changes the engine temperature can easily make the engine over or undercompressed. The message here is to run on the rich end of the curve. One advantage of the diesel is that it can be run rich without slowing down very much.

If you're starting your diesel for the first time, the safest setting is a rich needle and a low compression (I assume you're using a starter and a big prop. A small prop and low compression will give you a bloody finger if you hand flip it). Choke or prime the engine enough to be certain that it has fuel, and gradually increase compression until it starts.

With the engine really rich, it's tough to tell if it's over or undercompressed, so lean out the needle so the exhaust stops looking like you're burning old tires. Referring back to the figure, you'll see that leaning out the needle may result in under or overcompression. If it's undercompression, the engine will "burp," i.e. run with a miss or stutter type of sound. If its overcompressed, it will run smoothly, but will slow down and finally quit. Overcompression is to be avoided, as it can damage the engine.

Leave the needle alone and play with the compression screw. Try to find out what over and undercompressed conditions sound like. Then lean out the mixture some more and you'll see how the usable compression range shrinks as the mixture gets leaner.

One of the difficulties in FAI Team Racing is that, because we require maximum speed and economy, we have to operate at the far right end of the curve where the correct setting becomes almost a single point instead of a range of points. For sport use, there is no need to push to the leanest possible setting. In fact, it would cause a lot of difficulty, as when the engine is throttled back it will cool off. Then when the throttle is reopened, the compression will be too low. A richer high speed setting eliminates this problem.

Set the idle as you would a glow; again, a bit on the rich side. The engine will cool down because it's putting out less power, so the compression setting will be less than optimum, thereby requiring a rich setting.

As I said before, you're going to have

to learn to adjust a second variable. If you look at your engine as only a power source to tow your airplane around the sky and the less you have to know about it the better you like it, then I really doubt that you'll fall in love with diesels. On the other hand, if you're interested in engines, diesels have a personality all their own . . . sometimes not too pleasant, but always interesting. Try a diesel. You may not like it, but you won't forget it. •

KLAUSE

• Have you ever noticed that some modelers are natural born fiddlers? No matter how smooth things are going, they're always fiddling with something. The really compulsive ones keep it up until things turn into a can of worms. The most popular object of their attention is usually anything that changes the trim of the model, be it boat, car, or plane. Some other syndromes you may have noticed are "fuel mixers" and "prop changers," but my all-time favorite is the "carburetor adjuster." Any carburetor will do, but an R/C one really turns him on. Not only can he tweak the needle valve, he can also adjust the lower end stop, and the idle mixture control is the *piece de resistance*. He salivates at the very thought of it. You can't miss this guy at any flying site. After a flight where everything went right, he shakes his head, mumbles something, and makes a couple of quick carburetor adjustments, usually without the engine running. Sometime later he fires it up, and immediately launches into the wild blue yonder. All too often, the engine quits before the fuel runs out, and it's another dead-stick landing followed by many kind words about the engine manufacturer.

OK, so I may be exaggerating a little bit. I apologize. I was only trying to make a point. What started all this? Several phone calls during the past couple of weeks, that's what. Two from new modelers who couldn't get their engines started on pen bladder pressure and wanted to know approximately where to position the needle valve. Another was from an R/Cer who was having trouble with his engine quitting at the idle position. Whenever I receive such calls, I always jot down a note about it for possible comment in this column. So, this month the subject is carburetor settings.

Let's begin with a simple carburetor on a free flight or control line, suction operation, engine. The first logical question is, "Where should the needle valve be set for starting?" Some manufacturers include instructions such as, "Open the needle valve three turns. . ." Other do not. Here's a little technique that will work on just about any engine. I call it the "twist for hiss" method. First, fully close the needle valve, but be careful not to jam the needle against the seat in the spray bar; forcing a needle against the seat can ruin it. Now attach one end of about a one-foot length of tubing to the fuel nipple of the carburetor. Stick the other end of the tubing in your mouth, and hold the engine close to your ear. Apply breath pressure through the tubing, and slowly unscrew the needle. As soon as you hear the faintest hiss of air escaping from the carburetor, stop unscrewing the needle. Note the position of the needle, and then unscrew it another two-and-a-half turns. This is the approximate position for starting with a suction fuel system.

For pressure operation, use the same technique up to the point where you stopped unscrewing the needle at the hiss of the air. If you are using a tank with crankcase pressure, open the needle one additional turn. If you're using a pen bladder, open the needle three-quarters of a turn. Once again, these are the approximate positions for each particular engine.

Before discussing the R/C carburetor, here's a tip on setting the needle for flight. Adjust the needle for peak rpm, and then back it off (richen it) an eighth of a turn. This will give you a good airborne mixture for full power operation. In some cases, it will not require a full eighth of a turn. This is a very important procedure. If you do not do it, when your prop unloads in the air, the setting will probably be too lean for the increased airborne rpm. Perhaps a comment or two about prop unloading will highlight this.

When you adjust the mixture for peak rpm on the ground, the prop is working against a load generated by its disc area, blade area, chord, and effective pitch. Since the disc and blade areas and the chord do not change when an aircraft becomes airborne, we can ignore them for this discussion. The effective pitch of a prop is another matter. On the ground, the effective pitch is equal to its physical pitch. When your aircraft becomes airborne, it moves forward (most of the time), and the effective pitch of the prop decreases because the angle of attack of the prop to the plane of air molecules decreases. Thus, the engine senses a lower pitch or load. Consequently, it increases rpm, which simply means it needs more fuel. If you don't use that back-off richening procedure, the airborne mixtire will be too lean. That's exactly what happens when you see a model aircraft become airborne, hear the engine sag and sometimes quit. This same principle applies to R/C carburetors and to model boats. It also applies to a lesser degree to R/C cars. There is one notable exception to this, and that's when you use a fuel system pressurized by crankcase pressure. In this instance. the increased airborne rpm also increases tank pressure and thus fuel flow to the carburetor. Hence you will not have to enrichen the needle as much as with suction or pen bladder operation. In fact, with 1/2A pylon racers with crankcase pressure, if you peak the needle on the ground, it's usually also very close to a good airborne setting. Variations will be due to the particular prop you are using.

How about R/C throttle type carburetors? Well, quite simply, everything that

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has been said thus far applies equally to them. All we have to do is adjust the idle mixture controls. If, for some reason or another, yours are out of whack, here's how to set them properly. First, a general comment. All too often, idle problems are caused by attempting to make the engine idle at too low an rpm. Spending hours trying to get a two-cycle engine to idle reliably at 1500 rpm is a waste of time. Find out what rpm you need to initiate taxiing from a dead stop. You might be surprised to find out how much it takes. Certainly, there's no overriding need to idle at 2000 rpm if it takes 9000 or so to start your aircraft rolling. For those who may be saying, "But it's not scale-like . . ." my response is, "Buy a four-cycle engine." So much for the general concept of low end rpm.

For starters, set the idle mixture control at the mid-point of its physical range. Adjust the lower end stop so that you can see a decent bit of venturi hole in the rotating barrel or slide . . . about 1/16 inch. Open the throttle, start the engine, let it reach operating temperature, peak the rpm with the needle valve, and then back it off slightly. With your tachometer for a reference, slowly retard the throttle to the low end stop. The idle rpm will probably be a little high. That's no problem. Now, carefully adjust the low end stop to gradually decrease rpm. Be very careful! Remember that long-standing warning, "Beware of propellers." Any potential hazards such as loose or dangling clothing, or objects that can fall into the turning prop, are a NO NO! I once very carefully emptied my shirt pockets, bent over the model, and my sunglasses fell off. Embarrassing to say the least.

If the engine quits prematurely, the idle mixture is probably either too lean or too rich. Start it up again, and carefully retard the throttle close to the rpm where it quit. Now, screw in the needle valve. If the idling smoothes out, it means the idle mixture was too rich. Reset the needle for high rpm, and lean out the idle mixture control. Make small adjustments. The idle mixture control on some carburetors is very sensitive. If a lean idle mixture caused the engine to quit, unscrewing the needle valve will improve idling. All you have to do is adjust the needle valve at or close to idle rpm to get an indication of the idle mixture setting, and then adjust it accordingly. Don't forget to return the needle to the correct high rpm position.

It may take several times through this cycle to get all the adjustments set correctly. When you have things down to a gnat's you-know-what, run the engine at full throttle for about thirty seconds, and then come back to idle. Let it idle a while. Sit down and have a cool one. If it's still idling nicely after four or five minutes, open the throttle smoothly and positively. If everything's right, the engine will respond perfectly.

If you still seem to be having trouble, first remember my earlier caution about trying for too low an idle, and second, check the cleanliness of your carburetor,

fuel lines, tank, and filter. Don't overlook the possibility of a poor tank location. One way to prove this out is to set the engine on a test stand with a small tank at needle valve level. If the engine throttles fine on the test stand, but not in the aircraft, you know it's your aircraft's fuel system.

Now that you have it all together, resist that urge to diddle with the adjustments every flight. Unless climatic conditions vary significantly, everything will still be good your next time out. At most, you'll have to open the needle valve a quarter turn for the initial start of the day because preservatives may have congealed since your last flying session. Certainly, any adjustments will be small if you once set the carburetor properly. There's no need to be an obsessive fiddler. That's it, guys. See you next month. •

1 to 1 . . . . . *Continued from page 27*

occurred (actually, mounted on a sawhorse and run in the back yard). The hope is that I will be able to fly with a scale-size prop, making it possible to set the model before the judges and relate that no changes will occur to the model for flying.

The O.S. is not yet broken in, however, it does seem to handle a hefty prop. I am working toward a 16-inch prop, which is the scale diameter I need. An extra advantage is that I can eliminate about ½ to ¾ lbs. of fuel and internal starting battery, which is a distinct help in scale. In addition, the engine runs in a slobbery pool of oil that makes it very hard to ruin by leaning it out too much. Actually, if you get too lean, it just starts popping and sputtering and you *know* it's too lean. A disadvantage (?) is the vast amount of exhaust goo that gets all over the place. (The side of my house, the air conditioner, my work pants, etc.)

As Tevya in "Fiddler on the Roof" would say, "On the other hand," it's a lot quieter than a glow engine. But then too, my old Penford starter just laughs and says phooey when I ask it to turn the engine over. However, it's got a super idle. But then . . . oh heck, I'll fill you in later on how it runs in the air in my model. At any rate, it seems like an interesting prospect to scale modeling in achieving a whale of a lot of torque. Bob Davis lists 10,000 rpm with a 16x4 prop. Now if I could remember not to flip the prop through absentmindedly!

AND THEN THERE'S THIS POINT

The air has been filled (again) with information concerning "scale speed." I asked myself, "Why not join this illuminating discussion about how fast scale models should fly?" An answer echoed back through the vacant spaces above my shoulders relating, "You don't have any scientific knowledge that will shed light on this subject." To that I utter, "Posh! Who cares? That hasn't stopped you before from speaking on other subjects." So . . .

The subject has been around for as

long as scale models have been built, and much interesting research and information has indeed been directed toward clearing it up. I must admit to a great degree of lack of understanding of some of these equations and scientific information. The crux of the matter seems to fall in the category that smaller models have to fly faster than big models, and that all too often this speed is well above the "scale speed" the models should be flying.

This then brings up the problem of how you calculate scale speed. One school of thought suggests that you simply equate the scale of the model to this. Therefore, if you have a 1/5 scale model (2"=1') of a 300-mph airplane it should fly 50 mph. This seems reasonable if your 1/6 scale model is of a 300-mph aircraft, but if it's of a 100-mph aircraft, your concern increases when you come up with a *top* speed of 18-mph (especially if the contest is flown in a 20-mph wind).

Therefore, we surface with the other school of thought that relates the speed to factors of a mathematical nature that tend to graduate through a spectrum governed by model size, etc. I suspect that with a degree of study, I could fully digest this approach as well. It seems reasonable to me also in many ways, at least in the logic of its approach.

However, as I see it, both of these approaches miss one very important point which is most difficult to evaluate and impossible to scientifically evaluate. No matter how exact and perfectly detailed our models might be, we are creating, in the title of the newly produced AMA scale film by Jay Gerber, "The Grand Illusion."

Every scale modeler who has been around for a while can relate instances where he or she produced some element of a model out of actual scale simply because when it was done dead-on it "looked wrong." I can recall the first time I made a seat harness for my ¼-scale Bonzo that I was appalled at the width of the belt material and the size of the buckle. It looked like it was designed for the Jolly Green Giant. After checking my measurements I surmised that it was correct, but it still didn't *look* right.

I submit to you that much of what we are doing in the air is very much the same thing. We are attempting to create that complete grand illusion of the aircraft we are modeling. I recognize that what I am suggesting is very non-scientific and is most subjective in its consideration, but isn't most of what we do already that way? Indeed, let's suppose that we could agree on the correct method of determining scale speed and each contest director said to his judges, "We will use the X method." Short of utilizing the local police department and their handy-dandy radar gun, how are you going to *accurately* measure that model's speed? I guess you could time it over a measured course, but is that sort of thing really going to happen? Probably not.

Therefore, we are once again back to the subjective methods of the impression that the model makes on the viewers. Actually, it is not just the speed at which the model flies or its size that are the sole factors involved. The presentation of the model in relation to distance away and altitude enter in as well.

I submit to you the consideration that all the charts and arguments in the world will not create a totally accurate method of determining the speed at which the model must be flown to achieve scale speed as far as the viewers are concerned, and they are the ones we are attempting to influence. Granted, objective evidence can do much to overcome the subjective shortcomings that might exist, but it still behooves the competitor to create the necessary atmosphere to fit his model. Gradually, through a process of training and understanding, we can probably create the most accurate atmosphere possible, if indeed it does not already exist. But we must be prepared to understand the leeway necessary to create this illusion for the greatest number of persons. In short, we must be adaptable as well. When the professional baseball players meet for a world series, they are very cognizant of the fact that the strike zone varies somewhat between the two leagues. No

doubt, then, some adjustment is made in both the players' and the umpire's thinking. Think about it.

PREPARE YE THE WAY

As the new scale flying season approaches, the northern climes should be certain to read the new rules in effect. Nothing can be more distressing than to find that you are a rulebook behind some bright day at the first contest of the season. Some items that you should consider are the following:

Add to your presentation the required list of parts not made by you, the entrant. In light of recent concerns in regard to the amount of prefabrication in various kits, you may find some emphasis placed on this aspect of the new rules.

Be certain your *new* model contains a dummy pilot figure. As I understand it, you must find a rider to accommodate any older model which may not contain a figure now. And if you show up without a figure?

Read the judge's guide to be on a similar wavelength as any judges who might have been trained using it. (I didn't say you had to totally agree with it.)

Determine which class you are going to fly in as far as Sport Scale is concerned. Your choice is Sportsman and Expert. Your declaration will be necessary, but weigh the decision carefully.

Remember that you are now judged from a 15-foot distance and that the viewing conditions may be changed to show the model same as in the three-view.

Work on determining your flight order. You can now use proto taxi as a flight plan option. In addition, you are limited to three scale operations, not including multi-engines. On your P-51 you can still retract the legs, extend the flaperoos, and drop an egg, but don't expect to include the pilot waving and machine gunning the judges as your other two flight options.

Don't plan to enter the same model in the newly-formed Giant Scale and Sport Scale at the same contest.

Determine in which class you are entering the model *before* you get there. I spoke of the Giant Scale and Sport Scale classes. Read the requirements *carefully*. The Giant Scale model must have at least 1.25 cu. in. displacement, be at least 2-7/8"=1', or weigh at least 15 lbs. It is possible to have a maverick that doesn't fit either Giant or Sport Scale classes. Granted, you'll have to *work* at making it ineligible for one or the other, but from experience, someone will manage to do it this year.

When that new rulebook shows up, remember to read it carefully, several times! And oh yes, a reminder. There's a new rules cycle underway. Make your official proposals prior to next September. Check with AMA headquarters for the proper forms.

AND A LETTER OR TWO

A letter from Anthony Costanzo of Massachusetts brings the request for a

set of plans for a DeHavilland DH-88 Comet in 2"=1' scale (88-inch span). He noted pictures of my model and was interested. The problem is that I have no plans for my model. Does anyone know of a set in that scale? Col. Thacker's was smaller, and Ernie Violett's C/L of several years back was smaller yet. Contact Anthony Costanzo, 51 Oakhill Dr., Methuen, MA 01844 if you can. Maybe I ought to get on the ball and draw a set of plans.

A second letter, from Bill Kee of Twin Falls, Idaho, comments about some of the thoughts on color presentation problems in the January 1980 issue. His thoughts are appreciated and illustrate a commonly held concept that is most difficult to dispute. At the risk of using only a portion, let me quote a closing paragraph:

"When one is modeling a certain airplane and the colors are recorded (B&W days), then it should be 'that color,' but without the original prototype plane on hand, who's to say the modeler's color (shade) is exact? Perhaps too much emphasis is placed on documentation of color other than 'it is orange and black' for models of planes built prior to color photography. If the prototype is in the Smithsonian and one can see the colors and match, fine. If not, who can really dispute (judges). The intent of this letter is only to bring the consideration of colors of these earlier planes to mind. Perhaps I'm way off the beam on this as far as contest judging is concerned, but it is something to think about."

Yes, Bill, it's something to think about. Thank you for your comments. He does, however, mention in a postscript that he has "given up on R/C and is sticking to non-flying scale jobs, 1-1/2 inch scale." While Bill doesn't state why, hopefully, he will reverse this since the color shot of a model of a scratch built Boeing P-12 was most impressive looking. Actually, Bill, there are a lot of us scale modelers *in* R/C who seem to build non-flying models!

Enough for this month. May the wind be kind. •

Electric . . . . . *Continued from page 43*

enthusiasts such as John promoting the sport.

Another design that is well worth looking at is the Astro 05 sport model designed by Bob Boucher. One of the photos sent in by John shows seven of the pylon entries, including a high-wing cabin plane in the upper right of the photo. This is Bob's plane, and I had the chance to see it fly and to fly it myself over the Christmas holidays. I was really impressed. It is the best flying 05 plane I have ever seen, and that includes my own designs (some of which I thought were pretty good!). The climb is fantastic, like a Tee Dee powered plane, and it easily does consecutive loops from level flight. It also has a surprising rate of speed, which would make it competitive in the new sport electric pylon racing event. Bob's plane weighs 28 ounces and has 300 square inches of area, using a flat-bottom 9% airfoil swiped from the Astro Flight Malibu. Part of the low overall weight comes from the use of the Astro Flight electronic throttle, which eliminates the need for a receiver battery. The plane looks very modest in appearance, but seeing its performance is believing! Bob says that Astro Flight may kit it. I hope so, I'd like to have one myself.

Astro Flight will also have a new scale kit out soon, the Porterfield. It can use the Astro 15, the geared 15, or the Astro 25. The photos show the the framework and the finished plane. It is built like an Old Timer and is quite light for its size. Span is 64 inches, weight around 4 to 4-1/2 lbs. with the 15. I might try one when the kit comes out, perhaps even on floats! Have fun with the electrics! •

Instructor . . . . *Continued from page 11*

scheme in blue and white on my Alley Cat and am very pleased with the appearance.

Per instructions in a recent article on cleaning servo pots, I corrected a problem with one of my older servos but I didn't have any servo pot lubricant. Is it available from any supplier other than Ace? The mail order suppliers and local shops don't seem to carry this product. Can I use a substitute? One of the fliers in my club (Bucks County RC Club) told me I could use color TV tuner cleaner available from Radio Shack. He stressed using cleaner for color sets, not black and white. Comments? How much pot lube should I use?

Keep up the good work. Your efforts are appreciated. Dave Trabert.

My paint scheme involves simply a line down the middle of the span of the wing and then a line parallel to the fuse centerline at a point halfway from the fuse to the tip. The bottom is different and has a triangle on it with the outermost points at the half span point at the trailing edge and lines coming to an apex at the midpoint of the chord at the root.

The only retail source of pot lube I've seen is from Ace, as you mention, but most radio manufacturers would probably sell you some if you sent them a request. Many people have used vaseline as a lubricant in a pinch and it seems to work OK. My own feeling is that you should use as thin a film of lubricant as possible to avoid having the wiper hydroplane in the lubricant and lose contact. TV tuner cleaner can be used to clean the normal servo pots, but may be harmful to the conductive plastic type elements, so I hestitate to recommend it.

Dear Dave:

It seems like everyone is using tuned pipes these days. Do you think it's a good idea to add an extra ounce or two of castor oil to each gallon of fuel to protect the bearings from the additional

rpm? If not, what is a good safeguard, as I don't particularly want to be replacing bearings every week. Thanks for writing a great column. You seem like one of us Sunday Fliers rather than one of those fancy pattern guys. Keep it up. Jim DeBoer.

I personally do not recommend adding extra oil in tuned pipe engines. As a matter of fact, there are indications that just the opposite may be better, as at higher rpm's the bearings are being hurt more from too much oil, which causes the balls to hydroplane or skip rather than roll. I have tried a bearing shield behind the rear bearing as suggested by Jim Cline and Pat Shuttleworth with good results, and I plan to try some fuel with less oil and see what happens.

Thanks to all who have written, and I will get to all of you soon. Please do keep writing. •

FAI Soaring . . *Continued from page 35*

who doesn't design as close as possible to the limits is going to be beaten by someone who does.

"Now what's this?" you're thinking. "Is old six-ounce-a-foot Thornburg suddenly advocating heavy airplanes? What happened to the 'float like a butterfly, sting like a bee' philosophy?" Belgium . . . that's what happened to it. After eight rounds of European weather that old philosophy retired, just like Muhammad Ali. It retired not just because of speed, not just because of distance, but because of *thermal duration*, our American specialty. It retired because Tony Wackerle, flying a 10.6-ounce Dassel on ailerons, could pick up a European thermal at 75 feet of altitude and ride it to a max. Could, and did . . . right over the American tent. And Tony Wackerle, by his own admission, doesn't *like* flying thermal; he much prefers slope.

Wackerle's performance was no fluke, either. Over and over the top Europeans showed their ability to ride light Belgium lift with heavy airplanes. In Pretoria, the 1977 team had seen Ralf Decker's 11.4-ounce bird go up and out from hand-launch altitude. But we dismissed it as a fortunate combination of Ralf's skill and strong South Africa lift.

It was more than that; it was the handwriting on the wall. It said . . . and a lot of Americans still haven't gotten the message . . . *thermal duration is a given. If there is lift, a skilled pilot will find it and fly it, regardless of wing loading. Thermal duration is the least important event.*

I failed to grasp this message in 1977 (*mea culpa*, etc.). I went to Belgium last year counting, like the rest of the team, on our light-lift thermaling ability to pull us through, especially in a contest where almost half the score was duration. What our light airplanes got us was 93% of the winner's score, 74% of a perfect score. Not too shabby . . . if you admire being in fourth place.

And from what I keep hearing of current American thinking, there are a lot of folk shooting for another fourth place. "You can always ballast *up*," people keep explaining to me, as if it were a new idea, "but you can't ballast *down* when you need to." This is true . . . in AMA competition. Not in FAI.

Here's why.

AMA competition is normally 90% duration, 10% landing. No speed, no distance; just fly for 420 or 600 seconds, and then go *bang* on the spot. Over and over, all day long. When the lift is soft, light ships have a slight edge. They also have an edge in launch height, and in downwind launches, because everyone uses standardized winches. But their big edge is in the landing circle, and that's where AMA contests are won and lost. The top pilots, the guys who are flying

aggressively and well on that particular day, are going to get their maxes. It's the landings that separate 'em. And light airplanes slow down and go *bang* far more accurately then heavy ones, and do less damage in the process. That's why, all over America, the Cumulus is out and the Oly II is in.

But FAI is a different story. FAI is not a minimum-sink competition. FAI doesn't reward extreme landing accuracy. FAI is a penetration competition, pure and simple, and a heavy airplane is going to out-penetrate a light one 100 times out of 100. If every AMA contest were flown to FAI rules, the Oly II's would soon be out, and the Cumuluses back in. Then, very quickly, the Cumuluses would be out, and the Dassels in. And then the Dassels would be out, and something even heavier and cleaner would be in, *ad infinitum*, right up until the 24-ounce-per-foot, 11-pound max was achieved by all the top competitors. Then, and only then, would thermaling become important again . . . as a tie-breaker!

The Europeans who are serious about FAI . . . the people who are making and flying the current rules . . . don't give a sweet damn about thermal flying. And if we Americans hope to beat them at their own game in 1981, then *we'd* better forget about thermal flying, too. We'd better forget about thermaling, and we'd better forget about those open-structure, oh-so-beautiful wings of yesteryear, and we'd better see just how quickly we can develop a model that will carry 24 ounces a foot through a 180° turn at 90+ mph. Unless we admire being in fourth place.

Let's look at some figures. The November 1979 CIAM meeting voted the old three-task round back in (Speed + Duration + Distance = one round). So duration is now once again worth 33.3% of the total score, right? Wrong! Duration is now worth 26%, just as it was in 1977. Distance is worth 33.3%, speed is worth 33.3%, duration is worth 26%, and landing is worth 7.3% of the total score. I *told* you those Europeans don't give a damn about thermaling! Now, if they don't care about thermaling, and they whomped us primo American thermal pilots in '79, when minimum sink counted for 39% of the score, what are they going to do to us in 1981, when it counts for only 26%? Gentlemen, you better throw away your balsawood toys . . . you're gonna look downright silly with them in 1981.

And so much for thermal duration. Now let's look at the important events: speed and distance.

Speed is still the only FAI event you can fully control, the only event you can win *before the contest begins*. The Austrians recognized this right from the start. When Wackerle or one of the Sitars stepped up to fly speed, he had little reason to be nervous. He was virtually guaranteed 950 to 1000 points, every flight. He was king of the mountain, and he knew it. He wasn't playing catch up; he was the man to catch. There ain't no feeling like this in the world; it *do* give a man confidence. In the one event where luck plays no part, the one event where the score is determined solely by design and skill and practice, the Austrian team was untouchable. We can't let this happen again. We can't afford to send another team to a World Champs without the fastest ships in the meet. There just ain't no glory in it.

The Dassel's speed performance is worth looking at closely. The little ships ran very consistently in the mid-tens, and here's how those ten-point-somethings broke down, on the average:
Time from A to B: 4.2 seconds
Time from B to B: 1.5 seconds
(i.e., time in the turn)
Time from B to A: 4.8 seconds

Air quality on the course seemed to affect the Dassel very little; they ran about the same times whether in lift or sink. Their contest times were about .5 seconds faster than their practice times, on the average. (Their practice ship had over 1300 flights on it, and was winch-launched much further upwind from the starting gate than their competition ships, which were all hand towed.) Hans-Ruedi Schlapfer and his sons, of Switzerland, set up their own timing system and ground out virtually hundreds of speed and distance figures like those above, both during practice and during the competition itself. Here are some of the things those figures tell us:

1) The Dassel was not the fastest plane at the meet. Some A and B times were .5 seconds or more faster than the Dassel. This could not be accounted for by technique, because no ship launched higher or dived lower before entering the course than did the Dassel.

2) No other pilots could match the Austrians' consistency, especially their turn-time consistency (B to B).

3) Only the cleanest, heaviest airplanes could hold their momentum through the turn and come home (B to A) at a respectable speed.

What does this mean for American design? It means that every current "FAI model" we have is out of date, that's what it means. It means we can't just clean up our current designs and practice, practice, practice. It means we've got to go to the drawing boards and come up with airplanes that will run consistently in the low nines, with an occasional time in the eights. Airplanes that are heavy enough to ignore small weather fluctuations and fly strictly by the clock: "At the present wind velocity you will start your turn at 3.6 seconds." Airplanes equipped with "turn buttons" that mix aileron, rudder, and elevator automatically. Airplanes with one-piece wings, capable of withstanding a line tension of 50 or 60 pounds before release by the helper.

This is no fantasy. All of these requirements are currently within our reach; serious slope racers reached and exceeded them years ago. But how many FAI designers are reaching for them? Most of the people I'm hearing from are still trying to decide whether or not to use polyhedral! There was not a

single polyhedral airplane at the Belgian contest that could come within 200 points of the Dassel, *and the Dassel, remember, is passe.* And if you think the Austrians' new ship is going to be *slower,* when there are already half-a-dozen European designs capable of running in the low tens as soon as their owners learn to fly them consistently, then you're dreaming, my friend.

Much ado has been made in the American model press about the South Africans' airplanes. This is because, over the past five years, we've foolishly tied our national pride to the polyhedral wing. The plain fact is, the South Africans were handicapped by their airplanes, just as the Americans were. Every time they stepped up to fly speed, they gave away 200 points. The South Africans squeaked by the Austrians (42,260 to 42,096 out of a possible 48,000 points) for three reasons: They made absolutely NO mistakes; all three pilots flew extremely well; and they had more than their share of good luck in the distance event, while the Austrians had far less than their share.

Such a fortunate combination of factors is unlikely to happen again. In fact, the November 1979 CIAM meeting has taken care to see that it won't, by removing the one-attempt rule in distance. More about this latest European victory next month. •

Sunbird . . . . . *Continued from page 29*

airplanes, try running your antenna outside of the fuselage; it cuts average dead-air time by around 15%.)

Sunbird is launched much the same as a free flight HLG. I grip the fuselage firmly between my thumb and middle finger, placing my index finger solidly behind the aluminum skeg. If you use the double-sided skeg shown, index and middle fingers go behind it, and fuselage is gripped between thumb and two remaining fingers. Either way, you want to be sure you're squeezing the fuselage at a point that has plenty of strength; you may want to extend the wing mounting block down deeper into the fuselage for this purpose. Another tip not shown on the plans: I glue one-inch squares of No. 400 grit sandpaper to each side at the grip point. This not only tells you where to grab her, but gives you better traction for hard heaves.

Incidentally, the switch should be mounted flush with the fuselage side, partly for steamlining, and partly to keep you from turning it off inadvertently during the launch! An even better idea would be to substitute a subminiature jack and shorting plug for the slide switch. Set it up so that removing the plug closes the circuit, then tie a BIG RED RIBBON to the plug, so you never launch with the plug in place, or put the model away without it!

Unless you pitch a lot of hardball and stay in good physical shape, you'll want to work up slowly to hard launches. In fact, I rarely throw the Sunbird with "all I got," even in competition. A good snappy toss at maybe 75% of full power will get you 90% of full attitude, and you won't wake up regretting it tomorrow.

If you haven't flown free flight hand-launch gliders before, you're going to have to learn to "pick" air. It isn't hard; you can get enough experience on a single warm, sunny morning to make all your building efforts worthwhile. Free flighters have to run downhill like a gazelle to retrieve their ship after every toss; you can fly yours back and catch it. This lets you get lots and lots of flights in very quickly.

Look for a good breeding ground for thermals: a brown dirt field surrounded by grass, a blacktop parking lot, a small enbankment that lies exactly perpendicular to the sun's rays — any place where the air might heat up a little more quickly than normal. Remember that the sun can't heat the air directly; it must heat some other surface, and that hot surface will transfer the energy to the air.

Take off your shirt, so you'll be more sensitive to air currents and temperature fluctuations. Air is always moving, always shifting and squirming restlessly about, even on the calmest of days. Note the "feel" of the air around you before each toss. Be especially sensitive to sudden shifts in wind direction . . . these are sure signs of building or passing thermals. Cover as much ground as possible with each toss. What you're

looking for is "live" air; air that makes a wingtip jump, or causes a sudden and unexpected stall. Remember, when you graze the edge of a lift area, it will usually try to toss you out and away from the thermal . . . don't take *no* for an answer!

You should be able to turn your Sunbird in 10-foot or smaller circles, tight enough to ride even very young thermals. At twelve ounces flying weight, she's sensitive to every twitch and roll of the soft morning air. And unlike "pure" free flight, you can use a Sunbird to explore for lift in all directions, upwind as well as down. In fact, a well-built Sunbird would make a first-rate thermal detector for the serious free flight competitor!

Handlaunch R/C has opened up a whole new world to me, a world of micro-micro-meterology that takes place in the invisible air around us every minute . . . a world of miniature highs and lows, cold fronts and warm, that sweep and dance across flying fields no larger than a baseball diamond. If the romance of this kind of flying appeals to you, I hope you'll try a Sunbird. Once again, I want to emphasize the importance of not compromising with weight. If you decide to scale her up to 78 inches and use larger servos, what you'll wind up with is another ho-hum two-meter sailplane, totally unrelated to the Sunbird. This little plane's equipment is specialized, and its structure requires more than ordinary care, but the payoff is a light, nimble little airplane that will provide a lot of challenge, a lot of thermal-savvy, and a lot of good exercise.

Meet you at the chiropractor's! •

Pattern . . . . . *Continued from page 21*

to completing the 300-foot straight flight and then turn *deliberately* 90 degrees. This is where a badly balanced model will look awful as it zooms or dips. Depending on the wind (remember?), add power and/or continue outbound before starting the 270 degree turn so that the apparent speed and distance balance out to make the sequence look smooth and constant. As you complete the 270 degree turn, call "straight flight back" and throttle back as necessary to give the same apparent speed back downwind as you had going upwind. There is a tendency among inexperienced fliers to come smoking back downwind and leave the judges cringing in their chairs. After you have passed the judges stand, count to one and announce "maneuver complete." The judges will now grade each section of the maneuver. You will need to allow a moment for them to enter three scores, so don't hurry into position for the stall turn sequence.

I would like to close with this parting comment. The maneuvers discussed this time are the foundation for all good accurate flying and smooth landing approaches. Do not think you have learned the sequence until you can do it repeatedly, perfectly, and in crosswinds up to 20 mph. Scale model fliers should get this sequence down pat, as it is the basis for a smooth presentation. Sport fliers who learn the sequence will find that landings are much more fun when they use the procedure turn to line up for their approach. In addition, most of their other maneuvers will become easier.

See you next month with the stall turn and the single immelmann. •

Hannan . . . . . *Continued from page 54*

delightful creatures in person was quite an experience! Any model builder would be fascinated by the techniques employed in their construction and operation. The materials used include almost everything imaginable, such as wood, metal, plastic, cloth, and a surprising amount of foam rubber or the equivalent.

The size range of the Muppets was also unexpected, varying from rather small (Kermit the frog, for example) to larger-than-life types which are actually costumes worn by their operators. On the wall were large photo-murals de-

picting the interior of the Muppet workshop, and it resembled the typical modeler's organized chaos! Obviously the people involved enjoy their work and their enthusiasm certainly comes through in the finished products. Standouts in the display were Fozzie Bear, Miss Piggy (apparently the favorite of most people), the Great Gonzo, and the two old kibitzers, Waldorf and Statler. My only complaint was the conspicuous absence of my personal favorite Muppet, the Swedish cook, who was not (you should pardon the choice of words) on hand.

ERRATA DEPARTMENT

Apologies for the mysterious gremlin who inserted the word "Lockheed" in front of X-15 in Paul Garber's list of famous aircraft, especially to our friends from North American!

GOSSAMER NASA

Congratulations to Paul MacCready and crew, who have recently been granted a research contract by NASA. Experiments are expected to be conducted in the realm of ultralight low-speed aircraft and lightweight data measurement systems. The Gossamer Albatross no. 2 will be extensively tested under human power, towed, and with model aircraft electric motor power.

TURNER HALL RACER?

No, that's not a misprint! According to Bill Turner, owner of the fabulous Gee Bee Z reproduction presently on display in Cleveland, Ohio, his next project will be a full-size Hall "Bulldog" racer. Reportedly, designer Bob Hall himself is enthusiastic about the idea.

THE MOONEY BROTHERS

Robin Mooney, Walt's brother, dropped into the Hangar for the first time recently and was reminiscing about Walt's first model contest, at about the age of twelve. It seems Walt and Robin were walking along the streets of San Francisco and encountered a hobby shop. In the window were displayed entires for a contest to be held the following day. Walt exclaimed to his brother: "I can build a better model than those!" Whereupon he rushed home, constructed one that night, entered it the next day, and won first prize. Walt has been building circles around the rest of us ever since.

Item no. 2: Teetotaler Walt has been patronizing the same San Diego liquor store for years, but always to buy the same things . . . CO_2 capsules for his model engines, as Walt carefully explained to the somewhat skeptical owner. With the recent arrival in town of Robin Mooney, who likes his Budweiser, Walt walked into the liquor store and ordered a case of beer. No amount of explaining could convince the owner that Walt had not changed hobbies!

WORLD INDOOR CHAMPS AND PEANUT GRAN PRIX

The Miami Indoor Aircraft Model Association will host the 1980 World Indoor Model Championships, to be conducted in West Baden, Indiana, from June 21 through June 28. Fourteen nations are expected to compete in the

fabulous Northwood Institute site. As a bonus, the First World Peanut Gran Prix followed by the Fifth NIMAS Annual Record Trials will be conducted.

Volunteers are urgently needed, according to organizer Dr. John Martin, to serve as "workers, entrants, bodies, spear carriers, proxy Peanut fliers, timers, van drivers, gophers, guidon bearers, drummers, cheerleaders, and indoor folks of all kinds." He also points out the advantages of attending this event as a family vacation, since the area is a resort with plenty of activities available such as tennis, cycling, swimming, hiking, golf, and dancing.

The Peanut Gran Prix promises to be a special treat, with Butch Hadland of England to serve as Contest Director. Proxy entries are invited (note there will not be an **RCMB** event this year), so here is a chance to test your Peanutting abilities against the world's greatest. There is still plenty of time to prepare, but don't delay. Contact: Mike Arak, 10900 SW 61 Ct., Miami, FL 33156 for complete details. Please be sure to include return postage.

JACQUES POULIQUEN MEMORIAL CONTEST

From France we have received a brief account of this indoor Peanut meeting, which was dedicated to the late Jacques Pouliquen, who virtually single-handedly introduced the breed to France. According to Roger Aime and Jean Frugoli who participated, some 42 models were entered, including two mailed from the United States for proxy-flying. The new 9-inch (23 centimeters, actually) rules were employed, and well exploited by E. Fillon, who entered a Gossamer Condor! However, more conventionally proportioned models captured the first three places, and all by members of the same family. Results were as follows (apparently multiple entries were allowed):

1) Christian Frugoli, Farman Mosquito (best flight: 86 seconds)
2) Michel Frugoli, Farman Mosquito (best flight: 91 seconds)
3) J.F. Frugoli, Heinkel 100 V8 (best flight: 70 seconds)
4) E. Fillon, Gossamer Condor (best flight: 55 seconds)
5) J.F. Frugoli, Hirondelle
6) E. Fillon, Gossamer Condor
7) M. Pordio, Farman Mosquito
8) Roger Aime, Folkerts

Of the American proxy-flown entrants, Bob Peck's Volksplane placed 15th, but the placing of Bill Warner's Paulhan-Tatin was not reported in the brief summary we received. The awards were unusually lavish, consisting of elaborate cups, medals and merchandise. Our congratulations to the organizers, including Jacques Pouliquen's brave widow, Loly, who has continued to help support her husband's goals in the promotion of flying scale modeling.

FAREWELL TO DOUG GILLIES

We regret to report the passing of another fine model builder and frequent contributor to this column, J.D. Gillies, of Glasgow, Scotland. He was recognized as one of the leading aero historians in his native land, and had assisted many aviation writers over the years with his encyclopedic knowledge and comprehensive photographic archives. He was an enthusiastic supporter of model building in all its forms, including both static display and flying aircraft, model railroads, and ships. Also a lifelong student of philosophy, Doug ran a continuous study of what he called "people mechanisms."

During 1975 it was my pleasure to accompany Doug on an extensive tour to visit aviation enthusiasts and aero museums in Europe, and I shall always remember his advice about not trying to make snap judgments of other countries: "Things will be different. Not necessarily better or worse, but certainly different." This simple guiding edict served us well throughout our travels. To Doug, the appreciation of differences was totally natural, and he had the priceless ability to relate to people everywhere with readily apparent ease. His correspondence was literally worldwide in scope, and concerned with not only aviation, but such diverse topics as fiction writing, photography, stamp collecting, art, motorcycle racing, television, travel, electronics, and manufacturing. Regardless of the topic under

discussion, his letters were always cheerful, reflecting another of his all-encompassing interests, humor. We'll miss you, Doug Gillies! •

F/F Scale . . . . *Continued from page 53*

powered scale models, are the fillets made from card stock. At first glance these look to be a bit difficult to make, but they're really not. I have photographed a few of my models using these card stock fillets.

Most scale rubber models have their wings permanently mounted onto the fuselage. I feel that this makes filleting a bit easier, since you can attach the fillet permanently to both the wing and fuselage. My starting point is to make a triangular gusset from balsa and to glue it to the wing's trailing edge and fuselage. I then take a piece of 3x5 or bigger file card stock, and start cutting away until the fillet has the shape desired and will lay evenly on the wing and fuselage.

I then take a dowel (about 1/4-inch diameter) and roll the fillet over it until the fillet takes on a nice curved shape. I again place the fillet in place to check for fit. Once satisfied with the fit, I attach it using white glue. Any excess glue that squeezes out is carefully cleaned with a damp tissue or cloth.

Since I finish 99% of all my scale models with the Floquil method, I don't worry about what color the fillet is. If you are concerned about this, coat the fillets with several coats of clear dope, then cover with the appropriate colored tissue of your model, then trim and mount permanently.

If you don't like working with this type of card stock, you can find high quality material in good art stores. However, there is quite a difference in price.

I'm presently in the process of finishing Flyline's nifty Kinner Sportster. This particular aircraft has a very large and flowing fillet. I've incorporated pendulum ailerons, so the wing is made to come off. This meant that the fillet had to be permanently mounted onto the fuselage only, yet fair nicely over the wing.

The first thing I did was secure the wings onto the fuselage (wire rods inserted into tubes in the fuselage and held by rubber bands between hooks). Again, the triangular balsa gusset was cut out and glued to the fuselage only, but tangent to the wing's trailing edge. Card stock was trimmed, and rolled until I was satisfied with the way it looked. The fillet was then glued onto the fuselage and triangular balsa gusset only. I taped it down with drafting tape until the glue dried. While these were drying, I made a couple of triangular gussets that would fit underneath the fillet, one for each side. This was done not only for support, but to insure that the fillet would not lose its shape after doping and painting.

Still another approach to wing fillets is a bit different, and one that I have described some time ago, while building a Thompson Trophy model of Schoenfeldt's Firecracker. This airplane has a big fillet, and I realized that I would not be able to make it from card stock successfully. So, I came up with the following technique. I took a couple of balsa blocks (right and left) and cut out from each one the shape of the root rib. At this point I carved the rest of the block into the shape of the fillet. When finished, I had one for the right side and one for the left. I suppose if I had a vacuum forming system which was large enough, I could have used these forms to vacuum form from. However, I only have a Mattel unit and it is not big enough to handle this particular size. Instead, I used a paper mache approach by laminating cross layers of silkspan using white glue. First, though, I waxed the forms using a yellow crayon. The reason is twofold. The obvious one is so the layers will not stick to the forms, the other is so that when the fillet is removed from the forms, the color will transfer onto the fillet. Since the Firecracker is yellow, this worked out ex-

tremely well.

I have to confess that I came upon this quite by accident. Usually, I wax the forms using old candle wax. This time I happened to have an orange crayon on hand. I had carefully laid up alternating layers (cross-grain) of silkspan about four layers using white glue. When this had dried, I carefully peeled the fillet from the form. I was totally amazed when it was a bright orange. So naturally, the next stop was to use the appropriate color.

The fillets were carefully trimmed and glued into place. The results were very gratifying. This method takes more time than the other previously mentioned ways, but points out yet another approach to wing fillets.

There is still another way to go, and this may be the one for many of you. This system uses balsa only. I used this method with a Pfalz and found it to be the most time consuming of all. In the case of the Pfalz and other similar biplanes, there are a couple of bulkheads that have short wing stubs. To these stubs a root rib is attached. Then 1/32 balsa sheeting is used to fill between the root rib and the fuselage (see illustration). A soft balsa block is glued onto the trailing edge of these stubs, carved to give that nice flowing shape. Then I used vinyl spackle to fill any low spots that might have cropped up.

Regardless of which method you decide to use, just take your time in order to make them as neat and realistic as you possibly can. These are the kinds of details that set a great model from a mediocre one!

Recently, I had a chance to fly my Flyline Bucker Jungmeister. I have it equipped with a little two-channel radio, powered by a Cox .049. The model flies beautifully. I had a real ball flying this super little bipe. I enjoyed the most realistic 3-point landings. The model is very stable. However, the only regret is that I did not use a diesel. My Floquil finish was eaten away by the hot fuel. I'm usually very careful when filling the tank not to spill any of the fuel on the finish. The residual gunk that is left after the engine has been run, in the past, has never had an affect on my finish. For some reason this time it has done a real number on the finish. So, I'm going to refinish the front end, and I am going to change the engine to a diesel. This ought to help by offering me an opportunity to use a larger prop so that I can slow down the Bucker a tad. The Cox .049 really moves the bipe right along.

Lastly, while mentioning diesels, there is a new diesel fuel out on the market that is really good. It provides easy starting and reliable running. It is called "Aero Dyne," and is put together by Allen Heinrich. I do not have a price breakdown on the various volumes available. For further information, write to him at 3154 Falcon, Pomona, CA 91767, or call (714) 593-5789.

By the time this column reaches you, Bill Hannan's latest effort will be on sale. Bill has written a book called "Peanut Power," which will be published by Paul Matt of Historical Aviation Album fame. It will cover everything from the history of Peanuts, construction, design, flying and trimming, and everything else you've always wanted to know about this area of the hobby. •

Half-A . . . . . *Continued from page 26*

what people don't want. If R/C is taking over, it is because it has a broader appeal to the consumer. A very high percentage of R/C fliers flew F/F or C/L first, then switched to R/C when they could because that is what they *wanted* to do. Kraft doesn't send out a goon to write a contract on you if you only want to fly indoor HLG. R/C fliers don't even like the super light balsa that turns F/F fliers to jello.

Fourth, there is considerable bad-mouthing of the ready-to-fly set. Come on, guys, some people like to FLY, not build. Some don't even have time to build if they wanted to. Shucks, there are even wierdos who love to build, but can't bear the thought of flying and the inevitable crashing. I actually think that all these people have an acceptable

point of view (for them, not me). How many people would play tennis, golf, bowl, or roller skate if they had to make all their own equipment? It seems to me that the goal of successful flight is what got most of us interested in the first place, and unsuccessful attempts have scared an awful lot of people away. You really have to be pretty stubborn to learn modeling the hard way, i.e. build and crash, build and crash. I don't think it makes you one bit better to have suffered, either. If we want modeling to grow (maybe we don't, but that is another question), then we need easy and success-prone entry paths to this hobby. You don't ask a rank beginner to start with a competitive FAI free flight, or a competition U/C aerobatic model. In fact, I think it is unnecessary to ask them to build at all. Fly first and see if you like it, then build later when there is a better chance that the model you put your precious time into will last a while.

Finally, who are the "real" modelers? In my opinion, the gentlemen who are helpful to beginners, knowledgeable, and willing to share and learn, active in promoting modeling in the community are the stars and benefit us all. It doesn't matter what, or even *if* they fly. Some of the best modelers I know rarely have time to build or fly anymore, but still take the time to help out.

So if some R/C'er tromps your Free Flight model, deck the creep and realize that he is the exception, not the rule. His R/C buddies probably think he is a turkey too.

Now, on to some modeling. First photo is a Pilot QB-10L which I used as a flying test bed for the latest crop of .10 engines. The model suffered terribly from nagging radio problems which resulted in several repairs before any significant flying got done. Once I got everything straightened out, the model proved to be a good flier. Ultimately I had a chance to fly it with the Fuji .09, Enya .09, Max .10FSR, and Fuji .099FSR. By chance, the performance of the engines stacked up in exactly that order, the only surprise being that the latest Fuji would outfly the Max. Naturally, this was an uncontrolled study with one prototype of each; your results may vary (sound familiar, California residents?). I finally did it in myself by losing orientation while flying low toward myself. I rolled over and pulled "up" straight into the blacktop. The engine was OK and the model was repairable, but I couldn't face patching it up again.

If you build one of these models, I recommend that you wing mount the landing gear, as it is much too far forward for good ground handling as is. Also, I think that the nose could be narrowed at least 3/8 of an inch to reduce the drag. My model was nose heavy with the latest engines and mufflers, so you might consider shortening it a bit, perhaps 1/2 inch. Overall, I was well satisfied, and can recommend the model as an intermediate sport aircraft.

Second model photo was submitted by Alan Callaghan, of London, England. The rear model is a "Gremlin" built from a **Model Builder** plan. Alan says that the model is one of the best C/L aircraft he has ever flown. It has very superior turning ability while retaining grooving flight characteristics. Weight came out at 11.5 ounces, with Japanese tissue on the flying surfaces and epoxy on the fuselage. The other model is a semi-scale Martin Baker MB-2. The wing spans 33 inches and weight is 13.5 ounces. Scale fairings are attached to the wing mounted landing gear. Both models have cowlings which were removed for this photo. Both feature Tee Dee power with mufflers, which are a legal requirement in Merrie Olde England.

Third model belongs to AMA V.P. Jim Scarborough. He sent me some photos of his stepdaughter Kristy holding a 1/2A Texan 300. The model weighs 7.5 ounces, and has a Klause Tee Dee .049 for the noise up front. Jim says that the model is a great flier. Jim has won so many contests, if he says it's good, I, for one, am more than willing to believe him.

Next photograph is of a very handy gadget imported by Hermosa International Hobbies (181 N. Franklin Ave., San Gabriel, California 91775). Called the "Andy Clamp," this device is a cleverly designed clamp handle that makes any sort of holding job on small items easier. Although intended for the static scale and miniature builder, the Andy Clamp can do us flier types some

good too. Small drilling, filing, and painting tasks are greatly eased with a readily maneuverable handle, and you can see what you are doing from any angle with that clear base. The clip is removable and you can clip things directly to the base.

Final photo is of an ancient Dumas kit, the Taylorcraft. This design dates way, way back. I know for certain that it was also sold under the Veco label. Ralph Cooke built this model; it is the second one of the design for him. The powerplant is a Pee Wee .02 with a stock propeller. All up weight came out a miniscule 5 ounces, and at 32-inch span and 152 in² wing area, it flies very well. The photo was shot at the Flightmaster's Annual contest at Mile Square. I was really pleased by the way the model looked in flight; too bad the kit has been discontinued.

Well, Happy New Year (delayed by whatever our current publication delay is) and I'll be here next month unless I can go flyin' instead of writin'. •

Choppers . . . . *Continued on page 36*

between a control input and the response can be as much as five seconds! This encourages the impatient student to use too much control, with the resulting overshoot and panic correction. That, coupled with the chopper's instability and the necessity to control altitude and direction at the same time, soon gets him into trouble. That flying a helicopter is not an impossible task is witnessed by the fact that most beginners eventually put it all together and become experienced pilots. It's simply a matter of practice and perseverance . . . do you remember how long it took you to learn how to fly your R/C airplane?

CONTROL RESPONSE

I mentioned the time lag between control inputs and helicopter response. Here we get into quite a controversy as to how the helicopter should be set up for the average chopper pilot. There are as many pros and cons as there are helicopter pilots. Some of them desire an instantaneous response so that they don't have to anticipate the required corrections. Others prefer the slow response, since the chopper appears to be more stable and doesn't want to move away by itself quite as much. The fact of the matter is that the chopper can be set up to please the individual's own personal taste. Generally, the "fly-bar-less" helicopters are as close to instant response as you can get, however, the pilot must be on his toes with small and correct control inputs. My personal opinion is that the fly-bar-less choppers are more for the experienced pilot and for precision aerobatic maneuvers, where quick actions are necessary. Don't get me wrong with that statement; fly-bar-less choppers can be made quite stable also, with a little extra effort on the builder's part. On the other hand, those choppers *with* fly-bars *do* have greater inherent stability, since the paddles exert a considerable gyro effect on the main rotor system and thus tend to resist unwanted drifting of the helicopter. For a complete review of the methods by which you can adjust and trim your chopper to achieve the desired stability and control response to match your own capabilities, I suggest you dig out your files of **Model Builder** magazine and look for the August 1977 issue.

TORNADO WARNING

Another source of trouble for the would-be chopper pilot is the tendency of the main rotor system to produce its own gusty air, even in a steady hover on a dead calm day. This comes in the form of rotor tip vortices, or little miniature tornados which flow off the blade tips and interfere with the flight conditions. This phenomenon occurs as a result of airflow over the blades. Airflow over the top side of the blades produces a lower pressure above the blades. The airflow beneath the blades produces a higher pressure. Factually, this is what creates lift: the high pressure on the bottom pushing the blades upward into the lower pressure area. Naturally, the air on the bottom wants to flow around the blade and into the lower pressure area, but it is prevented from doing so by the sharp trailing edge. At the tip of the blades, however, nothing prevents the air from curling around the tip from the bottom to the top. This circular rotation of air is then dropped off to form the tip vortex.

We rarely see tip vortices, but sometimes, when the humidity and temperature conditions are just right, the low pressure in the vortex causes moisture in the air to condense into a miniature cloud which is easily visible. On humid days, mainly in the early morning hours, a trip to the local airport will usually permit the visual observation of these vorticies originating on the wing tips of airliners as they come over the boundary for a landing. It looks just like the airplane is dumping fuel, the vapor trail is so dense. It is also very violent . . . so much so that other airplanes landing

behind the airliner are warned of the possibility of severe turbulence!

Blade tip vorticies have an extremely high velocity core spinning off the tips, as if it were a solid bar, but outside the core the velocity falls off with distance. Observations of model helicopter vorticies show that there is some wobbling as they descend. Two or three loops down from the rotor, the individual vorticies get tangled up with each other and annihilate themselves. Since the tip vortices are sending induced velocities through the rotor they create unsteadiness in the flow fi[illegible]us a hovering helicopter produces its own gusty air and keeps the modeler from relaxing on the job (ha!). Possible solutions to the tip vortex problem may be the installation of rotor tip plates, Hoerner tips, or other types of blades which reduce their generation capability. See June 1977 **Model Builder** for one such type of blade tip which proved to have exceptional qualities.

FINAL APPROACH

By now, you have probably heard that Mike Mas, U.S. National Helicopter Champion, has successfully demonstrated sustained inverted flight including inverted hover and inverted outside loops with his "almost stock" Schluter Heli-Boy on Thanksgiving Day 1979. But did you know that an R/C helicopter modeler by the name of Uhli Baudrexel, of Munich, Germany, also accomplished spectacular inverted flight with his scratch-built chopper back in July 1979? Mr. Franz Kavan flew in from Nuremberg, Germany, right after Christmas and brought the movies of this event with him. Inverted hover and inverted figure eights looked so good you'd think anyone could do it . . . ha! After learning of Uhli's feat, Ernie Huber modified his Kavan Jet Ranger and proceeded to fly inverted also. The latest word I have is that Ernie gave an inverted demo at the Tangerine contest in Florida, the last week in December. I'm really impressed with the accomplishments of these three fine modelers and their contributions to the model helicopter industry! I'm especially impressed with Mike's performance, since he showed a fantastic ability to maneuver the chopper while all the time flying reversed controls; back stick for forward, forward stick for backward, right rudder for left turn, etc. Wow! Limited information on Mike's Heli-Boy indicates that only a minor modification to the throttle and collective pitch system was made. The rotor system was given positive *and* negative pitch capability, while a cam provided increased engine power in both modes. Uhli and Ernie accomplished essentially the same results in a different manner by designing and installing "changeover" switches on the transmitter to reverse the appropriate servo actions as the choppers rolled over to inverted. In this manner they could fly as though right side up. In any case, I'm sure they all had their hands full on that first flight! What do you suppose is left for us, now that we have inverted flight? I'll ponder that question until next issue and try to get more data from all three modelers. BCNU. ●

Power Boats . . *Continued from page 45*

NEW PRODUCTS FROM PRATHER PRODUCTS

Al and Terry Prather, down in Wilmington, California, are starting to really get into this model boating field. The new Prather 31-inch Deep-Vee designed by George Campbell is now available. I'll be reviewing this in an upcoming PRODUCT$ IN U$E article. Like the .40 size vee they brought out in 1979, the .21 size hull features epoxy fiberglass and super-nice workmanship. They are also offering a couple of other items that should prove very popular. Their water cooled exhaust throttles for 3.5's and 6.5/7.5's are available in either 12 or 20 degree angles for hydros or deep-vees. The throttles are very well made and the prices of $44.95 for the 3.5 and $49.95 for the 6.5/7.5 are very fair. Prather Products is also introducing three sizes of fiber-

glass reinforced silicone rubber tuned pipe couplers and four sizes of high temperature nyglass hose clamps. For a complete brochure showing all their products, write to Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744. If your local hobby shop doesn't have these items, contact, Prather Products directly.

BOBBY AYCOCK, I LOST YOUR RETURN ADDRESS

I really owe this gentleman an apology. He wrote me a really nice letter asking for help and his only return address was on the envelope, which I threw away before realizing there was no return address on the letter. Although Bobby apologized for the length of his letter, I think I'll use it in its entirety since he hits on some problems that often plague new model boaters.

"I have never written to a magazine editor for help before, but I've never had a model R/C boat before either. I've just finished a Deep-Vee .21 kit by Dumas with a 3.5 engine. From what I hear, these are very good engines. Now for my problem.

"I've had the engine started a few times with my drive shaft unhooked. When I tried starting it with all the drive train hooked up (parallel drive), the engine just doesn't turn over fast enough to start. I've got roller bearings in each end of the two stuffing boxes and they're filled with medium to light weight, high speed marine grease. I'm relatively sure it's not for lack of grease or lubrication that the shafts don't turn smoothly. I'm also using a 12-volt electric starter, but it just absolutely won't turn over fast enough to get started. I turn the throttle wide open and have it primed, so it's getting plenty of gas. I'm sorta afraid to run it anymore without water circulating through the head, but unless I can get it to run with a prop I can't get any water circulating.

"When I tried starting with one shaft hooked up (which I've had started before) the piston seems to stick in the compression stroke and will not budge. It turns easily without the plug in the head. Is it something I'm doing, or is it a characteristic of this engine to be so tight? Is running it out of water for a short period dangerous? One more thing; it won't run any longer than a few seconds at a time, and sometimes it has absolutely no throttle response.

"Well, as you can tell, I'm a pure maverick when it comes to these R/C boats. I hope you can help me because I'm just dying to get this thing in the water, and I don't want to get frustrated so bad that I just chuck the whole thing. I've got too much money invested."

Had Bobby had a return address on his letter, or better yet, a return envelope, I'd have written him personally. I just hope he hasn't "chucked it" before he reads this. Basically, there are three problems that have to be solved.

The first problem is with that drive system. Since Bobby mentions shafts, I'll assume he installed underwater universals rather than a cable drive. That's unfortunate, since the chances of binding up a drive system using underwater universals is much greater than when a cable drive is used. I haven't set up a boat using underwater universals in over four years. But through careful alignment, underwater universals can work very well. Bobby, carefully check the alignment to make sure that all the universals are free. Allow for some free play in the universals. The slightest amount of binding will cause added drag for the engine.

The second problem is with the engine sticking at the top of the compression stroke. Although you didn't say the engine was a K&B 3.5, I'm making another assumption. I once had a piston

and sleeve in one of my K&B 3.5's that did exactly the same thing. I did get mine to run, but even after a hour of running it did the same thing. I just pulled it out and sent it back to K&B with a letter explaining the problem. A short time later, a new piston and sleeve arrived at no cost. So don't feel like the Lone Ranger with that problem. However, before you pull the engine apart, let's see if we can't get it to run.

The third problem is with the butterfly exhaust system (assuming it's a K&B). As much as I love the K&B 3.5, I have no use for that butterfly exhaust system. I've never used it on any boat I've ever run with a K&B. But I guess some people can get it to work, so try the following things: 1) Make certain that you are closing the butterfly absolutely shut. The slightest amount of open throttle will allow the engine to keep running. 2) Lack of throttle response is usually an indication that the engine is too lean. Try getting the engine to run rich. And with a tight piston and sleeve, that isn't going to be easy. 3) Seriously consider purchasing an exhaust throttle, like the one mentioned earlier offered by Prather Products, and a tuned pipe. You will find that this makes an excellent means of controlling the speed as well as increasing performance and reducing noise.

When running the engine out of the water, take care not to race the engine. I start my engines on a table and then walk to the water. Keep the engine idled down and you shouldn't have any problems. I might also suggest that you get out to one of the local Oklahoma boat races and talk to some of the fellows during a break in the action. I know there is a NAMBA club in Oklahoma City. Hang in there. It'll get better.

That's it for another month. By the time this makes it into print and is delivered many of you will be running and racing. Please take the time to send in results, photos, and questions. This particular article was written in mid-January and there's still some snow in my backyard from last week's storm. But the good weather's coming. Share your hobby with our readers and make this writer's job a little easier. ●

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

cause the rear fin it was equipped with was one of the first I'd seen. Or maybe it was the nose contour, sticking out below the engine beams. In any case, the performance was impressive, since it weighed only 12 oz. with a .15 engine. If you think you can identify it, drop a quick letter to the **RCMB** office to see if you've won a year's subscription.

SANDING BLOCKS

A good sanding block, properly applied by a strong arm, is probably the most versatile tool in any modeler's workshop. Balsa is soft enough that sandpaper can be used as a basic cutting tool for shaping parts to the proper contour, as well as smoothing the surface for finishing materials. Sandpaper is an excellent means of adding lightness and improving the appearance of your models.

The best possible use of sandpaper depends on it being firmly attached to a block to hold it firmly and uniformly against the wood. Holding the paper in your fingers leaves dips and hollows in the wood which will detract from the final appearance of the model. There are many commercially available sanding blocks, but most are too heavy and cumbersome for model use. I generally

make up my sanding blocks from scraps of 1x2 or 1x3 lumber or plywood. Since sandpaper comes in 9x11-inch sheets, the most economical lengths of block are 4-1/2, 5-1/2, 9, or 11 inches.

The best way to attach the paper to the block is to glue it down. Tacks, staples, or a firm grip with your fingers doesn't hold the paper down firmly enough, so that the edges catch on the structure, tearing the sheets. I've tried a wide variety of adhesives for attaching the paper, trying to find something that will hold firmly, yet enable the used sandpaper to be peeled off easily for replacement. I finally settled on rubber cement as ideal for this purpose. It's cheap, readily available, and it works!

I usually make up a fresh bunch of sanding blocks before starting a new project. I peel off the worn-out sandpaper, then brush the rubber cement on the blocks and lay them down on the sandpaper sheet. I fit as many blocks as I have onto the sheet, then let everything dry for about half an hour. Trim around the edges of each block with an old razor blade and sand the edges with some coarse sandpaper, then glue sandpaper to the other side.

I prefer the newfangled white sandpaper (3M Tri-M-ite Fre-Cut Open Coat Silicon Carbide or Norton Adalox No-Fil Aluminum Oxide), since it seems to last longer and doesn't clog very easily, even when sanding fiberglass or epoxy. This paper tends to turn dark in color as it wears out, so there's a visual indication of how sharp the grit is. I use 120 grit for shaping parts, 180 grit for final shaping, and 220 and 320 grits for smoothing the surface for finishing. The 320 is very good for sanding primer coats and sanding sealer, since it doesn't clog like 400 wet-or-dry paper (which is not designed for dry sanding).

If you're in a hurry and can't wait for the rubber cement to dry, or have only one block to prepare, you can attach the sandpaper with double-sided carpet tape. It's a little more expensive, but the adhesive is stronger, which makes it better for sticking sandpaper to small sanding blocks. It's also possible to buy sandpaper with an adhesive backing already applied. ADC makes Ruff Stuff, which is a garnet paper, and 3M has just introduced their Press'N Sand Tri-M-ite paper. Unfortunately, the finest grit the latter is available in is 120.

ADC also makes the Tee Bar, which is a T-shaped aluminum extrusion, for use as a sanding block with their Ruff Stuff, in both 11 and 22-inch lengths. This makes a nice lightweight sanding block for sanding entire wing panels at one time, but the best feature is that you can use it edgewise to enlarge the width of spar slots, since it's only about 1/16 inch thick.

I've been talking mainly about flat sanding blocks, but there are a number of special shaped blocks you can use to make your building easier. I cut out blocks to match the top and bottom cambers of my Nordic wings, and sand the entire wing with these before covering. Bob White introduced me to this technique, and since I've been using these blocks, the uniformity of my wings has been greatly increased. Now that I have a bandsaw, it's an easy job to cut out these sanding blocks from 3-inch balsa blocks. But you can build them up as shown in the photos, even if you don't have fancy equipment. Cut out the required shape from 1/4-inch balsa, then make a saddle of 1/8 balsa, about three inches wide. Glue in the saddle with Hot Stuff, then run an epoxy fillet around the joint and add sandpaper. It's about as simple as adding a wing platform to a pylon gas model. The saddle material should be easily bendable to match the airfoil contour.

You can use sandpaper to cut perfectly fitting spar slots with a minimum of fuss and bother. Use either the carpet tape or adhesive-backed sandpaper to stick the abrasive to a three or four-inch length of spar stock. Glue this piece of wood to a scrap balsa handle, and glue a stop (spruce, preferably) alongside the bottom edge of the spar material. Now you can sand your spar notches in your ribs, either while pinned together in a stack (as I do), or after assembly, while pinned to the board, using a metal straightedge as a guide. A slight variation of this tool can be used to sand corner notches for longerons in fuselage formers.

The variations on this theme are endless. You can make sanding sticks out of thin plywood to use like a file in close quarters, or attach sandpaper to a dowel for sanding fillets or scallops in trailing edges. It won't take you too long to accumulate a drawerful of assorted sanding tools.

For some purposes, like finish sanding of curved surfaces, a flexible sanding block is better than a rigid one. Most of the commercial sanding blocks provide a pad between the sandpaper and the block. You could do the same by gluing a piece of cork or sponge to the block. Red Devil makes a flexible foam sanding block that is very reasonable. It can be used as is, or a finer grade of sandpaper can be attached to it. For smaller areas, like on the pylon area of fuselages, a rubber eraser makes a very useful block.

1981 WORLD FREE FLIGHT CHAMPIONSHIPS TO BE FLOWN IN SPAIN

If your appetite for spectating or participating in the World Champs was whetted by last fall's Taft extravaganza, you may be ready to make plans to attend the next one. Word has reached me that the CIAM, has set the 1981 Championships for Valdepenas, Spain, about 200 km south of Madrid, near Toledo (in Granada). Since prices in Spain are generally lower than in the rest of Western Europe, this might be a good opportunity to attend. (Another rumor has it that the Austrians would be interested in holding the 1983 event in Wiener Neustadt, as they seem to try to do every 10 years.) Plan ahead! •

Atlantic ..... *Continued on page 48*

the surface, assuming the worst happened. At least I'd know where the damn thing was!

The lifeboats were carved from standard balsa blocks with solid mahogany decking, oars, seats, etc. Davits were made from standard brass tubing and fitted into tubes within the deck, thus making them removable. I might add that the Atlantic carried her lifeboats in the swung out position to provide, I suppose, workspace for the crew on deck. Thus, while heeled over in a strong wind, it was not unusual to see her lifeboats afloat on the down side. This happened all the time with the model, so in strong winds they were removed and the tubes plugged to prevent water getting into the hull.

The method of sail attachment is the old Jack Stay utilizing dress hooks on the sails themselves which simply snap over the Jack Stay. A track arrangement would have been a lot better, but try to find one that will work. Don't forget, the masts are tapered, so cutting a groove for such a thing would be next to impossible, to say nothing of the poor sailmaker who would have to allow for the amount of taper at each station.

The sails, as mentioned earlier, are controlled by the one SC-3 unit through a pulley arrangement to each mast, all of which are located under the main deck. Believe it or not, it worked flawlessly the entire summer. Adjustments to each sail could be accomplished at the sail control unit itself or at the boom. Pulleys of various types were all purchased from Vortex Model Engineering, who has an excellent although very expensive line of sailboat hardware. They seem to be a very efficient, on-the-ball operation up there in Santa Barbara. Due to the

various routing of each sail line, the "in" and "out" haul of each sail does vary somewhat, but to no large extent. This part could have been engineered a lot better.

SAILING THE ATLANTIC

On August 2, 1979, the model was loaded into a nine-foot crate and delivered to Western Airlines in Los Angeles for shipment to Minneapolis, Minnesota, where I picked it up and drove the last 150 miles to Gull Lake in a borrowed truck. I remember wondering all the way up there and during the three-hour drive if she had been damaged during shipment halfway across the country, but something told me she was back there doing right nicely and free of damage and probably madder than heck because of the confinement.

The model had, at this point, lived with me from and during birth and had developed some kind of personality. Just what that was I wasn't sure of at this point, but I knew the answer would come in a matter of days when she would be asked to perform. Mind you, there were still a myriad of items to attend to, as most of us never get the job finished until we're at the site. So, on August 11th we had the big christening party for about 80 interested individuals with lots of booze and Lord knows what else, and the model got her share of champagne dumped all over her bow, which I'd worried might ruin her gleaming black high gloss finish. It didn't, as it turned out, and on August 19th we lifted her into her cradle and wheeled the beautiful monster down the dock to a lifting arrangement someone had helped me build just to get the thing in the water.

No matter where you turned, there was a stay hitting you in the head, nose, mouth, or you name it. We lowered away and soon she was afloat and right on the water line. The wind was almost nonexistent, which was OK with me, but there were light squalls out in the bay farther. With everything turned on, I engaged the motor and powered out towards the wind. The model was anxious, it seemed, as the wind began picking up. I shut the motor off to see what she'd do. Well, she was moving, but not fast at all. I headed her downwind a bit and she took off at a good clip. I was using too much rudder to get the desired effect, I realized, and stronger puffs of wind did begin to heel her over a bit more than I wanted to see.

Rod Carr had been right. He'd felt from the beginning there was too much sail area despite the 80 pounds of lead I'd poured into her belly months before. So back to the dock where I removed the three top Gaff sails and returned for a much better workout. It really was a delightful thing to watch and the response to the rudder movement was far better than I'd hoped. Tacking provided no problems, and she was quick to react to closely hauled sails. With her decks awash there was definite leaking going on, and it took me the better part of several days to figure out where the stuff was getting in. As it turned out . . . you guessed it . . . those removable deck hatches were not watertight at all.

So, out came the sponge rubber seal and in went hard rubber, and I doubled up on the blind nuts and bolts to ensure an extremely tight fit all the way around each hatch. It worked, and now the only leakage is coming from the lack of a stuffing box to the motor. Both the shaft and the motor are below the water line, so this is presently being worked on, but it's not serious enough to keep her out of the water. Real boats of all shapes and sizes give her a wide berth, and I'm glad I was able to recreate what must have been one of the world's great ships, even though mine is 177 feet shorter. . .●

MODEL SPECIFICATIONS

Type: Schooner
Masts: Three
Radio: Kraft KPS-15
Sail Unit: Vortex "SC-3"
Weight: 148 pounds
Length: 120 inches (ten feet)
Depth: 24 inches
Beam: 16 inches
Mast Heights: Fore 7'4", Mid 7'8", Aft 8'
Power: 12-volt aircraft flap motor (direct

drive)
Battery: Honda motorcycle battery (12-volt)
Prop: 2-1/2 inch brass, 2-blade by Al Wood, 16-degree pitch
Lights: All 12-volt automotive
Crew Figures: *Star Wars* characters reworked, *SWAT* team figures reworked
Plans: Bluejacket Shipcrafters, South Norwalk, Connecticut
Time in Production: Approximately 1500 hours
Materials: Balsa, mahogany and birch

FINISHING
Paint: Dietzler Automotive Enamel with Additives
Fillers: Dietzler High-Speed primer surfacer, Bondo automotive putty
Fiberglass: Interior of hull 20-pound matt cloth; Hull exterior, 18-pound heavy cloth
Stain: Degregory
Resin: Quick Prep
Paint Application: Spray gun with 50-pound pressure
Hardware: Vortex and self-made.

•

Letters . . . . *Continued from page 7*

builder. We have published at least four of his designs, including Wakefield, Unlimited Rubber, one or two Nordics, and an Easy B.

Dear WCN,

I guess I started it, so I'd like to finish it!

1) I respect any modeler who is creative, innovative, or just a real good craftsman, whether he flies model airplanes, drives cars, or boats. Modeler is the key word. Flying an ARF, or a balsa model that somebody else built does not qualify an R/C flier as a model builder, hence the comment on your title change. Since it appears that a large portion of the R/C fliers do not build their own models, that implies that my statement was generally true. I have built and flown F/F, R/C and Ukie, and enjoyed them all. Despite being 34 years old, I have about 30 years of modeling behind me, and really find FAI F/F to be very enjoyable for a couple of reasons. For one thing, the competition is so tough. So little is available in the way of kits and hardware that all sorts of strange materials find their way into a great variety of designs. Rules restrictions and tough competition encourage high performance design developments, and many really peculiar ways of increasing performance have been tried, such as flappers and folders, high aspect ratios, and some really weird looking airfoils. As a result, structures are extremely important. The models are an extremely difficult balance of compromises. I didn't say that FAI F/F was what everybody should fly, or that it was the best thing around. I said that I found it the most enjoyable, just as you must find some sort of R/C most enjoyable. I couldn't stand to wait for my turn to fly, and free flight is nice that way.

2) Sometimes we talk to the R/C guys who share our field. They are mostly sport fliers, some power, some glider. They usually come over to ask what frequency we are flying. I always tell them "Two to four times a week when the weather is decent." It always sends them away with some head scratching, I assure you! Of course, they have no notion of anything being able to fly without being controlled in some way. When one of them is really interested in our stuff, we're nice, and show them the handmade, original designed towhook with timer start, zoom rudder, circle tow, etc., etc., and try to explain how we can tow them in figure 8's, and do all sorts of things, and that the idea is to find a thermal and make a 3 minute flight.

Then they say: Where can I buy one? How much does it cost? And of course, they don't get one. Sometimes one will look at a modern Wakefield and say "I usta fly them rubber band jobs when I was a kid (sneer)." Or one of the local R/C fliers will ask "When are you going to move UP to R/C?" So, we like to needle them back in return, no big deal.

3) The reason you are putting R/C in front of **Model Builder** *is obviously so you pick up some of the R/C bods who only buy RCM and RCS. In a way, that will be a good thing, because those guys will learn, hopefully, something about other phases of the hobby of model building, and not just ARF assembling. I'm open-minded. I've tried or looked real seriously at various R/C construction techniques, like foam, Monkeycoat, etc. Some of it has some uses, some doesn't. I've been reading R/C, Ukie and F/F columns for years and years. True, I draw the line at helicopters and boats, but sometimes do read your R/C Car column. There's a lot of good poop in all of the columns, if you can figure out how to apply it to your own bag.*

4) See page 32, 9/75 **MB**. *"Message to free flighters: Not all R/C'ers are non-modelers. Top pylon racer Kent Nogy flew this Al Vela design in C gas." You didn't say that Kent built it, but I'm sure he could. I know lots of good R/C'ers are excellent modelers, like Bob Root, who used to belong to the Eastside Model Aero Club, of which I was also a member. Others I know are*

Bill Bone, Mike Daley, Dave Katagiri, etc. Really good modelers. You might also check Rutherford's column 12/75.

5) Model Builder *was a great name for a great magazine . . . the only one I subscribe to (MA comes by force, since I'm an active CD). It would please me if the title was "F/F Model Builder" or "FAI Model Builder," because I particularly like the FAI events, of any type. I hope the R/C initials increase your sales to the R/C bods, because they'll eventually recognize that there are other things to do, ones that don't involve 15 minute motor runs and burning gallons of expensive glow fuel each flying season. By the way, the reason I started flying Nordic was that I got tired of not being able to get Super Tigre parts, even when I could afford them, plus Nordics are really pretty in flight. Anything without an engine looked a lot better than Ukie speed, which was one test session a season in the spring, and then just flying at contests. That was dumb, but with no engine parts available, that was the way it had to be. Bench test and fly contests. Really silly.*

Keep up the good work, and don't do anything I wouldn't do!

Steve "O'Bat" Helmick
Renton, Washington

You didn't really start it, Steve, nor will you finish it. In model building, just as in politics and religion, everyone thinks their ideas on the subject are the best, and the debates are brought to the surface and perpetuated by those who show the least restraint in attempting to force their opinions on others.

Perhaps the best current answer to Mr. Roberti, is in the closing statement of a letter from Raul Araico Lomeli, of Guadalajara, Mexico, to Tom Hutchinson, and again, you can read into it what you wish. Mr. Lomeli says, "Keep up the good work in your column and remember that FREE FLIGHT is the root of the stem from which runs the sap that gives life to all branches of the hobby." •

Plug Sparks . . *Continued from page 40*

Aeroneers club is just what this area needed; a new look at old models.

Being in receipt of their second newsletter (it appears that George Wagner inherited the editorship by default), it now appears that their immediate goal is to restore the distinction the Aeroneers had of being THE San Diego Airplane Club.

George is right grateful to Fudo Takagi of the San Diego Obiteers and Ken Sykora of the SCIFS for all the help they have extended through their newsletters. SAM 41 has a tremendous heterogeny of modelers coming from Free Flight, Gliders, Flying Scale and R/C clubs. This club shouldn't suffer from lack of action.

As we mentioned before, if you live in the immediate San Diego area and are interested in a real fun club, contact George Wagner at 2879 Marathon Drive, San Diego, CA 92123. Better yet, give him a call, he's in the phone book.

TEXACO PERPETUAL TROPHY.

Have been carrying on a correspondence with Chet Lanzo who, believe it or not, still has the original Edward Roberts R/C Trophy he won at the 1937 Nationals. Chet reports the trophy is in excellent shape (has never been touched by human hands, haw!).

To get to the point, Lanzo had offered the trophy to the Huriot gang (SAM 39) in Northern Ohio, but the boys recommended Chet contact this writer. In letters to Chet, I have suggested we set this trophy up as a SAM Perpetual Trophy for the R/C Texaco event.

Seeing that this cup represents the first R/C winner, it would be no great trouble to back date all the R/C Texaco winners of SAM (there have only been six winners so far). Just as soon as we can get the cup updated and properly engraved, we will be all set for a presentation at the 1980 SAM Champs.

ANOTHER SAM TROPHY?

Are you one of those guys who never seem to get perfect flights? How about that one flight you goofed? Well, Gene Lapansie has a remedy for this. Gene would like to sponsor an event that is similar to the Frank Ehling "almost anything goes" event. Rules would be simplicity themselves:

1) Any O.T. gas model is eligible.

2) Model must have at least the profile of an Old Timer and be of any size.

3) No limit on flights. Fly as many times as you want to try to approach two minutes. Anything *over this time* is disqualified.

4) No dethermalizers allowed to bring model down in required time.

How about that, men? Let us know what you think and we'll try to squeeze it in the already crowded three-day SAM Champs schedule.

"SAMMY" AWARDS

What with all the Oscar, Emmy, Grammy, etc. awards being given, this naturally leads to the idea of giving out SAM awards. Due credit for the original idea should go to Ken Sykora; we have just taken the idea and nationalized it. If you really want to know who this columnist considers the best at this game, read on!

BEST ACTOR: Danny Sheelds, far and away the best. Received notice in *Aeromodeller* as "Clown Prince of SAM." Aptly named!

BEST "CON MAN": Joe Beshar. There is no disputing this fact. When Joe makes

INDEX TO ADVERTISERS

up his mind, no one can withstand the onslaught of verbiage. Joe singlehandedly promoted the SAM Champs trophy money during his tenure as President.

BEST OFFICIAL: Everett "Woody" Woodman. A dedicated Old Timer, although an R/C'er. He has run more local contests and has been responsible for running the Old Timer R/C events at the SAM Champs for the last six years; 1979 was the first year he missed the action.

BEST O.T. PROMOTER: Dave Knight. When he first went to Washington, after a very successful tour with the AMPS, he has alone revived a tremendous interest in Old Timer activity in the Northwest. The interest is so high, a proposal to run the 1981 SAM Champs may be forthcoming.

BEST FOREIGN PROMOTER OF O.T.: Dave Baker. Here is a man of seemingly indefatigable energy. At last reports he has been instrumenmtal in organizing SAM 36 into 135 members. He has organized the SMAE (English) Champs and been responsible for many of the contributions. At present, he is organizing a party of 100 people to descend on the SAM Champs in Ohio!

BEST WINNER: Don Bekins. Whether you consider free flight or radio control, Bekins has had the advantage of flying year round in numerous contests. His dedication to winning has resulted in the amassing of a tremendous number of places taken during 1979.

BEST TEAM: The Normans, Bruce and Leslie. What else can you say about these two dedicated modelers? They simply wipe the field clean when they put their minds to it.

BEST NEWSLETTER EDITOR: Ken Sykora of the SCIF *Flight Plug*. Ken has been an outstanding newsletter writer for years, doing his early writings in an FAI type newsletter known as *Scatter*.

Although Ken may be strictly free flight oriented, his newsletter is widely read by all. A close runner-up in this same line would be Harry Murphy of the CIA *Informer*.

BEST MODEL MAGAZINE: **R/C Model Builder**. We hate to toot our own horn, but this columnist has to admit that Bill Northrop, Editor, has been most generous in the amount of space allocated to Old Timer activity. This has helped more than anything else to spread the "gospel" of Old Timer.

Now, all you lucky guys, write to this

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TOLEDO-WEST HOBBY SWAP MEET. Got some engines, kits, etc. you don't want? Want to buy hobby items cheap? Bring your stuff, card table, and come to our meet. FREE ANTIQUE APPRAISAL — bring your old engines, kits, race cars, etc. Learn what they are worth. La Palma Recreation Hall, 7822 Walker, La Palma, CA 90623. Info: (714) 826-0589 eves. Sat. March 22, '80, 9-1 p.m.

WANTED: Old-Time spark ignition model airplane motors and gas model race cars. Russell Stokes, Rt. 1, Box 73J, Keller, TX 76248.

MODEL YACHTSMEN — Proportional conversion of any sail control unit. "R C" spinnaker control. "R C" genoa control. Plans $2 each — all $5. Rainbow, Box 796-MB, Westbury, NY 11590

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300 F/F KITS, rubber, Jap. silkspan, accessories. Send 45¢ in stamps for catalog. CHE! HOBBIES, 10900 Eastwood Ave., Inglewood, CA 90304

COMBAT FLYERS. ARF Planes. "Gotcha" fast combat $35. "SC-2" replaceable wing slow combat $35. Foam wing cores. Send S.A.S.E. or call (717) 964-2086. The Core House, Box 300A, RD #2, Palmyra, PA 17078.

columnist and receive one free plan of your choice as a token of the high esteem this writer has for you. Who knows, maybe next year we will have something a little more permanent!

THE WRAP-UP

Reading the various newsletters that are sent to me is always fun. If it weren't for the efforts of these editors, this column would be deadsville. To really point out what this modeling game is all about, I would like to excerpt the latest from Harry Murphy's comments in his CIA *Informer* newsletter.

"The day's activities (the Tri-County Aero Club Annual F/F Meet at the Lawrence-Vincennes Airport) were concluded with the customary awarding of some very nice trophies, followed by an impromptu merchandise raffle (you can win no matter what!). The Tri-County Aero Club president then thanked all for attending and in turn all applauded amid complimentary shouts of 'good contest.'

"What then followed was an unprecedented gesture that I have never observed in my many years of hawking model contests. This president of an *R/C club* that had just staged a free flight contest *for free flighters*, asked all of his R/C club members to give the F/F contestants a big round of applause for attending and participating . . . R/C'ers applauding F/F'ers!! You talk about feeing humble. Every one of those nasty things that I ever said about R/C'ers flashed before me in that moment as I glanced down at the concrete in a futile effort to spot a crack I could crawl into."

This is exactly what this columnist has been preaching for years about models, model building, and model activity. "Just like women, they are all good, just some are better." Don't you forget it, either! •

Workbench . . . *Continued from page 6*

responsibility, and found that his spare time for the hobby had dwindled to zero. Besides closing his Carr Sails business, Rod also felt that his lack of participation in the hobby world also detract from the effectiveness of his column, and thus chose to discontinue it.

Because of Rod's exceptional work with the column, it will not be easy to find a substitute, however, we do intend to continue coverage of R/C sailing, and in fact, this issue features a rather fantastic model, Dwight Brooks' superb three-masted schooner "Atlantic." Other R/C sailboating articles are also in the works.

AND SPEAKING OF. . .

R/C sailboating, that is. Neil Whitman, one of our modeling friends now living in Simsbury, Connecticut, writes as follows.

"I thought that I recognized the Cal 33 shown on page 50 of your November issue, but the name was unfamiliar. Talked to Tim *(his son, WCN)* about it over New Years and figured out that somehow Rod Carr got Tim's address into his name, for Tim lived on O'Leary Road at the time. The model is now in our basement. . ."

DOWN MEMORY LANE. . .

The lead photo is a kind of test for those R/C'ers who have been around since the reed days. Some of the old Delaware R/C Club members may recall this one.

The tail surfaces were genuine deBolt "Viscount." The fuselage was a slightly widened, fiberglass version of the Viscount design. Old flying buddy, Graham Lomax, carved the plug and made the female mold and finished bodies for various members of the club. There was just barely enough room for our Bill Deans reed system using separate receiver and relay cases, plus four Bonner Duramite servos. The wing is from the famous Ed Kazmurski "Orion." If the tips bother you, it's because we purposely glued them on backwards! The engine was a Super Tigre .46.

The all silver model (except for the yellow top surface of the wing) became a test rig for many subsequent radios of the proportional variety, and was last in the possession of Carl Cantera. By the way, "C.A.F." stood for "Chicken Air Force." •

From the builders of the widely acclaimed 1/3 scale Pitts Speci

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Wing Span - 57"
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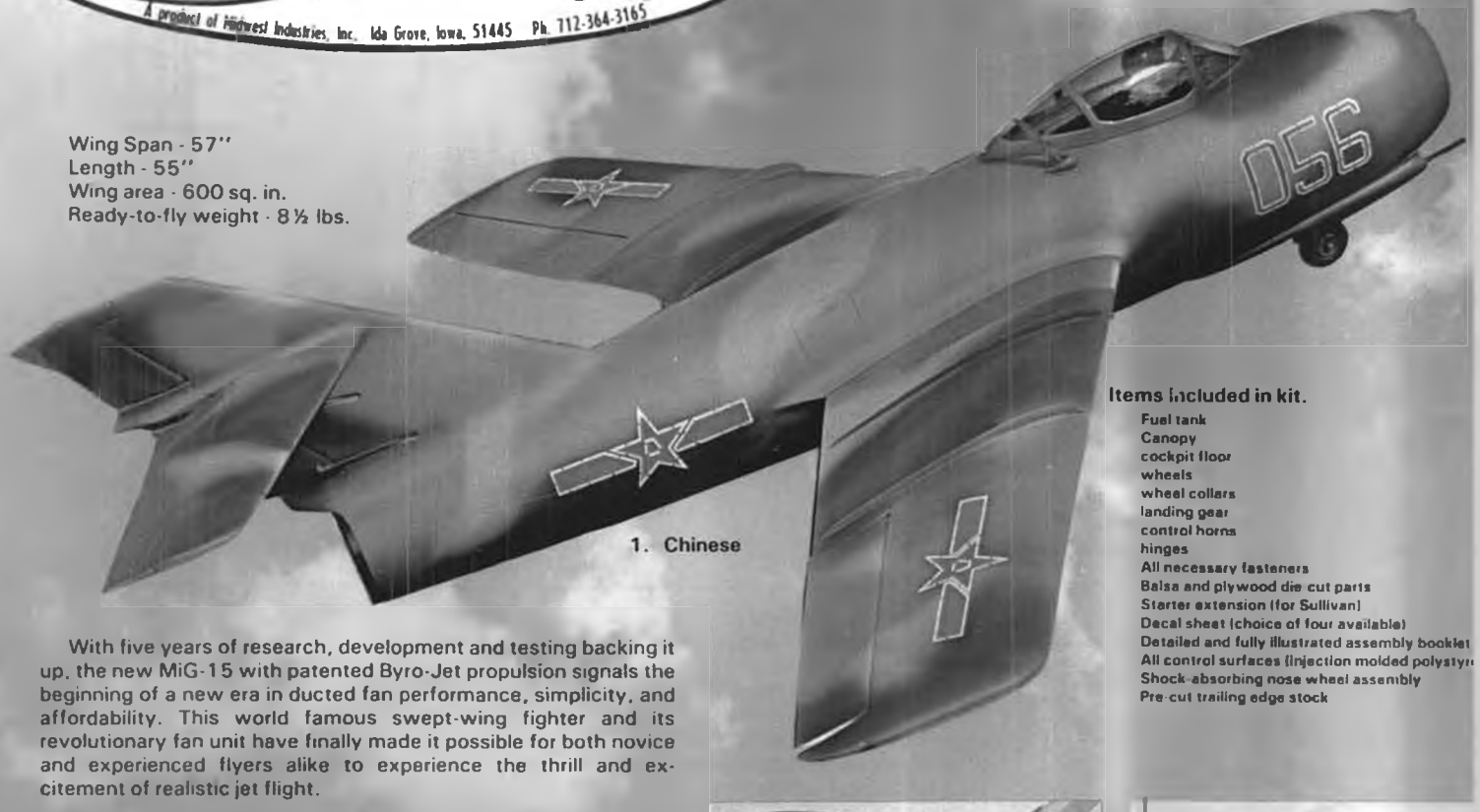

1. Chinese

Items included in kit.

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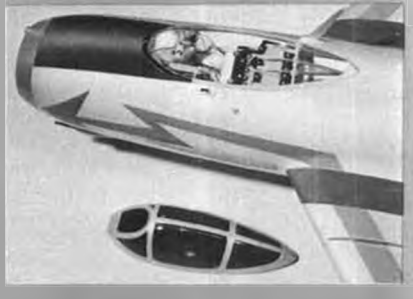
The entire fan unit is constructed of rugged, glass-filled nylon, yet weighs in at only 11 ounces. Removal of entire fan unit is achieved simply by removing four bolts.



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Kit includes any one of four decal sets!

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You'll marvel not only at the complete nature of this kit, but the unique time-saving construction methods as well. The rugged, hand layed fiberglass fuselage arrives with complete fan unit, thrust tube, radio compartment, reinforcing blocks, control rods and aluminum vertical fin spar **already installed**. Even the torque tubes are pre-installed to eliminate any guesswork. A special shock-absorbing nose wheel assembly is also included. All required plywood and balsa parts are precision die-cut. Wings and all control surfaces, consisting of lightweight yet impact resistant injection molded polystyrene, utilize scale center point hinging.

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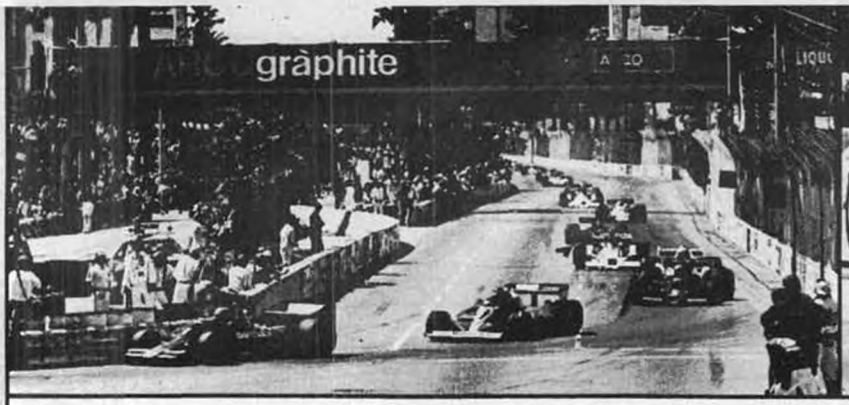
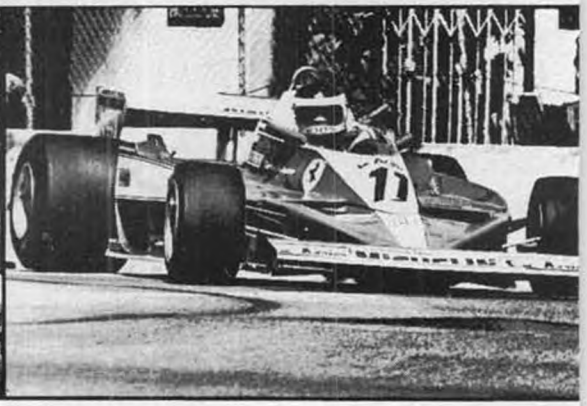
MACS MODEL & CRAFT SHOW MACS





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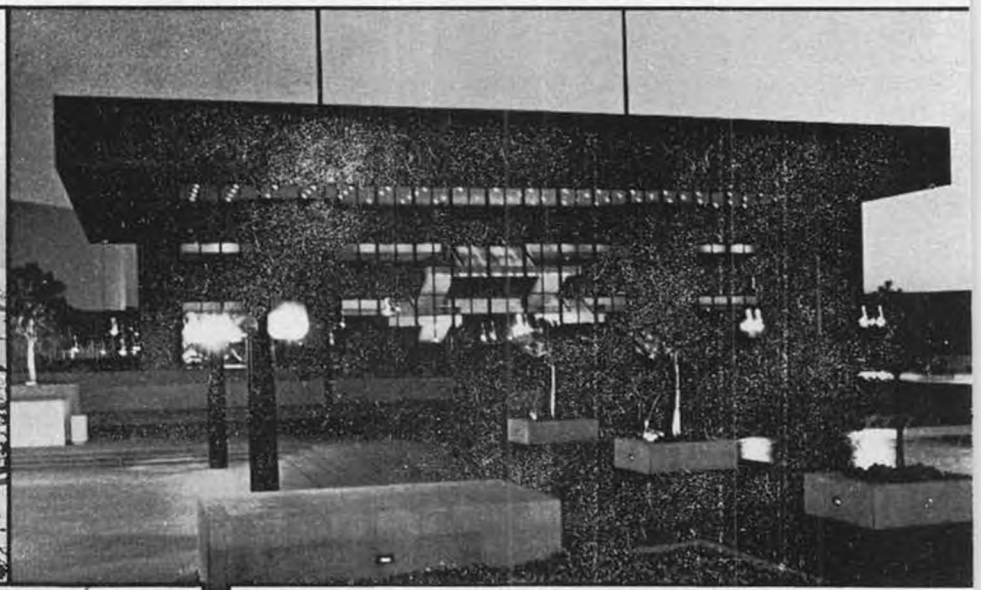
For the 10th Annual . . . MODEL AND CRAFT SHOW!!

America's largest and most attended Hobby Show . . . RC Model Spectacular . . . planes . helicopters . cars . boats . gliders . . . plus U-Control . Free Flight . rockets . . . continuous Indoor-Outdoor demonstrations . . . on the beautiful outdoor lake and special indoor track . . . free rides on live steamers . . . one of the nation's largest modular railroad layouts . "HO" and "N" gauges . . . giant Hobby Contest . . . open to all hobbyists . . . over 200 awards plus special valuable attendee drawings.



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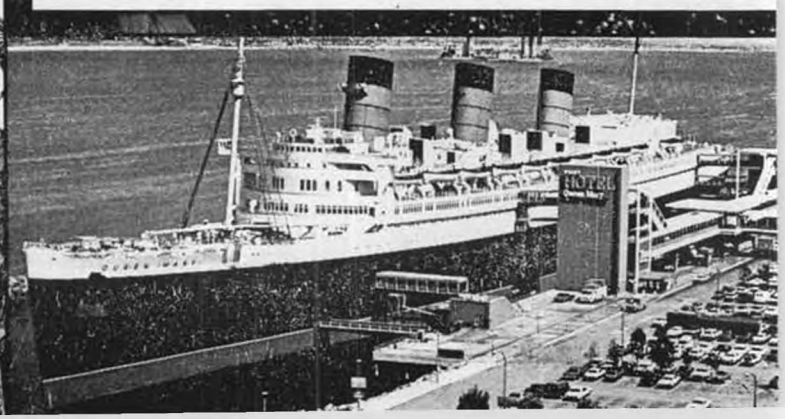

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Here is an engine out of Italy that is just about perfect for the Nosen series of quarter scale planes. A 1.34 cu. in. glow engine, it is relatively light for its displacement. It has a beautiful and practical radial mount and a compact muffler that could be ducted to the outside of a cowl with tubes. The Nosen series was originally designed for a .60 and are often beefed up when used with relatively heavy 2.0 cu. in. and 2.4 cu. in. chain saw engines. This makes for a lower wing loading machine with excellent performance.

The glow feature is really a plus because the radio system does not require electrical shielding. Also, glow fuel is considerably safer than gasoline from a fire and explosion standpoint.

The Tartan is built like a brick outhouse (not heavy, but strong). Ball bearings support the shaft front and rear. The lower rod journal is roller bearing and the upper rod end is bronze bushed. All very different from the most common chain saw engine conversions.

The engine tested at 7500 RPM on a 18 X 6 Top Flite maple prop. Reed valve induction permits right or left hand rotation (pusher prop fans).

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