

MODEL BUILDER

JULY 1977

volume 7, number 67

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can't check your engine
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suddenly becomes
perfectly clear
in the air**



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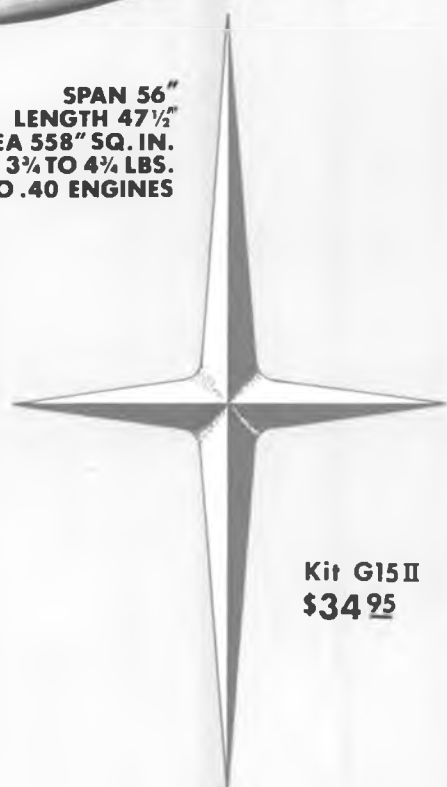
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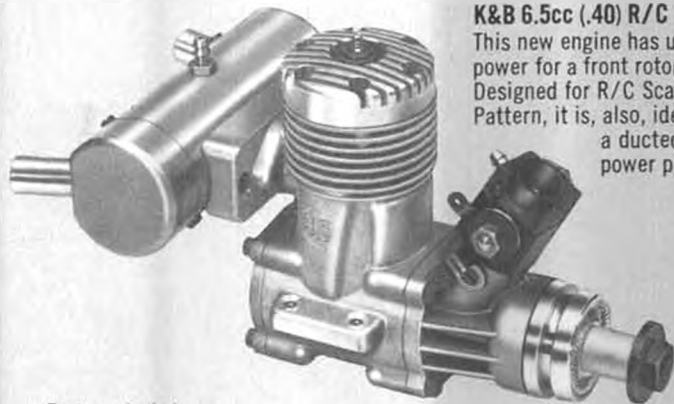


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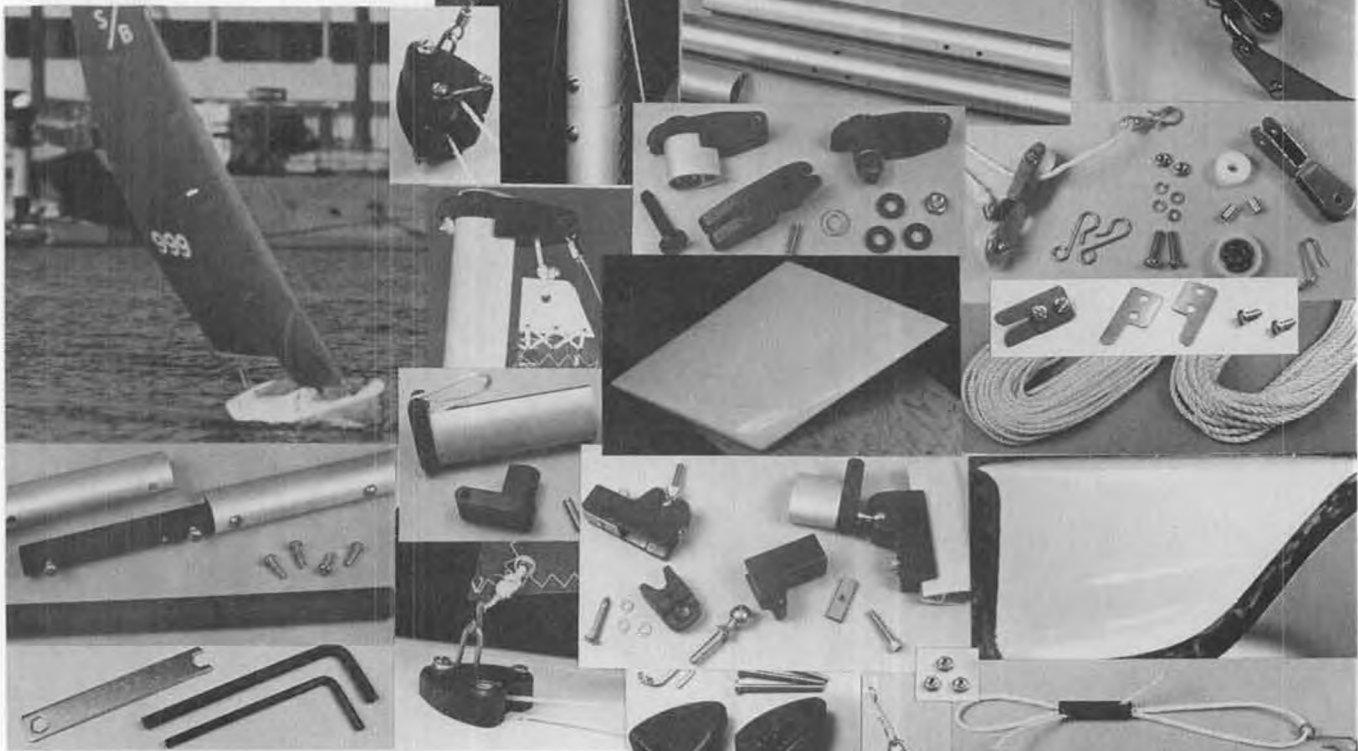
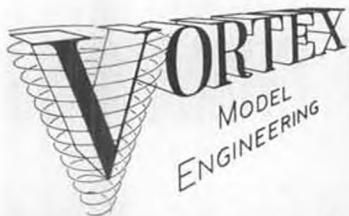
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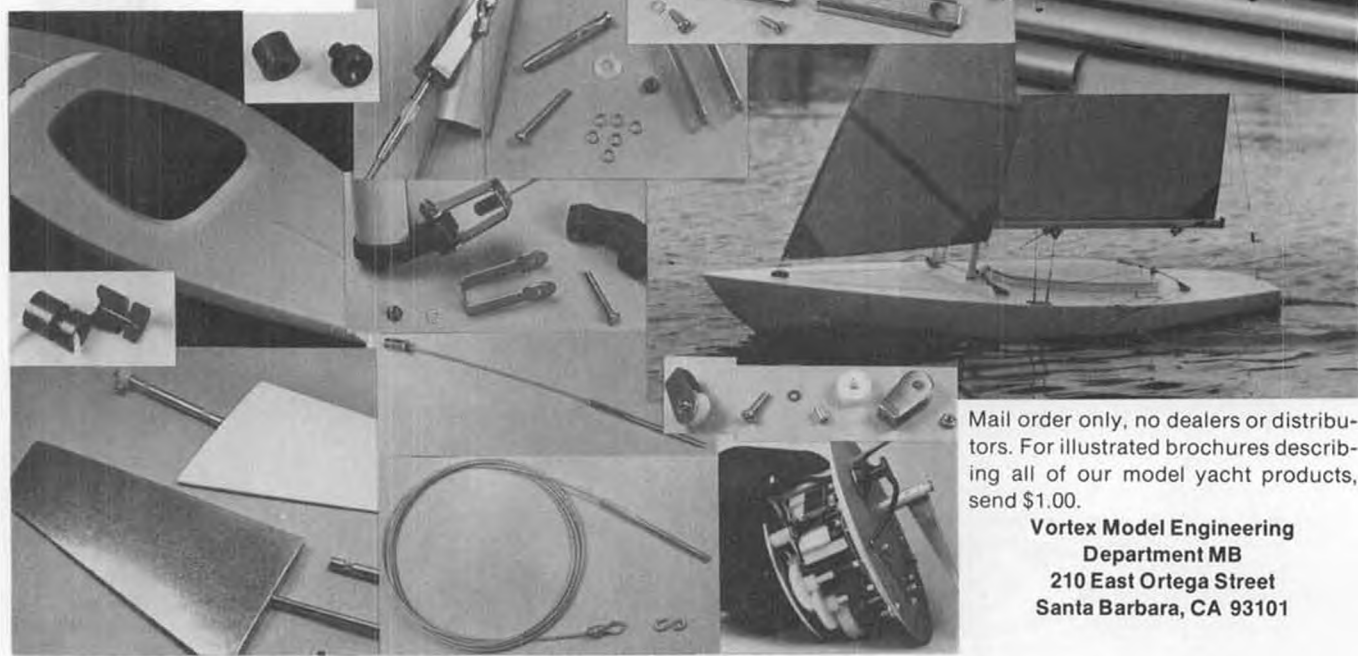


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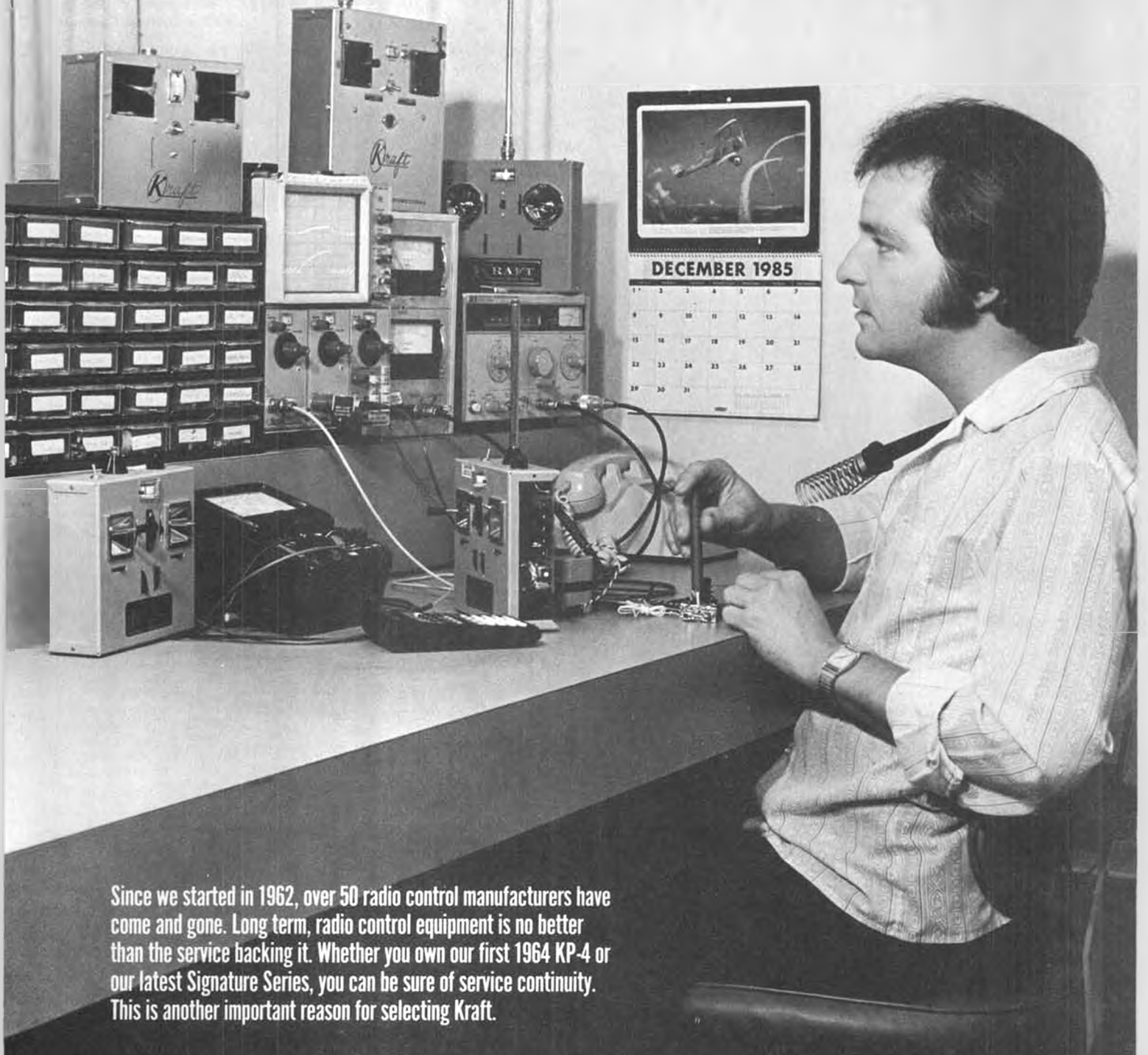


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November 1971

Nancy, R/C soarer.
R/C Pattern World Championships.
Peanut Fokker D VI.
LSF Tournament story.
Bi-Prentice, R/C biplane trainer.

Vol. 1, No. 2 \$3.00



December 1971

Curtiss-Wright Junior R/C 2" scale.
R/C Twin Trainer 75" span, for .40's.
Peanut Laird LC-DC.
Volkspiane 3V-1 3-views.
How to build light "wire" wheels.

Vol. 1, No. 3 \$2.00



January 1972

SHOCer F/F by Mel Schmidt.
White Trash, famous R/C soarer.
Peanut Ord-Hume.
Chet Lanzo's famous rubber Puss Moth.
Curtiss Robin 3-views.

Vol. 2, No. 4 \$1.00



February 1972

Minnow U/C profile scale racer.
Fokker E-III R/C scale.
Al Vela's E-Z Boy 1/2A E-Z Boy 1/2A, Al Vela.
Peanut Ford Flivver.
Fiberglassing over balsa, by Le Gray.
Spoiler, FAI Combat.

Vol. 2, No. 5 \$3.00



Mar/April 1972

Yankee Gull R/C glider 8' to 12' span.
Miss Cosmic Wind, QM R/C Pylon racer.
Peanut Scale Bucker Jungmann.
Siebel 1/4A F/F scale.
Mr. Mulligan 3-views.
FAI power "Folder."

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May 1972

Seahorse II, R/C seaplane. For .19-.35.
D.H. Humming Bird, F/F or R/C pulse.
Peanut Fokker V-23.
Whetstone 1/2A U/C combat.
Ryan ST 3-views.
Tethered Cars, R/C sail.

Vol. 2, No. 7 \$2.00



June 1972

Bob White Wakefield.
Mongster QM biplane R/C pylon racer.
Calif. Coaster R/C glider. Sheet wing.
Three profile Peanuts.
Deperdussin 3-views.
Pesco Special 3-views.

Vol. 2, No. 8 \$3.00



July 1972

Fairchild 51, 1" scale, R/C or F/F.
SAM-5 A/2 Nordic.
1912 Avro G rubber.
Comanche C stand-off R/C scale.
Travelair 2000 2" scale R/C, by Editor.
Chester Jeep 3-views.

Vol. 2, No. 9 \$4.00



August 1972

Bonzo standard R/C sport plane scale.
Counterforce A/1 ailerless .19-35.
Shoes' R/C QM.
Pearl Aylorcraft on 1/2A scale, also big one.
Fairley Delta 3-views.

Vol. 2, No. 10 \$4.00



Feb/March 1973

Profile F4U Corsair C/L stunt, .40 power.
Beecroft's Satan, Class A free flight.
Indoor Ornithopter.
Peanut Travelair 2000 PT-3 Scale Views.
Thermal hunting with R/C gliders.

Vol. 3, No. 16 \$2.00



April 1973

Fabulous PEA POD, R/C sailboat.
Briegleb BG-12, scale R/C soarer.
R/C Spirit of St. Louis, semi-scale, .049-.09.
Peanut Volkspiane
Finish painting of rubber scale models.

Vol. 3, No. 17 \$3.00



May 1973

Bantee mini-pattern R/C 3channel, .19 power.
Woodwind A/2, all sheet covered wing.
Slope soaring technique.
Teakettle, twin-boom CO₂ pusher.
Peanut Monocoupe 110.
Aerbo, .020 Replica, OT

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MODEL BUILDER

JULY

1977

volume 7, number 67

621 West Nineteenth St., Costa Mesa, California 92627

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Cover: We would be honored to have this gentleman on our cover any month, but this one in particular, as within a few weeks, he will be 65 years young, and retiring from the "other occupation" that keeps most every modeler away from his favorite pastime at least 40 hours a week. Of course, it is Frank Zaic, and the model is more fully described on page 27. Yes, we know the motor's unwound, but what modeler would really launch an airplane without first lighting the fusel? Kodachrome transparency by Joel Rieman.



ED MANULKIN

We deeply regret having to announce the passing of Ed Manulkin, president and owner of Sterling Models, Philadelphia, Pennsylvania. Ed died at his home in Jenkintown, Pa. on Monday, June 13, at the age of 59.

In addition to 30 years with his model business, he was treasurer and board member of the Hobby Industry Association of America, and a member of the Hobby Industry Association of the Delaware Valley.

Surviving are his wife, the former Sylvia Chakler; a daughter, Mrs. Joyce Malerman; a granddaughter, three brothers, and a sister.



from Bill Northrop's workbench . . .

WISH I HAD SAID THAT

We have often voiced, but have never quite been able to put in writing, our feelings about the difference between model building and the mere assembling or buying of toy airplanes. Ken Sykora, editor of "Flightplug", the Southern California Ignition Flyers' newsletter, has done it for us in the following editorial from the May 1977 issue.

"BY HAND

It was raining. We needed some balsa, so we pulled into an unfamiliar hobby shop because it was handy. It was pure RC oriented.

While we pawed through the wood, conversation from the "resident" coffee klatch gang at the back of the store drifted over to us. They were selling used ships to each other, and it was obvious that none of this group had actually built any of the models discussed.

As we toed up to the cash register, the owner gave us a friendly but puzzled smile and asked, "Do'in a little scratch build'in?" While we mumbled a reply, he got engaged with another customer; trying to show the poor guy how to open a "kit" box containing a ready made model! We walked up front to the magazine rack shaking our head.

Flipping through the mags, we reminisced. Time was, building was a modeling requirement equal to flying. But no more. Modern manufacturing methods, exotic materials, and reliable remote control systems have changed all that. New "modelers" seem to be joining the buy/fly (and crash?) ranks.

But, as we were sinking into a complete nostalgia funk, we reconsidered. Only a pure masochist would return to the "good" ole days of bamboo over a candle and 24-hour glue drying.

And yet . . . just think of what the new "painless" guys are missing. Years of cut fingers and glue smeared pants, sure . . . but a real learning time too . . . and no shop sells that. A real builder modeler can make any ship his whims direct, from a delicate 'mike' job to a huge gassie, and do a reasonable job of flying it. There's a lot of satisfaction in having that much personal "reach".

Sure we're prejudiced, but we can't think of a hobby with a bigger thrill than watching a pile of wood, metal, and covering grow under your own hands into a shape of grace and beauty . . . and then watch it floating free and high overhead, drifting with the clouds. The buy/fly bunch never feel that!

Suddenly our profound thoughts were broken as a junior tornado of small boys boiled into the shop. They scattered and started making selections . . . a wing-in-the-slot glider, a kite, two plastic RC's. But one little guy marched straight past the ready-made foam and plastic to the balsa rack. He returned to the counter with some sticks, two sheets, and a large tube of cement.

As the youngsters trooped past us on their way out, we counted noses; and cheered up. The odds were 5 to 1, true, but there was still hope. A few budding builders after all. Curious, creative minds and hands that refuse to be spoon-fed. Learners, who will earn from our great hobby/sport all that it can offer. Those intangibles bought only with time, patience and effort . . . and once possessed, are beyond price.

The little guy with the wood was having trouble getting his sticks through the shop's heavy swinging door. We gave him a hand, and as he nodded thanks, he spotted our stack of wood. We exchanged a glance, and he grinned.

And maybe it was our imagination, but we thought we saw a flicker of camaraderie there too . . . a couple of kindred spirits . . . marching to an alien drum."

THINGS TO DO

The Second Annual East Coast R/C Helicopter Championships is scheduled for August 14, 1977, in Lincroft, New Jersey. According to CD, Horace Hagen, the proposed AMA schedule of maneuvers will be flown. There will be a 10 dollar entry fee. For further information, contact Horace by calling (201) 949-3928.

* * *

The Montreal (Canada) R/C Club will be holding its annual sailplane contest on August 6 and 7, 1977, at St. Clet, near Montreal, Quebec, Canada. Open, "C", and Standard "B" classes will be contested, with trophies and prizes each day and overall. Power "fun flying" will also be featured after 4 p.m., taking advantage of excellent tarmac runways. There is camping on site, and a barbecue Saturday evening. Contact the C.D., Ric Reuland for any further information; 192 Meloche, St. Laurent, Montreal, Canada. Telephone (514) 336-0882.

* * *

The big, Reno National Championship Air Races are coming up on September 16-18, 1977. This year's purse has been raised to \$130,000, with \$90,000 going to the Unlimited race, and \$20,000 each for the AT-6/SNJ and IXL/Midget races.

A largest ever 30-35 Unlimiteds will be racing during the free-to-the-public qualifying heats, which are held just prior to the weekend's races.

Also scheduled for this 14th annual
Continued on page 103

"...THREE if by AIR"

(Letters to the Editor)

Attention: Mr. Wm. C. Northrop Jr., Editor

Please enter a two year subscription to your magazine, beginning with the July 1977 or later issue.

I think your magazine is great, and my wife goes through it pretty thoroughly too, enjoying its easy-to-read, friendly presentation even though not a modeler herself. We have been enjoying it from the beginning as newsstand purchasers.

I will put in a vote for scale model ships and boats, hoping to see something along this line appear. It is a field in which there is interest, but darn little published, to the best of my knowledge, the best thing I've found over the years being the English publication "Model Boats". I have a 50-800 class model sloop, enjoy it, but have difficulty seeing anything in the screaming model hydroplanes compared to scale-like sailing, or smooth, quiet model power boats running at scale speeds. Each to his own, however, and your publication does a fine job meeting wants of most everyone.

Your return to a 'sideways' cover picture permitted a very nice presentation of the replica "Spirit of St. Louis", and was again great for your DeH Moth picture. It typically lends itself to the proportions of an airplane picture. Hope it is as suitable for your magazine being identified when in racks with other publications.

Sincerely,
Ken Hamilton
Rancho Palos Verdes, Ca.

We are still searching for someone to handle our proposed "Model Shipyard" column. It will become a regular feature as soon as possible.

I've always favored the "sideways" cover if and when the particular photo warrants, and intend to stay with it in the future. Putting the logo in the upper right corner still maintains our newsrack identification.

Of course, this month it was logical to revert to the more standard vertical format!

Dear Bill,

I have been reading Model Builder faithfully for two years and I like your articles the best. For me, the big three is "Free-Flight Scale", "Hannan's Hangar", and "Peanut Gallery". Now the problem. I read: "A letter came in the other day", and "Chin Flynn dropped me a line", etc. I think it's great, but most of us readers do not know where to write to comment on "where I can acquire a Jetex", to "How do you make sliced ribs" on peanuts. So could give us neophyte, loner modelers the addresses of these fine gents who write the articles? Thank you. I love the magazine and I like the new "Three if by Air."

Sincerely,
Eric Cederlof
Vista, California

No sooner said than done. Addresses of our regular contributors are as follows:

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Tustin, Ca. 92680

Dear Sir:

We've been following your column closely since February when this "debate" on your advertising policy started. We're both modelers; we've sent mail orders on several occasions and we own a hobby shop. Hopefully the following explanation of how a hobby shop works will at least cool some tempers, although it cannot solve the dilemma.

One of the biggest complaints is the attitude and ability of the clerks. The problem's simple . . . what modeler wants to spend his spare time inside a hobby shop talking when he could be flying or building? NONE!!! Not even the owner! Consequently, the only willing help is inexperienced and uncaring. To help remedy the problem, leave your phone number with the store. If the clerk can't answer a customer's question, maybe you can.

The rest is basic economics. Pretend your dollar is a vote you cast. Individually, they don't seem like much, but collectively, they keep the hobby shop alive and thriving . . .

any hobby shop . . . mail order or local, good or bad.

Prices are higher at your local retailer for many valid reasons. One is the nice location you expect . . . and pay for! Retail business space in our part of the country runs \$3 to \$5 per square foot, maybe more. A mail order house can rent or lease in a warehouse district where rent is much cheaper. Don't forget to include insurance and utilities!

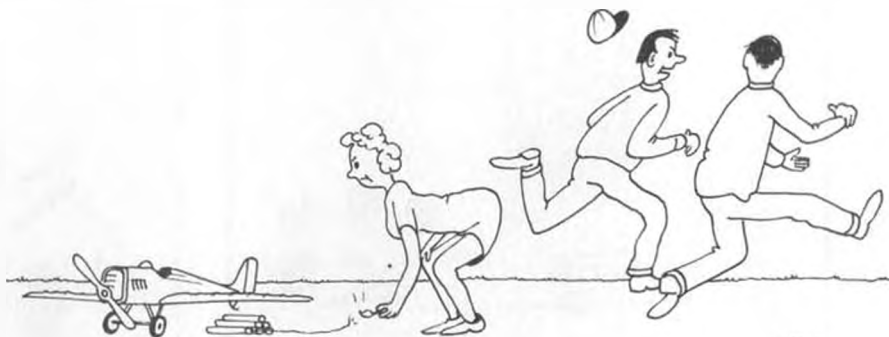
At this point, we're back to employees at the financial level. To get a modeler to work on a pretty Saturday, you'll have to pay him a lot over minimum wage. If all of your clerks are knowledgeable, it adds up very fast! A mail order house needs only the guy answering the telephone to know anything about the hobby. The stock boys (or girls), packers, shippers etc. are very cheap labor by comparison. However, consider the beginner; he can't get the help he needs over the telephone.

Of course, volume business is the key to the whole thing. AMA estimates that 1 person in every 1,000 is a model builder to varying extents. In a community of 100,000, there's 100 customers to divide their dollars between the various local shops. A mail order house works nationally. This gives it millions of potential customers by comparison. Consequently, it orders kits etc. by the case. . . hundreds of a particular one. It also gets volume prices because of it!

At this point, consider an interesting but realistic idea. Compare a \$50 kit purchase to a 50¢ hardware item. It takes the same amount of work to sell both. A buyer of a kit wants to look at the plans, check the wood, and see what other items he will have to purchase in the future to complete the model. A buyer of a 50¢ package of hardware wants the best possible item for his particular need. He checks all the different possibilities by all the different manufacturers. In the meantime, the clerk is waiting, offering suggestions, and showing the hardware buyer where to find the next possibility. After they decide to buy, it takes the same amount of time to write the ticket and get a sack for the hardware. The hobby shop lost 40¢ on the hardware sale and made \$19.40 on the kit sale after labor (minimum wage for 15 minutes) and the cost of the merchandise is subtracted. This is why mail order houses don't advertise or often stock small items. They too would lose money on the sale. Don't get us wrong! If you need that hardware, we want you to go to your local shop and get it, but it's the convenience he's offering you. Remember that when you buy your next kit!

The other major complaint is the lack of variety and selection of the local shops. After overhead and wages are paid, about 5¢ of each dollar spent can go towards expanding the stock of your local shop. Let's take the modeler who spends \$2,000 per year on his hobby. If he spends ALL of it at his local dealer for one year, the dealer will have \$100 to expand. That's less than ONE 3-channel RC system. If the customer forces the dealer

Continued on page 97



"You had to bet her \$20.00 it would never get off the ground, didn't you?"

OVER THE COUNTER

• Model Rectifier Corporation (MRC) has a new addition, which brings to nine, the number of servos available with its complete line of R/C Systems.

The newest is a ball bearing MR-70, recommended for the advanced R/C'er who wants optimum performance and can appreciate the added smoothness provided by ball bearings. These bearings add support and lessen friction between the output gear and the servo case. The results are minimum play, for precision control.

The MR-70, claimed to have the thickest lugs of any servo offered today, should work extra well in R/C cars and boats, because the ball bearings will absorb and protect the servo from vibration and rough handling associated with these little speedsters.

The electronics are designed around



F4U Corsair for 1/2A R/C, by GMC Models.

a Signetics 544A IC, well known in its own right as a dependable amplifier. Five output accessories are supplied with each servo; one triangular, one small

and one large disc, and two straight arms. The MR-70 weighs 1.8 ounces, and measures 1-3/4 x 7/8 x 1-3/8 inches. It is priced at \$49.95, from MRC,



ABC version of the Rossi R/C .15 is now available and AMA legal.



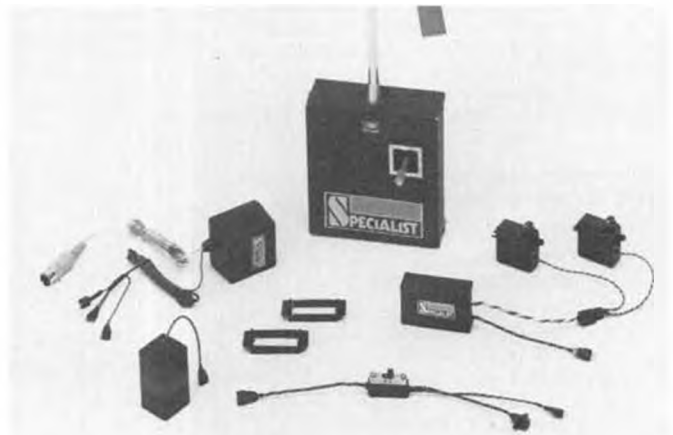
Tweezer-Lite, from Educational Products.



MRC's MR-70 servo features ball-bearing output gear.



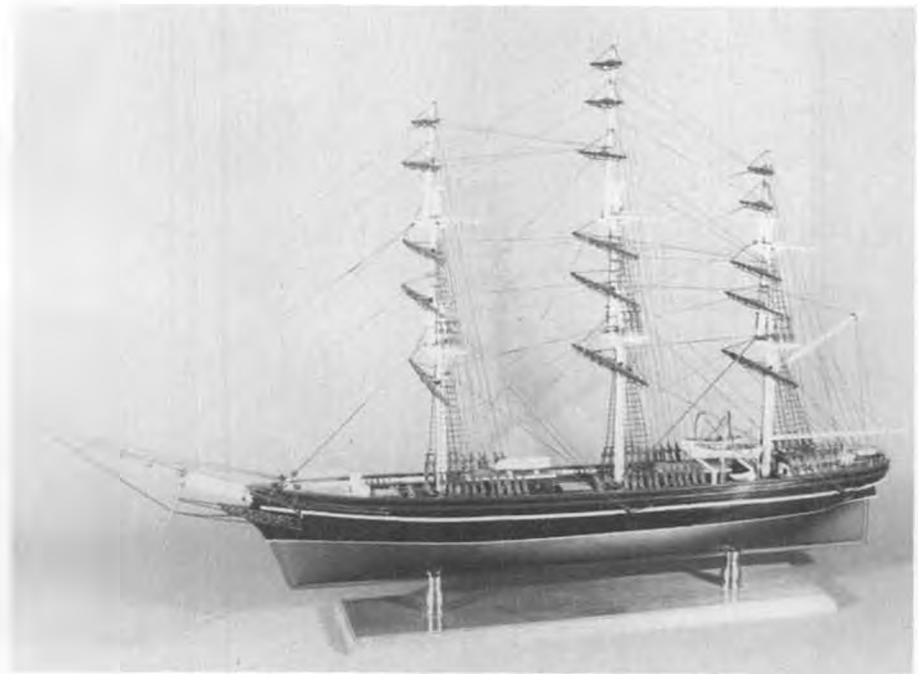
The high quality "Specialist" Eight Channel system by Millcott Corporation.



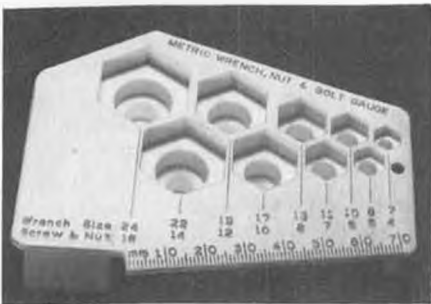
The "Specialist" Three by Millcott Corp.



Marlene Holley, Snata Ana, California, models the "Hot Stuff" T-Shirt.



The Clipper Ship "Cutty Sark", in 1/120th scale, from a Calex International kit.



Metric Size-A-Bolt, from Educational Products.

2500 Woodbridge Ave., Edison, NJ 08817, or one of its many dealers. Don't forget, you read about it in MB.

* * *

What is there left to say about the Rossi .15 R/C as used in Quarter Midgets for the last couple of years? It is probably enough to remind you that it is the engine, in the non-ABC version, used by Tom Christopher to fly his Rickey Rat at the up-to-now fastest time of 1:35.1. It is the engine, also non-ABC used by Bob Root to fly his

Lil' Cobra at what we believe to be the fastest recorded time over a straight course, average of two ways. The airplane was 100% legal for racing, stock prop, K&B 500, scale canopy; the time was 116 mph.

What is left to say is that the Rossi .15

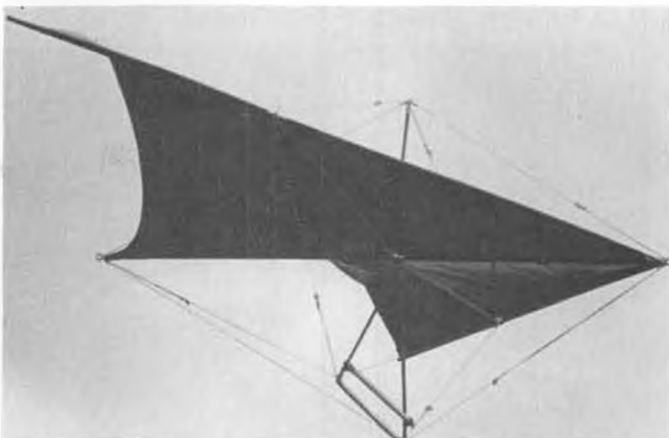
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Graupner Piper Cherokee, for Stand-Off Scale, available through Willoughby Enterprises.



Almost-Ready-To-Fly rockets by Centuri.



The Tom Morey 51 inch span hang glider model, "Ultra".



Glue tube dispenser tip by Educational Products.



Another "Big John" . . . this one built by Bill Phinney, Leisure City, Florida, and modified to two cockpits. Looks nice that way! Built back in 1969, the ship is still in the area, now owned by an airline pilot.

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

IMAC AT THE NATS

As mentioned briefly last month, there will be an unofficial Sport Biplane contest on Saturday and Sunday, August 6 and 7, at Riverside Raceway, Riverside, California, just a few miles from March AFB, site of the 1977 AMA Nationals.

There will be two events. Biplanes only will fly the three skill categories; Sportsman, Advanced, and Unlimited. There will also be a Sport Scale event for biplanes *and* monoplanes which are sport scale models of known aerobatic aircraft. Bring your proof if you're entering a relatively unknown subject! If you enter your biplane in the Sport Scale event in addition to the Biplane event, your flight score from the Biplane event will be your score in Sport Scale. If you enter Sport Scale only, you will fly the Advanced maneuver schedule.

Trophies and prizes will be awarded through 3rd place in each of the four categories, in addition to merchandise awards.

Registration is at 8:00 a.m. Saturday
Flying begins at 9:00 a.m. Saturday
Flying begins at 8:00 a.m. Sunday

A special Barnstorming event will be held on Sunday at 2:30 p.m., with merchandise awards.

Preregistration is \$5.00 per plane. If the same plane is used for both events, the second event is only \$1.00 additional. Registration at the site will be \$8.00.

To preregister and get a complete contestants packet, including location map, write to Bill Bell, C.D., P.O. Box 1371, Tustin, Ca. 92680. For late site information, call Bill at (714) 838-8096.

Directions to the site, for those who

enter late, or who wish to spectate, are as follows:

East from Riverside on Hwy 60 towards Indio.

Take Pigeon Pass Road off-ramp, which borders raceway, and turn into first gate, which will be open.

Contest site will now be in sight. Watch for posted signs.

Incidentally, the IMAC, along with the R/C Bees Club, and Model Builder Magazine are co-sponsoring this first official national IMAC contest. The first place trophies are beautiful, 3-dimensional wire statuary models of . . . what else . . . aerobatic biplanes!

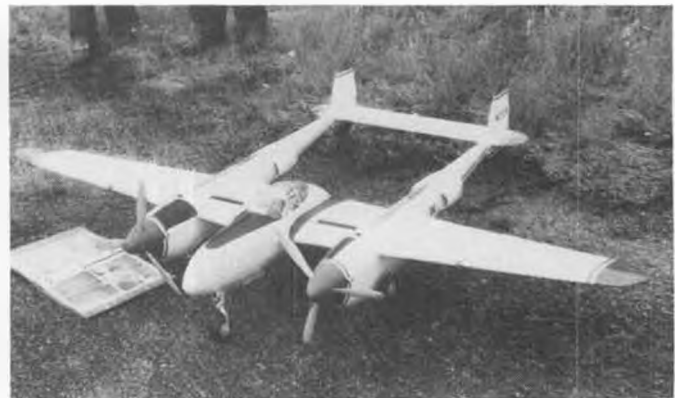
"COULD BE" SCALE

Ron Shettler, the Canadian modeler/hobby distributor, who brought the magneto ignited Quadra engine to our attention, is a gentleman whose interest in big model engines goes beyond just the marketing possibilities. His modeling interest is in large scale ships, like our Mammoth Classic idea, but with a different approach.

Ron's idea is to design a line of original design models that just as well *could be* scale models in their con-



Sig Cessna 150, built by Tony Orsini, Jacksonville, Florida. Seen at the Jacksonville Rebel Rally, May 28 and 29. Photo by Dot Fields.



Winner at the Jacksonville Rebel Rally was this P-38 by Jack Fehling, Hialeah, Florida. No kit information. Photo by Dot Fields.

cept . . . thus the name "Could Be" Scale. Here's his explanation.

"COULD BE" SCALE

This is the model that looks real, flies realistically, and most importantly, is the creation of the builder's own imagination, design, and construction. In short, it is what he would have produced in a full-size aircraft if he had possessed the means to do so.

The biggest gap we have in model aviation is in the 'home built' class, or model aviation's version of the E.A.A., or the various experimental aircraft associations throughout the world. The enjoyment they have at their numerous fly-ins; kicking tires, sharing each others' creativity, and helping to solve problems in a relaxed atmosphere which invites appreciation of everyone's efforts, is too often missed at our contests (Even the word contest suggests winning at all costs). Presently, modelers who are building models of this type are lumped into the 'sports flyer' category, and the only events in which they are offered the opportunity to fly are fun flies, which too often take the form of demolition derbies.

I guess you could best describe "Could Be" Scale as model prototypes of full-sized aircraft which have had, or could have had, a purpose in the era for which they were intended. More on the era later. If the vehicle was to be manned, or should we say personed, the standard used for scale should be a 6 foot, properly proportioned person, or the builder's own stature. For example, if the model was to be 1/4 scale (this event would be better suited to larger aircraft), then the pilot should be either 18 inches tall, or 1/4 your own size, and be able to ride in the plane if the servos he would replace in the full size weren't there.

This is where the era comes in, although probably, most of the aircraft would be built to today's standards. After you have determined the scale of your model prototype and its intended use, be it water bomber, sport aerobatic, fighter, utility, STOL, or whatever, you go shopping for the 'real' powerplant, instruments, wheels, prop, etc, that you would use, simulate them in your model, and list them on your spec sheet. Remember that this is "Could Be" Scale. The items which you list, such as power plant, wheels, etc., must be in correct proportion as to size, power, and shape. In other words, if the engine used would present a problem in cowling, your model would show how it was solved, had it been built full-size. It doesn't take much imagination to think of how the pilot would look if we scaled up a competition pattern ship to full-size proportions. If you chose an era that is now in the past, the same things apply. The only difference is that if you state that your prototype model was

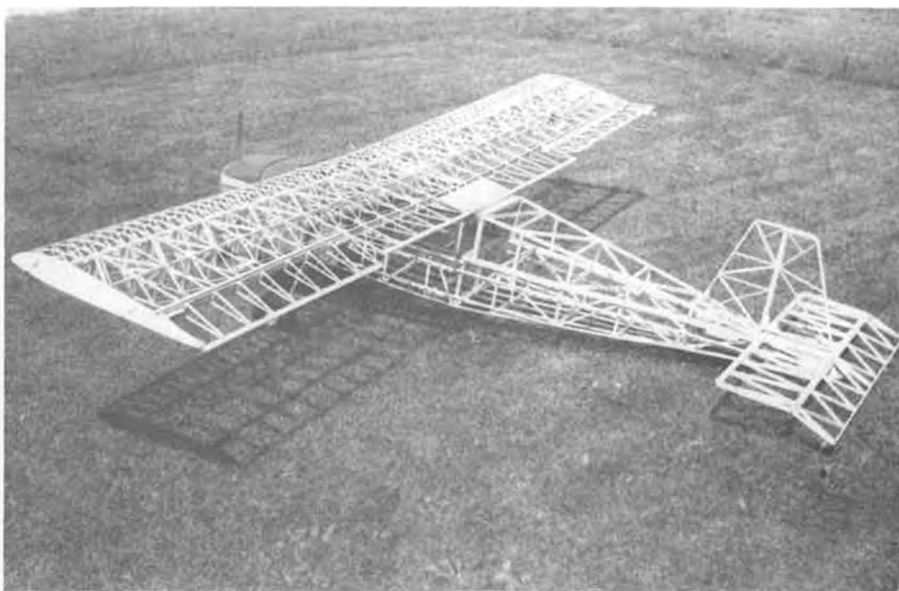
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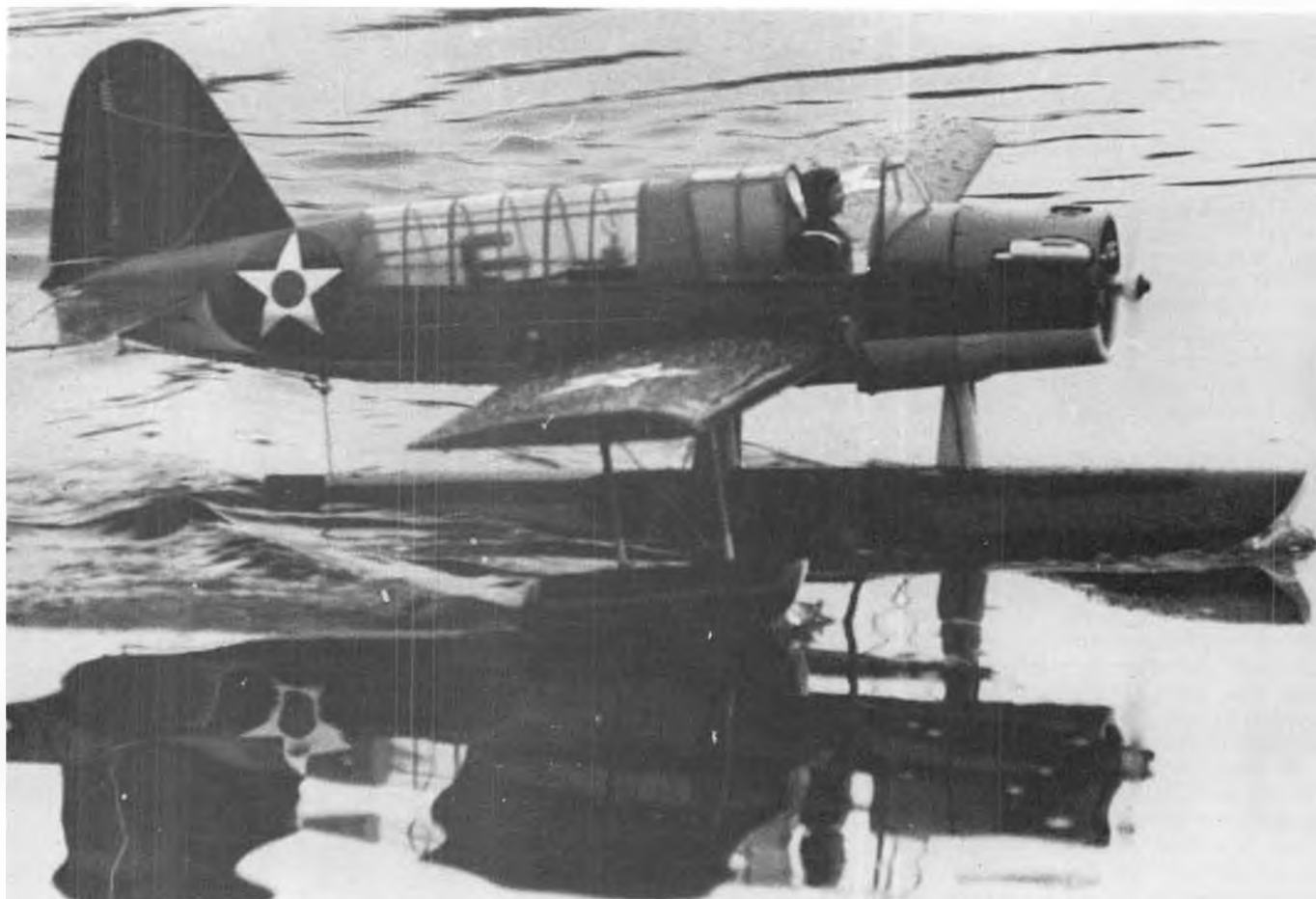
Almost 10 years ago, Dave Lane, USPJA Level 1 judge, was flying this Great Lakes Trainer at a contest in Phoenix, Arizona. He built it from a Scaleline kit. Photo by Dick Tichenor.



Ron Shettler, distributor of the Canadian magneto ignition Quadra engine, with the "Thunderbird", one of his "Could Be" scale designs, as described in the text. Quadra powered of course.



Another "Could Be" scale design by Ron Shettler, a S.T.O.L. utility bush aircraft. Uses 99% spruce construction, with 2700 pieces in the 10 foot span wing! Supports 180 lbs at center.



VOUGHT ★ OS2U-1 ★ "KINGFISHER"

By ELIOT KIMBLE . . . A fine combination; moderate size engine (OS Max .25), 48 inch wingspan, easy flier with flat-bottom airfoil, and best of all . . . semi-scale of a popular WW II Navy floatplane.

● The Vought OS2U-1, better known as the Kingfisher, came into being in 1938. It was powered with a 450 HP Pratt and Whitney R-985-4 Wasp Junior 9-cylinder radial air-cooled engine, and had a maximum speed of 177 M.P.H. This first model was delivered to the U.S.S. Colorado in 1940. Later, due to modifications in service equipment and the use of the R-985-50 engine, it became the OS2U-2. The OS2U-3 was produced in 1941 and was powered by either the

R-985-AN-2 or -8 Wasp Junior. By the end of 1941, all naval observation squadrons were equipped with the OS2U.

Although Vought produced the largest number of Kingfishers, 300 were manufactured by the Naval Aircraft Factory and were designated OS2N-1. All production of the Kingfisher ceased in 1942.

Spotting for naval gunfire, reconnaissance, anti-submarine patrol and

liaison, were just some of the chores performed by the Kingfisher. It operated from catapults on battleships and cruisers, and from seaplane tenders and shore bases. Overall performance was improved when fitted with wheels, by increasing the cruising speed from 119 M.P.H., with floats, to 125 M.P.H. with wheels. The service ceiling also increased from 13,000 feet to 15,500.

In 1942, an OS2U-3 made national headlines by rescuing Captain Eddie Rickenbacker and his crew, who had been adrift in the South Pacific in a rubber raft for 3 weeks. With the seven men lashed to the wings and jammed into the cockpits, the pilot of the OS2U taxied 40 miles in rough seas before being picked up by the rescue ship.

I had several reasons for building the Kingfisher. I like water flying, I like realism, and I like to be different. In addition, the profile of this plane turns me on. There is no prettier sight than when it's up on the step, skimming across the water, getting ready for lift off.

This model is far from scale but retains enough of the original outline to give the realism desired. Unlike the man-carrying machine, the model is



The "Kingfisher" plows through the water at low speed in the water, affording excellent handling and control of direction. At full speed, a tap of down elevator gets it "on the step".

quick to take off and is easy to fly. This is due mainly to its low wing loading . . . it is important to build it light. Remember, water is more forgiving than dry land, and does not require the building of a semi-solid model.

The following building instructions are for proper sequence only, many details are not mentioned, I am assuming that an experienced builder will apply his own techniques and know-how to its construction.

Begin fuselage by cutting out all formers. Using the top view as a pattern, make two identical crutch halves out of 1/8 medium-hard balsa, two 3/32 plywood crutch doublers, and two 3/32 balsa doublers which extend from former 1 through 5. Cement balsa and ply doublers to top of crutch halves, making a right and a left crutch.

Mark position of plywood firewall in place. Place this assembly bottom-side up on work surface, with top of firewall hanging over the edge of work surface. Mark off position of bottom formers 1 through 6 and 13 through 16. Cement bottom formers 1 and 2 together and cement in place on crutch. Chamfer forward edge of former No. 5 and glue to No. 4 . . . cement these to crutch. Cement former 6 and 13 through 15 in place.

Prepare hardwood motor bearers and cement in place. Cement 1/8 ply dowel base in place across motor bearers. Prepare 5/8 dowel per plan, and cement to dowel base and former No. 5, add 1/8 ply side and rear dowel braces. Cement 1/8 ply wing dowel supports and former No. 6A in place. Cement hardwood screw eye blocks in place on former No. 5. These should be flush to the edge of the former.

Cement 1/8 balsa fill between formers 2 and 3, cement former 13A and rear wing dowel supports in place. Cut and fit 1/8 balsa keel pieces between formers 13, 14, 15 and 16. Be sure to add the hardwood insert in bottom keel piece between 14 and 15. Cement 3/8 balsa



The author's model of the "Kingfisher" is extremely easy to fly and very stable in the air. Out-board floats will "knock off" if necessary. Note rubber bands holding main float in position.

wing seat in place and sand flush with crutch and formers 6 and 13.

Remove this assembly from plan and construct top half of fuselage in the same manner.

Top cowl is removable, but will be built in place, then cut apart after fuselage has been sheeted.

Tack-glue 1/16 balsa cowl bottom strips in place on top of crutch. These extend from former 1 to front of firewall, and from rear of firewall through former 19. Do not glue these to firewall. Cement formers 1 and 2 in place on cowl strips. Cement formers 17 and 18 in place. Do not cement to firewall. Use pieces of playing card or something of similar thickness between formers and firewall to provide a loose fit for easy removal of cowl when finished. Chamfer forward edge of former No. 5 and cement to No. 4. Cement both to cowl strips. Add formers 19, 20 and 21.

Since cowl separation is between formers 19 and 20, try not to glue these together. Cement 1/16 sheet cockpit cover to top of 20 and 21, and sand flush to edge of formers. Add formers 21A through 27. Cut and fit top keel pieces and 1/8 sq. stringers, cement in place. Add 1/16 sheet rear cockpit cover, and sand to contour of fuselage. Glue in

1/8 sheet between formers 25 and 26 for Nyrod exit support. Glue in 1/4 x 1/8 balsa stab supports and tail block. Install Nyrod for rudder and elevator control.

Check all formers for proper alignment and re-shape where necessary. In order to keep weight to a minimum, the original model was sheeted with 1/16, however I would recommend using 3/32 sheet, which will allow better sanding and a truer fuselage shape. Cut slot in tail for stab. Add simulated cowl flaps.

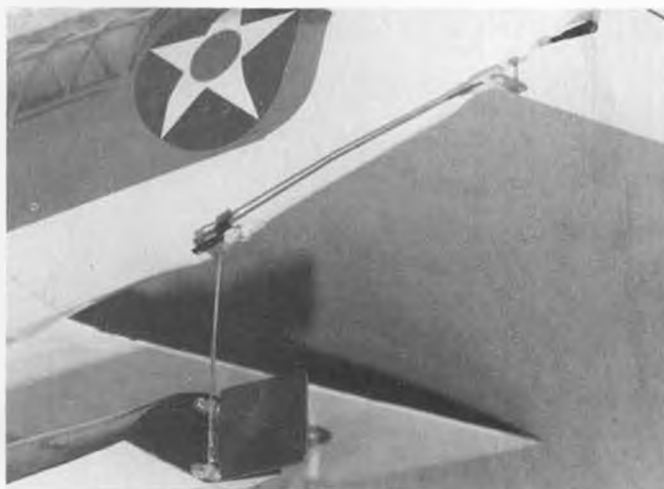
Fuselage is now ready for the finish of your choice. I used silk and dope on fuselage and fin, and Monokote on wing and stab. Top of fuselage is light blue, underside white. Top of wing and stab dark blue, underside white.

Top cowl may now be cut away from crutch and 1/8 balsa fuel tank floor can be cemented between motor bearers. Plug any gaps to prevent water from entering the forward fuselage compartment. Treat inside of cowl and fuel tank area with a liberal coat of resin.

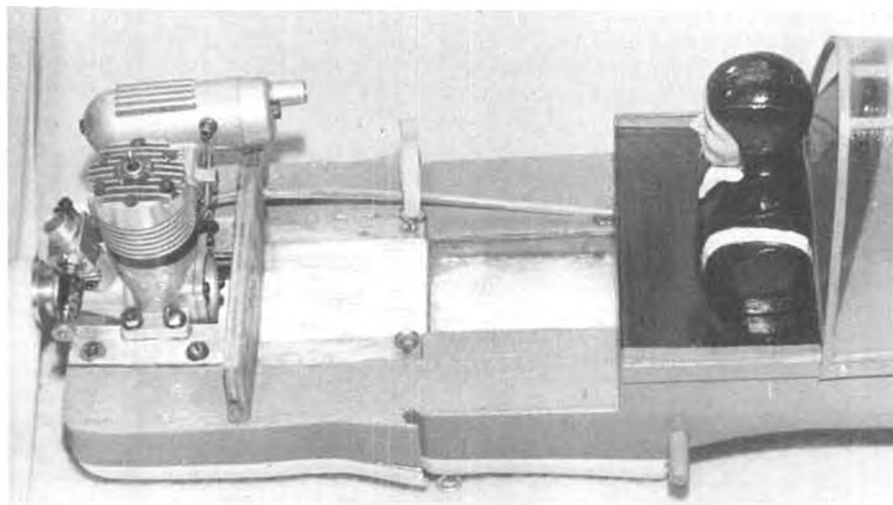
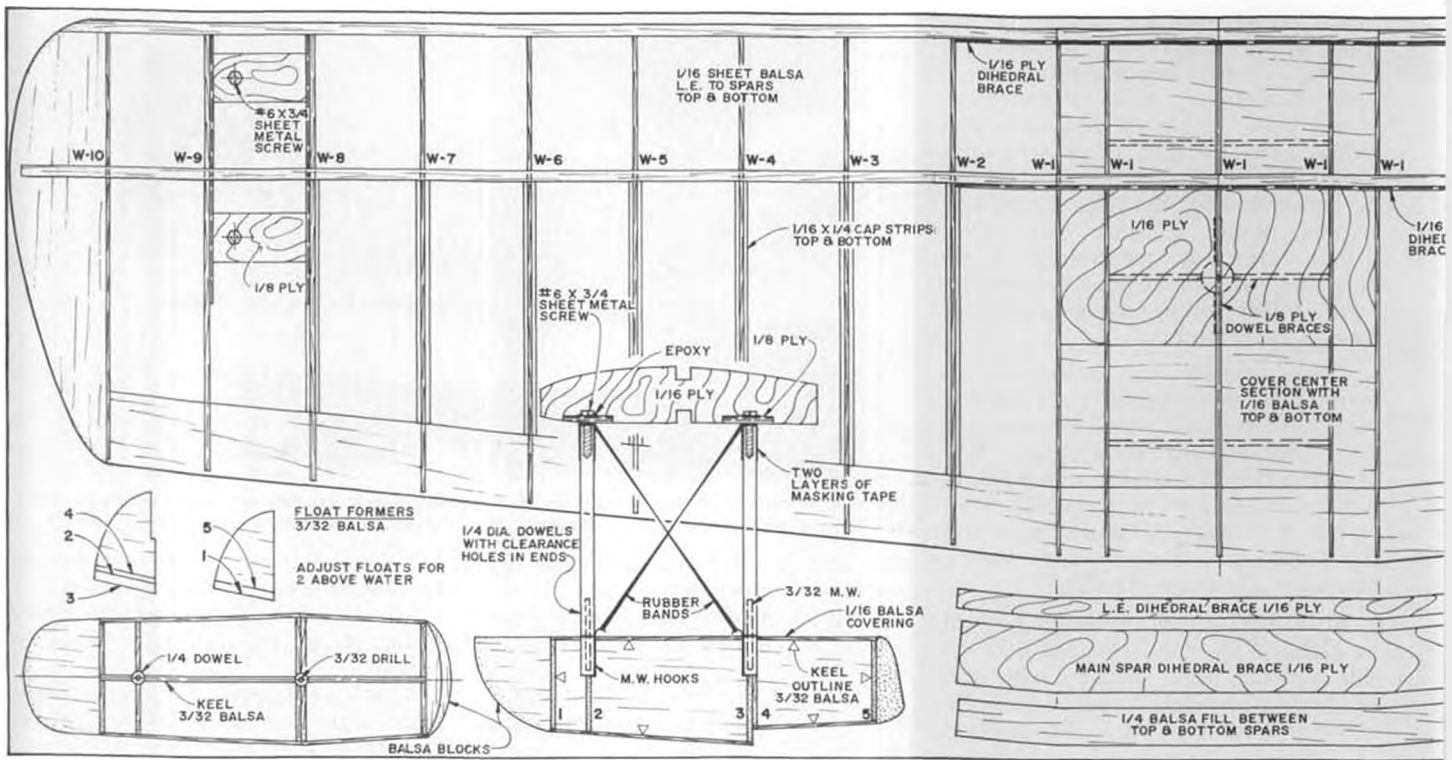
Prepare a set of aluminum motor plates and install the engine. I used an OS Max .25 with muffler, and have power to spare. An RST 6 tank fits nicely under the cowl, and is held in



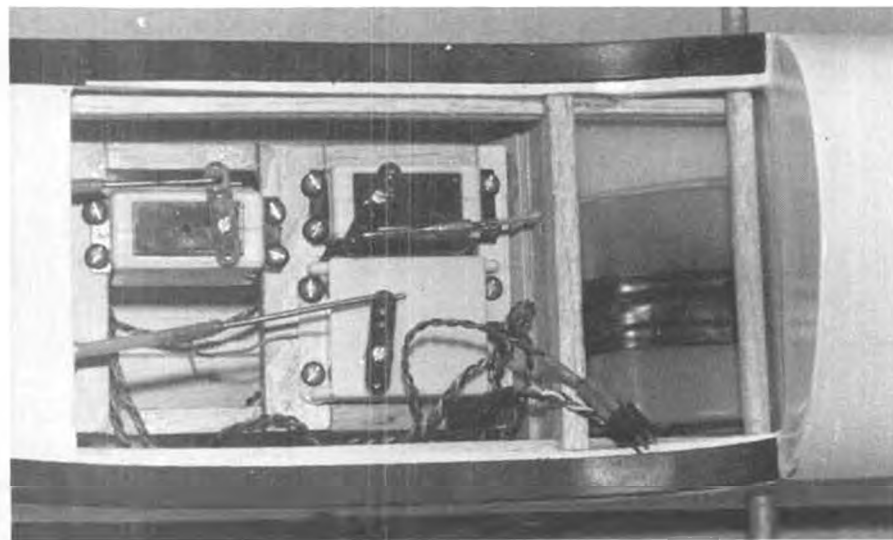
No "Chicken Scale" detailing here. This is a true Sport Scale model. Just enough stuff to show up 50 feet away, or in the air.



Water rudder linkage from air rudder. At any other angle than this, it is quite unobtrusive. Touch-and-go's are author's favorite trick.



How much access to the power compartment could you want? OS Max .25 with muffler has plenty of oomph for this 3-3/4 pound aircraft. No water entry problem here.



Cannon Tini-Block receiver/servo operates rudder, other two for elevator and throttle. With rubber wing seat/seal, only a total dunking would get radio gear wet.

place with a rubber band hooked to a screw eye on each side of the tank.

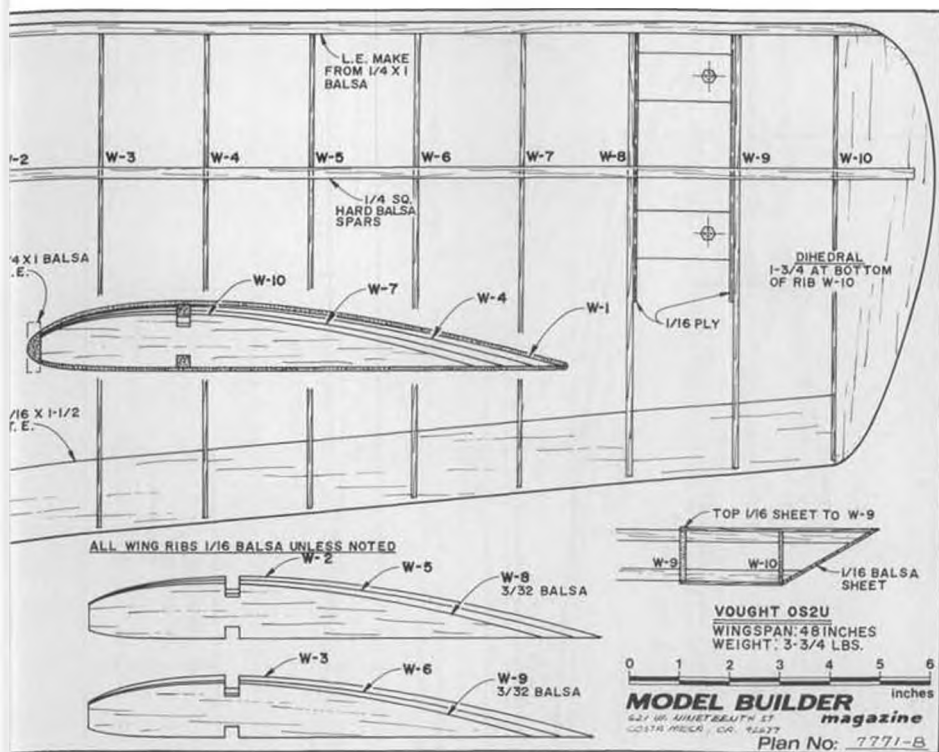
WING

Cut ribs No. 8 and 9 from 3/32 medium hard balsa, all other ribs are cut from 1/16 medium balsa. Build two wing panels directly on plan. Each panel starts at outer rib No. 1. Pin down 1/16 T.E. Cut a 1/16 shim approximately 1 inch wide and slightly longer than wing panel. Pin down in main spar location, cover with waxed paper, and pin bottom 1/4 sq. spar in place. Cement ribs 2 through 10 in place on spar and T.E. Cement top 1/4 sq. spar in place. Cement 1/4 x 1 inch leading edge in place (excess L.E. stock is trimmed off after L.E. sheeting has been added).

Do the following steps over the plan. When cement has completely set, raise tips of each panel 1-3/4 inches from bottom of rib 10 to work surface. Join panels with 1/4 inch balsa dihedral gusset which fills space between top and bottom spars. Add center section L.E., bottom T.E. and top and bottom spars. Add L.E. and main spar ply dihedral gussets. Cut all No. 1 ribs to fit, and cement into place fore and aft of main spar. Add top 1/16 T.E., then top 1/16 L.E. sheet and top center section sheet.

Cement 1/16 ply doublers to ribs 8 and 9. Epoxy a No. 6 x 3/4 inch sheet metal screw in place in 1/8 ply tip float strut support and cement into wing between ribs No. 8 and 9. See plan for detail. Bottom L.E. sheeting may now be added.

Top of wing tips are sheeted to rib No. 9. Cut L.E. and tip sheeting per plan view to form tip shape, then add bottom 1/16 sheet from bottom of rib No. 10



FULL SIZE PLANS AND PATTERNS AVAILABLE – SEE PAGE 104

up to meet top sheeting. When glue is dry, trim excess bottom sheeting.

Cement 1/16 ply dowel support in place and add bottom center section sheeting. Prepare 5/8 dowel per plan and cement in place. Add 1/8 ply dowel braces front and rear. With wing in place on fuselage, add formers 7 through 12. Add hardwood screw eye blocks to former No. 9. Sand formers to final

shape and add sheeting. Fill center section T.E. to a depth of a 1/2 inch with epoxy.

EMPENNAGE

Fin, rudder, stabilizer, and elevator are all made from 3/16 medium sheet with all leading edges rounded and trailing edges tapered. Insert 1/16 music wire for water rudder linkage into rudder, see plan for detail. Cover,

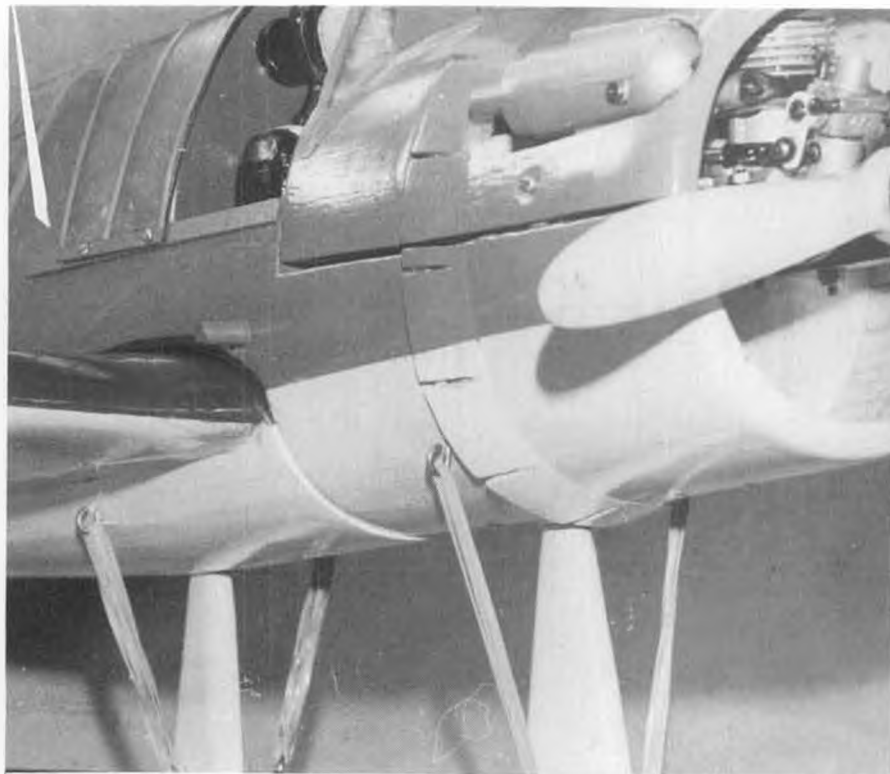
finish and hinge. Elevators are joined with 3/32 music wire yoke. Cover, finish and hinge.

MAIN FLOAT

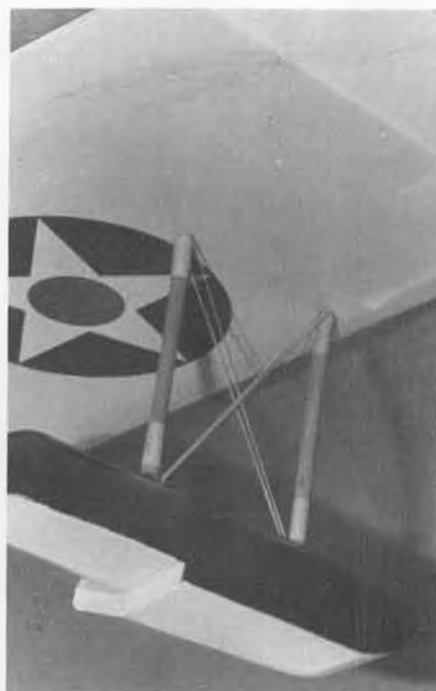
Cut all formers and crutch from 1/8 medium balsa. Mount wing to fuselage and mark dowel location on crutch. It is important that the 5/32 holes in the dowels line up. Proceed to cut out crutch and formers. Prepare 5/8 dowel as shown on plan. Place in position by sliding dowel into cut-out and seating crutch in dowel slot. Top end of dowel should extend approximately 3/32 above crutch. Cement in place. Add formers and hardwood blocks for screw eyes. Use a straight edge to check formers for alignment, make adjustments where necessary.

Float bottoms are added next. Use 1/8 rock hard balsa or 3/32 medium with 1/32 ply laminate. Cut bottom pieces oversize and trim off excess after cementing in place. Top sheeting is added in four sections; front of float to step, left and right . . . and from step to rear of float, left and right. Mark position of dowel on sheeting, cut and fit half-circle to dowel. Cement section in place, start on top centerline of crutch and bend sheet down over formers and edge of float bottom. When cement has set, trim flush with float bottom. Repeat this operation for the other three sections. Cement nose block in place as well as 1/16 ply end cap. Sand all to shape.

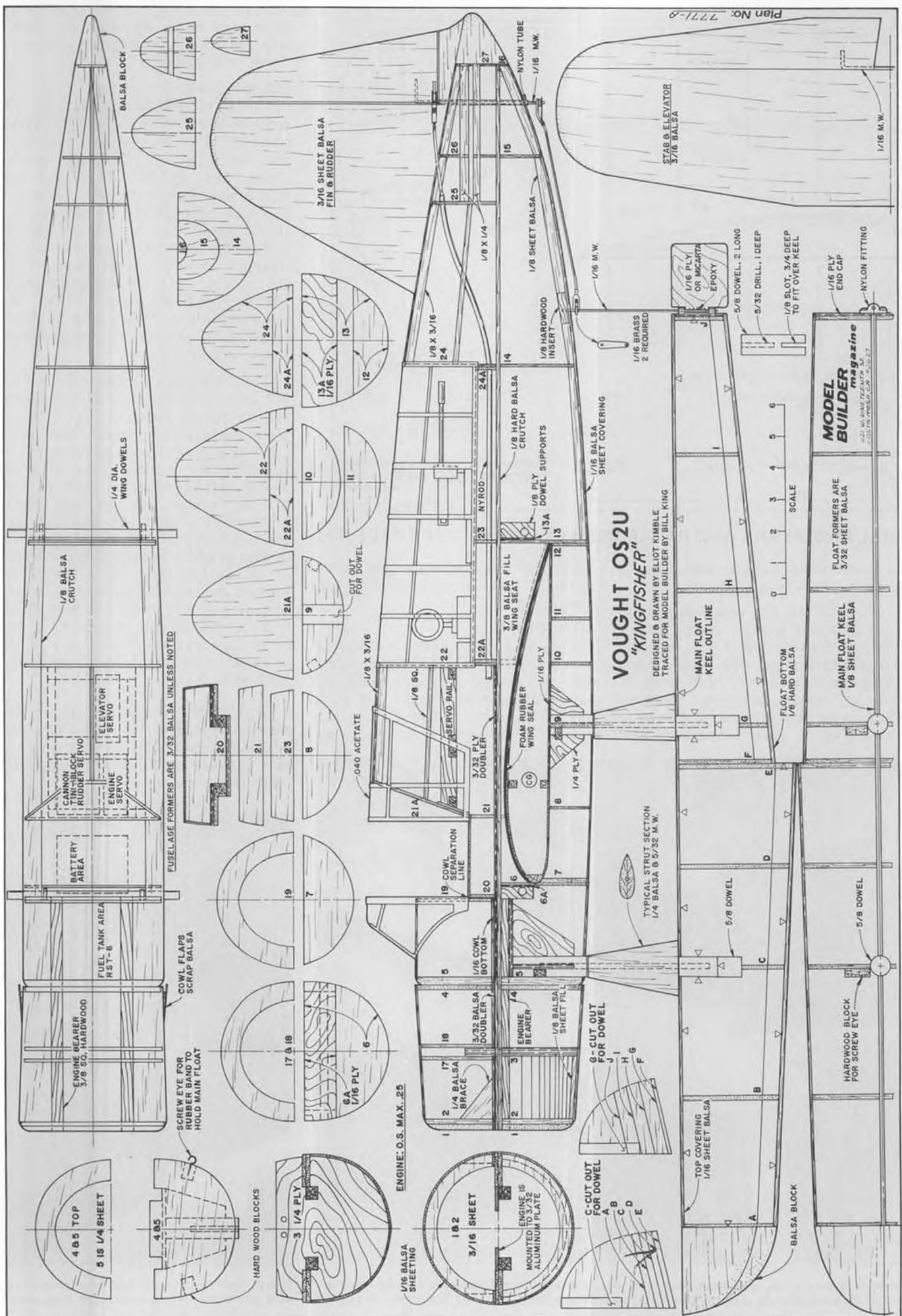
Tip floats are constructed in the same manner. Note, however, that the 3/32 music wire strut pins are epoxied into dowels and small hooks are cemented to the dowels.



Faired 5/32 music wire main float struts plug into drilled hardwood dowels in fuselage. Rubber bands hold everything in place. With a little research, you could build the landlubber version.



Dowel float struts thread into wing screws and plug into floats, rubber bands hold it together.



Plan No. 7771-8

VOUGHT OS2U "KINGFISHER"

DESIGNED & DRAWN BY ELIOT KIMBLE
TRACED FOR MODEL BUILDER BY BILL KING

MODEL BUILDER
magazine
P.O. BOX 1000, WILSON, N.C. 27157

SCALE
0 1 2 3 4 5 6

MAIN FLOAT STRUTS

Main float struts are made from 5/32 music wire sandwiched between two pieces of 1/4 inch balsa sanded to a streamline shape. These struts are not cemented to either the float or the fuselage, but are entirely removable. Make wire strut length such that they do not hit bottom on either dowel, this will enable you to make final adjustment of float angle by trimming length of balsa fairing.

MISCELLANEOUS

Windshield and both front and rear canopies were molded from .040 acetate.

I carved my molds from soft pine and used the kitchen oven for heat. The windshield plastic was held captive in a wood frame while being pulled down over the mold. The plastic for the canopies was laid on top of the mold in the oven and allowed to lay down naturally as the heat softened it. Flexible wood trim, a very thin veneer used for covering the raw edges of plywood, was used to simulate the canopy framing.

Machine gun and radio gear are made from scrap. For more scale detail, I would suggest that you purchase one of the small scale plastic models. These are highly detailed and excellent for reference.

FINAL ASSEMBLY

After all finishing has been completed, insert stab and elevator assembly into slot previously cut in aft fuselage, and cement in place. Plug remaining slot. Drill hole and insert nylon tube through aft fuselage for water rudder linkage. Cut a 'V'-groove in top of fuselage to receive fin, pre-glue fin and groove for a strong bond. Insert 1/16 wire extension into tube, and glue in fin and rudder assembly. Mount wing with rubber bands, insert main float struts into float and fuselage, and secure with rubber bands attached to screweyes on



Main float is just about to come out of its plowing attitude as ship gains speed. Note that although right rudder has been applied, the left float is still out of the water. Lotsa action!

each side of float and on wing and fuselage.

Cut 1/4 inch dowels for tip float struts. With model at rest in water, tip floats should have approximately a 2 inch clearance. Drill a hole in one end to allow the dowel to be screwed onto the wing tip. This is a break-away point to prevent damage to the wing in case of rough handling. Several wraps of masking tape on this end of the dowel will add strength to the dowel if it breaks away too easily. Screw dowel to tip and insert float pins into struts, secure with rubber bands attached to wire hooks on float and looped around wing tip screw.

Link up water rudder per plan. Be sure it turns in same direction as air rudder.

FLYING

Pilot should do a bit of taxi work to become familiar with the handling on water. High-speed taxi should be straight; trim out any unwanted turning with the

water rudder. When power is first applied, model will set back and plow, than as it gains speed, a touch of down elevator will put it up on the step. Model is ready to be airborne when it starts to skip along the top of the water. Sometimes a slight back pressure on the stick is needed for lift-off. Original model weighs 3-3/4 lbs. and flies like a trainer.

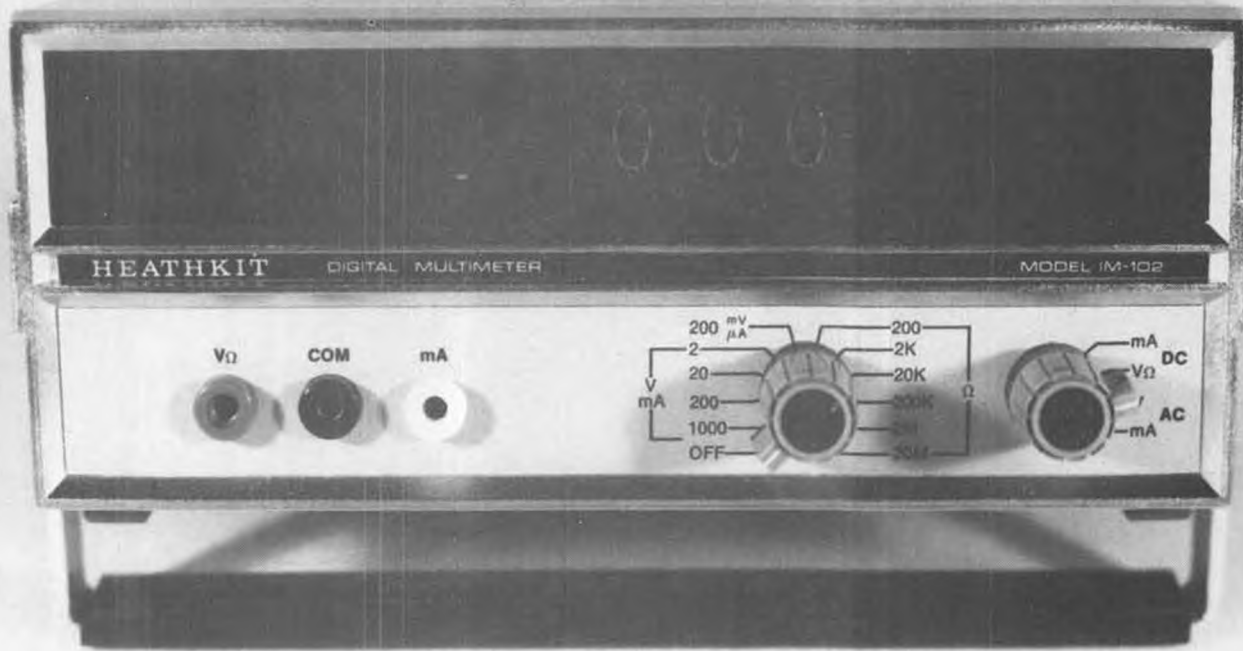
Happiness is shooting takeoffs and landings with the Kingfisher. Build one and have at a lot of happiness . . . ! ●



Though cowed, there is still plenty of room for cooling air to circulate around engine.



Pilot has excellent view of fuel tank with cowl/hatch removed! Excellent accessibility for work on engine, throttle, tank, etc.



PRODUCTS IN USE

ELOY MAREZ evaluates the HEATHKIT IM-102 Digital Multimeter, and gives you some hints on its use relative to our hobby.

• The Heathkit Model IM-102 Digital Multimeter is an instrument that performs extremely accurate voltage, current, and resistance measurements. These values are displayed on digital display tubes and other lamps. Except for the display devices, solid state

components (transistors and integrated circuits) are used throughout.

Five voltage and five current ranges are available for both alternating (AC) and direct (DC) currents. The voltage ranges for AC are from 200 millivolts to 500 volts, and for DC, from 200

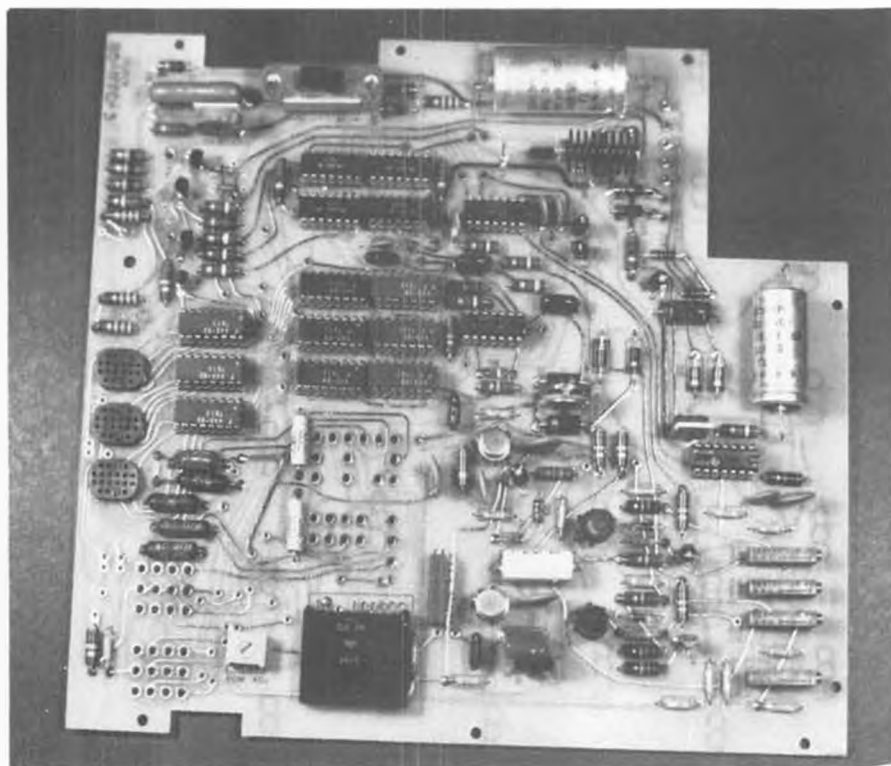
millivolts to 1000 volts. Current ranges are from 200 microamperes to 2 amps. The six resistance ranges are zero ohms to 20 megohms.

The DC ranges all have a high impedance input, so there is no loading of the circuit being tested. The majority of the voltage and current ranges have an illuminated overrange indicator which tells you if you are trying to read a value higher than that for which the instrument is set. Polarity of DC voltages and current is automatically determined and indicated. A decimal point is automatically determined and indicated. A decimal point is automatically located for each range.

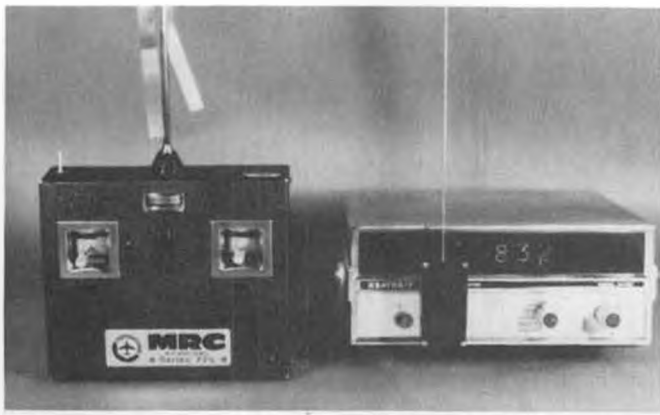
Overload protection is provided by three fuses, one in the incoming AC line, and one each in the volt-ohm input, and the current input line. A 3-wire polarized line cord is used, with the ground wire being connected directly to the chassis for maximum user protection. Dual transformer windings permit the unit to be wired for 120 or 240 volts, 50/60 Hz.

The Multimeter is housed in a low profile metal cabinet 3 inches high, 7 inches wide, and 7.9 inches deep, and it weighs approximately four pounds.

The convenience, versatility and accuracy of this modern instrument makes it a very desirable item for the electronics buff. It is also a worthwhile addition for the serious modeler who owns a number of electronic devices, from R/C systems to fuel pumps. We will attempt to detail some uses which will add to your enjoyment of the hobby; by providing you with added reliability from your equipment, resulting in some financial savings and hopefully, someday,



Business side of the largest of the two printed circuit boards that you must assemble. Just follow the thorough instructions and make that solder FLOW! Pencil iron a must.



The IM-102 with home brew field strength adapter installed. The read-out is relative . . . relative transmitter output.



Testing battery voltage under load. See text for instructions on how to build the variable loader.

saving your favorite airplane.

The Heath Model IM-102 is priced at \$250, possibly a bit high for many of us on a limited hobby budget, but well within the capabilities of any active club. Most clubs have at least one electronics bug who would be happy to assemble the unit and train the members in its use. Not only would the group benefit as mentioned, but it will add to the members' knowledge, and will certainly make the meetings more enjoyable than those spent arguing about the latest AMA rules changes.

Those of you who have previously assembled a Heathkit need no introduction to the excellent and complete instruction manuals. To those of you who haven't, and have reservations about your ability to do so, we feel completely safe in stating that ANYONE who can assemble and operate a kit model plane, boat, or car, can successfully assemble ANY Heathkit product. There is no way we can improve on the instructions provided, and we are not about to try. Suffice to say that the over 100 page manual has chapters on the Parts List, Assembly, Initial Test,

Calibration, Final Assembly, Operation, and a thorough trouble-shooting section in case you work too late some night and build in a problem. Also included are excellent schematics and X-Ray views . . . in short, all you need not only to assemble and test your DVOM, but also to understand its workings completely, if you have some basic electronic knowledge.

We will make only one suggestion, which is also covered in the manual, but we feel is as important as hooking the controls up properly in your latest airplane, which deserves too much, rather than not enough mention. If your last soldering job was a radiator, or the gutters on the house, put aside that equipment, you'll need something else. Even that gun with which you solder a landing gear is not it. Beg, borrow, steal, or break down and buy a small iron, not over 25 watts. It should have a small tip, preferably chisel shaped, and it should be clean at all times. Use only electronic type solder . . . the solder that comes with the kit is excellent, and there is more than enough. You won't need soldering paste of any

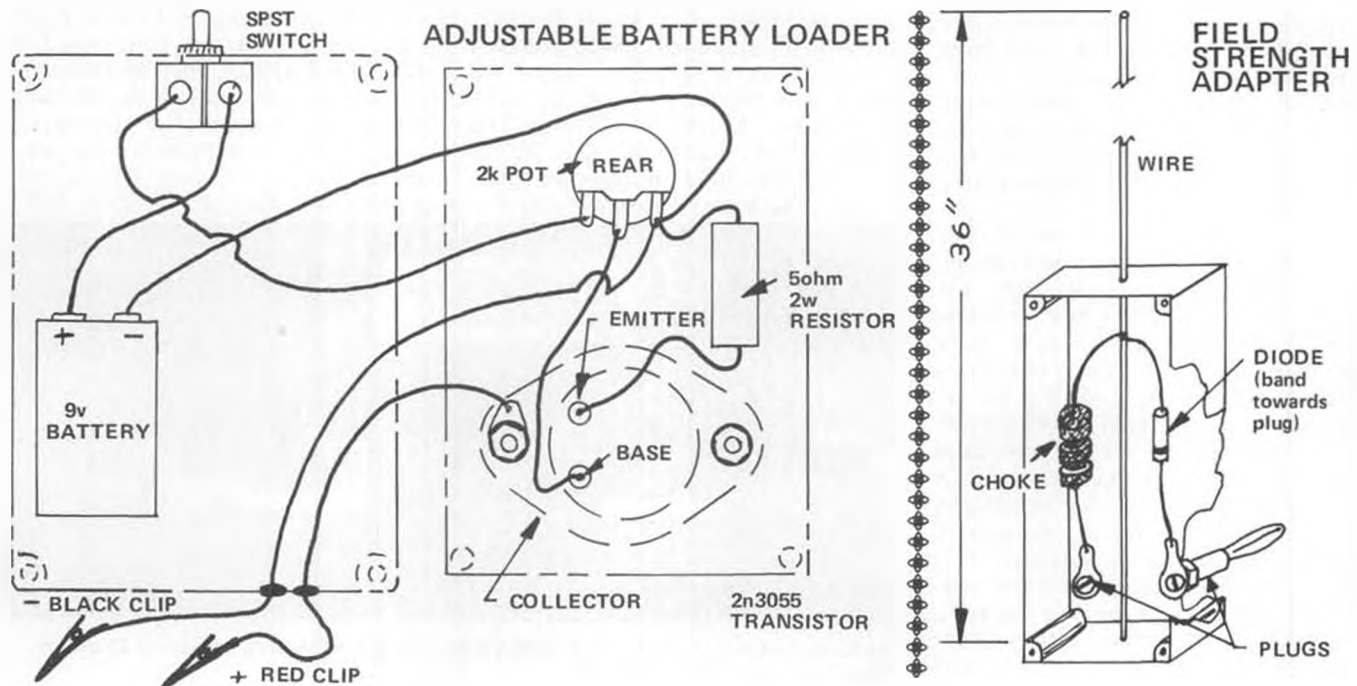
type, but if you are an addict, be sure that what you use is non-corrosive, and be prepared to remove the residue. General rules are; no guns, no big irons, no acid core solder. Neatness counts.

In fact, the guys at Heath have it all together for you . . . in their GH-25 Kitbuilders Tool Set, which includes all the tools you need for this sort of project. A wire stripper, side cutter, long nose pliers, three screwdrivers, five nutdrivers, a nut starter, soldering aid, solder, AND the proper type of soldering iron, all for only \$29.95.

If you have all the other goodies, and need only the iron, Heath has a nice one for \$7.95, their Number GDP-207. A more versatile 3-heat model, with stand and protective cage, is available in kit form as their GH-17A for \$24.95.

We like to clean the printed circuit boards after completion of soldering. With this kit, we did a complete cleaning just before the boards were assembled into the case and a spot cleaning after the final connections were made. We use a stiff-bristled fiber brush, trimmed to

Continued on page 69





Close-up of 5-blade rotor head on George Kruska's Hughes 500 D chopper.



Twin rotor Boeing Vertol 101, built by Horst Nietzel, Cypress, California. Ship is 6 feet long, weighs 13 pounds, and is powered by a single .60 engine. Building time was 700 hours.

CHOPPER CHATTER

By JOHN TUCKER



PHOTOS BY AUTHOR UNLESS NOTED

1977 ANNUAL M.A.C. SHOW

The first week of May is usually a high activity period for the average model builder, particularly when the annual M.A.C. show is in the offing! And this May was no different . . . what a fantastic show! Display models were in abundance, and the main floor was covered with some of the finest scale jobs in the states. I couldn't believe the beautiful finishes that were in evidence . . . they have certainly improved techniques in these past few years, and the products now available make it almost impossible to turn out a bad job.

Although there were quite a few helicopters on display, I was a little disappointed in that they were mostly locally built and very few came from outside the Los Angeles area. I can only conclude that the "bug" hasn't really hit the west coast yet, like it has back east. The star of the chopper show was none other than Charlie Gilbert's little "Baby Ranger". Charlie started on this gem only a month before the M.A.C. show date, but it was destined to be the most outstanding chopper from the beginning. The overall length is somewhere around 39 inches, which really puts it in the "small" class, but it certainly is not small in looks nor performance. The original idea was to provide an alternate fuselage for the Heli-Baby and the Revolution helicopters, but in the end, Charlie has decided to make an adaptation for the Kavan Alouette II also. I wouldn't be a bit surprised if he placed it on the market, complete with his own mechanics, in the near future.

I guess I should mention that the Baby Ranger took first place as best R/C

helicopter in the show. The fiberglass shell is flawless and the dimensions (although a little stubby) are delicately proportioned to achieve an extremely fine looking machine. N18A used the Revolution mechanics with a .40 engine. Flying weight comes to about 7-1/2 lbs., although the Alouette version has been cut down to a shade over 6 lbs.! By the time this article is published, Charlie will have made this body shell available in kit-form for about \$60.00. This price will include 3 sets of drawings, nose section, main body, tail cone, and all windows (vacuum formed to fit). The kit also includes the outlines for all formers used to convert it to the Revolution, Heli-Baby, or Alouette. If you're the least bit interested, I would suggest you place an order early, 'cause it's gonna be a big hit at the flying field. Write direct: Charles H. Gilbert, 2101 Camino Rey, Fullerton, Ca. 92633, Tel. (714) 871-8064 for the latest data.

Now, back to the other entrants.

Second place, sport R/C helicopters, went to Ralph Badham and his yellow Kavan Jet Ranger, with Super Tigre .61 and Futaba Radio. Another first place went to Dr. Richard Smith of La Habra for his Baby Ranger (ala Gilbert body). First place, scratch-built, went to Don Lodge for his Lockheed Cheyenne AH-56A helicopter . . . what a machine; 6 months in the design stage and 15 months in building resulted in an 11 lb. prize winner. A Webra .61 drives a 4-bladed main rotor of 52 inch span and a 4-bladed tail rotor, plus, a 3-bladed pusher prop on the tail cone! You really have to see this one to believe it. Yes, the pusher prop does propel the helicopter in forward flight!

Second place scratch built (stand-off scale) was taken by John Minasian and his Hughes 500D, N74D. A very large helicopter with a 4-bladed, fully articulated rotor. Third place in the same category went to George Kruska with an almost identical Hughes 500D,



The Kavan booth at the MAC Show starred John Tucker's helicopters, and (l to r) Cris Blum, Ziggy Kavan, and John Tucker, Jr.



Charlie Gilbert's "Baby Ranger" took First Place as best R/C helicopter. Can use Graupner, Heli-Baby, or Revolution mechanics.



John Simone, Sr. holds up the .61 size Revolution chopper, by American R/C Helicopters.

except that it featured a 5-bladed articulated rotor! Both were very pretty entries. The final chopper to be judged was a twin rotor Boeing Vertol 101, built by Horst Nietzel of Cypress, O.C. R/C Club. This six foot long chopper weighed in at 13 lbs., and was powered by a single .60 engine. Horst took 700 hours to build it. I didn't have the opportunity to find out if he was given a trophy, but he certainly deserved one for the huge undertaking.

We took color pictures of all the entries, but unfortunately, most of the choppers blended into the background too much and probably won't reproduce for the magazine. Right about here, I expect an Editor's note telling me that I should know better than to shoot color for magazine articles . . . and I do know

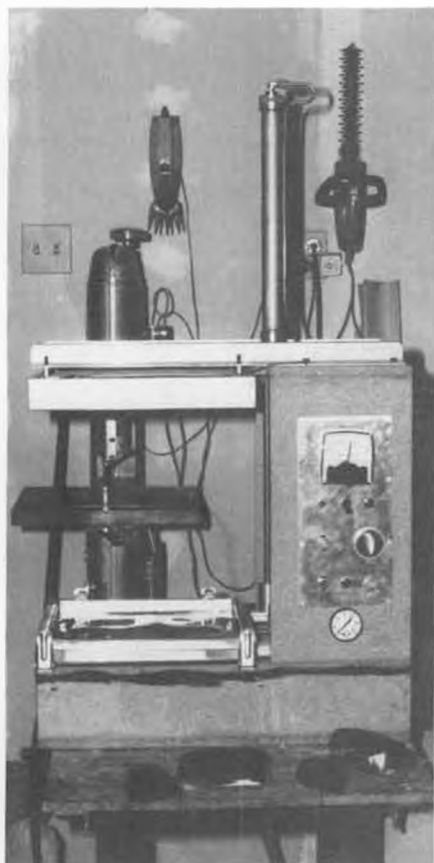


The new "Gazelle" helicopter to be available soon from American R/C Helicopters. Note "Fenestron" tail rotor.

better . . . sorry Bill, I won't do it again!
(If you're hinting for an extra camera for shooting black-and-white, forget it! wcn)

VACUUM FORMING MACHINE

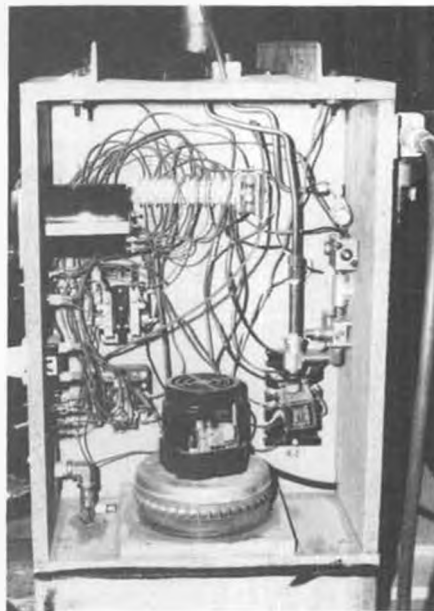
Since this is Charlie Gilbert's month in the box, let me tell you about his latest project, a home-built, precision and automatic vacuum forming machine. In making up the design for his Baby Ranger, he immediately recognized the need for such a machine to form the complicated windshields out of plexiglas, so he designed and built his own. Now this gadget is really a professional unit; about all you have to do is clamp in a sheet of plastic, arrange the plugs



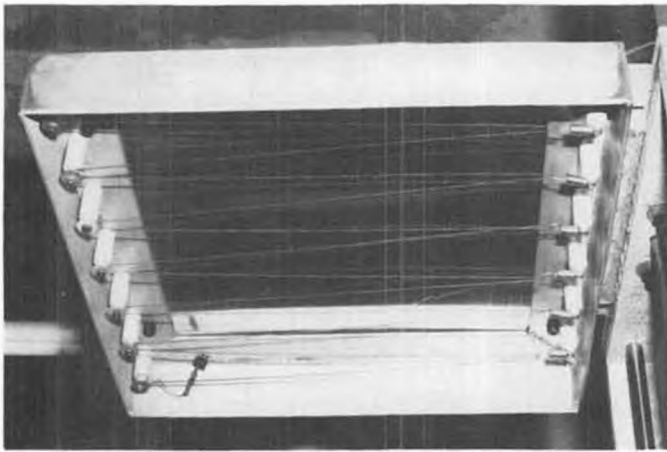
Charlie Gilbert's home brew automatic vacuum forming machine.



Close-up of control panel, with timer and heat controls. Plans available.



Rear view of mold box, with wiring and vacuum motor. Worth \$15 to see how he did it!



Overhead heating element in Charlie Gilbert's homemade automatic vacuum molding machine.



Finished "Baby Ranger" windows about ready to come out of the vacuum molder.



Charlie removing molding plugs from tray. Windows are still in the frame.



Another shot of Charlie Gilbert's "Baby Ranger". Designed to use various manufactured mechanics, kits will be available shortly. See text for more information.

Hughes 500 with a Kavan system collective pitch adaptation, also another helicopter builder's work-shop review (probably Gilberts!), and an Alouette II conversion to the Baby Ranger body.

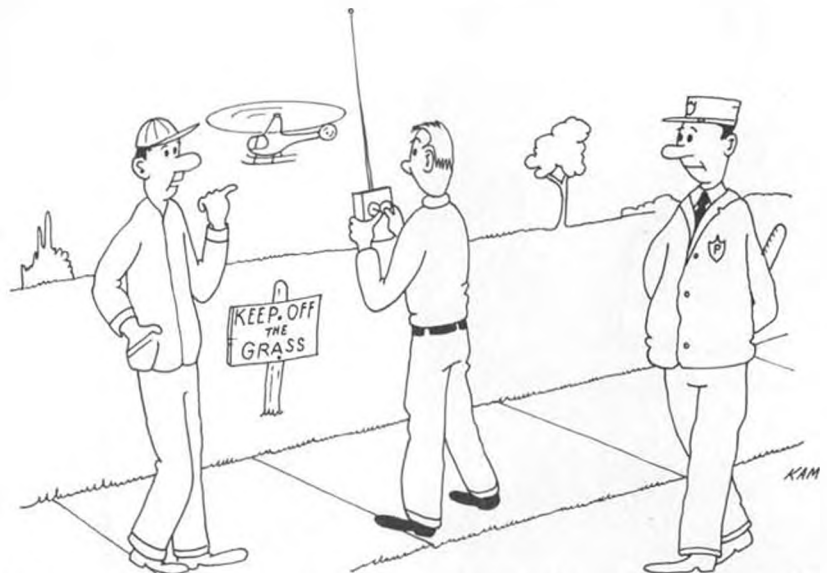
years one of the best engine men in the country. This fuel will be available very soon on the dealers shelves and will be distributed by Carl Goldberg Models, Inc. All I'm going to say now is that it's *different* than anything you've ever tried . . . and that it's *great* for helicopters! More next month when I finish my sample gallon in the Jet Ranger. BCNU next month. ●

on the work table and turn it on. From that point, the heater element turns on for a pre-set temperature and time, an air-driven piston drives the plastic sheet holder downward over the plugs, the vacuum turns on and draws the plastic over the plugs until they are set, then the whole thing turns off. All that remains for the operator to do is to remove the finished product and start over. Oh yes, it can be operated in the manual mode if you don't trust all those timers, gadgets and gimmicks! Charlie sez it can be built for approximately \$200 for the fully automatic version, and considerably less for a manually operated unit. He will be happy to send you a complete set of plans and instructions for building either model for \$10 or \$15. You'd better contact him for the correct price and details. The photos should give you a good idea of how it works, and what it looks like.

FINAL APPROACH

Well guys, that's about it for another month. Coming up in the next few issues will be a review of the Kalt

I will also have a report on that fantastic new fuel "Magnum Power" developed by George Aldrich, designer of the classic "Nobler" and in recent



I HOPE YOU'R KEEPING ACCURATE TRACK OF YOUR FUEL SUPPLY!



The scene is Rosemont Dry Lake, 1945. A bunch of the boys out for some sport flying. (l to r) Gus Edwards with highly modified Musketeer, Bill Culbrith with an American Ace, E. J. "Joe" Weathers and 12 ft. Westerner, Henry Myers (Stigelmier) original, and Lee Norcross, Pacer C.



PLUG SPARKS

By JOHN POND

• Despite the variable weather, fourteen hardy souls entered the SAM 21 Annual .020 Replica R/C Meet this year held at "Hill Country", Morgan Hill, May 1. As Jack Jella, sponsor of the meet, remarked during the presentation of trophies, "It is remarkable the improvement and sophistication the .020 Replica models have undergone in the last two years."

Actually, the boys weren't quite that brave, as it wasn't until ten o'clock that Contest Director Pond finally gave the go-ahead signal to start the contest. Originally scheduled to operate on the round system (to eliminate some of the sandbagging by the hot shots), all flights were rescheduled with two flights being required by one o'clock.

One of the first off, SAM 21 President, Don Bekins, discovered the rain that had fallen, was being re-evaporated into the air, giving some fantastic lift. This immediately galvanized other modelers into flying. The first round found at least six "max" flights turned in. A maximum flight time at this meet was defined as four minutes with an added 50 points for hitting the spot landing circle.

Rules as developed during the past two years specify only one-and-a-half cubic centimeters of the fuel provided by the contest director (generally Cox Red Can that is fast disappearing). All models must rise off ground. No exceptions! This rule has really separated the men from the boys, even when takeoff boards are provided. The contestant is given six attempts to make three official flights.

The number of attempts was found necessary, as any model ground looping on takeoff could not be restarted again

with an assurance of a good motor run, inasmuch as much as half of the fuel allotment would be used in starting and releasing the model. Most entrants would simply void the flight and re-gas with that precious amount of fuel.

Several scratch-built .020 Replica designs showed up, notably Barnett Kernoff (Tyro Models) with his junior version of the Playboy Junior. Surprisingly, with 200 square inches, this model flew and glided beautifully. Inspection of his engine revealed that it had been converted to Schnuerle type porting by Jim Gerard, a good engine man himself. What really rubbed salt in the wounds was that despite the thousand rpm increase, economy of fuel was still about the same! Guess what Jim is going to be doing for the other boys with their .020 engines. Never fails, someone always builds a better mousetrap.

In addition, Kernoff used the new Cannon mini-set, using two channels to control the model. However, fellows

such as Bob Lee were still using the Ace R/C Pulse Rudder single channel sets with excellent results. As a matter of fact, this was the first annual at which Lee has been beaten. His string of victories by his lightweight So Long is something to be considered in real competition.

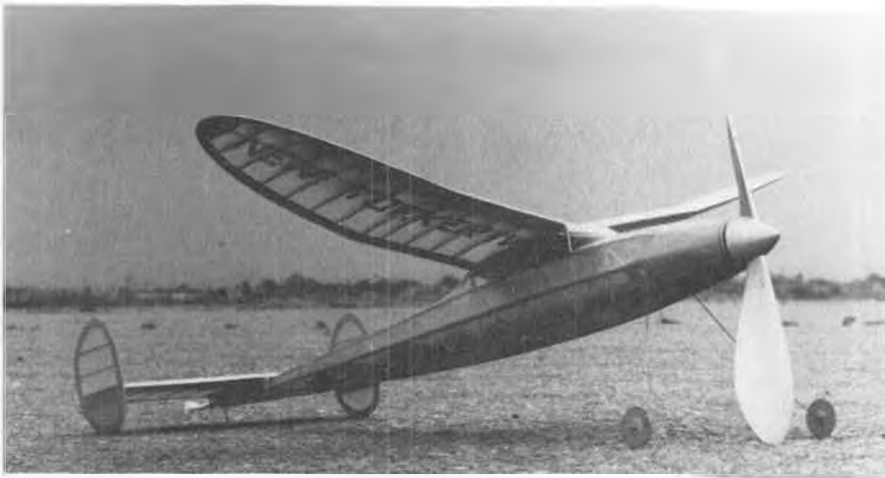
A real surprise developed at this Annual as Don Bekins, generally a strong contender, was way down on the list. His protege, Dick Hyde, did real good, on the other hand. Actually, the contest had been won by Barnett Kernoff but the Contest Director was prevailed on to give Hyde his last flight after closing time. The major reason for this was that Hyde had been shagging Kernoff's model in the strong 20-25 wind that had developed in the afternoon.

Wouldn't you know it! Just as soon as C.D. Pond bowed to popular demand to extend one more flight to Hyde, the wind died and the weather became fantastic for the next half hour. Needless to say, Hyde nosed out Barnett to win first. Kernoff, of course, was quite disappointed, as he was so hoping to announce his new .020 Replica R/C Playboy Jr. kit as a winner of the SAM 21 Annual. Well, that'll teach you to get big hearted, Barney!

Regardless of the foregoing, it now appears that Tyro Models will shortly announce production of this fine flying



Hank Scally, SAM 21 Veep, likes .020 R/C Replicas. This time it's an American Ace.



Tool box eye's view of Frank Colver's "New Yorker IV", designed by Frank Zaic and flown at the 1938 Nats to win Stout Trophy. See more on pages 26 and 27.



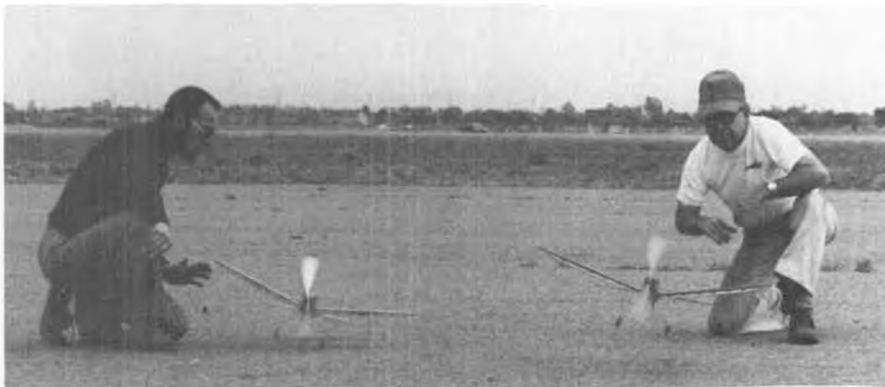
Another view of sleek New Yorker ship. Missed attempt at making Wakefield team due to unfortunate accident on ground. Colver's version is beautiful flyer.

model. At present, no plans are being made to produce the three-quarter size Viking developed last year.

Very few fellows went home this time without a prize, as Jack Jella and the C.D. were able to hustle up enough trophies and prizes for most everyone. Unique trophies given by Jella, consisted of silver serving trays mounted edgewise in a suitable stained block.

Momma is going to like the practicability of these types of trophies. Those silver trays will be in place for serving of niblets, hors d'ouerves, etc. In all probability, this may set a standard for SAM 21 future contests. One thing for sure, you can finally make points with Momma when you win a place at a SAM 21 contest!

Well, we've gabbed on long enough



"Lemme outa here!" Two Stahl "Hurricanes" flown by Hal Cover (left) and Jim Adams, about to "blow" at the cameraman. We'll be publishing this one in the future, from Flying Aces mag.

about the flying (which was excellent), but didn't mention that C.D. Pond provided the boys with considerable amusement when his glider drifted into the buffalo pen. Unfortunately, Momma buffalo had just calved only a half-hour ago, and was very nervous about her young. So unlike "Buffalo Roy" Edwards of last year, Pond decided not to enter the compound and patiently watched Poppa Buffalo stomp the errant glider (got it back the next day . . . junk!)

Thought we'd give you the results to tenth to show you what the boys are flying and the close competition:

	Points
1. Dick Hyde (Strato Streak)	713
2. Barnet Kernoff (Playboy Jr.)	697
3. Bob Lee (So Long)	602
4. Laurence Bekins (Thermal Thumber)	571
5. Bill Squire (Playboy)	569
6. Karl Tulp (Clipper II)	547
7. Ted Kafer (Bombshell)	502
8. Tom Bristol (Bombshell)	481
9. Don Bekins (Playboy)	476
10. Ed Solenberger (Viking)	463

MOTOR OF THE MONTH

This month's motor is the Brown Model E, commonly called the "Brownie". This was the last motor manufactured by Junior Motors Corp.

The Brown Model E was conceived as an answer to the extremely popular Ohlsson 23, as manufactured by Ohlsson & Rice. With production figures running over 50,000, E.J. Roberts decided it was time for his company to try and cash in on the exploding small engine market.

Attractively priced at \$7.50, the Junior Motors Company had high hopes for large sales. Such was not to be, as Bill Brown, employed at that time only as a consultant, warned against rushing an unproved motor into production.

Initially the engine sales were good, but as the modelers tried for performance it was then obvious the engine fell far below its estimated capabilities. The hoped-for shot-in-the-arm sales from



"Fancy meeting you here!" The Hurricanes look each other over at about 300 feet.

the Brownie engine failed to materialize, and the whole line of engines suffered accordingly.

Actually, the Brownie was a .29 size cu. in. displacement, despite its small appearance. The manifolds and crankcase were cast as one piece, with a built-in streamlined exhaust stack. According to advertisements of that day, the one piece steel cylinder embodied a locking device whereby register between port openings and the crankcase manifold is automatically secured.

The crankshaft was made of chrome-moly steel, drop forged, heat treated, and ground to size. The main bearing surface in the crankcase was broached and burnished. The timer (where trouble developed) had so-called "pressed" contact points rather than sprung. It was alleged this system eliminated carburizing or pitting of the face of the tungsten points. Needless to say, problems immediately developed.

For the technically minded, the Brownie featured a bore of .770, stroke .625, which gave this three-port engine a 1/7 hp. rating at 5200 rpm, employing a 10 in. dia. 7 inch pitch propeller. Fuel mixture was the same as recommended for all Brown Jr. engines; three parts of low test (white) gasoline to one part of SAE 70 wt. oil.

THE "GREAT" ENGINE CONTROVERSY

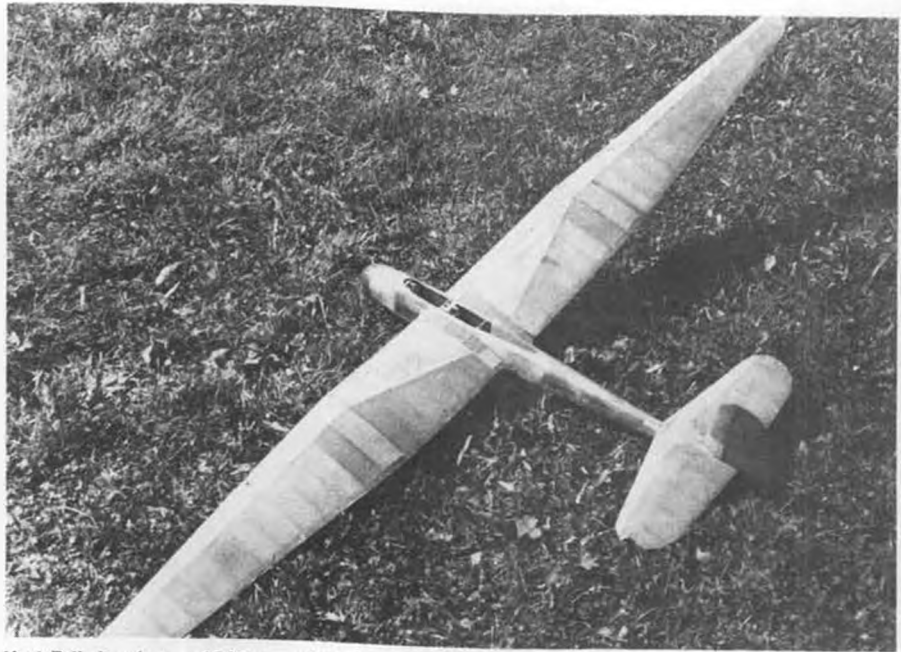
Up to now, the columnist has refrained from making any comments, pro or con, in this column, primarily to avoid using the magazine as a sounding board.

Amazingly (to this writer anyway), Al Hellman, Chairman of the Engine Conversion Rules Committee, and his 16 members, have come up with a series of rules and recommendations on converted ignition engines to be voted on. What be met and results presented. All due credit to Al Hellman for his chairmanship and patient disregard for unwarranted harassment and sniping.

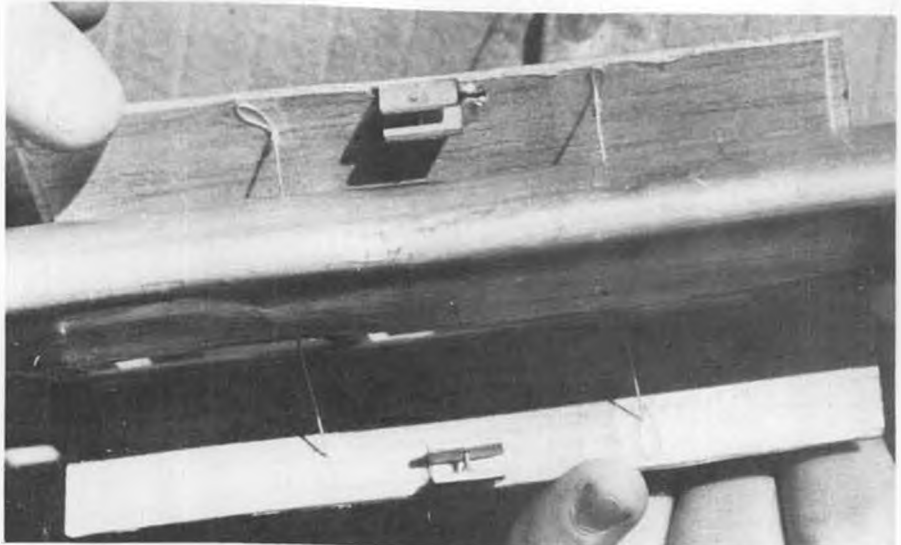
Regardless of how anyone feels about the present rules as presented in SAM Speaks, everyone should vote. Maybe the rules aren't perfect, but you have to start someplace. If the rules are approved (as the present trend appears to indicate) this will give the members a point to start from in possible refinement of the rules. Hurray! We finally got something done!!

For the benefit of the uninitiated, those who are not S.A.M. members, and do not receive "SAM Speaks", the official SAM publication, a series of proposals have been advanced by the surprises the writer is that with fellows such as Bob Hunter (real hot dog) and Danny Shields (strictly a traditionalist) on the committee, that agreement could Engine Conversion Rules Committee. According to Tim Banaszak, the Secty. Treas. of SAM, it appears from the early

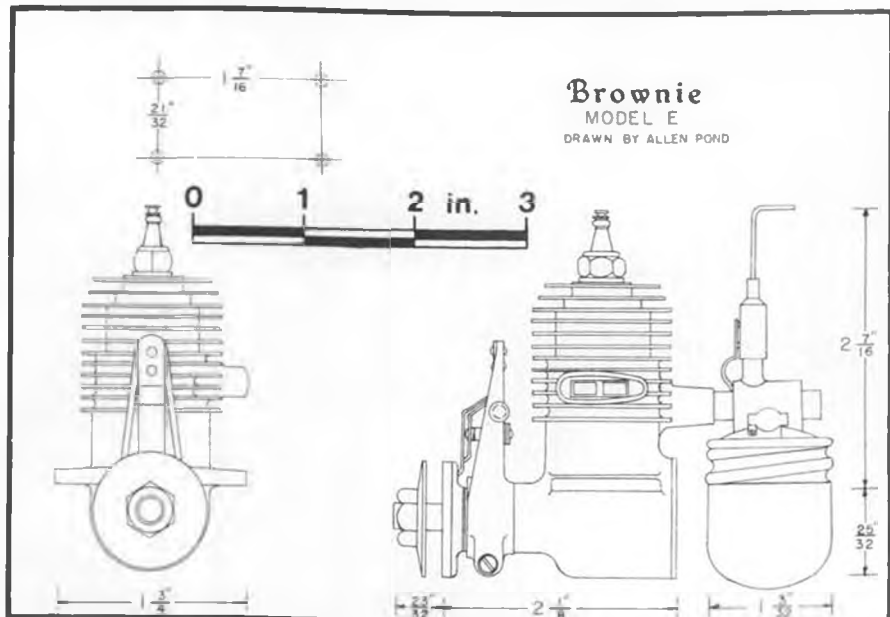
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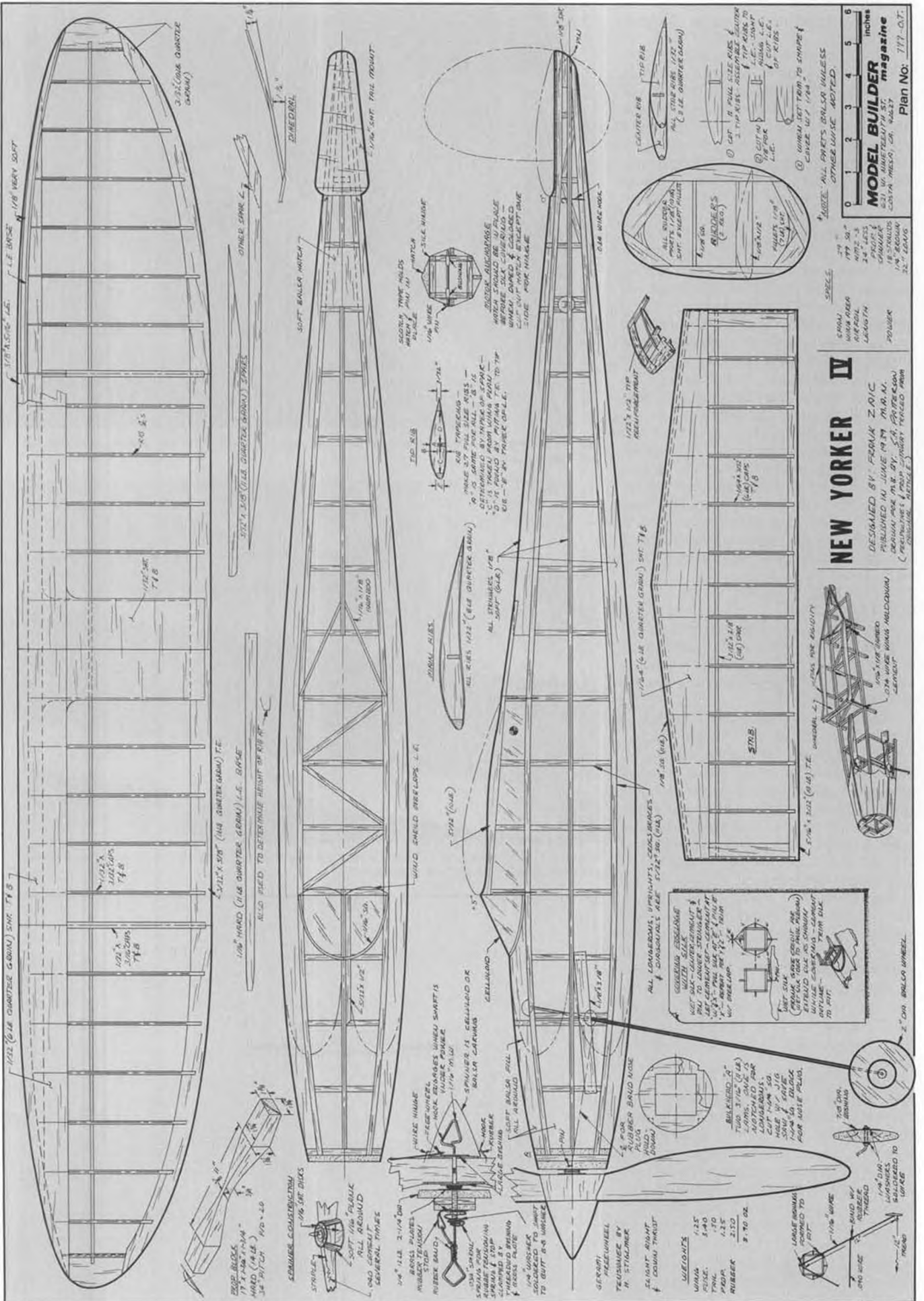


Karl-Erik Landegren 1942 record holding "Kranich" glider. Timer for spoilers is visible and still operates!



Closeup of the spoilers in the Landegren "Kranich" glider. Note that they are hinged at the aft edge, making them "self-energizing".





NEW YORKER IV
 DESIGNED BY: FRANK ZAJIC
 PUBLISHED IN JUNE 1979 M.B.M.
 DRAWING FOR THE BY: S.A. PATRICKSON
 (FURNISHES A PROSPERITY PRICED PLAN INCLUDING MATERIALS)

SCALE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.

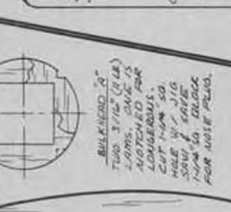
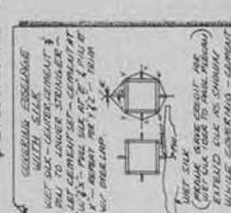
INCHES	MILLIMETERS
0	0
1	25.4
2	50.8
3	76.2
4	101.6
5	127.0
6	152.4

MODEL BUILDER
 831 W. BURETTELL ST.
 COSTA MESA, CA 92627

Plan No: 717-D7

WET SUE
 (SEE NOTE ON P. 104)
 WET SUE IS A TRADE NAME FOR A TYPE OF BALSA WHICH IS EXTREMELY SOFT AND EASY TO CUT. IT IS NOT SUITABLE FOR USE IN THE MAIN PARTS OF THE BOAT BUT IS USEFUL FOR THE MAST AND RIGGING.

CONSTRUCTION
 1. CUT OUT ALL PARTS FROM THE PLANS.
 2. SAND ALL PARTS TO REMOVE BURRS.
 3. ASSEMBLE THE BOAT AS SHOWN IN THE PLANS.
 4. USE A BRUSH TO APPLY THE FINISH COAT TO THE HULL AND DECK.



GENERAL INSTRUCTIONS
 1. CUT OUT ALL PARTS FROM THE PLANS.
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 1. CUT OUT ALL PARTS FROM THE PLANS.
 2. SAND ALL PARTS TO REMOVE BURRS.
 3. ASSEMBLE THE BOAT AS SHOWN IN THE PLANS.
 4. USE A BRUSH TO APPLY THE FINISH COAT TO THE HULL AND DECK.



Hal Cover holds aloft his version of Frank Zaic's "New Yorker IV", as the big free-wheeling prop spins away merrily.



"Up, up, and away!" In spite of 18 strands of 1/4 Pirelli, the high pitch prop only allows a moderate climb. Still . . .

OLD TIMER Model of the Month

FRANK ZAIC'S 'NEW YORKER IV'

Text by: Bill Northrop

Redrawn by: Al Patterson

• A new record of 17 minutes, 6.2 seconds was established for the Stout Trophy at the 1938 Nationals. The plane that did it was the "New Yorker IV", and the designer/flyer who did it was Frank Zaic, not exactly an unknown figure in the world of model aircraft . . . then or now.

As with any competition free flight model, the design is only as good as the thermal you get it into, and in this case, the New Yorker caught the fringes of two thermals and completed its flight inside the field. Frank gave credit to another well-known name in modeling for getting him launched just in time . . . Dick Everett.

The model shown on the cover with Frank, and in the pictures on this page, was built by still another well-known competition flier, Hal Cover. The plans, as redrawn herein, were published in the June 1939 issue of M.A.N. (Comet Zipper, \$3.95; Brown Model D, \$12.50;

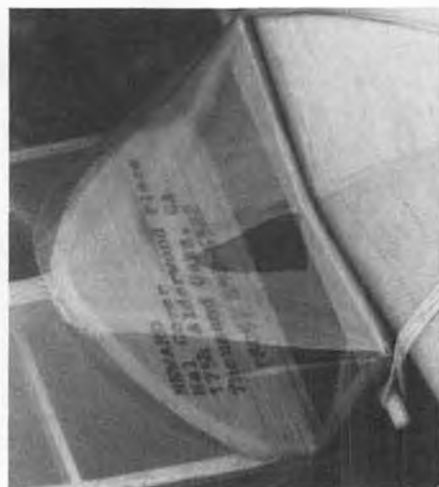
1/8 x 3 x 36 inch sheet, 10 cents!).

As can be seen in the photos, Hal made only a few changes from the original design, primarily in adding diagonal bracing to the fuselage structure. He even carved a prop from the same block dimensions, though he feels that the extremely high pitch absorbs a lot of the rubber motor's power. The original model used 18 strands of 1/4 flat

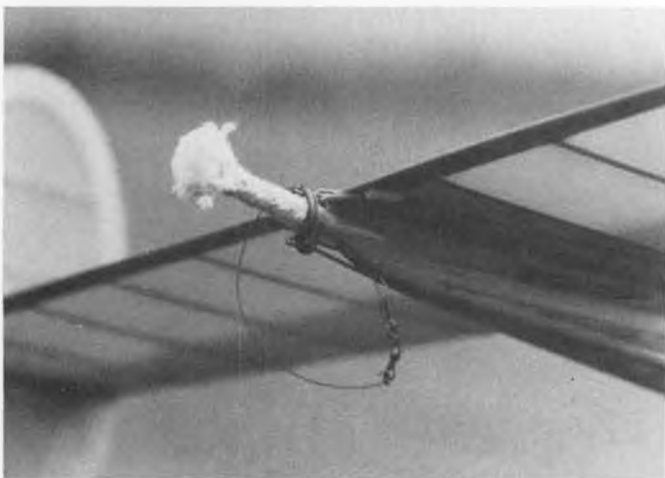
brown, while Hal uses 16 strands of 1/4 flat Pirelli . . . which is even more powerful. One advantage of the high pitch, however, is that the prop free-wheels easily and offers little resistance during the glide portion of flight. •



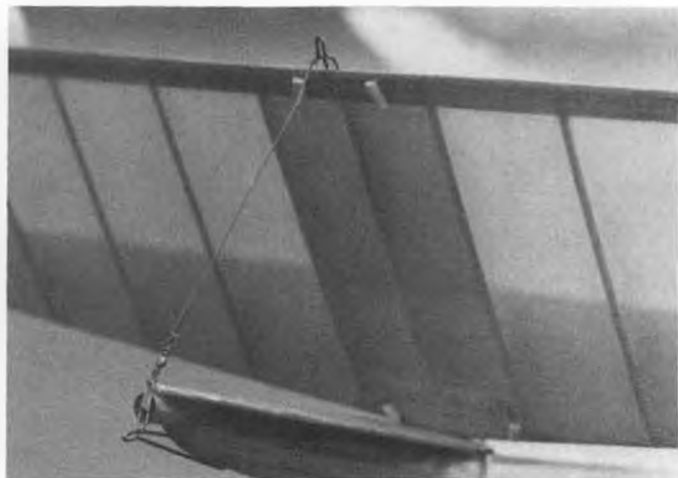
Bobbin and rubber tensioner latch show up well in this close-in photo. Wind without prop.



Close-up of revised, and simpler, windshield attachment. Good place for identification.



Tail construction adapts easily to modern DT system. Stop wire and snuffer tube show up well.



With the DT popped, you can see the all-important alignment half-dowels. No good free flight should be without them!



Formula I winners at the Chicago Pylon Club Champs, Oct. 2 & 3, (l to r): Bill Pries 1st, Bill Weesner 2nd, Jim Gager (Who?) 3rd, Allen Booth 4th, and Steve Metzger 5th.



Bill Hager, with his Ohio Pylon Racing Assoc. Trophy for High Point Totals for Formula I in 1976. See text for more.

PYLON

**"GO FAST AND
Turn Left!"**

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

● Boy, has it been quiet this past month. With Toledo over, *and* the first race we'll be able to attend still two weeks away, *and* heavy rains on and off for the past several weeks, it's really been a bummer. Did have one exciting incident when we put our new light-weight radio in last year's Form I. Seems it was just enough difference to change the C.G. to slightly tail-heavy. First Form I racer I've had that snap rolled when given full up elevator. Let this be a word to the wise.

BIG ART'S MODELS LR1A-QM

. . . A Report

We've tantalized you with tidbits of

information about this kit long enough, and as it's been completed and test flown, it's time to finish it off (the article, not the plane). As we mentioned earlier, the kit goes together very easily, and it really shouldn't take more than a week of evenings or a good two-day weekend to wind up with a completed, competitive airplane.

We purchased a basic kit consisting of the fiberglass fuselage and wheel pants, foam wing cores and cut-to-size plywood parts, as we prefer to select our own wood for wing sheeting and stabilizer parts. We should have bought the formed landing gear and machined aluminum

wheels though, as we'll point out later. WING ASSEMBLY

Prior to skinning the wings, I lay the cores back-to-back and cut out the aileron servo area and line the sides with hard 1/16 balsa. After the wing is skinned and covered with glass cloth and polyester resin, you can then neatly cut out the top wing skin where the servo cut-out area is to be; saves problems later.

We deviated from our standard building procedure in an effort to obtain an even lighter airplane, but suffered for this later. Our normal wing skinning operation calls for allowing the wing skins to overhang the trailing edge by a 1/2 inch and then gluing the top and bottom skins together with slow-drying epoxy while being held flat against a smooth flat surface. This helps keep warps out of the T.E. and gives added stiffness to what becomes a fragile area after the T.E. is sanded to a razor-sharp edge.



Q-M winners at Chicago Pylon Club Champs, (l to r) Floyd (The Flash) Fitzgerald 1st, Jim Gager (Again?) 2nd, and Dave Sears 3rd.



The columnist's good buddy, Allen Booth, with his version of Jack Stafford's Q-M Brown Racer.



Chicago Pylon Club's 1976 Formula I champ, Bill Pries, from St. Louis, Missouri.

Well, as we said, this time we went about it a little differently and contact cemented the top and bottom skins together. No problems with warps and nothing bad happened until we got ready to paint. Apparently we sanded through the fiberglass cloth that was wrapped around the T.E. in the process of finishing the wing. A change in humidity or the solvent in the paint caused the contact cement that was exposed at the T.E. to dissolve, and the wing-skins parted company. At this point, the possibility of ruining a potentially good finish really disturbed me. Not wanting to lose time epoxying the skins together and having to re-sand, we got out the "Hot Stuff" and while squeezing the skins together, carefully glued them back together. Yeah, I know, cyanoacrylates dissolve foam, but at this point I had nothing more to lose and the results seem to have worked.

We've taken to using 3/32 diameter welding rod for our torque rods and use a 4-40 die to thread the one end to accept a Rocket City aileron horn fitting. The nice thing about the welding rod is the 36 inch length it comes in, and the fact that it is of the proper stiffness to resist "torqueing" as piano wire does. A quarter-inch wide slot is cut out in the bottom wing skins and the foam is then hollowed out to allow the installation of the brass tubing used as aileron bearings. Five-minute epoxy

is used to glue in the torque rod assembly and at the same time the piece of wing skin is replaced. Any low spots can be filled with micro-balloons and polyester resin; mix the resin with the maximum amount of hardener to ensure the polyester curing over the epoxy.

Be sure to put an extra piece of at least 2 oz. fiberglass cloth over the top and bottom of the center section.

FUSELAGE

The fuse requires very little work to get ready. The lap joint "Big Art's" used eliminates the low spots and pin holes that seem to be common to the majority of Q-M kits available. Merely sand this joint down to the level of the fuselage and go on to the next step.

"Big Art's" has eliminated some work around the vertical stabilizer and rudder by molding them into the fuse. It's your option whether you want to cut the rudder part free and hook it up to its own servo or interconnect it with the aileron servo so that when you apply left aileron you get right rudder. This is supposed to keep the nose up during left pylon turns. We've never tried it, but from what we've read and seen, it does work. You should hook it up so that right aileron does not give you left rudder, but remains in neutral. Or, you can do like some braver souls and not use any rudder at all, and just leave the vertical tail all one piece and inoperable. This could also save you the weight of one servo. Only problem we can see with this approach is that in a severe crosswind you might have a problem to maintaining directional control. We elected to cut the fiberglass rudder loose and make one up from balsa wood. Strictly personal preference.

"Big Art's" has saved us some work at the front end too. They've molded a depression into the fuse to allow clearance for the exhaust extractor now common to Q-M racing engines. The firewall has also been cut to fit closely around this depression, again saving some time and effort. Get ready to install the engine by cutting the cowl down to the approximate finished size and trace the outline directly on the



Chicago Pylon Club's 1976 Q-M High Point Champion, Dennis Bielick.

fuselage. Mount the engine to the motor mount and hold it next to the fuselage in the approximate position it will go and mark the location of the firewall on the fuselage. Use your Dremel tool with its carbide cutting wheel and cut undersize to the lines you've drawn.

Slip the motor mount and engine into the opening, place a plywood spacer ring 1/32 to 1/16 thick (slightly smaller in diameter than the spinner) on the motor shaft; install the spinner. Line up the engine so there is no side, down, or up thrust visible. By keeping slight pressure against the spinner you can keep it from losing alignment. Plastic electrical tape pulled over the spinner and down

Continued on page 81



"Don't fire 'till you see . . ." Young Allen Gager shows off low frontal area of Big Art's Models' Q-M LR1A.



Comparing plan forms. Big Art's LR1A on the left, and Pro Model Product's Li'l Toni on the right. Allen Gager does the holding.



Big Art's Models Q-M LR1A with "fawncy" scallop paint job on the wing. Jim's product review of the kit is in this month's text.



Rod Carr's scratch-built TRACER is the MACH II design by Adrian Brewer, father of the SONIC BOOM, and SOUND EFFECT. The overall length (LOA) is 66.5 inches, a sailmaker's delight!

STRICTLY SAIL

By ROD CARR

• I hope that it was obvious from May's discussion that good mast shape is something to be eagerly sought. There are bad sails, but my experience has shown for every bad sail you see, it is outnumbered 10 to 1 by bad masts. Bad masts arise from many causes. As we discussed last month, the very grain which gives wood its strength is often the cause of warps and twists which make wooden masts worthless. But a reasonable effort can pick and choose wooden materials to make good masts. As I also pointed out, there are other mast materials to be considered, such as fiberglass and aluminum.

Assuming that we now have a spar that meets our primary criteria of being straight when unsupported by stays, and assuming a regular bend when under backstay tension, what can be done to maintain the integrity of the spar? The most important single item is to drill as few holes in the spar as possible. Everybody has had experience tearing toilet paper off rolls. Regardless of all the poor jokes about it tearing everywhere but at the perforations, a mast with a hole drilled through it has been seriously weakened. Worse than the risk of total failure, is the chance that the thing won't break. For the longer it holds together, the longer you will continue to sail with it, and the worse your mains'l shape will be. The boat will move, but not well. You'll swear that

your sailmaker socked it to you, and you will be completely wrong.

The loss of a wooden mast during a race is sad, replacement is not too costly. Sometimes, repairs can be effected. But an aluminum spar will never straighten out, and can be only cut up into lengths suitable for booms. In either case, failure will lead to a DNF, and go a long way toward spoiling your day.

Either avoid drilling any holes in the body of the spar, or drill the absolute minimum and make them as small as possible. Let's concentrate on the aluminum extrusions that I'm partial too, but the comments will be applicable to spars of any material. As of this writing, I know of no source for these kinds of fittings, though a couple of places are supposed to be working on them. John Reynolds has sent me a set of prototype fittings that he is considering manufacturing. By the time you read this they may well be available. I would suggest that you get direct information from John at Reynolds Mfg., 3010 Chris Lane, Orlando, Florida 32806. Since I suspect the production fittings will adhere to the same standard of quality as the Goldspar, they will be well worth whatever investment is required.

FITTING PLACEMENT: I field a number of inquiries about the proper placing of fittings on the mast. There are small changes to be brought about by the class rules in different boats, but the

general configuration is shown in Figure 1. The only major departures may be in the J and A classes, where the sheer size of the sails requires double spreaders and maybe two sets of lower shrouds. The special requirements of those two classes will wait for a later column. Suffice it to say that I have used the rigging in Figure 1 for all normal rigs up to an 84 inch tall 50/800 rig with which I won the Richmond 1976 Pumpkin Regatta, so I know it works.



The author's "A" Class "TRACER", weighs 39.8 lbs, carries 1600 sq. in. of sail.

The decision to terminate the side shrouds at the jenny strut is based on the desire to have the head of the mast lever off to leeward under wind pressure. This will push the mid-body of the mast to weather and open the slot between the jib leech and the main luff. It is shown in an exaggerated way by the dotted line in Figure 1, assuming that the wind is coming from the right. If the side stays run all the way to the mast head it will make the mast head hard to move under backstay tension adjustments, and it will remove the automatic puff relief one gets when the mast head can bend off to leeward during the peak of a gust. The side view shows a jib swivel on the forward end of the jib club, though I'm on record in favor of the radial job fitting arrangement.

FITTINGS: Starting at the mast head, we immediately run into the only two holes that I drill in a mast. Both of them are used to hold the masthead crane in position. Figure 2 shows the arrangement in an exploded view for an aluminum extrusion. The crane serves three functions:

- attachment point for the backstay
- attachment point for the jenny stays
- attachment point for the mains'l halyard

The crane is made from 1/16 aluminum. It counts as part of the mast, so be sure that it is mounted in such a way that it doesn't make the mast too high. I usually put brass grommets in the holes so that a larger, rounded bearing surface is available. This is not to protect the stainless stay wire, but to keep the plastic covering on the staywire from getting cut through. Once that covering goes, there are potential troubles with the swaging sleeves that are holding the loop in the head.

The attachment of the backstay is straightforward. It is just a loop and associated swaging sleeving. The end of the backstay down by the transom should be terminated the same way, just a loop. In that way, when you transport your rig, there is little to snag and create a rat's nest of lines. The hook is attached to a bowsered loop of 45 pound squidding line and stays with the hull.

The mains'l halyard is really just a loop of staywire that keeps the main head near the crane. Adjustment to main luff tension is made by a downhaul at the foot of the sail. The taller rigs that are becoming common require "Wilt-the-Stilt" to reach the halyard, so it may as well not require adjustment.

The jenny stays are a single chunk of staywire that is fixed at the spreader mounting. They pass through a grommeted hole in the forward end of the mast crane. Adjustment is by sliding a loop of squidding line down the jennys. Since they run freely through the crane, the tension is self-equalizing and symmetrical. For all of you who are



Tracey Carr, the author's 2-year old daughter, points out the nifty striping job on Pop's big yellow creation that borrowed her name. Hull is pine planking over frames, glass cloth inside.

still strung out on saving weight, it eliminates two swaging sleeves and two turnbuckles.

The through bolts are 2-56 and seem to do the job admirably.

Next down the mast we come to the jenny strut mount. It is made from 1/4 inch aluminum which has been drilled and filed to be a slide fit over the mast.

It is "C" shaped to allow the sail to exit from the slot on the aft side of the mast. Holes for shroud and stay terminations are drilled, and the jenny strut is made from 1/8 or 3/32 rod or tube and epoxied in place. When you are ready, epoxy the mount to the mast, making sure to rough the mast up well to allow a good "bite" and "tooth" for the adhesive. While it can be moved, I highly recommend getting it right the

first time!!!!

In Figure 3, we see the same kind of a mount, only this time it holds the spreader. I've started using the airfoil shaped aluminum tubing which fits over 1/8 inch stub spreaders which protrude from the mount about 2 inches. In this way, the mast makes a more easily-carried package when put into a car.

Now we come to the gooseneck mount and vang mount. These I have elected to make easily removable. The reason is that the masthead crane is usually a good strong force fit between those maple blocks, and the only way to remove the sail from the spar is to pull it out the bottom. Figure 5 gives the details. When making the gooseneck mount and the vang mount, drill the line of holes with the two slid on a short chunk of mast and clamped together.



TRACER's nimbleness shows in this 90 degree turn to starboard. Note the small wake.

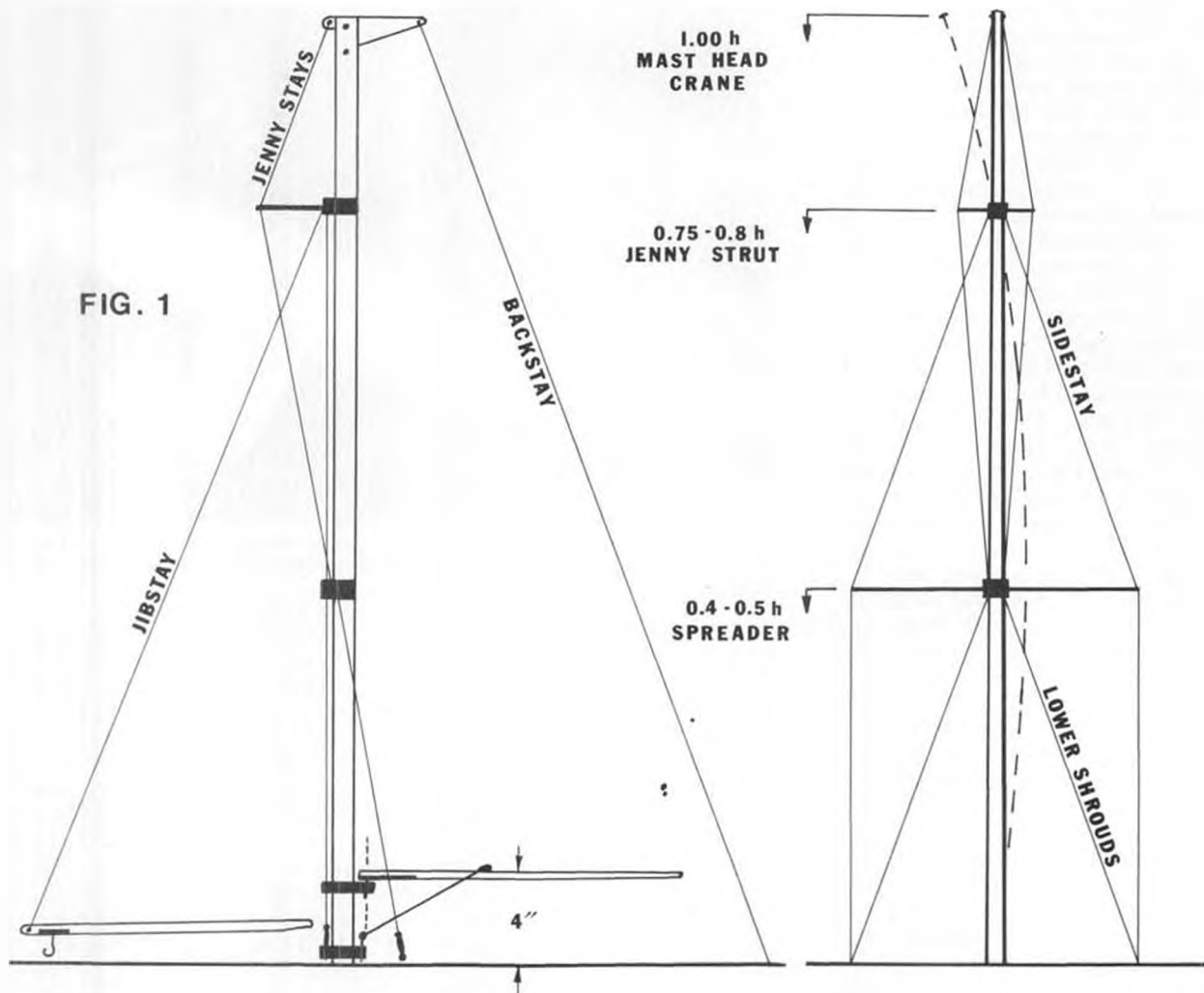


FIG. 1

This will insure that as the main boom rotates, the vang will follow it smoothly. Both are rotating about the same hinge line. The reason for the series of holes, is to allow the mainsail foot to develop more camber as one falls away from a closehauled setting. I make about 1-1/2 to 2 inches of total movement, as I want to have plenty of room to experiment. The small hole in the gooseneck mount is for the downward passage of your main luff downhaul. The method of rigging this downhaul is shown in Figure 6. Note that there is a corresponding hole in the vang mount. This puts the adjustment right down near the deck where you are while setting up turnbuckles. I hope that it will encourage more skippers to slack off this tension when they are through sailing, and conversely, make more use of it between heats to give good shape and power to the mainsail. I'm so convinced of its benefits that it will be the next R/C function to be utilized on my big A-boat. Certainly there is a demonstrated connection between wind speed, mast shape and luff tension that is worthwhile exploring in our small boats. It will come to be more important as longer distance races are added to our schedule. Right now, a good sense of tactics coupled with a good start will usually see you through a short waltz around

the buoys.

I'm sure that there are many other good kinks available in the manufacture of fittings for our boats. I'm equally sure that we will probably never know about them, because most skippers are so busy sailing that they won't take a minute or two to jot down their favorite fitting for the rest of us to see. I am continually asked why more

information is not written about sailing. The answer is that nobody will make the effort necessary to write it down. Three other magazines have had spots for sailing columns and no one has stepped forward to fill them. So I guess we get out of our sport just what we put into it... on an individual basis!

Our leading pictures are of my own new A-class boat named TRACER.

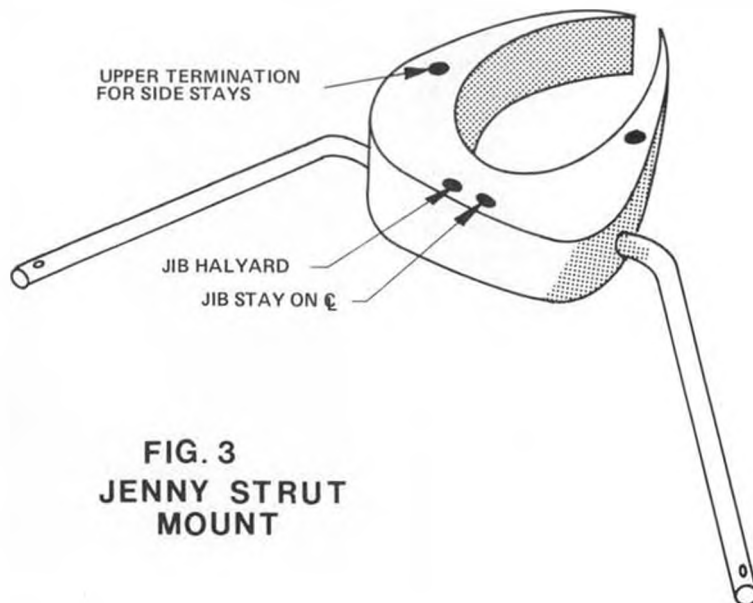


FIG. 3
JENNY STRUT
MOUNT

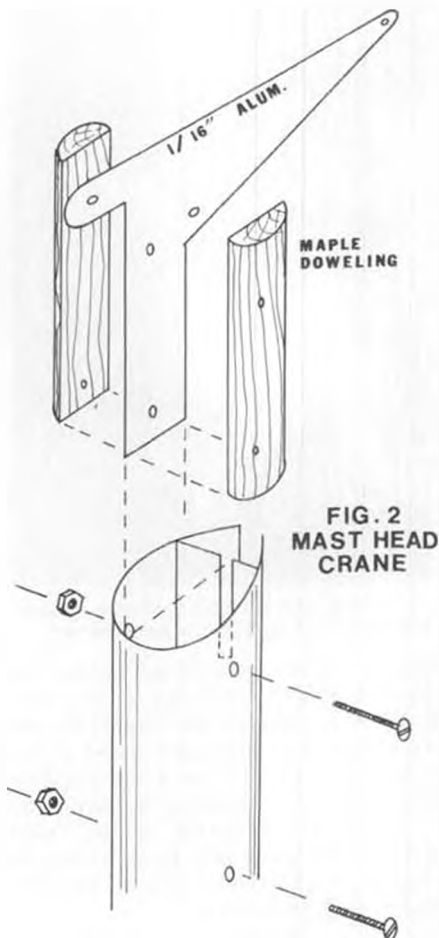


FIG. 2
MAST HEAD
CRANE

She is one of two existing hulls of the MACH II design by our good friend Adrian Brewer of Australia. (Now there is a fellow who contributes to the hobby.) The boat will go into competition with the Delaware Valley MYC, in their Saturday series held at Marsh Creek State Park, in Pennsylvania. After thorough tuning, she will be entered in the AMYA ACCR. After that, she will work for a berth on the AMYA team that will meet the MYRAA team at Whiting, New Jersey early in the fall.

FIG. 5
GOOSENECK &
VANG MOUNT

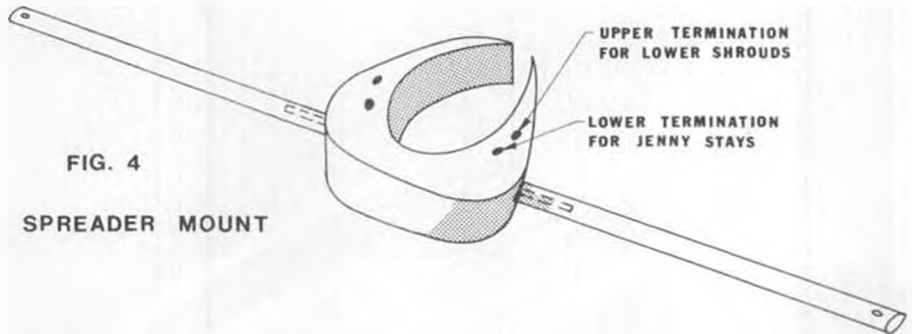
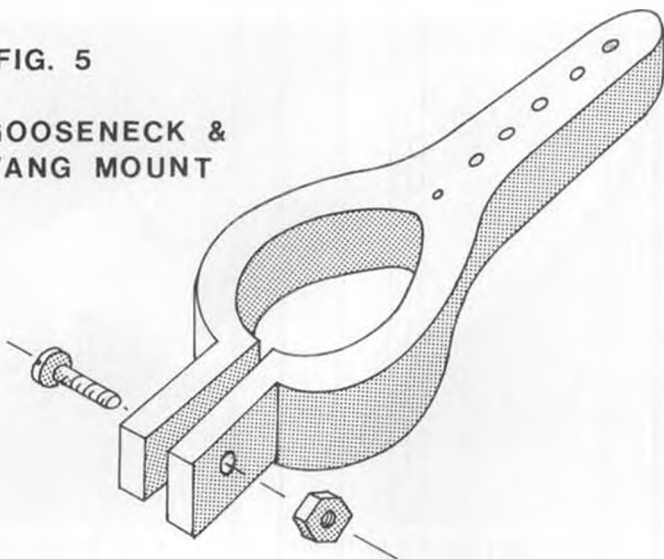


FIG. 4
SPREADER MOUNT

VITAL STATISTICS OF TRACER

LOA - 66.5"
LWL - 51.0"
Displacement - 40.2 lbs.
Sail Area - 1600 sq. in.
Mast - Reynolds Goldspar
R/C - Kraft 7 channel
Auxiliary functions - jib trim power
backstay
Sails - California Cut jib, tabled leech
main, 2.2 oz. DACRON
Main Winch - Sail Engineering SE-3P

TRACER is a bulb keel hull, with a rather flat bottom and 1600 square inches of sail area. Displacement as built came out at 40.2 pounds, a little bit above the designer's target. She added an inch of LWL and paid off by reducing sail a few square inches. In early trials, she is easily walking away from Bob Harris' EC/12, both pointing higher and moving faster. This is a natural consequence of the waterline difference between the boats, but should also make it obvious that though you can sail an EC/12 within the A-class, the deck is really stacked against you due to the way the formula controls the relationships between LWL, displacement and sail area. Her 28 pound bulb has concentrated her weight right in the center. With a Soling rudder the Tracer spins on a dime, so I expect that she will be quite a performer at the starting line.

Hull was white pine planked over frames. Fibreglas cloth on the inside, and a stained deck of similar construction. Winch is an SE-3P proportional unit from Sail Engineering, radio is 7-channel Kraft on 53 mHz. Backstay is a 2:1 purchase off a KPS-16 R/C servo, steering by a KPS-15H II. Jib trim is by a converted Drone which is due for replacement as soon as a prototype trim winch in the 4 ounce weight range becomes available.

While it will take the rest of the season to find out just how good she is, I would imagine that Adrian may release the lines, or authorize a hull manufacturer if there is interest within the sport. Right now, you'll just have to take my word for it. It's big, runs like its on rails, and in 10 knots downwind leaves a set of rollers behind it that would make PROUD MARY envious. Her wake to weather is non-existent, being smaller than my 50/800's. Adrian has outdone himself with this one.

Remember to send in your dues to AMYA Secretary, 2709 So. Federal Hwy., Delray Beach, Fla. 33444. The \$5.00 just covers the cost of the best Quarterly Newsletter available anywhere in the world.

I'll field questions for a self-addressed, stamped envelope in care of Model Builder, or direct to 7608 Gresham St., Springfield, Va. 22151. ●

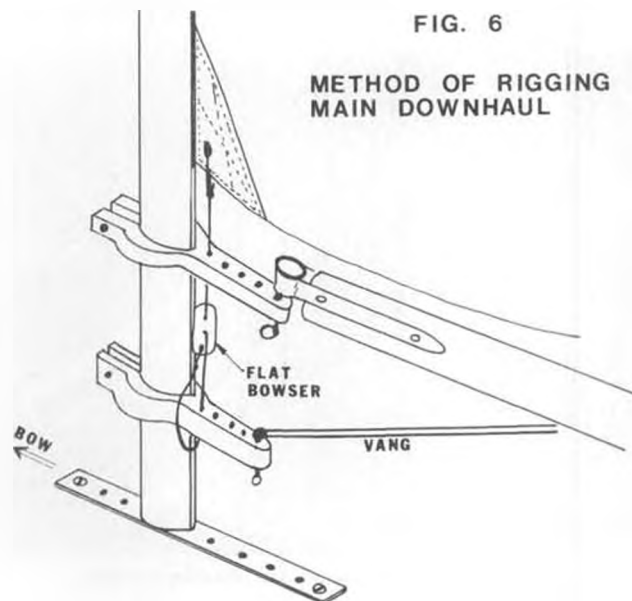
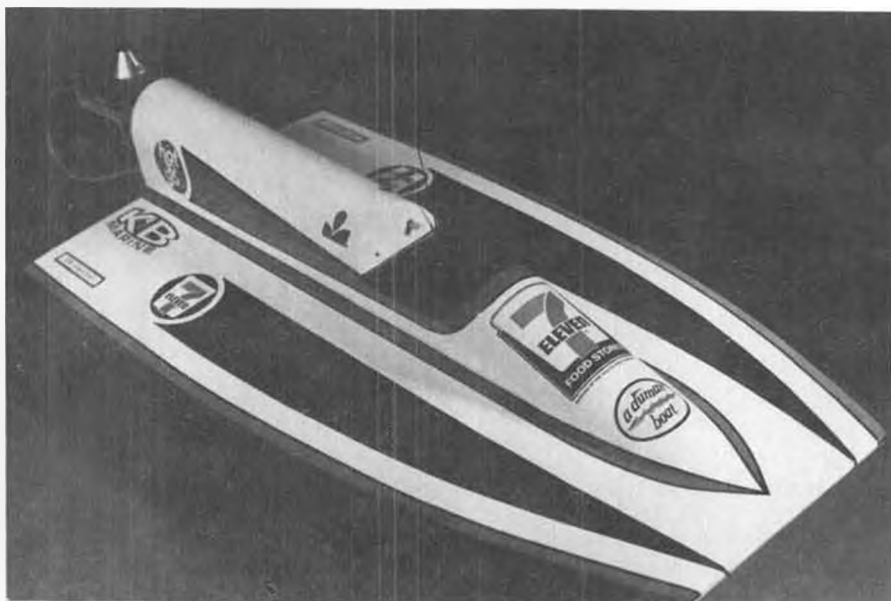
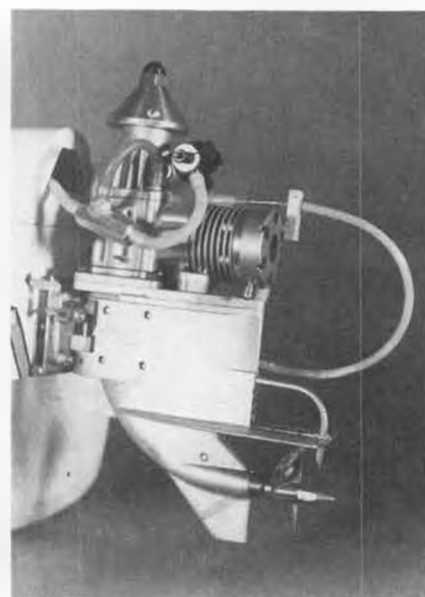


FIG. 6
METHOD OF RIGGING
MAIN DOWNHAUL



The author's completed "Hot Shot". Annual race for muscular dystrophy is sponsored by 7-Eleven, made \$3,000 each of last two years.



The sensational new K&B Outboard, instant boating with a complete power package!

PRODUCTS IN USE

CHARLIE VIOSCA builds the Dumas "HOT SHOT" and installs the K&B 3.5cc (.21 cu. in.) OUTBOARD.

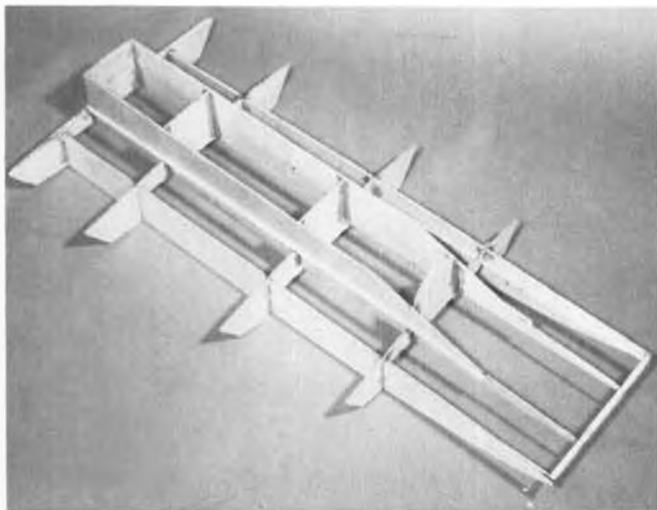
• Almost every modeler should be familiar with the new K&B Outboard engine for model boats. This fine piece of equipment captures everyone's fancy, simply because it is unique. K&B's 3.5cc engine, mated to the outboard drive lower unit, really is dependable. R/C boating has come on very strong, but this outboard adds quite a bit to the hobby. N.A.M.B.A. has already established a separate class for the outboard, and it is hoped that I.M.P.B.A. will add this class to its categories also. Being in the 3.5cc (.21) Class, it is most desirable because it doesn't gulp expensive fuel like the larger engines. Many manufacturers already have kits and hulls for the outboard.

I don't think I need to tell you about the quality of K&B engines; any modeler who has been around at least a little while, knows this. Ask any Formula One or Quickie 500 racer, and any boater in the .40 Class. All of the K&B .40 engines hold records in the various airplane and boat categories, and the K&B .40 is the engine that powered the first boat to officially go 80 m.p.h. (John Ackerman, August 8, 1976, Indianapolis, Indiana, I.M.P.B.A. sanctioned meet.)

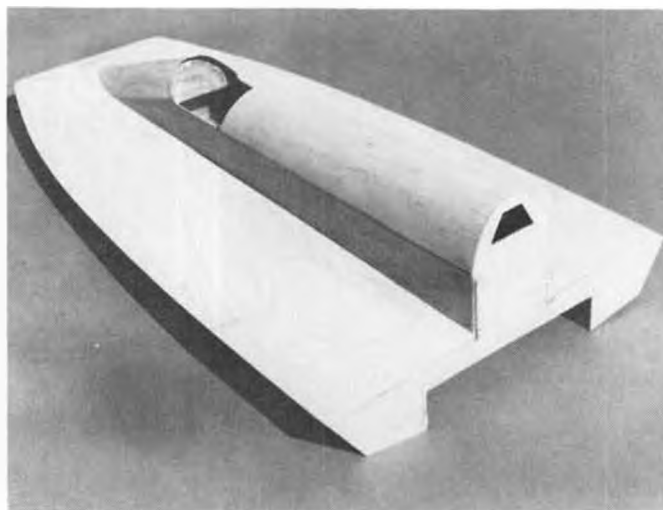
One thing that is evident with the K&B Outboard engine is the simplicity of the entire unit. Installation is a snap. With an electric starter on the flywheel, it is easy to start; no belt or string being necessary. There are no

special mounts, no special flywheel, and no drive shaft or shaft log to mess with. I know of several new modelers who have gone into boating because of this simplicity factor. Quite a few modelers are interested in boating, but are afraid to tackle the problems on their own. I know the outboard is providing the opportunity for modelers to get their feet wet (!) in boating.

Mr. John Brodbeck, of K&B, is an avid boater, and it took him two years to test the market for the need of his outboard project and to decide to develop the unit. After the decision to manufacture such a unit, several methods of driving the prop were investigated. Finally, the K&B team of engine designers came up with the present two-inch radius cable drive. After the design was extensively tested and accepted, it took only seven months to produce and market. Boating as a whole has benefited from this outboard development, and K&B's entire line of merchandise. K&B certainly keeps ahead of



The framed "Hot Shot" hull before plywood sheathing is added.



With sheathing added, the tunnel hull boat has its shape. Already for final sanding and finishing.



Bottom view of the tunnel hull. Boat rides on inner corners of sponsons, which must be kept sharp for directional control.



Top view of unfinished hull. Radio and tank in aft fuselage.

what's going on. It has put radio box push rod seals on the market, in both 1/16 and 1/8 inch diameter holes, plus an auto trim assembly for the outboard (Cat. No. 8591). Its recent acquisition of "Marine Specialties" compliments the entire marine line of merchandise. Several things are in the works that you will be happy to see on the market. We look forward to what will be next in the offering.

Now let's put this outboard on a hull. Dumas Products is one model boat manufacturer that has been around for quite some time. It produces all kinds of boat kits; sailboats, air boats, hydro's, scale boats, and a line of fine competition deep-V's in wood and fiberglass. The newest addition is the tunnel hull for the K&B outboard. This neat hull is called the "Hot Shot". What an appropriate name!

The Dallas R/C Boat Club was asked to run some boat demonstrations at the Dallas Southwestern Modeler's Show. We were delighted when Jay Brandon of Dumas asked us if we would run his "Hot Shot". Construction of the boat is simple and straightforward, with very good instructions. Even a beginner



The author's Hot Shot has placed well against inboard powered boats, which are theoretically faster. Not really under way in this picture, as there's too much spray.

should be able to build and run this boat. I suggest that you follow the instructions completely, and refer to the pictures while building. For once in my building career, I didn't run across anything I felt should be changed. Instructions for building a simple alignment jig and sanding blocks are suggested, and I used both. That's how good the instructions and kit really are.

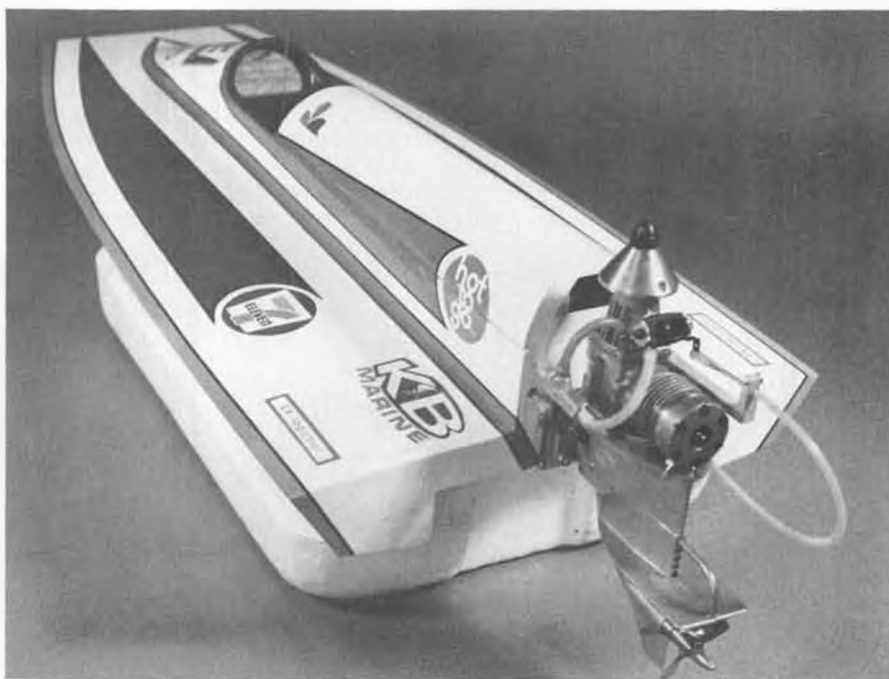
Before building the boat, read the instructions all the way through. You may not quite follow some things; however, as you read them again while you build, you will understand everything. I placed a check mark at each step as I went along, and that way I didn't lose my place. The hull comes out true and very strong. My boat was built entirely with Sig Kwik-Set Epoxy, except for attaching the hull decks. For this you will need a slow setting epoxy.

Sig's Kwik-Set Epoxy sets up fast and I like it because it doesn't get brittle with age. There are a lot of epoxy glues on the market, but this one is tops.

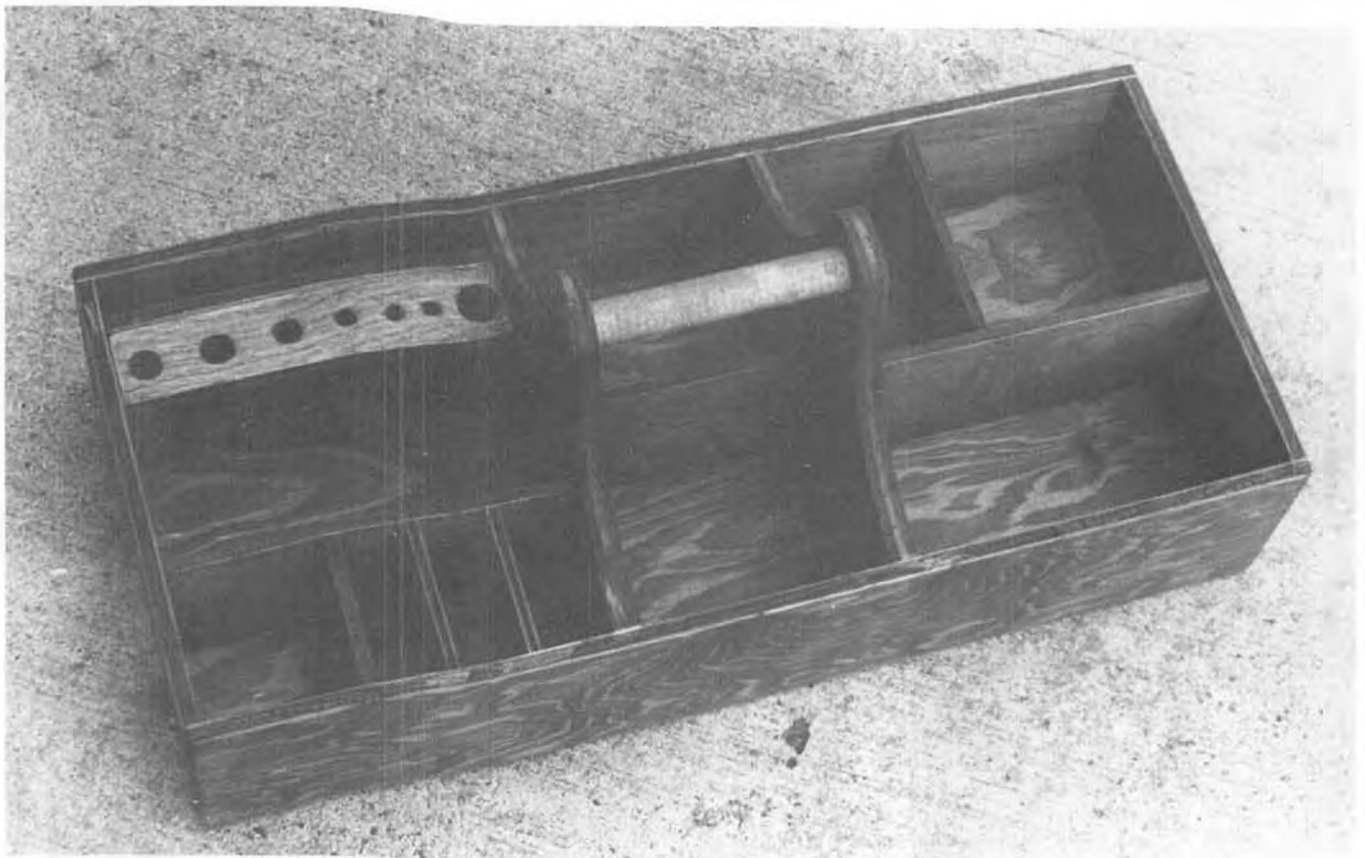
Building the hull takes about four to five evenings of work. Painting and finishing will be the most time-consuming. Of course, your skill level will enter into construction and finishing time.

Here is how I finished my boat: First, sand the entire hull with medium sandpaper, then sand again with fine sandpaper. After cleaning off all dust, apply a coat of K&B clear epoxy. When completely dry, sand again with fine sandpaper. Apply one coat of Hobby-poxy white sanding primer. When dry, sand the first coat, apply a second coat, and sand when dry. By now you should have eliminated all blemishes and are

Continued on page 79



Three-quarter rear view of boat shows outboard installation. Extra work in finish and trim goes a long way in improving appearance. Note molded foam "dry dock".



THE "QUICK-PIT" FLIGHT BOX

By RICH "von" LOPEZ . . . One of the nation's leading Combat fliers tells all about preparing for battle, and provides you with the means of "getting it all together" where you can find it when you need it!

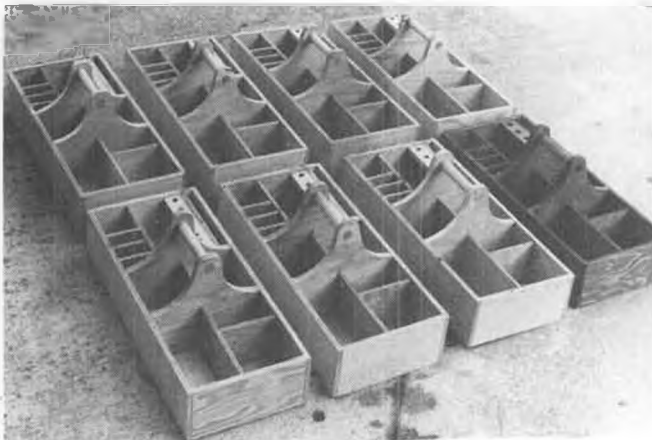
● In order to be a well prepared competitor, one's equipment must be in top condition and be readily accessible. One must know this equipment thoroughly and its value in competition. The Quick-Pit flight box that I have designed is laid out with all the equipment that I find necessary to fly competition combat, or that is needed in a contest situation. These needs will naturally differ slightly with the wants and needs of each individual pilot. It will, however, be a good starting point for the beginner, and even for some of the

more seasoned pilots who do not have the time to sit down and design a pit box around their needs. Hopefully, you will find this an informative and useful article and project.

The importance of pit work has been well recognized by race car drivers for a long time. Races are often won or lost in the pits. Given the Academy of Model Aeronautics (AMA) Combat rules, it is to the competitor's advantage to have a fast start. I have seen a great number of matches won through the work of an efficient pit crew. Give yourself the

best possible chance of winning by practicing your pit work. This is even more important in the now World Championship event, FAI Combat.

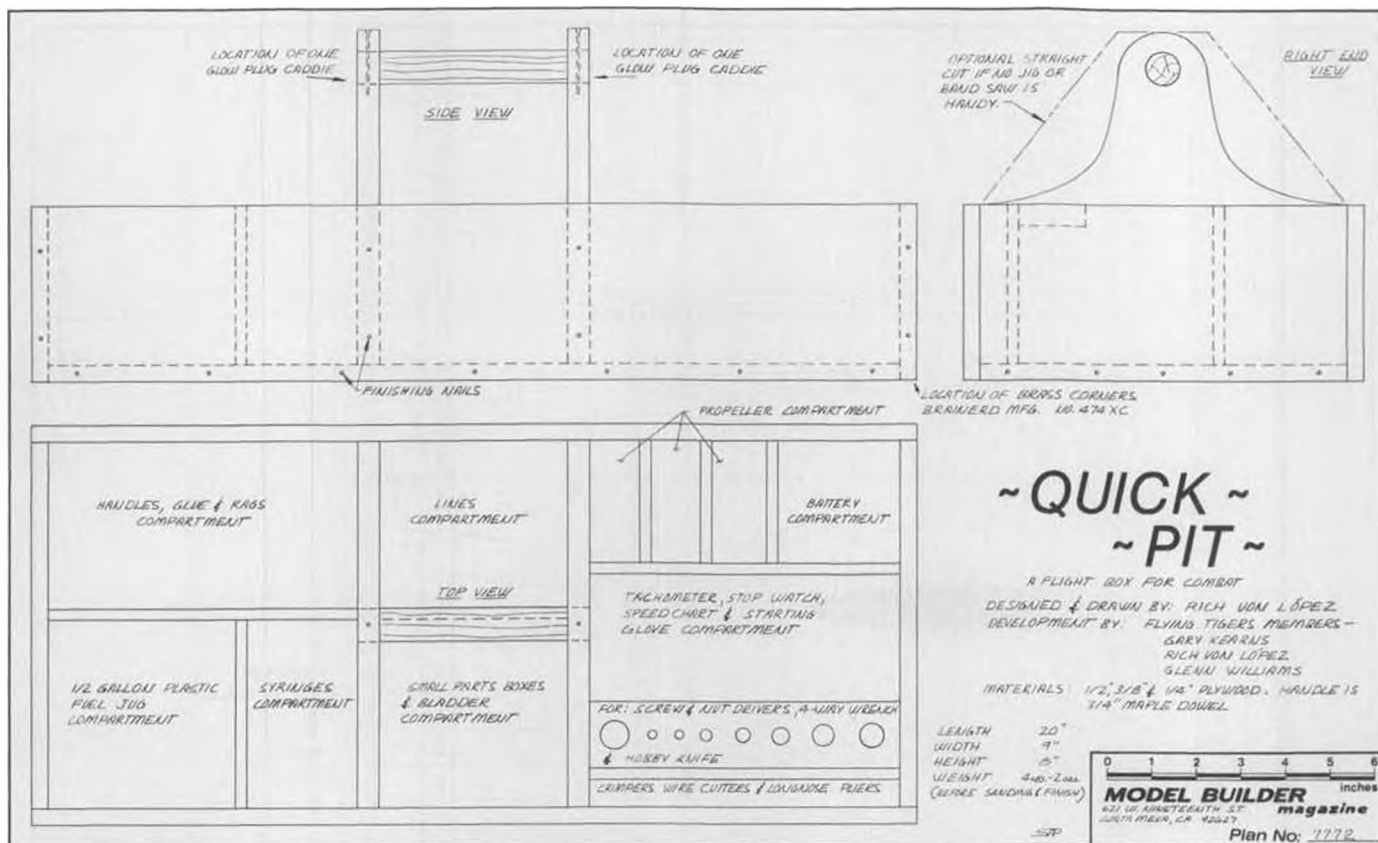
I have been flying combat in competition since 1965 and have achieved a considerable amount of success. This is due in part to having reliable equipment and knowing how to use it. I have tried to minimize equipment failures such as dead batteries, old glow plugs, not having the right wrench, not enough props, no spare needle valve and spray bar assembly, and many other such little



"Somebody forgot to turn off the machine!" A total of 36 man-hours (3 men, 2 evenings, 6 hours each, cranked out these plus two more.



"Quick-Pit" boxes belonging to Rich "von" Lopez and Glenn Williams, all loaded up and ready for fast action in the pit.



FULL SIZE PLANS AVAILABLE – SEE PAGE 104

items. I have seen a countless number of pilots running during a match from the flight circle to the pits in order to fetch a glow plug, wrench or bladder or some other such item that should have been in the flight box. This lack of the right equipment at the right time has been the cause of many lost matches or failures to get airborne. This is not only disgusting, it is also frustrating to the pilot who has spent countless hours of labor on his models and on traveling to a contest. As a result, some of these pilots never return to the combat circle, causing a drop in participation, something that the event cannot afford. The object in flying combat as I see it is to derive enjoyment. This is very difficult to achieve if you are fighting your equipment as well as your opponent, so some care and preparation is required. Enjoyment also means being competitive, so with this in mind, let's look at the equipment necessary to be proficient.

First of all, you need several first rate combat aircraft (I will be referring to fast combat aircraft, but the same holds true for slow, FAI or 1/2A combat), that is, combat wings that are light, straight, and trimmed out. Each individual should choose the design that suits him best, though my preference is, naturally, "Matador" (kit No. 248 by Midwest . . . published in July 1975 FM). Then you need at least two well broken in combat engines. You can choose from; the 1976 Fox Combat Specials, Super Tigre G21-Combat, G21-35 with Perry porting, the C-35

with Perry porting, the K&B 35 with or without a Ball Bearing front end, or the new K&B 5.8cc. That choice is entirely up to you. I have tried them all and they all seem to be adequate. Now that you have this part taken care of, take a close look at what you will need to operate this equipment.

Lines and handles are, of course, essential to control line flight. I use three different handles for combat aircraft, one for 1/2A (a Pylon brand unit No. 95), one for FAI or Class A (an E-Z-Just large handle). For Western Associated Modelers (WAM) competition, I take two sets of lines for each event, these having been cut and measured prior to the contest. For AMA combat, I like to have four sets of 60 foot lines, and FAI combat may require four to six sets of lines for a large contest. Check these lines often, making sure they are in good condition; that is, not badly kinked or frayed.

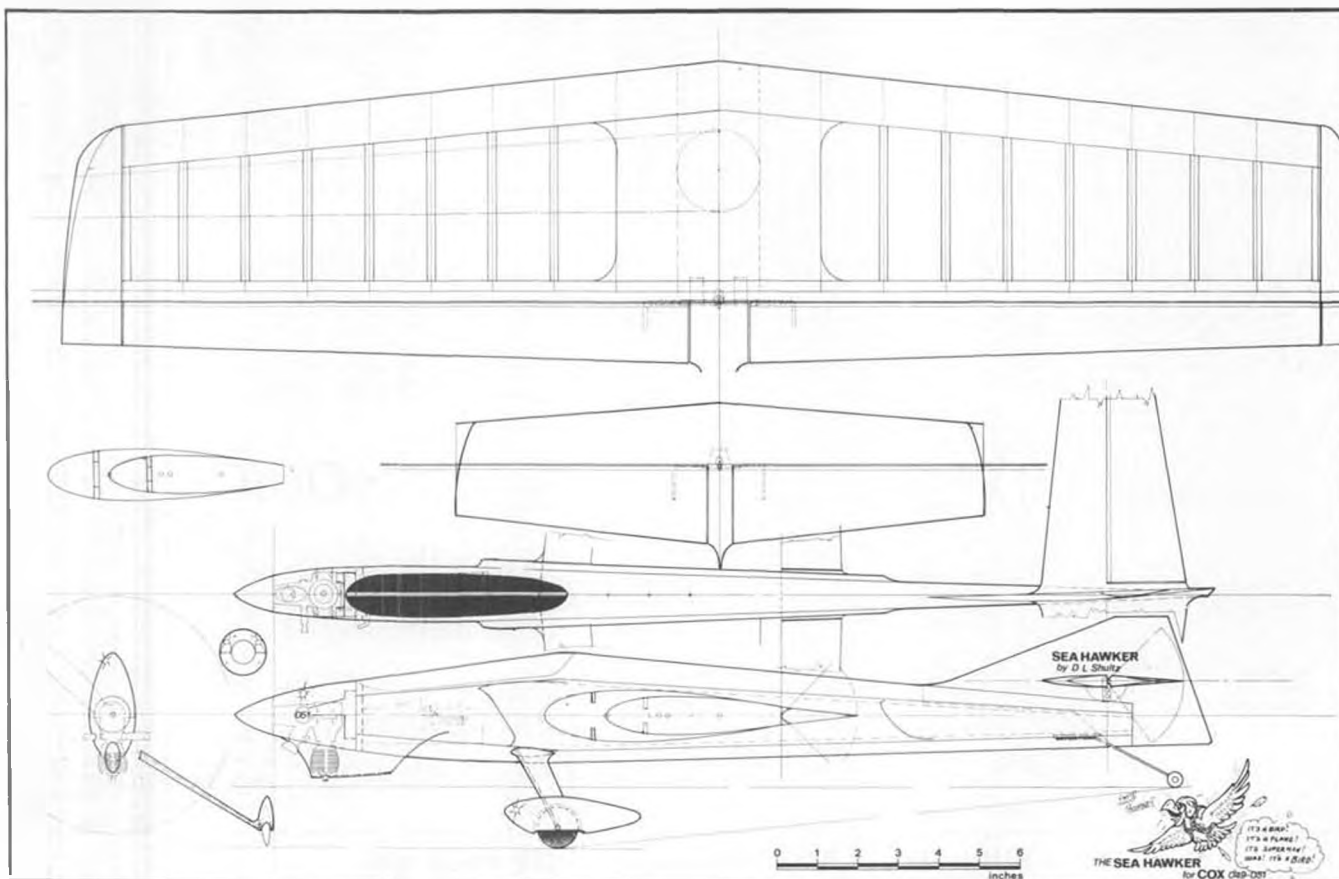
At this point we have an aircraft with engine, lines and handle. You next need fuel to run; the blend you wish to use is entirely up to you. The Quick-Pit flight box is designed to carry a half gallon of fuel; the container is a plastic 1/2 gallon jug from A&W Root Beer stores. It is set up with a filtered pick-up tube and a dry vent in the cap. This is done so that you only have to remove the cap to fill the container and not each time you want to fill a bladder. This system will always give you clean fuel. The filter used is a Du-Bro No. 161 R/C Tank Filter with a 1/8 inch diameter

brass pick-up filler tube. We drilled two 1/8 inch holes in the cap and soldered the tubes in place; one tube, the pick up tube, was made a 1/2 inch taller than the vent. We also added a flat washer to give a little extra support to the vents at the solder joint. A piece of flexible tubing can be looped from the pick-up tube to the vent to seal the container. To get the fuel out of the

Continued on page 93



End view off loaded pit box shows everything in its place, ready to be grabbed without a lot of time-wasting fumbling.



Not exactly a construction drawing, but something cooked up by Don Shultz to provoke a little thought among Stunt modelers who might be thinking about a 1/2A design.

Control line

By "DIRTY DAN" RUTHERFORD
PHOTOS BY AUTHOR UNLESS NOTED

• At the '76 Nats, Rich "von" Lopez and I were confused one with the other a number of times. So Rich and I, being basically bad folk, decided to do the obvious. I wore his banana farmer hat and an "official" AMA badge that told the world the person attached to the badge was Rich "von" Lopez himself. And Rich wore my beat up, floppy old hoss hat topped off with a press



Don Shultz, Stunt Grunt supremo, and one of the stunt judges for the 1977 Nats.

badge saying something about MB and its dirty C/L columnist.

Naturally, we really put it to quite a few people, the worst case being Marvin Denny, who I certainly hope has a good sense of humor and a forgiving nature.

So there is no chance of any mix-up at this year's Nats, I am publishing a full facial shot of myself (taken by Lopez, incidentally). Now that all of you know what I look like, be sure to step up and say something appropriate . . . Both Rich and I will be there with our Ford vans, so don't let that mix you up. Rich's van is basic white, while the Dirty Van is red, set off with the usual super-zoot van stuff.

NWSR

The letters in the heading mean "N.W. Sport Race", a Racing event that was put together by Mike "Nitroholic" Hazel, of Eugene, Oregon. This event has proven to be very popular in this area, so I thought that I would outline it for you. Perhaps it will fit your requirements for a cheap and slow Racing event, where novices can buck heads with pros on

more or less equal terms.

Before getting into the rules, I want to emphasize that this event is *not* workable on a national level. This event is meant for a regional group of fliers, and when kept on that level, can be controlled well enough to keep things from getting out of hand.

The rules for NWSR are pretty basic,



Jim "The Spic" Morway, of the Detroit Combat Team. Dirty calls that a strange nickname!



'Will the real Dirty Dan please stand up!' To end all the confusion, once and forever, here is Rutherford. Now you can find him at the '77 Nats and tell him what you think of him!



Mike "NitroholiC" Hazel, the N.W.'s only active speed flier, behind the NWSR rules.

and are designed to restrict the planes and engines to basic Sport planes, rather than one-off, tricko racers. Mike decided there was only one way to do this, and that was to require the planes to be stock kits, and a list of legal planes is part of the rules. I think that almost 30 kits are legal and all fall in the .35 size, profile category. Ringmasters, Flite Streaks Mongeese (?), Busters, Cosmic Winds, Shoestrings are common and are representative of the allowed kits. Although the kits cannot be cut down in any way, they can be beefed up some, even though it is hardly necessary or advantageous.

Motive power is limited to plain bearing, single bypass motors of .36 max displacement. This eliminates Schnuerles and Perry Ported motors. With these kinds of restrictions, all you have are inexpensive, common old Sport motors that everybody seems to already have laying around.



Larry Jolly, flying half of the Kusik/Jolly TR Team.



ZZZZZZzzzzzz. Larry Leonard, of A&L Distributors, hard at work during a Portland, Oregon C/L contest last year. Visiting accounts in the NW area was kind of tiring.

To insure that off-the-shelf planes would be competitive, without modification, it was decided to not allow shut-offs, fast-fills, hot gloves, etc. To the same end, the engines must feed from a suction tank. The tank can be of any capacity, and any style of venting is OK.

Back to the plane, wheels of 2-1/2 inch minimum diameter must be used. If the kit calls for only one wheel, as in the case of the Flite Streak, that's OK, in fact we also allow a single wheel on models designed to stand on their own two feet. We could use .015 lines without problems, as the planes are *real* slow, but with most everybody having Combat lines already, we require .018 x 60 lines.

Heat races and final are run to standard Rat rules and procedures, but we fly with at least three up, and it's a lot more fun to battle it out four at a time, so most heats see four up and all finals are run four up.

By now, the serious Racers are rolling their eyes and gasping things like, "That sounds boring as hell." Semi-skilled Racers are wondering why anybody would actually want to race a Ringmaster against a Flite Streak (good question),

and novice Racers, being novices, have gone back to doing important things like polishing their lines, lightening spinners, lapping wheels to axles and standing in front of the mirror practicing combing their hair into the "Racer's edge" style that can only be duplicated by having lines raked over your head while landing your plane.

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Arlie Prezler's super-trick Stunt flight box. If it's needed at the flight line, it's in there!



The Flying Tigers of Gardena, California. Front row (l to r): Steve Marty, Larry Voit, Shoichoi Kinouchi, Renee Hilden, Robert Hilden, Chris Rice, Doug Wood, David Toulette, and Harold Wynn. Back row (l to r): Martha and Roger Marty, Frank Voit, Paul Dadaian, Velma Voit, Balam Miles, Tony Frost, and Steve Hunt.

The 1/2-A SCENE

By LARRY RENGER

• All sorts of neat things coming up! Sure Flite is working on Stand-off (very far) scale Cutlass and Corsair II jet models, and GMS is working on "Pappy" Boynton's Corsair. House of Balsa has announced its Beechcraft Bonanza and FW-190 models. Big Art's Models is introducing a new 1/2A Streamliner which fits the AMA provisional pylon rules. This model features a miniscule 2-1/2 sq. in. cross-section and a super-slick styling. I saw the prototype in its early stages of development . . . its going to be super fast! The price on this one is up there at \$36, but worth every bit of it. Ace is releasing the GLH II kit, a competitive 1/2A racer. The GLH II is available in two forms, foam

wing and built-up wing versions. Tom Runge of ACE tells me that there is no detectable difference in performance . . . the built-up wing is lighter, but the foam airfoil is more accurate . . . it seems to even out. I have seen the GLH fly and it lives up to its name. Around here it's usually the winner in most races.

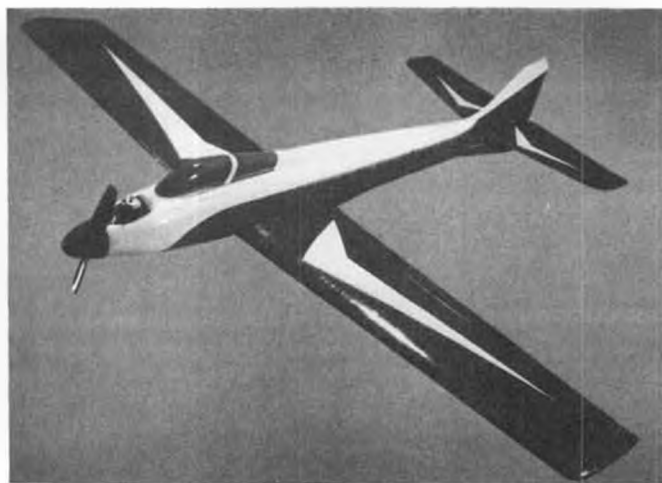
Royal has released its new 1/2A two-channel receiver kit (1.1 ounces!) I just built one of these little receivers and found it an easy evening's task. Despite the small size of this unit, it was easy to assemble. Mike Dorffler designed the circuitry and simplified things with a single-tuned FET front end. One especially neat feature is that you can add a second IC to the existing unit and

get 4 channels instead of two! My sole and very minor complaint is that the wiring of other than Royal's connectors is left up to the builder to decipher. Fortunately the board is pre-drilled for the extra power and ground leads I needed with Deans connectors. This unit works nicely, testing out at 4 micro-volt sensitivity. ACE now has .75 oz. micro servos and 100 mah battery packs.

It's going to be a good year! Two new throttle systems for Tee Dee and Medallion .049's are available. Both cut the peak RPM a bit, but addition of a throttle and muffler to any engine always does that. Tarno makes one carburetor, which should be used with your choice of muffler. Hiscott is a new name in our



Soon to come out, this semi-scale Cutlass, by Sure Flite. Use .049 or .09 with throttle, and two or three-channel radio.



Baby Birdie from Sure Flite, is one of the slickest 1/2A models available. No room wasted in this R/C aerobatic gem.

hobby, but the company produces a coordinated intake and exhaust throttle system which is beautifully made. Dave Robertson, of Orange Coast Hobbies, put a Hiscott equipped Tee Dee in a House of Balsa P-51 with a Four-Channel Cox/Sanwa Radio (He used the big servos and 450 mah batteries!). It is not a "hot" aircraft, but it does loops, rolls and snaps. Turns and climb are OK, though not spectacular. Fully controlled taxi out, take-off touch-and-go, and landings are really neat to see! The all up weight is 32 ounces.

THREE CHEERS SECTION

Larry Rice, of Gardena, California, sent me a nice letter outlining the activities of a club which his hobby shop and the city co-sponsor. Here is his letter:

"In 1976, Modelers Mansion, a local hobby and craft store, and the city of Gardena, California, agreed to co-sponsor a model flying club. Due to the limited space it was decided to use only 1/2A U-Control planes. The 1976 club had 20 members and the 1977 club, THE FLYING TIGERS OF GARDENA, has over 30 members, seven of whom are adults. The goals of the club are:

1. Teach people how to fly model planes.
2. Teach people how to build models.
3. Direct youngsters' activities into a creative hobby.
4. MOST IMPORTANT IS TO HAVE FUN!

"The city provides insurance for \$2.50 per year, a flying site, and a building area. The hobby store provides an instructor, a large stock of 1/2A models, and a 15% discount to club members. We have a set of safety rules that must be followed. In the summer, we take a tour of L.M. Cox Mfg., and in October or November, we have a big contest. By the time of the contest, most of the members are designing their own models and building from scratch. There are also classes on engine repair, choosing the correct prop, model air-



Shoichoi Kinouchi, Chris Rice, David Tulette, and Harold Wynn (l to r) busy building a Sterling beginner's Eindecker. Love those expressions!

plane design, etc.

"Please note that on the day the pictures were taken, there was a very strong wind and only a few members showed up. Anyone wishing for more information may call me at (213) 532-5599."

This, to me, is an outstanding effort on Mr. Rice's part, and any of you "old pro's" in the area ought to drop in and give him and the kids a hand. There are all too few young modelers receiving this kind of competent instruction.

As a teen-ager, I was fortunate to be in a similar club formed by the young customers of the local hobby shop. In addition, Mel Schmidt, the well known free flight flyer, lived in the neighborhood, and helped immensely by taking me flying with him, and he answered a zillion dumb questions. If we want this hobby to grow, new modelers have to come from somewhere, so let's catch them young and bring the kids up with a good modeling education. So take a kid flying with you . . . he won't even drink your beer!

While on the subject of control-line, there are a few points which seem not to be well understood. There are two little known, but interesting factors which affect the controllability and sensitivity of this type model. First item is the control-line length. As your flying lines are made longer, your model seems to become more sensitive, and narrower control-line spacing at the handle is required. The reason this effect takes place is that your model still retains its maneuver radius (as measured in feet), while the added line length cuts down the angular size of the maneuver. That is, a model which can do a grooved 450 loop on 26 ft. of line is turning on a 10 foot radius. When you go to 35 ft. of line this radius need only be 13-1/2 feet.

To cover the situation completely, you have to get into negative feedback control system theory (4th year optional course in Aeronautics at MIT). Just

narrow the line spacing at the handle as you lengthen the lines, and take my word for it!

The second item is a little easier to understand, and that is the effect of line springiness on your controls. Once I had the bright idea of using Nylon monofilament fish line as control lines; it was cheap, available, tough, and very slick, so it would have low air drag and slide easily on itself, too. Unfortunately, it doesn't work. Due to the springiness of this line, the model responded in an undescribably peculiar manner for the brief time it lasted. On a more useful level, this horror story alerted me to notice that a model flying on steel control line responds quicker and more accurately than it does on Dacron line. I still use Dacron line most of the time, since the .008 cable lines are ridiculously fragile for sport and show flying. No one sees them on the ground, so they get stomped on, they fray at the ends easily, and turn into spaghetti if you look cross-eyed at them. For go-fast, combat, or acrobatic competition, you have to use steel lines, the rest of the time, why suffer?

Continued on page 86



Dave Linstrum with his Satellite City 320 GLH. Try it with a prop, Dave!



Rich Porter with various VooDo's. Placed 2nd in Nats 1/2A Stunt with middle one.



"Hawaii, here I come!" Hang glider launching at Torrey Pines, California, high over the Pacific Ocean.

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

● Congratulations are never too late when they're well deserved. We all applaud the United States team for winning the first World Radio Controlled Soaring Championship, recently held in South Africa. Our team was managed by Dan Pruss, and included LeMon Payne, Dale Nutter and Skip Miller, with Dave Thornburg assisting. In fact, Skip Miller took top honors as the single best flyer in this world competition. What an accomplishment with only

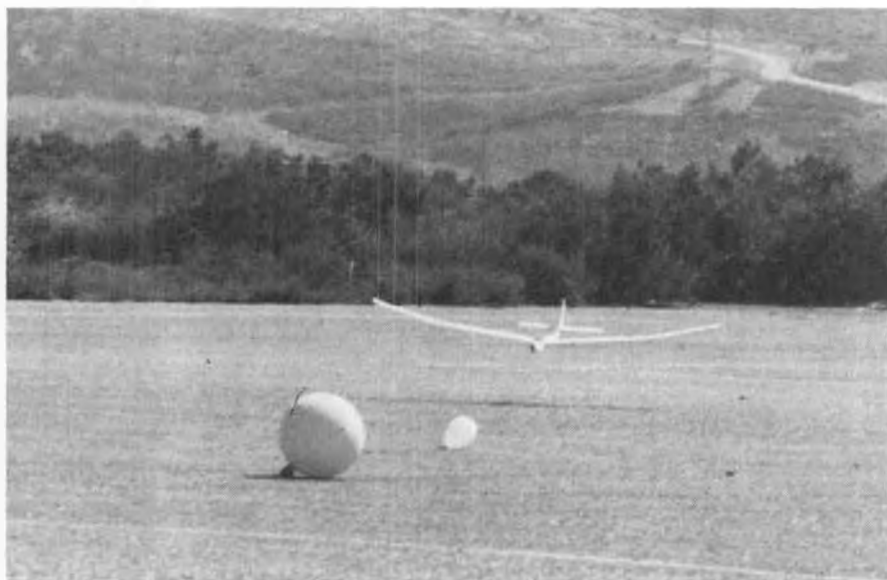
about a year of RC soaring experience! It's also appropriate to congratulate Jim Simpson, Senior Vice President of the National Soaring Society, who devised and conducted the selection tournament last year, resulting in this top notch team.

Tremendous hospitality was offered to all the contestants by the South African team. Dan Pruss developed a practice ritual with the team, regularly demonstrating its great skill. To some

extent, this may have gained them a psychological advantage. In fact, it was their consistency of performance that took the trophies. All we can say is, well done.

* * *

I'm sure you've been asked, "How long did it take you to build that sailplane?" Perhaps a more important question is, "How long did you spend in trimming it?" (No, not "trimming" as in "decorating", but "trimming" as in



"I've heard of arresting gear, but this is ridiculous!" Balloon bust and spot landing combined to make competition a little more interesting. Idea by Torrey Pines Gulls' Jim Pike.



Jim Pike, CD for the Balloon Bust Pro-Am contest.



A twin-fin racer speeds silently overhead at Torrey Pines.



A very scale, one foot-to-the-foot Schweitzer 2-33 landing on Torrey Pines runway, in front of the Salk Institute. Pacific Ocean is dead astern about 300 yards.

balancing the plane for best flight performance.)

Last weekend I flew with Frank Deis and other friends, in Huntsville, Alabama. After I'd been in the air for a while, Frank asked, "Are you happy?" I quickly responded that, "I'm well, in good health, and . . ." Frank interrupted. "That's the trouble, you're not unhappy with how your plane flies", he went on. "It's important to make certain that your plane is trimmed for best flight." He then took me through a procedure which made a distinct improvement in the performance of my modified Hobbie Hawk.

Later, I asked him to condense the procedure into some simple rules so that you, too, might improve your flight performance. He agreed. So here they are:

1. Be unhappy with the way your sailplane flies.

2. Measure the decalage (the difference between the angle of incidence of the wing and the stabilizer). Use a protractor and plumb bob to measure the wing near the trailing edge. Now measure the angle of the stab by placing the protractor tangent to the midpoint of the bottom surface. It doesn't matter how the plane is held during this operation since only the angular difference matters. In my case, the decalage was about seven degrees, indicating that the stab was lifting the nose and causing a lot of unnecessary drag. (A standard Hobbie Hawk problem. wcn) The obvious thing to do is cut that decalage to about two degrees. To do this:

3. Remove some weight from the nose (or if it's more convenient, attach some weight to the tail). We used quarter ounce slugs, taped to the aft end of the boom. This moves the center of gravity (c.g.) aft and reduces the longitudinal stability. You have to fly after each change of weight (balance). Find the new incidence angle for the stab that will now produce level flight (Not so easy on a glider with separate stab and elevator, but still the right idea. wcn)

Watch the glide become flatter as you make each step toward the point of neutral stability, the plane will continue to descend along the same flight path while the control stick is held in neutral position (I can hear the remarks of Ken Banks coming back to me as I review this procedure. Sometimes you have to learn something twice to remember it once.) Check that your trim control can take you from the edge of stall to the point of high penetration speed with little loss of altitude.

By now the c.g. is back to about 35 percent of the chord. As a result, you may need to reset the position of your towhook.

4. Move the towhook aft to that point where the underside of the flat-bottom wing is horizontal as you suspend the inverted plane on a string by means of the towhook. For safety's sake, in dealing with an undercambered wing, stay on the forward side. You should now rise sharply on tow. (Believe me, mine did.)

5. Now match the wing loading to the wind by adding ballast at the c.g. to increase the forward speed, ensure penetration, and at the same time increase the efficiency of flight performance (the greater the speed, the higher the Reynolds Number).

All this makes sense, but it's worthless until you put it to work on your own sailplanes. You'll enjoy the result.

* * *

You see all kinds of things at Torrey Pines; hang gliders launch some 400 feet above the surf, full scale sailplanes launch and land in front of the Salk Institute, while modelers share the air space and their latest creations. In recent weeks we've seen some unusual craft in this last regard: a twin fin racer, a high speed swept wing configuration, and a swept forward flying wing of fiberglass over plywood over foam. The last of these, designed and built by Harris Nelson, was of particular interest until a push rod broke in flight . . .

Let me introduce you to the Ridge

Rover, another import, which comes in a super-deluxe kit, including everything you need to get the plane in the air except paint and the radio. The wings are of foam and are covered with a hardwood veneer that the British call



"Ridge Rover" an imported glider from Great Britain. See text for more information.



Harris Nelson, with his swept forward flying wing. A push rod broke in flight . . .



High speed swept-wing design gets radio check before launch. Old Heathkit radios never die!



The swept-forward tailless about to go. Let's hope it has been rebuilt. A nice looking layout.



Gotta say it . . . you ain't lived until you've slope soared an R/C glider off Torrey Pines! If you're coming to the Nats . . .

"obechi." The full flying stab and rudder are also veneer-covered foam. The fuselage is fiberglass, and is painted white. Its lines are particularly graceful. A blue tinted canopy, trimmed to shape, is also included. Very little work is required to install the wing and the stab retainers,

since all the slots are partially-cut to size. The wing has several interesting features: it can be flown in either 104 inch or 151 inch span. This is accomplished by plugging in tip panels according to the flying conditions . . . short span for slope or particularly difficult

windy weather, long span for the usual thermal flying. Another interesting feature of the wing is the full span aileron/flap. The necessary hardware for operating these flaperons is included in the kit (for example, a Dodgson aileron

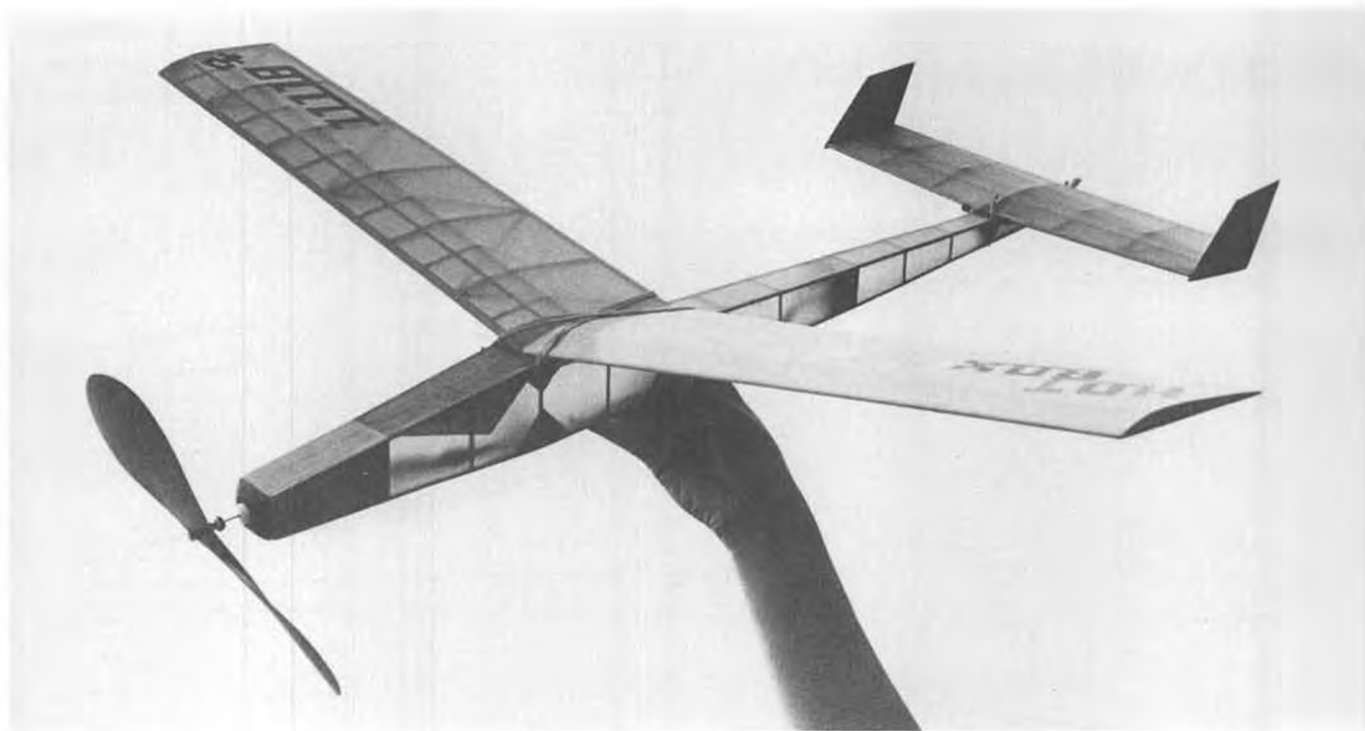
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Looking very bird-like, Harris Nelson's flying wing passes overhead.



You can work that slope until the glider is hard to see, or you can just tuck in and stay close. The lift continues several hundred yards out to sea.



'HOT BOX' P-30

By JOHN OLDENKAMP . . . Are you ready for the 1977 Nats free flight competition? Not until you put together a couple of P-30 Class models and come out to join the unofficial fun!

● P-30's are coming out of the woodwork faster than lovesick termites: my proposal of two years ago for a threshold competition rubber event has suddenly taken on momentum . . . particularly in the areas where sites are diminishing in size. P-30 will be flown as an unofficial event at the USFF Championships this year, as well as at the Riverside AMA Nats. In addition, there will be an International Proxy Postal meet, to be flown

off at Lake Elsinore by the San Diego Orbiters on September 10th and 11th. Latter is sponsored by M.A.N. and Dave Whatshistrum.

The rules are very simple; no dimension of the airplane may exceed 30 inches, including propeller and D/T hardware. It must have an unaltered 9-1/2 inch freewheeling commercial plastic propeller, and is allowed ten grams rubber total. Very interesting mix

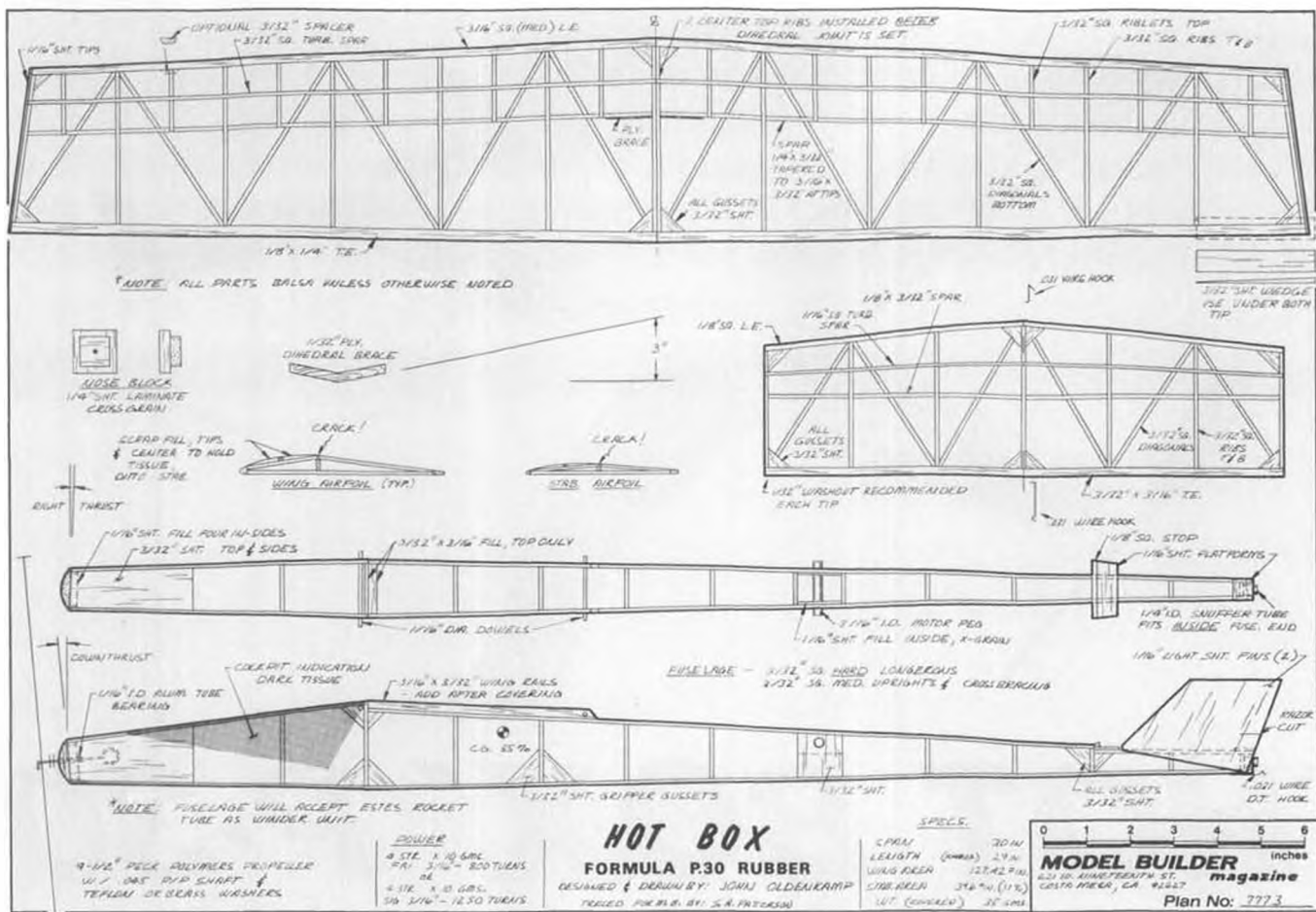
of ingredients. Until you see one zooming up, or, better still, build one and witness their extraordinary performance, you simply won't know. Those plastic props are very efficient, and if matched to the correct rubber stranding, really do go places.

HOT BOX is about the thirtieth P-30 I have designed, and although I haven't built this one yet, the prototype (in bright lilac and pink) flew more or less off Cynthia Sabransky's workbench, needing only very slight decalage increase. We haven't found the perfect pattern yet, but she expects to put up a strong challenge with it for the Ladies Cup at Taft and the Nats. HOT BOX is straight-forward, robust, and easy to build, owing to generous stock dimensions. A Hot-Stuffed version should require no more than a day-and-a-half or so to complete.

The Airfoil: Besides wanting to help create an event for all to enjoy, I tried several different ways to make the whole project, in building terms, a snap. Hence, the cracked ribs. My first few P-30 models were rather small, underpowered, super-light, but each had the cracked rib thing all the way. As I gradually increased areas and went to six and eight-strand motors, I found that the diamond-sectioned mode provided a fantastic climb, but no glide to speak of. I had reasoned that the Driftwound OHLG



At top of page: A HOTBOX all finished and ready for first test hop. Above: The moment of truth. HOTBOX on maiden flight. Peck-Polymers thrust bearing.

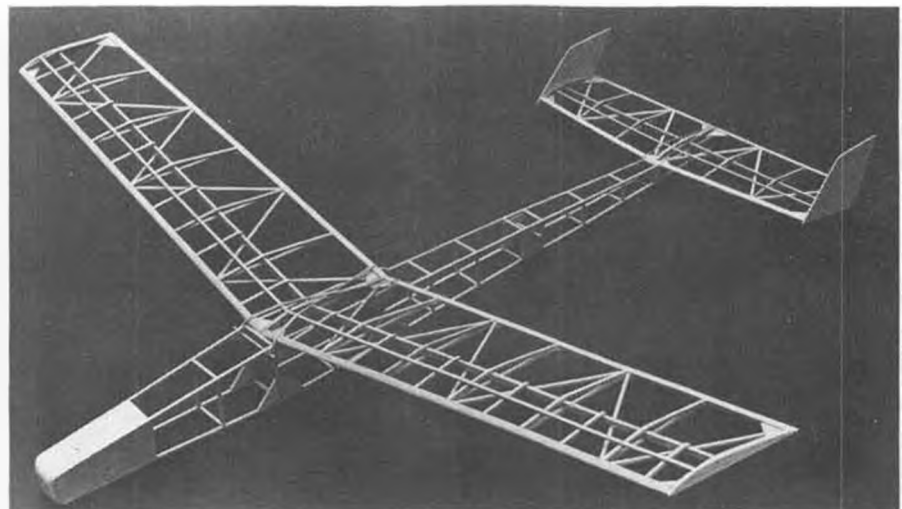


FULL SIZE PLANS AVAILABLE — SEE PAGE 104

(Geraghty) was getting by very nicely on the diamond shape, so why wouldn't a rubber ship of roughly three times the area and no more than twice the weight, etc? Several very pretty airplanes now sit in my "museum" . . . terrific climbers, but gliders they ain't. Curt Stevens, old line HLG theorist, suggested laying a turbulating spar somewhere on top of the diamond, run the tissue over it and see. It works. I've since built a couple of Coupe d'hivers (also plastic propped), a Payload, and an A/1 . . . all with same general layout, some undercambered. Success!

The airfoil break is at the spar, located 40 percent of the chord, while the turbulator spar is half that, giving an approximate 30% high point for good climb, plus moderate damping in the glide. It is quite evident at this point, that the glide of a rubber ship with freewheeling prop must be a whole lot slower than one equipped with a folder. The section then, must be at least 10% thick. Take it from me, the Cracked Rib works. Or go back a bit and use the RAF 32, if you dislike the idea of gluing all those little sticks together. George Perryman pointed out once, though, that you do it a piece at a time, and I agree.

To make this gorgeous little bird come alive, you will need to observe only a few hints from me. First off, order up a set of plans from your



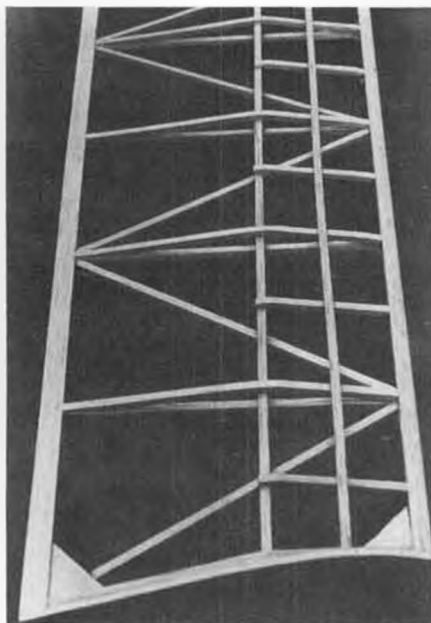
"I've been framed!" HOTBOX's nose area is large enough to accept winding tube. An Estes rocket unit works fine. Build a couple for the Nats. It won't take you long!

favorite publishing house, then knee it down to El Hobby for a miser's share of wood. The only hard stuff necessary will be four 3/32nd square pieces for the fuselage longerons (1.1 grams each). Everything else should be medium-weight, stringy sticks and very light quarter-grained sheet. Your target weight for the finished plane should be about 35 grams . . . eight of which are accounted for by the propeller and noseblock/shaft assembly.

IN GENERAL: Double glue everything with Titebond thinned about 30%

with plain water. Use a straightedge to establish pin lines around all major shapes. Cut and fit everything fingertight. Work on a flat surface. Breathe deeply while the critter takes shape.

SPECIFICALLY: The wing tips should have at least 3/32 inch washout built in. A shim is indicated on the plan. It is also not such a bad idea to add about 1/16th inch washout to the stabilizer as well. On the wing and stabilizer, I pin down all the major outlines, then add the gusseting, perpendicular rib sticks, the diagonals, next

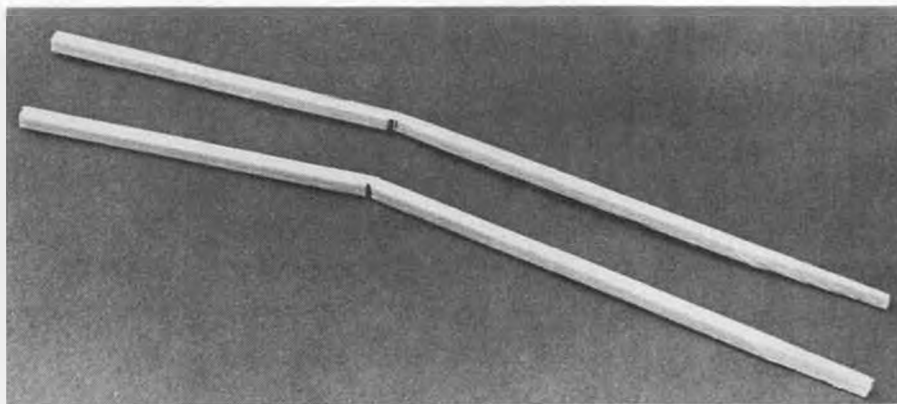


If you don't like cutting ribs, you're going to have to come up with another excuse! Tip is sheeted, and faired in.

the main spar, then the cracked ribs on top. Note that the wing spar tapers from the middle to 3/16 inch at the tips. Finally, install the riblets and the turbulator spar. Fill the center and tip ribs with soft scrap to provide a solid base for your tissue. The dihedral joint is bevel-sanded and butt glued before the little plywood brace is put in.

HOW TO CRACK A RIB: You might want to practice on the stabilizer first. Put a rib stick at the leading edge. Now make a Pentel mark where it crosses the spar. Brace the stick with a forefinger, then begin to dent/crack it with your thumbnail at the mark. The stick should crack/crush at the same time, assuming an angled profile. Put it back over the plan, trim the rear part to the trailing edge, and set aside. Do all for the panel that you are working on, then go back and trim a little off the bottom at the trailing edge side as shown in the photograph. Now brush on a spot of glue on the cracked side and let dry. If you did it right, the ribs will now fall into place without pinning, just double-gluing. If you panic, call me at (714) 235-6545, anytime. The answering service will think that you are cracked too, but I will try to get back to you.

The Fuselage: It is very helpful to cut out the big front sheet pieces and the motor peg support first, then pin the longerons and uprights around them. The extra large gussets are for launch-gripping, so do not leave them out. You will need to stack-build two identical sides, separate them, then join with the biggest cross pieces, then fill in with the others. The tail post is set in about a quarter of an inch to accept the D/T snuffer tube. Noseblock is a simple cross-grained sandwich from quarter-inch scrap balsa. The Peck/Polymers nylon thrust bearing works very well up front,



You don't have to be a football hero to crack ribs! Just mark the spot, place the stick between thumb and first finger, press down gently with thumbnail . . . and . . . crrrack!

as does their pre-formed wire prop shafts. Don't forget to line the nose and motor peg areas with some 1/16th scrap sheet. When your fuselage box is complete and as true as you can make it, fabricate the stabilizer platforms, wing rails, wing dowels, etc. Glue these on after covering, however.

What else? By now, with very little help from me, you should be looking at an uncovered, but recognizable HOT BOX. Use whatever tissueing technique suits . . . I prefer the old dope and stick it routine . . . but be sure to alcohol shrink before applying dope finish. I would suggest no more than two coats of thinned, plasticized nitrate, sanded out with well-worn No. 600 paper. Apply ID numbers, cockpit trim, name and address, etc., after the first coat. Now Hot-Stuff all the platforms, D/T hardware, and such in place. It should be the night after the day before yesterday. Just as a favor to yourself, carefully weigh all the main hunks and mark each with drafting ink, or in a notebook. You may wish to build another P-30 or so one of these days, and since wing loading as a function of total weight is the name of the game, you will at least have a base line to opt from.

HOT BOX is very slightly on the chunky side . . . you could easily use 1/16th inch stock for the ribs, main spars, and reduce the trailing edge dimensions, saving about ten grams in all. The prototype weighed in at 40 grams minus rubber . . . not bad for common lumber, great haste, and first time around. Its flying characteristics look excellent, but would doubtless be better at 30 grams. On the other hand, the bigger bits are easier to handle in building.

Does it fly? Indeed. Take careful note of the side and down-thrust angles indicated. I have been using 1977 FAI rubber, 4 strands by 3/16ths inch, which will take about 1000 turns with a Sterling winder, but the initial torque is a bit much, which explains the relatively massive offsets. A four-strand motor allows the prop to do its work without unloading too fast, albeit scary. Proceed.

Check for warps and remove any

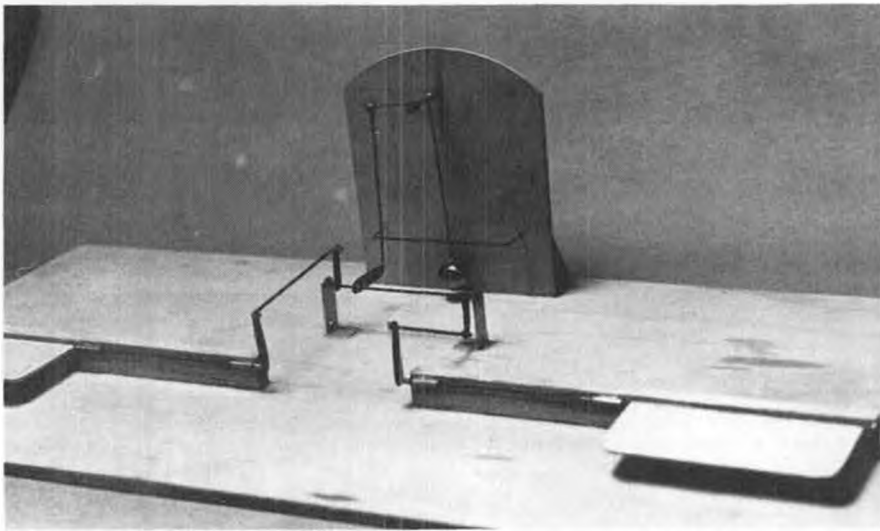
that look suspicious by steaming/twisting them out. The stabilizer/fin unit must be keyed in place, too. Put a pin in the middle of the bottom nose sheeting, then measure the fins out exactly the same distance. Mark and fit in some spruce or dowel chips on either side of the platforms. Load the model with rubber. Check the balance point. If it is where it should be, go fly. If not, correct with clay ballast. Also, squeeze on about half a pea of clay to the lighter side of the propeller blades to balance the unit. Most are hopelessly out of kilter as received. Last, if you are worried about all that rubber band hanging out the nose, in Peanut Scale fashion, get someone to lightly braid the strands. Some slack is needed to allow freewheeling, however.

DO NOT HAND GLIDE. Bent prop shaft will result. Wind about 200 turns and release. Airplane should move smartly up and to the right. If it looks a little hairy rightwise, tape a beer can tab on the right wing about halfway out

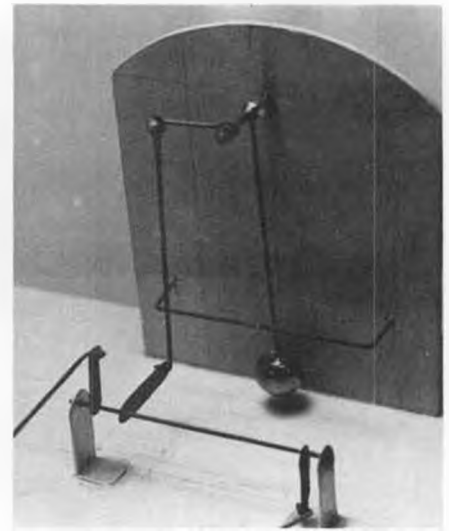
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Cynthia Sabransky winds for first flight on tent pole stooge. Harry Steinmetz motors by with his P-30 design at recent Orbiteers monthly club meet, Otay Mesa flying site.



Pendulum test set-up by Jack McCracken for ailerons in a low wing or biplane with ailerons in bottom wing. See text for more information.



Close-up of pendulum and first two linkages in control hook-up.

FREE FLIGHT SCALE

● I have an announcement that I hope will interest most scale modelers out there. In the third or fourth week of August, 1978, there will be the premier International F/F Scale Rally! This scale rally will be sponsored by the National Scale F/F Society. What, you say? Later on this year, all of the details will be worked out to get this organization under way. However, it is a fact that the contest will be held next summer, regardless. You will note that it does say International. I think it would be sensational if someone from another country would be willing to send their models to have them flown proxy, or by all means, travel the distance.

This will be a two-day affair with

flying taking place both Saturday and Sunday mornings to accommodate all of the various events. The different classes will be peanut, rubber, gas (including CO₂ and electric), Thompson Trophy, and a special multi-engine class. This latter class can be powered by any of the common means and will be flown simply as one class. All rules and regulations will be forthcoming. The flying site will be at Mile Square Park, Fountain Valley, California, which is ideally suited for a rally of this kind.

After I had written most of this article, I received the May issue of *Model Builder*. In Bill's "Workbench", there is reference to starting a National Scale Organization. The concept is to

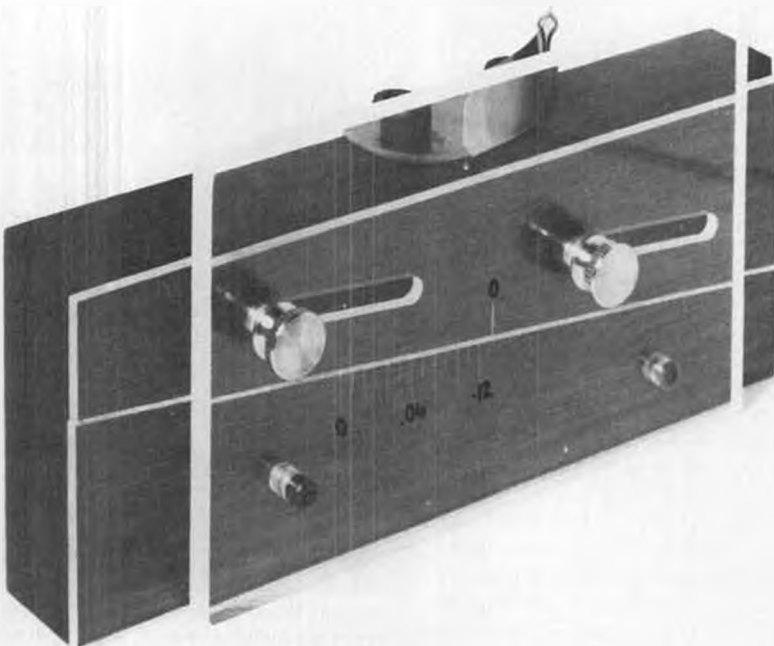
By FERNANDO RAMOS

include F/F, C/L, and R/C under one main organization. This group is to act as a sounding board for competition rules, team selections etc. Well, I hate to use this column for things other than modeling purposes, but I want to say that I am not in favor of seeing F/F scale as part of this organization. Why? Simple. F/F, as an example, has always taken a back seat to R/C, and there are a whole lot fewer scale free-flyers, and as long as R/C is involved, F/F Scale will always be the orphan. After all, where is the market directed, toward F/F Scale? Hardly. If it weren't for Peck, Flyline, Hi-Flyer and Thomas, where would the F/F Scale market be? No, I would rather see F/F Scale have a following just like the National F/F Society has with its members. Otherwise we would become another pawn in the system of the predominantly R/C AMA!

(The above paragraph is Fernando's opinion, to which he is entitled, and it is therefore published. It is not, however, the opinion of MB's editor/publisher.

As most of our readers should know by now, MB's editorial policy is not blindly R/C oriented, nor is it oblivious to the fact that a great number of scale-oriented modelers fly something other than rubber and gas F/F scale.

We wrote a letter to the AMA Executive Council last fall, suggesting that the Scale Contest Board be dissolved, and that three individual Advisory Committees; F/F, C/L, and R/C, be formed. Our primary reason for closing the Scale Board is that it cannot possibly do a suitable job for each scale category. However, an advisory committee, with proper authority established by the Executive Council, could set and process the rules for its particular



Precision balsa stripper by Jim Jones, 36631 Ledgestone, Mt. Clemens, Mich 48043, \$10.80 including postage and insurance. Cuts 1/64 to 1/8 stock to micrometer sizes.

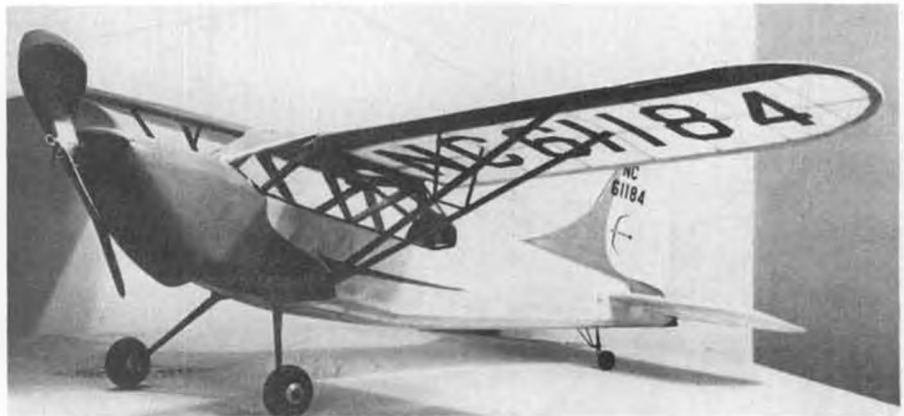
category. Its decisions would be handed over to the appropriate contest board; F/F, C/L, or R/C, for official action.

As a follow-on to these advisory committees, a national scale association could be built around these 33 members, 3 representing each district, or . . . if you wish to change positions of the cart and horse . . . select the advisory committee representatives from the national organization's membership. In either case, with 3 committees backed by one solid national organization, all scale modeling categories will have much better "clout" with our AMA rules-making Boards. wcn).

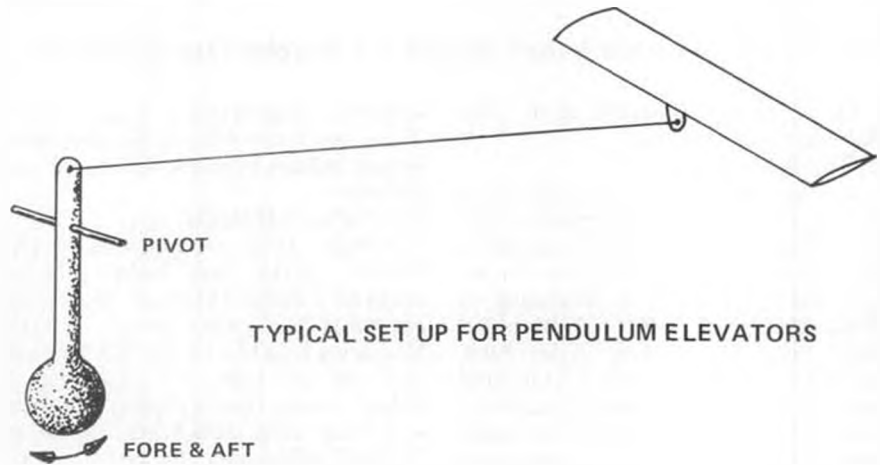
Bending piano wire has always been a pain, particularly when your hang-up is biplanes, with all of the wires needed for cabanes, struts, and landing gear. After all of these years of modeling, I can finally make several identical bends with minimal effort. I would like to show you how I do it.

Metal benders (those who work with metal, not the machine) know that every type of material has what is called a bend radius. By referring to a chart, these individuals can make any number of bends and have them come out just where they want them. Me, I want to do it in a hurry, but accomplish basically the same thing. Please refer to the sketches . . . You will note that to make a bend come out exactly where you want it, you measure back from the bend just the thickness of the wire you

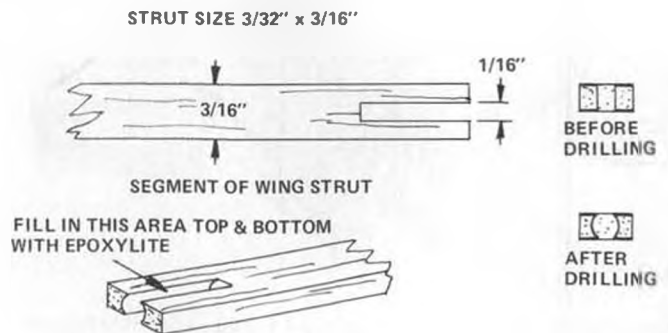
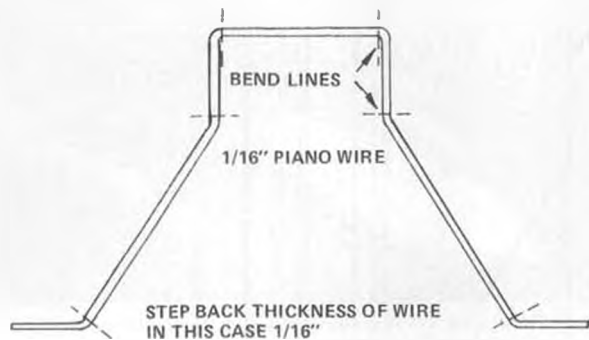
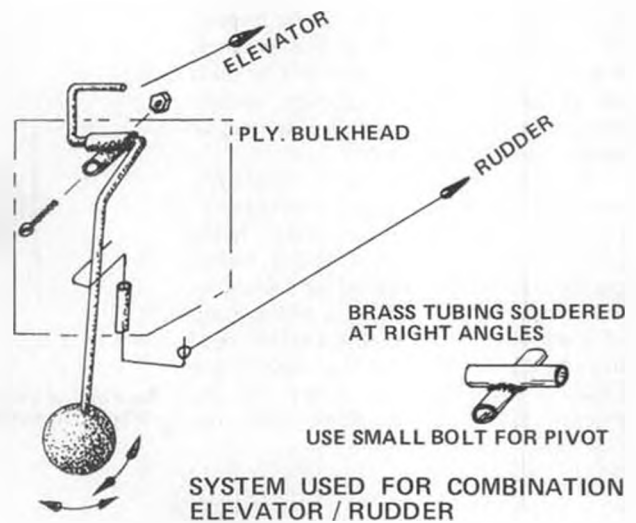
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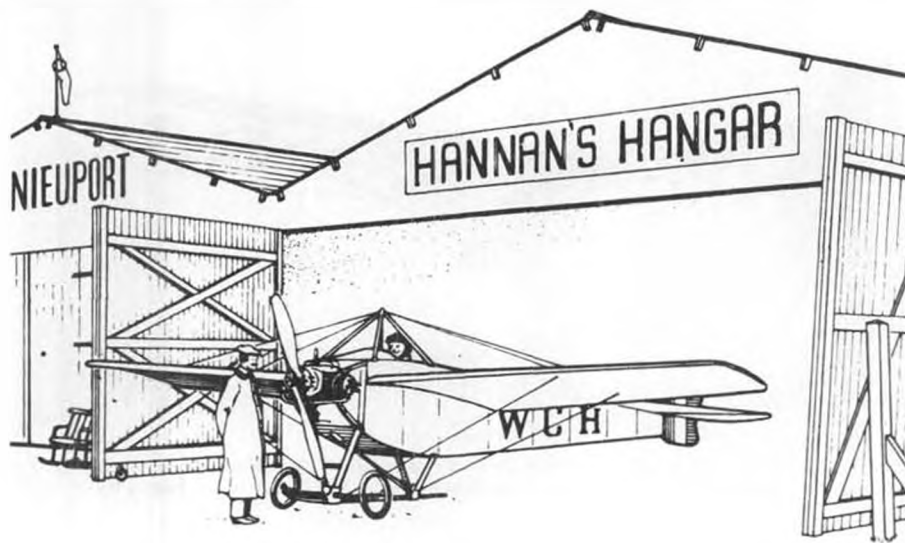


Stinson L-5, built by MB's editor in 1948, from Berkeley kit. Fully swivelled and sprung tail wheel, which did absolutely nothing for the flying qualities, but it was fun to wiggle it!



Walnut Scale "Baby Ace" by Peck-Polymers spans 17-1/2 inches, for rubber or CO₂ power. First of a series.





"To wear out the eraser before the pencil is Murphy's law in action!"

● Jack McCracken scores again, with this month's lead-in line.
THE EAA "SPIRIT"

A reproduction of the "Spirit of St. Louis", constructed by volunteers of the Experimental Aircraft Association, will be touring the United States for the next few months, in a simulation of Lindbergh's triumphant circuit undertaken upon his return from Paris, during 1927. Be sure to watch your local newspapers for the date when it may visit your area. A rare opportunity to experience the thrill many felt so many years ago. Incidentally, the EAA "Spirit" proved so unstable that a number of modifications were made in the interest of improving flight safety. For instance, the ship has quite a noticeable amount of dihedral. Perhaps future models should be based upon this machine, to avoid losing scale points?

The EAA magazine "Sport Aviation", probably the finest magazine devoted to full-scale *interesting* aircraft being published in the United States today, published a rather interesting caption in the May '77 issue. Under a photograph of a modified Fike E, the caption read in part: "A model of the low aspect ratio Fike is currently the terror of the Peanut Scale world, along with the

similarly wide-winged Lacey M-10." There you have it folks, recognition for Peanut models from the full-size aircraft builders!

DIRIGIBLE MEMORIAL

Hangar One, at the U.S. Navy's Moffett Field, has been officially declared a Naval Historical Monument, according to a news release by UPI. Measuring 1,133 feet long, 308 feet wide and 198 feet high, the building is an indoor model flyer's dream. The eight-acre floor area (about the size of ten football fields) was the test-flight site of the XFY-1 Pogo VTO aircraft of the



Mike Mulligan with his Chester "Goon" rubber powered Thompson Trophy model.

1950's. The craft was tethered during trials, however. Presently, the building contains other buildings (!), including two large flight simulators and various classrooms. Any mention of blimp hangars makes us yearn fondly for a return to the Tustin (Santa Ana) hangars, which unfortunately are presently out-of-bounds for political reasons.

CO2 NEWS

In describing the British TELCO CO2 engine, which features an eccentric crankshaft bushing to regulate the

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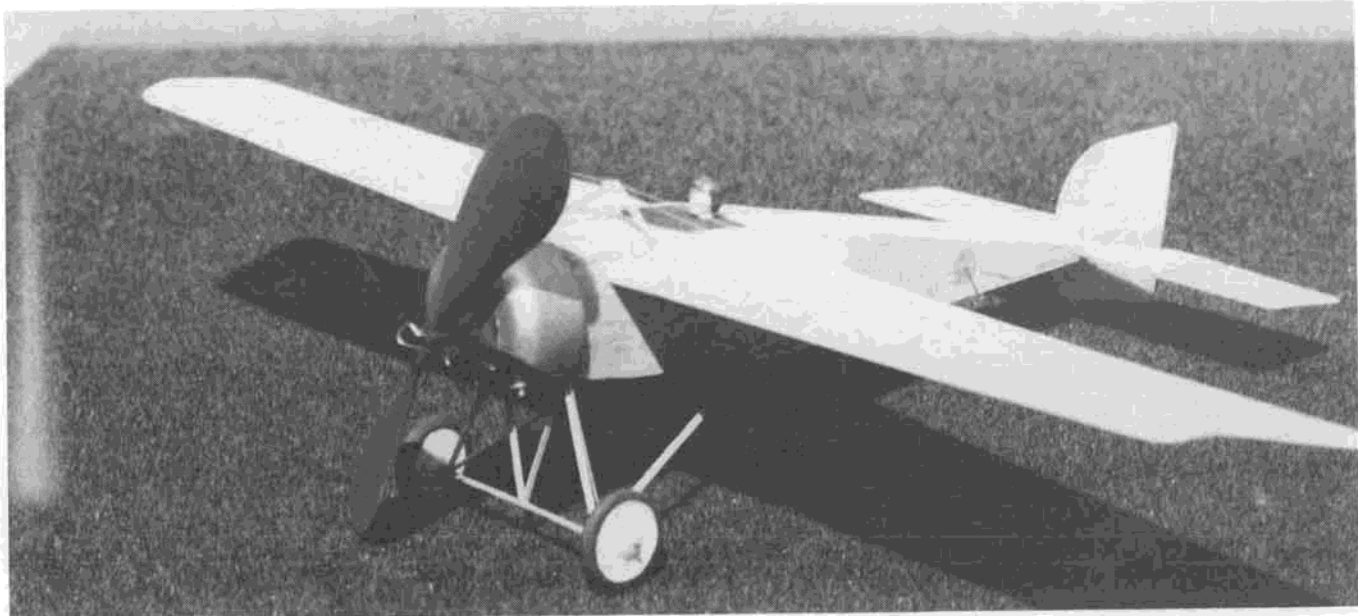
Rare bird photographed in landing pattern at Flabob Airport, near Riverside. Polish STOL PZL "Wilga". Radial engine version of ship modeled by Don Typond, seen on MB's Jan. '75 cover.



Milan Kacha, Czechoslovakia, built this 6-1/2 inch span "1/2 Peanut". S.E.5A weighs only 2.7 grams! Photo by Gullenberger.



Buck Rogers' rocket ship toys, belonging to Jim Gerard. One at left is "new in the box", while other has seen better days.



MORANE SAULNIER RACER

By WALT MOONEY . . . Ya say you'd like to fly a Peanut, but don't like gluing all those little sticks together? Tell us what we're gonna do. Just grab a couple of sheets and come on out to the workshop!

- The original aircraft was built before 1912, so it is truly a pioneer aircraft. The vertical fin was very small, but the rest of the surfaces were of ideal dimensions for a Peanut Scale model. The real airfoil section is quite suitable for sheet balsa simulation, so a simple sheet balsa model was inspired. The original model has flown as long as 30 seconds indoors, but most flights have been about 27 seconds. One change from the plans will be apparent in the photos. This is the fact that the vertical tail, as drawn, proved to be too small, and forced a replacement with a larger one. The nice thing about an all-sheet model is that such modifications are easy and quick.

The larger the propeller you select (or the higher its pitch), the larger the tail must be. Use the cut-and-try method to determine how big it must be on your model. A small, low-pitch propeller like the "Kayson" may allow you to get away with the tail shown.

The structure of the model is quite simple, consisting mostly of cementing together precisely cut pieces of balsa sheet. So, the first effort will be to discuss methods to be used when cutting balsa to precise dimensional patterns.

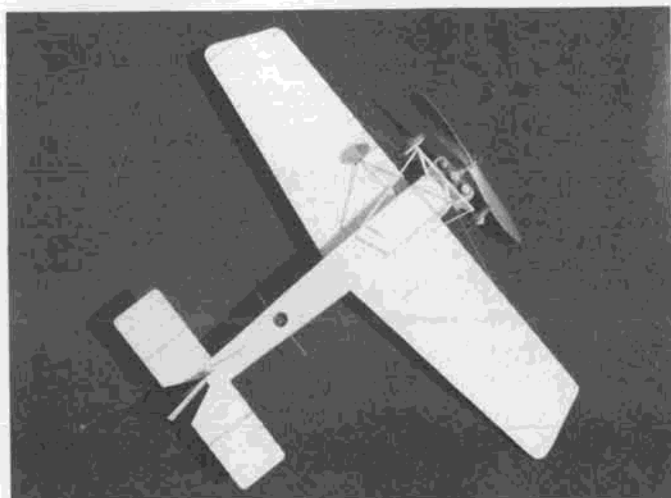
First, consider the wood itself. Balsa is a light, strong wood, however, it is very variable, both in weight and in strength. Generally, the lighter the wood, the softer and weaker it is. Even so,

by careful selection, you can find pieces which are optimum from a strength-to-weight basis. Weak pieces tend to crush when being cut. Balsa also is a grainy wood with variations in hardness following the grain direction.

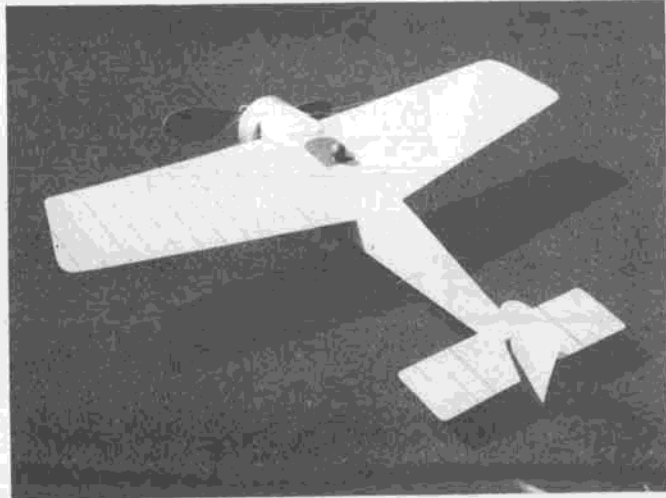
The weapon you use to cut your balsa must be sharp. Razor blades have been the old standby for this job over the years, but the UBER SKIVER knife sold by Model Builder Magazine is the modern first choice. Even Uber Skiver blades can get dull once in a while, so a fine stone is nice to have available to touch up the edge of the blades, when needed.

Cutting balsa across the grain,

Continued on page 80

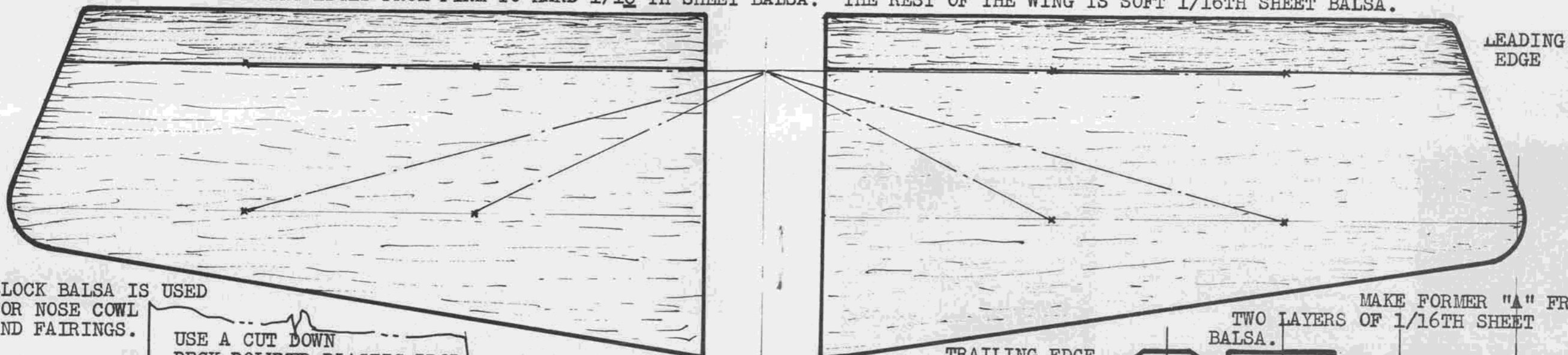


Strange . . . it doesn't look that much different from below than above! Wing is slightly Jedelsky-like in section. Plenty of lift.



Check the instructions regarding vertical fin size. Whatever you do, just tack it on lightly until your sure it will do the job.

MAKE WING LEADING EDGES FROM FIRM TO HARD 1/16 TH SHEET BALS. THE REST OF THE WING IS SOFT 1/16TH SHEET BALS.

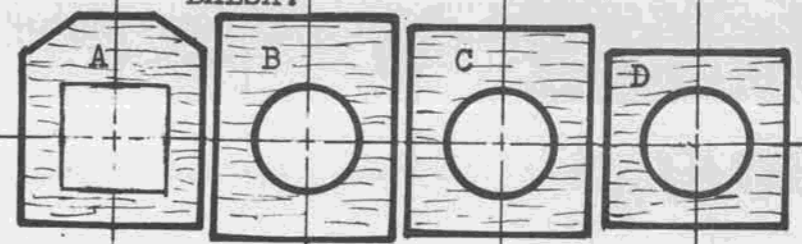


BLOCK BALS. IS USED FOR NOSE COWL AND FAIRINGS.

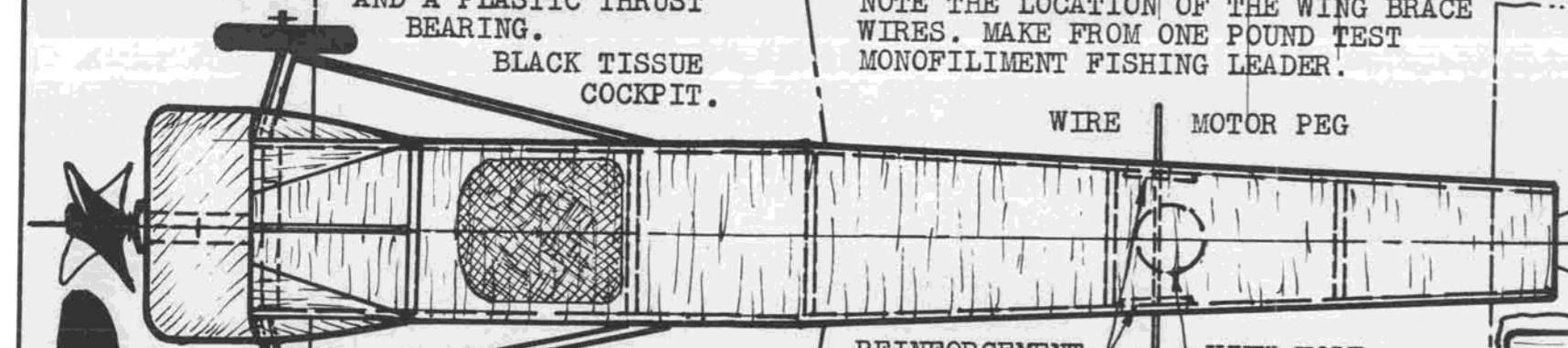
USE A CUT DOWN PECK POLYMER PLASTIC PROP AND A PLASTIC THRUST BEARING.
BLACK TISSUE COCKPIT.

NOTE THE LOCATION OF THE WING BRACE WIRES. MAKE FROM ONE POUND TEST MONOFILAMENT FISHING LEADER.

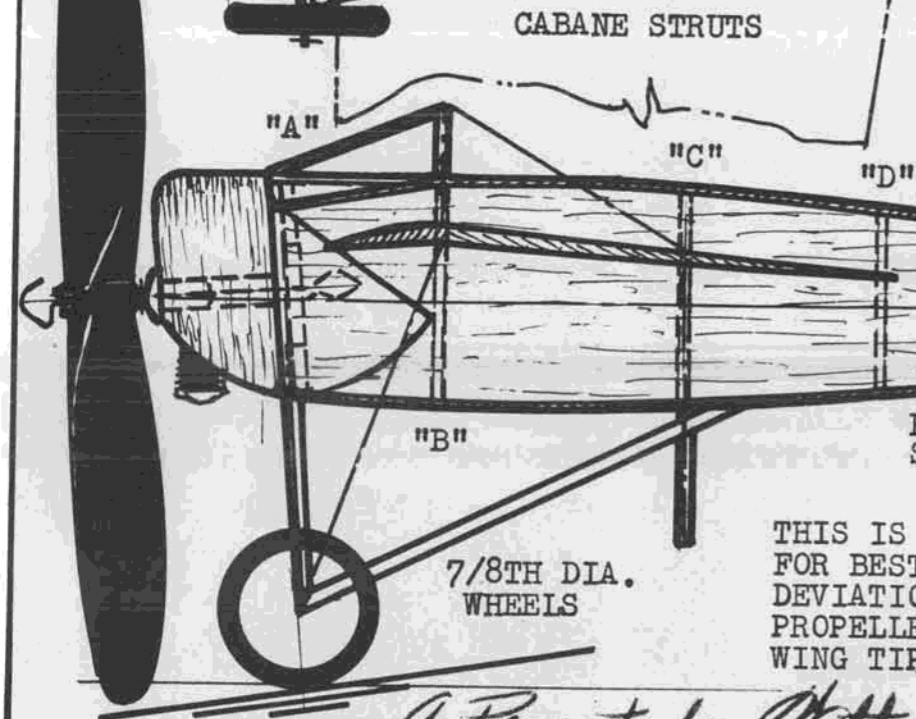
MAKE FORMER "A" FROM TWO LAYERS OF 1/16TH SHEET BALS.



MAKE BODY FORMERS FROM 1/16TH SHEET BALS. EXCEPT AS NOTED.

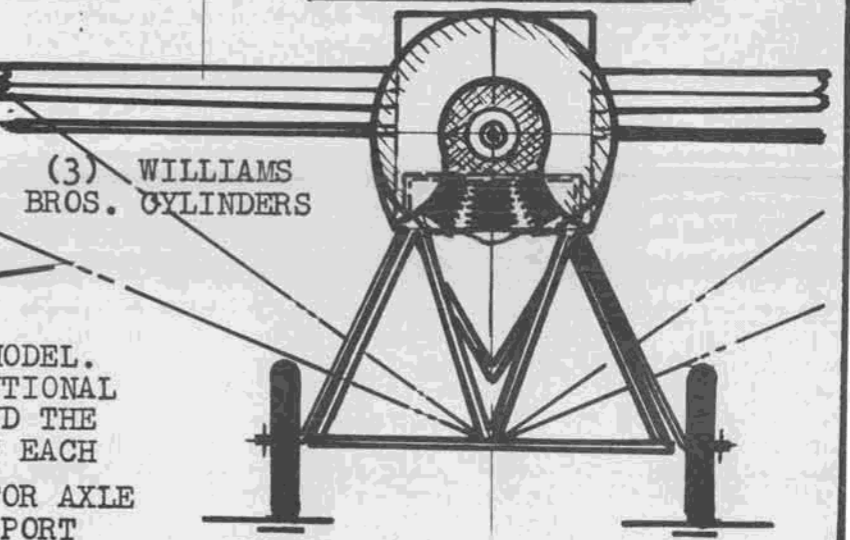


REINFORCEMENT VIEW HOLE
MAKE TAIL SURFACES FROM LIGHT 1/32ND SHEET BALS.
MAKE FUSELAGE TOP AND BOTTOM FROM 1/32ND SHEET BALS. NOTE GRAIN DIRECTION. LANDING GEAR STRUTS, CABANE STRUTS, AND TAIL SKID, ARE MADE FROM THIN BASSWOOD STRIP.



7/8TH DIA. WHEELS

FUSELAGE SIDES ARE CUT FROM 1/16TH SHEET BALS.



(3) WILLIAMS BROS. CYLINDERS

THIS IS A SIMPLE ALL SHEET BALS. CONSTRUCTION PEANUT SCALE MODEL. FOR BEST PERFORMANCE SELECT LIGHT FIRM BALS. THE ONLY INTENTIONAL DEVIATION FROM EXACT SCALE, IS THE ENLARGED VERTICLE TAIL AND THE PROPELLER DIAMETER. DIHEDRAL IS ONLY A QUARTER OF AN INCH AT EACH WING TIP.

USE 1/32ND DIA. (OR THINNER) MUSIC WIRE FOR AXLE AND MAIN LANDING GEAR STRUCTURAL SUPPORT

A Peanut by Matt Mooney

MORANE SAULNIER RACER



MODEL ROCKETRY

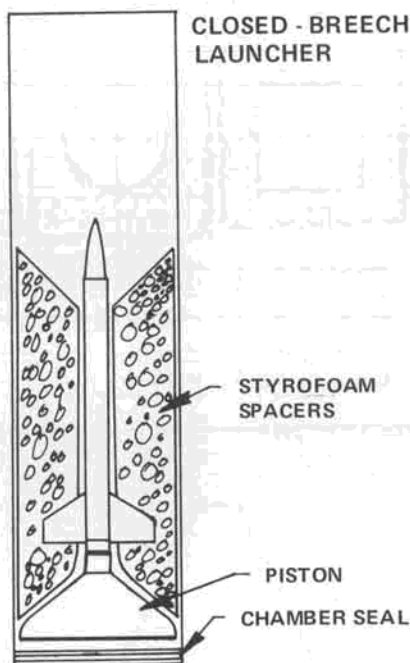
By DOUGLAS PRATT

• Some time ago, I received a letter asking for more information concerning the strange, oft-mentioned "piston launchers." These little devices are ubiquitous in competition, and have their applications in sport flying, too; so it is not out of place to devote space to their construction, care and feeding.

One of the basic Pink Book rules states that no launcher shall be used which imparts velocity to the model using any power source other than the engine contained in the model. This was originally written, I believe, to allow the use of closed-breech launchers, which use exhaust gases to pressurize a tube that surrounds the model in a bazooka-like manner. However, since they are pretty complicated and far from fool-proof, closed-breech launchers seldom appear on the contest scene. As shown in the illustration, the outer tube must be large enough to accommodate the largest diameter of the model; this works against efficiency, since the more space the engine has to pressurize, the less pressure will be built up and converted to momentum. The base plug has to slide easily in the tube, and the spacers that are necessary to maintain accurate aiming of the model also create friction. Altogether, the closed-breech launcher creates more problems than it solves, although I recall a Dual Egglifter which placed at a recent NARAM,

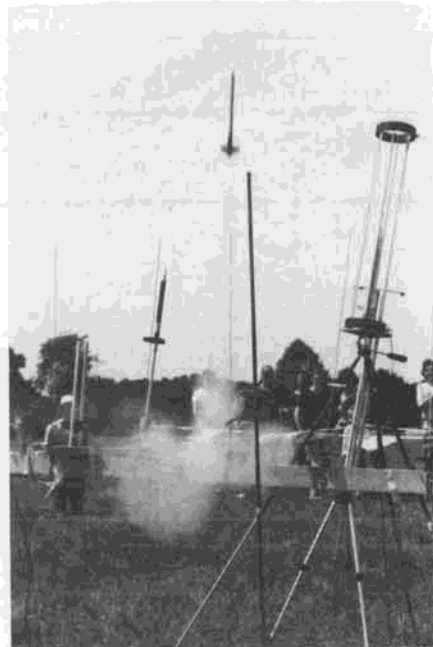
that was popped out of a tube.

The piston launcher is a far more effective pressure-assist launching device; it also has the advantage that it is simple to design, construct, and use. Basically, it is a tube that fits tightly over the projecting end of the engine casing (which is designed to project about 1/2 inch). This tube moves; either inside a larger tube or along the length of a dowel fitted into the inside. When the engine ignites, the exhaust gases pressurize the tube, which slides the length of the device, imparting extra velocity to the model. At the end, the tube strikes a stop, and the model pops out of the end of the device. Tests have shown that the extra velocity imparted can increase altitudes as much as 20%. It has also been demonstrated that the extra kick is almost enough to eliminate the need for a launch lug and rod or other guidance device (we'll discuss the "almost" in a minute).



The "original" piston launcher consisted of engine-mount-size tube (Estes BT-20 or Centuri ST-8) sliding in a tube of slightly larger diameter (Centuri ST-10). A centering ring was glued to the lower end of the piston tube, and to the upper end of the sleeve tube. The piston tube is inserted through the sleeve tube from the bottom, and the bottom end of the sleeve tube is plugged. The engine is inserted in the top of the piston tube, and at ignition the exhaust pressurizes the inside of this tube. As thrust builds up, so does pressure inside the tube, and the tube moves upward. At full extension, the centering rings prevent the piston tube from sliding out of the sleeve, and the model pops out of the piston.

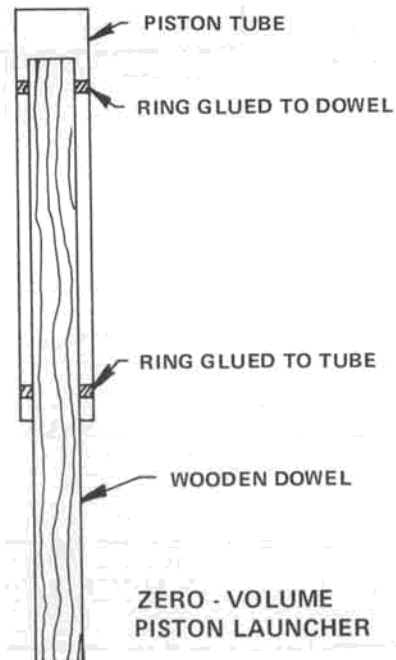
This design made its first appearance many years ago, and I'm not going to start a fight by giving anyone credit for the invention. Like so many other things,



Piston launchers at NARAM-18. Note tower launcher at right and smaller paper tube tower launcher at far left.

it depends on who you're talking to at the moment.

Of course, as the piston extends, the area to be pressurized expands, and efficiency is decreased; so the next step was to find a way to reduce the volume that the engine had to pressurize. This led to the Zero-Volume piston launcher, or ZVPL. (Spacemodelers are incurable inventors of acronyms.) The ZVPL consists of an engine-size piston tube, which slides on the outside of a wooden dowel. The dowel is not a slip fit inside the tube; centering rings are used to provide a stop when the piston tube is at full extension. This design is by far the more efficient system, since the volume of the piston at ignition is zero. Furthermore, by sharpening the nether end of the dowel, the whole business



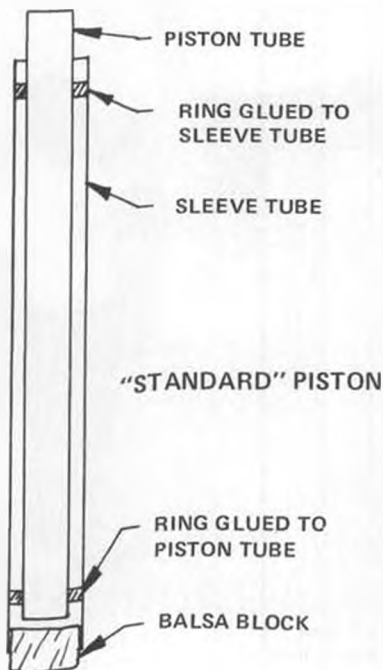


Jeff Flygare, editor of Buffalo "Satellite" n/1, hooks up altitude bird to CMR Boom Tube.

can be simply inserted in the ground at an appropriate spot for launching.

There is a commercially-available piston launcher, the "Boom Tube" ZVPL from Competition Model Rockets, Box 7022, Alexandria, Virginia 22307. The Boom Tube features a slippery nylon centering ring for the top end of the dowel, to reduce friction. It also has ignition wires that make contact with ignitor leads by resting on the top of the dowel, solving (most of the time) an annoying problem. Write to CMR for a catalog; but if you don't mention that you read about it in *Model Builder*, your launch battery will go flat at your next public demo.

The illustrious Bauer-Tholen-Porzio-DelVecchio team, of the Brooklyn Rocket Society (known to the intelligentsia as the Modroc Mafia) has developed a ZVPL that seems to be



practically indestructible. The sleeve tube is phenolic, which makes it impervious to burning in the exhaust. They report hundreds of launches from the little gems, with the only maintenance being an occasional cleaning of the ignitor contacts.

Speaking of which, it's time to discuss the various methods of igniting an engine that is totally enclosed by the end of a piston tube. The simplest method is to use an ignitor with long leads, such as the Centuri Sure-Shots. Install the ignitor in the engine, and slip the engine into the tube in such a way that the ignitor leads slip between the engine and the tube and (hopefully) stick out beyond the edges of the tube. Hook up your clips to the projecting leads. Of course, when the ignitor wire heats up enough to ignite the propellant, it'll also char and eventually weaken the top of the tube; but deterioration from the engine exhaust will force you to replace the tube soon anyway. I've seen some ZVPLs with holes drilled in the top centering ring, and ignitor leads run through the holes and epoxied in place. The wires can be left bare and twisted around the ignitor leads, which is simple but unreliable; or a pair of micro-clips can be attached to the leads for hookup. Tape is used to keep the clips from shorting out against each other. The piston tube is slid completely off the centering ring while the ignitor leads are connected; after the connection has been made, the tube is slid up around the engine casing and continuity is checked.

As mentioned earlier, some people have the idea (it amounts to a belief) that piston launchers impart so much extra velocity to the model, that no form of launch guidance is necessary. True, it works sometimes, but "sometimes" isn't enough, from either safety or competition standpoints. The most common method of auxiliary guidance is to simply enclose the model and piston in a tower launcher. The tower does its usual thing, and the model is not subject to tip-off as it leaves the piston. Incidentally, for the uninitiated, a tower launcher is three rods set in a tri-form pattern on a base. The bird slips down between the rods. Launching from a tower means that you don't need a launch lug, which accounts for as much as 20% of drag on a model.

I whipped up another auxiliary guidance method, and used it with success at ECRM-9, a few years back. This is based around the dandy CMR "pop" launch lug, which comes off the model at the top of the launch rod, having performed its function. Use a long rod. Glue a launch lug to the outside of the piston launcher, and slip it over the rod. Slip the model on the Poplug, and attach to launch rod. Then simply attach the model to the piston. There is enough rod left over to prevent tipoff,



Mike Micci connects altitude entry to his advanced piston launcher, which is enclosed in clear tube and mounted on tripod.

as long as you make sure that the model has some rod still to travel after the piston separates. A simple (not to say simpleminded) trick, but it works.

In competition, the piston launcher is useful in any event where some added initial velocity is helpful, i.e. all of them, with the minor exceptions of things like Superroc, Predicted Altitude, and Spot Landing. In Scale, some of the heavier

Continued on page 79



A rack of Single Egglofters, two with pistons and two without.



Taft, California's famed kitty litter plant forms background as some of the nation's finest A/2 fliers line up for the start of another round.

U.S. WESTERN REGIONAL Nordic Team Trial

By GARY MEDLEY . . . "Many qualified, but only one was chosen." Our reporter made this comment after photographing and analysing the tough, winner-take-all, Western Trial for the U.S. 1977 FAI Nordic Team.

• Something about Taft, California, beings out the best in Jim Walters' Nordic flying. Maybe it's the desolate terrain, or the smoke-belching kitty litter factory, or the scorching heat. For sure, it's the pressure of the big contest. Walters, from Seattle, Washington, bested 18 of America's toughest A/2 glider fliers in the United States Western Regional, and earned himself a spot on the American team for the second time.

In 1974, on this same Taft field, Walters placed first at the team selection finals, again beating the finest glider towers around . . . Something about that Taft field.

That a Nordic team for the upcoming World Championships was chosen at all, is a bit of a miracle. The regional format (two other regional contests were held in the East, each selecting a flier for the team) resulted from a year's worth of votes, compromises and committee meetings following the wind-blown cancellation of the 1976 Finals on Labor Day. Finally, with the World Champs closing in, a three-site finals became the only alternative, despite worries that such a plan would penalize geographic areas with an abundance of quality fliers by selecting only one for the team. It was decided that on Friday May 27, the day before the United States Free Flight Championships, Taft Condor Field would be the site of the Western Regional.

With Taft's flyable weather conditions, plus the lure of the Free Flight Champs, the Western Regional drew the most, if not the best, A/2 competitors, of any regional, including 1975 Team members Bob Isaacson, of Westminster, California, and Walters. This finals, however, differed from any previous finals in one big way . . . it was winner take all. Only one . . . not three . . . would be chosen.

The contest format was the same as in Minnesota: Eight rounds, with a three-round flyoff the following morning, consisting of progressive four, five and six minute maxes. All fliers with eight maxes, or 98 per cent of a perfect score advanced to the shootout. Only a scant 28 seconds could be dropped.

TECHNICALITIES

To fly A/2 is to circle-tow. At Taft, 12 out of the 18 fliers circle-towed in some fashion or another, with every device demonstrated, save the French offset twanger. Most used a Russian-style hook, using a spring-loaded latch to keep the tow ring secured. As the tension on the line increases enough to pull the hook away from the latch . . . usually about 6-7 lbs. force . . . the latch springs away, actuating the rudder for the zoom launch, and launching the model. A wide variety of this style of hook was used.

Four fliers, Tom Hutchinson,



Jim Walters checks out ship between flyoff flights. Second consecutive finals victory.



Jim Wilson, Redondo Beach, California, flew V-dihedral ship within 5 seconds of the flyoffs.



business end of Don Zink's "Wishbone". Twanger system uses a plunger to actuate rudder for zoom launch.



Da winnah and still champeen, Jim Walters. Second calm air flight in flyoff of 4:11 did the trick. It was that close, however.



Models were weighed in before each round. Zinc checks in, as Wilson and Walters wait.

These had no zoom launch function. Don Zink, however, had his ring connected to a spring-loaded plunger, which, when tension on the line was increased, the rudder deflected as on the Russian-style for the catapult launch. Bauer used yet another approach . . . the German twanger. Instead of using an impulse device on the line, the twang came from the hook . . . a torsion spring mounted on a brass plate. To further complicate matters, Bauer incorporated a plunger to achieve a zoom launch.

While many Russian-style hooks were used, only Jim Wilson, of Redondo Beach, California, used the Russian-Russian hook. One of his backup models used the multi-function, sliding aluminum plate hook designed by Issaenko of the famed Russian Nordic team.

And for nostalgia's sake, six fliers relied on the age-old method of straight towing, believing it's not how you tow, but when.

Styles and methods of towing also varied. The Pacific Northwest contingent . . . Walters, Portland, Oregon's Wayne Drake, Seattle, Washington's Guntis Sietins, and Denver, Colorado's George Batiuk . . . towed with monofilament fishing line, reeling it in hand-over-hand. The Southern California fliers . . . Zink, Isaacson, Costa Mesa, California's



(l to r) Andy Bauer, Kenny Bauer, George Batiuk, Juan Livoto, and CD Bill Hartill.

Lee Hines, Bauer . . . used hand-held winches to move the model through the sky. Other hand-over-handers were Wilson and Diez. Those using winches preferred a braided Dacron or Micron fishing line. Both the monofilament and braided line were of 40 to 50 lbs. test.

The straight towers were Atkinson, Gail Gewain, Larabee, John Lenderman,

Continued on page 83



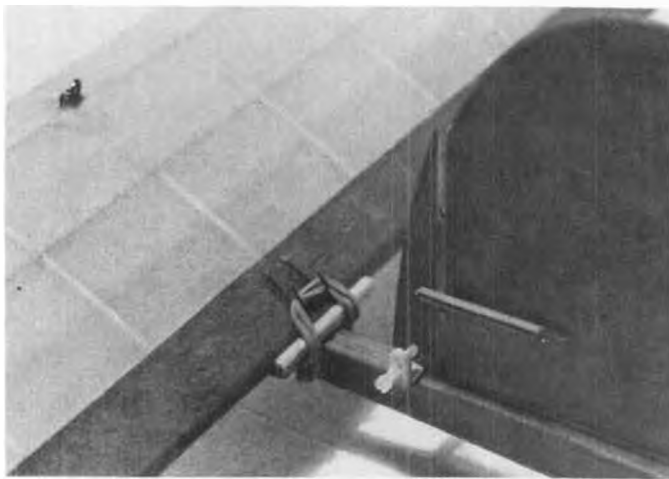
Dr. Wayne Drake, dentist, Portland, Ore., maxed out Friday, was third in flyoff.



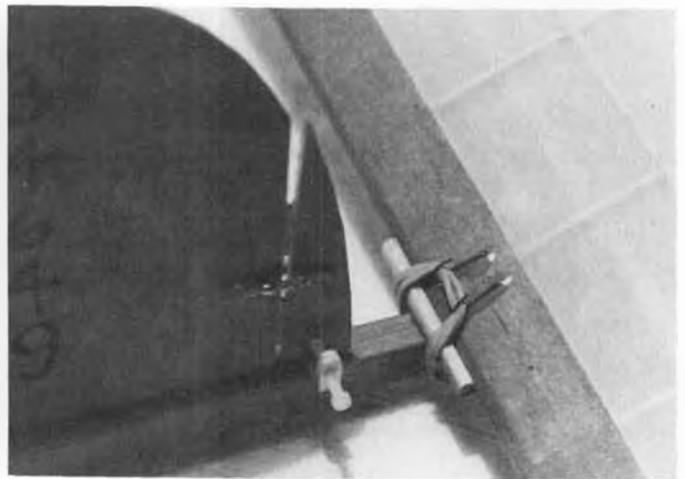
Lee Hines launches Don Zink's Wishbone on final flyoff flight. Missed win by 40 seconds.



Guntis Sietins, Washington, plays soccer for conditioning. Just missed flyoff.



Autorudder setup on Coupe model, shows rubber band to pull rudder into position. Nylon 2/56 bolt in bracket limits rudder travel.



Other side of rudder shows line from timer. Gap caused by R/C type hinge cuts down efficiency and doesn't look too great.

FREE FLIGHT

By BOB STALICK

• In looking back at recent issues of *Model Builder Free Flight*, it became apparent that the column was beginning to look alike from month to month. As a result, I have decided that this month, at least, things would be different. First, if you are looking for the Mystery Model, good luck. There isn't one this month. But there is a bunch of other stuff, like:

AUTORUDDERS

Autorudders have been used in free flight models for many years. There must be a reason, and guess what . . . there is! In fact, there are several reasons. One reason for the use of auto-rudders is to allow the model to be trimmed with different rudder settings for power and for the glide phases of the flight. Many models need to have the rudder set straight or slightly to the left during the power phase and to switch to the right for the glide phase (in a right/right flight pattern). An Autorudder allows this kind of setting without the compromises which are usual in a non-autorudder equipped type of model. Another reason for autorudders is to establish the glide circle. Usually, this kind of arrangement is seen most often in A/2 gliders, where the autorudder

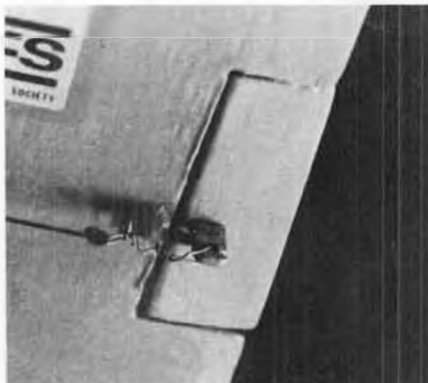
is used not only for straight tow, but also for circle tow, zoom launch and glide phases. These differences are caused by varying the angle of the offset in the autorudder. Usually, in a power model or rubber model, the autorudder has less effect on the total glide pattern. The third reason is to assist with transition from power to glide phases. Usually, models with small autorudders, such as those normally seen on power models, are used for this purpose.

Now, those are the reasons. If any appeal to you and you haven't tried autorudders in one of your models, the following will be of interest. Autorudders can be installed on any kind of model (with the possible exception of hand launch gliders). What is needed is some kind of hinging system, an adjustable stop on either side of the rudder, something to pull the rudder to the correct angle (usually a spring or a rubber band), and a device to actuate the rudder. The following descriptions, along with the pictures accompanying this month's column, should give you enough inspiration to get you started in using the autorudder.

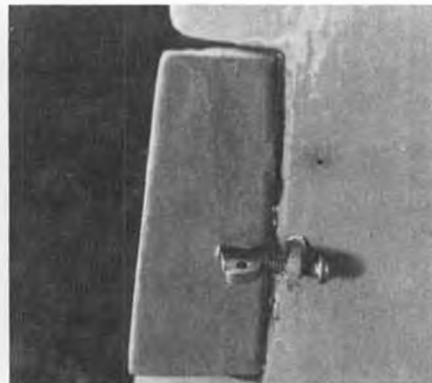
The hinging system: The autorudder must move freely back and forth without

any need for undue tension to force its movement; therefore a bind-free hinge is a must. In addition, it should be lightweight. Up until recently, the usual system was to cut small lengths of 1/16 aluminum tubing and epoxy 2 or 3 on the rudder and another two or three on the fin, then thread a piece of 1/32 music wire through them to attach the rudder to the fin. Newer developments from the R/C fraternity have alleviated this old style system. Klett hinges are lightweight, thin and easy to install. They are nearly universally used. Two of the small size hinges are very adequate for any autorudder system. If the rudder is made of thin wood, e.g.: thinner than 1/8, the installation is a bit trickier and more care must be taken to align the slots. In addition, if the rudder is narrow, then the Klett hinge must be cut down.

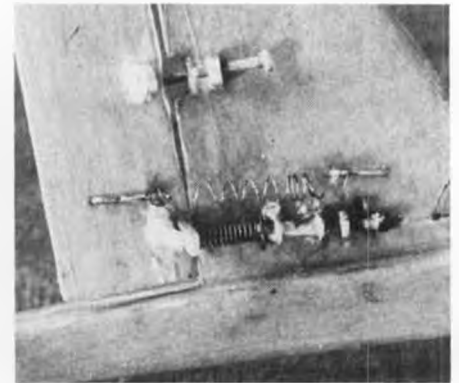
Tom Hutchinson has used a strip of the plastic covering material, such as Monokote, to act as an autorudder hinge. The strip is ironed on to both the fin and the rudder, on one side only. It should be pointed out that he uses this system on his Dragmaster A/2 gliders, but there is no reason it couldn't be used on rubber powered models, too. I would shy away from using



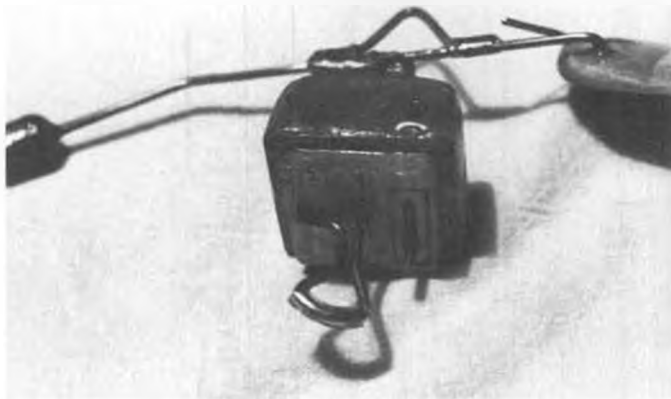
Rudder on author's FAI power model. Screw stop and line attachment are combined.



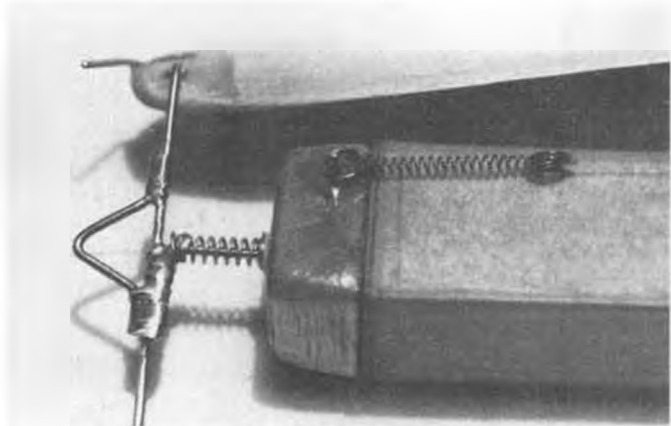
Other side of FAI Power ship rudder. Spring built into hinge, only turn stop is needed.



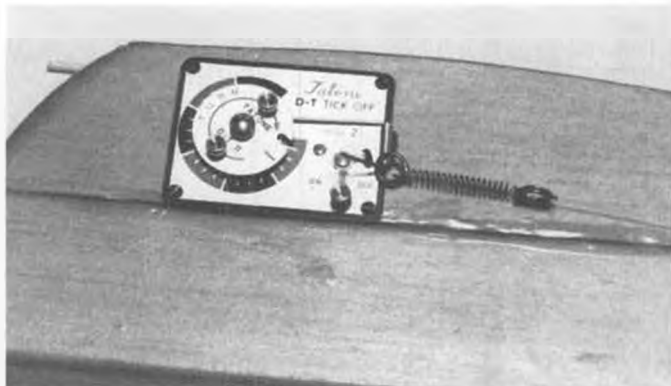
Complicated autorudder setup on circle-tow glider. Modified Hartschek/John Clear plunger.



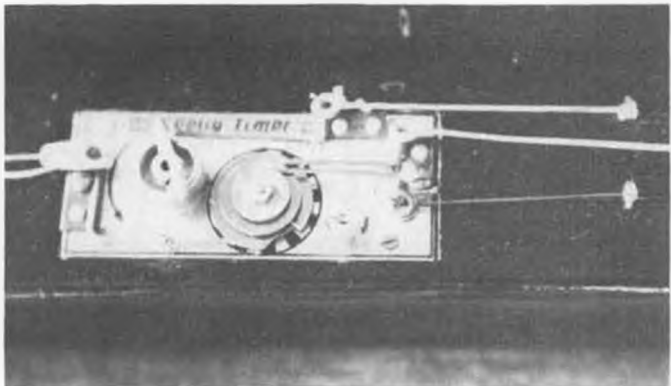
Rubber's eye view of "Horton Trigger" used to actuate various devices on rubber powered models.



Horton Trigger rigged up for autorudder. When rubber runs down, and prop stops, trigger releases rudder into glide turn.



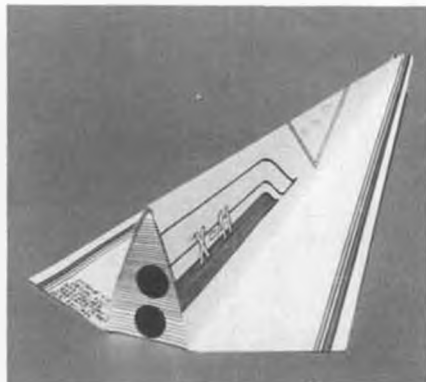
Tatone D.T. Timer used as an autorudder actuator on a Wakefield model. Tension spring lasts longer than rubber band.



Seelig timer installation. On right side, top to bottom, you have D.T. line, auto stab, and auto rudder lines. Whew! Keep 'em straight!

it on gas models, however.

Adjustable stops: The pictures accompanying this article show two kinds of adjustable stops. The purpose of the adjustable stops is to allow for fine



Bob Meuser entered this in the 5th Annual National Paper Airplane Champs. Placed 3rd, with a 2nd in distance. No wonder he had no time to continue as editor of the NFFS Digest!

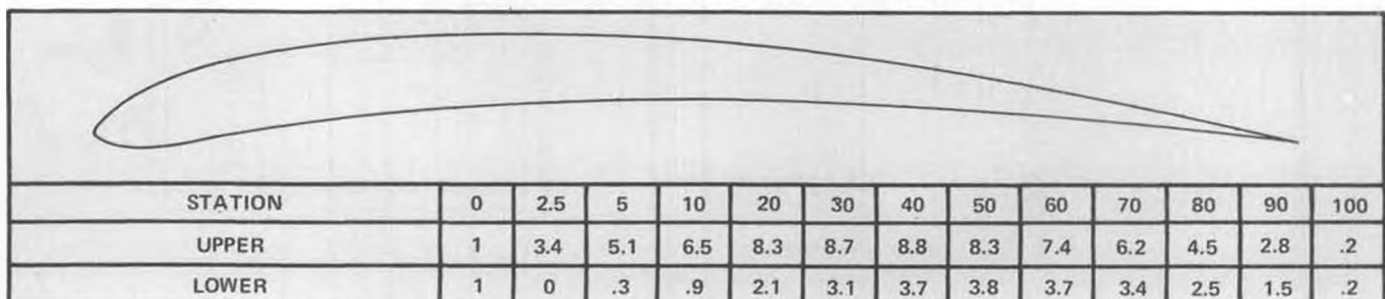
adjustments to the amount of rudder throw while on the field. It is not unusual to have to make such adjustments from one contest to the other as well as throughout the day, if wind conditions or other atmospheric changes occur.

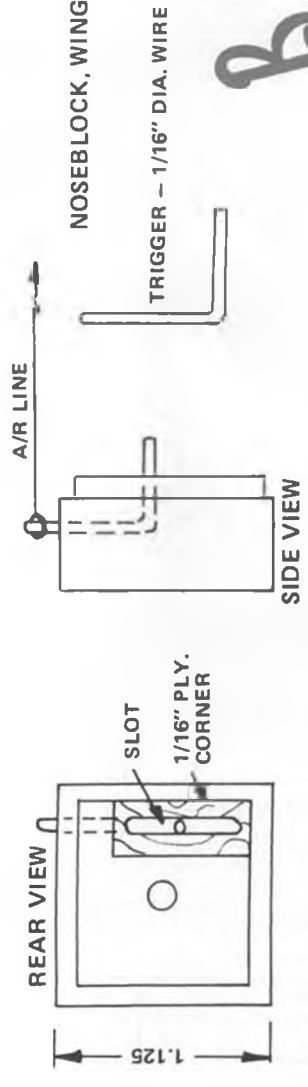
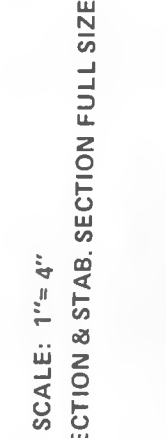
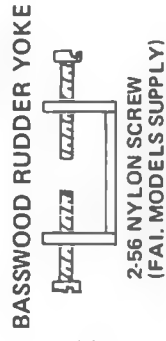
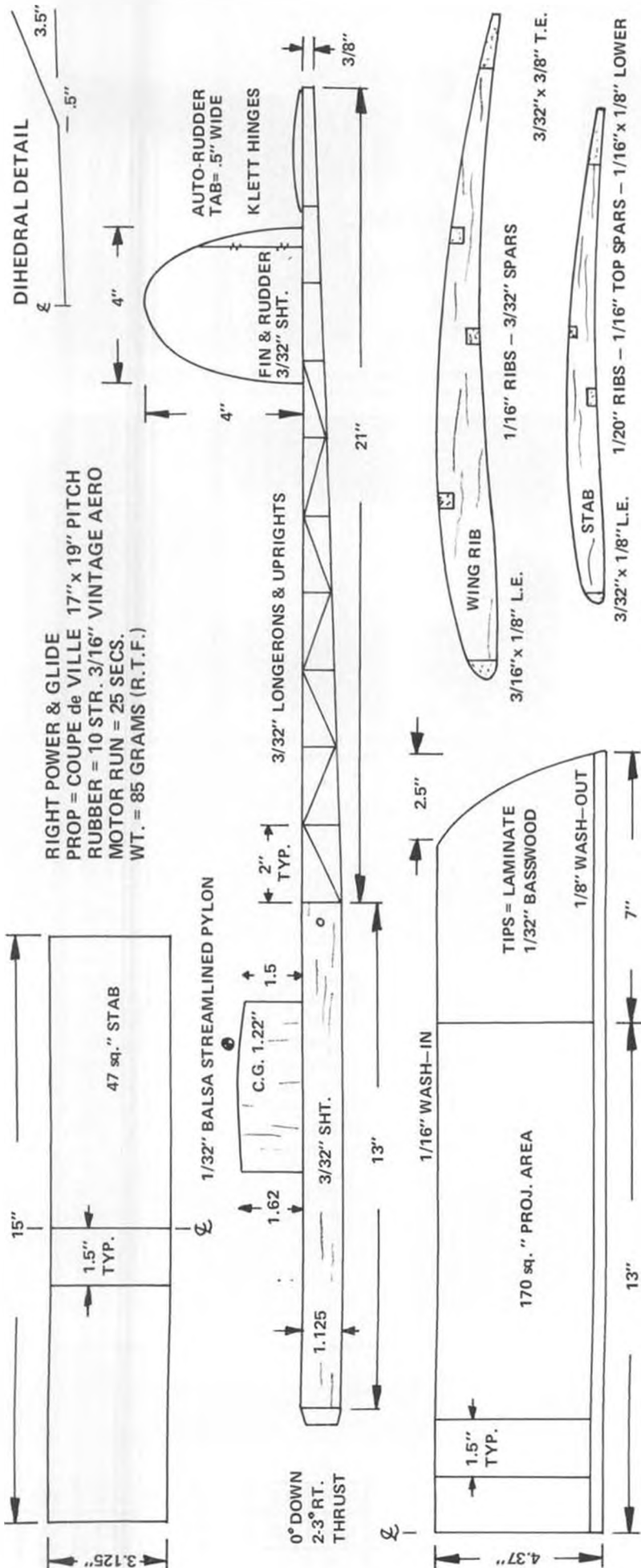
Again, the requirements for the autorudder stops include light weight and positive action. All of the autorudder systems pictured use a piece of tapped metal (aluminum strip), nylon or wood, and 2/56 bolts. The bolts are threaded into the metal, nylon or wood, and screwed down until they meet up against the rudder or a rudder stop. Then they are backed off during the initial flying stages of the airplane until the proper power pattern and glide patterns are obtained.

The autorudder is actuated by several means. In power models, the standard device is a timer. Both the Monks and the Seelig timers have the capabilities

to actuate. The K-Mart timer can be constructed to have an autorudder function and the Tatone floodoff timer is also usable nearly as is. In A/2 gliders, the autorudder is actuated by towline release. In rubber models, there are several ways. Two are pictured in this issue. One is to use a timer, another is to use a device which is actuated by the rubber motor, as is the case with the Horton trigger, diagrammed in this month's three-view. One way, not pictured, is to use the torque of the unwinding rubber motor. Essentially, the systems have the same kinds of features. There is some sort of spring or rubber band attached between the rudder and the fin to pull the rudder into its glide phase. There is a line attached to the opposite side of the rudder, and the other end of the line is attached via a releasing loop to the timer autorudder arm, or whatever other system for actuating is used.

DARNED GOOD AIRFOIL — HA-13





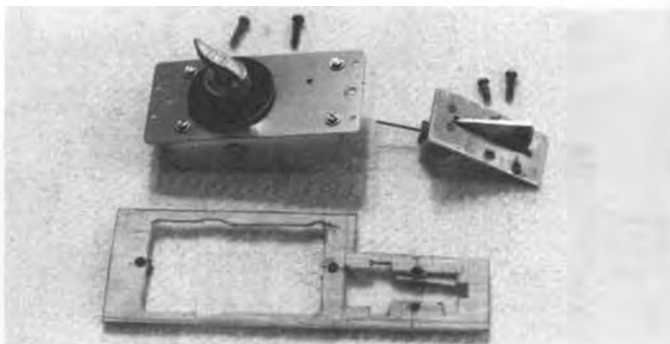
Billie's Bounce

A COUPE D'HIVER WITH AUTO-RUDDER BY STAN FINK

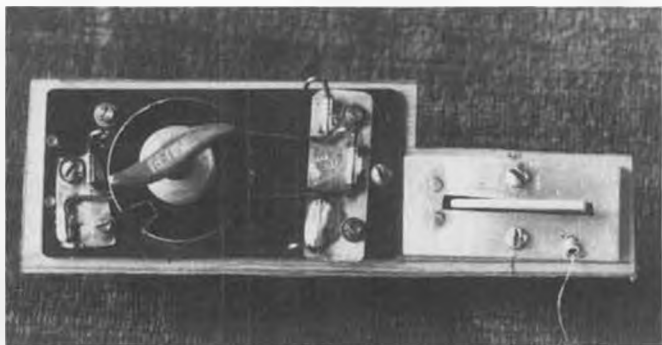
NOSE BLOCK WITH HORTON TRIGGER
SEE 1957-58 ZAIC YEARBOOK FOR DETAILS OF THE HORTON TRIGGER - P.73



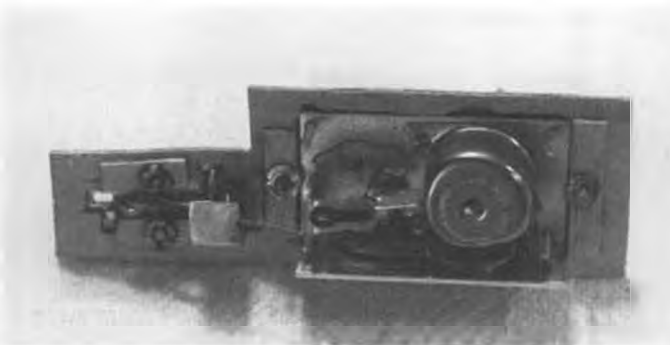
Monks timer and homebrew switch before all the gadgetry is added.



Monks timer and switch before assembly to the mounting plate.



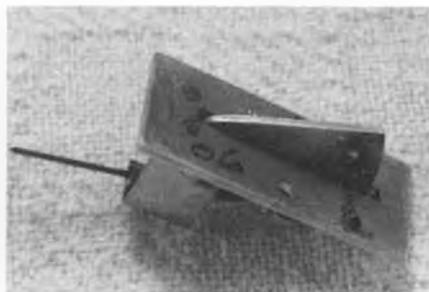
Top view of timer and switch installation. Switch is in "Timer Off" position.



Backside view of timer and switch installation. Switch is in the "Timer On" position.



Backside view of switch.



Switch in released position.



Switch in locked position.

In actual use, the autorudder is set into the power phase by attaching the line to the timer arm. The model is launched and at some point during the power run (or tow) the autorudder line is released, allowing the autorudder to swing into the glide phase. In rubber and power models, this is usually just at the end of the power run. Timing of actuation will vary slightly from model to model.

In A/2 gliders, since the rudder plays such a vital part in the circle-tow function, a special feature article, such as that written by Bob Hatschek in the January, 1974 issue of *Flying Models*, should be read. The autorudder is an extremely useful and simple-to-install system which can make most models much easier to trim, as well as more competitive. As with any kind of gadget, it must be checked frequently to see to it that it is functioning correctly. New rubber bands should be installed and the hinges should be checked to see that they are not binding or loosening. Of you haven't ever used an autorudder, try it. Some of the supplies needed, e.g.:

nylon 2/56 bolts, aluminum strip, etc. are available from FAI Model Supplies.

JULY THREE VIEW . . .

Billie's Bounce Coupe d'Hiver
Stan Fink, who designed this month's model, writes, "Billie's Bounce is my sixth attempt at building and flying Coupes. My previous five models were the ordinary gadget-free types. Then I built a Wakefield with a timer-controlled auto-rudder. I was surprised and impressed with the capability of trimming the power and the glide phases independently, and decided to search for a way to build a Coupe using the same principle.

"The main problem is the weight. A timer weighs about 20 grams, so that was definitely out. The solution, so far, is the Horton trigger system, found in the 1957-58 *Zaic Yearbook* (p.73). The extra weight of the parts and the beefed-up rudder is about 5 grams. The wing structure was lightened to compensate for this, but the plane still came out 5 grams overweight.

"The noseblock is the tough part. You must drill and hollow out the

right side so that the trigger will slide up and down with about 1/4 to 5/16 travel. The projecting trigger holds the autorudder line until the motor runs down. Then the prop shaft hits the trigger, forcing it down into the noseblock and releasing the rudder line."

DARNED GOOD AIRFOILS--HA 13

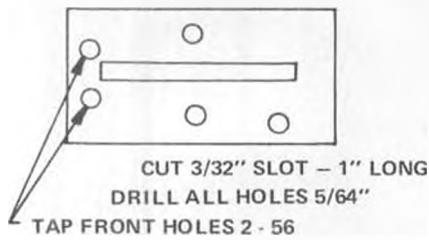
"Max Hacklinger designed the HA-13 section which was used by Rudi Lindner and has been used by Bob Van Nest. This section features a thinned entry and a slightly thickened rear portion to allow conventional building techniques. Performance characteristics of this section are very similar to the popular B6356b, but seem to be superior for aspect ratios above 15:1." Comments about this airfoil are from *NFFS Digest* of July, 1968. Maybe with all of the interest in the B6356b, current A/2 fliers are overlooking an excellent possibility in bypassing this section by Hacklinger.

MONKS TIMER MODIFICATIONS AND TIMER SWITCH

Several months ago, I ran a series of tests using currently available timers.

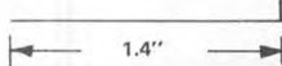
FACEPLATE (FULL SIZE)

1/16" SHT. ALUM.
(.7 WIDE x 1.4 LONG)



STOP WIRE (FULL SIZE)

1/32" DIA. MUSIC WIRE



OTHER ITEMS NEEDED

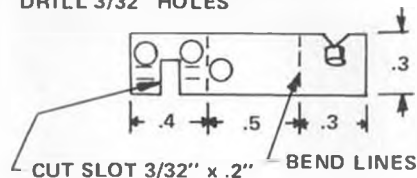
1. Bic Butane lighter spring
2. 4 2-56 bolts 1/8"-3/16" long
3. 2 2-56 blind nuts
4. 1/4" length of 3/32" O.D. alum. tubing
5. 3 3/16" lengths of 3/32" O.D. brass tubing
6. 5/8" length of 1/16" O.D. brass tubing
7. 2 0-90 brass washers (2-56 will do)

ASSEMBLY

1. Solder 2 of the 3/16" lengths of brass tube on either side of the slot in the brass support bracket. (See dashed line).
2. Solder remaining brass tube where indicated by the notch at the other end of the bracket.
3. Bend bracket on bend lines as shown:

SUPPORT BRACKET (FULL SIZE)

1/32" BRASS SHT.
DRILL 3/32" HOLES



FRONT VIEW



4. Install trigger into bracket as shown:

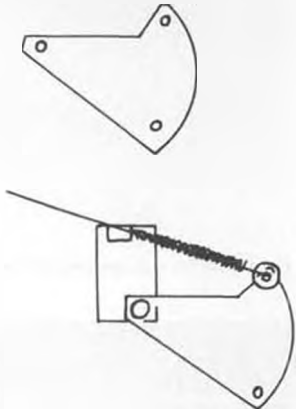
A. Install stop wire. Solder washer on either side of trigger hold. Before soldering slide wire through brass tube, slide spring onto wire.

B. Slide the 5/8" length of 1/16" brass tube into soldered tubes at base of bracket, lining up trigger hole. Crimp ends of 1/16" brass tube.

5. Using 2-56 bolts, fasten bracket to back of face plate. Trigger should move freely in slot. If not, file slot larger.
6. The Bic spring may have to be shortened

TRIGGER (FULL SIZE)

1/16" ALUM.
DRILL 1/16" HOLES



to allow stop wire to extend fully.

7. File the 5/64" hole on bottom right side of face plate to accept the 3/32" aluminum tube. Bend tubing so that it matches up with the 1/16" hole in the trigger. Hot Stuff tube in place in faceplate.
8. Build a plywood bracket to hold both the timer and the switch. Fasten both into place. Arrange the switch so that when the switch trigger is depressed, it engages the timer vane. Adjust by bending bracket accordingly. When trigger is released, the wire should disengage the vane, allowing the timer to start.
9. The trigger is held into the locked position by inserting a length of monofilament into aluminum tubing in faceplate and through the 1/16" hole in the trigger.

Among those included was the Monks timer from England, which if you recall, needed to have some fiddling done to it in order to get it to a usable stage for FAI Power use. Pictured this month is an example of a completed timer, which is set up for 5 functions . . . engine flood-off, engine brake, autorudder and auto stab, as well as normal d.t. function. All arms were bent from 1/32 music wire.

The brackets were cut from .015 brass and had 1/32 I.D. brass tubing soldered to them. Holes were drilled into the brass sheet brackets to match up with existing bolt locations on the Monks timer. The arms were installed in the brass tubing and the brackets attached to the timer. Necessary slots were cut into the aluminum disc so that the arms could be released at the correct time. Fine adjustments are made by slight bends in the 1/32 m.w. arms and by rotating the aluminum disc.

In addition, the timer switch is featured this month as a construction article. This switch may be used on the Seelig timer as well, but *must* be used on the Monks timer. If constructed as shown, the switch is loaded in the "on" position, so that release of the arm is also the automatic start of the timer itself. Such a device is so foolproof and easy to make and install that it is surprising that more are not in use today. You can be the first on your block to do so . . . just follow the simple direc-

tions.

FAI POWER WEIGHTS

There are certain weights that are "fixed" in any model. The weight of the engine, timer and other similar components are examples of such fixed weights. In addition, there are weights which are generally conceded to be "targets" to be aimed at in constructing a model. In FAI Power, all of these weights usually aim for the total weight of 750 grams (26.45 oz.) What follows is a chart of fixed weights of standard components and a chart of "targets". Hopefully, these will be helpful to you when you set about building that next FAI Power model.

Component	Grams	Ounces
Rossi .15	163	5.75
Cox .15	183	6.45
K&W Prop Brake	4.5	.16
Van Nest Engine Pan	53	1.87
Monks Timer, complete with switch	54	1.90
Seelig Multi-Function timer	39.6	1.40
K&W Fibreglas 7x3.5 prop	10.2	.36
Olofsson 7x3.75 fibreglas prop	7.2	.25
Rev-Up 7x3.5 Wood prop	4.0	.14
NFFS 1/8 dia. M.W. Skid Tank, Modified Perfect No. 6	14.0	.49
	21.0	.74
Weight of above items using maximum weight components:	339.7 grams	-- 11.98 oz.
Weight of above items using minimum weight components:	294.6 grams	-- 10.39 oz.
Target Weight Components	Minimum grams oz.	Maximum grams oz.

Wings Complete	198.5	7.0	227	8.0
Stab Complete	28.35	1.0	42.5	1.5

If you add to the above minimum target weights the minimum weights of the listed components, you will get a sub-total minimum of 521.45 grams (18.4 oz.), which will allow you to build a fuselage, less the listed components, which weighs 228.55 grams (8.06 oz.) and still stay within the required weight limits. If you build using the heavy components and the maximum target weights, your fuselage must weigh in at 140.8 grams (4.76 oz.), or less in order to come in at the required weight limits. If you exceed the listed target weights, then the amount of weight you have to play around with is diminished even further. The message should be pretty clear. 'Nuff said.

P-30 EVENT UPDATE

Last month, this column carried the announcement and rules for the P-30 event which will be held at the USFFC and the 1977 AMA Nationals. Now, the announcement is that the San Diego Orbiters are holding a special P-30 event to celebrate the tenth year of Dave Linstrom's editorship of the V.T.O. column in M.A.N. This is a P-30 Postal Proxy meet. Rules are as published last month, with the exception that the model *must* be equipped with a Peck-Polymers 9-1/2 inch propeller. The meet will be held at the famed Lake Elsinore site on September 10 and 11, 1977. Models may be delivered to a friendly

Orbiteer member at the Nats or sent to Peck-Polymers well prior to the competition date.

ALONG THE EDITORSHIP TRAIL

With the amazing announcement that Dave Linstrum has been with M.A.N. for ten years, comes the realization that there has also been another editorship change. This one is with the NFFS Digest. In looking at past issues, the following timeline has been established:

George Murphy	6/66 to 12/66
Dave Linstrum	1/67 to 2/68
Walt Rozelle	3/68 to 8/68
Bill & Ann Gieskieng	9/68 to 8/71
George Xenakis	3/72 to 12/72
Bob Meuser	1/73 to 3/77
Keith Varnau	4/77 to ?

You read it correctly . . . Bob Meuser, who also serves as the editor of another Free Flight Column in another magazine, did the gig for 4 years and 2 months. The longest tenure of anyone. As expected, the newsletter was very competently done, too. Now, with Keith Varnau at the helm, a new editor and new ideas. Send him your ideas and 3-views. His address is 4147 Wilson Ave., Castro Valley, Ca. 94546.

While you are at it, if you are not a member of the National Free Flight Society, join the only all free flight national organization now in existence. The cost for annual membership is a hyperinflated 10 bucks per year. Send for more info, or just send your bucks to: Bill Booth, NFFS Membership Chairman, 817 Minnewawa No. 103, Clovis, Ca. 93612.

SOME OTHER CHANGES OF NOTE

The FAI F.F. Committee is undergoing some changes in its membership. District representative George Xenakis has been replaced by Doug Galbreath. Doug can be reached at his business address of 707 2nd St., Davis, Ca. 95616. Also, District XI FAI fliers will be selecting a replacement for outgoing committee chairman, Bob Stalick, whose resignation is effective on June 15.

HINTS AND KINKS

From the "Dope Bucket" comes the following: "One of the thorniest problems to confront a model builder is how to remove the old covering when it comes time to recover a model. Of course, butyrate thinner brushed over the covering at the leading and trailing edges works well on Nitrate dope, and fairly well on butyrate dope, but putting butyrate thinner or ethyl acetate on an exotic top coat, such as epoxy, is like putting water on paraffin wax. A few years ago, I was attempting to remove the old covering from a Mexiboy wing, and was getting more exasperated by the hour. The covering was fuel proofed with epoxy and I had put in about 4 hours cutting and scraping and sanding and soaking and had the top surface of one wing tip uncovered, and could see I was getting nowhere. I sat there

✱

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- Includes medium tip. Large & small tips available, \$6.45 ea.
- Compressor adapter (1/4" Std.) with 8' heavyweight hose, \$4.00.

and thought about the problem and came up with an answer that was so simple I was amazed at my stupidity. Paint remover! In 45 minutes I had the wing covering off and the wing cleaned up and ready to be recovered. Just one heavy coat of the paint remover on the surface, let it set for a few minutes, and pull it off. If the remover dries out, just brush on a little more. It is a good idea to put the remover on just the covering that is attached to the model frame, and not put it on the entire covering. At today's prices, no sense in wasting paint remover, and being able to get a hold of the covering between the bays facilitates pulling the remover-coated covering from the frame. After the covering is removed, the frame should be wiped down with butyrate thinner to neutralize the paint remover and remove any tissue fuzz that may still be on the frame. It is not a good idea to put the paint remover directly on the wooden frame, as this may cause problems with loosening of the glue joints. When purchasing the paint remover, look for a brand that lists epoxy as one of the finishes it works on . . . not all removers work on epoxy.

One other word of caution, use the remover in a ventilated area and keep it off the hands, as it contains some very potent chemicals and will burn."

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DEWARPING WINGS AND STABS:

It nearly always comes as a bit of a surprise to read in columns or articles of the reference to using steam to dewarp wings and stabs. Other systems mention the use of auto exhaust, redoping the offending surface and blocking it into place while the dope dries. I have tried all of these methods and they work only occasionally, and seldom well. The most fool-proof and longlasting way of dewarping flying surfaces that I have found is with the use of an electric hot plate. Hold the offending surface directly over the plate, perhaps 4 to 6 inches above the plate, and twist the surface in the opposite direction of the warp . . . you will feel the panel give a

ATTENTION SUNDAY FLYERS!

HERE ARE FOUR NEW MOTORS CREATED ESPECIALLY FOR YOU.



FOX 15BB RC
ONLY 55.95

Easy starting, good idle, non critical handling characteristics with easy installation were the primary considerations in the design of the Fox 15BBRC. The side exhaust configuration fits the airplanes you now have. Power output does not suffer. The Fox 15BB is by far the most powerful side exhaust 15RC on the market and with suitable carburetor changes it will give the most expensive rear exhaust 15s a real run for their money. Install one of these new beauties in your 15 model - it's cooperative attitude will amaze and delight you.



FOX 19 RC
ONLY 31.95

The Fox 19 defies explanation. It has neither ball bearings or schneurle porting yet in Club 20 Racing it has so constantly outrun all comers that 1977 Club 20 rules handicap Foxes to 6 mm exhaust outlet. Webras, Tigres, Taipans, OSs & Vecos are permitted to run stock. For 1977 the Fox 19 has been given a beauty treatment, an improved carburetor and the crankshaft and rod have been beefed up a bit. We invite you to fit one of these remarkable motors in your model



FOX EAGLE 60
ONLY 64.95

Improved for 1977. Case enlarged to accommodate a beefed up rod. New glass bead finish. Leaning out suffered by some of the earlier models has been eliminated. The two ring piston holds compression better and starts readily by hand. Burns less fuel and weighs less. It does not make very good sense to pay \$60 more for a fancy import when a Fox Eagle will deliver all the power you can use. The service on the Eagle is better too. In event of a minus two foot landing you can call the factory direct for parts and have your engine ready to go for next Sundays flying.



FOX 45BB RC
ONLY 64.95

The Fox 45 BBRC is alone in it's field. Schneurle ported. 15mm crankshaft. Fox patented crankcase. Two ball bearings. Aluminum piston w/ full floating ring. For 1977 the case has been restyled and a new button type head has been fitted. The Fox 45 BBRC is the most powerful 45RC available today. It is also the most rugged and crash resistant. Most 60 size airplanes designed three or more years ago are handled better on less fuel by our 45 BBRC. Try it. You will be pleasantly surprised.



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bit, in fact it may even sound like your morning bowl of Rice Krispies. When you think that the warp has been dewarped, quickly lift the surface from above the hot plate and press it against your leg (wear long pants). Your leg will act as a heat sink and draw the heat from the surface. Check the surface to see that the warp is gone . . . if not, repeat the above steps until it is. This method is the closest to a permanent dewarping method that I have found. Try it, but not with anything but an electric heat source. Gas stoves are out, unless you like to put out house fires and build new wings!

That must be enough for this month
See you on the next go 'round. ●

Counter Continued from page 9

is now available in the ABC version, legal for Quarter Midget Racing in all aspects, including blessings from the AMA.

Available from your local dealer. For info, inquire from Bill's Miniature Engines, 1325 Carol Dr., Memphis, Tenn. 38116.

* * *

A new concept in model rocketry, Almost-Ready-To-Fly Rockets, is the latest idea from Centuri Engineering. Called Kwik Kits, they are available in three different models, and require no painting or special tools.

The newest to be launched is the Phoenix Bird, a big 26.3 inch long model with a 20 inch recovery parachute and an extra big payload section. Because it is so easily put together, it's ideal for beginners. Model No. 5407, at \$5.00.

Also in the Kwik Kit line, the very popular and colorful Screaming Eagle will fly as high as 1500 feet. It includes red, blue and chrome decals, and parachute recovery system, No. 5173, at \$3.00.

The big one is the Argus, over 28 inches long, and styled after the USAF X-17 Research Rocket. It can be assembled in less than one hour, includes dual chutes, and also requires no tools or measuring during building. No. 5039, recommended for Skill Level 2 Rocketeers, it is priced at \$5.50.

For more information about these and the many other Centuri Engineering rockets and accessories, write to Box 1988, Phoenix, AZ 85001.

* * *

Millcott Corporation, of Santa Ana, California, has recently announced production and availability of its "Specialist" line of radio control systems. While relatively young, probably the youngest of the R/C companies, Millcott Corporation was formed around a nucleus of highly experienced modelers and electronics technicians and engineers.

Clearly aimed at the competition and expert flyers, its entry into the R/C field is spearheaded by extremely impressive looking "Specialist" Six and Eight Channel systems. And to prove that looks are not everything . . . or the only thing, the "Specialist" lists a number of interesting features, amongst them being vinyl clad aluminum cases for both the receiver and transmitter, and all-metal open gimbals, driving sealed conductive plastic pots. Your choice of Mode I or II, on any 72 or 53 mHz frequency is available, and we understand that a Single Stick version is nearing completion. Electronic cross trims, and front panel adjustments for servo reverse and travel, three pre-set adjustable maneuver buttons, and an Expanded Scale Voltmeter for testing of both transmitter and receiver batteries, are also featured. The rate of stick-to-servo tracking can be preset in either a High or Low rate, switchable as desired. So can a feature that Millcott describes as an exponential rate to vary the stick-to-servo movement. Normally, the stick moves the servo in linear motion. The exponential rate can be set for say, 1/2 stick movement to give only 1/3 servo movement, with the remaining 2/3rd servo travel controlled by the last half of the stick throw. This soft feel around neutral is considered highly desirable for certain aerobatic maneuvers.

If that isn't enough, the "Specialist" Eight comes equipped with an elevator/rudder mixer, optional on the six, for

control of "Vee" tail aircraft without the use of mechanical mixers.

A "Specialist" Three is also available with a Dunham semi-open stick assembly, and many of the features found in the larger systems. All feature nickel-cadmiums of various capacities, trays, chargers, etc. Space doesn't permit us to list all the features and available options. We can only suggest you drop a line and request complete information direct about these new systems which are priced at \$725 for the Eight, \$615 for the Six, and \$275 for the Three.

Millcott Corp., 1420 Village Way, Unit E, Santa Ana, Ca. 92705. Tell them MB sent you.

* * *

It is summer time . . . T-Shirt time! Though here in Southern California, we see them all year around (eat your hearts out, Northerners!) And, for you and your bosom buddy (their words, not ours), Satellite City has available "Hot Stuff" T-Shirts, in white, with black lettering, front and back. The latter tells the world that, "Hot Stuff users make better lovers, they don't have to stay in the building room all night."

Available in small, medium, and large sizes, by direct mail only, only \$4.50 each postpaid, by air and insured.

Be sure to mention where you read about it when you order yours from Satellite City, P.O. Box 1935, Arleta, Ca. 91331.

* * *

EXPORTERS! Good news for you. Two well known and established companies, Exportations, and Emandi, have joined their combined 21 years of experience in the model export field to form a new company, Exportations, Ltd. With offices and warehouses at 17835 Sky Park Circle, Suite E, Irvine, Ca. 92714. It is located next to the Orange County Airport, and within easy driving distance of all the Los Angeles area harbor facilities and airport.

Established only to handle export wholesale, Exportations Ltd. will maintain in-stock an inventory of over 170 major lines. The list reads like a Who's Who of U.S. model manufacturers; from Ace R/C to Zaic, and includes Astro-Flight, Cannon, Cox, Du-Bro, Fox, Carl Goldberg, K&B, Mark's Models, MRC, Sullivan, and on and on.

Exportations Ltd, is well experienced in the intricacies of exports, and can offer all services required, from single source stock, to proper packaging and documentation. All foreign importers are urged to write for complete information. Cable "EXTRONIC", or call (714) 957-1331.

Don't forget to mention that Model Builder told you all about it.

* * *

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Unfortunately, there seem to be some model manufacturers and dealers around who spell the first part of that as L I P!



Perfection

Wood processing makes the difference in Midwest Micro-Cut products. Inspected three times, to make sure that you get only the finest straight grained wood - then pre-sanded to a .002 tolerance satin smooth finish.

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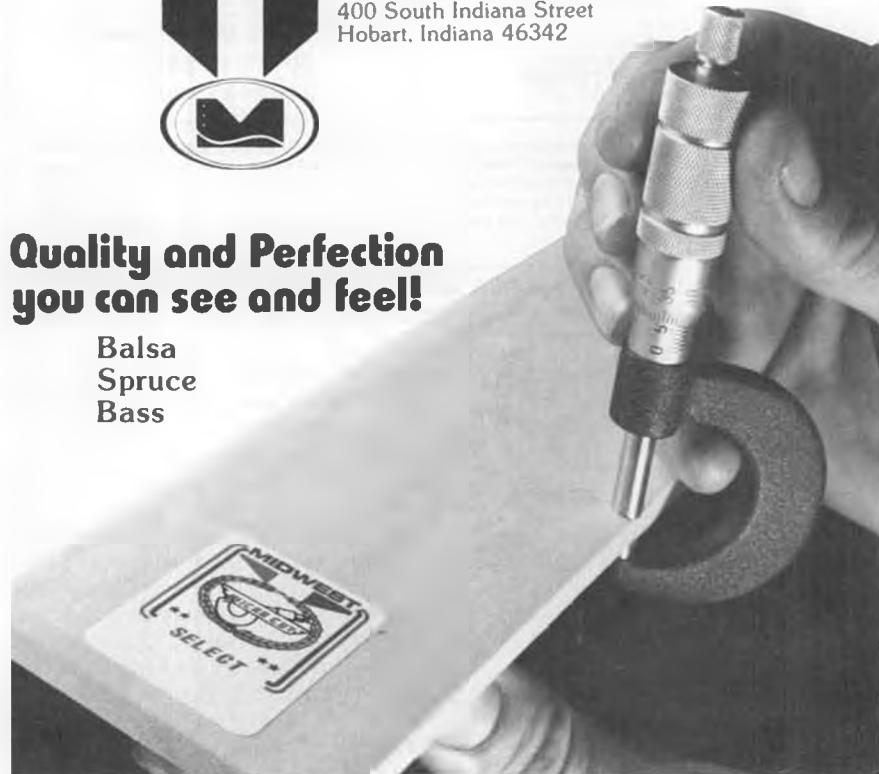
Champion model builders across the country rely on Midwest Micro-Cut products. You should too!



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Quality and Perfection you can see and feel!

Balsa
Spruce
Bass



But fortunately, there are also the other kinds, and we want to tell you about one of them.

First, some background. In 1967 through 1970, I lived in the little country of El Salvador, on a USAF assignment to the US Embassy as an Advisor to the Air Force of that country. We had, amongst other things, Cavalier P-51 Mustangs, and some of the Corsairs that are now part of the 'Baa Baa Black Sheep' Air Force.

Amongst my contributions to this beautiful little country, I like to think that the introduction of the R/C hobby is not the smallest. From nothing, I left a group of eight flyers to share the polo field with a group of equestrians. All

Mode One'rs . . . probably making El Salvador the only country where everyone flies the same way. Mode Two and Single Stick can't make that statement!

We also had Lake Ilopango, at which I spent many fun days flying a "Piranha" seaplane, and which I felt just cried for some R/C boat activity. Being completely inexperienced in this phase of the hobby, and with the nearest Hobby Shop being in Miami, quite a few miles away, I wrote to all the boat suppliers for catalogs and information. Amongst the ones that didn't answer was Octura Models.

In 1976, I landed here at MB, and soon my name began to appear both in the magazine, and in outgoing corres-

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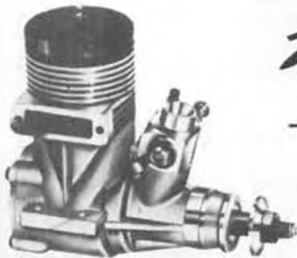


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calculator requires that a Top Flite or Power prop of the proper size for the engine under test be installed and an RPM reading be made. Only one setting of the calculator is required to then obtain the generated horsepower.

An interesting item that should do much to prove or disprove some theories, and settle some of those coffee shop arguments. Tell Gus where you read about it!

* * *

Run for the hills . . . the hang gliders are here!

Well, where else are you going to fly a model hang glider, if not in the hills? Actually, the Morey "Ultra", a 51 inch wingspan model of a world cup hang glider, is classed as an indoor or outdoor flyer. It is easily constructed following the complete illustrated instructions, and features top quality materials throughout, hardwood dowel rods, custom aluminum fittings, and high strength Mylar sail material.

The adjustable rigging allows you to trim for indoor, slope, or thermal outdoor flight. While not specifically designed for R/C, the "Ultra" appears capable of carrying the weight of a small radio, and we fully expect that some are already flying around doing just that.

Only \$11.95 at your dealers, or \$15 postpaid direct from Tom Morey & Co., Inc., Dept. C, 2571 Roosevelt St, Carlsbad, Ca. 92008.

* * *

Metrics got you down? Well, until you get your eyeballs recalibrated, you'll find the Size-a-Bolt, from Educational Products quite handy indeed. This 5-function gauge instantly measures metric dimensions of nuts and bolts. Wrench size, screw OD, nut ID, and thread pitch size, plus screw lengths, are all easily read. The gauge is molded in ABS plastic and measures 4-1/8 inches long. It is available for only \$2.00, postpaid.

Educational Products also has available a new dispenser tip for precision gluing with such adhesives as Permabond, Duco, Bond, Pliobond, Testors, and others of a similar type.

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pondence. A few weeks ago, a fat envelope marked "Everything you wanted to know about R/C model power boating but didn't know who to ask", from Octura Models, appeared with my other mail. It was from Octura, and inside was another envelope, with my correct 1967 address, even 'Eloy' spelled properly, postmarked August 1, 1967. For some unknown reason, it had been returned marked "Addressee Unknown".

Apparently it sat in Octura's filing system for ten years, and someone there recently made the connection and re-mailed it to me with a note saying "A bit late, but here it is".

Now we ask you, isn't this 'above and beyond' type of service? I only want to know now, Tom Perzentka, if I can still buy a 'White Heat' for \$29.95, and all the other accessories at the prices as shown in all this literature I just received???

* * *

We'll bet you knew all along that the Horsepower of your favorite engine can be easily calculated by multiplying the RPM times the Torque in foot-pounds times 2-Pi, and dividing by 33,000.

What you probably didn't know is that the easier way is to do it with a 'Horsepower Calculator', available from Gus Munich, 24 Skipper Dr., W. Islip, N.Y. 11795 for only \$4.95, postpaid.

This easily-read slide rule type of

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Morel Ultra
world cup class hang glider model kit



Take the perfect step between dreaming about flying and jumping off a cliff.

Now add a new dimension to your flying fun with the Morel ULTRA. This new kit is a flyable scale model of a world cup class hang glider. The sturdy model has a 51" wingspan and is easily constructed using the complete illustrated instructions. Top quality materials are used throughout, from the hardwood dowel rods and custom aluminum fittings to the high strength Mylar sail material. The Morel ULTRA appears to be a kite, but it is actually a free-flight glider that realistically duplicates the flight characteristics of full-size hang gliders. It can be flown indoors or add some weight and fly it outdoors as a slope soarer or thermal machine. The fully adjustable rigging allows you to "tune" your model for trimmed flight. Check it out today and see how much fun this model hang glider really is! Ask your hobby dealer or order directly from us.

\$15. even delivered to your door
(tax and shipping included)
or \$11.95 at your local hobby dealer

Enclose \$15.00 for each kit you want delivered to your door and mail to Tom Morel & Company, Inc. Dept. C 2571 Rosevelt Street, Carlsbad, CA 92008.

amt enclosed

name _____

address _____

zip _____

The Micro-Tip, as it is named, is made of semi-transparent polypropylene, curved at 47.5 degrees, which permits the adhesive tube to be held and used like a pencil. Most stickies will not adhere to the tip when dry, and the coating of material can be easily removed or the tip replaced. The radius can be changed by bending the body under hot water. Twenty for \$2.00, postpaid.

And for working in dark corners, you'll need a Tweezer-Lite. This unit is 4-5/8 inches long, and features precision stainless steel blade sections and a molded ABS plastic flashlight assembly. The latter requires an AAA size cell for power, which is included.

The Tweezer-Lite is \$5.95 postpaid, and is available, as are its other products, from Educational Products, PO Box 606, Mineola, NY 11501.

* * *

If "down to the sea in ships" is your thing, you'll be interested in the growing IMAI wood ship series kits, available from Calx International.

The latest additions, 1/120th scale, are the Clipper Ships "Cutty Sark" and "Flying Cloud." Either of these kits will build into a magnificent model ship you'll be proud of, yet do not require the experience necessary to construct "plank" hulls. A pre-carved and sanded solid hull is included, as are brass fittings,

die-cast metal ships boats and anchors, brass chain and railings, and a complete assortment of hardware. Everything, including the white glue and epoxy is included in these \$150 kits.

Other IMAI model kits are available, as are Minicraft and Hasegawa scale model cars and planes, and Nichimo cars. For a complete listing and further information, write Calx Int'l, 1510 West 228th St., Torrance, Ca. 90501. Be sure and tell them you read about these goodies in MB.

* * *

The F4U Corsair needs no further introduction . . . the bent-wing bird being one of the best-known WW II fighters made. But have you heard about the new GMC Models Corsair, for 1/2A Stand-off Scale?

For your Cox .049 or .051 engine, and two channel radio, it utilizes a foam wing requiring no sheeting and a plywood and Grade AA balsa fuselage. Flying weight is 20 to 25 ounces.

The kit includes machine-cut parts, hardware, including motor mount and landing gear, formed ASA plastic cowl, canopy, and full-size plans.

The complete kit is priced at \$31.95. Also available is a semi-kit consisting of wing, cowl and canopy at \$15.95. Available now at your dealers, or direct, postpaid, from GMC Models, 7349

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**A NEW CONCEPT IN
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NEW **JIM CROCKET REPLICAS**
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FRESNO, CA. 93728

Rindge Ave., Playa Del Rey, Ca. 90291.

A new double-adhesive mounting material has become available, claiming the convenience of foam tape, with the performance and reputation of neoprene. It is called NeoMount, and is available from A-West, PO Box N, Chula Vista, Ca. 92012.

A-West recommends NeoMount as useful for installation of tanks, servos, weights, modules, etc, and states that the long-aging acrylic adhesive used works well with plastics, metals, glass, rubber, paint, paper, etc. It is further reported that excellent resistance to oils

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07662

and fuels exists, and that NeoMount isolates vibration and reduces noise transmission.

The price is 75¢ for eight square inches, 1/32" thick, with directions and technical data.

NOTE: Apparently not all R/C manufacturers agree with the use of so-called "servo tape" materials of this type. And we know of one that used to enclosed a warranty disclaimer that if evidence of the use of these tapes was found on their servos, indicating that their recommended servo mounting trays had not been used, the warranty would not be honored. There is no doubt that some of our vehicles vibrate more than others. If you've any doubts, it might be worth checking with the maker of your R/C system.

* * *

Willoughby Enterprises, 14695 Candada Place, Tustin, Ca. 92680, reports availability of the newest Graupner R/C kit, the Piper Cherokee, for Stand-Off scale and sport flying. It is a well designed aerodynamically clean modern low wing airplane with a roomy cabin, wide, fixed landing gear, and enough dihedral for stable flight.

It builds into a 1600 mm (63 inch) wingspan, 1280 mm (50 - 3/8 inch) long model, needing a .60 up front for power. The .60, spinner, engine, and radio are the only things not included. All other parts, from detailed Quick-Build plans, shaped firewall and balsa parts, to numerous light-weight plastic parts, are included. The foam wing, rudder and stabilizer are plywood pre-skinned, and even wheels to go on the pre-bent landing gear are furnished. And you have your choice of decal markings, either US or German, both of which are included. Priced at \$137.50, shipped Freight Collect. An OS .60 FSR is also available for \$62.50, when ordered with the kit. All from the address above, but don't forget to mention MB.

* * *

Remember the guy who happened to be under a flying bird at a crucial moment and whose only comment was to give thanks that elephants don't fly?

For which we can all give double thanks, as there seems to be no shortage of elephant food. Peanuts, that is, with absolutely no reference being made to the White House, but to the prevalence and growing list of Peanut Flying Scale kits, plans, and accessories available. A recent entry unto the field is Gene Dubois, who brings us deluxe kits at only \$3.95. Currently available are a PT-19, Gere Sport, Hellcat, P-47D, and others. A complete catalog can be had for 50¢.

Address Gene at Box C. Acushnet, Ma. 02743.

* * *

It's new catalog of technical and do-it-yourself books has just been released by TAB Books, P.O. Box 40, Blue Ridge Summit, Pa. 17214. This fully illustrated catalog, featuring full color covers, lists and describes over 400 current and forthcoming books.

If it is electronic, TAB has a book about it. But you will also find such titles as "Homeowner's Guide to Solar Heating and Cooling"; "Rapid Auto Tuneup and Troubleshooting", and "How to Make Jewelry Like a Pro". And would you believe, "The Cruising Chef"? In short, the list is long and varied.

Some titles of interest to the modeler are;

No 825 - Flying Model Airplanes and Helicopters by Radio Control

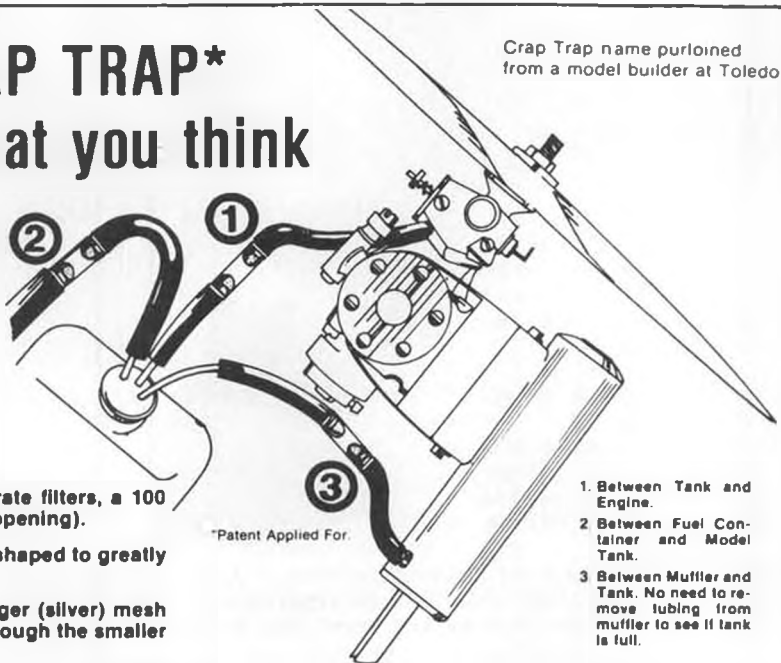
No. 812 - Radio Control For Models
No. 747 - R/C Modeler's Handbook

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- **COLOR CODED**—Fuel must go through larger (silver) mesh first to filter out larger particles and then through the smaller (bronze) mesh. This is a must.
- **WATCH IT WORK**—Filters are encased in see-through tubing.
- **CAN TAKE THE HEAT**—The extruded Teflon casing can handle temperatures up to 600°F.



Crap Trap name purloined from a model builder at Toledo

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2. Between Fuel Container and Model Tank.
3. Between Muffler and Tank. No need to remove tubing from muffler to see if tank is full.

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No. 693 - Model Sail and Power Boat-
ing by Remote Control

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Remote Control.

And more. And all available in your
choice of hard or soft covers. The
valuable and interesting catalog is yours
by simply telling them that you read
about it in MB; available from the above
address. ●

Heathkit Continued from page 19

3/8th inches or so, and 'trichlorethylene',
a clear chemical available from chemical
supply houses. Acetone, alcohol, and
the like, will dissolve the flux residue,
but does not remove it completely,
leaving a diluted layer over everything.
Trichlor, as it is called for short,
cleans clean. Be sure to use it with
adequate ventilation!

The manual breaks down the step-
by-step assembly into 13 separate and
distinct parts. Each is complete in itself,
and is probably a good stopping point
for an evening's work. Not that each part
will take a complete evening... some
are very short... but it is a good idea to
finish a sub-assembly while the nomen-
clatures and parts placement is fresh
in your mind.

We would roughly break down the
operation into three parts. First, the
two printed circuit boards get all the

components mounted on them. Then
the board, switches, and case are mated
together. You calibrate it, according to
the very complete instructions and
using a factory assembled and tested
standard, put on the top and bottom,
and it's ready to fly... er, ready to use.

As with most projects, the time to
completion varies with the individual.
I took eight evenings to complete this
one, about three hours each. This is not
a true figure, though, because I am a very
careful, neat and meticulous worker,
which my friends spell SLOW. Then
too, some of the time went to nosing
around just to become better familiar
with some of the circuitry used, and
really had nothing to do with the
primary job at hand. I feel that if I
had to, and didn't waste time, I could
have done it in half the time.

OPERATION

Operation of the Model IM-102
DVOM is covered in all aspects in its
own chapter, and needs nothing further
in the way of explanation for our
electronics fiends. A few reminders are
offered for the not-so-experienced.

The abbreviations used in the manual,
and on the panel, are:

V — Volts, the unit of electromotive
force

Ω — Ohm, the unit of electrical resis-
tance

COM — Common, or ground

mA — Milli-ampere, the 1/1000th part

of an ampere, unit of current flow
mV — Milli-volt, 1/1000th part of a volt
uA — Micro-amp, the 1/millionth part
of an amp.

DC — Direct Current

AC — Alternating Current

In use, the leads are plugged into the
proper jacks for the measurement to be
made. The Function Switch, on the
extreme right, is set to correspond.

The Range Switch, the left of the
two switches, is set for the same type
of reading, to the next highest number
of the value to be measured. In other
words, if you are measuring the voltage
of your 12 volt starter battery, set the
range switch to the '20' position. In all
cases, when the value is not approxi-
mately known, set this switch to the
highest position. The readings obtained
will be the proper value, less some of
the decimals. For example, a voltage of
123.6 will read exactly that on the 200
volt position, while on the 1000 volt
range it will show up as 123. CAUTION:
Position the switches and leads in the
proper jacks BEFORE connecting the
business end of the leads to whatever is
being tested.

Now, for some specific tests.

TESTING NICKEL-CADMIUM BATTERIES

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problems with a kite-eating tree,
R/C'ers, in general, probably have more

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charge. By loading to about half the
rated capacity, the voltage on such a
cell will drop to a much lower value,
indicating a defective (if previously
charged) cell.

Fixed resistors of the proper ohmage
and wattage can be used as a battery
load, however, a different size is
required for each voltage and/or capacity
combination. In other words, the one
used for the 500 mah receiver battery
will not work for the 225 mah receiver
battery or the 500 mah transmitter
battery.

Definitely, an adjustable load is in
order, now and for the future. We are
seeing a definite trend toward lower
capacity receiver batteries, and trans-
mitters which worked with eight cells
for years, have also undergone a change.
In 1977, Kraft introduced its Sport
Series with only five transmitter cells,
and the Cox/Sanwa uses nine. We
want to be able to test them all.

The Model Builder adjustable battery
load can be constructed for close to the
price of the box full of resistors other-
wise needed. The parts required are:

- 1—Small Aluminum box, 1-1/2 x 3 x 4
inches.
- 1—9-volt 'transistor' battery, Eveready
216 type.
- 1—Battery clip, with wires, for above.
- 1—Single Pole Single Throw Switch.
- 1—2,000 Ohm Pot
- 1—5 Ohm, 2-Watt Resistor.
- 1—2N3055 Transistor or HEP Equivalent
- 1—Insulating mounting kit for above
- 2—Small alligator clips
- 1—Knob, with calibrated skirt, to fit
pot shaft.

The schematic and pictorial diagrams
are pretty much self-explanatory. Parts
placement is not critical, except for the
transistor, which is mounted externally
with the mounting kit specified. It's
purpose is to mount the transistor
directly to the metal for proper heat
dissipation, while providing the necessary
electrical insulation. Connections to the
Base and Emitter of the transistor are
soldered directly to the pins, without
the use of a socket.

When wired as shown, full counter-
clockwise rotation on the pot will apply
zero load to the battery, and will
increase with clockwise rotation. A
reference mark is made on the box, next
to the knob, for future settings. The
connecting leads or clips should be
coded; red for positive, and black for
negative.

In use, the load to be applied is set
first. With the DVOM set to read V/MA
1000 and mA DC, and the leads plugged
into the COM and mA jacks, the negative
lead from the loader is connected to the
battery negative. The positive lead from
the meter is connected to battery
positive, negative meter lead to positive
loader lead. Turn the loader switch to
'On', there should be no reading on the
meter. Advance the pot clockwise, and

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problems with airplane-eating batteries
than with any other part of the R/C
system. While we do not recommend
even removing the cover from your
transmitter unless you know what you
are doing, testing batteries is simple and
should be done periodically.

First, the nomenclature. We have a
cell, which is the smallest electrical
and physical unit, and in the case of
nickel-cadmiums, is rated at a nominal
1.2 volts. Any combination of two or
more cells is a battery, and is rated at
1.2 times the number of cells. The
capacity is stated by the manufacturer,
and generally increases as the physical
size of the cell increases. Capacity is

measured in amps, or milliamps.

For a short period of time after
being charged, all nickel-cadmium cells
exhibit a slightly higher voltage, called
a surface charge, which can be as high
as 1.35 volts. This extra voltage is
maintained for some time if the cell is
not put into use, but will eventually
bleed off. The voltage rapidly settles
to the rated value of 1.2 volts, under
normal load conditions.

These cells and batteries must be
tested under load, as they will maintain
close to rated voltage even when the
actual remaining charge is almost zero.
Many cells will still show 1.2 volts
even when they will not accept a full

a reading will appear and increase with knob rotation. Set to one half the battery capacity, i.e., 250 ma for a 500 mah battery. Note the reading on the knob skirt for future settings.

Now, remove the meter leads from the circuit, and reconnect the loader positive lead to battery positive. Reset the meter to read V/MA 20, and V-Ohms DC; leads to COM and V-Ohms. Connect the meter leads to the battery, observing proper polarity. The battery voltage should now appear, and is being monitored under the previously set load current.

The voltage shown should be 1.2 per cell, or slightly higher for a battery just removed from charge. Any deviation should be investigated further; certainly if it is as much as 1.2 or a multiple less than the calculated value, this is a sure sign of dead cells. By removing the battery from its case, and testing each cell individually, with the load still applied, the culprit cell will be pin-pointed as the one with no voltage, or a very low value compared to the others.

Some of these cells will come up to voltage and capacity upon being cycled on one of the commercial devices available for this purpose, but they should be carefully tested and watched before being flown.

Any cell that at any time exhibits low voltage or capacity when it has been used alongside others that act normally, is not worth gambling on, as far as I am concerned. There must be some reason for it reading low, and I don't want it doing it again next time I am headed for Number One pylon. I recommend replacement. I also feel that one bad cell in a pack over a year old might be telling me something about the rest of them, so they all get demoted to my test instruments and flashlights. Airplanes are much harder to replace than nickel-cadmium batteries.

You are now an expert on voltage checking of batteries. On to capacity, which is, as the word implies, the exact quantity of magic found within that little cylinder. All batteries are rated by their manufacturers, by amp/hour capacity, which boils down to a current and time figure. The average AA size cell is rated at 500 mils, which means that that amount of current is available for a period of one hour, or a lesser current for a proportionally longer period.

Therefore, using the values established by our load test, we should be able to maintain that half capacity load for two hours before the voltage starts to drop. Theoretically, this is true. In practice, it will vary from manufacturer to manufacturer. Some brands of cells show consistently higher capacity than others.

The battery can obviously be capacity tested in this manner, leaving it con-

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nected to the battery loader and meter until the voltage drops to 1.1 volt per cell. It is not recommended to discharge below 1.1 volt per cell for various reasons, all leading to reduced cell life. So if this is done, the voltage must be carefully watched and the battery disconnected at the proper time.

For this type of test, there are a number of instruments, such as the "Super Cycle" by Electrostar Systems, that will automatically time-test your batteries under load and tell you the actual capacity. As a test of the tester, the Heath DVOM can be connected to the batteries and the exact cut-off voltage monitored and confirmed.

Like so many other things, these

testers can get out of calibration, or do not always survive the trip from the factory to your workshop in the best of conditions. If the cut-off voltage is wrong, you are not getting a true test, and the instrument should be recalibrated. And it is certainly nice to know your tests are accurate before starting a war with your radio or battery manufacturer.

R/C SYSTEM TESTING

Only limited R/C system testing is recommended to the inexperienced. However, some simple yet effective tests can be made, and should be made periodically . . . sometimes just for reassurance, though sometimes an actual fault will be located and corrected.

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Using the 'Field Strength' adapter as shown, you can establish a standard for transmitter output. This is another simple device to build and use. It picks up the transmitted signal and displays its relative strength on the DVOM. But don't forget that word 'relative'. This is an untuned device, whose output and subsequent reading is affected by frequency and relationship between the antennas. It will not necessarily read the same for different brands of transmitters on the same frequency. And the fact that one brand reads higher than another does not necessarily make it better, as other design parameters affect system range, which is the objective.

The 'Field Strength' adapter is designed to establish a standard, for an individual transmitter. It should always be used under the same conditions. Place the DVOM with adapter installed in the COM and mA jacks, and set to read 200 mV uA, and DC mA, on one end of a wooden table or workbench. The recently charged transmitter, with antenna extended, is placed on the other end, preferably 5 to 6 feet away. After the antenna stops whipping, you'll get a certain steady reading. This is your standard. Notice that if you hold the transmitter, move around, or place large metallic objects nearby, or between the antennas, the reading will change. It is

important only that future tests be made under the same conditions. A small variation in readings can be expected, but a greatly reduced reading should be suspect.

The Field Strength Adapter requires the following parts:

- 1—Small Plastic Box, 1-1/4 inches wide minimum.
- 1—Small choke, 1 to 2.5 mh
- 1—Germanium diode, 1N34 type
- 2—Banana plugs, tapped body (Johnson No. 100)
- 2—Solder lugs

The box I used was the top and bottom of an old large Orbit PS-2 servo. The size is not critical, except that the width must be enough to hold the banana plugs at a 3/4 inch spacing. They should be mounted first, along with solder lugs inside, adjusting the spacing so they plug into the COM and mA jacks on the meter. The antenna wire (1/16 piano wire) is supported in tight-fitting holes, one in the top of the case, and one in the bottom. The coil and diode are soldered to the 1/16 wire at a point at least 1 inch from the bottom of the antenna. Orient the coil to the left, as the other end of it is soldered to the lug on the left banana plug. The other end of the diode, which should be the end marked with the band, goes to the other (right side) solder lug.

Attach the cover, plug it in, set the

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meter as stated, and you are ready to make accurate transmitter radiated power measurements.

WIRING AND HARNESSES

Wiring and harnesses, and their associated pins, plugs, and switches can be a source of trouble, causing everything from a completely dead system to glitches.

An easy check consists of reading the voltage through them. Starting with the airborne battery, right at the battery terminals, read and remember that voltage. Then read it at the plug end of the harness, if yours is the type that has a pigtail separate from the switch harness. The voltage should be the same, exactly. Any voltage drop (reduced voltage) of over 2 or 3 hundredths is an indication of a poor connection at the plug end. The cause can be an intermittent mechanical condition or corrosion between the wire and the pin, resulting in a high resistance.

If the voltage is normal so far, plug in the switch harness and read at the other end. Again, no voltage drop should occur. If one is present, it can be the plug end, or in this case, the switch itself can be the victim of corrosion or a possible bent contact.

You can trace as far into the system as you feel confident in doing so. Remember that in almost all cases, red is positive and black is negative throughout the system, and the battery voltage

should be the same all the way. If it is noticeably less at any point, something is not normal and requires attention.

CURRENT MEASUREMENTS

Current measurements are good indications of normal, or abnormal conditions. However, they are made less often than voltage measurements, as the meter has to be inserted in series with the conductor. It is not always convenient to break a connection to do so, but adapters or jumpers can be fabricated and used to establish normal readings to be used later for comparisons.

For example, to test a servo for normal current drain, an adapter consisting of the proper male and female connectors is used, with all wires except the positive (red) connected normally. The meter, set to read mA 200 and mA DC, is connected between the two red wires. Two values will be obtained, a low one of ten mills or so when the motor is not running. This is the amplifier current. A higher reading, as much as 100 mills, will occur when the motor runs. This reading will increase as a mechanical load is applied to the servo arm. A higher, or abnormal reading, is usually indicative of a defective motor or gear train.

CHARGING CURRENT

Charging currents can be read the same way; one wire connected normally and the other open with the meter inserted in series. This is a good test

to make it you have any doubts about your charging rate, such as new batteries that do not pass a capacity test. Or if you haven't tested for capacity, but are getting less operating time than others with similar systems, check your charging current. CAUTION: If your system has a charger built in the transmitter, and some sort of transformer is not included in the system, we recommend that if you have doubts about the charging current, ask someone familiar with electronics testing to help you. This type of charging system has 110 volts AC, right out of the wall, floating around inside the transmitter, and should you get across it, chances are that you will not place well at the next contest. In fact, you may be the guy they have the one minute of silence in memory of.

RESISTANCE

Resistance measurements are a useful and accurate way of isolating problems. However, they are useful only if you know what the resistance is supposed to be. Normally, resistances are shown on schematic diagrams, and all resistors are marked with a color code, but that it getting deeper than the intent of this article.

For you, the non-tech, it is only necessary to remember that things other than those little colorful things called 'resistors' will display a readable resistance. Wire has it, as you know, from trying to light a glow plug with too long

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and too small a wire. Motors, plugs, switches, etc., will introduce some resistance. It is necessary only to read and record readings when the item is operating, and make comparisons, when and if it malfunctions. At that time, look for increased readings, or no reading at all.

For example, you will get a reading, very low, from the battery clips of your starter, through the switch and to some internal point in the starter. This is the first thing to check if it no longer works. A complete lack of resistance indicates an opening someplace in the wire, or defective switch contacts. Resistance will appear across the motor. A later increase points to dirty brushes.

Servo motors, one of the weak points in R/C systems, can be checked in this manner. Normally they will read less than 20 ohms; but establish a standard or check one from a properly working servo for comparison with the suspected one. An opening is rarely seen, but if you run into one, it has died. More often, you will encounter a high resistance, sure sign that the motor will run slow in the servo and should be retired. Servo motors are like nickel-cadmium batteries . . . don't gamble on them. Neither of the laws, Ohm's nor Murphy's, have been repeated, and one of them will get you.

CONCLUSION

The capabilities of the DVOM in testing of model electronics is limited only by your willingness to use it. Your knowledge will grow with experience. As I have attempted to point out, while it is helpful to be an electronic engineer, the rest of us are quite capable of a large number of tests that will pay off.

For those of you who care to pursue the inner workings of our magic boxes further, we recommend some of the Heath test and hardware training kits. These are especially designed, kindergarten-type courses that you can study at your own pace, and which make the learning process somewhat simpler than just reading about it, as actual working circuits are assembled and readings are made. Slowly, but surely, the mysteries disappear.

We recommend beginning with Kit EF-1, or EE-3101. Both, as well as continuing programs, are fully described in the Heath catalog, yours for the asking, and which you should not be without, anyway. Address your request to Heath Co. Benton Harbor, MI 49022.

Yours for happy testing. 73 de WIDBN

ignition engines, manufactured prior to 1950, or approved glow engine conversion.

B. Ignition engines manufactured prior to 1950 converted to glow by the manufacturer, with minor modification, will be considered to be an original engine when converted back to ignition.

C. Replicas of original ignition engines and bearing the same name shall be considered to be an original ignition engine.

D. Custom and production ignition engines designed and manufactured after 1950 shall be limited by the same rules applying to approved glow engine conversions.

E. Ignition components for all approved ignition engines shall be comprised of cam operated points, spark plug(s), coil, condenser, and batteries.

F. Approved glow engine conversions shall be limited to conventional ported, loop-scavenged type only; limited by displacement as follows:

Class	Glow Conver. Disp.	Orig. Ign. Disp.
A	0 - .150 cu. in.	0 - .200 cu. in.
B	.151 - .250 cu. in.	.201 - .300 cu. in.
C	.251 - .400 cu. in.	.301 - 1.20 cu. in.

Proposition II

1. Glow engines shall be prohibited for *basic* SAM Events.

Proposition III

1. Diesel engines shall be prohibited for *basic* SAM Events.

Well, that's a bit long-winded, but the columnist regards it as the best solution that could be reached by that committee. Of course, the traditionalists and the progressives on opposite poles will never be pleased. Let's hope this lays the so-called controversy to rest.

SWEDISH SAGA

Sven-Olov Linden of the very active Swedish Antique Club writes again to tell us another story of the famous old time Swedish modelers!

In an interview with Karl-Erik Landegren, one of the Vasteras FC members born in 1919, Sven discovered Karl was truly one of the great leaders in the aero-modelling movement in Sweden. During the time he was active in modelling, he won six individual

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1952-1977
25
SILVER ANNIVERSARY

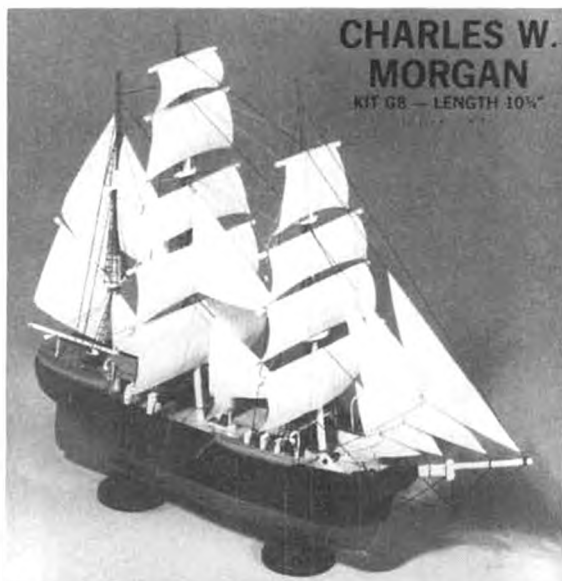
Plug Sparks . . Continued from page 25

balloting that all measures will pass. So, gentlemen, here is what you will have for rules beginning in 1978.

Proposition I

A. For *BASIC* SAM Events, ignition engines shall be limited to original

THE TALL SHIPS ARE COMING!



CHARLES W. MORGAN
KIT 68 — LENGTH 10 1/2"

THEY'RE EASY TO BUILD

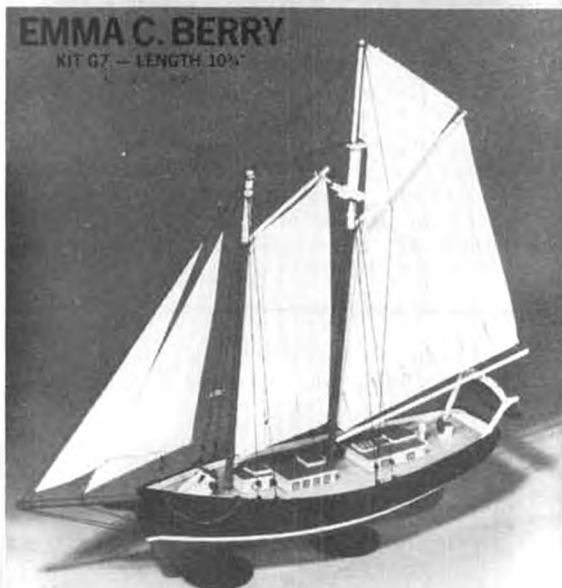
We know it seems unbelievable, but it's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is clear, simple and complete.

- **CARVED WOOD HULLS**

THEY'RE COMPLETE*

With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as Life Boats, Windlass, Anchors, Steering Wheel, Water Cask, Lights, Screw (propeller), Ladders, Compass, etc. Black and Tan rigging line, Printed CLOTH Sails, Decals, Display Pedestals and much more . . .

*Dry Kits paint and cement not included



EMMA C. BERRY
KIT 67 — LENGTH 10 1/2"

THEY'RE HISTORIC

Sailing out of her home Port of New Bedford Mass., the square rigger Charles W. Morgan sailed further and killed & processed more Whales than any other Whaling Ships of her time. Today it is for ever enshrined in all its glory at Mystic Seaport Conn., were it can be boarded and its history relived. The Emma C. Berry is one of the oldest commercial sailing ships in American Documentation. Preserved in excellent condition it can be visited and enjoyed at Mystic Seaport Conn. Emma was launched in June 1866, Slooped Rigged. Further details can be obtained from Mystic. Originally the U.S.C.G. Sailing Bark Eagle was built for the German Navy. It was acquired by the U.S. Coast Guard in 1946 and has been used as a training ship since then for Future Officers; Carrying 200 cadets. For further details write to the U.S. Coast Guard.

- **CLOTH SAILS**

- **CAST METAL FITTINGS, ETC.**



U.S. COAST GUARD EAGLE
KIT 69 — LENGTH 11 1/2"

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Because such amazing detail and authenticity is achieved in kits that are relatively easy to build. Plans include full size drawings, as well as assembly drawings for each step of the way. Authentic color scheme shows on full color kit box lid.

THEY'RE ONLY

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Sterling
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R/C Air Boat/Amphibian

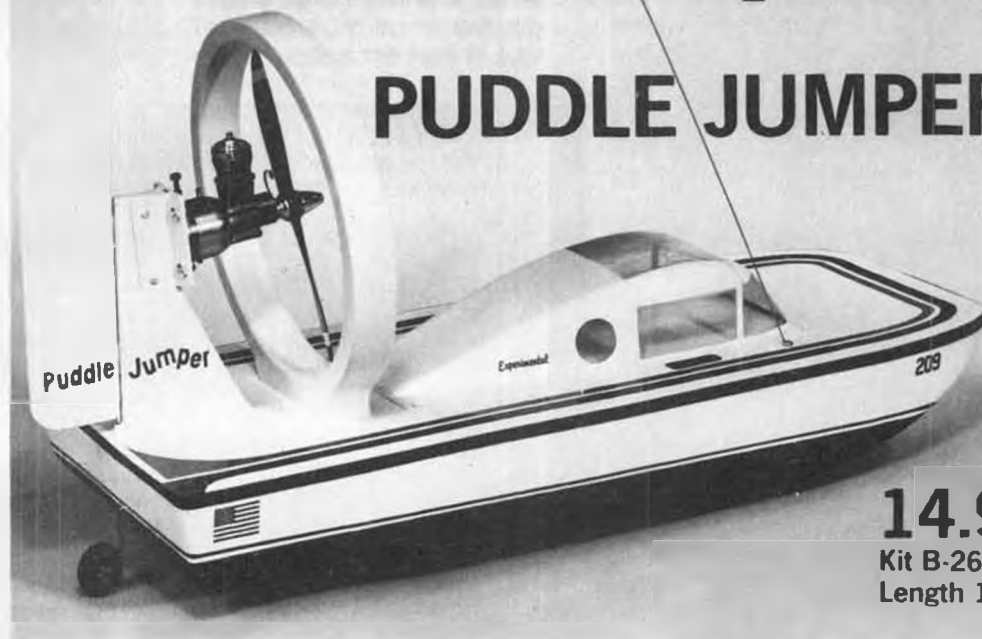
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Or in the water



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Kit B-26
Length 18½"

Designed expressly for 2 channel R/C (plenty of room for just about any R/C) and .049 throttle control engine, this amazing air boat/amphibian will give you more pure pleasure than you can imagine — it's equally at home in a swimming pool or pond as well as a school yard or any smooth surface.

... And it's so easy to build — both the rugged plastic hull and cabin are precisely formed. Main inner structure and deck are accurately die cut plywood as is the balsa. Included is nylon motor mount — easy to follow step by step plans, decals, hardware etc. See this beauty at your dealer.

Swedish Championships, as well as most of the big events from 1939 to 1946. At one time, he held two Swedish duration records.

While he was a member of the Swedish team at the Internationals in Finland in 1942, at Jamijarvi (remember that for Wakefield Internats in 1950 and 51?), Karl-Erik set a Swedish record for international class glider by flying a near-scale (we call them sport scale) DFS Kranich. The original model was designed by Sven Hjelmurus, but when Karl-Erik built it, he included a clockwork timer in it built from Model A Ford parts (His father ran an automobile shop). It was possible to set the timer from a half minute to two hours.

At Jamijarvi, Karl-Erik wanted to make a test flight as he was uncertain of the model's potential. However, he did tell the timekeepers to clock it to see what kind of time he would get. Somehow or another he set the timer for one hour-two minutes instead of two minutes. Naturally the model caught a tremendous thermal and disappeared in the clouds at 40:40.

Contest Director Lennart Poppius then had some fun poking him with his elbow, asking if that was an official flight. Somewhat sheepishly, Karl admitted he did not request a so-called "contest flight". Lennart exclaimed, "I must say you are an honest lad. However, we did not believe you and clocked the

entire flight for an official." It was a good record and stood for many years.

The original model is still flyable and all airbrakes (run by the timer) still work. Sven-Olov sez he has Karl's other models that he truly treasures, as Landegren is no longer active in Swedish modeling.

HTSYM

No, that's not a new acronym. It simply means, "how to save your model." The Pierce & Sons model Company (Pas-M-Co) of 25260 153rd S.E., Kent, Washington, 98031, has come up with an ingenious switch to turn off that howling motor when the model is in that last death dive.

Originally designed for electric powered free flights, the new "Crash Guard Switch" works very well in old timer models employing ignition engines. The mercury switch works by breaking electrical contact when the nose of the aircraft drops below 10 degrees horizontal. According to the brochure, this can be adjusted for less or greater pitch. Interestingly enough, the switch also activates when the ship reaches a completely inverted position. That'll get rid of those dangerous looping models!

As Kenn Rolén puts it, "The possibility of a crash with an out-of-trim ship can always exist." This does not take into account those weird wind gusts one encounters just after launch.

We'll agree with Kenn, with the engine shut down, the crash will be far less disastrous.

SAM 29

Just received a most informative letter from Helmer Johnson, 5812 Wales Ave., Ft. Worth, Tx. 76133, telling me of the latest SAM Chapter No. 29. With Helmer running things, the bulk of the flying (how about 99%?) is O/T R/C, a lot of small contests have provided lots of fun. In that line, this newest (and very active) SAM chapter has developed some events other chapters would do well to take notice.

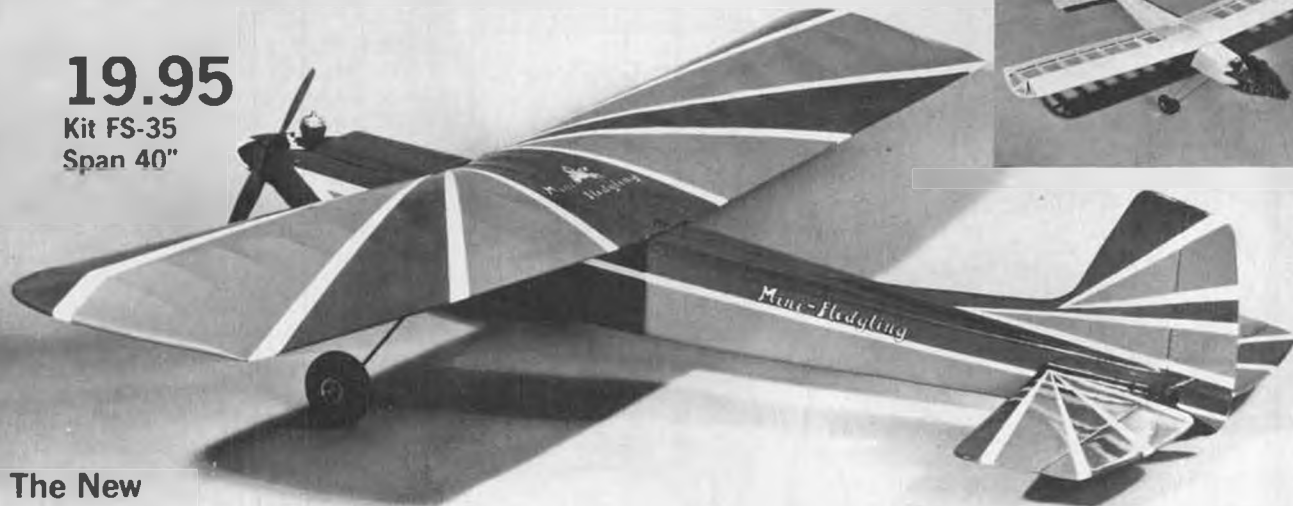
One very popular event called Task II-A (taken mainly from Sailplane Events) consists of putting together a total of 15 minutes on three flights, with no flight to be over seven-minutes! A spot landing circle is thrown in to keep things alive. Only 30 to 35 second motor runs are permitted. Johnson didn't make it clear what happens if you over-run the time total. Disqualifying the last flight would really make the cheese more binding! Perhaps some sort of penalty system of one second a point for every second over the limit. That'll gettun!

The second FUN event, called the "Chicken" Event, is where you climb out for 30 to 35 seconds, cut the engine, have 10 seconds in which to trim your glide and circle, then put the transmitter on the ground! Don't touch

For Beginners or Experts

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Kit FS-35
Span 40"



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MINI-FLEDGLING

If you've seen or flown our Fledgling it will give you an idea of the great performance you can expect from its little brother. Maintaining top quality & simple construction, all balsa & plywood parts are accurately die cut including full length fuselage sides, includes R/C hardware, decals full size step by step plans. Recommended engines .049 or .051 & 2 channel R/C although other suitable equipment may be used.

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same until you get "chicken" and must get it back to the takeoff area. If you don't make it back, you score a big fat zero!

Most of the flying has been in conjunction with the Ft. Worth Thunderbirds. The Thunderbird Field, located in Benbrook, Texas, on the shore of Benbrook Lake, will be the site of the big old timer meet called the "Texas Pride Tournament". Mark your calendar on August 13 for this one, as it will be a fully AMA-sanctioned contest (No. 548).

This "really big show" will feature separate events for Antique and Old Timer types. This meet will feature a flock of prizes, real fun, and the darndest best bunch of guys you would ever want to meet. For further information, write Helmer Johnson at the address given at the head of this contest writeup. See y'all there!

FLORIDA FLASHES

In reading the FMA News (Florida Modelers Association) the columnist noted the results of the Daytona Eagle-Beagle Meet. It appears they had night flying for the first time. Now they know why this event is so popular at Taft.

With three O/T free flight events being staged, Tommy Tibbs copped two firsts, even beating out that 70 year old hot shot, Bryton Barron. That's no mean feat as Barron placed in two events as did Phil Peach. To wrap things

up, John Houtenbrink beat out Howard Hemminger and Barron for the Class B-C Event.

Looks like a great year in Florida this year, with the following meets coming up: Rebel Rally at Jacksonville, Fiesta of Five Flags at Pensacola, Hurricane Meet (no site yet), and the K.O.I. at the end of the year. Great stuff! Nothing brings out the flyers like a good display of models and flying.

MODEL ENGINE REVIEWS

A little rusty in your identification of old engines? Well, Arthur Suhr, W218 N5866 Maclynn Court, Menomonie Falls, Wisconsin, 53051, has the answer for that.

As a follow-on to his Antique Gas Engines publication, Art has now come up with a collection of reprints of all the engine reviews that appeared in Flying Aces, Air Trails, Model Craftsman, and others. If you lost your early magazines, here is a neat way to get current on engines and at the same time provide a valuable reference for your library.

The 200 page book sells for \$12.00, and is well worth it. Art is now contemplating the publication of old engine catalogs and model stuff similar to that. This should be a great way to preserve those old papers. Art is presently selling five items (including the Model Engine Reviews). Write to the above address and get the dope. You won't be sorry!

XP-3 REVISITED

Since we published the account of the first RC-1 to fly, we have been receiving various accounts of other RC-1's that have been built.

The RC-1, regarded as the follow-on to the XP-3, was designed by Sheresaw and intended to attract the radio control enthusiasts. However, as Phil McCary sez in his letter, darn few knew anything about radio and even fewer had radio gear.

In Grand Junction, Colorado (McCary's hometown), there was possibly only as many as 10 modelers in the area. Imagine Phil's astonishment when his friend, Bob Riggs, showed up with an RC-1 kit and asked him to build it. Well, Phil had it about half finished when Riggs took it over.

The ship was finally completed with a Forster 99 in it, but was flown as a free flight. Phil writes to find out if anyone in that area ever knew what happened to this model. With so few modelers in that area, it would seem such a novelty as the RC-1 model should bring back memories. Anyone out there know?

MASSACHUSETTS MEANDERINGS

Latest dope from Sears McCarrison, C.D. of the New England Wakefield Group (NEWG) Spring Old Timer Free Flight meet, is that everything was just great, with nearly ideal weather.

Held next to the State Correctional

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When in Southern California for the Nationals you won't want to miss other entertainments and attractions. Use these coupons for discount admission to either (or both) the San Diego Zoo, in the heart of San Diego, or the new San Diego Wild Animal Park, near Escondido, 30 miles north. Both are within easy 2 hour drive from March Air Force Base. Bring the family!

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Present this coupon at the Group Services window and your whole family will save on a special ticket package that includes:

- Entrance to the Zoo • 3-mile, 40-minute guided bus tour • Admission to the Children's Zoo

Adults (16 and over) \$3.15; a \$3.75 value
Children (4-15) \$.95; a \$1.15 value
Children (4 and under) Free
Free Parking

Offer good June 1 thru Sept. 6, 1977
Limit 8 persons in party.

Cashier's Codes: A-392 C-492

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Children (5 and under) Free

Free Parking

Offer good June 1 thru Sept. 6, 1977
Limit 8 persons in party.

Cashier's Codes: A-130 C-230

Institution (prison to you), no model landed anywhere near the compound. It wasn't until the end of the contest that the wind picked up to 30 mph. By that time, practically all flights were in.

A novel system of handicapping the .020 Replica cabin and pylon models was introduced in this meet, consisting of 10 second motor run for the Cabin and only eight for pylon types. Seemed to work out alright, as there were few complaints.

Again, this year, the rubber event drew the most entrants, while Towline Glider starved for entries. Richard Ivers took the rubber event and also managed to win the .020 Replica Event. Old Timer hand launched glider, which hasn't

caught on anywhere yet, was won by Phil Ingwerson, while son John placed second in the tough rubber event. That's the way to get those juniors in the fun!

NORTHWEST NOTES

Ever since Dave Knight left the AMPS of Northern California and moved to Washington, it has been a case of their gain. Dave has practically singlehandedly organized a series of old timer contests that can't help but arouse interest.

According to Knight, he is proposing to schedule four O/T meets. This in addition to the activity sponsored by the Williamette Model Club (WMC, i.e., Bob Stalick & Co.)

Dave has imposed the following engine limitations. No Schneurle ported

engines, glow engine models will be handicapped the same as present SAM rules, and until a definite SAM vote is made on converted ignition engines, these will be banned. As one of the founders of this movement, won't this columnist be glad when we get a vote on the recent Engine Committee recommendations as presented by Al Hellman to the membership!

The First O/T meet at Harts Lake Prairie went off without a hitch. Good weather, but surprisingly, in spite of the big crowd, the amount of official flying was quite small by comparison.

Knight notes that in spite of all the talk about winter projects, the same old clunkers were out there again. Guess most of us look at it from the standpoint of why change from a winner. Five events were staged, with Don Nordlund winning cabin and Antique Events, Phillips copped the .020 Replica Event, Clarence Haught was all alone in pylon, and Ernie Linn won the rubber event, using Sparky and Flemish Defiance Models. Don't undersell those small rubber designs!

Anyone up North interested in old timer activity should contact David Knight at 6512 149th N.E. Redmond, Wash. 98052. If you are close enough, you can call him at (206) 885-1157. Let's get out and fly!

SAM 27 SALLIES

That very active club in the Northern Bay area has again put on a good O/T R/C meet at Marysville, May 15.

Based on the success of the outdoor barbecue and contest (that got blown out) staged by SAM 21, the Marysville portion of SAM 27 decided to put on a feed of their own. Nick and Neva Nicholau provided the chicken and "Speed" Hughes, who not only provided the field, was the Head Barbecue Chef. Now, how about that for a field owner?

Contestwise, it was no real contest, with Don Bekins winning two firsts and a second, Ed Solenberger scoring the only other first in the Limited Engine Run Event. Despite the tremendously windy conditions elsewhere in the state, the Marysville area enjoyed a fantastic day. Must have been the center of the storm!!

On the casualty side, Loren Schmidt is going to learn to pull off the glow plug clip without going through the prop. Cut his thumb to the bone! The columnist enjoys ignition, as only one switch, conveniently out of the way, is all that is required to start. Guess we will have to use booster leads with jacks for the glow engines.

SAL TAIBI CONTEST

Hard on the heels of the Henry Struck Contest staged by SAM 7 on the East Coast, the westerners, under the direction of the McDonnell Douglas Thermal Thumbers, have decided to hold a contest based on flying models designed by Sal Taibi.

June 12 at Lake Elsinore is the date,

with O/T .020 Replica, Old Timer Gas combined classes, Modern 1/2A & A plus Modern Classes B & C. Unfortunately, the Thermal Thumbers left the door open when they declared R.O.G. optional for the Old Timers and .020 Replica. This, to the columnist, is the crux of old timers; i.e., the realistic takeoff and flight.

One thing that did please the writer is the ruling that the old timers must be powered with ignition engines. Of course, all others can use whatever they please. By the time this goes to press, the contest will be history. We'll try to have the dope on how well the meet was accepted by modelers, and the participation thereof.

THE WRAPUP

Jimmy Dean, Editor of the SCAMPS newsletter, "Hot Leads", is always good for some real sharp humor. He states, "Now that we have expressed our opinions by casting ballots on the proposed solution to the 'Great Engine Controversy', perhaps we can return to pursuing our hobby in a more sensible manner. I expect to see no more winning by the 'winners'. It will be the 'losers' who populate the winners circle from now on." Haw!

In all deference to Jim, you could supply the winners with eggbeaters and they would figure out a way to beat you. Let's face facts men, if you want to be a winner, you've got to work for it. No amount of rule changing will ever equate the situation. On that note, let's get back to the fun that everyone seems to have forgotten about.

Old Timers Forever! ●

Rocketry . . . Continued from page 55

models make use of pistons so they can use smaller engines, keep the peak altitude down, and better the chances for recovery. I have also seen them used with great success on boost-gliders, with no auxiliary guidance; if the glider is going to be stable during powered flight, then the piston seems to be just enough guidance.

I must thank Grant Boyd, of Centuri Engineering, for the pictures that accompany this column. During my recent visit to the Centuri offices, I mentioned the piston project, and he obligingly came up with shots of pistons used at last year's NARAM. Incidentally, I got some excellent pictures of the Centuri installation, which I will run sometime soon, just to prove that Centuri's R&D work isn't done by a group of elves who work from midnight to 3 a.m.

Speaking of NARAM (although nobody was) this is just about your last chance to get in on NARAM-19, in Kansas City, Missouri. If you can't plan to compete at this late date (although I don't see why not) then just come to watch; there'll be hundreds of contestants, a speaker from NASA, and all of the usual fun and games.



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Dumas/K&B . . Continued from page 35

ready to spray on a coat of K&B white epoxy paint. Be sure to use the gloss catalyst. When the white paint is dry, you can wet-sand the entire hull *very carefully*, and just enough to take the gloss off the finish. This way you have a good base for your color finish and it will be very smooth. I caution you not to sand through the finish, especially at the corners. Keep all corners of running surfaces sharp, not rounded.

You are now ready to apply your

trim coats. Think about and plan your trim for an attractive finished product. I used three colors, which entails a lot of masking but it adds to the looks. After all of the colors are applied and dry, lightly wet-sand the colors, paying particular attention to the edges. I cannot caution you enough to use care on all sanding so as not to sand through the paint. When all of the painting and sanding is complete, you can apply decals of your choice, etc. I used a one-sixteenth strip of Goldberg's D.J. striping tape to separate all colors. The boat is now ready for a final coat of K&B gloss clear epoxy paint. If you take the time to finish your boat as outlined above, you will have a finish to be proud



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(Photo reductions of Aero Era Peanuts)

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of, and you will be glad you took the time and effort. There are no short cuts to a good finish. Lots of sanding and patience are required. Naturally, the finish will not help you win a race, but it will instill pride in your work.

Installing the engine is a snap, and only requires drilling four holes in the transom. I used hardened bolts and vibration-proof lock nuts to prevent the engine from working loose. Be sure to use washers between the wood transom and nuts. I would like to suggest that you remove the bolts from the engine and use Loctite (nut lock, catalog no. 74-21) on the threads to prevent them from coming loose. This is good to do on all boat hardware, as vibration is somewhat of a problem in boats.

Radio installation will take you about a couple of hours. The receiver, switch, battery servos and associated push rods are no problem. I would like to recommend that you use the new Du-Bro Kwik Switch mount (no. 203). I used one on this boat and found that it works great.

Du-Bro suggests that you use Vaseline on the switch shaft to waterproof it, but I found that you can substitute the K&B one-sixteenth seal for the plastic mounting bolt to completely water-proof the switch. When using the K&B seals, be sure to keep them oiled so the "O" ring doesn't become dried out. The Du-Bro hand-operated Kwik Fill fuel pump No. 191 is another product that I recommend. You may remove the hand crank and install their spinner to use your electric starter to pump the fuel.

Running the boat is easy, and if you get the C.G. right, it should run great the first time. If the nose rides too high and the boat is a little squirrely, you may have to adjust the engine tilt by adding washers under the top bolts between the engine and transom. However, if the nose wants to dig in, add some washers between the engine and transom on the bottom bolts.

I suggest you purchase the K&B Auto-Trim Assembly (catalog number 8591) and install it on your engine and hull. The Trim will automatically trim

your engine up when you make a turn. This keeps the nose up and also the RPM of your engine.

Another addition I made was to install the Robart Super Pumper to my engine. To do this, remove the top right front plate screw (as viewed looking down on the engine with the cylinder pointing towards your head) and replace it with a K&B pressure fitting (part No. 6723-102). First you must drill a No. 60 hole into the crankcase. Drill it on an angle into the case and you will find it works to perfection. By using the Robart Pumper, I was able to install my fuel tank in the cockpit.

For years, I have been using E.K. Logictrol radios in my planes and boats. Now, E.K. has developed a new servo called "MAXI MITE". I am using two of the prototypes in my Hot Shot. This servo is faster than any I have ever used or seen. I checked the power and it pulled seven pounds without stalling. The power should be welcome, especially for Deep-V and large Hydro boats, and the new large scale planes. This servo should prove to be a popular new item.

I hope you enjoy building and running your K&B powered Hot Shot as I have. Good luck in your racing endeavors.

Editor's Note: Just before going to press, we learned from K&B's John Brodbeck, Sr., that some production changes have been made in the 3.5cc outboard.

The Perry carburetor has been replaced by a standard venturi. Engine speed is now controlled by an exhaust slide valve, resulting in higher top rpm.

To prevent premature drive train wear, a ball-bearing has been substituted for the sleeve-bearing at the engine drive-shaft connection to the flex-cable, and the bronze bearing for the prop drive-shaft has been replaced by a leaded teflon bearing.

Price of the engine remains the same.

K&B Outboard owners can make the slide-valve/venturi modification by ordering a \$6.95 conversion kit.

Prices for the other mods are not yet established, however, the changes can be accomplished by the owner, or the engine may be returned for modification by the factory.

Peanut Continued from page 51

towards the outside edge of the piece, tends to split off the last eighth of an inch. Cutting from both edges towards the center of the piece works well when cutting 90 degrees across the grain. When cutting across the grain at angles other than 90 degrees, it is important to realize that the grain will try to guide the knife blade. Therefore, it is important to be cutting in a direction such that the grain tends to hold the blade against whatever you are using as a guide. A dull blade will increase all your problem, so keep sharp!

When cutting balsa, it is almost always better to make several passes along the desired cut line, than to try to use brute force and do the cut in a single pass. A good guide for the blade is a must for accurate cuts. The very least you should have, for straight line cuts, is a metal edged ruler. A 12 inch rule is large enough for a Peanut, but it's really nice to have a three-foot metal straight edge. Some hardware stores now sell low-priced aluminum yard or meter sticks and these are great for balsa cutting guides (*Check them for straightness by holding two of them edge-to-edge. wcn*) Don't use your drafting triangles (like I do), because they will gradually be ruined by blade knicks.

Curved guides for a one or two-shot cutting effort can be made of card, or even of plastic. For a larger number of similar parts, it is useful to make the guide out of sheet metal; aluminum, brass, or even tin can material. Corners, like the tips of the tail on this model, or the wing tip, are best cut relatively close to size and then sanded to the perfect final shape with fine sandpaper.

Round holes in balsa present one of the hardest things for the beginner to do neatly. Regular drills tend to crush the balsa and bring it out in ragged chunks. Homemade tube drills work much better and are easy to make. Model shops carry brass tubing in telescoping sizes from 1/16 to 3/4 inch diameter. Another source of tubing is portable TV antenna. Most TV repair shops have a few broken ones in their trash, from time to time, that are good to no one but a model builder.

Take a length of tube and bevel the inside of an end with a sharp knife blade, until the end has a sharp edge all around it. A steel knife blade will cut brass tubing well enough to do this, although it will have to be resharpened fairly often. Brass is not a metal to hold a cutting edge very long, but we are only making holes in balsa, so it works well for us.

Use the brass tubing drill to make round holes in balsa by pushing it into the balsa with a twisting motion. Again, it is better to make many twists than to try to cut all the way through in a single thrust. With a little practice, you'll find that you can make very precise neat holes in balsa up to about 3/4 inch thick. The round pieces of balsa that come out of the holes can be saved and used for wheels, cylinder fins, or local reinforcements, as is the case in this model at the wire motor peg.

With practice, you should be able to cut balsa accurately enough that no sanding is necessary, for formers that are going on the inside of the body.

However, if you haven't yet reached that skill level, a sheet of fine sandpaper can be used to slowly bring an oversize piece down to exact dimensions. For an undersize piece . . . start over . . . there



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is no such thing as "desanding paper". All the struts on this model, except the main gear wire landing strut which provides the load carrying member from the axle of the wheels to the fuselage, are made from thin basswood strips. Most shops that deal in model trains have this in a wide variety of sizes and shapes. It's great stuff, stronger than balsa and easy to use. If it isn't easy to get in your area, try Peck-Polymers (as advertised in M.B.) who is also a supplier of propellers, thrust bearings, wheels, and other good things.

Why not go out and cut up some balsa to make this model? The original model liked to fly in left circles. It should have

its center of gravity 1/4 inch behind former "B". The pilot's head on the model in the photo was a plastic slot car driver head. The cowl was painted silver. The tires and the simulated cowl opening is flat black. Ribs are brown felt pen.

Pylon Continued from page 29

along the fuse will free up your hands for other tasks. Push the firewall in through the wing saddle opening and push it up against the motor mount. Hold the firewall against the motor mount with one hand and mark the motor mount holes for the blind nuts

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with the other hand. Remove the firewall and install the blind nuts. Remove the engine and push the firewall up against the motor mount and install the mounting bolts; reinsert the engine, plywood spacer, and spinner. Make sure the engine again lines up without any off-thrust; you can now either five-minute epoxy or "Hot Stuff" the firewall in place.

After the firewall is tacked in place, remove the engine and then, through the wing saddle opening, use 6 oz. fiberglass cloth and long-drying epoxy to permanently install and reinforce the

firewall. Be sure you tie the front of the motor mount down to lessen vibration problems and allow the engine to develop full power. The cowl is one of the few on currently available Q-M kits that will accept a Cox 15 installation without a lot of reworking. If you use the cowl, be sure to cut enough openings, or a large opening in the cowl, to allow the exit of the heated air passing around the engine.

HORIZONTAL STAB AND ELEVATORS

Sheet balsa 3/16 thick was used for the stab and elevators; 1/32 plywood

inserts were installed with "Hot Stuff" into slots cut into the leading and trailing edges with the saw blade on the Dremel tool.

When it came time for finishing the wheel pants, we first thought that they had sent us their 1/2A wheel pants by mistake. We tried stuffing our Kraft-Hayes wheels into the pants first, and they wouldn't fit; then we tried Kustom Kraftmanship's racing wheels, and they wouldn't fit. A quick call to Archie Adamisin at "Big Art's", accusing them of sending the wrong pants, led to the information that they were indeed the correct ones and we needed their special wheels to fit. We immediately ordered a set. In the meantime, we copped a pair of pants off of our "Little Toni" so we could take the pictures.

On the other hand, instead of building it our way, you may want to follow the very complete instructions supplied with the kit.

We've talked about finishing enough times so we'll not cover it again; just strive to keep the end product light. Our version, ready to fly, less fuel, weighs 42 oz., so it's well within the competitive range.

We've only put 4 flights on the airplane at this time, no pylon course was used, and no other racers were flying at the same time, so all we can say is that it appears to be very fast. The airplane shows itself to be stable and without any unpredictable or undesirable characteristics.

We've also included some pictures of our good buddy Allen Booth, with his Brown Racer built from Jack Stafford's kit. Al is very pleased with the kit, and reports it went together easily, except for the beginning assembly of the fuselage while using the kit box as a building board and assembly jig. Fitting the Cox 15 inside the cowl also presents some problems, as he couldn't get the engine in with the carb on. He solved the problem by installing the carb after the engine and cowl were in place.

All up weight, as you see it in the pictures with the engine installed, coated with 3/4 oz. fiberglass cloth and polyester resin, is 26 oz. Lacking only paint and radio, it will surely come in under the 2-1/2 pound weight minimum. Probably the first time Al will ever have had to add weight to meet the rules.

PROFILE OF A RACER

We're starting a new feature with this month's column, and from time to time we will be giving a brief look at some of the more notable flyers involved in pylon racing.

A likely profile to start with is the 1976 NMPRA National Points Champion, Bill Hager. Bill wound up with 583.9 total points, barely edging past John McDermott, who was second with 582.2 points. Bill hails from Dayton, Ohio, and at 36 years of age, can look back on a typical modeling career begin-

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ning at the tender age of eight. Interest then was in rubber powered freeflight, progressing to U-control and continuing until the early teen years, when he discovered other interesting things. So he took time out from modeling to learn the toolmakers trade and start raising a family. Bill and his wife Nancy have six children.

Shortly after Bill had gotten involved in RC in 1970, he attended his first contest as a spectator at the Wright Bros. Memorial Contest in Dayton. This was the first time he'd seen pylon racing, and these races enthused him enough to make his goal that of being one of the top flyers in the game. This dedication leaves no time for other interests or hobbies. Time not spent in practice or actual races (outside of family responsibilities) goes into construction of his own planes and reworking of the famous Supertigre X-40.

Bill obviously spends time with his family, as his oldest son, Robbie, has just become a factor to be reckoned with in pylon racing.

The last year has seen some of Bill's dreams come true. As mentioned, he finished first in NMPRA points in Form I, won third at the NMPRA Q-M races, just recently won best finish in the pylon category at the 1977 Toledo Conference, and while normally it is an unheralded feat, was C.D. at the Form I and Q-M portion of the 1976 Dayton Nats. As an example of family commitment, Bill's wife Nancy spent the entire Nats week shuffling through the mountain of paperwork involved in such an event. He's also been elected Pres. of the Dayton Association of Model Airplane Clubs for the 3rd year in a row, is currently active in the Ohio Pylon Racing Association (a club which he helped found to promote pylon racing in the area).

When asked what he'd like to see different in the current pylon scene, Bill stated that he'd like to see the NMPRA districts broken up into smaller areas and the number of V.P.'s increased, as he feels this would promote closer and better communication between the racers and the NMPRA officers.

I'd say that the name Hager will be around racing for some time to come. Keep up the good work, Bill.

PYLON CALENDAR

JULY		
2,3	So. El Monte, Ca.	F1
2,3	Mentor, Ohio	Q-500
9	Lockport, NY	Q-M
10	Lockport, NY	F1 & Sport
9 & 10	Warminster, Pa.	Q-M
9	Ft. Wayne, Ind.	Q-M
10	Ft. Wayne, Ind.	F1
16 & 17	Missoula, Mont.	F1 & Sport
17	Charlotte, N.C.	1/2A & Q500
31	Ann Arbor, Mich.	Q-M
AUGUST		
6-14	Riverside, Ca.	NATS
7	Colo. Sprgs, Co.	Q-M
13	Olean, NY	Q-M



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21	Chicago, Ill.	Q-M
SEPT.		
10 & 11	Rough River, Ky.	Q-M
11	Toledo, Ohio	F1
24	Dayton, Ohio	1/2A, Q-500
25	Dayton, Ohio	Q-M & F1
OCT.		
1	Forest City, Canada	Q-M
1	Chicago, Ill.	Q-500, Sport
2	Chicago, Ill.	Q-M & F1

Team Trial . . . Continued from page 57

Lee Polansky, and George Xenakis.

Model design has not changed radically over the past few years. Construction, however, has evolved to withstand the force of the catapult launch. Those models at Taft which were zoomed with gusto were built with a maximum of torsional stiffness, light wing tips, and an increase in flexibility towards the tips. Torsional rigidity prevents wing "flutter," which cuts down the zoom by limiting the model's speed as it nears launch.

Fuselage design, for the most part, was rather straight-forward, except for more cavernous front ends to handle

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the tow hooks and assorted gadgetry. Location of rudder adjustments also depended on the flier's preference. On some, all adjustment controls were in with the hook, while others were mounted back on the rudder. In nearly every case, however, the flier used a tighter circle setting for towing than he did for the glide.

Despite these technical advancements, Nordic remains a flier's competition. The man with the most Pirelli rubber doesn't win, nor does the guy with big



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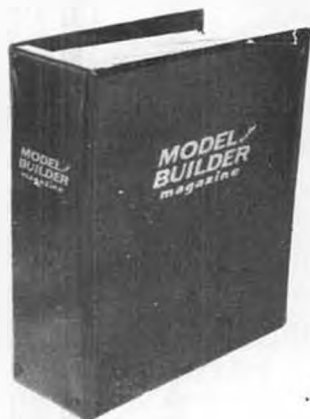
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THE CONTEST

Free flight contests are more often lost than they are won. In each round, one or two fliers succumb to a mechanical malfunction, an evasive thermal, or pilot error. Every hour has its own tragedy.

Weather conditions early Friday morning consisted of high cloud cover, temperature in the low 60's, and very little breeze . . . perfect weather. Several fliers who had been practicing earlier in the week reported that as early as 6 a.m., lift could be found. If so, the

flyoff would be crowded. After an easy practice max at 6:30 a.m., Zink commented, "If the air stays like this, we'll all be in the flyoff."

At 7 a.m., Contest Director Bill Hartill blew the airhorn, shattering Taft's early morning stillness and commencing the competition. And, hardly before the squeal had quieted, Bauer zoomed off into a thick, grey thermal for an easy max. Ten minutes later nearly all the circle towers had positioned themselves in various corners of the field. Wilson, Isaacson, and Zink strategically moved downwind, waiting to piggyback, and as soon as Sietins' thermalling model drifted by, the three—some towed over for easy pickins'.

The contest's first victims were Lee Hines, Hector Diez and Denver, Colorado's Gail Gewain. Hines found lift, set up to zoom, and zoomed. only to have his tow ring flag catch the rudder control horn, bend it out of shape, and send his Ultimax back to earth in 72 seconds. In over 500 previous flights, Hines said, the flag had never snagged the rudder. Diez' story was no less tragic. While towing, the line twanged out of the ring inadvertently, causing a 60 second flight. Gewain, a straight tower, missed the lift. Everyone else maxed, although not easily. Walter's early morning model lived up to its name, squeaking out three minutes and ten seconds.

In Round Two, the pattern, that remained throughout the day, began. With the temperature climbing, Taft's famed, strong lift began to develop, and soon, groups of 6 to 10 models would max in the same thermal. The straight towers were in luck. All they had to do was keep an eye on any flier towing upwind, wait for him to launch in lift, and take off.

The second round produced all but two maxes. Gewain missed again, and Walt Ghio took two attempts for a zero. (Walt, by the way, was only competing for fun, since he had already made the Wakefield team.)

Everyone flew in the round's first 20 minutes. Each flying period was one

hour, followed by a half-hour recovery time. And, with many fliers going off in a single thermal, the wait between rounds was longer than the half-hour intermission. After watching seven models soar skyward in one thermal, CD Hartill said, "It's five minutes of panic, followed by an hour and a half of sheer boredom."

By 10 a.m., the start of Round Three, the sky had cleared, leaving only popcorn kernel clouds and numerous thermals. Again, all but two maxed. Lee Polansky, a former team member, from Arcadia, California and a straight tower, missed the lift, and Sietins dropped five seconds, still leaving him in the flyoff. All through the round, "gang thermaling" prevailed.

Round Four brought more maxes, one reprieve and a thermal rejection. The reprieve was Tom Hutchinson's, who dropped two seconds to keep his flyoff hopes alive, and the rejection was Jim Wilson's. Wilson, after zooming his V-dihedral model into obvious lift, watched it climb to 300 feet in a minute-and-a-half, and sink 300 feet in the next 56 seconds, for a 146 . . . or 5 seconds less than needed to stay in the flyoff. Had the model not glided into a tent five feet off the ground, he would have made it.

At this point, 10 of the 18 fliers were flyoff bound; eight of those 10 had maxed out. Those with perfect scores were Aktinson, Batiuk, Bauer, Drake, Isaacson, Larabee, Lenderman, Walters, Xenakis and Zink.

The fifth round's casualty was Larabee, a straight tower, who ran past the lift for a 110. Don Zink flew a different model this round, as a fourth round line tangle with Isaacson had damaged his ship. This was not Zink's contest for models. On Thursday, he lost his co-number one Nordic behind the kitty litter factory.

By rounds five and six, the temperature hovered in the 80's, with a slight breeze . . . under five miles per hour. In Round Six, Hutchinson fell victim to his flying twanger, which caught his stab, dragging his Ultimate Dragmaster (NFFS Model of the Year) to the ground

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in 82 seconds. As in Hines' case, this had never before happened to Hutchinson. The round's big scare went to Bob Isaacson. His Wishbone never really centered the thermal, and it took two motorcycles and Mike Taibi waving his T-shirt to break loose enough ground lift to eek out a 3:10.

With the field full of thermals and gliders, three straight towers still had perfect scores; Aktinson, Lenderman and Xenakis.

Kenny Bauer fell by the wayside in Round Seven when his model DT'd early, landing in 107 seconds. In round eight, Bauer did it again. It seems the lever arm that runs in the spool found a low spot, triggering the DT too soon. Guntis Sietins, who survived a Round Three scare, wasn't so lucky in the eighth and final round. His Elita ship went off to the side of the thermal and sailed down in 125 seconds.

When the contest had finished at 7 p.m. eight fliers had maxed out and earned a spot in Saturday morning's three-round flyoff. Atkinson, Batiuk, Isaacson, Lenderman, Walters, Drake, Xenakis, and Zink ran the board, with perfect 1,440-second scores.

THE FLYOFF

If Friday morning had been remarkable in its abundance of thermals, Saturday morning was remarkable in its absence of thermals. At 6 a.m., the start of the first 15-minute round, the sky was calm, cloudless and challenging . . . flyoff weather.

No sooner had the horn sounded to start the first round, than Zink and Isaacson towed to the southwest corner of the field. Isaacson had reported finding lift there earlier in the week at this time of the morning, and it was also the highest spot on the field. On the other end of the field, Walters zoomed off early into questionable air. The model glided smoothly, but not in lift. He was down in 178 seconds . . . not very close to the four-minute max.

Lenderman picked a thick piece of air to straight-tow into and scored 209 seconds with his calm-air model.

Fifteen minutes is not a long time to find the thickest piece of air, and as the time dwindles away, fliers settled for whatever was overhead, regardless of how it felt. Isaacson launched into air that held the model for a couple of circles but then deteriorated. Zink checked out Isaacson's air and kept towing until the final moment, when zoomed off amid oohs and ahhs from the spectators. Zink found a marginal thermal, enough for 228 seconds, the round's best score.

At the end of round one, the score read: Zink, 228; Lenderman, 209; Drake, 188; Walters, 178; Isaacson, 166; Xenakis, 146; Batiuk, 115; and Atkinson 0. Seven flights had found only one thermal. This, indeed, was a flyoff.

Round Two, at 6:30, started similar to Round One. Zink and Isaacson towed to the same side of the field, only changed positions, and Walters, taking note of Zink's first round success, also mosied to the west side. Batiuk and Drake were off at the other end of the field, waiting, as patiently as one can wait in a fifteen minute period, for lift. The straight towers, lines strung, legs poised, kept their eyes open.

Ten minutes into the round, Walters launched, into the morning's best chunk of air. The model actually climbed . . . the flyoff's first real thermal. Four minutes and eleven seconds later, the model landed and Walters' hopes of winning soared. No one else even got near a thermal. Zink got a mere 137; Drake, 160; Lenderman, 141; Isaacson, 159; Batiuk, 145; Xenakis, 167; and Atkinson, 136. Going into the final round . . . with the six-minute max . . . Walters enjoyed a 64-second lead over Zink, nearly insurmountable unless he fell into a pucker bush . . . or someone found a six-minute thermal.

Walters took off immediately as Round Three began, towing again to the southwest corner. Quickly, however, after two brief circles, he released the model, apparently inadvertently. If he dropped badly, it would be a new ball game. The model, gliding beautifully, as if destined to fly at the World



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Champs in Denmark, hung on for a 154. Zink needed 219 seconds to catch him, the others more. Elsewhere on the field, Isaacson raced madly up and down the west ridge. Finally, he felt lift, or thought he did. He checked the air and zoomed off. His Wishbone looked good for a couple of circles, then slid to the side, stalling slightly. Bob wouldn't do it.

But, Zink still had a chance, as did Drake. Drake towed alone near the cars, checking the air with every draw of the line. He finally zoomed off into average air for a 174. Zink was again testing the southwest corner. It didn't look too promising, but he had no choice. He twanged his Wishbone into a tight

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circular arc upward, hoping to find the needed 219 seconds. The model dropped ever so slightly. A crowd of three T-shirt flappers and four motorcycles beat the air underneath the glider, trying to concoct some lift. It wasn't there. The glider skidded to the ground 40 seconds short. Jim Walters had won at Taft again.

Overall, it was a superb contest. Long-time observers of the United States free flight scene agreed that it was the finest exhibition of A/2 flying this country had ever displayed. Eight fliers maxed out, four dropped only one, and two others dropped two, of which only one was bad enough to keep them out of

the flyoff. While one reason for the many maxes was the plentiful lift, another was the increased proficiency at circle-towing. As a group, the Americans still may not be as good as the Russians, but they are much closer than two years ago. And, who knows what'll happen with two more years of practice.

One thing for sure, Jim Walters hopes the 1978 Finals are at Taft!

Editor's Note:

We checked with AMA Headquarters before going to press, and learned that the two other regional winners, and thus members of the U.S. Nordic Team, are Chuck Markos (at Bong Field, Wisconsin) and Bob Sifleet (at Bowie, Maryland).

Half-A Continued from page 41
SOAPBOX TIME

Another control line topic . . . Why are there no new 1/2A aerobatic kits? I can state categorically that there is not one even near stage-of-the-art design commercially available, and no rumors of any forthcoming. Sturdi-Built still makes its foam wing models, and these are aerodynamically the right size, but they lack visual appeal, the fuselage construction is weak, and the control sensitivity is strange. The wing is excellent, and a great starting point for your own design, at least. Other than that, the remaining available kit models are as

small as half the size they should be, and ridiculously heavy. I realize these models fill a trainer purpose, and should not be eliminated, but, there must be a market for at least one well-designed full stunt 1/2A model. If there is a market for Miss Poppy at \$80 in the big model size, and people buy 1/2A RC kits like popcorn at \$20 to \$35 a whack, someone out there could have a single, profitable, 1/2A C/L stunter on the market. ●

Soaring Continued from page 44

linkage and an electronic mixer for positive interaction). Also included is a releasable towhook, a Graupner tail-plane horn, and even some epoxy glue.

First reports on the flight of this plane in America indicate that it penetrates well, even in 30 knot winds. The flaperons are very responsive but can be reduced in sensitivity if the pilot prefers more docile flight. Pontchartrain Distributors, Inc., 901 Veterans Blvd., Suite 208, Metairie, Louisiana 70005, handles this model, the Ridge Rider and the Ridge Racer for the British manufacturer. I expect to see these take their share of the prizes in forthcoming competitions.

Hobby Lobby has come out with two new ready-to-fly sailplanes, hand constructed in West Germany. Their PB 20-ST has a span of 82.7 inches, wing area of 616 square inches, fuselage length of 41.6 inches; while their PB 50-DV is somewhat larger, with these measures being 102.4, 775, and 48.9, respectively. These models have a beautiful finish of clear plastic coated balsa. According to Hobby Lobby, they're suitable for launching from a powered aircraft. That might be a real kick.

* * *

You are liable to see some new construction of sailplanes, based on new materials. For example, Archaeopteryx Airframe, 7830 Airport Road, Gaithersburg, Maryland 20760, offers a powered flight-ready aircraft. Naturally, I'm not interested in such "noisemakers", but I want to call your attention to the way the wings and stab are constructed. They are precision formed in a paper/foam laminating process. This provides lightweight strength, and sets one to thinking of sailplane wings and planes, even a fuselage of similar construction.

Pursuing this matter further, may I call your attention to Gatorfoam, a product of the International Paper Company, Uniwood Bonded Lamination Division, P.O. Box 5380, Statesville, North Carolina 29677. This material comes in various thickness panels with a foam sandwiched between flexible water-proof, smooth-surfaced veneer. The rigid material on one side of the polystyrene foam can be removed, and the foam grooved to allow the panel to be bent into the shape of an airfoil, or whatever. It's lightweight and extremely

strong. Here's a material suitable for encouraging your creativity. It comes in 48 x 96 inch, 30 x 40 inch, or 40 x 60 inch panels, in thickness from 3/16 inch to 1/2 inch, the weight being seven pounds for a 4 x 8 foot sheet in the 3/16 inch thickness. I look forward to hearing from you when you make this stuff fly.

General Electric announces its TR B90 6-cell rechargeable nickel-cadmium battery. The nominal voltage is 7.5, the weighted capacity at 75 milliamps is .075 amp-hours, and at 15 milliamps is .080 amp-hours. The maximum discharge rate is .15 amps on a continuous basis. The internal resistance is 500 milliohms. The battery weighs two ounces. This adds another rechargeable to the ensemble of those suitable for flight packs.

* * *

May I call your attention to Patent No. 3680253 for a toy glider, invented by the very young Robert F. Spencer. Here, a delta wing configuration with twin fins benefits from a sliding tube arrangement which allows the pilot to change the c.g. for each flight. According to the patent, paper is the material of choice, but why be so restricted. Let's think more about the use of an extendable fuselage arrangement and the shifting of c.g. during flight.

Dr. Robert Liebeck of Douglas Aircraft Company offered the last lecture in the series jointly sponsored by the National Soaring Society and the American Institute of Aeronautics and Astronautics. He spoke "On the Design of Airfoils for High Lift at Low Reynolds Numbers." After giving some reasons that this subject is of current interest (as, for example, in the design of ultra-high altitude slow speed surveillance vehicles), he went on to review the fundamental theory of airfoil design and stressed the possibility of using a computer to design sections which satisfy the desired velocity profile around the wing. Here, the velocity of the airstream is plotted from the trailing edge around the undersurface plane as a negative velocity, through zero at the stagnation point, and as a positive profile on the uppersurface, returning to the original magnitude at the trailing edge. The distance around the section is normalized to unity. The desired conditions are then enforced in terms of the profile. I would take you through some of the technical details, but there is neither sufficient time nor space.

Bob recommends some unusual airfoils for low speed applications but has yet to devote his full talent to the specifics of overall model and sailplane design. He devised the wings used on 26 cars in the last Indianapolis Race . . . wings which double the weight of the vehicle as they reach 200 miles an hour. The lecture closed with a long series of questions, the last of which was, "Can





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we have another such lecture series next year?" I hope so.

Every so often, Jim Pike, of the Torrey Pines Gulls, comes up with a great idea for a contest. You may recall that he originated the Pro-Am contest concept. Recently, he suggested a balloon bash, and so the Gulls authorized him to CD just such a contest at Hourglass Field. This contest was also in the form of a Pro-Am, with each beginner assigned an advanced pilot to advise him and help him through any anxious moments. A thumbtack was fixed to the nose of each plane, using punctured tape. The object was to fly a fixed time, land at a particular point and, in addition, puncture one or more balloons which were tethered in the landing area on short strings.

All went well, and the contest was a notable success in spite of the fact that it is unbelievably difficult to burst a balloon. As Jim comes up with more good ideas, I'll pass them along to you.

By now, some 200 contestants are practicing for the RC soaring portion of the AMA Nats. The pilot's briefing will be held on the evening of August 9th, at Massacre Canyon Inn, Gilman Hot Springs, California. The next three days will include "man-on-man" thermal competition and the static judging of the scale entrants. The flight task for Class A through C sailplanes will be a seven minute precision duration. The scale

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planes will be flown on August 13th. The Awards Banquet will be held that night at the Inn.

A total of nine rounds will be flown, with ten winches operating simultaneously for each heat. Launches will be staggered slightly in time to ensure safety. The scores will be based on the best score within each heat, calculated as follows: a max flight will earn a contestant a raw score of 420 points. To determine the flight points, multiply the flight time in seconds by five. The preliminary flight score is the flight points of the contestant divided by the flight point of the winner of that heat. The final flight score is the preliminary flight score multiplied by 950. The

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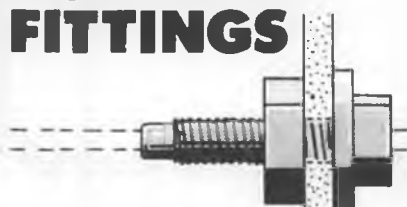


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final score is the final flight score plus the landing points.

Using this formula, if the winner of a heat had maximum flight with a 50 point landing, his final score would be 1000. If another contestant in that heat had a raw score of 380 points and a 40 point landing, his final score would be calculated as follows (all scores being rounded to the nearest whole number):

flight points = 380 x 5 = 1900
 preliminary flight score = 1900/2100 = .905
 final flight score = .905 x 950 = 860
 final score = 860 + 40 = 900

The scores for all other contestants

in that heat would be calculated in the same manner. As you can see, emphasis is placed upon flying ability. This scoring should serve to discourage kamikaze landings.

Unofficial events also scheduled for August 13th include Flying Wing and Electric Powered Sailplane Competitions.

According to my information, this year's League of Silent Flight Tournament will be held August 27th and 28th, at a variety of locations including Seattle, Sacramento, Los Angeles, Denver, Dallas, Chicago, Ann Arbor, York (Pennsylvania), Huntsville, and Orlando. All these contests will be alike in terms of task, classes, awards, and fees; the task being seven minute precision/duration with a 100 point landing circle, one point per three inches, the high and low rounds to be throwaways. Seven rounds are to be flown with all sailplanes flying the same tasks.

So far I've tried my hand at poetry only twice. My most recent attempt is called,

"Sandbagging"

Wait, wound winch,
 When will warm wind welcome willing wings.
 We watch while wayward white whips wander.
 When will wrestling wings warp with weight?
 Swish . . . silent sliver's sent soaring skyward
 Seeking solitary solace.

Perhaps you're wondering about my first attempt. Okay, you asked for it. It's called,

"Egocentricity"

The greatest thing about this poem,
 Is that I wrote it all alone. ●

P-30 Continued from page 47

and about a half inch by an inch, curl down. Use drafting tape to secure. Try again. Increase turns by fifty each flight to maximum. It probably will not power stall, owing to all that downthrust, but it might not go up steeply enough, or the glide may be a trifle fast, so put a layer

of drafting tape under the stabilizer trailing edge. That should do it. Next, you may want your HOT BOX to have a glide turn . . . it makes sense to do a right/right pattern, so gradually either shift/tilt the stabilizer towards the turn, or, tweak the *left* fin over to the right, maybe a 64th at a time. The model should glide circle about seventy-five feet, then tighten up in lift. If you installed enough tip washout, stalls will not be a problem.

Now that you are there, enjoy! My address is 654 India Street, San Diego, Ca. 92101. Prototype built and flown by Cynthia Sabransky, AMA 11118. ●

C/L Continued from page 39

So I feel somewhat obligated to go over the reasons for the rules being what they are. The whole idea of NWSR was to allow anybody and everybody a chance to get their feet wet (with spilled fuel, of course) and their body involved in Racing. An event that requires trick planes turns off most, so it was decided to require box-stock kits. Everybody either already has one or can easily throw one together in a couple of nights. More important, the novice knows for sure that the pros aren't cleaning their clocks with super-zoot equipment that they either can't build or don't have plans for.

The ban on anything as sophisticated (?) as shut-offs, fast-fills and the like drew a lot of comment back when Mike was trying to come up with these rules. I wanted to allow shut-offs for sure, as they can keep burndowns to a minimum, make it a bunch quicker and easier to test-fly for the magic needle setting and, after all, are so simple to rig up that anybody can do it.

I was shut out on this one, and looking back will admit that the ban on typical Racer set-ups was the right way to go. Sure, a shut-off is simple, but not to the novice. The rigging of the shut-off turns out to be just one more stumbling block for the novice and the whole idea was to make this an easy event to enter. Same applies to the fast-fills and

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hot gloves . . . they are neat to have, but have a tendency to turn off those not already involved in Racing.

The rules require big ol' wheels for a couple of reasons. First, the planes that are already built, and that can compete in this event, have big wheels to start with, so no modification is necessary here. Second, it is not always easy to find a paved Racing site. If all the planes are set up to take off of grass, we don't have to worry about a paved circle. This is really handy up here, as most of our contests are Combat meets, and they are held at grass fields, of course. With NWSR available to us, we can add a Racing event to the basic Combat meet, running it right in the same circle, if necessary. By doing this, we have gotten a lot of Combat fliers involved in Racing.

The reasons for the engine restrictions are pretty obvious. Most any Sport motor is competitive and everybody already has at least one of them. With everybody coming out with multiple-port engines lately, we have pretty much guaranteed that any single bypass engine made in the past 5 or 6 years is competitive right now and will not be made obsolete in the foreseeable future.

That's it for the rules. But there is another ingredient necessary to pull off this event successfully, and that is the attitude of the established and already successful Racers towards this event. If they take it too seriously and do everything possible to win at any cost, the event is quickly ruined as far as being attractive to novices.

Of course, this problem can be avoided by not allowing the pros to enter NWSR, but in this area that would be a mistake. Around here, the pros enter this event for fun and *do not* take it very seriously. They are, however, quite well prepared and have the basics covered when it comes time to put up a flight. The novices see this and quickly realize that if they aren't competitive it is only because they are doing dumb things like not checking plugs before heats, test-flying to get good settings, etc.

I personally feel that by limiting entry

to an event like NWSR only results in novices competing against other novices and nobody really learns anything . . . except how to be the best-prepared (or luckiest) of a group that is basically ill-prepared (or down on luck that day). The novices should be in this to learn something, and the best way to do that is to let them run up against guys who know what they are doing.

I mentioned that pros cannot take this event seriously in order for it to work as intended. For example, Gary Stevens and I have our act together in the Racing events and do very well in Rat, Goodyear and Slow Rat. And guess what we use in NWSR? I use a Goldberg Cosmic Wind that was gathering dust up until two years ago, and it is powered by a Fox 36 plain bearing that is painfully stock. The Fox twists a 9 x 6 Taipan grey, tank is a 2 ounce Pylon clunk tank, filled with Aldrich's Magnum 15% fuel, and plugs are anything I have laying around. The plane is absolutely stock, having been built a long time before I knew any tricks, including two great big Perfect wheels. Gary flies a Boogie Man (a Slow Combat plane that P.T. Granderson used to kit) that has been fixed a bunch and has a warp someplace in the wing. Power is (get ready) an old Enya 29. The Enya swings any prop that is handy, feeds off of an inboard mounted 4 ounce Pylon clunk tank and likes any kind of sport fuel for nourishment.

With just a little thought and effort, even a first-time novice can come up with a combination that is superior to either one of these planes in many respects. Still, as it happens, I hold the low time for a heat with about a 4:20, and Gary holds low time for a final with an 8:28. These times are both within the reach of novice Racers with a race or two under their belt and with the will to watch what we do and then to either do it as well or a bit better with equipment that is available and yet superior to our thrown-together combinations.

The "loose" attitude of the pros also has to be applied to winning and losing come Race Day. Another example: At

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the first contest of this year, Gary blew it in a heat race, but I turned a good time and made it to the final. Ran a really good, clean final and we assumed that my plane had taken it going away. But when the results were posted a novice racer had won, and a check of his plane revealed that he didn't remember our plain bearing-only rule, and was running a new Fox Combat Special (this was his first race). Not only that, he had his plane come in on him during the race, picking it up almost in the pilot's circle and then carrying it out to his pit-man. This very slow pit, coupled with a rich setting that kept his plane kinda slow, made it pretty obvious that not only was



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his plane illegal, but somebody had screwed-up when timing his flight. Now if we were running a serious race with go-fast equipment, Gary and I woulda bitched. But in the context of NWSR, it wasn't worth it. We had picked up a new Racer, he had placed in a Racing event, the last thing I need is another trophy, and our new Racer was primed to try it again at the next contest. With a legal engine, of course.

I guess that's enough on NWSR, except for once again emphasizing that this event can only work as a regional or local event and needs the backing of pro Racers who look at it as a pure fun event, not yet another chance to stroke it to the novices with trick equipment.

Anybody proposing this, or a similar event, for use as an AMA event to be published in the AMA rulebook, deserves having pin-holes in all his fast-fills and kinks in his lines.

(This is what we had hoped for 1/2A R/C pylon racing, but unfortunately, it has been proposed as an AMA event, and already, there are nationwide arguments about what the rules should be. It was going fine as a local rule, locally flown event. wcn). ●

Hannan Continued from page 50

engine's speed, we were unaware that the idea had been employed many years

previously in model engines. Russ-Craft Model Museum recently acquired the collection of the late Richard Schumacher, and among the engines was a French-made "Ouragan" diesel. It featured a convenient lever, of the type used on spark ignition engines, to raise and lower the crankshaft, and thus the engine's compression ratio. Incidentally, the Russ-Craft Museum in San Marcos has been closed, and is expected to reopen in a few months, near Morgan Hill, California.

CANARD, AGAIN

Adding credence to the belief that "duck" is the *correct* French translation for the word "Canard" as applied to tail-first aircraft by pioneer airmen, Frans Grosspieler points out that the German aero term for that type of craft is "Ente", which translates to . . . you guessed it, "duck"!

LINDBERGH CELEBRATIONS

Among the many activities held in recognition of the 50 year anniversary of the New York-to-Paris solo flight, were various TV specials (such as the one featured in MB). In addition, the theme of this year's Paris Air Show, held at Le Bourget field, where Lindbergh landed, is 50 years of flight, from the "Spirit" to the Concorde. Interesting to note how times have changed: While Lindy was welcomed with open arms by the French, the Concorde has been getting the cold shoulder from New

Yorkers!

Special commemorative postage stamps were issued by both France and the U.S., a rare event for our readers who are also philatelists. These are *bound* to be valuable in a few more years.

BUCK ROGERS TOYS

A few tissues ago, we asked if anyone else remembered the old die-cast metal rocket ships that were sold all over the country in 5 & 10 stores (now 5 and 10 *DOLLAR* stores!). Engine collector Jim Gerard, of Northern California, responded by showing us his two prized examples, seen in one of our photos. They are called the "Venus Duo-Destroyer", and the "Battle Cruiser". A third type, name unknown, was equipped with small pulleys, enabling them to slide down a stretched length of string. Jim said that a very few of these toys were sold after WW-II, packed in boxes. We seem to recall that the pre-war ones were simply marketed unwrapped, like other metal toys of the period, at about 5 or 10 cents each. Current collectors' prices . . . \$30 to \$60!!

PEANUTS IN

CARTER'S FRONT YARD?

Maybe! Wandering VTO columnist Dave Linstrum, during a recent visit to Washington D.C. AMA headquarters, seriously advanced the idea of holding a small Peanut Scale fly-in on the White House lawn. Seems as if the current occupant should favor such an event.

After all, they have held Easter Egg hunts there!

MAN-POWERED MACHINE INTEREST GROWS

An interesting phenomenon is taking place, in case you hadn't noticed: The entire world seems rather suddenly (on a scale of years yardstick) to be taking a fresh interest in the potentials of the human body. People everywhere are trying to improve their eating and exercise habits, giving up smoking, etc. Perhaps the increasing mental crush brought on by energy shortages and suchlike has refocused interest on the simpler ways of life found in earlier times. Whatever the reasons, bicycle sales are way up, hiking trails are getting greater use, and health books are appearing in profusion . . . And, man-powered vehicles are back in the news.

At nearby Palomar Airport, 72-year young Clyde "Daring" Goerhring has his man-powered aircraft almost ready for testing. Clyde is a long-time model builder, and his accumulated experience can readily be detected. Essentially, his aluminum tube fuselage resembles that of a Demoiselle . . . that is to say it is a triangular open-work structure, but mounted inverted in comparison to the Santos-Dumont craft. The tail assembly is quite conventional in appearance, but the wing is the real focal point, being similar to that of the Douglas O-43A; beautifully tapered with every rib different (except on the opposite panel, of course!). Not the easiest thing to construct, but certainly pleasing to the eye.

Goerhring (rhymes with "daring") is one of the most enthusiastic gentlemen we have met in many years, literally bubbling over with the sheer joy of being involved in such an exciting project. He has been the subject of numerous TV and radio interviews, as well as many newspaper reports. He takes it all in his stride, and enjoys openly being in the limelight, in direct contrast with many builders, who are secretive, and seem to resent even the slightest interruption. As a result, Clyde has a steady parade of well-wishers and willing boosters passing through his small shop. He keeps a book with signatures and occupations of his visitors, which makes fascinating reading in itself.

Perhaps the main difference in design philosophy Clyde expresses, is in regard to weight and strength. His approach seems to be along the lines of "if in doubt, make it stout". Yet, he points out the logic in his thinking, by explaining that most existing man-powered aircraft are extremely frail, some even having been severely damaged by relatively minor wind gusts or gentle impacts. The Goerhring machine should be able to be exposed to mild winds with little fear of damage. However, with the weight target being somewhere

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in the 200 pounds region, with the pilot adding nearly the same amount, it appears to be heavier than any previous contender for the big prize. Sol Berman and your Hangar proprietor hope to be on hand during the initial test, and will keep you posted. From where we stand, we'd sure like to see a model builder, such as Clyde, make the big score!

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This meant 4 a.m. reveille for many of us, not exactly the easiest way to start the day! However, we were astonished after probing our way through fog-filled and poorly sign-posted streets, to discover a large crowd of eager participants and an enthusiastic audience. We quickly spotted Taras Kiceniuk of "Icarus" fame, Volmer Jenson of powered hang-glider renown, as well as model builders Walt Mooney, Ed Lockhart, Bill Watson, Dave Saks and their friends. Made us wonder if we were at the right place!

After completing the 1/4-mile or so hike to the pits, we had the chance to examine at close range the fantastic array of entries. Some were virtually standard 10-speed type bikes, with streamlined shrouds, while others were truly far-out, specially built chassis types, with exotic molded sheets. Materials included everything from fiberglass to 1-mil mylar model airplane covering. Weights ranged from hard-to-

believe 16 pounds, clear through a couple of hundred pounds. And propulsion systems were just as diverse including a rowing machine, hand AND feet driven pedals, push-pull layouts, etc.

Driving positions ranged from fairly conventional upright, through recumbent supine and recumbent prone (on yer belly or on yer back). Some featured two drivers, while others had three! Some looked for all the world like exotic tropical fish, with their strange shapes and slight oscillatory motions once under way. Some appeared to have been constructed the night before, but some obviously were the result of hundreds of man-hours' effort.

The course itself appeared to be about a half-mile long, although the actual timing was conducted in a "trap" varying in length with the particular event (200 meters, 500 meters, etc.). At any rate, those of us who perhaps fall in the ranks of "slightly out of

condition", were surprised the riders had any "steam" left by the time they made it TO the timing portion of the course. Yet, repeated runs were made all day long by these hardy souls. The announcer kept the crowd informed as to the proceedings, as well as entertained, with light patter such as (for the rowing entry) "O.K. (everyone, let's all sing ROW, ROW, ROW YOUR BOAT, GENTLY DOWN THE) STREAM!", and they did. Or: "The vehicle has come to a stop, and is WALKING off the course!" Looking, we might add, very much like a tall sow-bug. Another source of comedy-relief was one bike, which featured a model body in the shape and color of a banana! At least it had appeal . . . Hsss! another, called the "Black Aardvark", looked very much the part.

Needless to say, we were pulling strongly for model builders Bill Watson and Dave Saks, both of whom turned in very respectable times in the 40 miles-per-hour range, and attracted a great deal of attention with their cleverly engineered designs. Keep your eye on these lads! High time, as of our departure, was 49.93 miles per hour, set, I think by Dr. Allan Abbott, with a very similar time achieved by one of the multiple-rider machines. So you see folks, there still are ways of getting around without fuel.

NEW CATALOGS

Two new offerings arrived at the Hangar, well worth your investigation.

Majestic Models favored us with their illustrated catalog, featuring Keil Kraft's fine range of kits from the United Kingdom. Included are a variety of gliders, rubber-driven sport models and flying scale types. Other designs are for power duration and powered flying scale. We've heard good reports about the mail-order service provided by Tom and Marion Majestic, so why not give 'em a try? Twenty-five cents is the price asked for their list: Majestic Models, 3273 West 129th St., Cleveland, Oh. 44111.

Another catalog, from Peck-Polymers, contains its newly expanded range of products. We were recently privileged to see the factory prototype of the newest kit, the "Baby Ace", designed for either rubber or CO₂ power. And we understand other "Walnut Scale" designs are soon to be released. Then too, we were pleased to see the fine range of Peanut Scale plans from France, drawn by E. Fillon, who may well be the Walt Mooney of that country. Bob and Sandy, Jill and Vera, will see to it that your orders receive fast, fair service, so send 'em a bushel of orders! Catalog price is 50 cents, and their advert appears in every issue of MB.

We appreciate it when you mention seeing these reminders in *Model Builder*, because it helps to assure our advertisers that their hard-earned advertising dollars

are being well-spent!
PARTING SHOT

It is nice to be important, but it's important to be nice!

Quick-Pit . . . Continued from page 37

container and fill the bladders, I use a 60cc disposable plastic syringe; there are a number of different manufacturers. The syringe marketed by Tatone Products (No. 74) is the best one I have used; it seems to last the longest before the rubber plunger gives up. The Quick-Pit flight box has a compartment that will hold three or four syringes, depending on the brand you use.

You now need a number of bladders to run your motors. Many pilots use pen bladders; these are available from Tatone Products (Sm. No. 71, Med. No. 72, and Lg. No. 73). Other pilots, like myself, prefer surgical bladders; Midwest Products markets surgical bladders (No. 1201), or they can be scratch built, provided you can find the right size tubing. I use 5/32 Bore x 3/64 Wall Surgical Latex Tubing. Still other pilots use baby pacifier tanks. Pacifiers can be purchased from a number of different sources, including drug stores. The clamp I use to pinch the fuel line is an electrical heat sink; it is small, inexpensive, and effective. I have, however, lost several of these units. Surgical forceps or clamps are nice, but they are expensive and can sometimes be too large. There are a number of other clamps that will work. Experiment and find out what works best for you.

Propellers are next. Experimentation is done at the practice field and not at a contest. Make sure you have enough props for a contest; seven or eight balanced wooden propellers for AMA Fast combat contests should be enough. Three props for each class at a WAM contest will get you by since you are limited to three flights per event. The new Top Flite Pylon racing props that are 8-1/2 inch in diameter are worth trying. I will not tell you what props to use, because each aircraft engine set-up will require a different prop to achieve maximum performance. This is something you will have to find out for yourself.

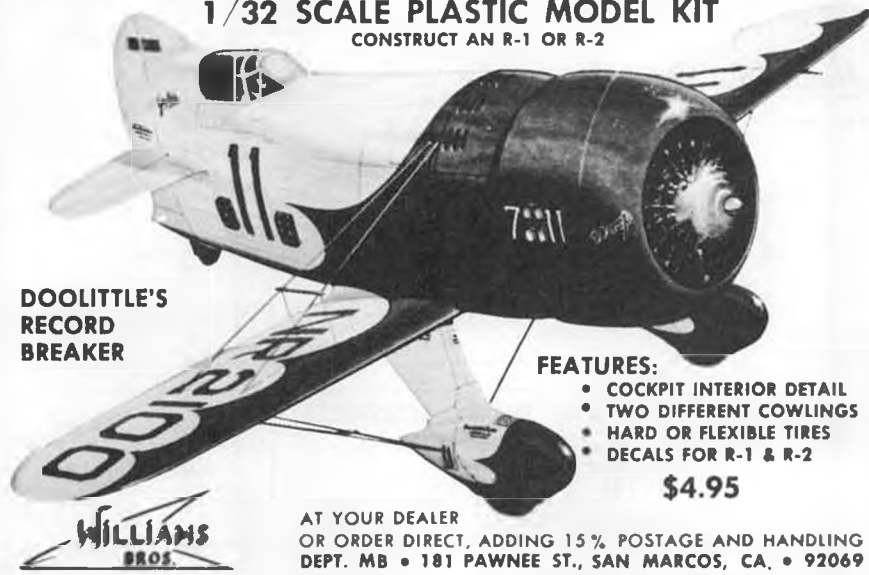
A battery is the next essential item. I like to use the tall, round No. 6, 1-1/2 volt Ignitor Dry Cell unit in conjunction with a Kraft Glow Plug Analyzer Model CPA-R and a Graupner glow plug clip no. 1608. Many combat pilots use a variety of rechargeable batteries that are either nickel-cadmium or wet-cell units. The new Fusite Fire Plug looks good and is compact; it is, however, a bit on the expensive side. Some sort of meter to determine the condition of your glow plug at a glance is a must in a contest situation.

Glow plugs are an expendable item because of their delicate nature. A new

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glow plug, whether you need it or not for each contest flight, is a good policy to follow. The used plugs can be put in a separate caddy, and used during practice sessions. A full caddy of nine plugs, plus a new one in each engine, is a good way to start off for a contest. Experiment with the various brands to find the ones that work best for you and your set-ups. The Quick-Pit flight box uses two "Nifty" glow plug caddies by Sonic Tronics No. 260.

A starting glove is helpful in preventing prop-bitten hands and fingers. I have been using a motorcycle moto-x glove that is padded along the backs of the fingers. It has saved my hands and fingers many times, and is a cheap form of medical insurance. You can also use "chicken sticks" (Tatone No. 51), but you lose the feel of the motor. Bare finger starting is reckless and is just asking for injury. I have also seen pilots who use a piece of rubber hose over the fingers as an aid in starting motors; it seems to work for them. One pilot that I know used an archery finger guard glove. It made for a real neat unit and is worth looking into. If you have an effective idea in this area, use it and let other pilots know about it.

TOOLS

A four-way wrench (Austin Craft No. 227 or Fox No. 70104) is a standard item used in every tool box, and the Quick-Pit flight box is no exception. It is handy for prop nuts, glow plugs, and mounting bolt nuts. Some nut drivers are also nice to have in your flight-box. I carry a 5/16 driver for glow plugs, .15 size prop nuts and mounting bolt nuts. I also use a 1/4 inch nut driver for 1/2A and Class A or FAI mounting bolt nuts. The Quick-Pit flight box has spaces set aside for large, medium and



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small screw drivers. There is a space set aside for an X-Acto super knife (No. 3111) in its case; you can always find a use for this item (*Mainly to cut your throat for not using an Uber Skiver! wcn*). The Quick-Pit flight box has a long deep slot for a pair of long nose pliers, a pair of wire cutters, a crimping tool, and a pen. These items fit in the box standing up so they are easy to get to.

These days, competitive pilots have to carry 5-minute epoxy and cyanoacrylate glue for quick field repairs. Make sure that these items are in your tool box. A competitive combat pilot should have the following items available to him at a contest: a sealing iron, heat gun, pieces of Fascal, and a pair of scissors. These items do not have to be at the flight circle, but should be nearby. A clean rag is one of the most forgotten items, yet it is one of the most useful accessories at a contest or at the practice field. I like to wipe off my aircraft after a day of contest use or after a practice

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session. Be sure to start off a day of flying with a clean rag in your tool box. A small note pad is worth having in your tool box, not only for equipment performance notes, but also for names and addresses of prospective combat pilots. There are lots of people who would love to get into combat flying, but have no way of getting started or anyone to encourage them. Seasoned combat pilots take note! If you find a prospective combat pilot, give him a hand; with the proper guidance a beginner can learn a great deal in a short time. Not only that, you will have someone to go out practicing with. You will derive a great deal of satisfaction when your student starts progressing.

One more item that belongs in the Quick-Pit flight box is 2 or more plastic or metal small-parts boxes. These should hold extra sets of mounting bolts, spare needle valve assemblies, a few pins, extra fuel filters, spare bladders, some small wrenches, copper or brass tubing for tying up lines, small rubber bands, 1/2A glow heads, and anything else you think might be useful at a contest.

The intention of this article has been for you to get an idea of what equipment is necessary to be a competitive combat pilot. You may want to add some of your own special tools or subtract

some of the ones I have recommended; by all means use those with which you feel comfortable.

CONSTRUCTION

This project is not a long, time consuming endeavor that will keep you in the work shop for months. It is, rather, a one-week task that will yield a valuable tool useful for many years, the Quick-Pit flight box. There were three Flying Tiger Club (1976 WAM Club Combat Champions) members who worked on the construction and design of the Quick-Pit: Gary Kearns, Glenn Williams and myself. Gary and I took one 4-hour evening to lay out and build one of the prototype boxes. The three of us put in two 6-hour evenings cutting out, building and rough sanding ten tool boxes. Gary is a carpenter and cabinetmaker, so naturally we used his garage workshop for these work sessions.

We used a table saw to cut out the parts, but a saber, jig, or band saw would probably also work. We used a "Whammer" paneling nail gun on the basic frame of the box and center handle support dividers, which happened to be handy in Gary's shop. This can also be done with a regular hammer and nails. We used Aliphatic Resin glue on frame and the center handle support dividers. The rest of the smaller dividers were glued in with 5-minute epoxy. We used various

size sanding blocks with various grits of sandpaper and a power hand sander to get the box into a ready-to-finish state. The Quick-Pit flight box will weigh approximately 4 pounds 2 ounces before finishing and sanding. The weights will vary depending on the density of the wood you use.

1. Cut out the 19-1/4 x 8-1/4 x 3/8 inch bottom, the two 20 x 4 x 3/8 inch sides and the two 8-1/4 x 4 x 3/8 inch ends.

2. Glue (Aliphatic Resin) and nail the ends of the box to the bottom. Note the location of the nails as shown on the plans.

3. Glue and nail the sides of the box to the bottom and ends.

4. Cut out the two 8-1/4 x 7-5/8 x 1/2 inch center handle supports. Cut them to the shape shown on the right end view of the plans. We used a "Dremel Moto Shop" jig saw for this procedure.

5. Drill the 3/4 inch holes in the center handle supports.

6. Cut a piece of 3/4 inch dowel 5-1/4 inches in length.

7. Glue and nail the center handle supports at the location shown on the plans.

8. Glue and nail the 3/4 x 5-1/4 inch dowel handle in place.

9. Cut out the 7 x 4 x 1/4 inch and 4-1/4 x 4 x 1/4 inch dividers for the left side of the box, as shown on the plans.

10. Epoxy (5-minute type) these dividers at the exact location shown on the plans.

11. Cut out the 4-1/4 x 4 x 1/4 inch divider that will go directly under the handle.

12. Epoxy this divider in place.

13. Cut out two 7 x 4 x 1/4 inch and three 2-3/4 x 4 x 1/4 inch dividers for the right side of the box as shown on the plans.

14. Epoxy all these dividers at the locations shown on the plans.

15. Cut out 7 x 1-1/2 x 1/2 inch tool holder.

16. Mark the location and drill the different size holes in this tool holder.

17. Epoxy the tool holder in place.

18. Sand the entire box with rough, then medium and fine sandpaper.

19. Stain the box whatever color you like.

20. Decorate your box with decals and stickers of your choice.

21. Coat the box with three or four coats of "Flecto" Varathane.

22. We added solid brass corners (Brainerd Mfg. No. 474 xc) to our boxes for added protection of the corners and bottom of the box. Note the location on the plans.

23. The last item to be added to the box will be two "Nifty" glow plug caddies by Sonic Tronics No. 260.

CONCLUSION

Fill the box with all your gear and enjoy years of use from your Quick-Pit flight box. Only a glance at the Quick-

Pit is required to see that all items for a day's flying are there.

I hope to see you at the Combat Circles.

F/F Scale . . . Continued from page 49

are using. At this point, place a small piece of masking tape to mark where you want to grip with pliers. I have found that with fine wire, even marking pens do not leave a clear enough mark to see. Invariably, I accidentally wipe off the mark, so masking tape is a good way to go.

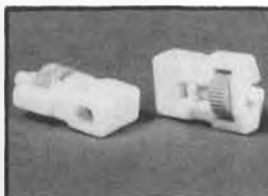
One item that I have mentioned in the past, but should be mentioned again, as long as I'm talking about wire, is the use of welding rod. Welding rod, in the 1/16 size is ideally suited for cabanes. It is very easy to bend as compared to the same size piano wire, and by the time all of the "X" bracing is attached to the cabanes, it becomes very rigid.

I use this rod almost every time that the 1/16 size has to be used. Even the 3/32 welding rod comes in handy for the same purpose, but for much larger aircraft. These rods can be soldered. For obvious reasons, it *should not* be used for landing gears, because there is no spring to it. (Check your closet for coathanger wire. We used it on our .60 powered "Spruce Goose" biplane cabane struts. Even bent closed eyes in the ends for bolt-on attachment. Plenty rugged! wcn)

One important point may not be familiar to all scale modelers, and that is to check wings for balance, prior to covering. I know that R/C'ers, particularly those in competition, balance their wings from wing-tip to wing-tip before covering. You can readily see that if one wing-tip weighs more than the other, trimming your model will not be an easy task. Naturally, on small peanut type models, where there is very little material involved, the weight difference, if any, will be quite minimal. However, on larger models, the difference is very noticeable, and certainly has an effect on the way your model flies. It only takes a minute to set it up to balance.

During the construction of the Thomas Heath Parasol, I decided to use the small Horny Hinge Points for wing strut attachment. The approximate O.D. of the hinges is 3/32. The obvious step is to drill a 3/32 hole at the end of each wing strut and into the fuselage. On this design, there was a bit of a problem. The material size of the struts is 3/32 x 3/16. By looking at the sketch, you can see what I did to employ this easy method of attaching struts.

I first made a slit about 1/16 wide and as deep as the hinge point. I then put a 3/32 drill in a pin vise, and by holding the end, firmly, drilled through the slot. This rounds the slot and permits a somewhat better fit than an oversized slot. I used Ambroid to hold the hinges in



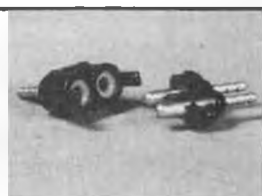
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place, but any glue would work. After the glue had dried, I sanded the struts into an airfoil shape. The slots were then filled with Sig's Epoxilite (For those of you who may not be familiar with this product, it is a two-part epoxy that comes paste-like, and is water soluble until it hardens. If you feel this isn't strong enough, a few turns of polyester thread will reinforce the area.

I want to devote a couple of columns to pendulums, starting off with an introduction extracted from Chapter Six . . . "Pendulums for Free Flight", from the book *Flying Scale Models*, written by Ron Moulton.

"Of course you'll fit a pendulum . . . That plain statement, usually from one uninformed and inexperienced of the subject of scale models, is an admission of how much we modelers follow fashion. One season we may be control-line stunt crazy, the next, we switch to radio control. In scale design, we sometimes get a flush of biplanes, then a rush of multi-engine bombers. The pendulum came suddenly as one of these fashion periods, and before long, any and every scale subject being tackled was fitted with a pendulum that was supposed to be the magic answer to all stability problems. Most of the models so fitted would have been improved without the

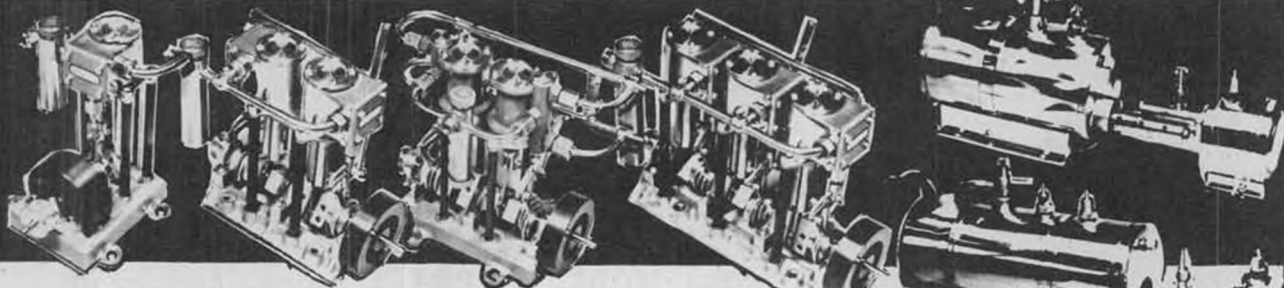
pendulum attachment.

"Make no mistake, we cannot decry the pendulum . . . for it is an aid to stability when used correctly, and it can make a model perform wondrous aerobatics in certain safety; but it is *not* the cure-all answer that people have been led by assumption to believe."

Certainly, the phrase, "for it is an aid to stability when used correctly, but is not a cure all", just about says it all! However, the book was written in 1960, and a lot has occurred since. At the '67 Nats, the late Vic Harden had entered a one-inch scale F/F model of Whitman's newest Bonzo. This model was a miniature replica of the real aircraft, including scale tail size and zero dihedral. Besides being accurate in scale, the workmanship was flawless. One feature, not so noticeable, was that it had pendulum ailerons. I can remember how neat it was to see Vic bank the model and the ailerons would move. It wasn't until we saw the Bonzo fly that everyone was duly impressed. It took off realistically and flew in wide, left-hand circles. When a wing would drop, you could see the pendulum work as the low wing would be "picked up". It was really something to see. Here was model of a plane that no modeler would ever choose for F/F.

The tail area was so small that no one imagined that it would ever fly.

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Like so many things in our lives, we get charged up on one or several items, then the enthusiasm drops off, and all is forgotten. This happened to me and pendulums. It wasn't until I met Jack McCracken a few years after that Nats that my interest was rekindled. Jack has done a tremendous amount of work and experimentation with pendulums, and I've learned more from him than any other source.

Before getting too far along, let's look at some of the early applications of pendulums. Apparently, the first attempts with pendulums were for rudder. These initial trials worked out quite satisfactorily, with the rudder movement hardly noticeable. As the use of pendulums increased, modelers found their models either spiraling to the ground or looping frantically. The probable cause was either too much movement or sticky controls. Even though pendulum rudder was first used, the elevator is, or has been the most popular. With rudder control, if there is over-correction, the model spirals to the ground. With pendulum elevator, theoretically this should never happen. Usually, with the nose down the pendulum will pick it up, or visa versa.

One big disadvantage to a pendulum elevator is that all flights should be done R.O.G. Why? When you hand launch, the first thing that happens is that the pendulum is surged back (For every

action there is a reaction.). This causes immediate down elevator, and at shoulder height . . . sure disaster. About six years ago, for the first Flightmaster Scale R.O.W., I built a Sopwith Schneider that had both pendulum rudder and elevator. When I first flew the model, I had to run like mad, then toss the model into a very steep climb. The model would gently stall and continue on a reasonably stable flight. The only reason I could endure such tactics is that I was waist high in grass.

My personal feelings about pendulum elevator (I won't even consider pendulum rudder) is that even a rock will remain straight and level if there is enough energy behind it . . . meaning that a model can be trimmed for a flat glide regardless of its weight, as long as there is enough flying speed involved. So that brings up the point about pendulum ailerons. Unquestionably the biggest problem with many scale models is spiral instability. This can be caused by several factors, with lack of dihedral being the major one. Therefore, it logically stands to reason that pendulum ailerons would be the most sensible control to use.

What kind of designs should you consider for using pendulum ailerons? Certainly not the old Stable Mabels that have been done and over done, such as the venerable Piper Cub, T-Craft, Tiger Moth, S.E.5, etc. These and similar

aircraft have such good full-scale proportions that additional help from pendulums is not necessary. However, what about a Staggerwing Beech, or even a Fokker DR I or a Boeing F4-B4? It's certainly a challenging thought, wouldn't you'd say?

The photograph of one type of aileron control is that used by Jack McCracken. As the weight swings to one side, the corresponding aileron works to pick up the low wing. This system is suited to models which have the ailerons on the bottom wing, if its a biplane, or for any low-wing design. If it is a parasol or a biplane with the ailerons in the upper wing only, then refer to one of the sketches.

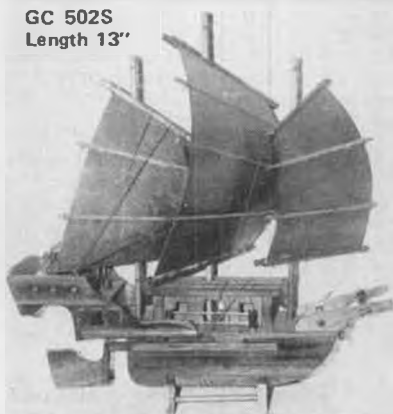
Is there a drawback to this particular system? Yes. Jack had this system installed in his magnificent Staggerwing. On the first test flights, it was found that due to the speed of the model (it is built to one-inch scale, with a 30 inch wingspan, and is fairly heavy for its size, powered with a Cox .049 engine . . . It has to fly fast) that as the model banked sharply to the left, you could see the pendulum trying to pick-up the low wing. However, as the speed of the model increased, the pendulum was swung to the opposite side due as a result of the centrifugal force set up by the tight spiral. This, of course, caused the model to continue spiraling into the ground. Fortunately, in this case . . . tall grass. Jack has since revamped the

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system, and I'll discuss it next month. So, for a model that does not have an excessive wing loading and will fly at a reasonable speed, this particular set up should be quite satisfactory.

On my Heath Parasol, I have the pendulum in the wing, but as of this writing, I have not flown the model. It has a flat wing and therefore should prove quite interesting during testing. I should have further information in the next column. I'll also go into how to construct the system as to wire size, leverages, etc. I just hope this article gets some of you motivated into coming up with some ideas of your own . . . that you may want to share with the rest of us.

Peck-Polymers has just released a new kit . . . the Walnut size, 17-1/2 inch wingspan Baby Ace. Baby Ace is known as the king of the homebuilts, and the model is an ideal size to be flown with rubber or CO₂ power. The kit plans show rubber and CO₂ motor installations. Kit is complete with photo instructions, 3-views for proof of scale, formed plastic wheel pants, nylon thrust gearing, contest balsa, wheels, plastic propeller, and correct size rubber for flying. It is priced at \$4.75. This may be the beginning of a whole new line for Bob Peck. This model should make an excellent flyer due to its ideal proportions. ●

Letters Continued from page 7
to discount, it's less than that.

To compensate for the limited variety a hobby shop can offer, many try to special-order those items he doesn't normally stock. This is NOT easy! A customer special orders a \$5 item or even a \$30 kit. What the customer doesn't see is the minimum order restrictions ranging from \$50 to \$250 dealer cost (not retail) and only 1 or 2 of the dealer's regular distributors may stock the item (Sometimes less than that!). The dealer places this customer's item on the first order going out (maybe 2 or 3 weeks later) to a distributor who may stock it with enough other merchandise to make minimum order. If all goes well it will be back in 1 to 6 weeks. If it doesn't go well, the item will be back-ordered, out-of-stocked or discontinued. So he repeats the process to another distributor as soon as he needs enough merchandise to make minimum order with the next company . . . if there's another to try. When he eventually gets the merchandise, hopefully the customer still wants it!

There's a lot you, the customer, can do when you special order. First: BE PATIENT! Second: Offer to pay at least half when you place your order. Third: BE PATIENT! Fourth: If you're in a hurry for the item, offer to pay any special charges your dealer might otherwise have to absorb, such as a long distance phone call to place the order, extra charges assessed if he cannot make minimum order, and even the shipping charges and insurance. Fifth: BE PATIENT! Finally: Pick the item up as soon as possible after the dealer lets you know it has arrived. If you find the item someplace else in the meantime, contact your dealer immediately. Have him cancel your order if possible. If it's too late, offer to pick it up anyway or find a friend

who can use it. NEVER order something and leave your dealer stuck with it. It doesn't take long for hundreds of dollars to get tied up in unwanted, unpopular merchandise.

Let's go back to the idea your dollar is a vote. Also keep in mind that volume is essential. In so doing, we suggest you select a hobby dealer . . . local or mail order . . . and support him, for whatever your reasons; reliable help, good stock, low prices or convenience, as much as possible. If your friends agree with your selection and aid in the support, your favorite dealer will grow and expand while the not-so-good will perish. In a couple of years, your support will be showing with new merchandise and good help. MODEL BUILDER: As hobby shop owners, we appreciate your support! MODELER: As modelers, we sympathize with your problem!

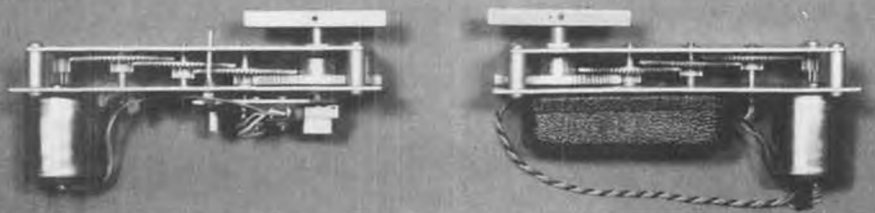
Sincerely,
Matt & Gail Gewain
Aero Hobbies
Midwest City, Ok.

Thanks for your calm and comprehensive analysis. Perhaps it will help more of us to understand the problem from both points of view.

Dear Will-yum;

The comments about mail-order vs. local shop simply points out the fact that only an individual's immediate circumstances can determine the appropriate course of action. I am fortunate in being within 5 minutes of our local shop, Sailair, run by a couple of fine people, Dottie and George Dennis. George's only complaint is that work interferes with his building! Sound familiar? My main reason for being willing to pay a little more than mail order for big-ticket items is, that tube of glue, sheet of balsa, piece of music wire that I need right now! They couldn't survive on the nickel-and-dime stuff, and I

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can't . . . no won't wait 3 days for those little necessities.

I am not a Pattern buff, so I have no axe to grind in my next comment. When I read about things like roll buttons, spin buttons, dual rates, etc., I am appalled. I have a great deal of respect for people who excel in their favorite field, but if our champions like Miller, Matt et al, are using "computers" to do their flying, my feelings must take a large step downward. Can you imagine Clint McHenry or Leo Loudenslager pushing buttons to do the maneuvers in their full scale planes? "Nuff said!"

How about a rose or two? I read a half-dozen or so mags every month and I think they all do a great job. Sure, they don't always print that "Perfect article", and do add a juicy typo once in a while, but so what? I think you all do a great job, and I never fail to find something of interest in every one of them. I know you'll keep doing your best, and that is all I can ask.

Sincerely yours,
Lee N. Robinson
Boca Raton, Fla.

A very good point about the value of a local hobby shop, that may be forgotten . . . or taken for granted by too many modelers.

The roll buttons, etc., are not all that capable. Until you are able to do the maneuvers pretty well *without* them, you'll only make a mess of things unless you know when and where to push the "buttons". A completely pre-programmed maneuver would be something else, but there's no way for the programming to compensate for variable outside forces that could upset the airplane in the middle of a program.

Oh, and thanks for the roses. Too many times we just get the stems.



Remotely . . . Continued from page 11

built in 1918, 1925, or 1940, you must also simulate materials, technology, etc., that were available to the designers at that time.

Why do we need this event? Aren't there enough of them now, you ask? Let me explain. A great majority of modelers are really frustrated inventors, tinkerers, and designers, who, if born 50 or 60 years ago, would have attempted to build a full-size vehicle, and in the case of an aircraft, roared down a pasture progressively taking longer lurches into the air until they learned to fly it themselves. Times may have changed, rules and regulations certainly have, but the people haven't. Modeling is the only way in which most of us can express our desire to create, not copy. To many modelers, scale, as we know it, is how closely we can copy someone else's design.

Before someone suggests that people like us should join the E.A.A., or other home-builders' group, to do our thing, let me say that thousands of modelers have, but many simply fall out when they realize what it takes to get from a modeler to a designer of their own full sized aircraft, then legally making its first and certifying flights. Building a home-built kit is almost the same as a paint-by-number proposition, if done without changes. Like modeling, however, it would be foolish to design your first aircraft as your first attempt.

Modeling provides the means of being able to tilt the building/drawing board

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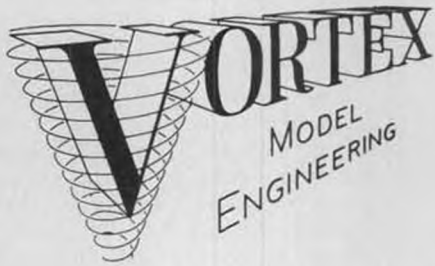


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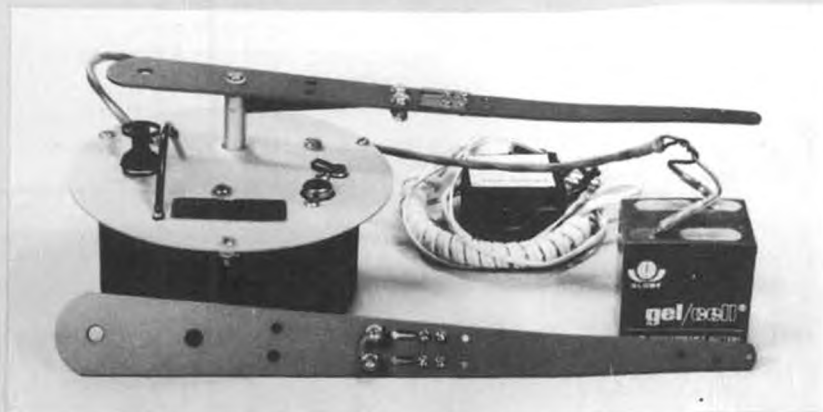
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to 45°, if you feel that something else is more interesting than what you are working on now. The cost of building a full-size aircraft precludes doing this.

As to the competition aspect, we would use the same method as the world home-built associations use to determine the winners, just as if they were full-size aircraft. The boredom which spectators and other competitors often experience from watching pattern events all day long, would be eliminated. Each aircraft and each demo flight would be different. In flight demonstrations, such as controlled smoke, cargo drop, STOL operation, and aerial photography, the simulated off-on ignition control which was used in early engines for speed control could add points. In other words, you are attempting realism. Doing outside loops with a four engined bomber won't help you a bit.

As a major model distributor in Canada, and now with our Quadra ignition engine selling in many parts of the world, I know that despite the efforts of some very fine organizations and dedicated people in MAAC, FAI, AMA, etc., there are more modelers outside of these organizations than in them. I believe that our present life style requires that we have the opportunity to create. Our present technology, rules, and events, however, tend to lump us together. We have enough experience now in pattern, for example, to come up with the best average

design in three months, if the pattern changes. If we spend our time and effort trying to come up with something different rather than perfecting our flying, we handicap ourselves.

You have probably gathered by now that this type of event doesn't have to be limited to RC aircraft. U-control, free flight, helicopters, and even cars and boats can use this concept.

Please, let's hear what you think about "Could Be" Scale.

* * *

Though Ron didn't mention it in his "Could Be" article, he is marketing partial kits for his "Thunderbird" design. The fuselage, cowling, and canopy are

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Cowling is also available separately, as is the lexan canopy. Plans for several variations, including a biplane, are on the way. Dealers inquiries are welcome. If any small manufacturers can supply large ready-covered foam wings of good quality at prices modelers can afford, let Ron know, and say you saw it in *Model Builder*."

Ron may be contacted at Pottery Rd., R.R. 3, Vernon British Columbia, Canada V1T 6L6, Phone (604) 542-4151. **STANDARD PATTERN**

Does the R/C world need a non-aileron, non-retracting, sub .60 pattern event for newcomers to the game of premeditated aerial maneuvers?

Today's AMA Pattern category is divided into four skill classes; Novice, Advanced, Expert, and Master. True, the Novice, when compared to fliers in the other three classes, and not counting the sandbaggers, is inferior. But the Novice is NOT an amateur R/C flier by any means. How many beginners could handle a typical .60 powered, retract-gear, full-house machine that plows through the air in the 80 mph bracket? This is what 99% of the "Novice" fliers are doing.

So it makes you wonder . . . Suppose there was a pattern event for the *real* novice flier, the person who is not yet actually capable of handling that Pre-

cision Pattern aircraft? In order to keep it somewhat pure, such an event would have to have aircraft and control function restrictions.

The argument against equipment restrictions is based on the somewhat logical idea that a modeler should not have to purchase (or maybe even build!) a new model each time he or she takes another step up the skill ladder . . . though we bet you won't find too many fliers using the same plane and radio as they progress through the ranks, any more than an increasingly skilled golfer or tennis player would stay with his original tools of the trade as his game improves. There's always something coming along that makes last year's equipment seem a little obsolete . . .

Anyway, if you're going to have a true event for the newcomer to pattern competition, then you have to have certain equipment restrictions. The amateur competitor should be able to get into the game when he's first capable of handling a moderately-powered rudder/elevator/throttle, shoulder or high wing type model. He should NOT have to compete against the typical precision pattern thoroughbred machine.

Admittedly, we were on the Contest Board in the mid-'60s, when it was decided that equipment categories should be thrown out in favor of skill categories, but there were several good reasons at the time for taking that step. For one thing, Rudder-Only had degenerated into freaky .60 powered airplanes with 6 to 8 degrees of up-thrust, and two servos on the rudder . . . one for fine control and one for extreme movement. And with no control over contestant classification, the rudder-only specialists, who remained in the category and cleaned up in contest after contest, could be named on the fingers of one hand. Another problem was in the so-called Intermediate Class, which allowed just about anything that wasn't Rudder-Only or full-house Multi.

Some of these ships, combined with outstanding marvels of electronic gadgetry (even without transistors and integrated circuits!), could out-manuever the Multi Class airplanes in the hands of equally skilled fliers. In self defense, we threw everything into the same pot and established the skill categories.

Now, with radio systems somewhat stabilized into two basic types; digital proportional of any number of controls, or magnetic actuated pulse-rudder without throttle, the matter of establishing a restricted competition category for amateur pattern fliers becomes somewhat simpler. The big question is, "Do we need it?"

The underlying current that brings about new events and restrictive revisions to existing events, is a continuing urge on the part of the creators to dig the grass roots modelers out of their shells and into competition. The point that is often missed by the com-

petition minded modeler is the fact that many people are in the hobby for the mere relaxation and/or the pleasure of building models from kits or scratch, and then operating them for their own satisfaction and/or amazement. If you need proof of that fact, just check AMA's records. Something in the neighborhood of 5% of the total membership is competition oriented!

Be that as it may, it's still possible that an amateur category (Does "Standard Pattern" sound less degrading?) of pattern competition would be of interest. We would suggest something with the following aircraft restrictions:

Shoulder wing or high wing cabin design of conventional configuration. Maximum engine size of .30 cu. in. Muffler required.

Minimum wing area of 500 sq. in. Minimum V-Dihedral of 3 degrees/panel.

Controls limited to rudder, elevator, and throttle.

No ailerons or flaps allowed, coupled or uncoupled.

Aft 2/3 of wing section's lower surface must be flat or undercambered.

Steerable nosewheel or tailwheel allowed.

The following maneuver list is suggested:

1. Takeoff
2. Straight Flight out
3. Procedure Turn
4. Straight Flight Back
5. Stall Turn
6. Single Immelman
7. Two Inside Loops
8. Two Barrel Rolls
9. Half Cuban-8
10. Traffic Pattern
11. Landing and Spot

And not to overlook pulse-rudder, would the proponents of this pioneer method of R/C flying like to compete among themselves in aerobatics? Veterans of the early days of R/C will tell you not to laugh at Rudder-Only. It's amazing what you could do with a plane that was properly trimmed to fly without the benefit of elevator control; loops, rolls, Immelman turns, Cuban-8s, spins, etc. But in those days, there were no small, light multi-control systems or digital proportional radios to tempt the model flier. He was content with what he had, and only dreamed of a system whereby the surfaces followed a control stick . . . you never had it so good!

So, with these systems now available, and if they were allowed, we'd be right back to the freaky, .60 powered, up-thrusted weirdos. No thanks! That means a class of airplane restricted to the magnetic-actuated, pulse-rudder single-channel radio without throttle control, or single-channel digital, without throttle.

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what controlled by the air-load limits of the strongest pulse actuator. After all, let's use what's available, and don't eliminate pulse by going to a power and wing loading that could be handled by a digital propo servo, but would be too much for pulse . . . Are you there, Paul Runge?

Oh yes, it must be without throttle. Throttle control with rudder-only becomes "elevator". Used in conjunction with that freaky up-thrust, the plane will loop in full throttle, fly level at low-cruise, and descend in low-low. So true rudder-only competition is based on the

flying maneuvers mentioned earlier; loops, rolls, Immelmans, Cuban-8s, spins, etc. Fuel is self-allotted by the contestant to give himself enough time to complete the pattern, then circle downwind and wait for the engine cut before calling "Landing and Spot."

So back to the original questions. Do we need these competition levels for aerobatics? Are there droves of grass roots modelers just waiting for something like this to come along? Or are we looking at something from the past that cannot be brought back to the present?

Whaddya think?

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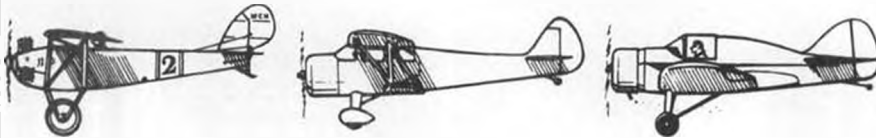
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MAMMOTH CLASSIC FLY-IN

It has been suggested, to get the ball rolling in Mammoth Classic Scale, that Model Builder should sponsor an MCS Fly-In. Well, why not?

However, realizing that it could take more than a little time to get some models built . . . most would have to be from scratch, as Bud Nosen kits are about the only ones available to suite the specifications . . . it would seem advisable to schedule such an event down-stream about 3 or 4 months; like sometime in October or November. Also, the fly-in

site should be based on the quantity and location of the majority of those wishing to attend.

As a preliminary measure, we'd like to hear from those who would be interested in coming, so we can take the first steps in solidifying the date and location.

Next month we'll clarify a few points regarding specifications. Any more suggestions on full-size type events to add to the fun?

RUNNING RADIALS

Ever since the introduction of the

Morton/Burgess 5-cylinder radial engine, prior to World War II, modelers have dreamed up fantasies of flying scale and scale-like aircraft powered with scale-like radial engines. It has nearly always had to remain a fantasy, as the Morton, if it ran at all, and then only in the hands of skilled, mechanically-minded modelers, was not exactly what you'd call a fool-proof engine. The only one this writer ever heard running was in the nose of an Antic, flown at the 1963 Nationals by the plane's designer, Lou Proctor. The engine was modified and rebuilt by Lou . . . not stock. All the rest with which we have come in contact were static collector's items.

The fantasy of flying with a working radial is about to become a reality. During the week following the Toledo R/C Exposition, the staff of Model Builder watched and listened as Glenn Hargrave, of Technopower Enterprises Limited, Shannon, Ireland, started and ran a stock, production line .846 cu. in. 5-cylinder, 4-cycle, OHV engine, which weighs 18 ounces, and turns a 16-6 Rev-Up prop at better than 4,000 rpm. The 7-cylinder, 1.18 cu. in. version weighs 24 ounces and turns an 18-6 prop at over 4,500 rpm. A 9-cylinder engine, which requires a larger crankcase, is coming later.

The 5 and 7-cylinder Hargrave engines have been available (if you want to call it that) for over a year in the U.S., but the extremely high price which was being asked by the importer virtually killed any possible sales and use of the engine. As of just a few days ago, Model Builder Products has taken over the marketing of these engines in the U.S. and Canada, and for that matter, most any place on this earth from which it receives an order.

The best part of this deal from the modeler's point of view, is that we intend to sell these engines direct only (available to dealers at minimal discount), and because of the obviously limited demand, will market them at about half the price previously advertised. Exact prices cannot be quoted for about another month, but ballpark figures indicate

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Model Airplane magazines for sail - 1936 to 1971 - most in binders. Send for free list. Bruce Thompson, 328 St. Germain Ave., Toronto, Ontario, Canada M5M 1W3

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under \$500 for the 5-cylinder engine, and under \$700 for the 7-cylinder engine. Model Builder Products will also carry a full line of spare parts and will provide repair service.

Shipments of the Mk II Hargrave Radials should begin in September, when ads for the engines will first appear.

At that time, Model Builder Products will be able to provide printed information on specifications and prices. Orders for priority shipments may be placed at any time.

Meanwhile, start checking your plans files for some of those Kinner-powered Golden Oldies!

Workbench . . . Continued from page 6

affair will be a spectacular air show, featuring the Canadian "Snowbirds". This Canadian Air Force Demonstration Team will be making its southern-most U.S. engagement at Reno. The Confederate Air Force will also be appearing, a popular return from their first showing last year.

Tickets are now available for the three-day race and show. Contact the Greater Reno Chamber of Commerce News Bureau, P.O. Box 3499, Reno, Nevada 89505, Phone (702) 786-3030.

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looks like fun" public, check this. As reported in the English magazine "Radio Modeler", the RM/St. Albans All-Electric Fly-in had to forego its proposed activities this year . . . because of a petition by local residents! This was against "weekend sporting activities" . . . due to the noise created by spectators and participants!

This reminds us of the time a resident of the Mile Square (Fountain Valley, California) area called police about the noisy model airplanes at this popular flying site. Upon investigation, it was discovered that an R/C glider contest was in full swing. The mere sight of models in the air, and she figured they must be making noise! She probably heard a lawn mower, chain saw, or motorcycle, none of which have sound control regulations.

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1/16 x 3/16 11	1/8 x 1/2 29	3/32 x 2 28	2 x 2 30	2 x 2 151	3/4 x 2 2.05
1/16 x 1/4 14	3/16 x 3/16 19	1/8 x 2 31	1 x 3 30	1 x 3 151	1 x 2 2.38
1/16 x 3/8 16	3/16 x 1/2 37	3/16 x 2 40	2 x 3 40	2 x 3 2.31	1-1/2 x 2 2.72
1/16 x 1/2 19	3/16 x 3/4 44	1/4 x 2 51	3 x 3 59	3 x 3 3.47	2 x 2 3.05
1/16 x 3/4 26	1/4 x 1/4 30	3/8 x 2 55		1 x 4 1.97	1/2 x 3 1.92
1/16 x 1 31	1/4 x 1/2 39	1/32 x 3 30	BLOCKS 6" Lengths	2 x 4 3.13	3/4 x 3 2.49
3/32 x 3/32 09	1/4 x 3/4 51	1/20 x 3 32	1 x 1 23	3 x 4 4.62	1 x 3 3.07
3/32 x 1/8 10	5/16 x 5/16 39	1/16 x 3 33	1/2 x 2 29	1 x 6 3.10	1-1/2 x 3 3.77
3/32 x 3/16 11	3/8 x 3/8 49	3/32 x 3 40	3/4 x 2 36	2 x 6 4.50	2 x 3 4.51
3/32 x 1/4 13	3/8 x 1/2 55	1/8 x 3 46	1 x 2 41	3 x 6 6.77	3 x 3 6.82
3/32 x 3/8 17	3/8 x 3/4 72	5/32 x 3 52	1-1/2 x 2 48		1/2 x 4 3.18
3/32 x 1/2 21	1/2 x 1/2 64	3/16 x 3 58	2 x 2 55	BLOCKS 24" Lengths	3/4 x 4 3.63
3/32 x 3/4 27	1/2 x 3/4 88	1/4 x 3 64	1/2 x 3 38	1 x 1 81	1 x 4 3.93
3/32 x 1 35		5/16 x 3 74	3/4 x 3 47	1 x 2 1.62	1-1/2 x 4 5.10
1/8 x 1/8 11	48" AAA SHEETS	3/8 x 3 83	1 x 3 56	2 x 2 2.13	2 x 4 6.14
1/8 x 3/16 13	1/32 x 3 84	1/32 x 4 49	1-1/2 x 3 65	1/2 x 3 1.30	3 x 4 9.20
1/8 x 1/4 17	1/16 x 3 89	1/16 x 4 53	2 x 3 75	1 x 3 2.13	1/2 x 6 4.35
1/8 x 5/16 18	3/32 x 3 106	3/32 x 4 61	3 x 3 116	2 x 3 3.06	3/4 x 6 6.10
1/8 x 3/8 20	1/8 x 3 1.21	1/8 x 4 71	1/2 x 4 55	3 x 3 4.62	1 x 6 5.10
1/8 x 1/2 24	3/16 x 3 1.48	3/16 x 4 79	3/4 x 4 63	1 x 4 2.66	1-1/2 x 6 7.65
1/8 x 3/4 34	1/4 x 3 1.74	1/4 x 4 93	1 x 4 70	3 x 4 4.16	2 x 6 8.97
1/8 x 1 39	3/8 x 3 2.20	3/8 x 4 118	1-1/2 x 4 88	2 x 4 6.16	3 x 6 13.60
3/16 x 3/16 16	1/16 x 4 1.32	SHEETS 36" Lengths	2 x 4 107	3 x 4 1.54	
3/16 x 1/4 19	3/32 x 4 1.49	1/32 x 2 44	3 x 4 1.54	AIRFOILED SHAPED SHEETS	C-GRAIN AAA 8-12 LBS
3/16 x 3/8 22	1/8 x 4 1.70	1/16 x 2 51	1/2 x 6 79	3/16 x 3 x 36 1.24	1/32 x 2 50
3/16 x 1/2 27	3/16 x 4 1.96	3/32 x 2 56	3/4 x 6 92	1/4 x 3 x 36 1.40	1/16 x 2 56
3/16 x 3/4 36	1/4 x 4 2.32	1/8 x 2 63	1 x 6 1.07	1/4 x 4 x 36 1.90	3/32 x 2 62
3/16 x 1 42	3/8 x 4 2.98	3/16 x 2 80	1-1/2 x 6 1.33		1/8 x 2 68
1/4 x 1/4 23	1/16 x 6 2.45	1/4 x 2 1.02	2 x 6 1.50		3/16 x 2 85
1/4 x 3/8 28	3/32 x 6 2.60	3/8 x 2 1.10	3 x 6 2.32		1/4 x 2 1.07
1/4 x 1/2 31	1/8 x 6 2.84	1/32 x 3 61			3/8 x 2 1.16
1/4 x 3/4 44	3/16 x 6 3.20	1/20 x 3 64	BLOCKS 12" Lengths		1/32 x 3 65
1/4 x 1 55	1/4 x 6 3.82	1/16 x 3 66	1 x 1 42		1/16 x 3 72
5/16 x 5/16 27	3/8 x 6 4.40	3/32 x 3 79	1/2 x 2 55	36" TAPERED TRAILING EDGE	3/32 x 3 85
5/16 x 3/8 36		1/8 x 3 93	3/4 x 2 70	1/8 x 1/2 31	1/8 x 3 98
5/16 x 1/2 41	ROUNDED EDGE	5/32 x 3 105	1 x 2 82	3/16 x 3/4 40	3/16 x 3 1.21
5/16 x 5/8 51	AILERON & ELEVATOR STOCK	3/16 x 3 116	1-1/2 x 2 92	1/4 x 1 51	1/4 x 3 1.33
3/8 x 3/8 41	1/4 x 1 70	1/4 x 3 128	2 x 2 1.07	5/16 x 1-1/4 63	3/8 x 3 1.71
3/8 x 1/2 47	3/8 x 1 82	5/16 x 3 149	1/2 x 3 68	3/8 x 1-1/2 72	
3/8 x 3/4 54	1/4 x 2 95	3/8 x 3 165	3/4 x 3 86	18" BALSA ASSORTMENT	
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1/2 x 3/4 70	LEADING EDGE	3/32 x 4 1.21	2 x 3 1.53		3/32 x 3 85
1/2 x 1 87	36" Lengths	1/8 x 4 1.40	3 x 3 2.31		1/8 x 3 98
5/8 x 5/8 64	1/2 x 3/8 54	3/16 x 4 1.57	1/2 x 4 1.07	BULK BALSA - 3" x 36"	3/16 x 3 1.21
5/8 x 1 94	3/4 x 5/8 82	1/4 x 4 1.84	3/4 x 4 1.23	Not Stamped or Sorted	1/4 x 3 1.32
3/4 x 3/4 88	1 x 3/4 1.10	3/8 x 4 2.37	1 x 4 1.45	Sold Only in Standard Packs	3/8 x 3 1.71
3/4 x 1 1.00		1/16 x 6 1.94	1-1/2 x 4 1.72	Standard Packs in ()	
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	36" Lengths	1/8 x 6 2.37	3 x 4 3.06	1/32 x 3 (25) 47	1/32 x 3 72
	Tapered to 1/16" Edge	3/16 x 6 2.50	1/2 x 6 1.48	1/16 x 3 (20) 50	1/16 x 3 77
	1/4 x 3 1.33	1/4 x 6 3.15	3/4 x 6 1.72	3/32 x 3 (25) 59	3/32 x 3 90
	1/4 x 4 1.80	3/8 x 6 3.70	1 x 6 2.03	1/8 x 3 (15) 69	1/8 x 3 1.03
	ODDS & ENDS		1-1/2 x 6 2.61	3/16 x 3 (10) 84	3/16 x 3 1.27
	PACKAGE OF BALSA		2 x 6 3.05	1/4 x 3 (10) 1.04	1/4 x 3 1.39
	Package 1.39		3 x 6 4.52	3/8 x 3 (10) 1.28	3/8 x 3 1.76



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Keith Martin (Bellevue, Washington) is shown here with his FAI power and unlimited rubber airplanes. Since 1971, he has set the astounding total of 78 official AMA National records in Indoor and Outdoor Free Flight categories, surely one of the best individual performances in modeling history. An engineering student at the University of Washington, Keith thinks modeling is a great hobby. His father, Charlie Martin, has been a builder since the 1930's. Using an original design, Charlie won a place on the 3 man U.S. Free Flight Power Team at the Finals in Minneapolis last summer and will fly in the World FF Championships scheduled to be held in Denmark, July 6-12.

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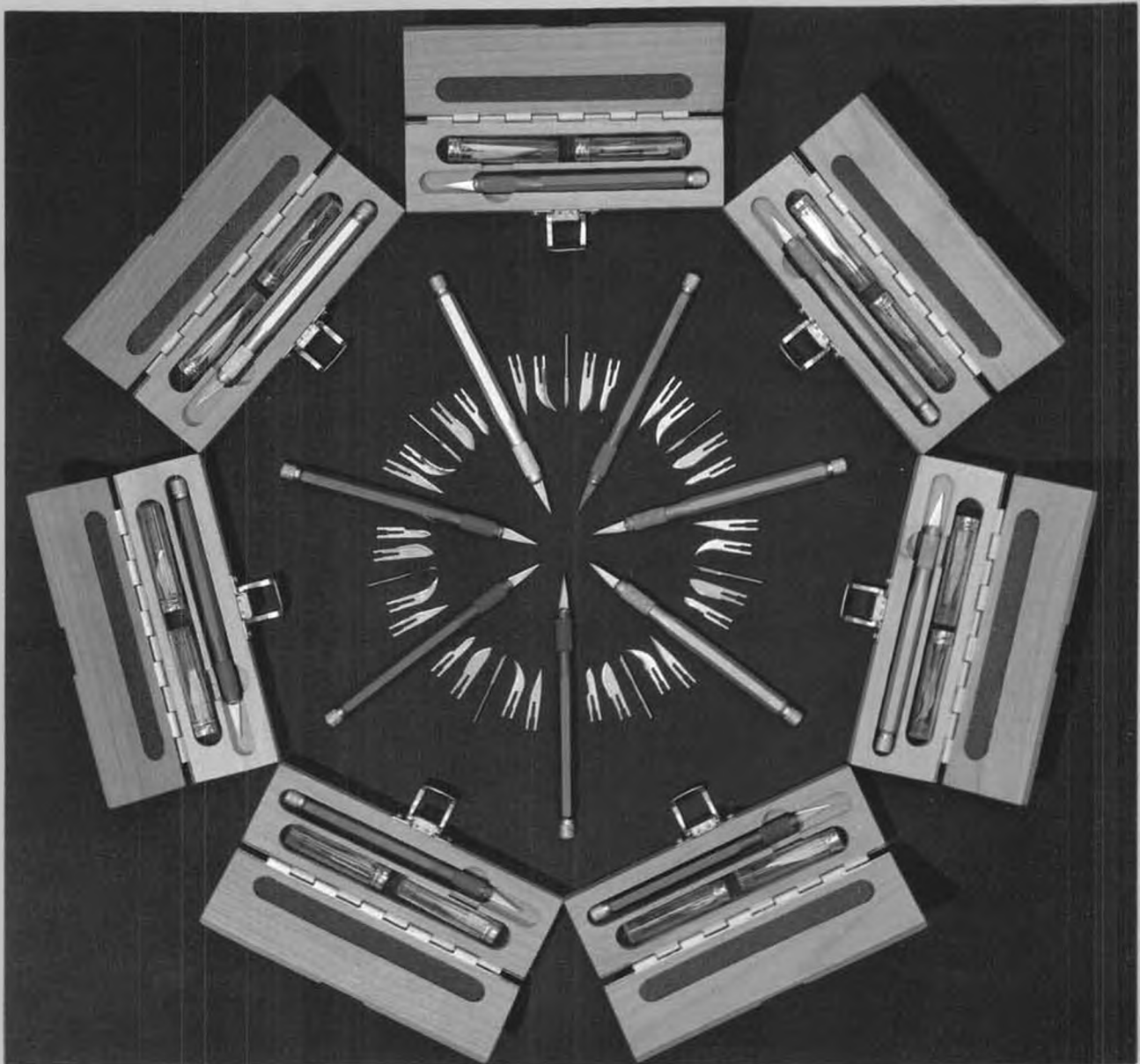


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