

MODEL BUILDER

MARCH/APRIL 1978

volume 8, number 75

\$1.50



If you don't know the difference between MRC's 775 and ordinary sets... there's a lot you don't know

Precision machined all metal open gimbal sticks honed to critical tolerances, outlast and outperform plastic open gimbals.

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Miniaturized receiver only 2 1/2" x 1 1/4" x 3/4" is metal encased for added protection, better shielding.

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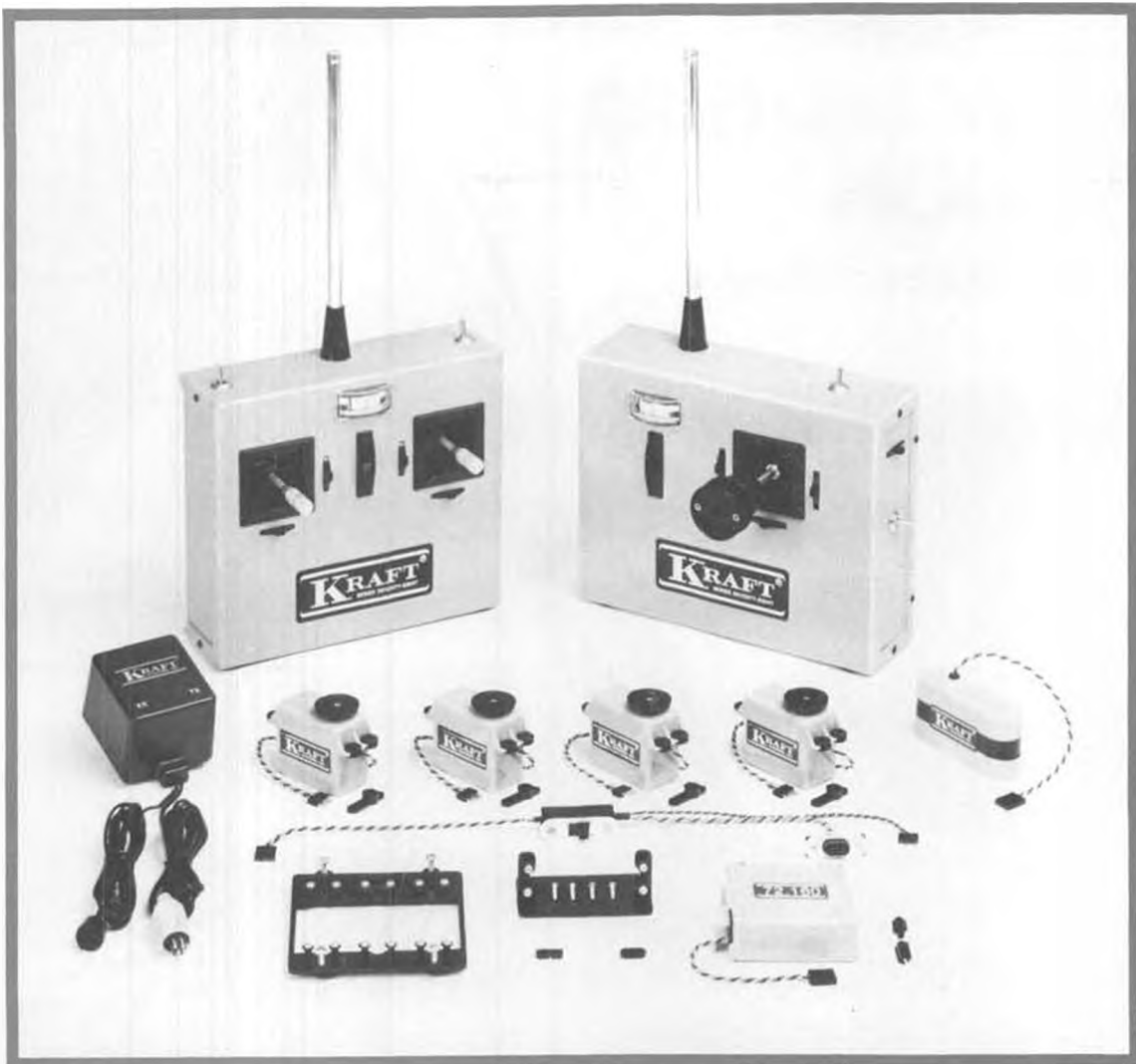
Select from 8 different servos including ball bearing coreless motor and mini type.

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And there's one more thing you should know. The difference in price between an ordinary 5 channel and MRC's 775 professional system is less than what you'd probably spend for a couple of gallons of fuel. That's a small price to pay for the best. See the difference at your hobby dealer, today.

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The KPT-5C transmitter has two precision two-axis open gimbal control sticks designed to eliminate any possibility of centering error, and to provide excellent feel. Our KPT-5CS transmitter features an

open gimbal stick control assembly adapted by the addition of a rotary control knob that incorporates an integral rudder trim lever.

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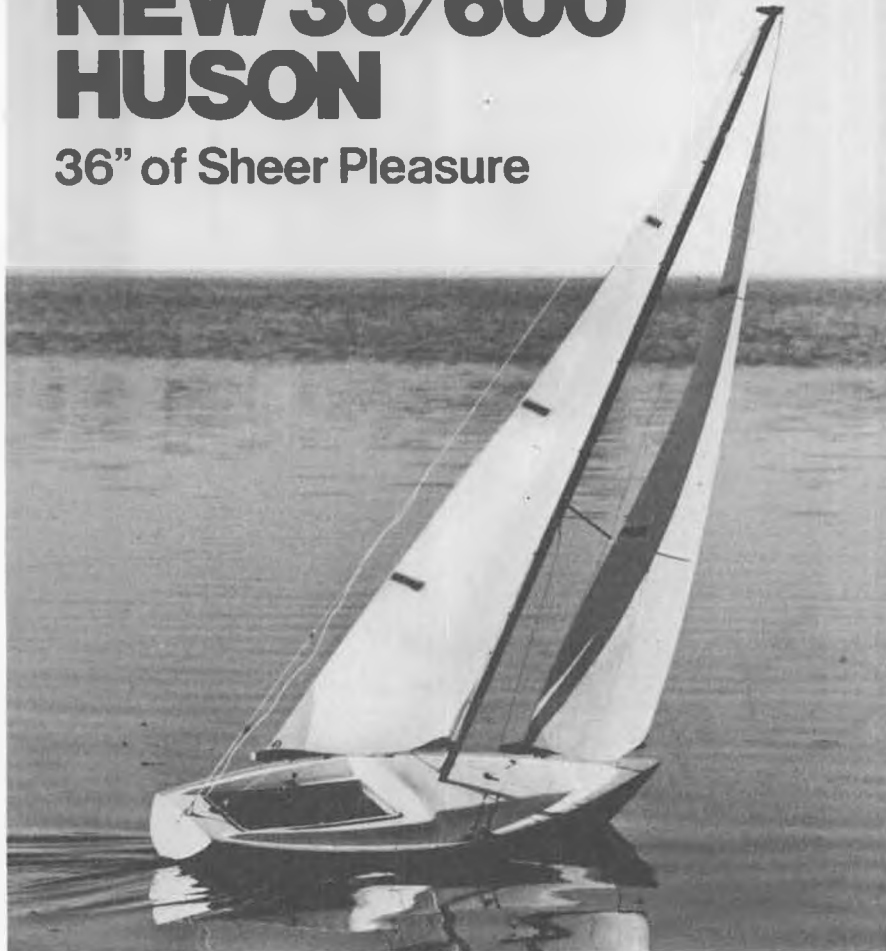
Pictured are the optional KPS-15II servos which combine great power with high speed of operation, and the optional lightweight 450 MAH KB-4M battery pack.

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KRAFT
SYSTEMS

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BINGO



ETCHELLS 22



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ANTIDOTES FOR BIPLANE FEVER

FULLY AEROBATIC SYMMETRICAL WINGS

Skybolt

Designed by CLAUDE McCULLOUGH

SIG

KIT RC-34

ENGINES: .60
WING SPAN: 51"
LENGTH: 42-1/2"



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1ST SPORTSMAN BIPLANE AT 1977 SIG IMAC CHAMPIONSHIPS

LIBERTY SPORT

Designed by DICK GRAHAM

SIG

KIT RC-33

ENGINE SIZE: .45 - .60
WING SPAN: 57"
LENGTH: 45"



\$64.95

NATIONALS WINNERS

1st Place - 1973 National Multi-Wing - Dick Graham
1st Place - 1975 CL AMA Scale Sr. - Cathy Burnstine
2nd Place - 1975 FF Scale Gas JS - Scott Gesner

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PLAN TO ATTEND SIG'S INTERNATIONAL MINIATURE AEROBATIC CHAMPIONSHIPS
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Glen Sig 's

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Designed by MIKE GRETZ

SIG

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TOTAL WING AREA: 650 Sq. In.
LENGTH: 40-3/8"



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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.

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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 sailless A/1 Jic.
Shoes' R/C QM.
Pearl Aylorcraft on ts, also big one.
Fairey Delta 3-views.

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Feb/March 1973
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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



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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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MARCH/APRIL

1978

volume 8, number 75

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COVER: George Clapp has a built-in supply of student pilots for his TORC Trainer, the R/C construction feature starting on page 12 of this issue. They are his four grandsons Brad Sheldon (holding TORC), and from left to right, Adam Sheldon, Jeff Bradbury, and Todd Bradbury. Being on the cover is "old hat" to Jeff, who posed with Grandpapa George's Navy-type flying boat on our November 1975 cover. Pavilion in background was built by members of the "Syracuse Thunderbird Aero Radio Society" (S.T.A.R.S.). Kodachrome transparencies by Gary Brown.



Southwestern Modelers Show's Mike Clark and International Modelers Show's Bill Northrop listen to a Texas Aggie joke being told by Mike's show partner, Chuck Holden. This one was about the Aggie library burning down and some of the books hadn't even been colored yet!

from Bill Northrop's workbench . . .

COMING ATTRACTIONS

As we mentioned last month, this issue is dated March/April so that we can bring our cover date up to snuff with the other model publications. Starting with the next issue, May, **Model Builder** will appear in the hobby shops and in the subscribers' mail one month ahead of time.

Speaking of subscribers' mail, a word of explanation. Some subscribers complain that new issues hit the stands before the mailman brings them their private copy. Unfortunately, this is true, but it's not a trick to get you to buy two copies a month. When the mags come off the press, they are immediately trucked to a mailing house, where all the individual copies and dealer bundles are processed in one day and delivered to the post office. At this point, the mag is literally "out of our hands." In the post office at our end of the trip, as well as the office at your end of the trip, it is a standing policy that all bulk mail *must go out the same day it comes in*. If it didn't, the resulting jam would be like Christmas all year! Consequently, the bundles move faster than the individual pieces.

There's one not very practical solution. For \$1.01 per month, your copy can be sent First Class!

Anyway, we're getting off the subject. We also announced last month that our radio control coverage would be increased. With the first expanded issue already in production, we can tell you about some of what's coming.

Bob Underwood, who was appointed president of the new Na-

tional Association of Scale Aeromodelers (NASA) during its formation meeting at the '77 Nats, will present a monthly feature on R/C scale modeling. His efforts will cover both Precision and Sport scale, and his experience in these areas speaks for itself.

With the rapidly growing interest in Mammoth Scale, there are enough new ideas, gimmicks, accessories, etc. to keep a columnist going full time. In fact, Ron Shetler, the man primarily responsible for the development and availability of the Quadra engine for model aircraft, had so much information passing over his desk that he started a newsletter in order to pass on the details to his many correspondents. The newsletter will become our column on Mammoth Scale!

Many an R/C model dies on the workbench before it ever gets to the flying field and into the air for the first time. With the rapid influx of new R/Cers to the hobby, and the phenomenal growth of the industry, the beginner is faced with a confusing array of servo trays, switches, linkages, rods, control tubes, connectors, etc., and without the experience of having grown up with all of these gadgets, it is possible, in fact very likely, that he will install his equipment in such a way that it is guaranteed to fail on his first flight attempt. Hal deBolt, who has been flying radio controlled aircraft almost as long as he has smoked a corn-cob pipe, will hold forth as moderator and answer-man on this subject.

And once you've got that plane out to the field, with radio properly

installed, are you ready to fly? If you happen to be in a large club that has a training program for new R/C pilots . . . and good instructors willing to donate their time, you'll do just fine. However, for those not so fortunate, **Model Builder** offers you "The Flight Instructor", who will guide you along the way and answer your questions as you develop your flying skills. He brings with him a fair reputation as a competition flier, and also has the ability to get his advice across . . . our current National Champion, Dave Brown!

Unless your only thing is R/C Soaring, you've got to face up to engine problems, sooner or later. **Model Builder** feels that engines fall into 3 basic categories, and we've got an expert for each one . . . Half-A, Larger Glow, and Ignition.

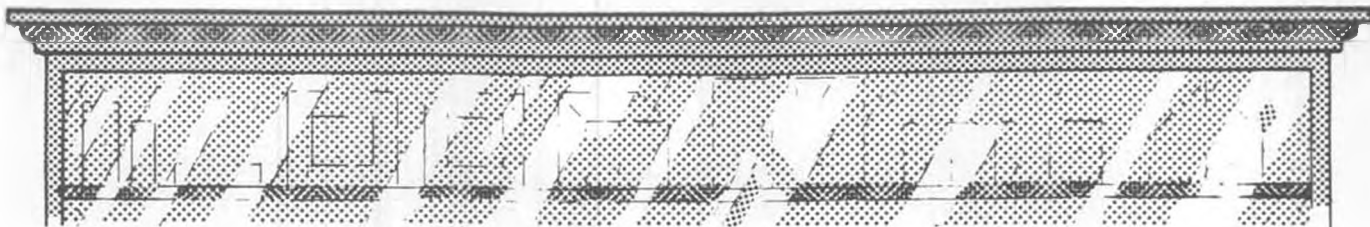
For Half-A, there is probably no one more knowledgeable than Dale Kirn. For larger engines, the initials GMA should be enough, but if you're not familiar with the developer of Magnum glow fuel, it's George Aldrich. In ignition, and/or ignition conversion, Otto Bernhardt's reputation is well established as an expert.

These three men will comprise our monthly engine symposium. Send in your questions, and we'll forward them to the proper authority.

That, for a start, is some of the expanded coverage in radio control that will begin with the next issue. Incidentally, the feature construction article has been prepared by an R/Cer who also presented an R/C

Continued on page 102

OVER THE COUNTER



• Whatever you may personally choose to call them, Mammoth Scale, or Quarter Scale . . . which is not really true since so many of them are Third Scale . . . it looks like the big birds are here to stay.

And as you might expect, Model Rectifier Corporation (MRC) is not going to deny us the benefits of its experience and expertise when bigger ones are called for. It now has available the new MRC-Webra Schneurle ported, high performance .91 cu. in. glow plug engine. If you are already thinking metrics only, this one inhales 15 cc's each time around.

The design is obviously based on the highly successful Speed .61 Series, with changes as dictated by the needs of a larger engine. It is a front rotary design, with a husky crankshaft running in two heavy ball bearings, the front end is integral with the crankcase, the rear cover being removable. A single ringed piston is used; also following design parameters known to work.

The engine does not have an exhaust throttle valve, as it will probably be muffled in most installations. The carburetor is a modification of the easily-adjusted Webra TN model, designated as the TN-MC carburetor. This is an extremely smooth operating device using two needle valves; one for high, and one for idle adjustment. Adjustment is simple and foolproof; the dual



Midwest Products Co. introduces the Twin Stik Trainer for .19 to .30 engines.

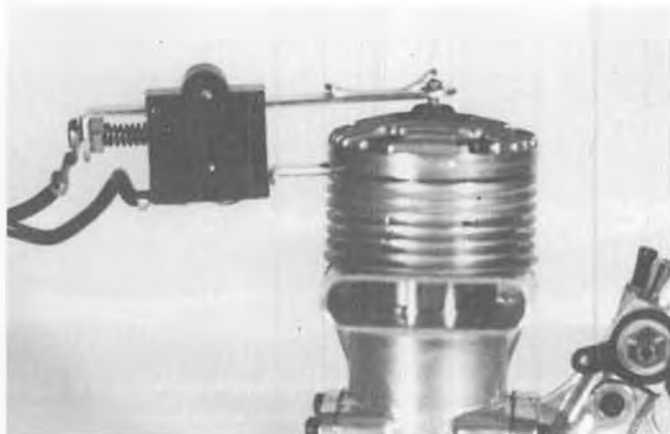
needles reducing the sensitivity to changes in fuel level throughout the flight. The MC model is modified for inflight mixture adjustment by another R/C channel, an extremely important feature when it comes to getting the maximum possible power without the risk of a too lean setting.

The MRC-Webra .91 is rated at 2.6 horsepower, swinging a 12x 8 or 14x 6 prop at 13,000 RPM. Fuel recommended is a very conservative 3 to 5 percent nitro for R/C Sport flying, to 30 percent for maximum power.

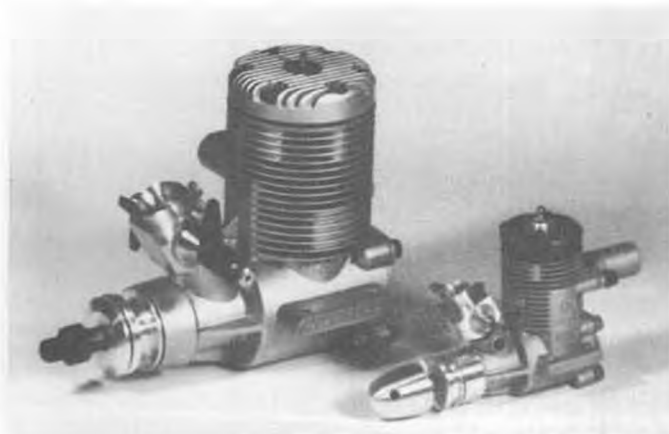
The engine comes complete with

metric wrenches as necessary for proper upkeep, and an owner's manual that covers break-in and normal operation, including the adjustment of the carburetor. A complete parts list, including description, part number, and price, is also included, thereby making that chore painless, when and if it comes up.

As with all other Webra engines, this one can be seen at your local dealer. Further information can be had upon request from Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.



Kwik Klip is Du-Bro Products Co.'s answer for a glow plug connector.



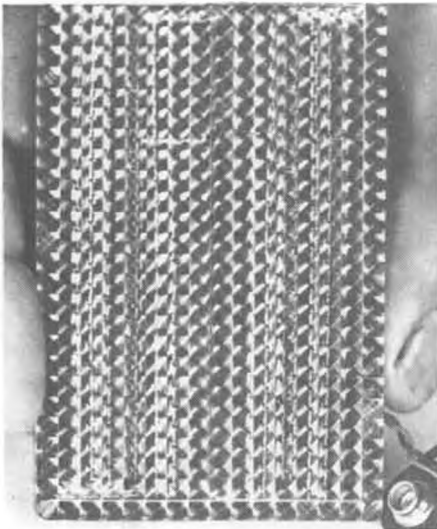
MRC can fill your power needs. Shown are the Webra .91 and .10.



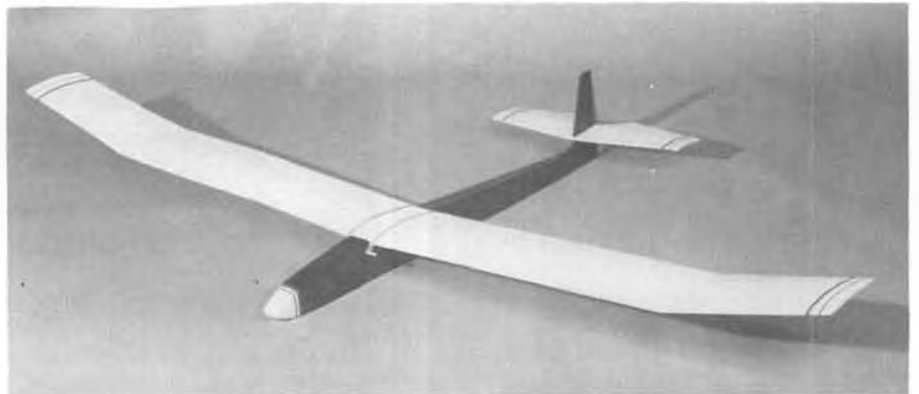
A complete line of R/C system and component kits are available from Charlie's R/C Goodies.



The Specialist Three system from Millcott Corporation has sophisticated features.



Eduprod Solar Cell from Educational Products can replace 4.5, 6, or 9-volt batteries.



The Southwester Top Cat is a 6-foot span ARF R/C glider by Pioneer Models & Accessories.

* * *

Du-Bro Products Inc., has a very practical answer to the question of how to connect the battery to the glow plug. It is called a "Kwik Klip", and provides for the dual require-

ment of a mechanically and electrically secure connection that will not fly off and into the prop. It consists of a steel and nylon spring-loaded clip that fits over the plug end and locks onto the engine cooling fins. It is installed in seconds; drops into position, and requires only slight pressure to unlock and remove.

"Kwik Klips" are available in two sizes, one for engines up to .074, and

the other for up to .80'. They are available with or without wires, and in order to keep the cost reasonable, come in kit form that require only minutes to assemble.

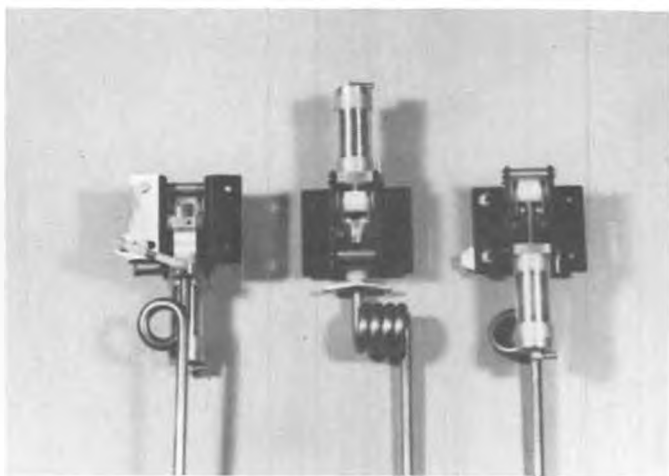
Look for them at your local shop, and write for complete information regarding this and the complete line of accessories guaranteed to make your modeling life easier and more enjoyable. Du-Bro Products, Inc.,



Steve Muck's R/C Boats offers the Mini Dolphin for .09 to .15 engines.



Li'l Lightning is a winning outboard, also by Steve Muck.



Rom Air pneumatic retracts have exciting new features.



Cannon R/C Systems has a complete line for 1978, including this 2-channel set.

480 Bonner Rd., Wauconda, IL 60084.

* * *

Cannon R/C Systems offers five different model lines, of from two to seven channels, for 1978. They range from what is described as the smallest R/C system which is test flown and warranted for one year.

Newest is the Mini-Sport System, available in two channels (dry) for \$119.95, to a five-channel nickel-cadmium equipped system for \$259.95. Factory conversion to more channels and any desired stick configuration is available, as flying skills and requirements change.

Airborne systems can be a choice of Cannon's "Full Power" Flite Packs using the CE-4 servos with 4-pounds thrust at 1.25 ounces each, or the Miniature Flite Packs, with the smaller CE-8A servo with 3-pounds thrust at .75 ounce each. System weight, with three servos using



Manifold headers for tuned pipes are available from Jenesco Engineering.

CE-4's and a 500 mah battery, is 8.8 ounces; and 4.8 ounces when using CE-8A's and a 100 mah battery. Flite Packs are also available separately, and are compatible with practically every make of transmitter being sold today.

Mini-Sport Systems are available in basic models, for dry-cells throughout, Standard with a dry-cell powered transmitter and rechargeables for the airborne, and Deluxe, fully nickel-cadmium and charger equipped.

Foreign flyers take note. All Cannon systems are available on all 27,



Hi-Flight Model Products has a ready-to-use electric winch for gliders.

29, 35, 40, 53, and 72 MHz bands, even the new Canadian 72 frequencies. Price for these special frequencies is \$15.

A complete brochure is available for 25¢ in coin or stamps in the U.S., foreign requests should enclose \$1.00 to: Cannon R/C Systems, 13400-26 Saticoy St., North Hollywood, CA 91605.

* * *

In spite of climbing costs of practically everything else, in or out of the hobby, there are some excellent buys to be had in the case of R/C systems, especially the smaller two and three-channel and Sport sets.

Continued on page 95



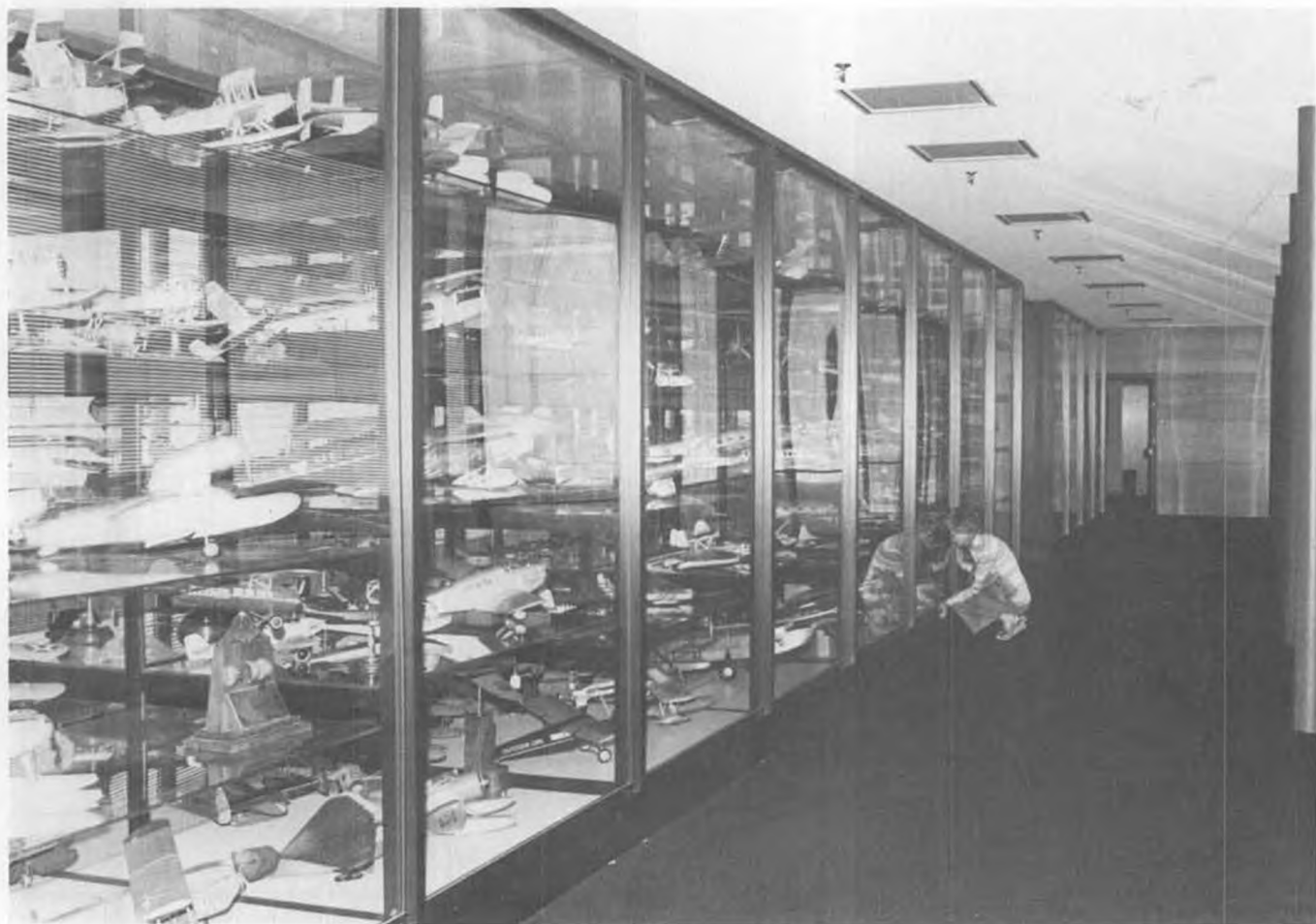
The Aeromodeller Annual is the closest thing to the famous Zaic Yearbooks of the past.



Softglas is a new finishing preparation by Ohio Superstar Model Products.



R/C Etc. has drilled and tapped motor mounts for Cox and Rossi .15's.





OUR AEROSPACE MUSEUM'S BEST KEPT SECRET?

Next time you're in Washington, D.C. and plan to take in the Smithsonian's Aerospace Museum, you'll be missing the best part unless you make the discovery that was such a thrill to Bud and Dotty Gay.

• Bud Gay and his wife, Dotty, proprietors of the Bristol Hobby Center, Bristol, Connecticut, recently took some time off to visit the Aerospace Museum at the Smithsonian Institute in Washington, D.C. As Bud said, "I wanted to see the 'Spirit of St. Louis' for what will probably be my last time, and Dotty just wanted to get out of the state for awhile."

After shooting many rolls of Tri-X, Bud started checking around, and came to the realization that there were far too few models being exhibited. Getting a little footsore, he walked back to a predetermined meeting spot and found Dotty, rested and relaxed, watching the world pass by. He complained to her about the missing

models, to which she calmly replied, "How would you like to see the Museum's model airplane collection?"

While he had been hiking and snapping, Dotty had struck up a conversation with one of the security men, and had advised him of her husband's model building hobby, etc., etc. The guard instructed her to take her husband to the security desk, ask the guard to obtain permission from the Director, and then take the elevator to the 4th floor annex . . . and ogle.

What they discovered were glass cases full of thousands of precious built-up models of just

Continued on page 95



The author, George Clapp (right), with his brother, Bernie, and the R/C trainer version of "TORC".

⋮ "TORC" ⋮⋮⋮ TRAINER ⋮⋮⋮

By GEORGE CLAPP . . . Here's an R/C trainer that was designed over 40 years ago! Today's engines may be more powerful and modern adhesives may be more permanent, but functional beauty remains the same.

● The day is perfect, with warm sunshine and almost no wind. After some test glides over tall grass, I was quite sure my first gas powered model was ready to taste the air currents under the power of its Baby Cyclone engine. The Cyclone had run well on the bench before installing it in the ship, but today all we can get out of it is a pop now and then. My buddies' wife and mine are getting impatient, as it is also Sunday, with noon almost upon us. So we have to give up, muttering to ourselves.

The very next time out the Cyclone is ready, for some unexplainable reason. It roars into action almost on the first flip of the prop. Conditions are not as good this day, for there is enough wind to cause considerable drift and there are trees in the area. Oh well, we hand launch it into the wind anyway. The model climbs out in big circles, with only a minor scallop to its flight. As it circles, it looks like the climb will take it over a tall tree which it is drifting towards. The Austin timer now decides that the Cyclone has run long enough, the plane straightens out, and the long flat glide

allows it to stay up for a considerable time, in the top of that tree!

This all happened about forty years ago, and as I remember, the model more often than not, ended up entangled in tree limbs. If you have ever flown a big free flight model and know the sickening feeling you get as it tumbles down from limb-to-limb after repeated prodding, you will really appreciate radio control. While the Baby Cyclone was probably as good as most engines of the day, and we now look back with nostalgia, it does not in

any way compare with the easy-starting modern glow engine without ignition problems.

After a phone conversation with Bill Northrop in regard to my Fokker tri-motor "America" (August '76 MB), during which he stated that old-timers make great trainers, I began to think about my old gas job done again, this time as a trainer. After several kits of so-called trainers, I still needed one slow enough for these old reflexes. My TORC trainer presented here is the results. The name TORC, of course, is



Who can deny the thrill of a tail-up takeoff run? It is as good now as in the 1930's.



This photo was taken of George's original TORC back in 1937. Classic lines are enduring.

O.T.R/C scrambled a little.

The first flight of TORC was a revelation of simple R/C flying. Its takeoff was at 1/4 throttle, the balance was just about perfect, and its general handling was good. As long as the throttle was kept at 1/4, it had no bad habits, and would climb much as its ancestor did.

This all changed the first time I gave it full throttle. The Enya .40 at full bore has one full H.P., while the Baby Cyclone only had one-sixth H.P. wide open. It was a good thing I had gained a respectable bit of altitude at 1/4 throttle on that first flight, because when I gave TORC full power, it very rapidly came up and over in a loop with no up-stick! It became evident that something had to be changed. I flew it several times like this, using trim to help, but it was not enough.

I finally took the entire tail group off and reset the horizontal stabilizer with three degrees more of positive incidence. This is clearly shown on the drawing. Again, off we go to the flying field. This time it is much better, but it still has a decided climb at full bore.

Again it is back to my shop to give the model some down-thrust. The Enya had been mounted in the same manner as the Baby Cyclone, but the plywood was not aircraft plywood. I had used some regular 1/4 inch plywood I had on hand. I shimmed the rear of the Enya to give it about four-degrees down-thrust. TORC then handled real well at any throttle setting. The poor quality of the plywood soon produced a loose engine that I had to do something about. I then cut out this area and installed the firewall of 1/4 inch aircraft plywood. To this I installed the Tatone mount, inverted as shown on the plane.

TORC has been flown since May of 1977 on many occasions, such as fun flies, demonstration flights at static displays, and just for fun, whenever the weather and time would allow. It enabled me to improve my flying to the point where I

was able to fly my Fokker at the Endicott, New York contest in July. I did well the first day, but the corn roast and beer Saturday night did nothing to improve my flying Sunday.

Another reason that I decided to do my old design over as an R/C trainer was the fact that I have four grandsons who I would like to interest in R/C flying. They range in age from ten to sixteen years old. TORC, because of its gentle nature, has allowed them all to fly it without any previous R/C time.

CONSTRUCTION

While an attempt was made to show both the original 1936 design and the R/C version on the drawing, it was the trainer I was most concerned with, as the original free flight was not published during the period of its origin.

Although the construction is

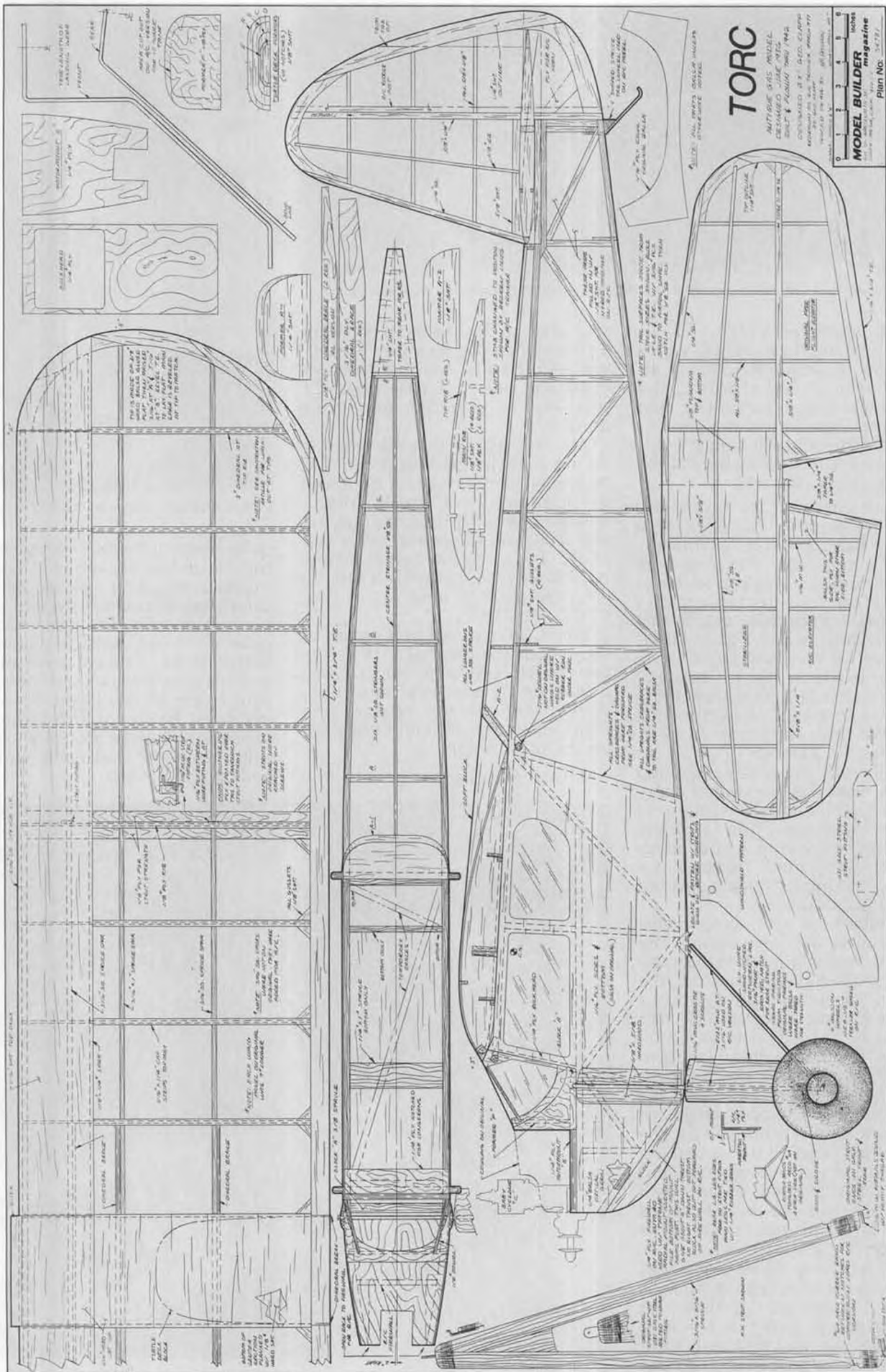


Lots of ingenuity shown in this 1937 photo.

quite normal, there are a few points that should be explained. All of the material marked spruce on the drawings was cut from straight-grain pine on my ship, because I had the pine on hand. Spruce would be better. Balsa verticals, cross pieces and diagonals were used aft of the wing to keep the tail light. By selecting light balsa for the large tail surfaces and using the Enya .40, my ship came out balanced without adding any ballast.



No, the framework is not showing the normal landing attitude of TORC! Structure is simple, light, and strong.



TORC

MITCHELL GRES MODEL
 CONSTRUCTION BY G. GRES
 COMPLETED BY G. GRES
 REPRODUCED BY THE MODEL BUILDER MAGAZINE
 1942

MODEL BUILDER
 magazine
 Plan No. 34777



Here is the nose of the modern R/C version of TORC. Hmmm . . . no spark plug.



George shows the topside of TORC. Long tail moment assures stability.

The wings on the original were not called upon for the stress of aerobatics, so the 3/16 square spars were added. They junction at the strut attachment points. The struts are also fastened in a different manner than on the original because of this. The wings have been put through very high stress with no structural failure. The struts on TORC are needed.

The landing gear wire was increased in size and the Arco No. 64 rubber bands added as per drawing. This gear will take a lot of abuse and is quite unusual during ground operation.

FUSELAGE AND LANDING GEAR

Construct both sides using 1/4 sq. pine or spruce for longerons and all members forward of the trailing edge of the wing. Aft of this point, I used balsa cross pieces and diagonals to keep the tail light.

The 1/16 plywood sides are now glued on, making sure you have a right and a left.

The two halves are then assembled upside down, with plywood bulkhead and cross pieces in cabin area only. A good flat surface is needed for this. Make a temporary diagonal cross piece and tack-glue it in at the rear rectangle formed by top, bottom and sides. Add another

temporary cross piece in the open top and glue on bottom 1/16 skin. Let dry completely. This is the foundation for a true fuselage.

Next draw rear together, glue and clamp. The vee-shaped piece shown on drawing was not used on my trainer version because I used a tail wheel. A piece of 1/16 plywood will later go on bottom rear for this. With the rear fastened securely, add the cross pieces to the whole rear of fuselage. Add gussets and let dry.

The 1/4 inch aircraft plywood motor mount is now cut out. Open it in front as shown, back to firewall. Wet plywood sides forward of cabin area on outside, this will help bend front sides in to epoxy on what was the motor mount on original model. I brought the front sides in with a clamp.

Now cut and fit vertical 1/4 inch ply firewall as shown and epoxy it in place. Do not add bottom front block as yet. Do not use five-minute epoxy for any of this. It dries too fast to penetrate wood and hold well.

The landing gear parts are now bent. Remember the main vertical section in front is one piece. So is the rear section.

This now slides down over the fuselage in position shown and is epoxied in place along with block

"A". Note on drawing how plywood motor mount previously mentioned and marked "B" on drawing is tight against top of landing gear main legs. Now shape and add 1/8 x 5/8 hardwood pieces each side of main gear. The 1/16 music wire cross piece is now added below fuselage.

Wire wrap ends of rear legs to main gear and solder. This floats free on steel strut fitting. Do not attach this strut fitting yet. The 3/16 pine fairings on main gear are slotted for wire, shaped and epoxied, each half over wire.

The 1/16 cowlings and 1/8 plywood former "F" are now cut out. Make sure you cut out the former for the size tank you want to install. Fit and apply these to fuselage, notching cowl piece where it goes over landing gear wire.

The formers on top can be added now. Fit and glue five top stringers. Notice formers are not notched for stringers. The 1/4 plywood piece that forms the top of the windshield is now added, along with the small pieces of 1/16 plywood on each side. The cowlings are drilled for acceptance of the two 1/8 dowel pieces and they are glued in. Drill for 5/16 wing dowels and install.

Now completely coat the whole

Continued on page 70



Julie (Mrs. George) Aldrich, with huge array of trophies awarded in the model display competition at the Southwestern Modeler Show.



Charley Smith's Vought OS2U-3 captured 1st place in R/C Scale, WW II, and Best Military Scale at SM Show.

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

● If this column tends to ramble on in a disconnected manner (more than usual), you can blame it on the Southwest Modelers Show in Dallas, Texas, a week after that town's football team "did it" to the Denver Broncos. We came back from there with a bad case of bronchial flu, and this is being written "under medication."

Arriving in Dallas was not without its funny incident. Last year, it was a shot of warm water in the face when we lowered the driver's window of the rental car just as the attendant threw the water to clean off the ice! This year, the ice was on the road, and as we attempted to leave the car rental lot, we made a right, uphill turn, only to face a car that was slowly coming toward us, the front wheels turned and locked, in a fully uncontrollable skid. As the driver gestured wildly, we gingerly reversed and backed into the area we had just come from. The other car slid on past in front of us, the driver saluting gamely in recognition of our avoidance maneuver, and finally came to some solid ground where

he regained control.

This was the second Dallas show, and for the second year, the weather played mean tricks (so what's new *this year!*). You are reading here and now the first official word that the 1979 Dallas show will be sometime in May!

In spite of the snow, ice, and dense fog that played games all during the show weekend, a pretty

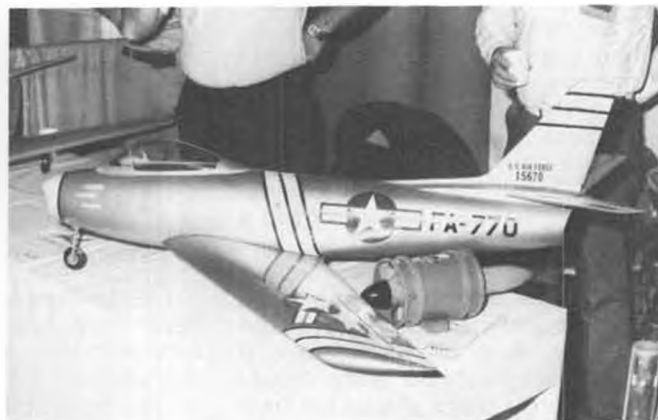
fair turnout of spectators came in to see the manufacturer's exhibits. The exhibit space was almost double that of last year, leaving no doubt that the Dallas show is already a permanent fixture in the annual model trade show schedule. Some of the Chicago and eastern seaboard exhibitors were unable to get out of their own territory because of the weather situation. Among the miss-



Ace R/C showed this amazingly simple and effective throttle for reed-valve 1/2A engines.



The Dauntless cabin cruiser was a new item shown by Helen and Jay Brandon, of Dumas Products.



Sport Scale F-86 Sabre ducted fan model introduced by Air-Forms, Inc. Lightweight model will fly on "sporty-forty" power.

ing were Model Airplane News, Helmut Bernhardt Precision Movements, and Sonic Tronics.

We were particularly impressed with several new items at the show. For one, Kraft Systems showed the first FM R/C units available for U.S. use. Limited now to 6 meter operators only in the U.S., the high interference rejection, tightly tuned radios are rapidly gaining in popularity overseas, and it is hoped that more frequency availability will show up in the future. If nothing else, it should make the kit manufacturers happy, as more and more aircraft can fly in a given area at one time, making mid-air more likely!

Air-Forms, Inc., of Clovis, New Mexico, introduced the first of a series of ducted fan models for the sport flier. The North American F-86 Sabre weighs only 6 pounds ready to fly, yet with scale outline, has 616 sq. in. of wing area. Designed around the Midwest RK-40 fan unit, the plane can be flown by the Sunday flier with a "sporty-forty", or be given the full treatment and use an ABC type racing engine. The light, epoxy-glass fuselage is 50 inches long, the foam-cored wing spans 49 inches (remember, there's a lot of sweep-back), and the wing loading approximates 23 oz./sq. ft.

Not since Delta Products produced some at least 10 years ago, have we seen such a useful modeling tool. We're referring to rectangular extruded aluminum sanding bars up to 36 inches long, as put out by Larry Stanfield, of Fort Worth. The grit material is fastened to the bar using double-stick carpet tape, and in addition to precision sanding, the tool is excellent for stripping sticks from sheet stock.

Ace now has a neat little throttling device for reed-valve Cox .049's. There's a picture somewhere in this column that describes it best.

Southern R/C Products will soon have a hand-held electric starter battery pack, and was also showing



"Well, yes, I have seen a few Big Johns", says RCM's Chuck Cunningham.

SEE IT HERE

New from Kraft "FM" FREQUENCY MODULATION

—The first USA manufactured FM radio control set, the KP-6AFM, is now available. It is offered for use in countries permitting this type of R/C transmission including Europe, Australia, and Canada. In the USA, it is available for use on the 6 meter amateur radio frequencies.

—The KP-6AFM is a sophisticated addition to our growing Sport Series line. As you would expect from Kraft, the KP-6AFM has truly unique technical and performance features.

SPECIFICATIONS	
Frequency Bands: 27, 30, 32, 35, 40, 53 MHz	
TRANSMITTER	
Power Input	— 0.5 W typical
Frequency Stability	— 0.01% (crystal)
Modulation	— ±5 kHz deviation
Control System	— 1 kHz
Dr. System	— 6.0 (standard) and 6.0 (special)
RECEIVER	
Sensitivity	— Better than 1.0 microvolt
LF Bandwidth	— 75 db: ±3 KHz / -50 db: ±9 KHz
Front End Tuning	— Double shielded RF filters
Antenna	— 96" (91.5 cm)
Current Consumption	— 10 mA at 4.8V
Noise Suppression	— 20 dB (standard) and 30 dB (special)
Dimensions	— 2.75" x 1.36" x 1.68" (76 mm x 35 mm x 43 mm)
Price	— \$199.00 (KPS-14IIA, KPS-15IIA (standard), KPS-18A (special))

Kraft Systems introduced its FM R/C sets at the Southwestern Modeler Show in Dallas.



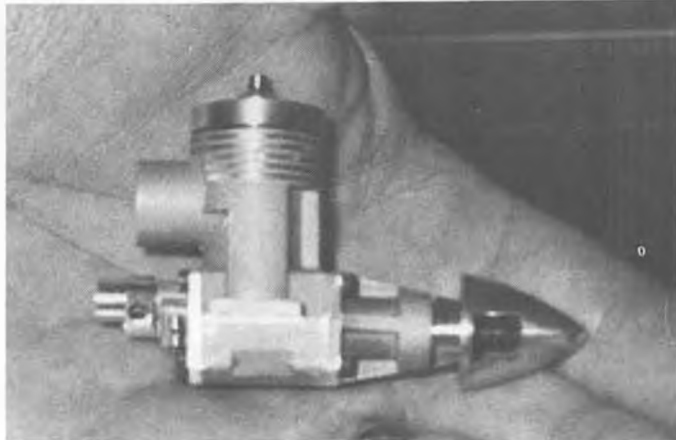
Powered glider built by Bill Goff, Texarkana, Texas, has 20 foot span, weighs 25 pounds, and is powered by ST .46 engine. Debbie Dilworth provides size comparison.

Bruno Giezendanner's electric retracts. A three-gear set is \$99.95, and each unit is self-contained, so that the only "linkage" is electric wiring.

And right next to our booth, Radio Controlled Models (RAM) was showing a new, ready-to-float

boat for the K & B 3.5cc outboard. For the guy who wants to try R/C powerboating without going through the complicated (to a newcomer) routine of hooking up a drive train, this is the way to go.

Perhaps the most unusual display



It is an .049, it turns 30 grand, and costs \$300. Speed & Racing Specialties, Box 35458, Houston, Texas 77035.



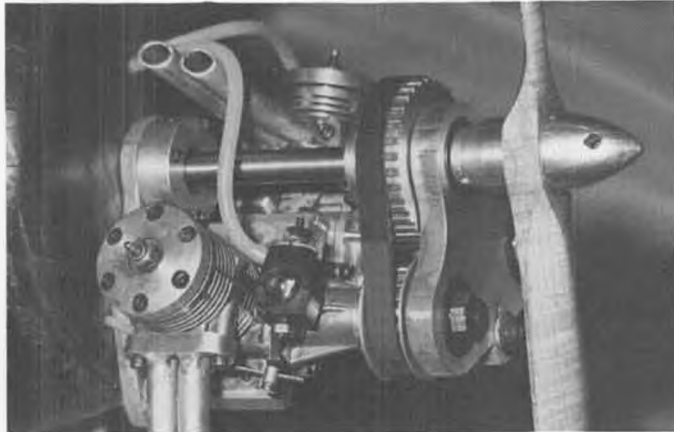
Goldberg's new P-6E and Skylark II. Bob Rich and Carl G. greet friends at booth.



House of Balsa's .40 size P-51 was big hit. Joe Zdankiewicz tells about it.



Jerry Bonzo showed Pro Line radios. Several new models were presented.



Drive unit for two .40 engines, by Radio Control, Inc., 5303 Center Mall, K.C., Mo 64119.



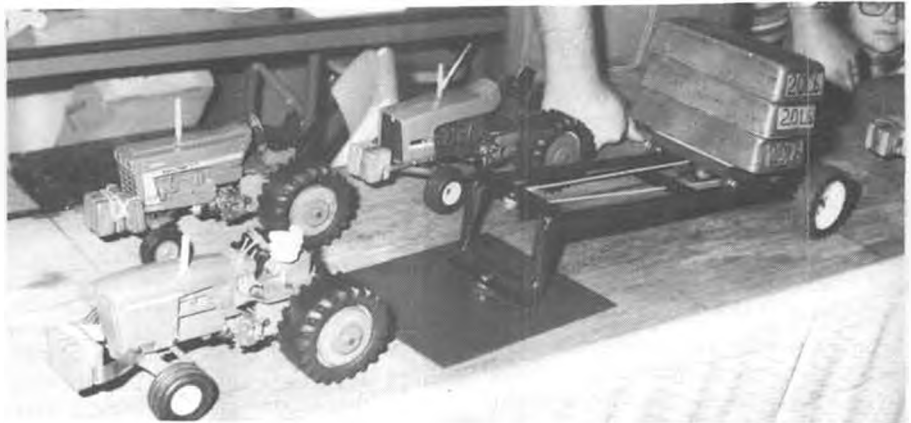
Southern R/C Products distributes the electric retracts by Bruno Giezendanner.

at Dallas was put on by a non-radio control association . . . and we ain't kidding . . . it's the National Model Tractor Pullers Association! They have a complete set of rules, three classes (stock, hot rod, and 4-wheel drive pickup), and organized "pulls". The 1/2A powered tractors are scale International, Allis Chalmers, or John Deere, going for \$125 each, and maximum loads are in the 175 pound bracket! This is serious business, and Rule No. 4 under General Rules states that there are no pull-overs in a pull-off!

FAN FARE

As a follow-on to the Mirage III

Continued on page 101



National Model Tractor Pullers Association demonstrated geared .049 power by pulling up to 170 pounds at the show!



The 1978 HP engines were displayed by Jerry Nelson, of Midwest Model Supply.



Oscar Slaughter and Larry Stanfield, of Stanfield Manufacturing, showed their Super Sanders.



Mr. Model Aviation, Carl Goldberg, with his original Sailplane, as restored by Lou Levine. You can see it, among other treasures, in the Russ Barrera National Model Museum, Morgan Hill, California.



PLUG SPARKS

By JOHN POND

• After all the O/T R/C chatter in the last issue, we're going to concentrate mostly on free flight this issue. So with that in mind, here goes...

What a difference a field makes! In paraphrasing that old tune, does it ever! Since the SAM Champs (and the Nationals) were held at Wright-Patterson Air Force Base in Dayton, Ohio, the field has been made available to various free flight clubs in the Ohio-Indiana area.

Clubs like the COFFC (Central Ohio Free Flight Club), NOFFA (Northern Ohio Free Flight Association), and the CIA (Central Indiana Association), have been benefiting from this field where free flight can be flown regardless of what the crop condition is locally.

Among some of the clubs undergoing dramatic changes is the CIA. Under the dynamic leadership of Bob Larsh, President, and Harry Murphy, Newsletter Editor, a real renaissance of free flight is occurring in this area. No less than five contests were held last year!

Of course, Wright-Patterson is not a complete cure-all, as windy days limit flying to two-minute flights. But, the best part of flying at Wright-Pat is that the model will land in the field, making retrieving easy. This is something that free flight has needed for a long time in the central states. Driving up to Bong AFB can get to be a drag.

Murphy (Murf to his friends, and "Dirty Harry" to others) writes a most entertaining newsletter, as long as you are not his present target. One thing about Murf is his democratic approach; everyone (including the columnist) gets his share. In retrospect, the writer thinks something like this is not too bad for the membership, as everyone needs to be cut down to size occasionally. Murphy can also do it to himself, by just getting in hot water over some paragraph he wrote in fun (join the club, bub!).

ENGINE PROBLEMS

It is taking a little time for the SAM membership (including a few die-hards) to accept the converted-to-ignition glow motors, but all one has



Photo from 1943. It is WW II, and Vic Dubery flies his Taylor Cub at Machrihanish NAS, while serving aboard HMS Biter.



Spiro Nicholaw carefully avoids the Super Cyke prop on his Sailplane. Photo by Al Hellman.



The 3rd part of a triumvirate (Murphy, Larsen, and Burgess). Bill Burgess with his faithful Cyke powered Foote Westerner.



NOFFA Rudy "Butch" Kluiber, always in the winners' circle, with his version of the Laurie Twin Cyclone.



Jerry Persh can make Comet Interceptors fly! He's been doing it for twenty years! Seen at Brainbuster's Annual.

to do these days is go to the latest MECA Collectogether in your area and get acquainted with the facts of life on old ignition engines.

Prices are high! I don't care what the collectors say; supply and demand, and all that. There are just so many engines available and that's all there is to it. The writer was assured at Fresno that the Spitfire he purchased for \$75 was a bargain, but later discovered he still had to find some small items for it. Compare this with the purchase of a brand new (or like new) Merco 60 for \$25.

For \$40 more you can have a fellow

such as Otto Bernhardt, Mark Fechner, et al, convert the engine. You now have a reliable new engine with parts readily available in case of a catastrophic crash. Gives one a rather comfortable feeling to know your prize jewel is not beyond repair.

Anyway, that's enough on engines. We promise not to get this column involved again in another controversy. You simply can't please everyone!

BEEP, BEEP!

This is a direct steal from Harry Murphy's column in the CIA Informer, but it was too good to pass up. It all came about when Keith Fulmer, a Hoosier free flighter who flies quite a bit at contests, claims to have not lost a model for three years in all that corn and soybeans. Murphy was intrigued by this statement.

Scarcely believing what he heard, he watched Fulmer disappear into a sea of corn and emerge from it in about 15 minutes. From the depth the model flew into the field, Murphy estimated it would take a week of Sundays to find it. When Murphy questioned Fulmer on how he could accomplish this feat so easily, Fulmer replied, "Beep, beep!"

Now Murphy is no dummy, and figured he had seen enough early morning TV comics featuring the Roadrunner. So he did not think the

remark was very humorous, to say the least. Murphy then discovered Keith was dead serious. "Beep, beep" was exactly how he found his model, in other words, a small transmitter in the model!

Keith, to build a transmitter, uses the circuit board and components from an Estes Transroc kit, and powers same with four Mallory R400 hearing aid batteries in series. The whole apparatus weighs only 5/8 ounce! Mounted at the center of gravity of the model, the circuit



COFFC member, Bob Lyle, has a lavender silkspan covered So Long. Wright Patterson AFB in the background.



Bob Larsh, outgoing CIA president, with Arden powered Twin Cyclone (Tom Laurie design).

board only takes up a 1 x 2 inch space.

Battery life is good for 24 hours continuous operation, with a range of a quarter-mile. Of course, this will vary depending on atmospheric conditions, local CB interference, and the transmitter battery condition. You can depend on it to last the entire meet, as Fulmer has yet to lose a model. He is even installing this transmitter in a 1/2A model!

Fulmer monitors Channel 5 on a small, inexpensive, standard walkie-talkie, and walks (not runs like a roadrunner!) until he picks up the signal. As the signal gets stronger, he keeps shortening the antenna until he practically steps on the model.

Now for some do's and don'ts. Fulmer sez to allow plenty of time when ordering from the Estes people. Speed is not their middle name. Mount the completed circuit board in foam, sponge, anything that will resist the high vibrations emanating from your hot engine. If you don't, the components will come off the board, being rigidly mounted. Use flexible hookup wire rather than solid types. Use good fresh batteries in your walkie-talkie to assure good reception.

Murphy is to be commended for publishing Fulmer's excellent retrieval systems. Of course, Fulmer is the greatest for sharing this idea. Should work great as long as there are not too many transmitting sources in the corn.

If you are interested, Estes gets around \$18.00 for the kit. If you don't like soldering electronic components you can get pre-assembled units at advanced costs. Write to Estes Industries, Dept. TX, Penrose, Colorado 81240, for the Transroc kit (*Tell 'em where you read about it!* wcn). Better yet, send a quarter for their catalog to get all the details. Sounds great to us out here in the West, as we do have problems with cotton fields. Thanks!

ENGINE OF THE MONTH

This month's engine is another small West Coast engine, manufactured primarily to take advantage of the tremendous interest in small models. In the early days of gas modeling, all the big designs were to be found on the East Coast. Out in California, a six-foot model was considered large; hence, the tremendous sales field for small engines. Numerous engines were produced on the West Coast, among those being; Trojan, Brat, Madewell, Husky, Ohlsson, and many others.

Strangely enough, after World War II, California manufacturers produced a tremendous number of ".60" size engines, such as Ohlsson,



Caldwell (Slick Stick) Johnson flies gas too! A Roeser/Parmenter "Swoose" from the Chicago area. See .020 Replica version, OT Model of the Month.

Super Cyclone, Atwood, Orwick, Hassad, Hornet, McCoy, Contestor, and many other smaller producers. Big designs were the vogue in California!

The M&M arrived on the screen shortly after the gas allowance type events were abandoned in favor of the limited engine run rule. In 1939, the first M&M engine made its appearance in its first advertisements in the August 1938 issue of Model Airplane News. The M&M Company, based on the tremendous acceptance of their wheels, had gotten into the market with a .23 size motor. Initial price was \$17.50, ready-to-fly.

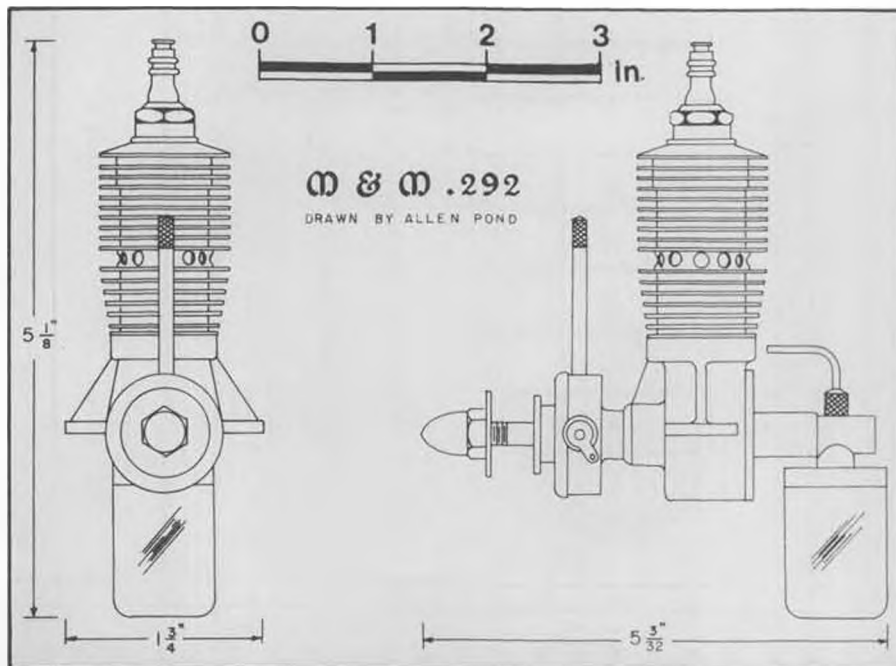
With the new rules now extending Class B to include .29 size engines, M&M promptly brought out their newest effort, the .292 engine. Surprisingly, this was priced a dollar cheaper at \$16.50, as noted in the

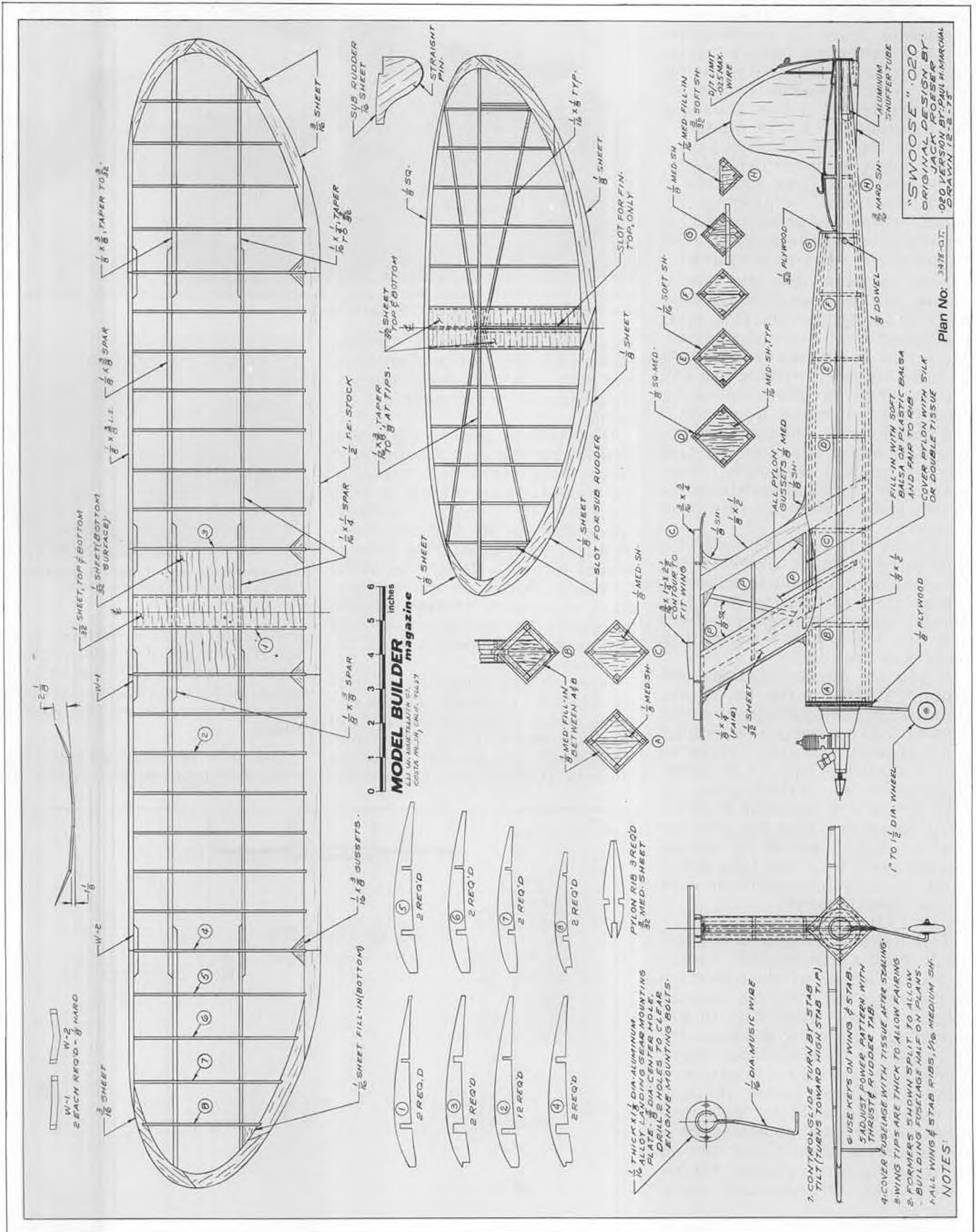


Didn't have a picture of Harry Murphy. His field box eloquently tells the story!

initial opening advertisement in the July 1939 issue of Model Airplane News. However, sales weren't that great, as the engine advertisements ceased in the January 1940 issue of MAN.

Basically the M&M 29 was a piston-valve type engine, which the





manufacturers claimed was the first major improvement in model engines. Another claim was made that the piston and cylinder being symmetrical would allow the piston to rotate, making for uniform wear and maintaining good compression. In theory, this sounds great, but as the man said, "tain't so". The most successful two-cycle engines are those with the least amount of moving parts.

For those interested in the manufacturing specifications, the M&M engine featured cast iron cylinder and piston. The circumferential exhaust, later exploited in the Arden engines, was advertised as contributing to more power with quicker disposal of gases.

Points were fully enclosed to keep oil from fouling the points. For this reason, the motor operated equally well inverted or upright. Inverting the engine was quite simple, requiring only the intake tube and gas tank to be rotated 180 degrees. Probably took all of two or three seconds' work.

The engine also featured a transparent gas tank, which could be easily removed for cleaning. The so-called pull-tube carburetor needle valve (with micro-gas adjustment) featured no threads or pin holes to get clogged. The whole assembly could be easily taken apart for cleaning.

The motor displacement was .292, with bore of 23/32 and stroke of 32/32 (one inch to you). Base weight was 4-1/2 ounces. The engine was sold complete, ready-to-run, with spark coil. Recommended propeller size was 11-1/2 x 8 pitch. M&M claimed that it was not necessary to run the engine at high speed to develop full power (and naturally induce more wear).

30 YEARS AGO I WAS...

Got a nice follow-on letter from Vic Dubery with further experiences aboard the MHS Biter and the trials and tribulations of building models at sea.

You will remember several issues back, Vic was salvaging the balsa from the Fairy Swordfish landing gear. This odd shaped piece of balsa had to be cut into strip and sheet sections. The only tool available aboard ship was a massive bandsaw in the carpenter shop. Located forward in the bow, the shop was incredibly cramped.

It was in this "shop" that Vic discovered how to saw balsa with a rough blade that took better than one-eighth of an inch each cut. As he said, stripping was done very carefully, like handling an alligator in the back seat of your car.

About this time, Vic acquired



Jim Adams, with improvised blinders, checks the radio action on his Tom Laurie Experimental as Bob Oslan (left) and Mike Bernhardt look on. Bob and Jim are OT F/F to R/C converts.

more useful shapes of birch and spruce while visiting aircraft repair shops ashore. One must understand that there was plenty of wood in a cracked-up Swordfish, but the Swordfish being produced by Blackburn was a metal-framed version unlike the original. As Dubery put it, more work went into preparing the wood to size than the actual construction time.

Covering posed another problem, as like balsa, it had completely disappeared in the U.K. In Argentina, Newfoundland (one of the U.S. Land-Lease Bases), Dubery canvassed the local shop for tissue... any sort of tissue, whether it be wrapping or what have you. Seems like Dubery's ports-of-call were never in the right place for model supplies.

The wrapping tissue turned out to be a surprise, as it did not shrink very appreciably nor did it take colored inks very well. To help modify and heighten the colored tissue used for Peanut building, inks and suede shoe dye diluted with alcohol (called methylated spirits in England) were tried. More surprises!

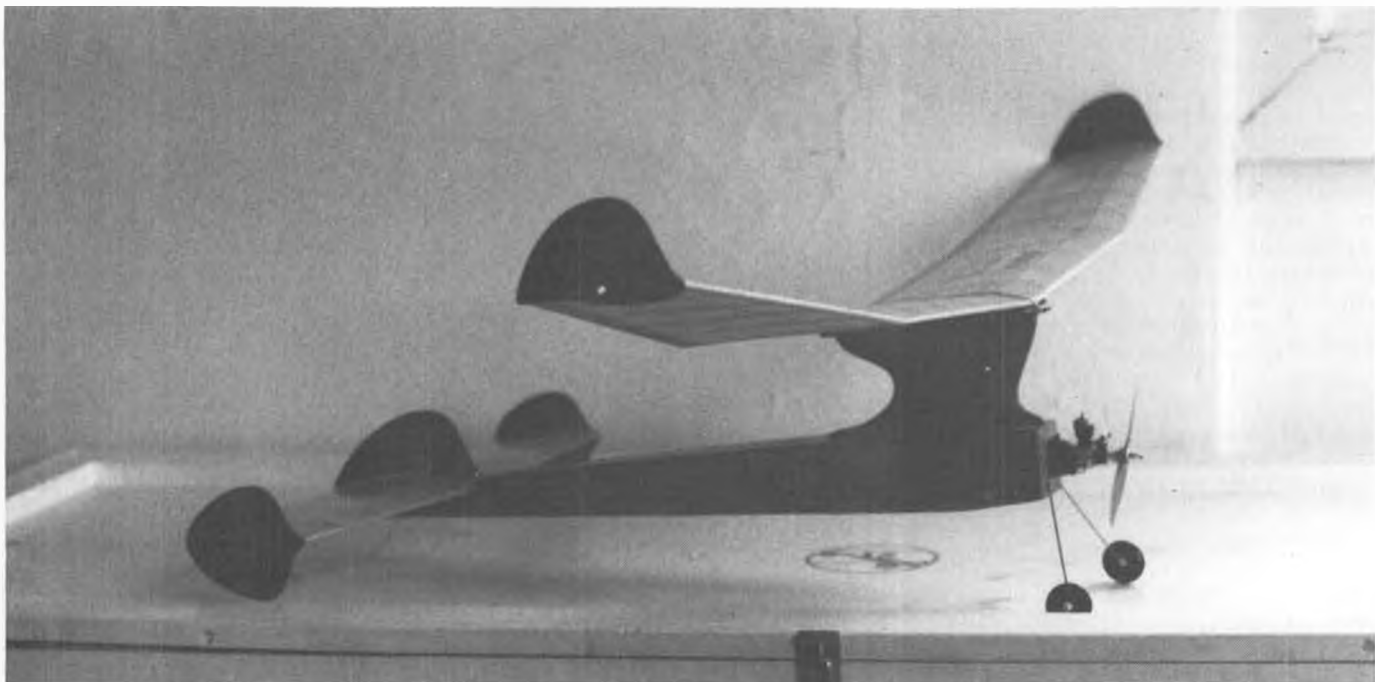
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Karl Tulp, winner of the SCIF R/C Texaco Perpetual, used Dallaire and OS 4-cycle ign.



Ohlsson 60 in a Playbor Senior makes a good combination, says Gene Hartmangruder, at the Brainbuster Annual.



The author's 39 inch span Strato Streak, a famous Louis Garami design. It has turned out to be an excellent contender in the R/C .020 Replica event.

.020 REPLICA R/C

By DON BEKINS . . . Fast-growing in popularity, the R/C .020 Replica combines the best features of the great Old Timer designs and the fascination of duration competition using R/C to find good air.

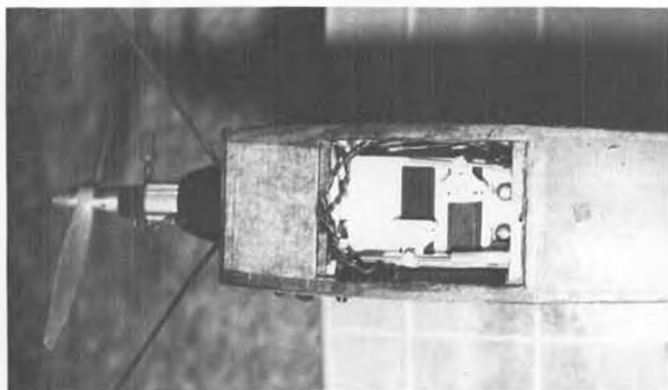
• Three years ago, SAM 21 tried an experimental contest for radio assist of the .020 replica, an event that has become one of the most popular in the Old-Timer revival. The lack of flying fields of sufficient size in the San Francisco Bay area made it a necessity to "bring-em-back alive" with some sort of radio control. A number of excellent .020 kits on the market could be adapted to single-channel operation and could easily carry the added 2.5 to 3.5 ounces of radio gear needed for control. Pulse control systems have long been available, and have become quite sophisticated and reliable, with frequency choices in the 27 MHz and 72 MHz ranges. Within the last

year-and-a-half, proportional systems have come down in weight and size to the point that they can easily compete with the pulse control, including the use of multiple channels.

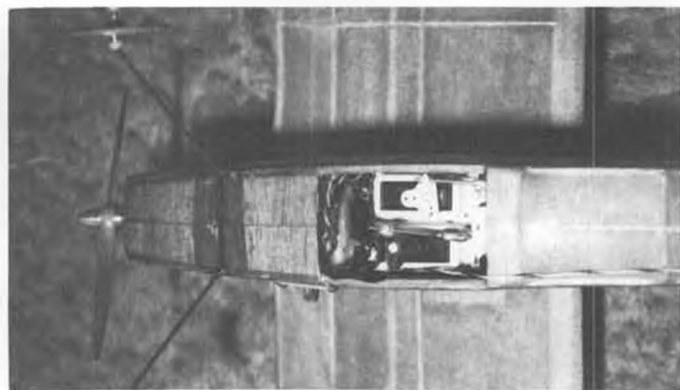
Because of the added weight of the radio, it was decided to eliminate the engine run cutoff timer utilized on the free flight versions, and use a limited amount of fuel, as supplied by the contest director. At first, 2 cc's of Cox Red Can Racing fuel was used, which gave an engine run of forty-five to fifty-five seconds. These powerful little models almost disappeared in that time, so it was decided to cut down the fuel quantity to 1-1/2 cc's. This provided

an engine run of thirty to forty seconds, which is just about right to give 200 to 300 feet in altitude. A well-trimmed, lightweight model should do about three minutes in still air.

In the first contest, a four-minute max was established, with three official flights out of six attempts. The contest director designated a large area in which the plane was to land in order to make the flight count, generally within the boundaries of the twenty-five acre field on which the contest was held. This was later refined to a fifty foot circle, which gave fifty bonus points to the pilot who could skillfully guide these little hot rods to rest at home



The Cannon 2 Super-Mini flight pack weighs only 3.2 ounces as installed in the 39 inch Strato Streak.



This installation uses a 100 mah battery and Cannon receiver, with cases removed, plus Litco and Ace servos.

base. The flying field boundary still counted for flight attempts.

Jack Jella, of Air Trails, Inc., Salinas, sponsored these fledgling events, and it is to his enthusiastic support that SAM 21 owes a debt of gratitude. The trophies he provided were beautiful (along with merchandise), and gave plenty of incentive for the modelers to build for this annual event. Now, SAM 21 has established a beautiful perpetual trophy, and in 1977, awarded engraved silver trays for the first three places of the best five-out-of-seven designated meets during the calendar year. In addition to these prizes, a Cannon Micro-block 2-channel flight pack went to the winner, and an Ace R/C micro-servo and 100 mah battery pack went to the runner-up.

In a story written by Bob Oslan, published in the September '77 issue of MAN, the size parameters of the .020 replica free flight were outlined. In the initial stages, the freeflighters used a maximum thirty-six inch wingspan, but they found with experimentation that wing area was the most important factor in scaling down a winner. As Bob outlined, 140 sq. in. would be the minimum and 160 sq. in. the maximum areas for the best performance for free flights. Jim Dean developed a series of 144 sq. in. replica plans which flew very well indeed.

However, these free flight replicas seldom weighed over 4-1/4 ounces to remain competitive. The added weight of the radio gear in the R/C assist versions cut down the performance characteristics of these square footers considerably. Barnett Kernoff, of Tyro Models, began testing models up to 200 square inches with considerable success. At the 2nd Annual .020 Replica Meet at the Hill Country Air Museum in Morgan Hill, California, Barnett wiped out the competition



Winners at the first annual SAM 21 .020 meet (l to r) Tom Bristol, Barnett Kernoff, John Pond, Bob Lee, Roy Edwards, and Don Bekins.

in three perfect four-minute maxes with his 200 square inch Thermal Thumber. The following year, he nearly repeated that performance, but for flukey weather, with a beautiful 200 square inch Playboy, Jr. That model had a forty inch wingspan and flew like a feather, exhibiting excellent climb under power.

As Barnett was testing optimum wing areas, I began experimenting with multiple-channel proportional radio systems. In heavy wind conditions, it was often difficult to return to the designated field with rudder control only. The loss of Ted Kafer's (SAM 21 newsletter editor) beautiful Mark II Clipper replica attested that problem. To reduce weight, I removed servos, receivers and batteries from their cases and installed them in my early replicas.

The smallest battery pack then available was 225 mah at 1-3/4 ounces. Removing the batteries from the little rechargeable Mattel Sizzler cars found in the kids' toy box, produced a satisfactory fast-charge 100 mah pack weighing just over an ounce. Now such packs are available from both Cannon and

Ace R/C.

The weight disadvantage of the 2-channel proportional appeared to compensate for the wind penetration problems of the single-channel pulse models. However, in competitive events over the past two years, lightly-built and well-flown pulse R/C models have proven they can match the performance of the heavier multi-channel planes. Weights should vary from 6-1/2 to 8 ounces depending on radio type.

The .020 R/C replicas are free flights and must be adjusted and flown as such. They should be adjusted to fly up on their wing and not hang on their prop. A high-speed, forty degree climb will get an .020 replica much higher than a vertical prop-hanging takeoff.

During 1977, I have continued my experimentation on the optimum .020 replica. In preparation for the Las Vegas SAM Champs, I scaled up a thirty-six inch Playboy, Sr. replica to forty inches and just under 200 sq. in., weighing 7-3/4 ounces. That model flew well enough to win the

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Typical control surface details. Control areas must be adequate and not interfere with each other.



Tom Bristol preparing his Buzzard Bombshell for a winning flight.



An eight-year-old Schluter Cobra, being flown by Dick Tristao. Twelve pounds flying weight, OS .60FSR power, MRC single-stick radio, and K&B Super Poxy finish. Cobra has logged over 700 hours of flying time.

CHOPPER CHATTER

By JOHN TUCKER



PHOTOS BY AUTHOR UNLESS NOTED

FUN-DAY ON SUNDAY

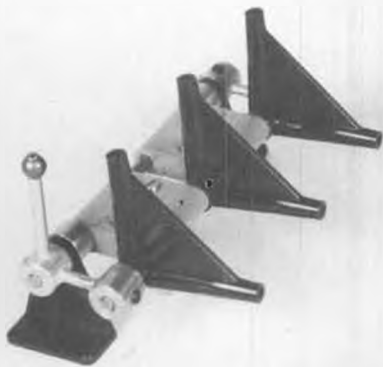
The scene was Pad No. 5 at the Marine Corps Air Station (helicopter) in Santa Ana, California, on a bright, Sunday morning. Across the ramp, I could see dozens of Sikorsky CH53 and Boeing Vertol 46 tandem-rotor helicopters, lined-up in military fashion, just waiting for the following day's training activities. As I weaved my car through a maze of huge, 10,000 pound blocks of concrete, I could see my ultimate destination, the flying site for a group of dedicated R/C model helicopter pilots, most of whom spend their on-duty hours working on the real thing. It seems that the MCAS(H) commanding officer, Colonel Young, has a soft spot in his heart for



Marvin Copfer doing his thing with his Revolution I at MCAS (Helicopter), Santa Ana, Calif.



Is this body English related to an R/C pinball machine?? Nope . . . It's Paul Taylor enjoying a flying session with his Revolution I.



See text about this Kavan Jet Ranger control modification.

his men, and has set aside Pad No. 5 for the exclusive use of military, retired, and their guests, every Saturday and Sunday. Race cars, model airplanes, gliders, and choppers were all in evidence on the day of my visit.

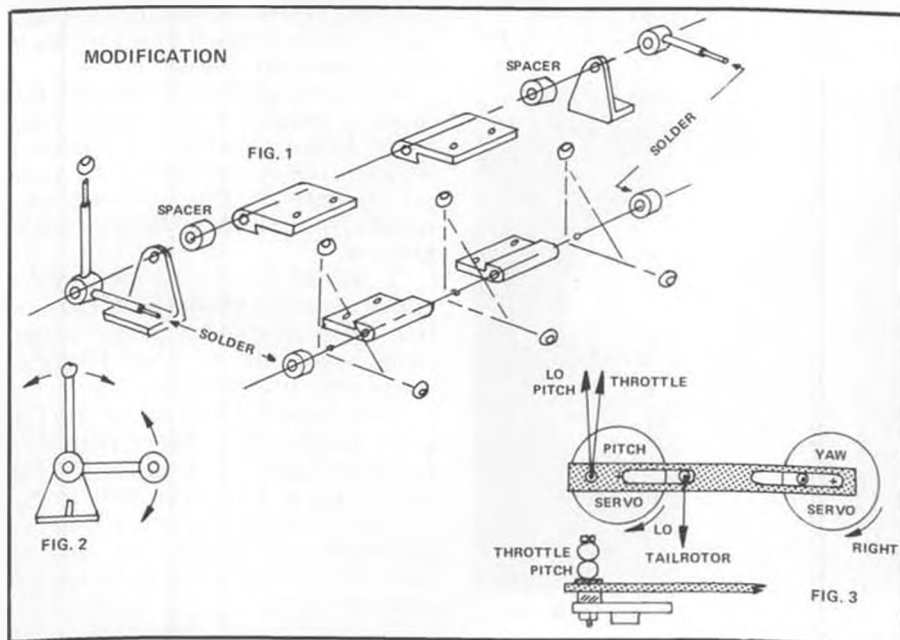
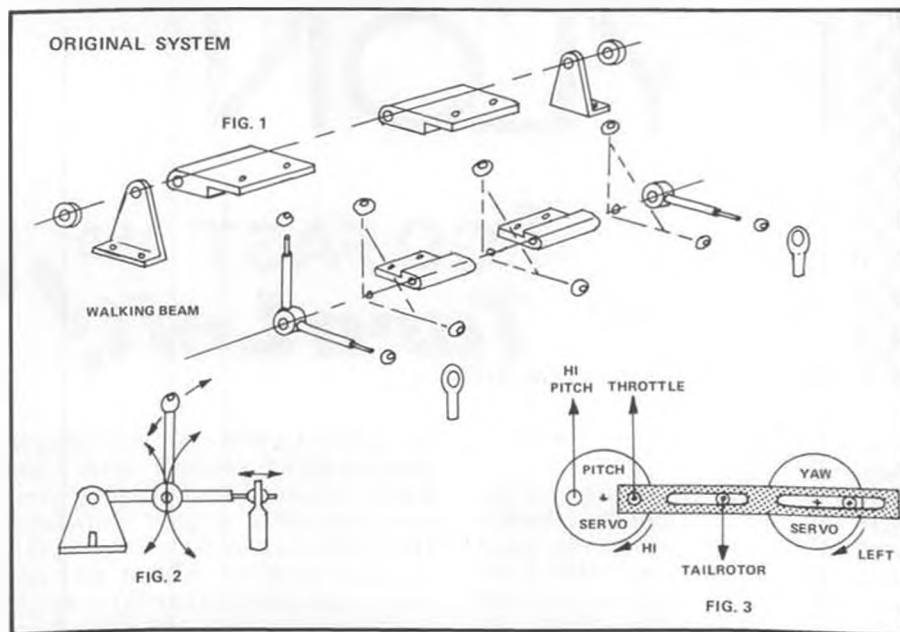
Earlier in the week, I had been fortunate enough to receive an invitation from Marvin Copfer, who is stationed at the El Toro Marine Base, and flies his choppers each weekend at Pad No. 5. Marv and his lovely wife Tricia usually dominate the helicopter scene, with their expertise and generous time-sharing with the beginners. Actually, Tricia claims to be a rank beginner herself, but in the 6 months she has been flying R/C 'copters, she has become quite proficient in hover and slow speed maneuvers around the pad. Marv is an excellent driver, and really shows off his skills with a Revolution and Kavan Jet Ranger. While I was unloading my Alouette, an old friend, Tracy Day, walked up and introduced me to the rest of the group. Tracy had visited my shop in San Diego on previous occasions while he was building his Heli-Baby, and it was a pleasure to see him practicing hovering with those long, l-o-n-g training skids!

Dave Robertson, owner and operator of Orange Coast Hobbies in Westminster, California (R/C specialists), had just discovered R/C helicopters about a week earlier, but was really making headway with his Revolution I. At one point, it kinda' got away from him and rose to 20 feet and started to move across the ramp . . . with much lip-biting and body english, he managed to get it back on the ground without accident. Needless to say, he shut down for a short breather before firing it up again! Speaking of body english, another young marine, Paul

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Tracy Day, with his Heli-Baby, at MCAS (Helicopter), Santa Ana. Eat your heart out, indoor fliers! That's one of the two hangars no longer available for indoor competition. A damn shame!





Starting line scene from the Ohio Pylon Race Championships held at Dayton, Ohio, in September, 1977.

PYLON

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

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

• Racing Season is almost here — Are YOU ready?

Last month, we pushed pretty hard to get you to join the NMPRA for 1978. It's time now to put up or shut up as to what the NMPRA can be and do for you. It cannot function if you do not support the organization and help it grow. It's very easy to sit back and carp about

the policies and workings of people who are doing volunteer work if you aren't involved or offering constructive ideas and/or criticisms. The least you can do is to lend your financial support. Above and beyond your dues, the officers could use some feedback and input from all of us. We've included a membership form to make it easy for you to join. Please do it now!

Before we get too deeply into this month's subject, we received a note from LeRoy Webb, of Campus, Illinois. LeRoy competes in Q-M racing here in the Midwest, and speaks from a knowledgeable background.

"I would like to thank you for your column in **Model Builder** as it is the 'Best of the big three magazines.' Now as to your October comments on Formula I.

"Yes, I think Formula I is too fast and deadly. We have very few Formula I races in our area, and the reason for it, in my opinion, is that the planes are too fast and the pilots, although only a few, are just too squirrely to be racing at the speeds they are flying.

"I would like to see Formula I go

to 15% fuel, to slow down the planes and save money and engines, as you and Terry pointed out.

"Now everyone who races will say, 'It will slow you down too much to make a good race.' Answer: To speed up Formula I on 15% fuel, shorten the Formula I course by 65 feet, then lengthen the Quarter Midget course by 65 feet to slow them down. (Longer lap time, but not slower! wcn)

"Now what we have is two classes of planes running on the same size course. The C.D. at a contest or race, what have you, could run a round of Formula I, then a round of Quarter Midget. Just think, Jim, no back-to-back racing! Time to make adjustments and repairs if you need to. You could even throw in Quickee 500 and Sport Pylon.

"Now that we have established that I am crazy, could you just think about it for a minute."

(Signed) LeRoy Webb



Dave Keats is high point man in Q-500 for 1977.



Russ Dewitt has Ohio's high points in QM for 1977.

We're also reprinting an editorial by Dave Shadel, which appeared in the November, 1977, issue of the NMPRA newsletter.

"In the past few months, racing has declined in nearly all parts of the U.S.

"Many comments have been made on how to increase participation. In a past newsletter, we voted on whether or not to try a race in each district using 15% nitro fuel. A total of 98 people voted, and the only district that wants to try a race with 15% fuel is the Northeast.

"Apparently, not many people in the NMPRA are real-life pylon racers, Formula I in particular, or they just can't be bothered.

"An alternative to the regulated use of a particular fuel is to have a standard class in which there is no static judging and let them burn 15% (or whatever) fuel, so that beginning racers have a place to start. Naturally, these racers could not be considered for championship points, but at least they could gain experience and eventually move to expert class.

"Better awards for contests is also being proposed. When you come right down to it, Formula I racing is one helluva lot of work to be competitive, in such areas as Florida and California, and other areas too.

"Perhaps in the coming year we can change the profile of Formula I. It needs a shot in the arm, and I think that Bob Smith can give it the needed shove in the right direction. Let's all support him.

"In closing, I'd like to thank all of you out there who contributed to the newsletter in the past months."

(Signed) Dave Shadel

With THE SEASON almost upon us, we're printing a pre-race checklist that was prepared by Art Arro and that appeared in the Ohio Pylon Racing Association Newsletter. While primarily intended for Q-500, it is appropriate for any type of air racing:

(1) Select and balance the props which will be used in the races. (Try to have several made up in advance and tested for performance. Save the best for the tough races. . . Jim). A 9 x 7 or 9 x 7-1/2 size seems to work the best for Q-500. Rev-up Special Pro Series, Top Flite Power Props, or Zinger Props are good brands to choose from. Balance all props, using a good balancer such as the one made by Prather Products. You will have to ream out the prop hubs for the K&B engine. The "Rosie Reamer" works fine. This reamer has a 1/4 inch pilot tip which centers the reamer in the existing hole to insure true reaming.

(2) Check all engine and motor



Ohio Pylon Championships Formula I winners are (l to r) Bill Hager 1st, Bob Mellen 2nd, Barney Polzin 3rd. All flew Prather Toni's.

mount screws with the proper size wrench or screwdriver. The set-screws holding the carburetor in place are particularly prone to loosening, and many a race has been lost due to a loose carb. Remember to tighten all screws diametrically, i.e., upper left, then lower right, etc.

(3) Replace the glow plug with a new one which you've checked, and get in the habit of doing this before each heat. Save the good used plugs for test flying. Good results have been had with the K&B 1L or the Glo-Bee Sport plugs without an idle bar. The idle bar type plugs will usually cause a 500 rpm loss; save them for idle events like pattern (or maybe Q-M. . . Jim).

(4) Replace all fuel lines, taking care not to get any kinks in your layout. The new silicone tubing made by Prather Products is great, since it is really tough and grips the fittings really well. (Pro Model Products has another good fuel line. . . Jim). Check the fuel lines for any pinholes, as they can wreak havoc in trying to obtain a good needle setting. Now is a good time to clean

and backflush the fuel filter that you should be using. While you're on the fuel system, remove the needle valve and flush the jet out with clean fuel and alcohol.

The needle valve of the Perry Carburetor tends to loosen up with use, and tends to "creep" (always to the lean side, it seems). This can be cured by slipping a 1/4 inch length of fuel tubing over the spring. The compressed tubing supplies sufficient drag to hold your setting. The use of a second spring, wound the opposite direction to the original one, is a more elegant solution to the problem.

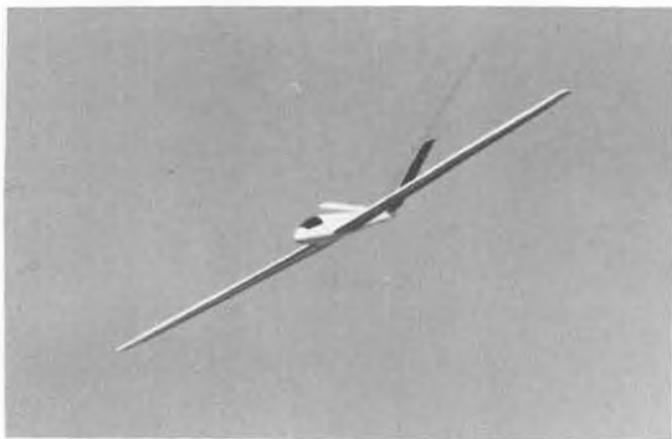
(5) Check the fuel tank for chafing which could develop into a leak, probably during the last lap of the flyoff race for 1st place with you in a slight lead. Pack your tank in foam to minimize the foaming of the fuel. (Another cause of the elusive good needle setting. . . Jim.)

(6) Not enough words can be written about checking the radio installation and making sure you're satisfied with the quality of it. Servo rails, push rods, output arms, link-

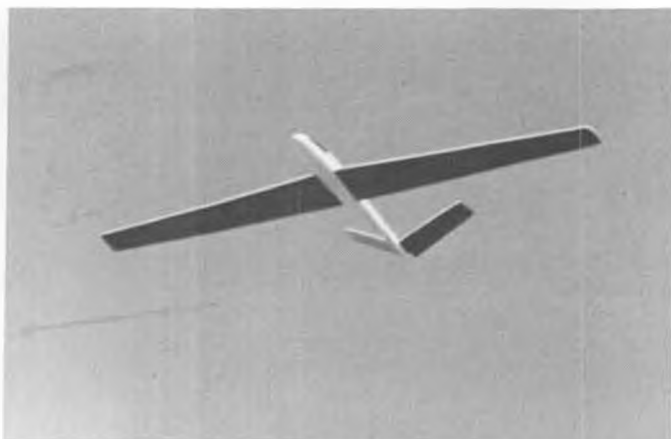
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Art Arro (left) 1st Q-500, Dave Keats (ctr.) 2nd QM, high points Q-500, Gary Villard (right) 2nd in Q-500, at Ohio Championships.



Chet Herbert flies a Ridge Runner with V-tail modification. It is fully aerobatic.



Chet's Ridge Runner uses 2 channels for elevator and aileron control. A clean machine!

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• I've long felt the need for improving our landing quality in RC soaring contests. My friend and I were watching the landing circle. He commented that it was much like a javelin throw contest.

How about requiring that each contestant install a Shock-Fuse or similar inertial threshold monitor (a device manufactured by Impact-O-Graph Corporation, 4943 McConnell Ave., Los Angeles, for use by those who ship electronic equipment or other delicate instruments). It measures less than 1/2 x 1/2 x 3/4 inches and weighs only 2 grams. Two metal balls are separated by a spring, each ball being centered in an opposing post . . . until some transverse shock dislodges them. The spring can be set to trigger at 5 g, 10 g, and so forth, up to 150 g. The shock-fuse comes with servo-mounting tape, so it's easy to install in your fuselage.

Bill Mueller and I have now had a

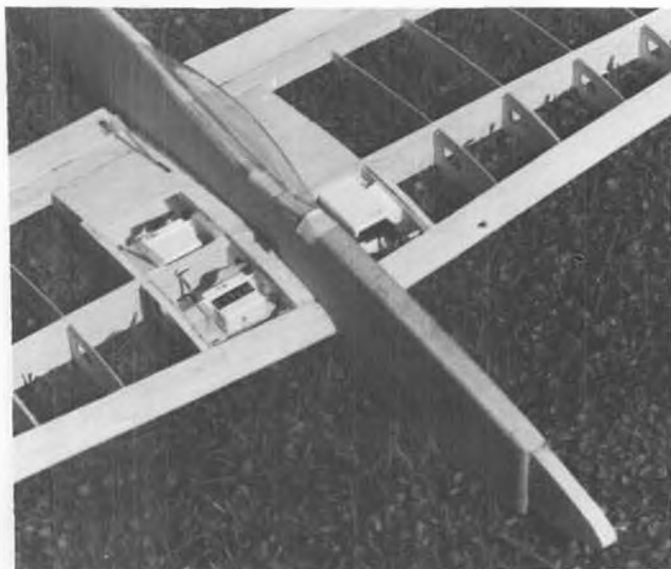
chance to "try this on for size", and it works well (although I'm not yet sure exactly what g-limit should be used to define "acceptable landings" in a contest). Unfortunately, the manufactured device is not resettable, and the cost per unit is high in small quantities. Can we make a resettable version of this device, or design a similar shock-fuse to meet our own specifications? Just having such a device aboard the aircraft would surely encourage smooth landings. Your timer measures the position of your fuselage, then checks whether the shock-fuse qualifies this as an acceptable landing . . . otherwise no landing points. What are your thoughts on this idea?

Can you remember where you saw that article on a certain sailplane, or the plans for a particular model? You can't? Well, your problems are over. A new book entitled, "Index of Model Periodicals 1971-1975" has all this

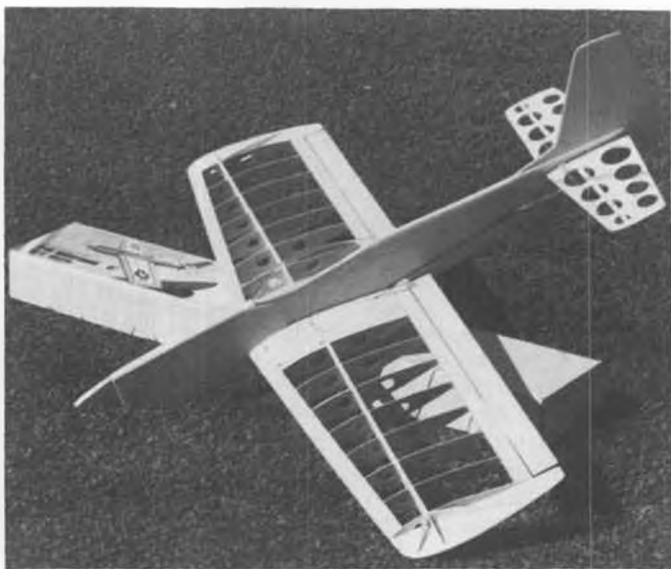
and more (published by The Scarecrow Press, Metuchen, NJ 08840). The author, Paul Cardwell, has painstakingly collected the contents of every model magazine you can think of and brought all this material to-



Shock-fuse device is described in text. We need something to improve those glider landings!



Radio installation in Dixon Pratt's slope soarer. Batteries are installed in the nose.



Dixon Pratt converted a Midwest control line profile scale kit into this sharp aerobatic slope soarer. Great idea!



Chet Herbert's experimental bi-sailplane uses pivoted wings as the only control. Very sensitive.



Another experimental biplane by Chet. Uses two sets of cut-down Hobie Hawk wings (oops! Midwest Hawk wings).



Chet Herbert and his son, Doug, at Torrey Pines, California. They are at the top of a 400 foot high sheer cliff above the ocean.

gether in easy reference form. The book covers static scale aircraft, armour, automobiles, figures, railroads, missiles and space vehicles, and so forth. The second portion of the book is devoted to operating scale in categories of aircraft, boats, cars, railroad rolling stock, and rockets. The third portion provides reference to color patterns. The fourth concerns non-scale models, while the fifth deals with articles on all kinds of subject matter (including, of course, radio controlled soaring). The remainder of the book is an index of book reviews on modeling. It's one thing to save your magazines for that rainy day when you'll want to sit down and read that article . . . It's another thing to find both that "rainy day" and the article at the same time. Now, here's the key to your own library and to other libraries as well. Let's hope successive issues of this index will keep pace with the growing literature.

In a casual moment, Dixon Pratt, of the Torrey Pines Gulls, mentioned that he had some time to spare and wanted to find an interesting construction project. I suggested that he build an RC sailplane from a "U-control" kit. No sooner said than done. Next thing I knew, I was looking at the

48 inch span, P-51 Mustang profile model as offered by Midwest Products Co., of Hobard, Indiana. Naturally, Dixon made some significant changes. He lightened the stab and give it a shaped symmetrical airfoil, with a single double-thickness main spar. He mounted four rechargeable alkaline penlight batteries in parallel in the nose of the fuselage, and the receiver and servos in the wings. Hatches permit easy access. All in all, a neat aerobatic sailplane that looks well when covered, and flies as well as it looks. You've got to try a converted U-control if there's a suitable slope in sight.

Chet Herbert, of Anaheim, California, has been flying a V-tailed Ridge Runner. This craft has swept wings with ailerons. The V-tail operates only as an elevator, thus completing the two-channels required for control. That's all that's needed for truly aerobatic flight. This sailplane is especially light and stays aloft when many of the floaters are scratching for lift.

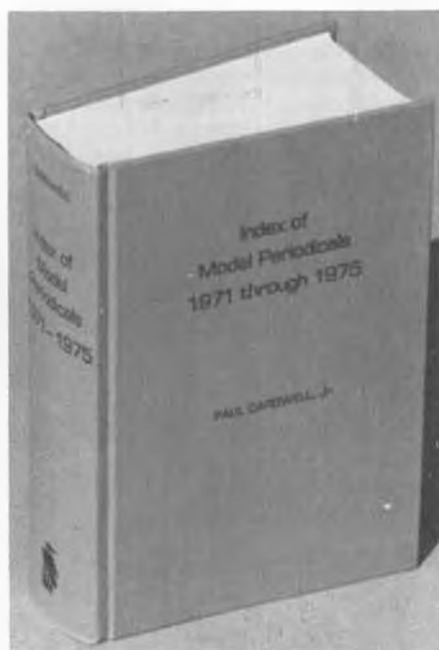
More recently, Chet's been experimenting with biplanes. I know they say that two wings cause too much drag. But why not try it anyway? His first attempt consisted of two cut-down Hobie Hawk wings mounted in

parallel on a rather short fuselage. It's heavy, goes like blazes, and is still very controllable. Of course, there's always the option of removing that upper wing . . . thus reducing the aircraft to a more conventional configuration. According to Chet, a little longer fuselage would have helped.

But that's not all. Chet went on to design, build, and fly an even more unusual biplane, one wherein the wings rotate to provide the required control surfaces. Here the elevator is fixed and the rudder is simply the slender fuselage. The first flight of this bird demonstrated its supersensitivity. It's hard *not* to over-control this craft. But it flew. So, on with improving the design.

Scotty Jenkins, of San Diego, is concerned with the recent rash of international RC sailplane speed records. Going back to fundamentals, he derived an equation which relates the maximum speed to the altitude for different assumed drag coefficient and

Continued on page 88



If you have a magazine library, you need this invaluable index to locate articles.



GLIDER FLIGHT and WINCH BOXES

By FERD CHAPPA . . . A pair of boxes just for the R/C glider enthusiast. In addition to the essential winch box, the author presents a flight box without electric starter and fuel can compartments. Who needs 'em?!

• This glider winch box is a "Plain Jane" heavy-duty unit designed to work hard. It is ultra-reliable and will be on-site, winching away, when most pilots are ready to call it a day.

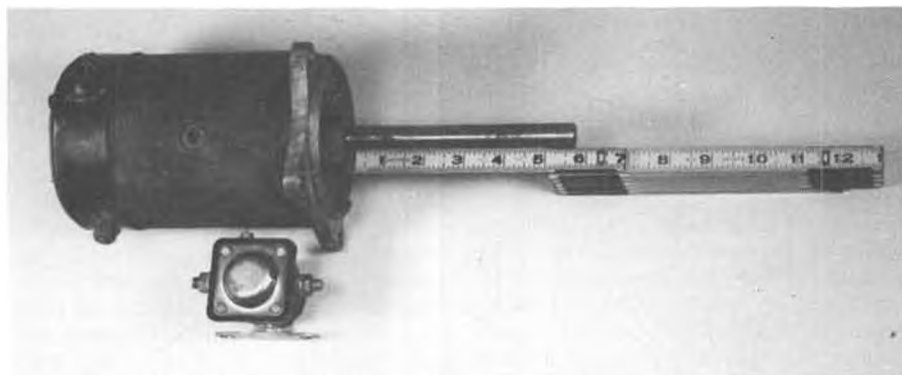
The original purpose of this unit was to be for contest work, and while it is used for that, fliers throughout Florida are using the winch for weekend soaring.

That's the good part. Now for the bad part . . . It's expensive.

"Heavy-Duty" is kind of like "High Performance." Those of us who've bought "High Performance" car, motorcycle, boat, or model airplane equipment know too well that the instant you hang the High Performance/Heavy-Duty label on equipment it triples in price.

Sure, part of it is profit motivated, but part of it is the fact that when equipment is *designed* for abuse, it just plain costs more . . . like this winch box. Look at it. This thing

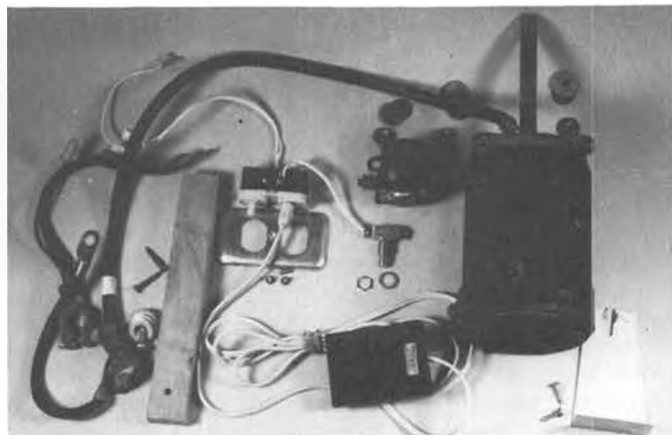
weighs 75 pounds . . . uses a big battery . . . an automobile starter motor to spin the spool . . . and is housed in a sturdy box. When all is said and done, you'll probably have



Ford starter motor and solenoid. Shaft must have a minimum length of 5-3/4 inches, as shown.



Parachute and turn-around are stored in box. Turn-around is made of channel stock and bicycle hub.



The components required for the electrical installation (less battery).

a minimum of \$100 invested and a maximum of \$160 to \$175. That's as much as a completed Open Class glider.

And that's that. No rationalizing, no excuses, no apologies. The box costs some money.

Dollar-wise it looks a lot better as a club project than as an individual project . . . although most of the units in operation are privately owned.

If you aren't scared off yet, here is the building part:

The average RCer can handle the electronics part of this project with no trouble. Building the housing (the box) does require at least basic woodworking skills and some power tools. We won't try to waltz you through Basic Shop I; rather, let us suggest that if you don't have basic woodworking skills, find a buddy who does.

A complete list of building materials is presented at the end of this article.

Study the bill of materials, fill the bill, and transfer the dimensions onto your 4 x 8 sheet of 1/2 inch plywood. Cut your pieces, drill the necessary holes, rabbet the corners, and glue and nail your box together. Then cut the top off. Now, trial fit the hardware . . . don't glue and screw yet . . . just fit and screw. Remove the hardware before you paint or stain/varnish/whatever the box.

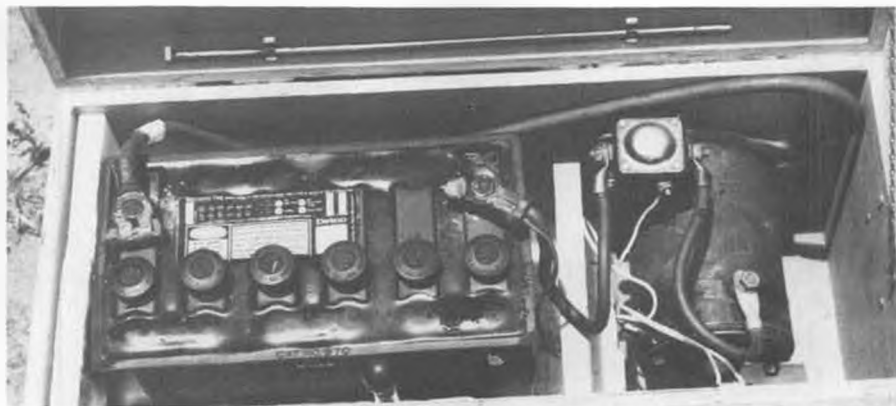
When the box is complete, load it with the proper components as per the wiring sketch.

The only touchy part is the starter motor. The shaft of the starter motor (without Bendix Spring) must be at least 5-3/4 inches in length. It must be this long to clear the 1/2 inch plywood box and still be able to accommodate the spool. Pre-1960 Ford starter motors will work. Others may, but we have only used the Fords, so we cannot recommend alternate starters. However, others may work. Measure them first. Remember, you've got to have 5-3/4 inches of shaft.

If all of this sounds oversimplified, it probably is. This is a project for the SERIOUS and EXPERIENCED modeler. It is not a project for the beginner. If you are new to the hobby and want a unit like this, please get an experienced friend to help you.

Now for the best part! You can use this unit for contest flying . . . personal flying . . . or a weekend with your buddies. You can tow 70 to 80 flights in a strong wind without recharging the battery. A recharge takes overnight and you are ready to go again. This box will withstand such treatment time and time again.

The Pensacola Aeromodelers use



Interior of completed winch box. Note turn-around stake stowed in clips on underside of box lid.



Heavy-duty 8-volt golf cart battery.



Spool and line. See text.

four of these units for their frequent contests, and have yet to record a major failure. Pilot error will snag a unit occasionally, and this will take a few minutes to unravel, but you won't experience major problems with these winches.

Now that you have your winch box all squared away, what you really need is a nifty glider flight box to go with it . . . and we just happen to have such a box in mind . . . stay tuned.

FLIGHT BOX

● Practically every specialty group flying has its own specialty flying

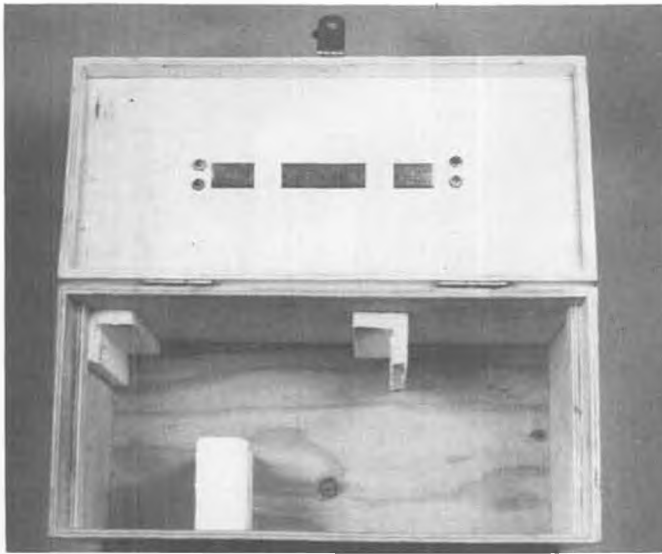
box . . . except soaring pilots. Just what we need is a compartment for an electric starter, a starter battery, or . . . the most useful slot of all . . . a gaping hole for a gallon of fuel!

Rejoice. Here is a practical, SMALL flight box made just for soaring freaks. It will hold your transmitter, rubber bands, frequency flag, stopwatch, compass (heaven forbid having to use it) and the few additional items it takes to enjoy soaring. The box pictured is designed for the sole purpose of being a proper box for glider pilots.

It does all of the above, is very inexpensive to build and will, once



The winch box, ready for the flight line. Foot switch is shown hooked up and ready for use. Pedal stores in box when not in use.



Interior of flight box. Foam blocks secure transmitter.



Bottom portion of glider flight box, with gear in place.

and for all, identify you to the world as a dedicated glider pilot. So, let's build one.

What you need to build this unit is some basic woodworking skill, a couple of chunks of plywood and some hardware. Specifically, you'll need about half a sheet (4 x 4) of 1/4 inch plywood; enough scrap 1/8 plywood to build a tray; one pair of small hinges and one small latch. White glue, Titebond, or Sears Glue is a staple in most modeling workshops as is some sort of finish . . . which doesn't have to be fuel proof.

What you do to build the unit is to cut out the parts as per the sketch, glue and nail it together, cut the top off, finish it, and add the hardware. Tough project, huh? Now, what you need to do is to get out to the flying field where you should have been anyway.

Good luck and good soaring. ●



Small stuff goes in tray which fits in upper part of box. Prevents stuff from getting lost in jumble.



A lot of copies of these boxes have already been built by glider guiders in the southeast.

WINCH BOX

BILL OF MATERIALS

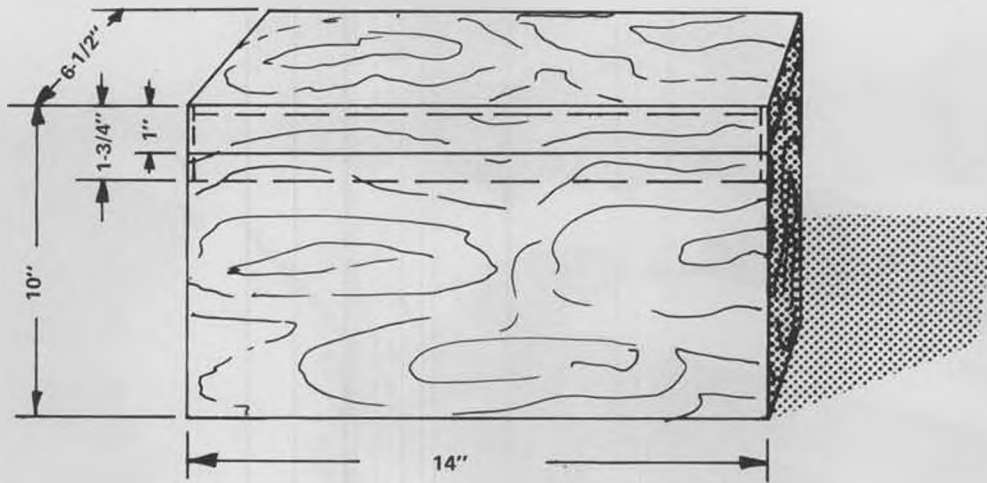
Quantity	Item	Cost
1	Sheet of 1/2 inch 4 x 8 plywood (interior grade)	\$12.00
1	Battery . . . 6 or 8-volts	35.00
1	Pre-1960 Ford Starter Motor	10.00
1	Ford Solenoid Starter Switch	8.00
1	Winch Reel	25.00
1	Set Battery Cables (short)	4.00
1	Set of Handles	2.50
1	Pair of Flush Hinges	1.50
1	Small chunk 1/16 aluminum scrap	NC
1	Switch w/faceplate	2.00
1	Remote Foot Pedal	5.00
3	Carriage Bolts (@ .25 ea.)	.75
	Assorted nuts, bolts, screws, chunk of styrofoam, etc.	NC

In addition, you will need a Turn-Around @ \$12.00, 2,000 feet of #15 (129 lb. test) Seine line @ \$4.00; a parachute @ \$2.00; and some grommets at a dime or so each. Support material is about \$18.00.

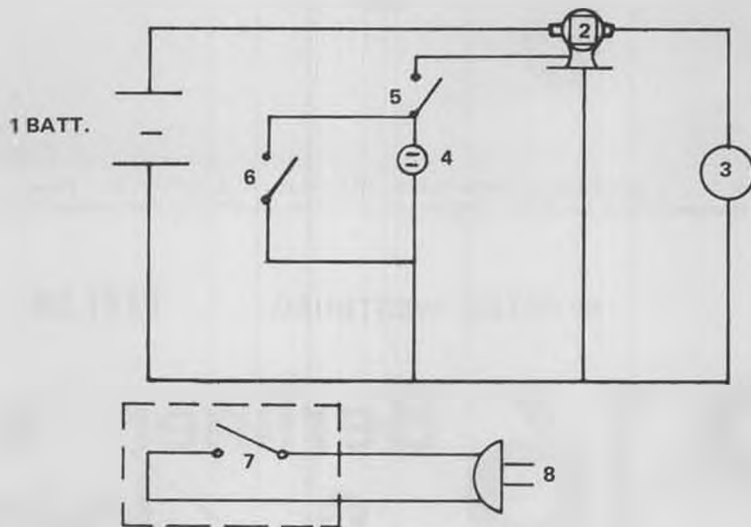
Also nice is a Hydrometer @ \$1.50, a battery terminal cleaner @ \$1.50; a Battery Carrier @ \$2.00 and, of course, a Battery Charger at \$35.00.

Basic Components	\$107.75
Accessories	68.00
Total	\$176.75

GLIDER FLIGHT BOX

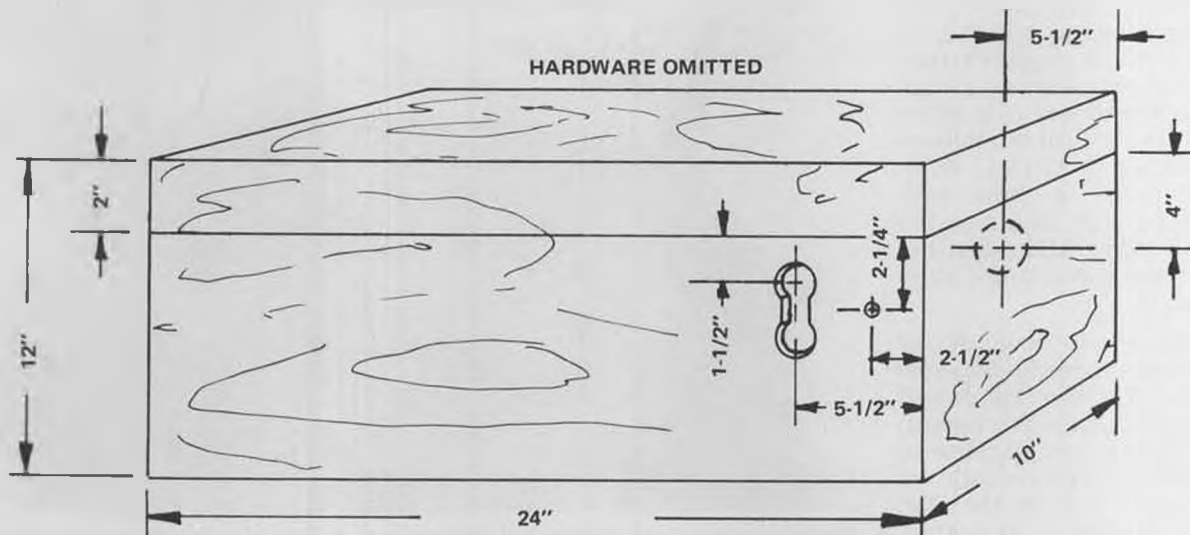


BOX CONSTRUCTED OF 1/2" INTERIOR GRADE PLY. TRAY 1/8" PLY.



- WIRING LEGEND**
- 1) SIX; EIGHT; OR TWELVE VOLT BATTERY
 - 2) SOLENOID - 6v FOR 6 OR 8v BATT. OR 12v FOR 12v BATT.
 - 3) 12v STARTER (SEE ARTICLE)
 - 4) AC RECEPTACLE FOR FOOT SWITCH
 - 5) ARMING SWITCH
 - 6) RETRIEVER SWITCH
 - 7) FOOT SWITCH
 - 8) FOOT SWITCH PLUG

WINCH BOX





Most often seen 1932 PR photo of the P-16 was this captioned, "... it is being flown above the clouds by Capt. A. B. Ballard, 94th Pursuit Squadron, Selfridge Field." Six P-16's flew from Selfridge to Rockwell Field, San Diego, and return on a cross country test and training flight.

THE

LEAN, MEAN,

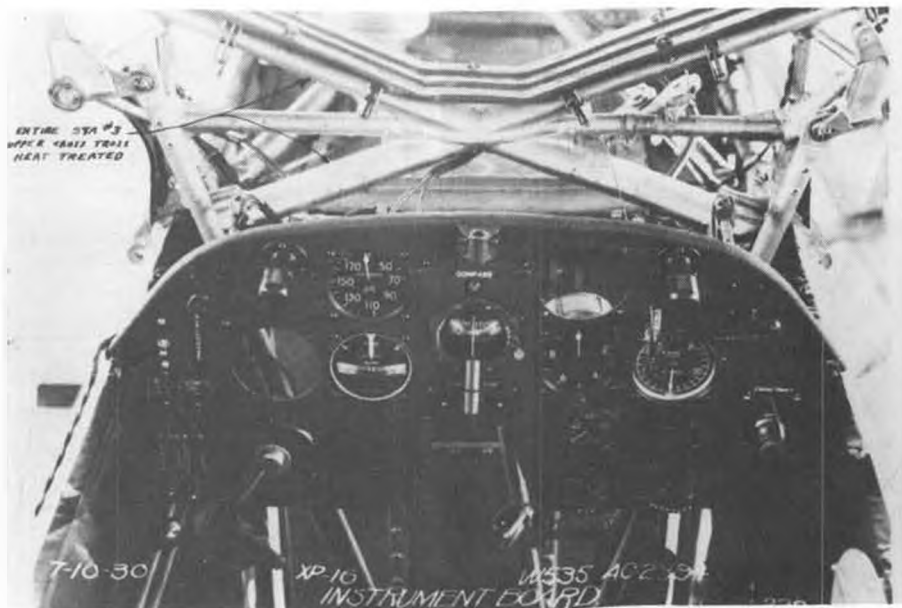
by PETER WESTBURG

PART ONE

P-16 Berliner Joyce

• Towards the end of WW I, military airplanes flew at about the same speed... a hundred miles-per-hour or slightly better. No one fighter possessed a great edge in speed; he could hit, but he couldn't run, because the enemy was just as fast. This limit on speed was one of the reasons for the classical dogfight of airplanes milling in circles, dives, and zooms, trying to shoot each other down. In such an arena, the two-seater fighter had a distinct advantage, since it could fire aft as well as forward.

No one needs to be reminded of two of the most successful two-seat fighters of the War, the Halberstadt CL II, and particularly the famous Bristol F2B Fighter, an airplane so respected that German fighters would not attack it from the rear, and usually avoided it altogether. The idea of a fast, deadly, two-place



Pilot was well equipped with standard instruments of the time. Gun charger handles in upper left and right corners. Aileron control rods go to cranks in gull aft of rear spar.



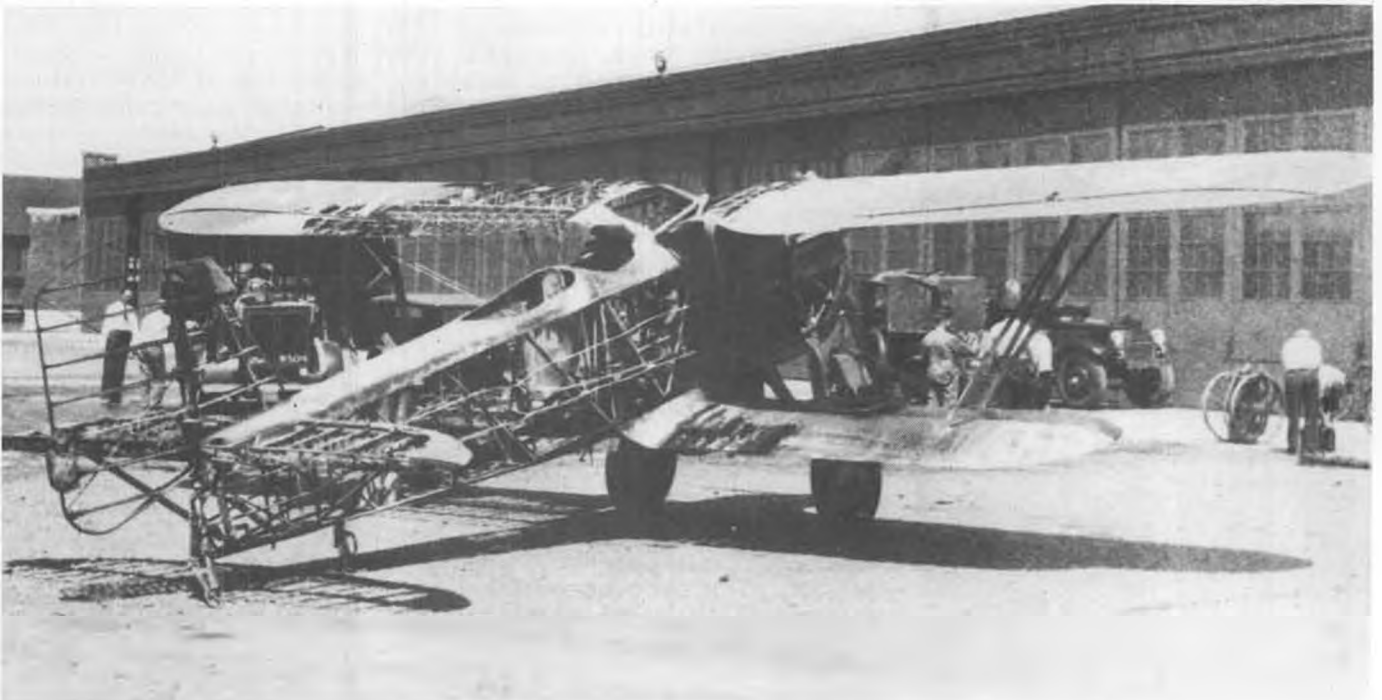
The one-only XP-16 was completed October, 1930. Supercharged Curtiss Conqueror of 600 hp gave the two-seater a top of 183 mph at 10,000 ft.

fighter persisted in most air forces long after the War. In the U.S., the Army Air Service tried with no success to develop the Thomas Morse TM-24, but the airplane was a notable failure, not even earning a military designation. Good ideas die

hard, bad ones even harder. In April of 1929, the Air Corps held a design competition for two-seat fighters, and in June, the new Berliner/Joyce company won a contract over its prestigious rivals, Boeing and Curtiss.

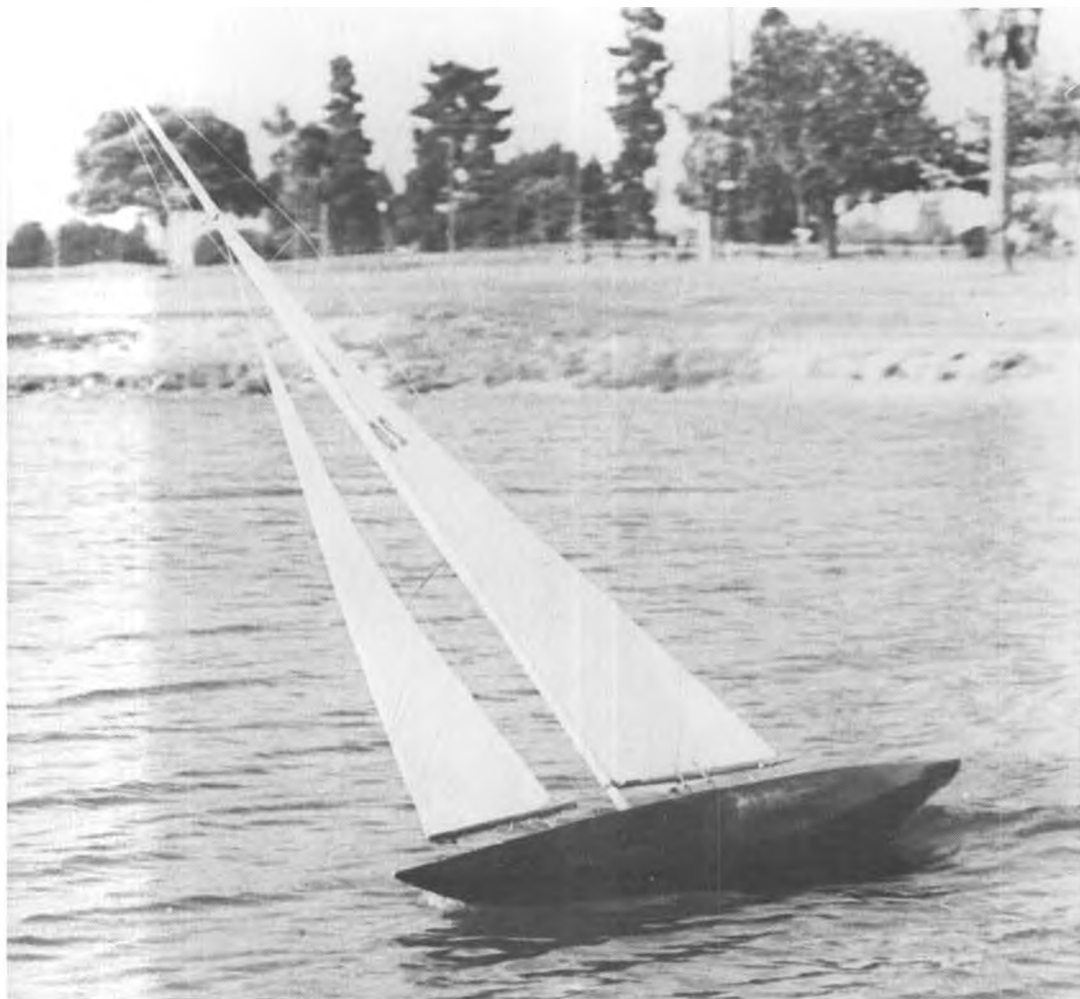
Henry Berliner was well on his way to developing a successful helicopter at his small factory in Alexandria, Pennsylvania, when Lindbergh flew the Atlantic, and suddenly, no one was interested in

Continued on page 83



Circumstances of the flash fire that ruined this P-16 are unknown. Can anyone shed light on the happening? Maybe a frantic scale modeler wanted to get a better look at the framework details!!

STRICTLY SAIL



By ROD CARR

Chuck Black's Newport 12-meter displaying a beautiful set and trim for beating to weather.



Way too much twist in these EC/12's sails. More tension on both sheets, as well as main vang, required.

● These words are being written just as 1978 waltzed in the door. It is traditional for such events to trigger a schmaltzy look back, a news reporter report to the nation, and finally a somewhat rosy and optimistic look into the future. Traditional though it seems, it might not be a waste of these pages, nor our time, to do just that.

SCHMALTZY LOOK BACK

R/C model yachting came into existence in early 1970, with the banding together of 9 fellows who agreed to contribute their efforts toward the betterment of sailing small boats for fun. The writer packs AMYA No. 2 on his membership card, so I was there from the start. In the ensuing 8 years, I have watched the sport grow to its present size. I suppose I have watched with some envy and some sadness as more and more folks joined, raced, and melted away, never to have spoken or written to me while engrossed in the sport. In the early days, with 200 members, AMYA was a really chummy place. You could get off a plane in just about any town, pick up a phone and be sure of a free dinner, a lot of talk about sailing, and a warm feeling in your gizzard when

you said good night. A lot of that old nucleus is still around . . . the greater portion still pulling an unfair share of the load as AMYA Directors, Class Secretaries, or Club Newsletter Editors. A case in point is Dick Hein, AMYA president. Unless I've blown it, Dick has served AMYA continuously in some major capacity since 1970, when he was annointed as one of the "Chosen 9". He definitely holds the record!!!

The early days were certainly ones of ferment. There were some knotty issues to solve. Should skippers be allowed to walk along the bank with their boats, or should they be confined to a compound like so many antenna-toting cattle? How close should our 50/800 rules be to the requirements of the IMYRU International M Class? Is a hull a boat? Do little squares in a hull automatically preclude registration problems? Many are still debated . . . like "When is a one-design not a one-design?" "Where do I register an Endicott Racer?" (If you know what that is, you have been in this game as long as the author!)

Does all this nostalgia tell us that the good old days are gone? I think not. We are still addressing the same

basic set of problems faced by the founding fathers. How do we get and keep skippers so that the maximum enjoyment can be extracted from the sport? Such a question needs to be interpreted by each and every fellow in the hobby. Just what is meant by enjoyment? Is it building? Is it designing? Is it racing? There could be as many answers as there are skippers.

REPORT TO THE NATION

Where are we today? Well, from the statistics that are leaked by the AMYA Secretary, AMYA has stabilized at about 1500 to 1700 skippers each year. The following year, only about 2/3 of those renew their membership. If we assumed that the renewal was a random process, then the next time, only 2/3 of the 2/3 remaining would have renewed; 4/9 of the originals are left in the 3rd year. Since that 2/3 figure has been kind of stable over the life of the AMYA, and we are now in our 8th year, a quick calculation shows that approximately 5.5% of the original 1970 membership might still be associated with the organization. $0.055 \times 165 = 9$ folks!!!! I swear I didn't know that when I wrote the preceding paragraphs. I'm sure the mathematicians among you can do a little detailed work on that.

As of the 1977 Annual Meeting, the AMYA Secretary reported the following: Total Membership: 1355. Total Boats Registered: 2005. The class sizes were as follows:

50/800	828
36/600	307
EC/12.....	229
S/B OD	197
SOLING OD	86
STAR 45	73
N/12	69
OPEN.....	63
10-rater	62
A-Class	33
Magnum OD.....	26
J-Equally	26

Equally interesting, was the discovery that out of 1355 members, only 334, or 25%, took time to vote in the annual balloting for officers. (Don't complain! AMA seldom gets over 10% voting response nationally. wcn)

Take a look at the boats you have stabled in your shop and compare them with the population statistics given above. Have you done anything at all to help your class grow??

The major difference between those of us who are sailing types, and both the hydroplane and aircraft boys, seems to be in the longevity of our vehicles. In the past 8 years, I've only heard of one sailing model irretrievably sunk ... that was a scale of EMMA BERRY, at that. Since sailboats last so long, there is



That famous profile . . . not his . . . the hull!! Dave Forsman photo.



Ed Michell and 9/10 inch = 1 foot Intrepid model. Lots of room for a genoa jib winch. Dave Forsman photo.



Forever Orange, a 10-rater of English design, built by John Krick, of Glenolden, Pa.

not the market for replacements like our louder and more daredevil counterparts. The result is a similarly reduced size of supply for hulls, fittings, and so on. Having kitted winches, full EC/12 kits, and now being in the sailmaking end of it, I can speak with authority on the small size of the market that is realistically available. A potential manufacturer is going to need a

bigger audience for his wares than is offered by the sailboat market. We can only thank the likes of Vortex, Crump, Dumas and the rest, for providing our needs for the past seasons.

The 1978 Preliminary Regatta Schedule seems a good indication of the continuing activity in sailing

Continued on page 99



Hughey Boats Propeller Pitch Gauge, comes complete with all parts, instructions, and MPH speed chart.



Measuring blades to check for equal cupping.

R/C POWER BOATS

By BOB PREUSSE



● An open deep vee class has been added to the events to be raced at the World's Championships to be held August 2 through 5 at the Kent Lagoon, south of Seattle, Washington. The deep vees will join the R/C Unlimited and R/C OPC tunnel boats previously slated to race. The World Championships for R/C Unlimiteds, R/C OPC and Deep Vees is hosted by a group of model boaters from the Seattle area. Wednesday, August 2, and Thursday, August 3, have been set aside for testing and qualifying for fast lap prizes. The deep vees and outboards will race on Friday and the R/C Unlimiteds will race on Saturday.

The deep vee boats may use any engine up to 22.009cc (that's A through X classes in NAMBA). All engine classes will be raced together in just one deep vee class. The boats will race two heats. Each heat will be 10 minutes in duration. Winners will be determined by total laps accumulated in the two heats. A special grand prix for the top boats on each frequency (up to eight) will be held on Saturday. The deep vees will run an irregular course. NAMBA rules pertaining to deep vees will be followed. Although scale drivers will not be required, those participating are encouraged to strive for realism. There will be scale judging, and trophies awarded for the best scale-appearing deep vees.

The R/C Unlimited race will fea-

ture three qualifying heats leading up to a six-boat winner-take-all final heat. There will also be at least two consolation heats for other top qualifiers. NAMBA rules applicable to the R/C Unlimited class will be in effect. The running of the race will attempt to reflect a full size unlimited race. There will be a scale judging prior to the beginning of racing to pick the best scale model.

The R/C OPC tunnel class will be restricted to stock outboards not exceeding 3.5 cc. Since NAMBA does not currently recognize tunnel hulls as a separate class, this part of the event will not be NAMBA sanctioned. However, all NAMBA racing rules will be in effect. The R/C OPC tunnel boats will race in four heats. Each heat will be five minutes in

duration. Winners will be determined by total laps accumulated in four heats of racing. There will be a grand prix for the top boats on each frequency (up to eight) on Saturday. There will also be scale judging for best appearing model tunnel. A scale driver is required.

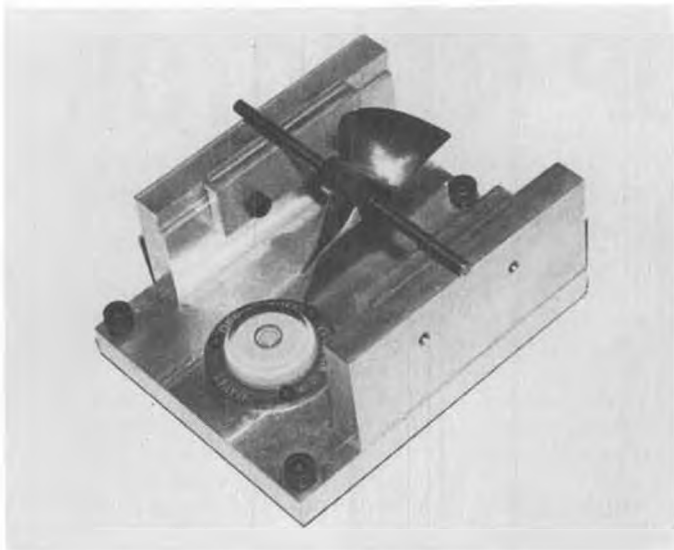
More information on the World Championships for R/C Unlimited, R/C OPC and Deep Vees can be obtained by writing or calling Jerry Dunlap, 6702 Mt. Tacoma Dr. S.W., Tacoma, WA 98499, or (206) 584-7131.

PROPELLER POINTERS

G.P.P.E. is the password of successful boaters. Of course, many factors are needed to build a competitive entry; however, near the



Heating a prop with propane torch is part of softening treatment so that blades may be cupped and sharpened.



An excellent prop balancer made by Charlie Pottol, of Saratoga, California.



A good set of jeweler's files is used for sharpening the leading edge.

top of the list should be "good propeller performance and efficiency". The model boater of today has the largest selection of props, prop maintenance items, and measuring devices ever in R/C boating, thanks to people like Tom Presentka; of Octura Models, Jim Gale, of J-G Products, Ed Hughey, of Hughey Boats, Dee Hughey, of Dial-a-Prop, and, of course, Ed Kalfus. To cover all aspects of this phase of our hobby and to do justice to the products available, would not be possible in one article, so, at this time, let's go over several pointers to help you in the areas of propeller selection, reworking propellers, measuring pitch, and balancing.

PROPELLER SELECTION

Selection of the right prop can be a frustrating experience for the beginner. On second thought, it can be costly, time consuming, and difficult for anyone; because strut depth, sponson depth and angle of attack; size of boat, weight, and balance point; engine size and rpm, are all variables that affect propeller performance. With this in mind, here is a chart that will give you guidelines according to engine sizes and hull type which may help you with prop selection. Remember, these guidelines are based on the assumption that you are using stock props.

Two of the model boater's main sources for ready made propellers are Octura Models and J.G. Products. Octura Models, 7351 N. Hamlin Ave., Skokie, Illinois 60076, has been in the prop business for a number of years, and through careful design and testing stocks, offers 41 different props, with most available in glass filled plastic, beryllium copper, and silicon brass. Octura produces both left-hand and right-

ENGINE SIZE	HYDRO	MONO
.049	Dumas: P-39B	Dumas: P-39B
.09	JG: A-7	JG: A-7
.19	JG: E-20, F-20, G-20, F-22, G-22, F-25, G-25, J-30	JG: A-7, C-7, C-20, E-20
	Octura: 1.6, 1.8, 2.0, 1445, 1450, 1455, 1950	Octura: 1240, 1440, 1435
.40	JG: I-25X, I-25, H-27, I-27X, I-27, I-30, J-30, J-35	JG: F-20, G-20, F-22, G-22, F-25, G-25, H-25, H-27
	Octura: 2.2, 1455, 1460, 1462, 1655, 1955, 1957, 2050	Octura: 1445, 1450, 1245, 1250
.60-.71	Octura: 2.4, 2.6, 2.8, 1465, 1467, 1470, 1567	JG: I-25X, K-25, I-27X, I-27, I-30, J-30, J-35, 3I-22
		Octura: 1455, 1457, 1460, 1462, 1655

hand (in some sizes) props for those twin-engine counter-rotating applications. Most boaters use the b.c. props because of their workability, strength, and good shaping and polishing characteristics. However, there is a cost advantage to using plastic props during the trim stages of most monos. When trimming my twin .60 Dumas Deep-Vee, I started

plastic 1455's, 1457's, and 1462's. I found the 1460's worked the best, so then I got a pair of 1460's in b.c. That saved a good deal of money, yet I still tested several size blades.

I also recommend trying some beryllium copper props from J.G. Products, 8030 Fordham Road, Los

Continued on page 94



Dial-a-Prop has the mandrels for cupping blades. They are also useful for straightening bent blades. See text.

1914 LATHROP TRACTOR

By GENERAL (2-Star) DAVE STOTT, F.A.C. . . . Bypassing the convenience of the modern hobby shop, our author relived the difficult experiences of obtaining modeling materials just as WW I was beginning.

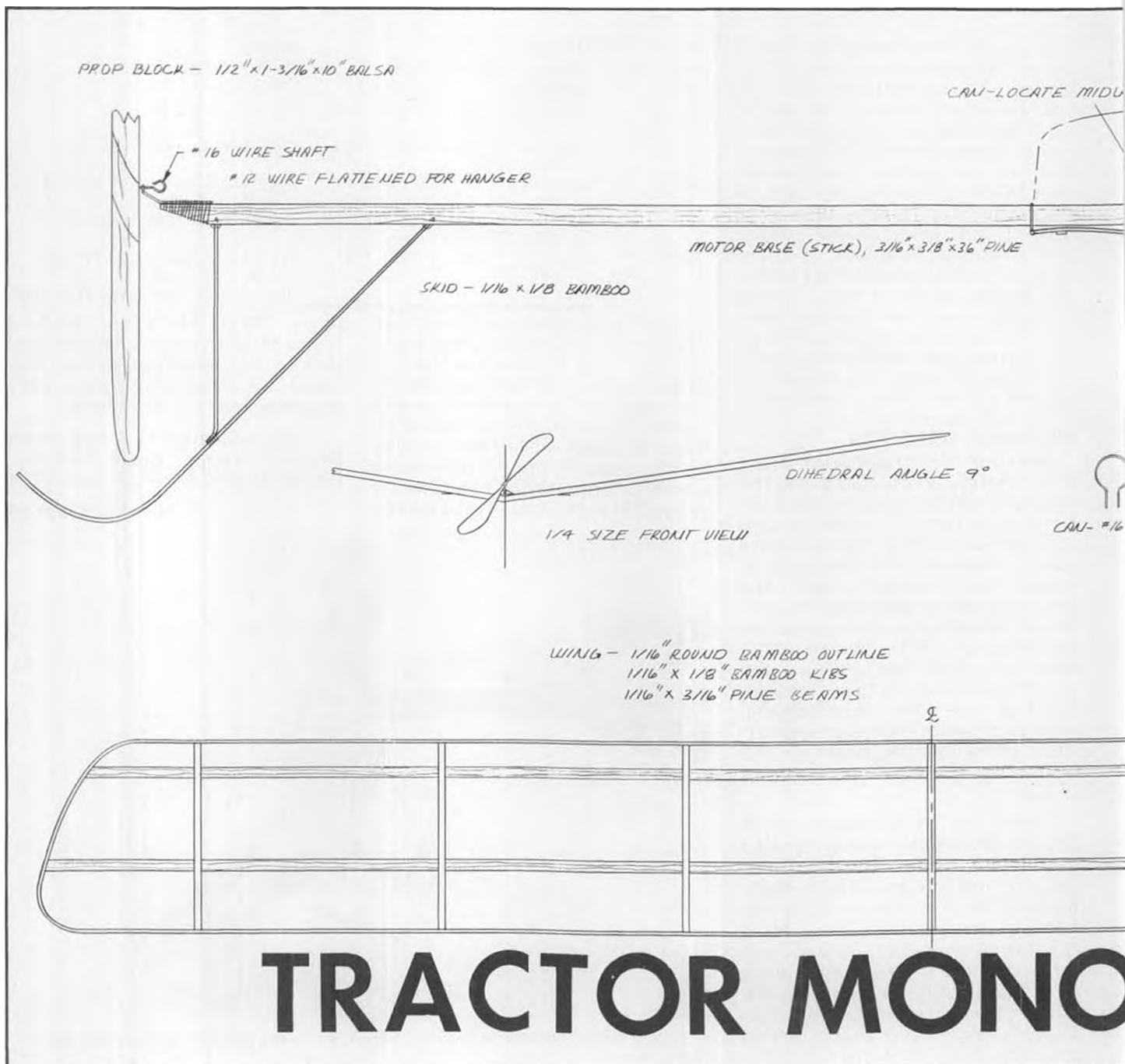
• While browsing in an antique shop, I came upon a book for boys entitled, "Flying High". It contained fiction stories on aviation, interspersed with plans to build some really old models. Of course, I bought the book. Sure, I read some of the stories. Naturally, I perused the plans. That is when I got to thinking. How was it to build a flying model back in those times, with no local hobby shop to run to for supplies and advice? When aviation

itself was very young. How was it to be one of the lonely pioneers in aeromodeling? I thought I might recapture some of the trials and tribulations of that era by building a model from this book. By building it as closely as possible to the original, even though knowledge gained over the years would tend to lead me off the purist course.

Although there were no hobby shops back in 1914, there were mail order houses where supplies and

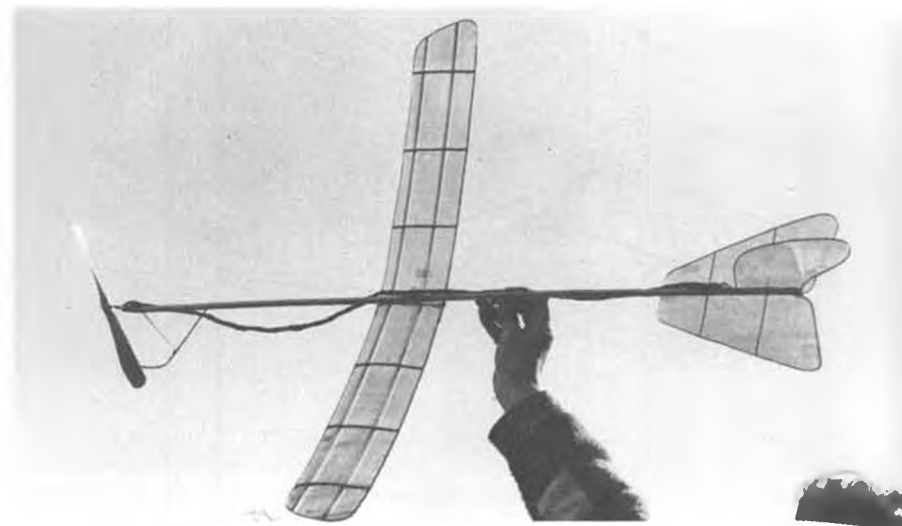
even complete kits might be purchased, like the Ideal Aeroplane and Supply Company and the Wading River Manufacturing Company. But boy, the prices for complete kits! Not for the son of Mr. Average Man in the U.S.A. back then! But the cost of some covering material and rubber might well be had by a determined lad, in time.

The model builder of those times had less distractions to contend with. There was no television, radio,

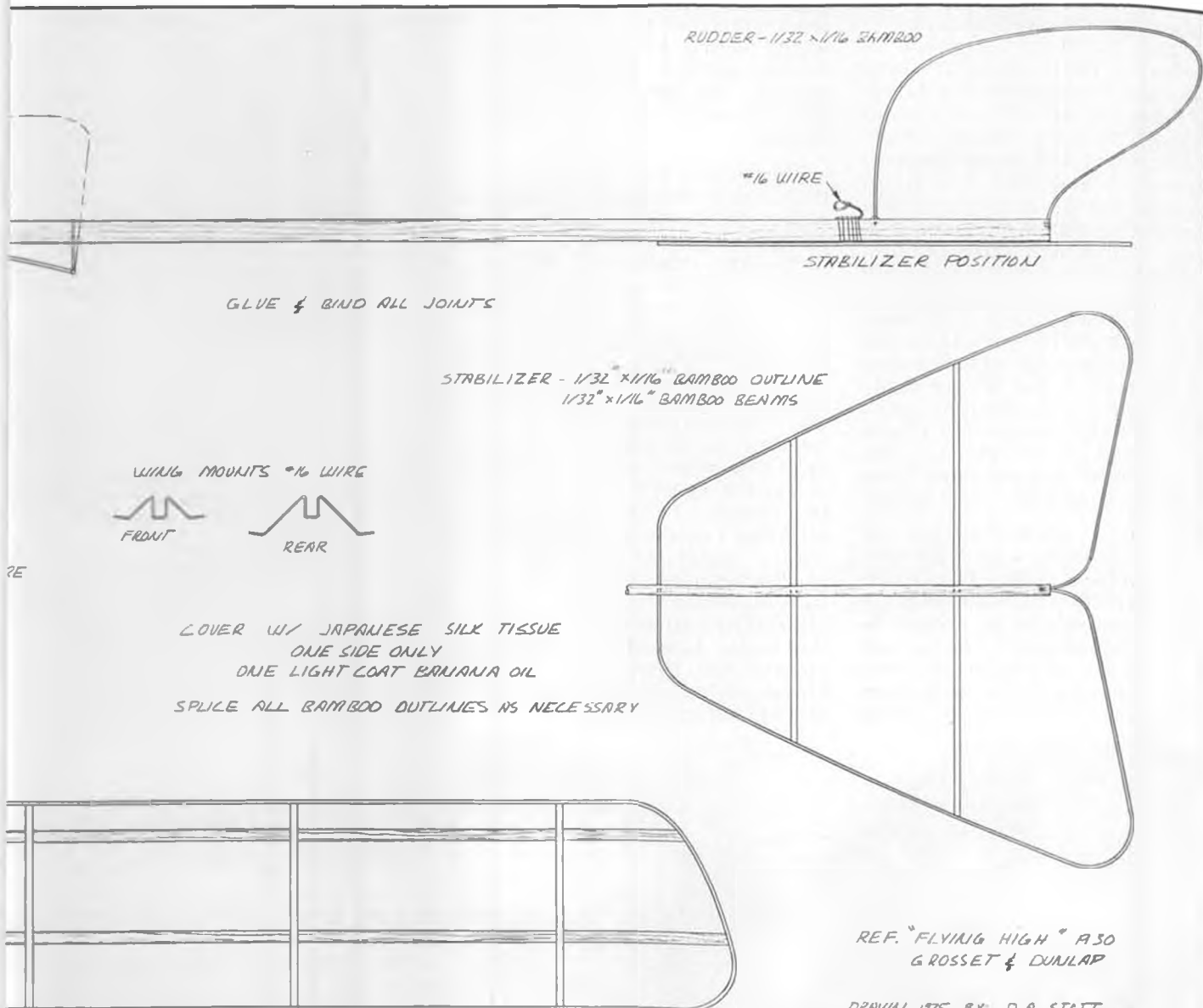


and in many cases, no family car. And, if he was indeed lucky, the library might have a copy of "The Boy's Book of Model Airplanes", by Francis A. Collins, to aid him in his task. This book gave valuable information on how to split bamboo, make a laminated propeller from cigar box wood, and much more.

If he lived in a large city, he might not even be a lone eagle, for model aero clubs were being formed. One such club was the Illinois Model Aero Club. It was to this club that Donovan Lathrop belonged when he designed the tractor monoplane described in Flying High. The straight forward design of this ship struck me, as did the fact that it was a tractor in an era of twin pushers. This was the model for me to try to build while heady with nostalgia.



How they looked in 1914. Excessive dihedral is caused by contraction of translucent gold-beater's skin covering in winter temperature. Simple structure is evident.



REF. "FLYING HIGH" #30
GROSSET & DUNLAP

DRAWN 1975 BY: D.A. STETT
TRACED FOR M.B. BY: SA. PATRICK

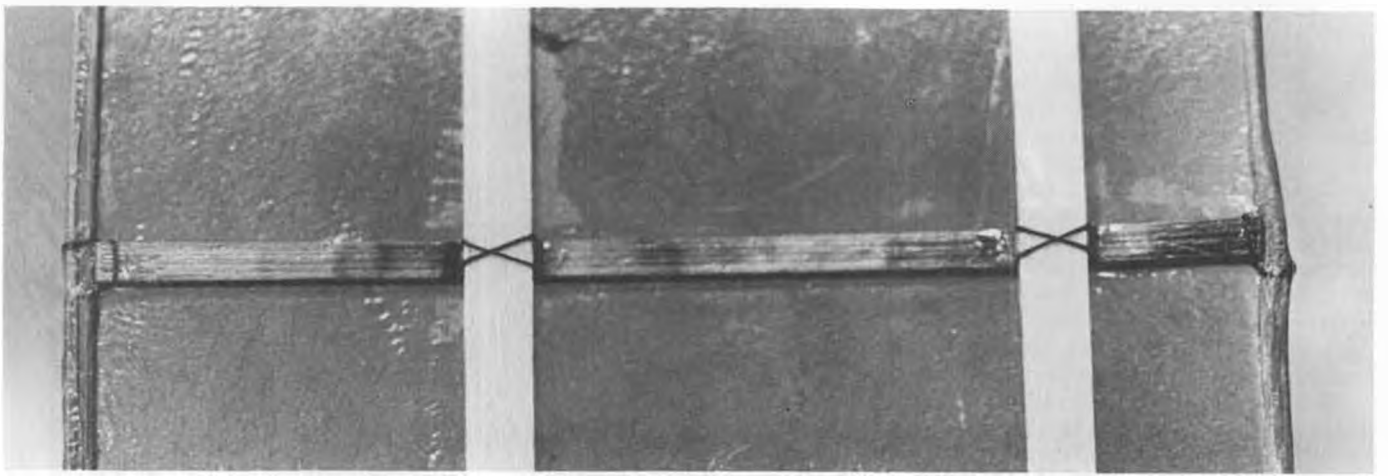
0 1 2 3 4 5 6
inches

MODEL BUILDER magazine
621 W. ANIMETZEA LN. ST.
COSTA MESA, CALIF. 92627

Plan No: 24782

PLANE

A 1914 DESIGN BY ILLINOIS
MODEL AERO CLUB MEMBER
DONOVAN LATHROP



Section of wing, showing thread lashing on structural members. Note node on bamboo leading edge at rib juncture. Save those old porch blinds!

Rounding up all the materials was the first task. Piano wire, thread, rubber, and balsa were no problem. The plan called for white pine for hardwood parts. As I had some basswood, I substituted this. Japanese tissue was called for as a covering material, but I thought I might go one better and use goldbeater's skin purchased from Old-Timer Models. For glue, Ambroid was used on the original. I decided to go a step farther and make my own by dissolving an old celluloid drafting angle in acetone. Bamboo in 12 inch lengths was found in gift shops under the guise of Fondu forks. The bamboo in longer lengths for wing and tail outlines harried me until I came upon an old bamboo porch blind. Not the best grade of bamboo, with plenty of bulging nodes, but I thought Donovan must surely have had as much trouble in his day.

The plan is self explanatory, but let's go over things a bit to be sure. The motor base, or stick, is cut to the dimensions shown. Small holes are drilled into the stick to receive the bamboo skid assembly. The can and rear hook are bent from .040 wire. The prop hangar can be made from a flattened nail, cotter pin, or strip of

brass, if bashing a piece of .062 music wire sounds like blacksmith work rather than modeling. The end would have to be annealed before drilling, anyhow. Glue thoroughly all joints, and lash with thread. Give the completed stick two coats of lacquer.

The tail is built as indicated on the plan. Use a soldering iron as a heat source for bending bamboo. You can lay the strip of bamboo directly on the iron, moving it steadily back and forth while applying bending pressure. As the iron gets hotter, move the bamboo farther up toward the handle. Once this area becomes too hot, simply unplug the iron and begin working your way down toward the point to do your bending. A little practice and a mile or so of bamboo is all that is needed to get the knack!! Don't feel bad. Donovan Lathrop probably scorched a mile or so of his bamboo over a candle, or gas lamp. Two small holes are drilled in the motor base to receive the rudder outline. The rudder is covered after gluing to the motor base. The stabilizer is covered first, then glued in place. Once again, lash all joints with thread, and coat with glue.

The main plane, or wing, is built as shown on the plan. The 1/16 round bamboo outline takes a bit of time to prepare. Once the bamboo is stripped to a 1/16 square size, it must be scraped or sanded to a round section. Scraping should be done with a knife or piece of glass. It is rather puzzling why Lathrop made his wing ribs so beefy, but for the sake of purity, I followed his specifications. Mark the spar locations on each rib, as the spars are added after the wing ribs are glued to the leading and trailing edges over the plan. Add dihedral, lash all joints, and smear with glue. Cover the wing. Bend the wing mounts to the shape shown on the plan. Be accurate in this, as it affects flight quality. Glue, lash, and coat with more glue. Be sure you have located the wing mounts correctly by slipping a piece of balsa wood the same size as the motor base into them and eyeballing the whole rig.

Now, whether you have covered your wing with tissue, goldbeater's skin, or silk, DO NOT water shrink the covering. You will end up with pretzels!! Simply give the covering on both wing and tail a couple of coats of clear lacquer . . . Not dope, but lacquer . . . Lacquer does not shrink, therefore chances of warping are reduced considerably.

The only balsa wood called for on this model is the propeller. The prop is carved from a Langley-type blank cut from a block 1/2 x 1-3/16 x 10 inches. A Langley type blank is laid out by simply drawing two lines from corner to corner on the 1-3/16 face of the block, crossing them at the center. Drill the shaft hole at the center, and pencil in a pair of curved lines either side of it to outline a hub about 1/4 inch wide and 1 inch long. The block is now cut to this outline. Begin carving by doing the back of each blade. Next shape the outline of each blade similar to that shown



Hot soldering iron is used to bend bamboo. Keep bamboo strip moving to prevent scorching. Proctor kits are about the only place you'll find bent bamboo in modern model construction.

on the front view of the plan. Now finish carving the blades to about 1/16 thickness. Balance and give the prop three coats of lacquer.

Form the prop shaft of .040 wire, insert it through the prop hanger, add a brass washer, glass bead, and another brass washer. Then push the prop on over the shaft, bend the shaft over 90 degrees about 1/4 inch from the end. Glue the shaft to the prop thoroughly. There was no free wheeling in use in those days, hence none on our model.

Time to engine up! Form an "S" hook of .040 wire. Slip a piece of plastic or rubber tubing over the end to receive the rubber, and the prop shaft hook as well. Make up a six-strand motor of 1/8 F.A.I. rubber thirty-three inches long. Lube it and string it in place. Old-timer, it is time to fly!

According to the book, "Flying High", the Lathrop weighed in at 1-1/8 ounces. I felt I had built mine pretty much in accord with the specs, yet it weighed 1-1/2 ounces. I guess modelers are like fishermen. The fisherman always makes his fish a little longer and heavier than it really is. The modeler tends to describe his model as lighter than the truth.

My model flies best with the wing positioned about 1/4 inch farther forward than the plans shows. It seems to be necessary to have the glide just a bit on the nose-heavy side to keep the bird from stalling under power. Turn capacity is about 1,400, which is pretty good. I have not yet tried a longer motor, as the set-up described allows for a decent glide. A longer motor may bunch at the rear and destroy the glide.

Flight path is not consistent. She is a wanderer, but it seems not to affect duration. One bugaboo showed up in flight that you just have to live with. When the wind gets about 10 mph or better, the old bird develops wing flutter that takes her all the way down to terra firma! So, keep her in the hangar when it is kicking up outside.;

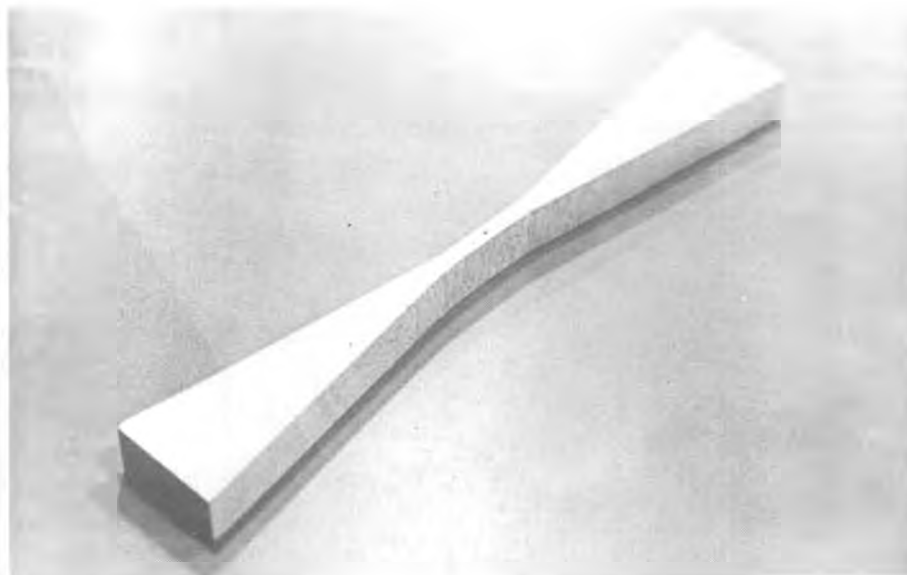
Does she perform? Well fellas, Donovan Lathrop set an official world's record for hand launched tractors in 1914 of 240 seconds, with this slender sky buggy, that stood for ten years! I haven't been as lucky with my replica, but she did win first place in rubber endurance in the 1977 SAM East Coast Champs. Maybe you ought to find out for yourself. The odors of hot bamboo and homemade glue are worth it in itself. Truly, the modeler's opium.●



"S" hook will not walk or climb off this simple rear hook. Model is wound from the rear.



The only balsa wood used in this ancient bird was for the prop.



A Langley-type propeller blank, ready for carving. Blade thickness should not exceed 1/16 inch when completed.



Bob Haight, the Vegas Vulture, ran this meet for the 9th consecutive year.



Herb Sweet and Tom Atkinson judge Walt Mooney's Morane. Model built night before.



Walt Mooney winds Morane while wife, Carol, helps. Walt complained of headache. Strange . .

Las Vegas, New Years, and Peanuts

By BILL WARNER . . . Las Vegas is now famous for the Tournament of Champions, but lively model airplane competition of another sort has been going on there for nearly a decade. And how do you measure fun?

• "What're you doin' for New Years?" asks an old colleague of mine who has just announced his plans for a lovely year-end vacation in Mexico. "Going to Las Vegas," say I, watching his expression, "to fly toy aeroplanes." A look of wonderment passes over his features. "Sure wish I could go with ya', but I promised the wife last year. . ." I put my arm around his shoulders and offer him my handkerchief to dry his tears. "Maybe next year. . .", I offer. "Yeah," says he choking back a sob.

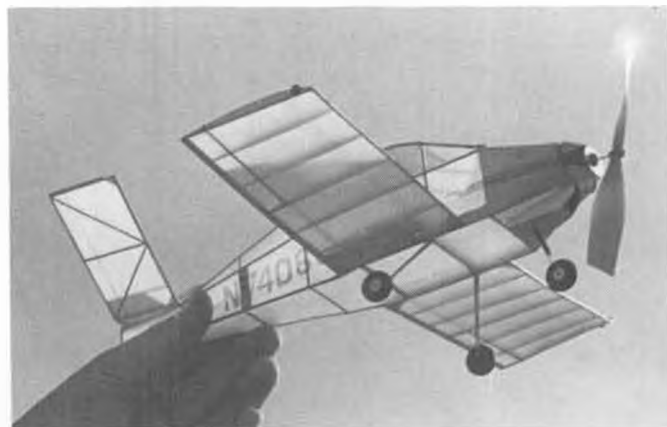
What my friend was missing was, and is, one of the most unique events of the modeling year, the Vegas Vultures New Years Peanut Bash. Due to extremely variable weather conditions and often high winds, the meet has been held in the desert, in an airplane hangar, round-

the-pole in a large room, in a gymnasium, and on a junior high playing field. One of the features of the meet is that it is difficult to plan ahead! Also, the bottom line on the Peanut Handicap Rules chart is "Rules Subject to Change Without Notice." Once, a contest which was underway indoors moved outdoors when the wind subsided! No place for someone who takes his competition seriously! Then I remember the look of amazement on Fernando Ramos' face when he was asked his age and told that it would be subtracted from his flight score. No flight is official unless your dome is crowned with a New Years' funny hat, but you may fly as often as you wish.

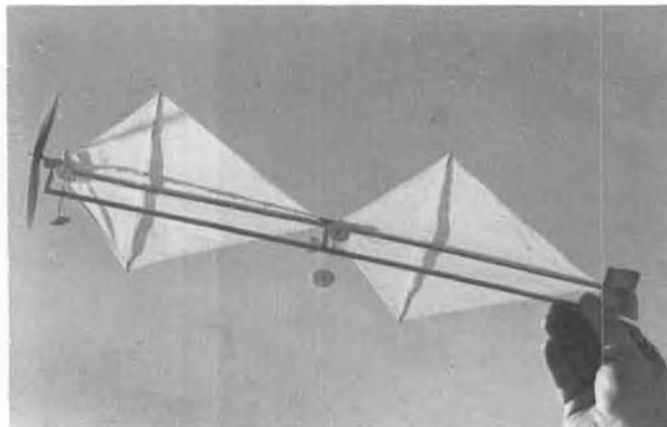
A couple of days before New Years, cars laden with boxes, beer,

and building supplies, begin arriving at Head Vulture Headquarters (Bobby and Doris Haight's). New models are begun in Bob's spotless, tidy workshop (*If you've ever seen it, you know that the author lies a lot! wcn*) and a running bull session, songfest, and idea swap session gets underway. From time to time, breaks are in order for model movies or slides, Doris' superb cuisine, or trimming sessions at 1 a.m. under the street light. About 3 a.m., one begins stumbling over bodies in sleeping bags on the way to the trimming site. Even the neighbors are used to having someone rap on their door at midnight asking if it's okay to get a model off the roof!

The contest itself this year got underway to a superb day with no wind and T-shirt temperatures. Two



Mike Mulligan's Davis Peanut sparkles in the morning sun. He and Clarence Mather have perfected design to be a 5-minute beater.



Bill Stroman's 1909 Windham Tandem Monoplane. Model flies better than the real plane (which didn't!). Lots of wing area.



Fine Thulin Swedish monoplane by well known Bob Peck, Peck-Polymers. Entered in CO₂ WW I event.



Chrislea Bee Mooney (named after aeroplane, of course) and Uncle Robin, Walt's brother. Says its only 3rd model he ever built.



Walt Mooney's delicate Bleriot 4.



Sopwith Tabloid by Mike Mulligan, quietly cruising around at scale speed, low altitude.



Bill Warner's CO₂ Avro 4 is all sheet balsa construction. Foam wheels.

events in addition to the Peanut were CO₂ triplane and CO₂ World War One. CO₂'s don't do so well in the early morning, tending to frost up and sputter, so the air was filled with the tiny rubber-powered gems until Hung, God of the Almighty Thermal, began his act.

A friendly side competition to try and beat Walt Mooney with one of his own models always adds spice to any meet. To counter this threat, Walt had built an ultra-light condenser-paper-covered Morane in exactly five hours flat the previous night. Putting up flight after flight

over a minute seemed like child's play for the 'ol perffesser. However, proving the ancient adage that old age and treachery will triumph over youth and skill, Warner's secret offerings to Hung were rewarded with a couple of flights over two minutes with a 2-1/2 gram Huntington monoplane of Mooney's own design (also built the day before the meet). However, when an almost three-minute flight landed on a nearby golf ball driving range, resulting in a harrowing retrieval under fire worthy of an Army medic, the Huntington was retired for the

day.

In World War One, competition was hot and heavy among Bob Peck's Thulin which flew on rails of Swedish steel, Bob (Ernst Kessler) Haight's Fokker DR-1 looking as if it was on location for a movie, Bill Stroman's outstanding Taube which seemed to stay up forever with its Shark engine, and Mike Mulligan's ultra-light, magnificent Sopwith Tabloid floating along just like the real thing.

CO₂ Triplane class saw Bill Stroman's superscale Euler DR-1 pitted

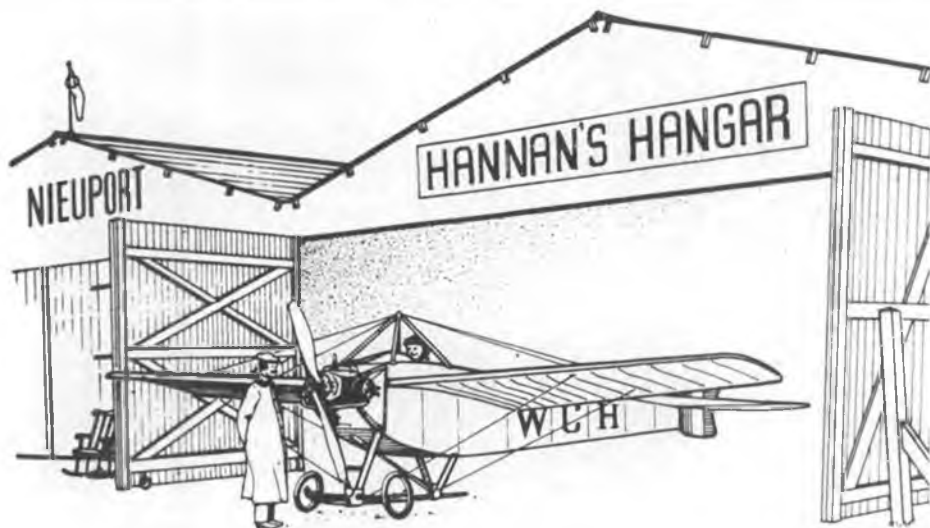
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CD Bob Haight launches "Kempf", CO₂ Fokker DR-1. Placed 3rd in CO₂ Triplane category.



Infamous Count Pisana, Bill Warner, took 1st in CO₂ Triplanes. Also 1st in Peanut.



Keep your plans to yourself, they may check your progress.

• This month's lead-in line, another in our "Fortune Cookie" series, printed by Japan.
YEAR'S END

This column is being composed shortly after Christmas, inevitably a time for reflection and stock-taking. First, we would like to pause and thank our readers and contributors . . . truly international in scope . . . who faithfully supply us with the material and motivation to keep going. As time passes, magazine deadlines seem to grow closer together; yet thanks to you, our well-spring never runs dry. Also, we appreciate the many cards and letters received during this holiday season. Thanks to Editor Bill Northrop and his staff for their continued support of this activity, which Pete Soule has aptly termed "the recording of unclassifiable information."

Along with the pleasant memories, the year has had its share of sadnesses. Some of our best modelers are no longer with us, at least on the earthbound flying fields. Let us hope that they are in a place of eternal tall grass and windless days.

Two of them very close to us personally, were Jacques Pouliquen, of Vence, France, and Jack Lueken, of Escondido, California;

geographically far apart, but kindred spirits in the hobby of aeromodeling. Jacques, a driving force in the promotion of flying scale models in his country, had been a participant in the first **Model Builder** Postal Peanut contest. He was also a supplier of information and photographs to this column over the years. Feared lost about a year ago following surgery, he had rallied and fought to recover. Alas it was not to be. Our heartfelt condolences to his wife, Loly, and his fellow French flyers.

Jack Lueken was a close friend and neighbor, with whom we had the pleasure of attending the U.S. Nationals. Only 47 years of age, he had been avidly interested in all phases of modeling, including free flight, control-line and r/c gliders. Jack was especially well-known for his sense of humor, and was at his best before an audience. Perhaps

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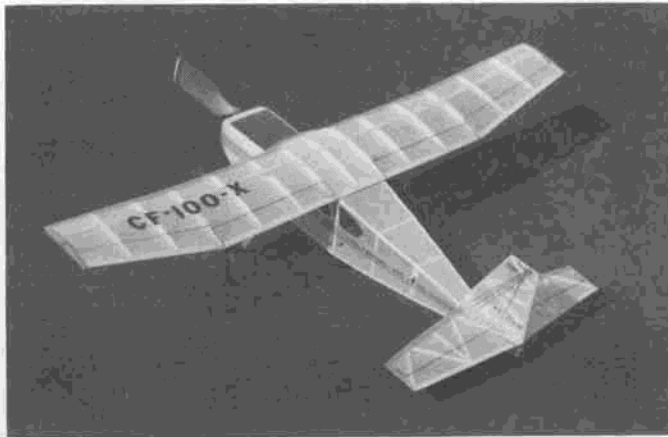
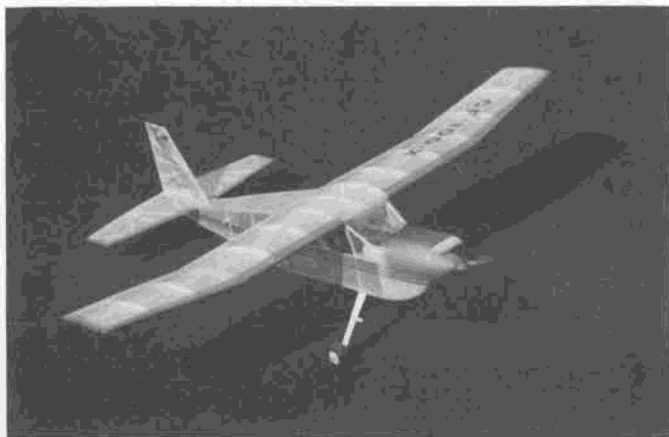
Embryo Endurance participants at '77 Nats. Kneeling (l to r): Bill Stroman, Lonnie Cope. Standing (l to r): Bob Clemens, Hen Hannan, Bob Haight, WCH, Bill Warner, and the late Jack Lueken.



J.D. Frisola, Scientific Model Airplane Co. (left), and Ben Sheresaw with original Scientific Mercury. Jimmie Condon photo.



Russ Brown's Jumbo Scale rubber-powered Bell P-63 King Cobra, in Russian winter colors.



The FOUND "CENTENNIAL 100" BROTHERS

By WALT MOONEY . . . This aircraft comes under the classification of one that appears to have been designed with the model builder in mind. It does consistent 1-minute outdoor flights, and has a 92 sec. top.

• This is the most recent version of a Utility Bush Plane, built by Found Brothers Aircraft Company, in Canada. The prototype was first flown on April 8, 1967. The three-view from which this model was developed was found in the 1968 issue of, "The Observers Book of Aircraft", by William Green, published by Frederick Warne & Co. Ltd.

Although the Centennial 100 does not have a super-low aspect-ratio configuration like the Lacey, and the Fike, it is in all other respects an excellent design for Peanut Scale. It is a cantilever high-wing monoplane with dihedral in the outer panels. It has adequate horizontal and vertical tail area. It has a simple landing gear. It has a slab-sided, rectangular cross-section fuselage almost from the very front to the aft end.

All of the above configurational characteristics make it easily represented, using very conventional model building techniques. In fact, almost all the information necessary

to construct the model will be found on the plan, and there is no need to replace it. However, since flying it in a couple of contests, there are a couple of comments that may be of help.

Keep it light; this one weighs half an ounce in flying trim, and it can undoubtedly be built lighter, especially if you intend to fly it indoors. We covered it with white tissue and used red and black tissue trim. Obviously, using condenser paper and felt pen trim coloring will save some weight. Making the tail without the diagonals will save weight at both ends, because the model shown required a little clay in the nose for balance.

Note that the top cowl was carved and hollowed from a solid block of balsa. Because of the flat cowl top and relatively sharply rounded corners, this is an easy way to do it. Wrapping it, using one-thirty-second sheet, will be lighter, but will require a former at the nose and at the position of the instrument panel.

The formers will have to be relieved to allow clearance for the nose hook and rubber motor. If you elect to follow the plans and hollow the top cowl, make it as thin as possible along the top center line for rubber clearance. On a few occasions, the rubber has knotted up at the front and produced a premature power failure. This produces an interesting flight if it works loose prior to landing and the motor starts again, but isn't so good if you are limited to 3 or 4 officials. It makes little difference if there are unlimited officials, as there are in several of the California contests during the year. Nevertheless, eliminate the possibility of this problem as much as possible; a consistent performing model is easier to understand.

The model as built had an eighth-of-an-inch of washout at the tip of each outer wing panel. It required a thirty-second thick shim of down-thrust to eliminate a tendency to loop under the high power at the beginning of the flight.

Originally, the model in the photos was built without any provision for propeller freewheeling. At the December 1977 Flightmasters contest, it put in ten consecutive flights of more than sixty seconds. The best flight was 92 seconds. The glide in all cases was a spiral dive to the right because of the stopped propeller (a great dethermalizer). It has since been modified for freewheeling and the glide is much better.

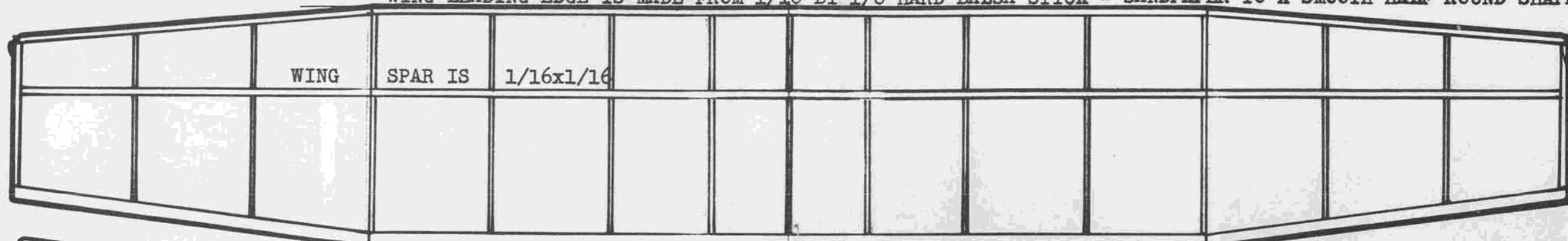
Let's talk a little bit about tools for making Peanuts. Everyone is aware of the requirement for sharp cutting equipment such as razor blades, and the Uber Skiver knife, and for



The overall design of the Centennial 100 makes it an excellent Peanut Scale subject. How about that scale dihedral set-up!?

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WING LEADING EDGE IS MADE FROM 1/16 BY 1/8 HARD BALSA STICK - SANDPAPER TO A SMOOTH HALF ROUND SHAPE.



WING TRAILING EDGE IS MADE FROM 1/16 BY 1/8 BALSA STICK - TAPER TO TRIANGLE-
SHAPE.

ROUND OFF LEADING EDGE.

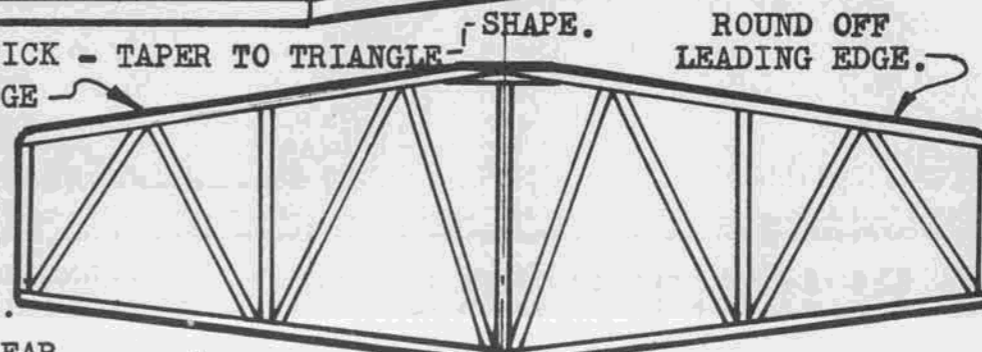
DIHEDRAL

LEADING EDGE

EITHER CARVE A PROPELLER WITH THE SPINNER INTEGRAL, FROM SOFT PINE OR HARD BALSA OR SELECT A PLASTIC COMMERCIAL ONE TO CUT DOWN TO SIZE.

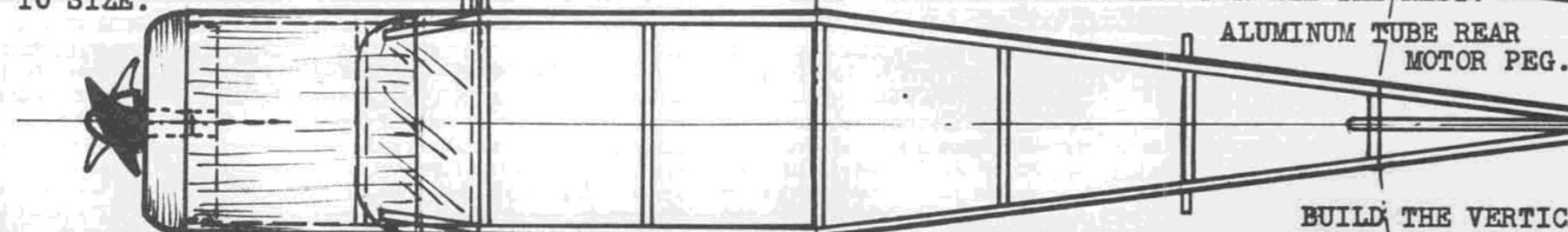
WING DIHEDRAL IS ONLY ON TAPERED TIPS. AFTER ASSEMBLY OF I.E., T.E., AND RIBS, BLOCK UP TIPS, PUT IN SPAR.

THE HORIZONTAL TAIL IS BUILT FLAT DIRECTLY OVER THIS PLAN. ALL STICKS ARE 1/16TH SQUARE BALSA. USE A HARD PIECE FOR THE LEADING EDGE, AND LIGHT WEIGHT BALSA FOR ALL THE REST.



TRAILING EDGE

TAPER ALL TAIL TRAILING EDGES TO A STREAMLINED SHAPE.



ALUMINUM TUBE REAR MOTOR PEG.

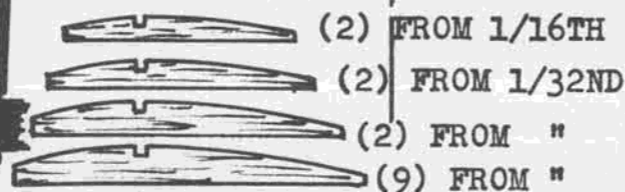
WINDSHIELD IS MADE FROM THIN TRANSPARENT PLASTIC, BUT WINDOWS ARE SIMULATED USING BLACK TISSUE FOR MINIMUM WEIGHT.

FAIRING, THIN SHEET OR PAPER.

TOP COWL BLOCK 1/4 INCH THICK. HOLLOW AS INDICATED BELOW.

BUILD THE VERTICAL TAIL SIMILARLY TO THE HORIZONTAL. USE 1/16 BY 1/8 FOR THE EDGES, TOP, AND BOTTOM.

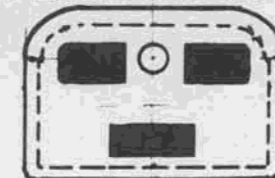
BEND THE LANDING GEAR WIRE TO THIS SHAPE. USE .015 DIA MUSIC WIRE.



WING RIBS

VERTICAL TAIL

THE NOSE BLOCK IS MADE FROM TWO PIECES OF 1/4 INCH THICK BALSA. SECOND PIECE IS SHOWN BY THE DOTTED LINE AND FITS INTO FRONT OF NOSE.



MAKE 2 COWL SIDES

"PECK POLYMERS" PLASTIC THRUST BUTTON IS USED.

1/16TH SHEET.

USE VERY THIN WIRE FOR TAIL LANDING GEAR. SIDE BRACE "V" MAKES IT A TRIPOD.

BALANCE MODEL AT C.G.

1/16TH SHEET FOR BOTTOM OF COWL.

COVER MODEL WITH WHITE LIGHTWEIGHT TISSUE OR CONDENSER PAPER. RED TISSUE TRIM. THE FUSELAGE IS A CONVENTIONAL FOUR LONGERON BOX. MAKE TWO SIDES DIRECTLY OVER THIS PLAN USING 1/16TH SQUARE FIRM BALSA FOR THE LONGERONS. USE SOFTER, LIGHTER WOOD FOR THE UPRIGHTS. REMOVE SIDES FROM PLAN AND SEPARATE. CEMENT TOGETHER AT REAR END AND ADD CROSSPIECES FORWARD TO WING T.E. CRACK ALL FOUR LONGERONS TO MAKE BEND, AND ADD FORWARD CROSSPIECES AND THEN COWL SIDES, TOP, AND BOTTOM.

THIS IS THE FOUND BROTHERS CENTENNIAL 100 A SIMPLE PEANUT

BY *Natt Mooney*

POWER - ONE LOOP OF 3/32ND RUBBER. TOTAL WEIGHT OF ORIGINAL MODEL - 1/2 OUNCE.



Bill Warner's Airspeed Ferry AS-4 has three first place trophies to its credit. It's powered by three Astro .010 electric motors and weighs 14 oz. with four 3/4 length nickel-cadmiums. Features interior detail, opening door, working landing gear oleos. Held by wife Phyllis.

FREE FLIGHT SCALE

By FERNANDO RAMOS and
BILL WARNER

• The '77 Scale F/F contest season in Southern California ended with one of the most outstanding group of contestants and spectators, with flying weather to match. Before I go on, I want to point out that this is not going to be another contest report, but rather, the covering of a new event and some of its ramifications. Traditionally, the Flightmasters end their contest season with a combination Peanut/Jumbo contest during the first weekend in December. This year was no exception, however, a multi-engine event was included for the first time ever. This very specialized event included any mode of power desired by the modeler, with gas, rubber, CO₂ and electric being represented. Every so often, a club has to come out with something out of the ordinary to keep the modelers perked up. It is pretty easy to get into a rut and build

only one type of model, so we all need change to keep motivated.

It is always interesting to speculate on how many models will be

entered, as compared to the number of those who say they are building for an event. As it turned out, seven models showed up, with five



Westland Whirlwind from a Cleveland kit, by Chuck West. Uses two Cox TD .020's. Had problems with inconsistent engine runs.



George James' rubber powered Dornier "Pfiel" had a few trim problems.



Burnelli UB14B Transport, by Warren Shipp. Warren took photos of original ship in the '30's for his proof-of-scale presentation!



Fernando "von" Ramos' Bloch powered glider was a good choice of subject. Twin CO₂ system suffered from gas leak.



Bill Stroman's Zeppelin "Staaken" with four Astro Flight .020 electric motors. Pendulum controls for stable flight.



Stroman's "Staaken" at lift-off. Pendulum controls required ROG. Long takeoff run exhausted batteries, resulting in short flights. Placed 3rd in Flightmasters' multi-engine event. Fantastic!



Douglas XB-42 Mixmaster, by Tom Laurie. Geared drive to contra-rotating props.

officially entered. Also, there were several modelers who had projects started but not finished. The models entered were as follows: Walt Mooney had a rubber powered Canadair CL 215, Bill Warner had his venerable tri-motored Airspeed AS-4, Bill Stroman entered a four-engined Staaken R, Chuck West had the only gas entry with a Westland Whirlwind, Tom Laurie brought a Douglas XP-42 which had contra-rotating props, George James had the push-pull Dornier, Bob Barker built a super DeHavilland Rapide, and my entry was a homely, French Angular Bloch, which was CO₂ powered.

provide contra-rotation of the props. On top of this, it had to be light, since the model was a pusher design. Tom wound the model and set it down for an R.O.C. It ran like a streak down the runway, but it never broke ground. One major problem with this design is that it has a rather long sub-rudder. This keeps the model, and at one time, probably the real airplane, from rotating in the usual manner. On another attempt, Tom cranked in a whole bunch of winds, hoping that this would help. As the model stormed down the runway, it hit a small rock, which caused it to leap

into the air. The Douglas showed every indication of being a real stable flyer.

The model that took the eye of everyone, was Bill Stroman's Staaken. This four-engine monstrosity was truly a crowd pleaser. Bill would flick on the switch and

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The day started out with a ground fog which didn't clear until about 10 in the morning; but once it cleared, the weather was ideal for flying. As usual, Walt Mooney was the first one on the flight line, barely waiting for the fog to lift. His Canadair put on some rather impressive flights. He really had a routine, getting the model's motors wound and launched with the help of his wife, Carol. George James had difficulty getting his Dornier into a climbing turn, but once his trim problems are licked this will be a neat flyer. Tom Laurie's Douglas had the gear-box of all gear-boxes. This was a cleverly thought out mechanism that had to



Walt Mooney's Canadair CL 125 had rubber power in nacelles, which limited flights to about 20 seconds. Excellent performance otherwise. Interesting R/C scale possibilities, no?



A classic Fairchild 51 from Col. Hurst Bowers' personal collection. This particular ship was a construction feature in the July, 1972 issue of *Model Builder*. Plans for this one-inch scale ship (44 inch span) are still available (No. 7721, \$3.00).

The **1/2-A** SCENE

By LARRY RENGER

• There is a new kid on the block in 1/2A land! Specifically, I'm talking about the new Testor's 8000 engine. There are some interesting features to this engine, but let's talk about performance first.

Performance, on the prop provided with the engine, and Testor's fuel, was 13,800 RPM. Switching to Cox Glow fuel and a 6 x 3 Cox gray competition prop increased RPM to 14,500. That is very respectable performance from a reed-valve engine, especially at the price. I can't offer any data as to the consistency from engine to engine, or the life you can expect, but both should be satisfactory.

There is a peculiar feature to this engine: the cylinder/needle valve/fuel pickup relationship is designed exclusively for control-line use. It will work extremely well on U/C models with no cowling, and it

mounts in the same holes as the Cox reed-valve series of .049's. As a result, it fits all those easy-to-build kits that are available. But! The engine can only be mounted with the cylinder head down, for R/C or Free Flight use. Also, the tank shape is a bit strange, and would be quite difficult to cowl in. Neither of these difficulties should be of any concern to the average user of this engine. He flies sporty, uncowed U/C models such as the Me 109, kitted by Midwest, shown in the photograph.

We will move on to discuss that airplane. It is one of an extensive beginners series of U/C kit models. This particular series features simple sheet construction and nearly indestructible nylon hardware for engine mounting and control system. The fuselages feature plywood reinforcing of the nose. These models are smooth and rugged. The

Me 109 is one of my particular favorites, so if you get one, do an extra nice construction job . . . THAT'S AN ORDER! The engine shown on the model is a Cox Golden Bee, but the new Testors 8000 would be an excellent choice for the more advanced flyer who can handle the extra power.

Midwest Products, by the way, is one of the few manufacturers left which is willing to develop new kits for U/C. Fortunately, many of these new kits are 1/2A size.

BEGINNER'S WORKSHOP

This month, let's examine the control-line model and its control system. There are three basic types of control systems for line-controlled models. First, and simplest, is the tethered model. Usually the flier has a stick, or even a fishing rod as a handle, and a long line leading to the wingtip of the plane.



A control line autogyro sent in by Frank Scott. One of a series of autogyro experiments, some were without wings.



Midwest Products' popular ME 109, half/A size control line ship is a favorite with both beginner and more advanced modeler.



The author's S-Tee is a shoulder wing version of the Cox Q-Tee. It uses 2-channel R/C. Original is Lee Renaud design.



R/C Sport Scale 1/2A Piper Cherokee Lance from Superior Flying Models, has R/C rudder and elevator controls.

The model is controlled by raising or lowering the string in a simple guiding technique. Dizziness may be avoided by simply swinging the model overhead. This is a simple, reliable, easy way to fly a model with little skill or coordination required. My three-year-old invented it for himself, just as a multitude of three-year-olds have before him. There have been a few internally controlled, tethered models, such as the "Sure Flyer" system sold by Cox. It uses a special pendulum system to help stabilize the model.

Second, and most popular technique, is the classic "U-Control" system. This system uses two control lines, a control handle for the pilot, and a bellcrank and pushrod system in the airplane to convert the position of the handle to a control setting for the elevator. The controls may be tuned for anyone from novice to expert. Here is a chart

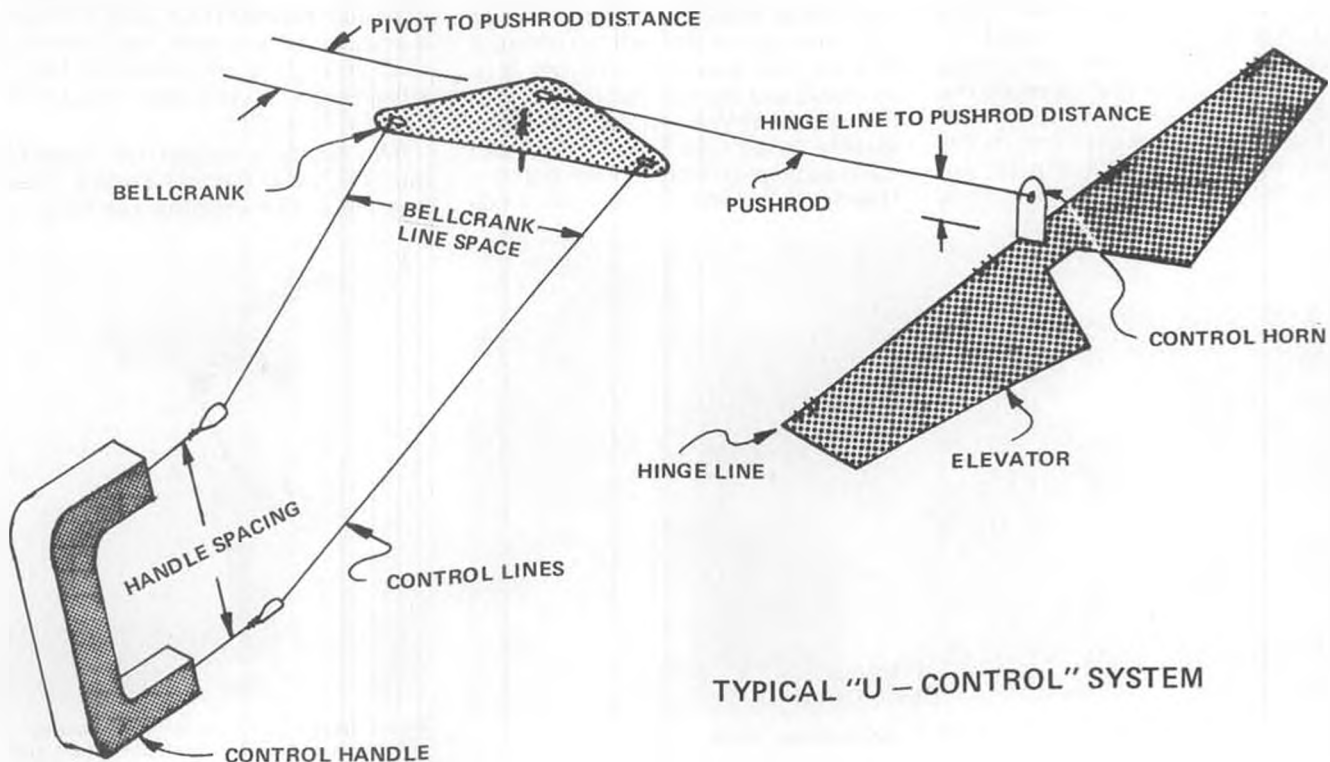
UNIT	BEGINNER	EXPERT
Control Handle	Line spacing should be very close less than the width of the bellcrank control line spacing.	Line space gets wider, rarely more than 2-times the width of the bellcrank control-line spacing.
Bellcrank	Distance from pivot to pushrod should be much less than line spacing, perhaps 5%.	Pivot to pushrod can be as much as 10% of the line spacing.
Control Horn	Relatively long distance from hinge-line to pushrod hole, as much as double that of the bellcrank pivot-to-pushrod.	Usually the same as the bellcrank pivot-to-pushrod distance.
Elevator	Tends to be smaller, but this has very little effect.	Tends to be larger, but this is a very insensitive factor.
Balance Point	Aim for having the model balance toward the forward end of the specified range.	Usually carefully tuned to be as far back as the skill of the pilot will allow.
Engine	Power and propeller selected to give steady level flight at moderate speeds.	Power is usually much higher and propeller is selected either for pulling power or speed, depending on the type of model.

showing the relationships of handle size, bellcrank, control (elevator) horn, and elevator:

No matter what your pilot skill level, it is extremely important that your entire control system be

"solid" but "free". That is, there should be no slop or looseness in the system, but it must work easily, with little force. My rule of thumb is that at the absolute worst, the con-

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TYPICAL "U - CONTROL" SYSTEM



Dick Myers launching his original double-size Lucky Lindy, at the Stockton Gas Model Club's "Annual Gathering of the Ducks" R.O.W. meet. Modified Super Tigre 65, hot fuel.

FREE FLIGHT

By BOB STALICK

• Most of the pictures accompanying this month's article come from Lyman Armstrong (Yuba City, Northern California). The pix were shot at the Stockton Gas Model Club's "Annual Gathering of Ducks" R.O.W. meet. Names like this cause me to wonder about the meets held now and then around the country.

Whatever happened to: "The Gathering of Eagles" or "The Gathering of Crows" meets? It conjures up wonderous things to see Eagles gathered around. Somehow, the image is not the same with a pile of ducks waddling about the flying field. Nothing against the Stockton boys, but there goes our image again! It must be that time of the year, too! We are having Symposium planning sessions here in the N.W., where the local experts are going to go on and on about their

favorite FAI topics, like circle tow hooks pro and con; how to choose the correct rubber, and similar esoteric and mundane topics. Swap meets and auctions will be held in Seattle. Maybe someone will hold a contest or two. Sounds like what you do in the wintertime. Maybe we'll even gather a few ducks.

MARCH MYSTERY MODEL

Every once in awhile, as we peruse our old model magazines, we come across a design that just looks like it would make a good mystery model. Some of the used criteria include; distinctive enough to set it apart from the run of the mill; so unusual that no one would remember it (if so, don't use it); and published after the end of WW II, so that it doesn't qualify as an Old Timer (wouldn't want to step on Pond's toes again — Haw!). If it meets these loose cri-

teria, then it's a candidate for the Mystery Model. Well, this month's design does meet the criteria. The ship came out in the early 50's, it has swept-forward wings, cabin-style fuselage, a hinged stab d.t. system, and was powered by an O.K. Cub .074. The swept-forward wing was supposed to increase the range under which the model could be flown without spinning in. Did it work? Who knows? The designer said it did.

If you know the name of the model design, drop a line to Bill N. at **Model Builder** H.Q., and if you do it ahead of the others, he'll see to it that you get a nice reward, like a subscription to this here magazine . . . fair enough?

The Mystery Model for November, 1977, was George Funk's "Yellow Fin". The winning identifier is



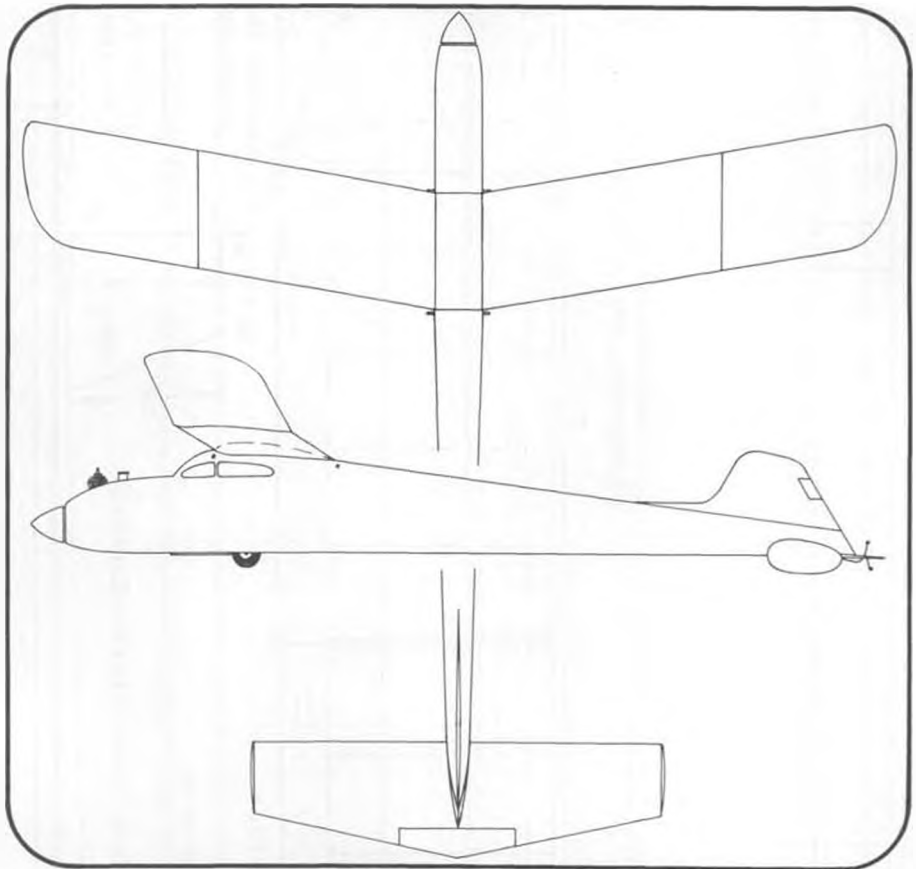
Joe Pinto's R.O.W. attempt didn't quite make it. Joe, and wife, Marie, are both ardent modellers.



Darryl Stevens' Cat I and II record holding ornithopter. Model has 4 flapping wings, and 600 sq. in. area.



Cat I and II record holding helicopter being launched by Darryl Stevens.



MARCH/APRIL MYSTERY MODEL



John Drobsoff with his 1/2A R.O.W. record breaker. John has been modeling longer than John Pond!

Kevin Bennett, Bayside, N.Y.

Richard Neveln, Berkeley, California, had the earliest corrected postmark date on his answer to the December, 1977 Mystery Model, the "Panam Polka", by Dallas Sherman.

Capt. Keith Laumer's "Switch-

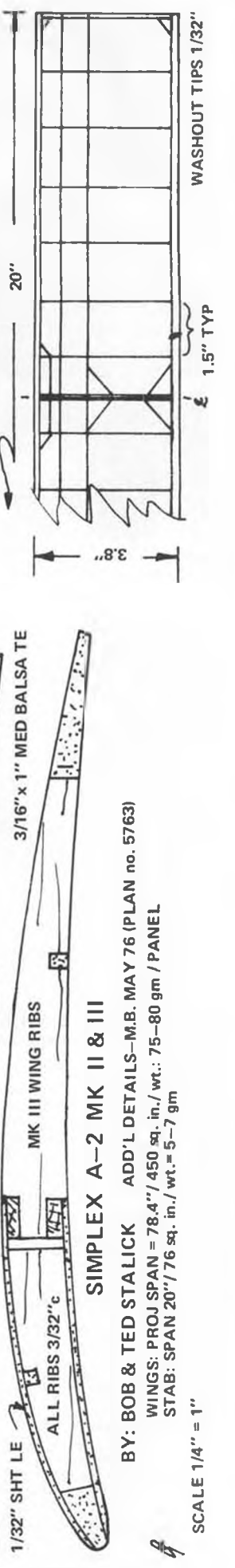
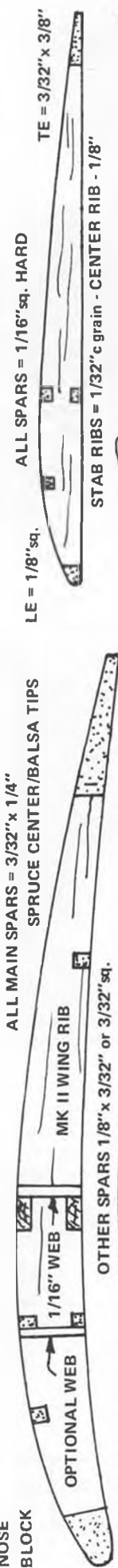
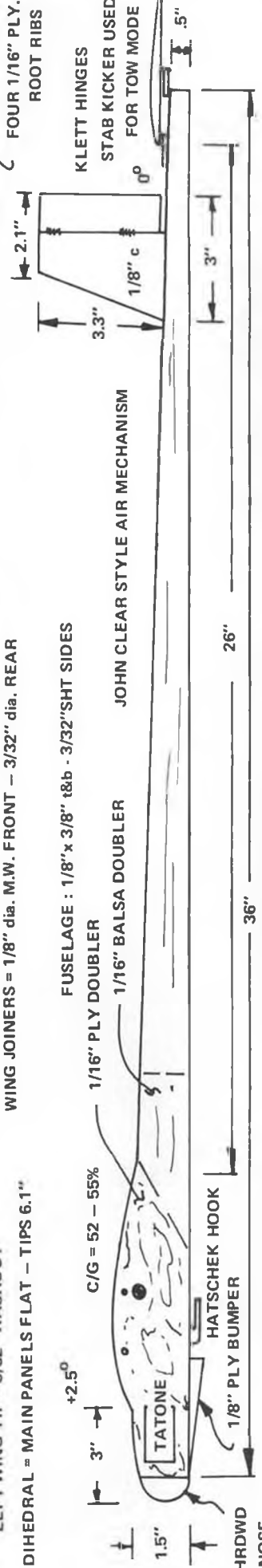
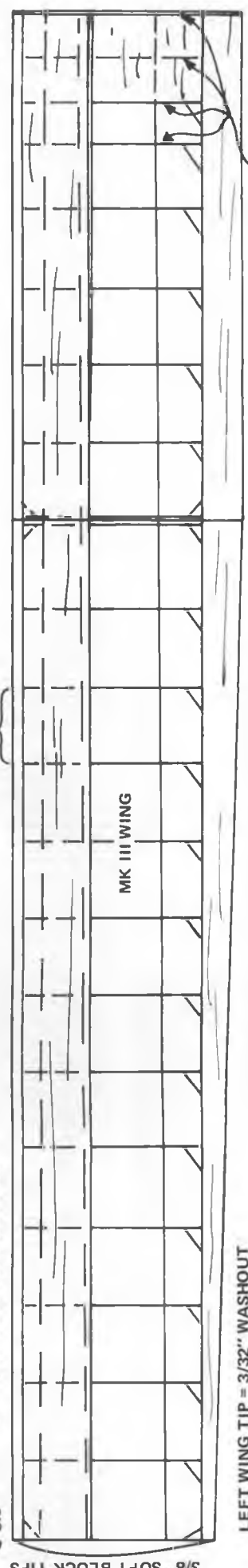
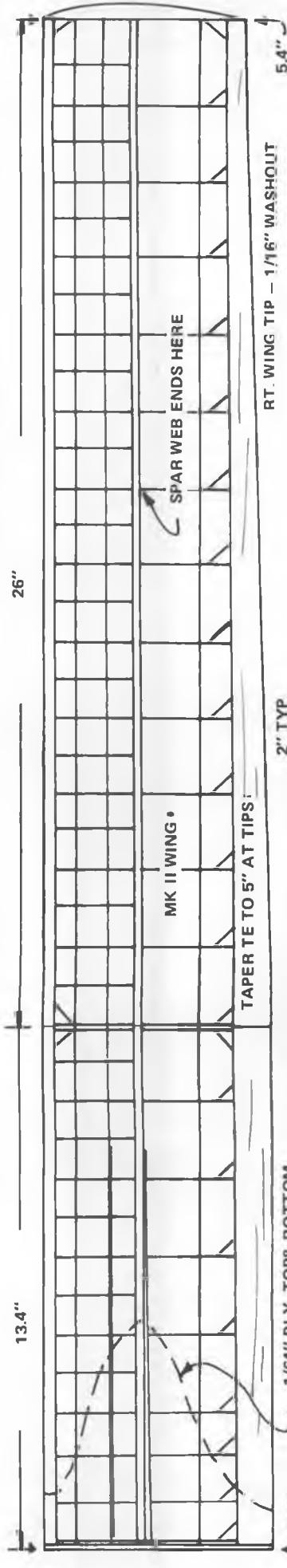


Darryl (14) and Gary (16) Stevens captured 23 Nationals trophies and 17 National records in 1977. They built a total of 67 models for the Jr. and Sr. events at the 1977 Riverside Nats.

DARNED GOOD AIRFOIL – BTS SIMPLEX A - 2



STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	1	3.5	4	5.1	6.2	7.2	8.4	9.6	10.1	10.8	10.8	9.7	9	7.62	6.1	4.33	3	1.7
LOWER	1	0	0	0.4	0.95	1.2	2	2.65	3	3.1	3.3	3.2	3	2.8	2	1.4	0.8	0



BY: BOB & TED STALICK ADD'L DETAILS-M.B. MAY 76 (PLAN no. 5763)
 WINGS: PROJ SPAN = 78.4" / 450 sq. in. / wt.: 75-80 gm / PANEL
 STAB: SPAN 20" / 76 sq. in. / wt.: 5-7 gm
 SCALE 1/4" = 1"

roo" was first correctly identified as the January 1978 Mystery Model by Russ Leisten, Elk Grove Village, Illinois.

New or renewed subscriptions have been entered for all three winners.

DARNED GOOD AIRFOIL . . .
BTS Simplex A-2

Many airfoils which have been featured in this series over the past 3 years have come from some very scientific sources; Bendix, Goettingen, NACA, and the like. This one doesn't. This is the airfoil which I have been using for the past 4 or 5 years on A/2 gliders. It began life as a Mountie A/2 airfoil, but it has been pushed and shoved this way and that so that it is no longer recognizable. Therefore it must qualify as an original. It has been used on the Simplex series of gliders with excellent success. As you can see, the top camber is a bit higher than what is commonly found today, but the under camber is also quite high, so the overall airfoil thickness is in the moderate category. The rounded nose radius allows for some forgiving stall recovery for erratic launches, and since the trailing edge is not hooked, the section does allow for even zoom launching without excessive pitching.

A total of 9 A/2 gliders have been built and flown with this airfoil, and all perform similarly. The glide is soft and bouncy, trimmed just with a hint of a stall, so that when the wing lifts, the stab pulls the model into a level attitude. Alternative structures may be used when building the wing, as shown in the accompanying three-view, but the airfoil seems to not change its flight characteristics. In all, I have found it to be an excellent and utilitarian section to use in A/2 gliders. If you are looking for a section which is very thermal sensitive, try this one.

MARCH THREE-VIEW . . .

Simplex A/2 Mk. II and III

The May, 1976 issue of **Model Builder** contained a construction article on the Simplex A/2 glider. This ship was built so that it could be used by the first timer in Nordic flying . . . straightforward and simple to build and fly. It was and still is a very good glider for this purpose.

What was not clear at the time the original Simplex series was designed, was how well it would do in competition. After the summer of 1977, this issue was settled. The original Simplex won the Boeing Management Association A/2 event for the second straight year, with all max flights, it won Junior A/2 at the Riverside Nationals, and it flew well

Continued on page 86



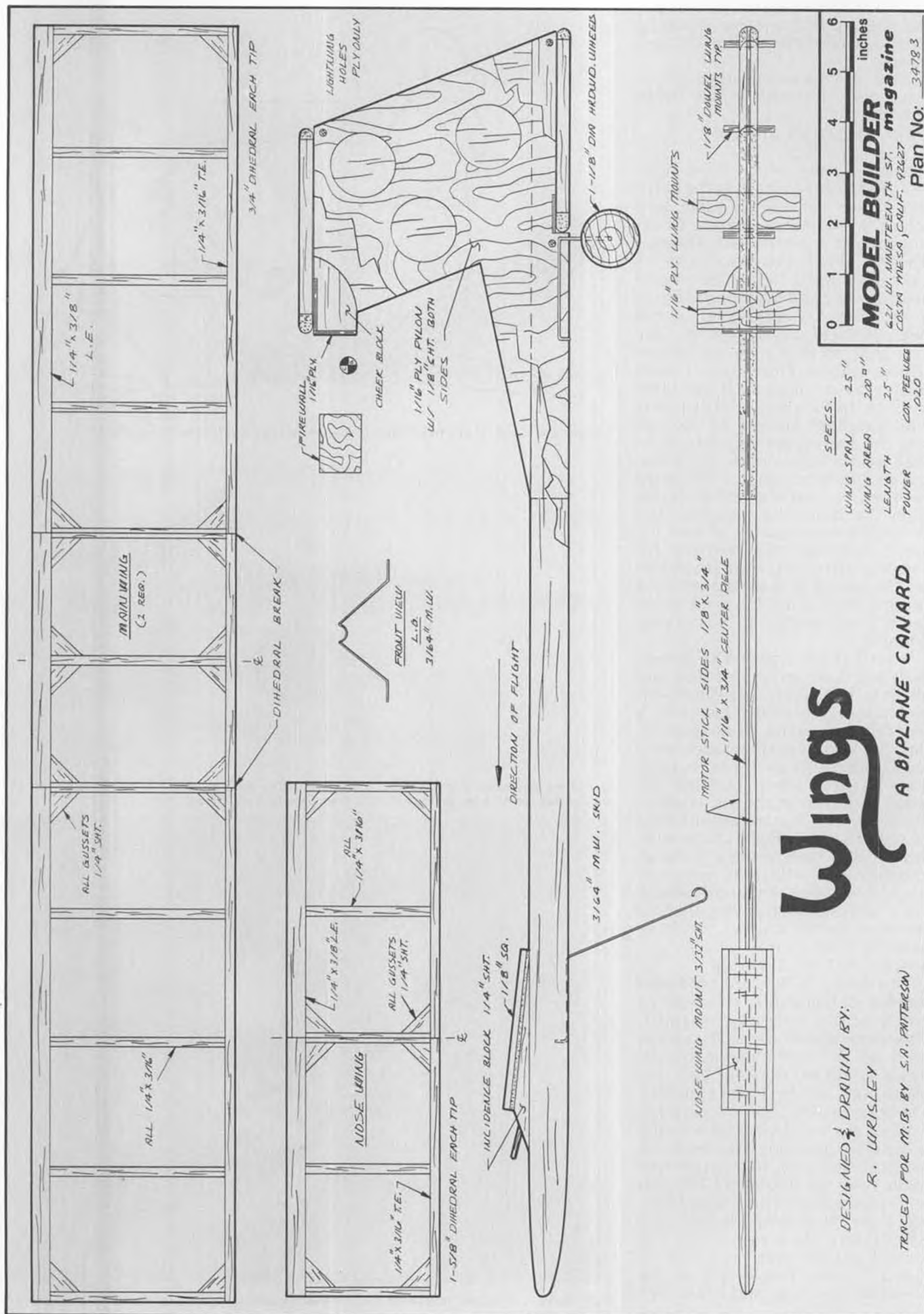
"That's free flight. That's free flight'. Is that all you can say?! 'That's free flight?'"



Darryl Stevens' cargo ship lifting 56 ounces with a Cox .020, burning 82% nitro on this record setting flight at Mile Square Park. Poppa Curt Stevens is on the watch.



Dick Myers . . . shucks, this photo doesn't need a caption. Maybe just "Greetings gate, pass me the cyanoacrylate!"



SPECS.

WING SPAN	25"
WING AREA	200"
LENGTH	25"
POWER	CDX PEWEEV .020

0 1 2 3 4 5 6 inches

MODEL BUILDER magazine

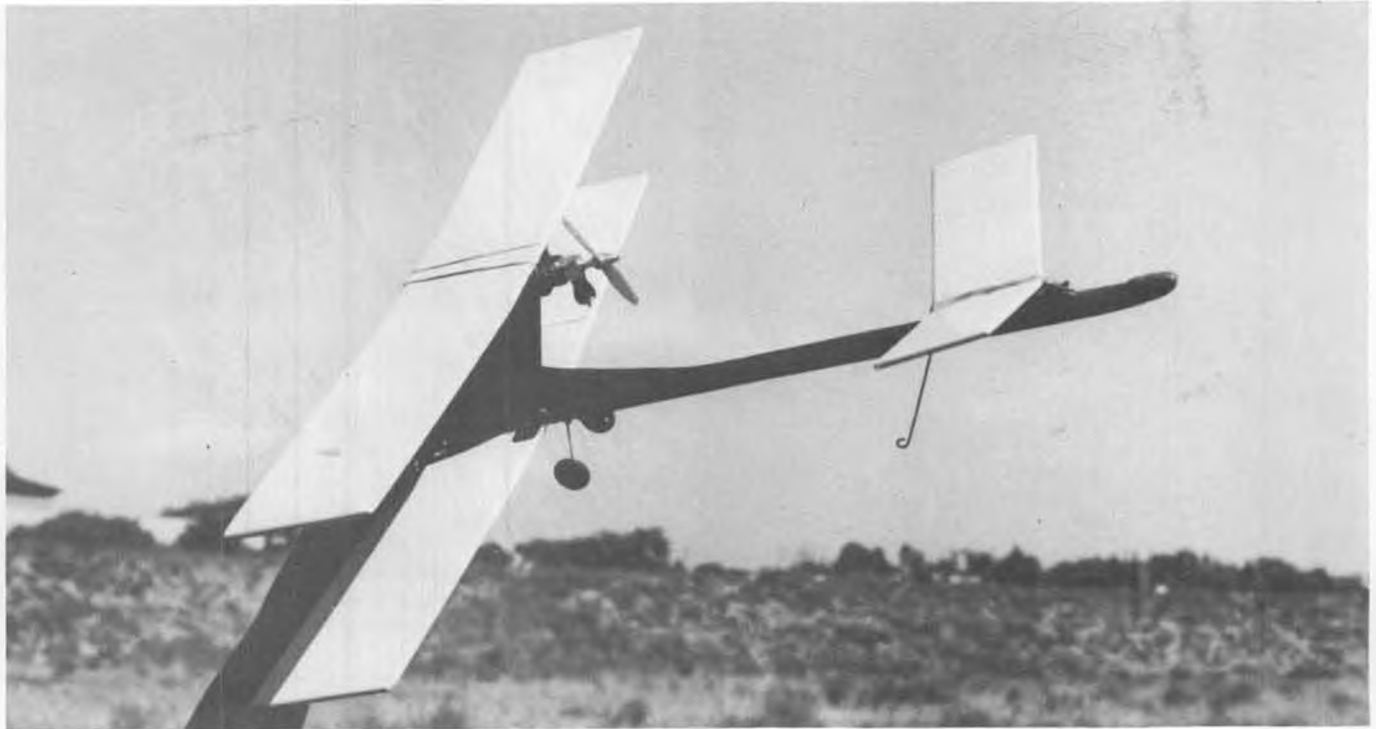
621 W. NINETEENTH ST. COSTA MESA, CALIF. 92627

Plan No: 34783

DESIGNED & DRAWN BY:

R. WURTSLEY

TRACED FOR M.B. BY S.A. PATTERSON



If you like unusual aircraft that are easy to build and that perform well, WINGS might be just what the doctor ordered.

◆ CANARD-BIPE ◆ "WINGS"

By RANDY WRISLEY . . . Looking for something "out of the rut"? This little biplane canard should cause no little amount of comment that will turn to praise when it is flown. Be the first on in your block . . .

• Free Flight biplanes are seldom seen anymore. Perhaps it's due to the extra work of building another wing. In my mind, however, two wings climbing gracefully in the morning sunlight, is worth the effort, this, plus a canard arrangement makes for a very unique model.

"Wings" steals its construction from the baby R.O.G.'s of days gone by. All surfaces are flat strip stock,

the motor stick is a simple three-piece lamination. If you use Hot Stuff, you can build it in about 6 hours on Saturday evening, and fly it Sunday morning. Besides, it's almost indestructible. This makes "Wings" a good first gas model.

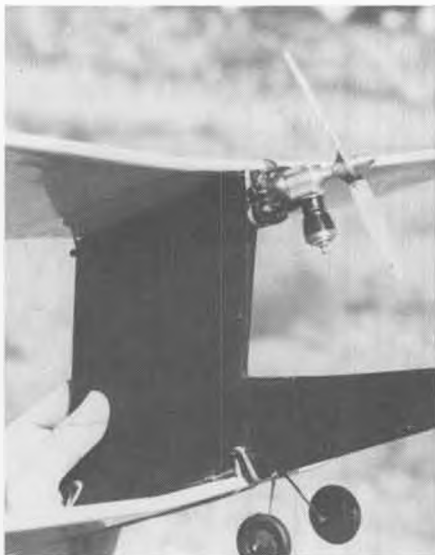
A canard for a first gas model!? Well, the Wright Brothers' first flight was in a canard, wasn't it? Let's build one.

MOTOR STICK

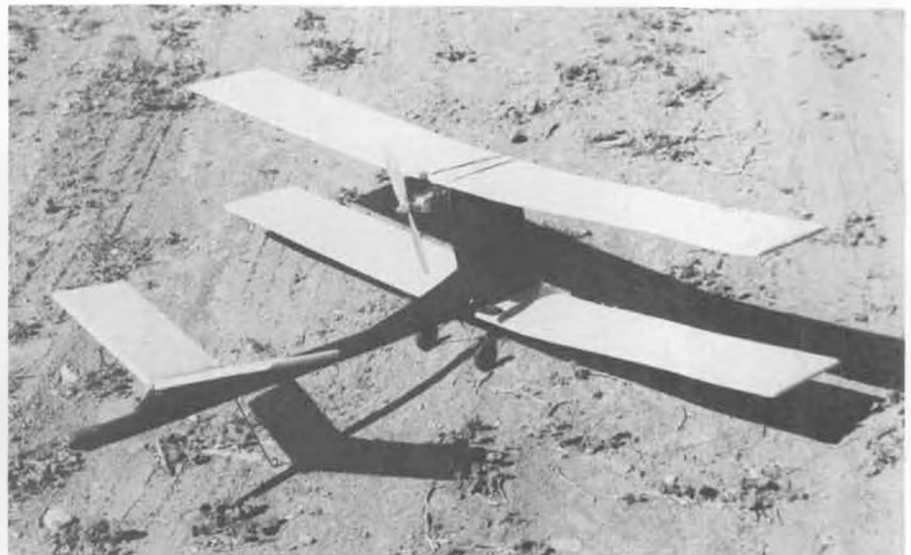
Cut the pylon core out of 1/16 plywood. Make lightning holes as shown. Cut pylon sides from 1/8 x 4 inch soft sheet balsa. Position one pylon side on the plan.

Pin a firm piece of 1/8 x 3/4 balsa in place, cementing it to the pylon side. Cement plywood core in place. Follow with the 1/16 x 3/4 center lamination. To complete the structure, cement the final pylon

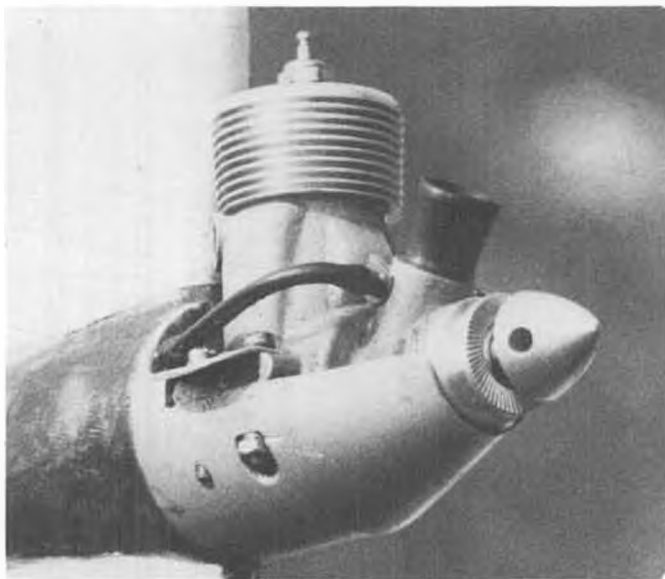
Continued on page 80



How is this for simplicity?



Build this and be prepared for fun comments from your flying buddies . . . until they see it fly!



Russian FAI Combat engine. See text for complete description. Henry Nelson photo above and to right.



The split rear exhaust is an interesting . . . and practical feature of the Russian engine. Clears leading edge of wing, also wing pylon on F/F.

Control line

By "DIRTY DAN" RUTHERFORD
PHOTOS BY AUTHOR UNLESS NOTED

• Did you notice? I mean, you did notice, didn't you? Last month's column had not one mention of anything directly related to that Primo C/L event, I'm speaking of Combat, of course.

That column was done in answer to my critics who claim that I only know how to write about Combat. As to the other critics claiming that I don't know how to write at all, whether about Combat or not, I can only say that they are probably right. . . .

THE STRAIGHT SCOOP



Unknown FAI Combat pilot complying with helmet rule. Don't let British insignia fool you.

FROM HENRY

Remember a few columns back when I made mention of the engines and models used by the Russian FAI Combat Team at the Criterion of Aces in Europe? That was written using a report from John Hammersley as a source of information. Now it seems that I let myself be slightly misled by John's report and probably punched-up the Russian engines performance levels too much. My own fault, of course, but I had forgotten that what to a British FAI Combat flier may be dazzling speed and power, is only average stuff to a serious American FAI Combat flier.

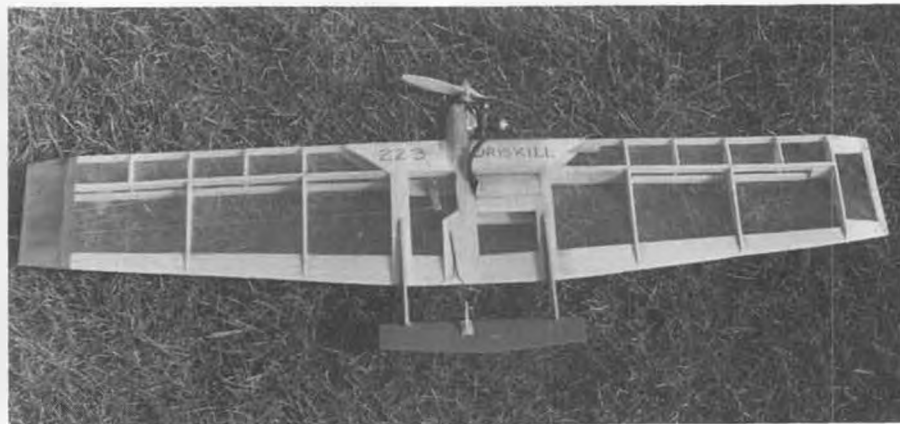
I'll now let Henry Nelson, America's No. 1 FAI TR flier at the moment, and who was at the C.A.M.,

give his views of the new Russian FAI Combat engines.

"Just a couple of comments re your mention of the Soviet Combat engines. I have seen the engines and have seen them tached. Briefly, don't worry. Your Rossi isn't in danger. There are two completely different engines. One is a side exhaust with 10 x 7mm crank. The unusual feature is a weight of 117 grams (Rossi is 158 grams). The second engine is more interesting, as it has a rear exhaust, split to avoid the model's wing. Only the case is split, the sleeve has one window.

Again a lightweight at 135 grams, it still features a 12 x 8mm crank (that's the same rear journal as a ST 35).

"The weight of both engines was kept down by using as short a crank



Larry Driskill, Yuba City, Cal., latest member of the Jive Combat Team. Larry meets (?) WAM muffler rule with spring wrapped around exhaust. And modelers complain about too many rules!

as possible. The cases are about a 1/2 inch shorter than a Rossi, which saves aluminum and steel. The second engine has a tall case, which has a threaded I.D. above the sleeve seating surface. A button insert drops in on top of the sleeve and a threaded clamp-ring holds it down. Not a bad idea for a glow engine, as head cooling doesn't seem too important. The first engine has a normal head with four screws.

"Inside is typical Rossi. The sleeves are short to save weight and the window geometry is about the same as Rossi . . . nothing new. The rods look a bit scrawny and are unbushed. The funny thing is that the second engine has a big crank bore to get in the 12 x 24mm rear bearing. So they used a very thin steel rear cover which has a lip going under the rod to further stuff the case. I would have used the space for a beefy rod. The second engine has a ball check valve in the pressure fitting machined in the rear cover. Both engines have pressure taps.

"So much for details . . . Did they run? No! Compared to a stock Rossi, about 2K down. A poor example? Maybe. But, are the British ST's any good? I doubt it.

"Probably the existence of these engines is purely as a result of the nonavailability of Western currency in the Soviet Union. Where we, today, anyway, can equate domestic and foreign engines in dollars, the Soviet modelers cannot. So, since modeling is so important, they build their own. Domestic cost has no relationship to dollar cost.

"I don't know who built these



The 1/2A Li'l Matador, designed and built by Rich "von" Lopez. Watch for his FAI design coming soon to MB.

engines, or how many were made. Both were nicely done with the second one being the better. But other than the split rear exhaust, there is nothing radical about either. Regarding performance, although the Soviet TR engines have ruled the roost for 5 to 7 years, none of the performance has rubbed off on their Speed engines. There were some funny stories going around at Verviers concerning their Speed engine development. Seems that the local Domo who runs the model institute where the competition stuff is made, has some fixed ideas, and nothing else gets tried . . . period. You come to the institute and you play by his rules.

"Anyway, as I put it in a similar letter to MACA, the Soviets are serious, and, if not as good as the British, are not your average yokel.

The two Soviet/British matches I saw were good, and Wilkens only won his with a successful protest.

"If the U.S. team doesn't go to England ready for a tough fight, they'll get stomped, and it won't necessarily be the British who do it."

There you have it; a much better appraisal of the Russian engines than I was able to give a couple of months ago. Thanks, Henry.

U.S. FAI COMBAT TEAM

As you should be aware, FAI Combat has been elevated to World Championship status, and will be flown along with Stunt, Team Race and Speed at the next World Champs, to be held in England. I don't have the dates, but I think the W/C's will be in August, 1978.

Primarily due to the efforts of Gary Frost, working through MACA,

Continued on page 68



Girlie Combat flier Rosalie Samuel is OK. She runs a Fox, knows how to wrap lines correctly, and her used streamer is all there!



Junior National Fast Combat Champ, Matt Rodriguez, with his FAI Combat model.

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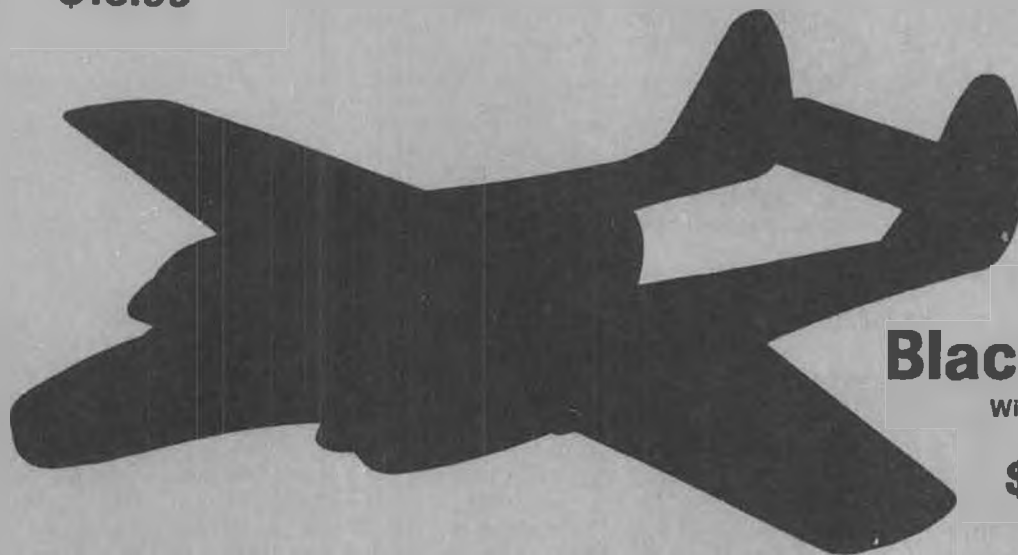
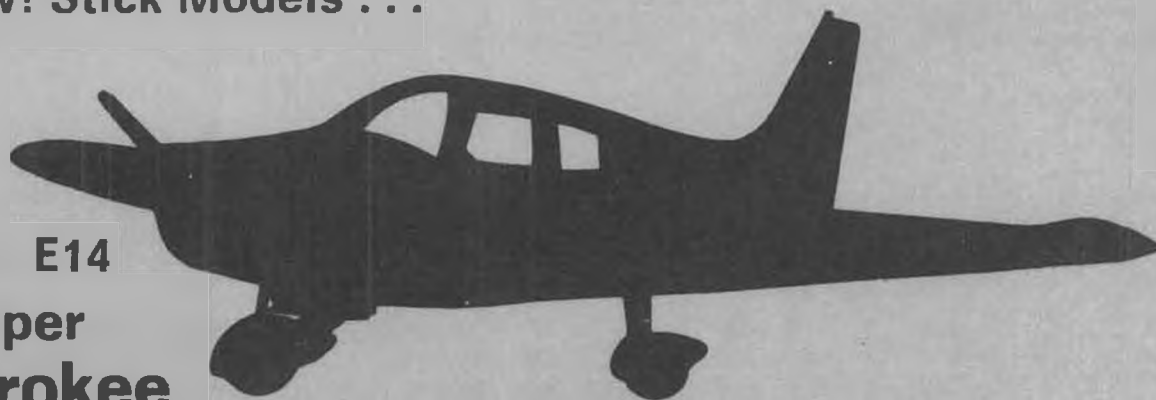
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C/L Continued from page 65

we do have a team selected. Appropriately enough, Gary Frost is on the team, as are Chuck Rudner and George Cleveland.

With the team selected, many MACA members have banded together behind Gary Frost in his efforts to come up with funding for sending Combat pit-persons over to the W/C's. Although Combat is not recognized as a team event, it certainly is, especially when Combat is flown at a high level of competition, and this is even more true when the Combat event in question is FAI

Combat. The pit-persons can make the difference between winning and losing any given match often enough to be a serious consideration in the effectiveness of our team.

Unfortunately, the FAI Combat rules do not treat Combat as a team event. Therefore, when Gary approached the AMA Executive Council for extra team funding needed to get several pit-persons flown over, the AMA said no. Aha! Another strike against the AMA. No, not really. It would have been nice if the AMA Exec's could have seen their way to throwing in some extra support for this, our very first FAI

Combat Team, but there happens to be some very good reasons for not doing so.

Still faced with the problem of raising some extra money, Gary has appealed to the membership of MACA. Contests are being held, the proceeds going to the "Pit-man Fund", many individuals are kicking in, most with a few bucks or so. Tops here, and an indication of their seriousness about FAI Combat, are Howard Rush and Bob Burch, throwing in almost \$100.00 between them. Good ol' WCN also came through with a nice cash donation, even though it was unsolicited, so MB is backing the team.

And what can you do? Well, you can do the obvious, but chances are, that if you were going to send any money, you have already done so. How's about buying a high-zoot T-shirt? That's right, Debi Imhoff is making up a bunch of shirts and is selling 'em. All profits will go into the pit-man fund. Now, just any old t-shirt wouldn't cut it, so the ones Debi is selling have some writing on the front. Get ready. "Combat Fliers Get More Tail". Now I've worn some T-shirts that said some pretty suggestive things, but this has to be an all-time high. Love it!

The shirts cost \$4.95 each, plus 75¢ for postage and handling. If you want your name on the shirt, that'll cost another \$1.00 (10 letters maximum on the name). Order them from: Debi Imhoff, 524 Sinclair N.E., Grand Rapids, Michigan 49503. Probably be nice to tell her whether you want small, medium, large, extra large, or the mammoth double extra large.

Incidentally, Debi is the same Foxy Lady seen at the '76 NATS, wearing the MACA T-shirt that had been signed by most of the Combat fliers. I know, Debi asked me to sign it, my first experience at signing my name on a surface involving compound curves. Everybody thought it an odd place to sign my name, but I personally found it highly appropriate.

JET SET STUFF

Bill Pardue happens to be one of those rare people willing to go all out in promoting certain events. In Bill's case, he is off on a Jet kick right now, generating all kinds of correspondence, most of which is presently being published in "Da Gaz", referred to by the California Flash as the "Gazelle" and more widely known as The Control Line Speed and Racing Gazette. Subscribe to Da Gaz and catch up on the latest from Pardue's tail pipe. If the Jet stuff doesn't interest you, subscribe anyway, Doc Jackson manages to put together a rather decent little rag

with many items of interest for any serious C/L fliers, especially those into Racing and/or Speed. Send \$5.00 to: Doc Jackson, 523 Meadowbrook Circle, St. Davids, PA 19087.

For an updated "Jet, where to get it list", send an S.S.A.E. to: Bill Pardue, 1201 Surry Drive, Greensboro, NC 27408. Many of the Jet items are very hard to locate, but with Pardue's list in your singed little hands, you're halfway there.

And where is "there"? Someplace over 200 mph is where it's at in Jet right now. Mike Langlois presently holds the record at 211 mph. That is fast with a capital "F". Chuckle, chuckle. I remember several years ago watching Jerry Thomas run 194 and 196. Those flights were so mind-blowing I'm not even sure I'd want to see one go 210 plus.

WON'T START, HUH?

Having been involved in various modeling events demanding instant starts and restarts of rather radical (or, at the least, loosely set up) motors . . . all without the help (?) of an electric starter . . . watching most modelers trying to start their mild engines within 1/2 hour is almost guaranteed to send me into violent and uncontrolled laughter. It seems so easy to do, once you have mastered the basics. Of course, the desire to always get the magic one-flip starts and pits in Combat and Racing events greatly accelerates the learning curve for those of us involved in the go-fast stuff.

Let's say you have never been known as Super-Pit, except when speaking of body odor. And you have no desire to be known by that name, either in flippin' or stinkin' terms. But you do want to fly that model instead of twist its nose, don't you? Sure you do. There are either other people waiting for the circle or ten jillion people wanting to fly on your frequency. Frequency?

Okay, first off, if you have the plug lit, the proper amount of prime in the cylinder, the needle someplace close to the right setting, a tank full of fuel, and the fuel system drawing properly, the damn thing will start and run. It has to . . . don't argue with me . . . I know better. Oops, the only other thing that might mess things up is the condition of the engine. If you've had it apart, maybe you forgot to tighten the back plate of the head. Or possibly you pulled one of the most common "Novice No-No's" in reinstalling the cylinder liner backwards. Happens all of the time.

We'll just have to assume the engine is in good condition, but still won't start. Grab or borrow an electric starter, right? Wrong, of course. If you have to resort to an



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Nick Zirolu, noted scale modeler with his Heinkel 162, jet fighter.

electric starter, you will never learn to start an engine the right way, which will, in the long run, cause you more problems than you can imagine. Look, I said for you not to argue with me. If you're reading this to learn something, you'll just have to believe me when I say that 99% of the time an electric starter is an unnecessary crutch, quite often slowing the process of firing off that beast.

First thing to check is that 1-1/2 v. "Never-Ready" battery. Hook it up to a plug you know is good and see if the plug glows brightly. Not just enough to see it, but bright. Chances

are that your battery is bogus . . . chuck it. If all you can get is another of the same kind of battery, okay, just check it before you buy it. No telling how long it has been sitting in a warehouse someplace.

Personally, I always had really bad luck with the 1-1/2 V. dry batteries, so don't use them. I now use two different types of starting battery, the most universal of which is the Fire Plug from GloBee (Fusite). It is a really fine little unit with a 2-volt gell-type, rechargeable battery inside, variable voltage, and a meter to tell you what's going on with the plug. I don't very often call any

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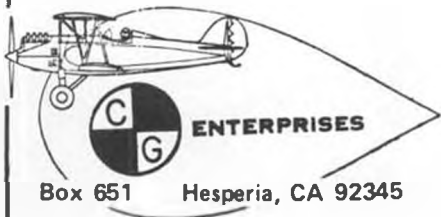
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product "the best", but the Fire Plug is the best starting battery presently available.

The other starting battery I use is again a 2-volt number, and it is built in to the Show-Biz Toolbox, which is designed and built for pitting Combat planes. The battery is lead/acid from military surplus, and drives through a resistor that is tapped in various places to give 1.2, 1.6 and 2 volts.

I have had such good luck with 2-volt batteries, especially in firing off loaded (flooded) motors, that I'll never use lower voltage batteries again. Especially the dry kind.

Now that you have got a decent battery, or know that you should, check that plug in the engine. It has to glow brightly, remember? If it doesn't, kick the voltage up on your new Fire Plug. Quit worrying about blowing the element with the 2 volts. Most plugs will handle voltage that lights them up to the point that it is hard on the eyes to look directly at the element. Just don't do it too long. If the plug won't get bright, lend it to your buddy. While checking the plug, look for any deposits on the element. These little globs of stuff make the plug "colder" and can affect not only starting, but top-

end power also. I won't use a plug that has these goober things on the element, it's just not worth it.

As long as the plug is out, maybe you have a flooded engine, so flip it over a few times and see if maybe you can't clear its throat some. If the crankcase is loaded with fuel, it may be necessary to turn the model so that fuel runs up the bypass ports, into the cylinder and then out the exhaust port or the plug hole. Awkward but effective.

Now you have a clear engine, a good plug and a hot battery. Flip it a few times, it ought to start. If not, you probably need a prime. If the engine has a muffler, you'll have to prime the intake and then flip until the prime gets up into the cylinder. An electric starter can be handy here, but is hardly necessary. The priming job is a lot easier and a whole bunch more effective if there is no muffler in the way. But don't just jam the bulb nozzle in the stack and squirt. Turn the model so the exhaust stack is facing up. Turn the prop until the piston closes off the exhaust port. With the bulb, carefully lay 4 to 6 drops of fuel on the piston. Again, turn the prop, opening the exhaust, port and letting the few drops of prime directly into the

cylinder. Close the exhaust port again, get the model back into position, and flip that hummer.

If it still didn't start, you didn't try hard enough . . . literally. Quite often the difference in getting an engine started and in not getting it started is in how fast you flip the prop. A halfhearted flippity-flippity-flip won't do it lots of times. Get the prop set in a comfortable position and really smack the thing. Or carefully look at how you flip the prop. A little snap of the wrist instead of straight-handing it spins that prop faster. Probably enough faster to get you in the air. (Tell 'em to flip the prop with their finger as near as possible to the hub, Dan. This increases the "flipping rpm" and improves possibility of a quick start. I've seen beginners trying to flip from out near the tip . . . pretty hopeless. wcn)

If the motor still won't start (you really are a helpless type, aren't you), then there is no substitute for getting hold of an experienced flier and having him help you out. If he's good, he'll have your recip singing to you. If he's not good, you can tell by the lack of engine noise. Naturally, the best people to get help from are accomplished C/L Racing and Combat fliers. Believe it.

NEXT MONTH

We'll continue with some more on engine starting. More!? Sure, you have yet to be exposed to the ultra-trick, super-zoot, sure-fire, no-joke way to light off a fire-breathing Combat motor in one flip or less. Developed, tested, used and fully endorsed by none other than the most famous Combat team on the face of this earth, the Jive Combat Team, I'll bet you can hardly wait for it. (ZZZZZ . . . huh . . . oh, is he finished?) ●

TORC Continued from page 15

front end, inside and out, with epoxy. Fill in areas at tail as shown, to make nyrod exits. Add nyrod tubes and support with 1/8 x 3/8 balsa cross pieces drilled for tubes. Make sure nyrod ends will line up with servos.

TAIL SURFACES

The tail surfaces are made from stock sizes shown on print. The ribs are glued in place without the air foil shape. The leading and trailing edges are blocked up with 3/16 pieces, or to the center of the unshaped ribs. The tips are added, also blocked up, and left to dry. During this building, the main spars of the horizontal stabilizer and elevator, also the main spars of the vertical fin and rudder, are lightly glued in place to keep them to-

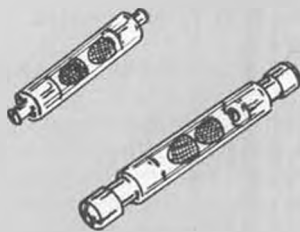
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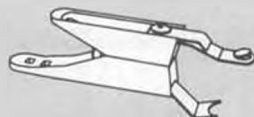


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gether while sanding ribs to a symmetrical, streamline shape. After sanding to shape, separate parts with razor blade and notch the fin and stabilizer for 1/8 square pieces. Add 1/8 balsa planking to center of stabilizer and sand to shape. Round off spars for control operation and make slots for nylon hinges. Add plywood for control horns to both elevator and rudder. Epoxy and pin hinges after covering tail group parts separately. Fit small balsa block under horizontal stabilizer. Assemble and glue horizontal stabilizer to block after covering ship.

WING AND STRUTS

The wing on TORC is fourteen inches shorter in span than on the original 1936 model. The Clark "y" airfoil was laid out with coordinates on TORC. The side-view shows the main ribs, as well as the two tip ribs, in dotted lines. It is suggested that the two 1/8 ply ribs that the strut music wire fittings are attached to be made first. Then use one of these as a pattern to cut the other 16 balsa ribs. Two of the 16 will be modified for the tip ribs. It is my practice to finally fasten all ribs together very carefully with T-pins, making sure the resulting block of ribs is square. Then cut all bottom notches on a table saw. This can't be done very

well with nose and top notch, but if carefully cut individually, they will line up when put together. After cutting spar notches on saw, touch up nose and top notches with file and fit the leading edge and top 1/8 x 1/4 piece into these before separating them.

Make one left and one right wing panel, leaving butt ends of main spar long enough to later add center section. Cut the angle on the bottom of the ends of main spars to match the ends of dihedral splice shown. Do this before assembly.

Now cut out tip pieces and glue them together on flat surface. When completely dry, add these to tips in this manner; because the tip progressively rises as it comes around from the trailing edge to meet the leading edge; place a 3/16 shim under it at point "A", and a 5/16 shim under it at point "B". The part that joins the trailing edge will have to be tapered on the bottom to match the 1/4 thick trailing edge. Glue it well at all joints and leave to dry. When dry, taper bottom of main spar to match and add top 1/8 x 1/4 ply and two bottom 3/16 square spar ends.

At this point, the 1/16 M.W. strut fittings are still not in place. Now join the two wing halves together

with the plywood dihedral splices, by carefully blocking up each panel for dihedral. Add leading and trailing edges to center section, also 1/8 x 1/4 top piece. Allow long-setting epoxy to dry overnight.

Next fit the bottom planking in from the top of the center section and glue well. When dry, apply top of center section, top leading edge, and 1/16 x 1/4 cap strips.

The 1/16 music wire strut fittings are now bent and secured in place with 1/16 plywood scraps as shown on drawing. Use long-setting epoxy for this. After these are completely dry, add the 1/8 pieces that go along each side of the plywood rib and also the gussets at the trailing edge. Now carve and glue on turtle back block.

The struts are made from 3/16 x 11/16 spruce, and I believe, are fully explained on prints. Epoxy wire fittings with long-setting epoxy after binding with heavy black thread.

To prevent tip stall at slow speeds, I put about two degrees of wash-out in the wing tips. This was done by fastening the wing on the fuselage with rubber bands and attaching the wing struts to the wing. Move the bottom strut fitting back and forth until each wing has the same amount of wash-out; mark its loca-

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FOX 19 RC
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The Fox 19 defies explanation. It has neither ball bearings or schneurle porting yet in Club 20 Racing it has so consistently 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
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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.



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tion and fasten it to belly with small R.H. screws. This is done before covering.

Take each wing panel and spray it with water, block it up on a flat surface with about twice the required amount of wash-out and let it dry overnight. It will spring back some.

After the Tatone inverted motor mount is fastened with blind nuts from back of firewall, epoxy on bottom nose block and shape.

TORC is now ready for windshields, windows, and covering.

After tank is installed, seal all around with General Electric clear silicone seal. As noted in photos, I

used 1/2 inch soft copper pipe to divert the exhaust oil from side of fuselage.

CONCLUSION

TORC has unusual fast-slow capability, and despite its large area and light wing loading, has good wind penetration. Because of its large vertical fin and rudder, it flies surprisingly well inverted. As mentioned before, it will takeoff and climb out at one-quarter throttle. At full throttle, it is airborne almost immediately, with a spectacular climb. It might be said that it climbs like an old-timer possessed. ●



Hannan Continued from page 50

this was not so surprising, considering his show business background, which included being a stage magician and hosting a television program. Later, he became a teacher, and also ran a hobby shop. During the Nationals, he conducted several of the unofficial events.

A measure of his dedication to the hobby may be gained from the fact that he was actually building a Peanut Scale model during his confinement in the hospital's intensive care section, shortly before his passing. Our sympathy is extended to Jack's wife, Janet, his son, Jim, and daughters Meredith and Jane Lueken.

ONE STEP UP FROM MANPOWER

Dave Stott, of the Flying Aces Club, was kind enough to send us a clipping from the British magazine FLIGHT, relating to a Japanese man-carrying glider powered by six OS .60 model engines! Designed by M. Onishi, the craft spans over 46 feet, and has a gross weight of 297 pounds. Each engine swings a 12 inch prop at 14,000 r.p.m., yielding about 10.2 horsepower as a sextet. The takeoff run is approximately 500 feet, and the cruising speed is 24 m.p.h. . . . frighteningly close to its stalling speed of 21 m.p.h.! Obviously, one of the chief drawbacks is the noise involved, and Onishi is now checking into the possibility of a "switch" to electric power.

THE SCIENTIFIC MERCURY

With apologies to John Pond, we present an "Old Timer" photo this month. According to R.J. Neulin, this photo was taken during 1939, and shows the first Scientific Mercury model, designed by Ben Shershaw. The occasion was demonstration flying for J.D. Frisoli, of the Scientific Model Airplane Co., prior to kitting the design.

After the flights were completed, the Mercury was given a professional paint job and photographed for use in Scientific's magazine advertising. Neulin points out that the large Patterson, New Jersey flying site shown in the photo's background, would today not allow even enough room to fly a Peanut! ANOTHER COUNTRY HEARD FROM

And speaking of Peanuts, the French magazine, MRA, recently announced a contest for same conducted in Belgium, evidently the first of its kind held there. NOW HEAR THIS

On the subject of mufflers for model engines, Aeromodeller magazine's "Pylonius" wisely

opines: "Do not ask for whom the decibel tolls, it tolls for thee."

And from Scotland, Doug Gillies sez the answer to retaining the use of neighborhood flying fields is simply to use C.A.R.E. (Compressed Air, Rubber, Electricity).

THE COLONEL SPEAKS

Bob Thacker, in an unusually philosophical mood, advances this notion: "There is a great deal more to life than just toy aeroplanes!" Wonder what he meant by that?

AMEN!

This circa 1933 quote from Geoffrey DeHavilland, then director and Chief Designer of the DeHavilland Aircraft Co., Ltd.: "There was a time when I thought it was quite easy to build a model aeroplane. After building one, my views were modified, and after trying to make it fly, they were still further modified."

IN-CREASING INTEREST

Our October '77 column featured Phil Koopman's hint for creasing corrugated cardboard by pre-scoring with a nickel. Ray Golden, of Lincoln, Nebraska, suggests that holding the nickel with vice-grip pliers is much less tiring, and will allow greater pressure to be applied. He also points out that small parts can be clamped in vice-grips, which in turn may be held in a regular bench vice, freeing both hands for the work.

MANHATTAN PROXY CONTEST

Dr. John Martin, Dave Linstrum, and cohorts from the MIAMA club, are conducting a proxy postal contest for Manhattan Formula indoor models, with entries open to anyone interested. Flying is scheduled to take place in a 75-foot high blimp hangar, on April 23, 1978.

First prize is slated to be a round-trip to Miami, Florida, for two, including an all-day fishing expedition in the Gulf Stream (courtesy of Wild Bill Hiscock), a guest of honor appearance at the MIAMA annual banquet, and a blimp ride for two (courtesy of Goodyear), if the blimp is still in town. In the event travel arrangements cannot be worked out, suitable trophies will be provided.

Entry forms are available from Dr. Martin, 3227 Darwin, Miami, FL 33133. Sounds like fun!

THOUGHT FOR THE DAY

Dave Gibson asks: "Are builders of Grapenuts . . . Grapenuts Flakes?"

BAD NEWS AND GOOD NEWS

The bad news is, according to Walt Schroder, of Model Airplane News, that the Circus Circus contest will NOT include a scale category in 1978. The good news is that the R/C pattern event rules will require scale-like models. The combination



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of realistic aerobatic types, combined with the fantastically skilled flying, should do wonders toward restoring spectator interest in the previously repetitious pattern contest. It may very well start a trend for ALL future pattern event organizers to consider.

RIVETS, ANYONE?

A long-standing controversy among scale modelers and judges has concerned the use of rivets. We've all seen the ludicrous examples of tiny models bristling with pin-heads supposedly representing rivets . . . or the 1/72nd scale plastic models looking as though they had warts . . . too large even for a model locomotive.

Other approaches to representation have included India-ink dots, clock gear-wheel impressions, glue blobs, and even actual miniature rivets laboriously inserted by the thousands. A very few metal models have employed *functional* rivets in their construction. Curiously, very little seems to have appeared in the modeling press regarding the size and configuration of scale rivets. Howard McLeod has attended to that oversight with the accompanying chart. With it, any dedicated scale builder will easily be able to determine accurately, the size of the

rivets for his subject. Note that in some cases, it might be better not to indicate them at all, rather than to grossly overstate them.

NEW GOODIES DEPARTMENT

A bumper crop of new items was brought to our attention during the Christmas season, and we'd like to share a description of them with you. When writing to the producers, please mention that you learned of their products in **Model Builder** . . . perhaps they will advertise with us!

Gordon Coddling, 3724 John L. Ave., Kingman, AZ 86401, has expanded his range of drawings and plans to include templates and instructions for the old World War II 1/72nd scale identification models. A stamped envelope will bring you his list.

Air Replicas International has been founded, dedicated to the preservation of aviation history through flying reproductions. It is intended to appeal to "Homebuilt" aircraft constructors, but also to model builders, aviation artists, historians, etc. A membership brochure covering the range of interests from 1/72nd scale shelf models through full-size piloted aircraft, may be obtained by sending a stamped, addressed envelope to: Air Replicas International, P.O. Box 2218, Durango, CO 81301.

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RARE BIRDS, 791 Nisqually Drive, Sunnyvale, CA 94087, offer a proof-of-scale documentation service. The sample we received consisted of two 11 x 17 inch pages of scale drawings plus an 8 x 10 inch black-and-white SHARP photograph of the Loening Kitten. For this particular machine, the drawings may be furnished in either Peanut Scale size (13 inch wingspan) or 1/10 scale. Cost for the packet is \$5.00. The detailed drawings are by Monty Groves, well-known for his officiating at the Morgan Hill R/C scale contests.

STRIPPERS? No, not the burly-Q kind, but for balsa wood and rubber. Two separate designs deal nicely with these needs, and are especially useful to builders of small scale or indoor models. Hand-crafted from hardwood, plexiglas and quality hardware, the tools could easily pay for themselves in a short time. The price of each stripper is \$10.80 including postage and insurance, surely bargains by today's standards. Order from: Jim Jones, 36631 Ledgestone, Mt. Clemens, MI 48043.

SILLY SIGN-OFF

Bruce Carmichael is responsible for this tidbit: Question: What do Eskimos use for model cement?

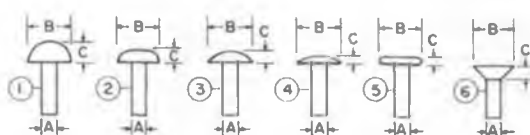
Answer: Ig-glu! hisses ... booo!
(And they usually photograph their models with Polar-oid cameras! wcn)

F/F Scale Continued from page 55

the sound of the four electric motors commanded respect. As the model gained momentum, the prospect of flight was imminent, and finally, after a most realistic run, the Staaken broke ground. Unfortunately, there was apparently not enough "juice" to sustain the behemoth for any length of time. Regardless, everyone was thrilled by the effort. Another electric powered model, that of Bill Warner, needs no introduction. His Airspeed AS-4 is a proven model, and handily won the event with its usual neat flight.

In talking to Bill Stroman the other evening, he was still working on a solution to get more power from the four Astroflight .020 motors. One solution that was suggested to him by Bob Boucher of Astroflight, was to suspend his model on strings from the garage rafters. Then, by turning the motors on, the model would move forward. How much it will move will depend on the amount of thrust generated. Bill will be trying out different prop combinations, which in turn, should provide him with the best pitch and diameter. I would imagine that using a pretty good fish scale balance, attached to the tail post of a model, could give you similar results. Either of these set-ups would be an easy way to determine propeller efficiency.

Bob Barker built one of my favorite airplanes, a DeHavilland Rapide.



REF. BRUHN, ANALYSIS AND DESIGN OF AIRPLANE STRUCTURES.

NO.	RIVET TYPE	B	C
1	ROUND HEAD	2 A	.75 A
2	MUSHROOM HEAD	2 A	.625 A
3	BRAZIER HEAD	2.5 A	.50 A
4	MODIFIED BRAZIER	2 A	.53 A
5	FLAT HEAD	2 A	.4 A
6	COUNTERSUNK HEAD	1.81 A	.5 A

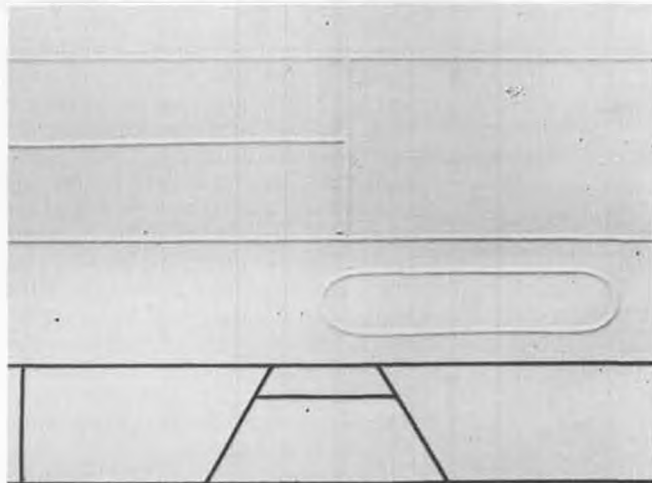
RIVET DIAMETER (A)

- 3/32 = .0937
- 1/8 = .1250
- 5/32 = .1562
- 3/16 = .1875

EXAMPLES: 1/8" DIA. SHANK (A), ROUND HEAD (1) AND COUNTERSUNK HEAD (6) RIVETS

RIVET TYPE	RIVET DIMENSION										RIVET TYPE
	1" = 1" FULL SIZE	2" = 1" 1/6 F.S.	1 1/2" = 1" 1/8 F.S.	1" = 1" 1/2 F.S.	3/4" = 1" 1/16 F.S.	1/2" = 1" 1/24 F.S.	3/8" = 1" 1/32 F.S.	1/4" = 1" 1/48 F.S.	1/6" = 1" 1/72 F.S.	1" = 1" FULL SIZE	
① ROUND HEAD	A = 1250	.0208	.0156	.0104	.0078	.0052	.0039	.0026	.0017	= A	
	B = 2500	.0417	.0312	.0208	.0156	.0104	.0078	.0052	.0035	= B	
	C = 0937	.0156	.0117	.0078	.0058	.0039	.0029	.0019	.0013	= C	
⑥ COUNTER-SUNK	A = .1250	.0208	.0156	.0104	.0078	.0052	.0039	.0026	.0017	= A	
	B = 2262	.0377	.0283	.0188	.0141	.0094	.0070	.0047	.0031	= B	

NEW! PANEL LINE TAPE



At last, simulate panel lines and hatches simply and easily with this new tape, from the makers of the famed "Zinger" props. No messy ink, masking or tissue strips ever again. The ideal final touch on any scale model. Saves hours of tedious work, and looks authentic, too!

Specifically designed for scale applications, this tape is only .020" wide and .0015" thick. Comes in two styles: black, for use on pre-painted surfaces; or white, to be applied before the color coats.

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This is a gorgeous model, with its delicate looking wings and fragile structure. Bob had a most unusual method of getting power to the two motors. He had a gear-box in the rear-most part of the model to which he had attached two stranded wire cables. These cables are the type used by R/C'ers, the very smallest, which are in a plastic sheath. These cables were routed from the gear-box, through the wings, and into the engine nacelles. These were powered by one central rubber motor. Like so many of the multi-engine models, this one had teething problems as well. There just wasn't enough power to get the model airborne, but once this has been worked out, Bob will have a truly sensational model. One other neat innovation, the tail wheel was used to engage and disengage the gear-box. Once wound, all Bob had to do to start the motors is to push down on the tail of the model. A lot of thought went into the construction of all of the models entered.

Chuck West's Whirlwind had everyone's attention when both of his Cox .020's were in "synch". When he released the model, it quickly took off and snap rolled. Twice this occurred, damaging the model the second time. It appeared that the two engines were not completely synchronized, causing one to pull more than the other. We all have a great deal to learn.

As far as my own efforts were concerned, I thought that CO₂ would be a slick way of getting two engines started and stopped quickly. Let me give you my impression of this mode of power for multi-engine use. First, since my building schedule has slowed up considerably as I

get nearer to completion of my fullsize "model", I had to choose a design that would be fairly easy to build, and yet would fly. As soon as I saw a 3-view of the French Bloch, I knew I had the design I wanted. It is as square as you would want for simplicity, but heavy on homeliness. One of the first changes I made was to convert the regular size tank that comes with Brown engines to a 20cc tank that Brown makes. I figured that this would provide me with enough volume of gas to keep two engines running for quite a while. The most difficult part came in trying to work out some kind of solution for wing attachment which would include copper lines for the engines. These latter two lines were worked around until they came out of each side of the fuselage in the region of the wing roots. The wings, in turn, had a piece of plastic tubing just large enough to accommodate the tubing, glued in such a way that when the wing was plugged into the fuselage, the tubing would follow the route of the plastic tube coming out behind the engine nacelles.

All this worked out just fine until I had to solder the tubing onto the engines. I found it nearly impossible to solder onto the engine heads, then make the usual coil around the heads, the tubing kept kinking!

There was not enough room or length to conveniently do this. At any rate, it was a real pain. Adding to this, I found a leak on one of the engines, so resoldering was necessary. Once this was finally completed, I could hardly wait to fill the tank and give the engines a go. They sounded pretty good. I took the model into my back yard and gave it a healthy launch. It glided perfectly.

Now, if it would fly as well under power...

At the contest, everything went poorly, something about Murphy's Law. The filler nozzle line had kinked and broken. I located a portable soldering iron and got it repaired... so I thought. What happened next is that the solder plugged up the line, so that took care of that, and no one at the contest had a small enough drill to open up the line. While I was still able to fill the tank, one thing I discovered was that the 20cc tank never filled to capacity. I know this, because I could still use the same cartridge, but physically, they are very close to being the same size as the 20cc tank. I don't know whether or not the regular cartridges have enough pressure to fill a tank of that size, or if there is some other reason why it wouldn't fill completely. Several of the small tanks hooked up in series can be filled with no problems... Anyone know the answer?

If I ever do this set-up again, I would solder a length of copper tubing to the heads of the engines first, then route them through the wings and into the fuselage. The problem with using CO₂ is that you either have to have everything permanently in place; engines, tubing, wings, and tank, and then cover the model, or do like I did; have everything covered first, then hustle the lines to the engines later.

Hopefully, someday soon, someone will come out with some kind of quick disconnect so that CO₂ engines can be detached from the fuel line. This would simplify mounting, plus having the added bonus of being able to switch the engine from model-to-model without gut-

- Will mount with rubber bands or can be screwed down for permanent installation.
- Fits Cox Tee Dee and Medalion .049 and .051 engines.
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ting it each time.

I haven't given up on this project, because the model shows promise of putting in some good flights, but it will have to wait until I have more time to tinker and get all the kinks ironed out. I would like to build a larger version of this same old crate and power it with two diesel conversions of the Cox .020.

Even though there were only a total of seven multi-engined models entered the first time around, there is sufficient interest to warrant having the event again next year. And just like the first time we introduced scale F/F R.O.W., there were a lot of teething problems and few models ever broke water, now those that don't are the exception. I'm sure that multi-engine models will be the same way. I'm just sorry I didn't have more pictures, but my camera acted up and the negatives came out rather poorly. I do plan to cover in more length the gear-box

arrangements used by Tom Laurie and Bob Barker, so that some of you tinkerers can have a ball working on a multi-engine of your own.

There haven't been any new products pass my way for quite some time, but recently, I received a couple of new ones that I'm sure will interest you. The first one is Lloyd V. Hunt Models' Vintage Spoked Wheel Kits. These are plastic-tired spoke wheels in kit form, which come in the following sizes: from 3/4 to 1-1/4 inches in 1/8 inch increments, and 1-1/2, 1-3/4, and 2 inch sizes. The prices range from \$2.98 to \$4.98. The kits are complete, so that a pair of wire wheels can be made fairly easy. Like anything else, the directions must be followed for the best results. By next month, I will have mine ready so you can see how neat they are. Lloyd's address is 11250 Vista La Cuesta, San Diego, CA 92131. Dealers should contact A & L Distributors, 16509 Saticoy St., Van

Nuys, CA 91406.

The other is kind of two-fold. Keeler Propellers, 572 Deodara St., Vacaville, CA 95688, makes a variety of scale propellers for mostly R/C scale models... for WW I type models he has hand-carved laminated wood props. For other type aircraft, they are cast resin propellers. But for more in keeping with our area of endeavor, Mr. Keeler sent me a letter asking whether I felt there would be a market for machine-carved balsa props similar to the ones furnished in kits years ago. He sent me a sample which looks quite nice, and his idea of a price seems to be very reasonable. Of course, he won't go into production unless there is a market for it. If you are interested, drop him a card and let him know.

In closing, I just want to thank all of you who have taken the time to write and provide items for us to pass along through this column during the past year. I just hope that F/F Scale can be even more successful for '78!

NOBLE EXPERIMENT

By BILL WARNER ...

● Among free-flight scalars whom I know, most drift back and forth between the desire to make something that they know will fly great (generally a homebuilt, high-winged, single-engined knockabout with about as much class as a Saltines carton), and an exotic subject with any number of factors disqualifying it as a creature of the air in model form. Foremost among these are the number and placement of engines. Just think of all the gorgeous beasts that go unmodelled due to a lack of creative courage on the part of us all.

Several types have been tried in the past. P-38's have been done in rubber, having ample prop clearance and long tail booms to house the motors. Dornier "Pfiels" with a prop at each end have been done in rubber a number of times. Contrarotaters have been done, such as the Macchi-Castoldi 72 racer, the "Mix-master", or the Martin-Baker fighter. Rubber generally offers the advantage of a reliable and "adjustable" power source, not being subject to the problems experienced with glow engines, which tend to vary their speeds somewhat unpredictably in relation to each other. A CO₂ Canadair water bomber, created by Walt Mooney a few years ago, suffered from similar afflictions. Many tri-motored ships have flown with power hooked to the center, while the outboard motors freewheel.

In 1972, Bob Boucher, of Astro-Flight, offered me a couple of his new electric .15's to try in a Nats FF Scale ship. After drawing up an 80 inch G.A. Monospar Kings Cup Racer, I decided to beg off until something smaller came along. The Mattel electric units were okay, but lacked the "oomph" necessary. VL Hytorks, great motors with planetary gearing, generally swung larger props than could be readily accommodated by multi-engined subjects. Finally, Bob came up with an experimental set of .010's operating with a reasonable weight. Putting out about the same power as one of his .02's, a trio of these just suited the Airspeed "Ferry". I fell so much in love with the ship when she first appeared in *Aeroplane Monthly*, that I even wrote a letter to a fellow modeler with similar tastes, threatening him with termites in his balsa if he touched it.

The Airspeed project was not a well-thought-out attempt to win a contest. From the first line on paper, to taxi-test, was only three weeks. The problems were worked out in the air. Initially, a lack of power with three 3/4-length nicads, was traced to having them hooked up in series rather than in parallel. Another problem was that the VL switch/charger mechanism failed under the extra current which it was not designed for. A series of crashes due to being underpowered and also having a too-small empennage, took their toll regarding repair time and re-engineering. The props (6/3 gas props cut down to 5/3 to gain revs) are held on with neoprene tubing bushings and a drop of Hot Stuff. Unfortunately, the cyanoacrylate got into a motor bearing and knocked about 1,000 RPM's off its speed, throwing a powerful tendency to turn left into the ship. Despite all of these problems, the plane was, at 13 ounces, flyable enough to better a minute on a number of occasions. I think that it may have been its showing, however primitive (R.O.G.'s not possible due to stronger right engine and middle engine contributing to left torque reaction), that prompted Flightmasters to try a multi-engine event along with their annual Peanut and Jumbo Scale contest in December of 1977.

Imaginations were fired, and a number of extremely well-done ships were fielded. As usual, the problem of having enough time to work out the bugs was there, even more evident due to the fact that few of us have much multi-engine experience to draw upon! There were many brave setbacks. Stroman's "Staaken" made heroic taxi



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and takeoff runs, only to succumb to the lack of enough prop and battery. Laurie's "Mixmaster" made beautiful high-speed taxis, with only lack of testing preventing equally lovely climb-outs. Ramos' Bloch twin CO₂ was sidelined due to a gas leak in the system. Mooney's Canadair flew great, but times were short due to the length of the rubber motors, necessitated by the engine nacelles. James' Pfiel looked promising, though it takes more work than is apparent to coordinate the "push-pull" layout (mainly prop and thrust adjustment problems, I think). Shipp's Burnelli came close, but had unique adjustment problems not easily worked out in the heat of competition. One might say that the Airspeed won by default, being the only multi there tempered by a year of failures and reworking.

The success of the first FF Scale multi-engine event in Southern California cannot be measured by the number of planes which qualified in the contest, but perhaps in the variety of experimentation and inspiration evident. I remember the first R.O.W. scale event we tried, in which very few got off the water. One might well expect not only a higher percentage of planes in the air at the next meet, but even more

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exotic designs. My personal feeling is that there will be lighter ships, more like rubber jobs, with perhaps a little less emphasis on superscale, and that we will see more electrics. Bob Boucher has informed me that the .010, in an improved version, is in the production stages and should be on dealers shelves by the end of April 1978. With the ready availability of a lightweight power system which is smooth and reliable (if you don't get Hot Stuff into it or overcharge the batteries), multi should become more and more attractive. Although other power sources will continue to be tried with varying

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degrees of success, I would rate them as follows as far as cost, reliability, and adaptability to a variety of subjects: 1) electric, 2) rubber, 3) CO₂, 4) glow.

The secrets? Don't get too far out re: moments, drag-producing structure, etc. to start with. Keep it *light*; extra motors mean extra weight. Got enough wing area to carry it all? Use a wire gauge in electric recommended by the manufacturer, and check with him if you intend to add more batteries or increase prop sizes over standard. Pay attention to original thrust lines. Above all, don't be daunted by failure. When you finally get that DO-X in the air, your pleasure will be a thousand times that of a "cinchy" ship! ●

R/C Replica . . . Continued from page 25

.020 Replica R/C event. However, I felt it still did not have the glide that is typical of Barnett Kernoff's models. So I scaled a Strato Streak to a thirty-nine inch wing and 210 sq. in. It weighs eight ounces. The flying characteristics of this model are fantastic, but the aircraft size limits its climb rate compared to smaller .020's. Therefore, it appears that wing areas between 185 sq. in. and 200 sq. in. will produce the best results for replica R/C assist. How-

ever, the thirty-nine inch Streak proved an outstanding competitor at the recent John Pond Commemorative in Santa Maria by winning the .020 event with three perfect max flights.

The advent of the new proportional micro-systems pioneered by Cannon Electronics has made multiple-channel .020 replica competition a viable and popular event. Both Ace R/C and Litco Systems are also now producing similar lightweight flight packs. Tyro models will soon have an .020 replica designed specifically for R/C assist. Of course, the kits by Micro Models and J & R Models make excellent conversions to both R/C pulse and proportional systems.

For the scratch builders, there are a number of .020 replica plans available from the various modeling publications, as well as John Pond Old Plan Service and Jim Dean. For further R/C adaptation details, contact me at 85 Bellevue Avenue, Belvedere, California 94920.

The .020 R/C Replica rules that have evolved, and were used at the 1977 SAM Champs are as follows:

The plane must be a model of any gas model kit or plans published prior to January 1943. Gas-type rubber models like Comet's rubber-powered CLIPPER, Scientific's

FLEA, etc., are acceptable. The model may be a scaled version of a larger model of the period. Two-wheel gear may be substituted for single-wheel, and construction is at the discretion of the modeler. All cross-sections, areas and moments must be the same or in scale with the original. Airfoils may be modified, but must retain the characteristic shape of the original, i.e., RAF 32 "type", N.A.C.A. 6409 "type", single-surface "type", Clark Y "type". All models must ROG.

The engine must be a standard Cox .020 Tee Dee; 1-1/2 cc's of fuel, supplied by CD, must be Cox Red Can Racing Fuel or equivalent. There may be six attempts for three official flights. Maximum flight time is four minutes, with no deduction for overtime. A fifty point bonus is awarded for landing in the designated fifty-foot circle. The model may not shed any parts (i.e., crash landing) to receive the bonus points. Any flight of less than twenty seconds is considered to be an attempt and receives a zero score.

The rules established for SAM 21 .020 replica perpetual trophy are as follows:

1. Five flyers minimum to constitute an official contest.
2. Fifteen points are awarded for each first place, fourteen for

second, etc.

3. Fifty foot landing circle will be counted to determine place.

4. Best five out of the seven designated contests or total if less.

5. An attempt is defined as 40 seconds or more.

6. A/C owner must be absent from the contest to allow a proxy flight/entry.

So there you have it! Flying .020 Replica R/C Old Timers is fun and competitive, at a fraction of the cost in money and time. They are sturdy and take up very little space; in comparison to those 1938 lumber eaters with nine-foot wingspans; and they can be flown in the local school yard.

Come join SAM 21 in the .020 Replica fun!

Vegas Peanuts . Continued from page 49

against Haight's Pfalz (Webster: "unreal") DR-1 and Warner's not-too-scale Avro 4 all-sheet. Motor troubles held the two fantastic ships in check, allowing the Avro to post a 38.9 average. Lesson: if it's light enough, you can throttle back on the CO₂ consumption for longer runs in the air!

Chuck West, master of the CO₂ Taube, finally found his match in Stroman's Taube. Both planes flew in outstanding fashion for duel after duel in the Vegas skies, until finally, Chuck's ship broke a fuel line and hissed itself to sleep. Chuck, who stayed up until 5 a.m. helping his friend Lee with her Peanut "Rivets", was in his usual fine form, bright and alert.

Beautiful biplane performances were posted by Curtiss (all Walt's kids are named for aeroplanes) Mooney with a Laird Speedwings averaging almost a minute per flight, and Larry Schwartz with his impressive SE5a.

Junior entries were down this year, but Craig Rose got off some very realistic and stable flights with his Pietenpol Air Camper. Craig was plagued by a wing misalignment which hampered his efforts for much of the contest. Fortunately, the plane had a sturdy undercarriage and a snug-fitting nose plug, along with unwarped wings. A cutting and regluing of two cabane struts made a world of difference. But then, many adults don't take the time to measure the distance from each wing tip to the tail post to see if the wing is on straight!

One gorgeous peanut to see in flight is Mike Mulligan's gear-up "Goon". This slick racer has opened many eyes with its well-over-a-minute performances. Remember Kurt Enkenhus' Folkerts SK-3 which

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won the **Model Builder** Grand Peanut of 1977 award with over two minutes indoors under a low ceiling? Don't let anyone tell you a light-streamlined racer can't mix it up with the Lacey/Fike/Cougar crowd!

Robin Mooney, Walt's twin brother, and Carol, Walt's charming wife, flew all-sheet Siemens-Schuckerts in peanut, while Douglas (Walt's younger son) flew a Wickner Wicko, a profile Gee-Bee which flew whip-control attached to his hat, and various and sundry other ships in a very entertaining fashion, changing outfits every few minutes to keep from being recognized as an imposter.

Bob and Sandy Peck (Peck-Polymers) won the award for the greatest contribution to peanut scale in 1977, having helped spread the sport via their excellent kits and plans all over the world. Bob is, along with Walt Mooney, one of the most prolific and competent designers ever, and their work has brought success to many newcomers to the model aviation game.

After scale judges Tom Atkinson and Bob Sweet finished with the huge field of qualified ships, the contest adjourned to Vulture H.Q. for the awards. All contestants received merchandise, much of it donated by Walt Mooney and the

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Sherry holds the semi-scale Taylorcraft. A 22" Span Rubber Model that converts easily to CO² and the 16:1 winder which is an important item for the small rubber models!!

Pecks, and magnificent cast-aluminum plaques went to the top three places in each class. The plaques were created by Bill Stroman, who, when is is not making weird models, is a metallurgist. Everyone took more than awards away with them. The good fellowship and amity which were the central concerns, left a warm feeling with all who came. The contest remains a means

to an end, not an end in itself, a fact which in some circles has been forgotten. May the spirit of the Vultures be with you in your relations with other modelers!

... results, for anyone who cares

PEANUT (average of best 3 flights)

1. Bill Warner, Huntington Mono	137.0
2. Walt Mooney, Morane Mono	76.2
3. Mike Mulligan, Chester Goon	46.0
4. Curtiss Mooney, Laird Speedwings	46.8
5. Larry Schwartz, SE5A	22.9
6. Robin Mooney, Siemens-Schukert Mono	26.1
7. Carol Mooney, Siemens-Schukert Mono	18.6
8. Bob Peck, Piper Cub	29.4
9. Douglas Mooney, Wickner Wicko	17.0
10. Bob Haight, Jodel Mascaret	7.0

CO₂ TRIPLANE

1. Bill Warner, Avro 4
2. Bill Stroman, Euler DR-1
3. Bob Haight, Fokker DR-1

CO₂ WW 1

1. Bill Stroman, Taube
2. Mike Mulligan, Sopwith Tabloid
3. Bob Peck, Thulin Mono
4. Chuck West, Taube

WINGSContinued from page 63

side in place, followed again by piece of 1/8 x 3/4 firm balsa. Leave the works pinned in place overnight to allow the cement to set.

MAIN WINGS

Since you don't have an airfoil to confuse you, build both wings together, like fuselage sides. Construction is mainly 3/16 x 1/4 with 3/8 x 1/4 leading edges. The best tool to use for cutting is a razor saw. It helps in making square cuts. After allowing drying time, remove wings from plan, separate, and add 1/2 inch dihedral to each tip. Don't forget the center-section gussets;

they add the strength your sloppy joint doesn't!

NOSE-WING

Just a repeat of the wings, but smaller. Add 3-1/4 inches of dihedral to one tip, making sure both leading and trailing edges are the same height. This is important for ease of adjustment.

ASSEMBLY

Pull the motor stick off the plan. Cut the nose-wing mount from 1/4 inch sheet and cement in place. Finish by adding the saddle of 1/8 sheet and the 1/8 square rails. Cut the firewall and wing saddles from 1/6 plywood. Use 5-minute epoxy and attach these to motor stick. Cheek blocks are cut from scrap 1/4 inch balsa, one per side, and epoxied in place. Bend landing gear and skid out of 3/64 wire and epoxy in place. Finally, attach the 1/8 dowels.

COVERING

Hold it! Before covering, sand it smooth. Round all exposed edges on the wings and nose-wing. Sand motor stick semi-round, but leave the top and bottom of the pylon flat. Now, cover lifting surfaces with tissue, newspaper, bedsheets, or Monokote. I used tissue, however, most anything will do. It's best to paint the motor stick with dope, however, unless you like cutting tiny pieces of Monokote and ironing all night.

FLYING

First, take your engine apart, invert the cylinder, and stick the needle valve on the side. Put the pick-up tube in the bottom of the tank and reassemble. Attach engine to motor stick with woodscrews. Strap on wings and nose-wing. Balance the airplane. It should balance level when supported by

the glow plug. Add clay to either end to achieve this. Hand-glide before trying power flights. "Wings" won't float, but a mush or dive should be corrected.

First power flights should have about a 15 sec. motor run. "Wings" flies best to the left in power and glide. If at the end of the motor run, "Wings" stops flying and spins into the ground, lower the nose-wing incidence. If it won't hold a tight enough left turn under power, wash out the lower left wing about a 1/4 inch. Glide turn is controlled by tilting the nose-wing toward the desired direction of flight . . . a little goes a long way.

Good luck and good flying. •

Pylon Continued from page 29

ages, and wiring should all be double-checked. Check servos and replace any jittery ones. It's a good idea to cycle the batteries, transmitter and receiver, and fully charge them before each race day. Label the switch on your plane so your mechanic knows which way is "on" before releasing the plane. Have someone else double-check your installation . . . two heads are better than one.

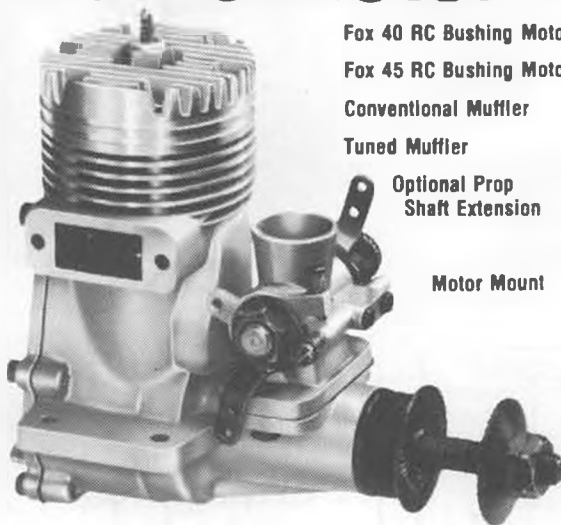
(7) The rest of the plane should be checked for cracks, loose control surfaces, and overall integrity. Pay special attention to hinges, wing hold-downs, control horns, clevises, and landing gear. Use "Lock-tite" or equivalent on wheel collars, to prevent wheels from falling off. Make sure the plane tracks properly and that the wheels don't bind up. (A little toe-in goes a long way towards helping the plane track right . . . Jim.)

You might want to make your own list, using the above as a start, and put the list where you'll be able to find it and check off the items prior to race day, so you'll be ready. PROPS

In the January issue, we printed some information about reworking props, by George Zink, as written in the MARA newsletter. This month, George goes into the hows and whys of how props work and how one can take advantage of them.

"Feedback from Part I gave us the opinion that we might have set the engine r's too high on the ground. Remember that this is a pinch method, and we assume you have a good engine mount and a good day. Some people were only able to get 21,000 under what they swear were these exact conditions. I have seen the 22,500, but that may have been on a special prop with a somewhat reduced pitch. If you want to revise the r's down to 21,000 or 21,500, that

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may be best for you. In this case experience is the best teacher.

(Our own personal experience, and that of many other competitors, proves out George's original recommendation. Depending on weather conditions, it still seems best to go off the line at 22,500, or somewhere close to that range . . . Jim.)

Leaving diameter and pitch aside for the moment, there are several other factors which can affect the way your prop unloads. The shape of the blade planform and the airfoil are large factors. In planform, a wide blade in a static run-up moves more air and develops more drag to

oppose the engine torque. Consequently, they run-up slower than the thin props. In the air, the gain in r's should be somewhat greater, and you have to compensate for this with the needle setting.

The blade cross-sectional shape is essentially the same as a wing airfoil and you can treat it in the same manner. Some airfoils are more effective at higher angles of attack than others, and from airfoil-to-airfoil, the drag also changes. Drag is usually very dependent on the angle of attack at which the airfoil operates. Changing the velocity of an aircraft changes the angle of attack

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blades have a real advantage because of their thrust production at low speeds. You can get the same effect by washing out the pitch at the hub in a thin blade, but it weakens the blade quite a bit. •

Peanut Continued from page 51

straight pins, and wax paper or plastic wrap to protect the plans. There are some other tools worth mentioning, for instance:

Pliers. These should be a long-nosed version with a side cutter. For this tool, it is worthwhile to spend enough money to get a high quality plier. Cheap pliers are a pain. The cutting edges may be too soft to cut music wire and deteriorate rapidly into a series of notches. The ends may bend or twist and prevent you from making accurate wire bends. While it takes practice to make precise and accurate bends in piano wire, probably the biggest handicap faced by a beginning modeler is having a poor quality long-nose plier to use, or even trying to get along with a common pair of mechanics pliers.

Drills. Regular wood drills are almost useless for making holes in balsa wood. Standard metal drills are somewhat better, especially in sizes less than about an eighth-of-an-inch in diameter. For making larger holes in thin sheet balsa, the best hole maker is a metal tube with its end sharpened. Brass tubing is available in most model shops in a large number of sizes. A sharp edge can be put on the end of a piece of tubing by cutting around the inside with a steel knife. This edge on the tube won't last for very many holes, but usually there are only a few holes required in any model, so touching up the edge each time it is used is not much bother. Hole-making technique requires backing the balsa sheet with a soft wood plank or several layers of paper, and then pushing the tube through the sheet with a twisting motion. Extremely neat holes are the result.

Some special tools are available that can make Peanut building and flying more enjoyable, and possibly cheaper. Two of these are available from Jim Jones, 36631 Ledgestone, Mt. Clemens, MI 48043.

The first is a truly superb "Adjustable Balsa Stripper". This tool is a piece of art that can strip sheet balsa of any thickness up to one-eighth, in widths up to one-eighth. It adjusts to sheet thickness automatically, and has a micrometer readout that will precisely measure strip widths. Each division on the scale is 0.010 inch, and you can read it closer than that.

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of the prop blade. Most airfoils we use shouldn't be used above a 9° angle of attack. The flat bottom sections work well from about 6 to 8° and the symmetrical sections are lower from about 5 to 7°. The faster the airfoil is moving, the lower angle of attack works better.

Here we see an airfoil of the prop in cross-section. The prop is fixed-pitch, and the angle the airfoil makes with the hub is the same in the sketch. V is the velocity vector of the aircraft. The length represents the speed of the aircraft. A long arrow means a high airspeed and a short arrow a low airspeed, simulating a takeoff, or even no airspeed simulating a ground run up. v is the air velocity that is induced or created by the moving prop. θ is the angle of attack.

When we go out and actually fly the course, we find a few other conditions that slow down the engine r 's. This often happens in the turns. Of course, there are other factors, such as changes to the fuel supply, but even when the fuel is pressurized, we still notice the slowdown.

In the turn, the wing has to produce a lot of lift, and with that lift comes the extra drag to slow down

the aircraft. V is now reduced and θ is increased, and so is the drag on the blade, which again increases the need for torque. . . and slows down the engine. The engine can go below its peak H.P. without your losing much, but if it drops below your peak torque, you really have trouble keeping your speed. This happens when the turn is just too tight. It can be better to take the turn wider and cover more ground, but keep the engine near peak, than to take a tight line and sag the engine just before you need it for the straightaway. If the engine really sags around the turns, check for a fuel problem first and if it checks okay, then go to a thinner prop. We find the thinner props keep the engine r 's better in the turn, but they don't accelerate out of the turn quite as fast.

We leave it to you to figure your own best way of flying the course, but we find it best to take the 2-3 turn in one sweep and not two distinct turns. You should also keep the aircraft at the same altitude or drop slightly, providing there is room, but don't climb, especially when starting the upwind leg to No. 1.

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Price is \$10.80, including insurance and postage. It is a great buy for a serious builder of Peanuts, or other indoor models. I like it. It works great.

The second item from the same source, and for the same price, is a rubber stripper that will allow you to make your own special rubber strip widths, starting with one-quarter flat. With it, you can optimize your rubber motor for the model and conditions under which you are flying. This also is a quality tool.

These two tools by Jim Jones are obviously well thought out, and produced by a true craftsman.

Good tools make modeling easier and more enjoyable. ●

Westburg Continued from page 39

rotary winged aircraft. Temple Joyce was an engineer/pilot, cited by Gen. "Blackjack" Pershing for his work testing Allied and German aircraft in France. After the war, he engaged in a number of unsuccessful aviation enterprises, was a test pilot for Curtiss and Chance Vought, demonstrating export Corsairs (no, Junior, not the bent wing jobs, but the original biplane Corsairs), when Henry Berliner proposed that they team up to build fixed-wing aircraft.

The first venture of the new company was the 29-1, a high wing cabin

monoplane with a Kinner engine that looked like the Curtiss Robin. Joyce tested it in August of 1929, two months before the stock market crash and the onset of the Great Depression that strangled so many aircraft firms. The 29-1 found no market; Berliner/Joyce turned to the military, designed the XFJ-1 carrier fighter for the Navy, and won the contract for the XP-16.

The XP-16 was conventional in design except for the manner in which the wings joined the fuselage. Both wings were gulled and braced

by wires and N-struts. A 600 hp Curtiss Conqueror swung a 2-bladed Hamilton Standard prop and pulled the airplane along at a top of 185 mph, a speed nearly the same as that of the P-12 and P-6. The engine was supercharged, giving the XP-16 a speed of 147 at 25,000 feet and a service ceiling of 26,200 feet, a clear edge over the P-12 and P-6. The performance was good enough to earn a contract for 25 production airplanes.

As usually happens, design



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changes in the production model adversely affected the promised performance. The supercharger was unreliable and was dropped from the YP-16; performance dropped to a maximum speed of 175 and a service ceiling of 21,500, with a speed of 138 at that altitude.

The comments of test pilots, Lts. Corkille and Beery, and Capt. Mof-fat, are revealing. "Protection from the wind? Good, except that wind blast pushes forward on back of neck and shoulders. Does plane appear to take off quickly? No ... requires quite a long run when full of gas, compared to the P-12 or P-6. In snap rolls at low speed, the ailerons vibrate almost to the point of flutter. Just a matter of time until they shake off. The top of the rudder and vertical fin shake in a sideslip and in a power stall. Not uncomfortable to fly, but if wing is down, does not return to level position itself." As to maneuverability, the comments were all favorable and excellent in regard to banking, and the airplane returned unusually well from a sideslip and came out of a spin easily. However, in a slow roll from the top of loop, Prestone spewed out, striking the pilot's goggles. "No overflow or loss of Prestone during maneuvers," said

the report, "except when rolled off or back onto right side, when it shoots out every time. . ." Another criticism was that the engine cowling was loose and that "the fairing on the landing gear struts vibrates a lot."

The general impression after reading the pilots' report is that the YP-16 was a pretty fair airplane once you learned its idiosyncrasies.

To be continued . .

Half-A Continued from page 57

controls must be just operable by the weight of the model. If it is worse than that, don't even try to fly! On the other end of the spectrum, Competition Stunt models have no slop at all, but the controls will fall under just the weight of the control surfaces alone.

Now, one further caution: don't try to fly with a control system tuned for "expert" if you aren't up to it. You are guaranteed a crash. Flying with a too sensitively tuned model will always make you fly worse, not better. When in doubt, use less control!

Some expert's models use coupled flaps. That is, the wing flaps move down when the elevator

moves up. The purpose of this is to reduce the time lag and fuselage wiggle which you get in the super-tight competition maneuvers. The flaps also give a slightly higher wing lift, but their main purpose is to add smoothness.

The third control-line system, which is in common use, is the "Mono-Line" system. This is not very popular or readily available, but it has some interesting advantages. The control is carried from handle to airplane by twisting a solid spring steel wire. The handle looks like a fishing rod made of two twisted wires, and the control system in the airplane is a mechanical marvel which defies description.

Installation must be made with quite a bit of care, compared to the crudest control line systems.

You get what you pay for, however! Models flown on Mono-line can handle incredible line lengths, and you don't need any line tension for control. A 1/2A trainer with a Golden Bee normally would fly on 50 to 60 foot lines with this system! Seventy foot radius flight circles on 1/2A stunt is commonplace.

Victor Stanzel still has these units available on a very limited basis. If you are just getting started, don't be scared off, because Mono-Line is no harder to learn than U-Control, if you haven't any previous experience. It may be easier, since you get less dizzy, and don't have to worry about line tension.

MODELS FOR THE MONTH

S-Tee, basically a Q-Tee with the wing lowered to shoulder position. The model shown was built by yours truly, from Lee Renaud's design. Lee has shown prototypes at various shows for several years, and I just had to build one. My S-Tee is modified in two areas. The canopy called for, is sheet plastic; I substituted a portion of a bubble canopy. The pilot is also my addition. The final major change is the engine mounting. By inverting the cylinder, and use of a relatively large spinner, the front end has become very slinky, and seems to be fully cowled even though it is fully open on the bottom. I used an unmuffled Black Widow, but the model will fly well with anything from a Babe Bee or QRC to a throttle-modified Tee Dee .049 and three channels. Mine has just rudder and elevator control.

The next model is unique, to say the very least! Frank Scott, 4283 Honeybrook Ave., Dayton, Ohio 45415, sent in photos of his latest control line autogyro. Frank and his sons have built a variety of these interesting models in the 1/2A size. This is the first one he has built which also has wings. The previous

ones flew entirely on rotor lift. Frank says that there is a curious interaction between rotor and fixed wings that can cause a peculiar flight during takeoff. He doesn't clarify what the peculiarity might be. Oh well, not only is the model really cleanly built, but his photographs are super quality. Thanks Frank! By the way, Chris Scott, Frank's son, won Mouse II at the '76 Nats in Dayton. He used a Black Widow against the Tee Dees, but the other guys didn't know how to make an engine go fast in the rain.

Fourth model for the month is a new kit released by Superior Flying Models, 4027 S. 275th Place, Auburn, Washington 98002. It is an R/C sport scale model of Piper's Cherokee Lance. Power is a Tee Dee .049 or .051. Controls are simple rudder and elevator . . . easy to rig! Construction is all wood with spruce wing spars. The kit features an impressive amount of hardware, including spinner, tank, and Tatone engine mount! Area of the wing is 225 sq. in., wingspan is 374 inches. No landing gear is used, so fly over grass.

Final item for this month is a beautiful Fairchild '51'. This model is one of Hurst Bower's personal collection. It seems that the Flyline series is but a small sampling of his available designs! The Wildcat, built by Don Small, and shown a few months ago, was also from Hurst's plans. Hurst is one of the main proponents of "Schoolyard Scale", and the Fairchild fits into that philosophy beautifully. With 44 inch wingspan and only 18 ounce weight, with Cannon two-channel radio, it fits the "large but light" category without sacrificing in the detail department. Originally the powerplant for this beauty was a Medalion .09, but that was much too hot, so a Black Widow was installed. Performance is still rated as being on the hot side for the class of model. Hurst says that there is no current intention to kit this model. Even so, it is really a pleasure to see a beautiful, classic aircraft executed in this manner.

(And Larry, in case you came along too late to remember, Hurst's Fairchild 51 was a feature construction article in the July 1972 issue of **Model Builder!** As with most all MB construction articles, plans are still available, complete with a reprint of the article. The price is \$3.00. Ask for Plan No. 7721. By the way, wouldn't the 51 make a swell Mammoth Classic Scale project! wcn)



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Choppers Continued from page 27

Taylor, put on a soft-shoe routine (while flying his Revolution) that had us all in stitches! Each time he lifted off, his chopper turned around and chased him around the pad . . . in an effort to keep it from executing such erratic behavior, Paul would bend, twist, shuffle, and in general, put on a better performance than his chopper. He didn't know we were taking pictures of this routine, so they will be a real surprise! Ha!

The other two members of the group were Bob Siebert and Loren

Furlong. I didn't see Bob fly, but he was spending a lot of time making adjustments and helping the others. Loren, a captain with Continental Airlines, did very well with his Revolution I and II, especially with only 6 months of weekend flying in his chopper logbook. As the day's flying session came to a close, I watched a contented group pack up their gear and drive off, knowing they each had a "fun-day" and very little maintenance work to be done before the next weekend!

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Last month, we promised photos of a minor modification to the

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Kavan Jet Ranger control system. This mod changes the method of lifting the swash-plate by revising the walking-beam movements. In the original version, the three bell-cranks are positioned by "prying" the common shaft (walking beam) against a ball-socket joint attached to the mounting board. Although it has worked well in practice, a certain amount of wear eventually develops, which allows the swash-plate to "float", and a certain amount of precision control is lost. This new version simply eliminates the ball socket (hinge) and provides a means of directly lifting the common shaft, for better control. Perhaps at this point, I should mention that it is a little difficult to remove the original assembly and replace it with the modified version, by virtue of the fact that the attach bolts are secured on the "underside" of the board with nuts, and it's almost impossible to get at them on an already-completed model. It is, however, recommended when first building your kit.

The changeover utilizes all the components of the original version (except the ball sockets), plus the addition of four wheel collars. Two of these collars are soldered to the crank-arms as indicated, and the

other two are used as spacers. For ease of construction, both original and modified versions are shown in the exploded drawings. Figures No. 1 show the 3/4-view; Figures 2 show the end view, and Figures 3 indicate changes in the servo directions and mixing lever attachment (necessary for correct control movements). If you follow the drawings, you should have no trouble in converting the assembly. This mod has been installed in several Jet Rangers in Germany and I have one in my Hughes 500 with Kavan mechanics . . . to the complete satisfaction of all.

FINAL APPROACH

Today, I received a fine letter from Dick Tristao, of Visalia, California, that really gave me a "shot in the arm" concerning the high(?) costs of R/C helicopters. It was so well written and to the point, that I will include it here. After reading it, you might want to show it to your wife, especially if she gives you those funny looks every time she sees your chopper (like mine does). Ha!

"Often in our enthusiasm to share interests in R/C helicopters, we fail to point out to fellow modelers a major benefit of our investment.

"While most model helicopters

cost more than the average airplane, they also last much longer. For example, the Schluter Cobra pictured is over eight years old, and has accumulated over 700 hours of flying time.

"This ship has run out two engines, survived two severe crashes that would have written off any airplane, while costing about fifty dollars total, in maintenance.

"Four modelers, including myself, learned to fly R/C helicopters with the Cobra, proving it is one of the best trainers around.

"Recently, due to poor preflight, a doubled-over fuel klunk brought the ship down for the last time. Fuselage damage was extensive, so it was retired. All mechanical parts, which make up two-thirds of a helicopter's cost, were undamaged. A Schluter DS-22 Enstrom fuselage is being readied as replacement. Cost \$150.00.

"Add all that up, plus \$350.00 original purchase price, and, excluding engines because you'll buy these anyway, you have approximately \$500.00. Spread this over eight years and you soon see this particular ship has been very inexpensive. I've spent that much on a few scale airplanes that are now only memories.

"My point is, a good helicopter kit, built, maintained, and flown carefully, will return your investment many times, and you'll still have the darned thing.

"Currently, I'm flying an O.S. 60-FSR powered Schluter Gazelle, but in past years have also experienced Du-Bro ships, the Kavan Jet Ranger and Allouette, plus the American Revolution. They have all cost differing amounts to maintain and fly, but none were ever heavily damaged or destroyed.

"Lastly John, this rotor winged hobby is still the biggest challenge I've faced, and I hope others will try once they realize it isn't really expensive.

"Thanks for a fine column in a super-fine magazine. Let's see some re-reviews of the helicopter kits and accessories available today."

Dick's Schluter Cobra picture reminds me of the "good-old-days". Thanks for the photos and letter Dick. . . We hope to hear more from you!

F/F Continued from page 61

enough to lead the field at the Tacoma FAI Semi-finals for three rounds. In all cases, it was flown by my Junior age son, Ted. The only difference in the model from that printed in **Model Builder** was that it was equipped with a Hatschek hook

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by Jim Crocket Replicas. The original model was more than 25 square inches under the maximum allowable area for FAI specifications for A/2 glider, and it still won many local meets as well as the above-mentioned large contests.

What made it fly so well? Although some of the credit should go to the flier, who is getting pretty good at circle towing and zoom launching, it has something to do with the glider itself. The tail end is very light and so are the wings. Most of the weight is centered close to the C.G. The fuselage is short, so that recovery is quick when the model is upset. The nose moment is so short that you have to look twice.

The wing layout is a tried-and-true long-tip design, with main panels just large enough to support the necessary structure. And the airfoil is one which contributes to the model's thermal-seeking ability. The model seems to seek out lift, center itself, and go up. No spinning out of thermals has ever been seen with a Simplex. Two of the original Simplex gliders (son Tom's and mine) were last seen overhead and drifting away with stuck DT's.

So, it seemed that the basic design was a good one. When both Ted and I qualified for the FAI Finals to be

held Labor Day, 1978, it was obvious which gliders were going to be built to use at this important meet. It would be the Simplex. But the Simplex would need some updating in order to make it more competitive. For one, the total area would need to go up in order to take advantage of the extra 25+ sq. in. of area which we weren't using. In addition, we believed that the wing could be made stronger, in order to allow for a higher load to be placed on the model with harder zoom launches. Another change which looked good, was the addition of a kicker for the stab in the tow mode. This little device allows for a shorter turning radius under tow, so that the flier doesn't have to end up sprinting downwind in order to keep up with the model.

So, the result is the Simplex II and III. The only difference between these two ships is the wing construction style. Simplex II uses a standard multi-spar structure, just slightly different from the original design. The III uses a sheeted leading edge. As of this date, two ships use the sheeted leading edge. There appears to be no difference in overall performance between the two, but the sheeted wing is a bit stiffer.

An increase in wing area from the

original was obtained, as was an increase in aspect ratio. This was accomplished by reducing the root chord from 6.2 to 5.9 inches, and increasing the wingspan from 36 inches per wing half to 39.4 (flat). The stab was unchanged. The fuselage was changed by extending the TMA by .5 inch and the NMA was shortened by the same amount. A plywood bumper was epoxied to the underside of the nose in order to protect the towhook, when it was found that landing on concrete was hard on this item. The ship still comes out underweight when balanced at the C.G. The wings on II and III are approximately 10 g. heavier than the original, but are much stronger.

An adjustable stab kicker was designed, and will be detailed next month in this column.

The new models fly better than the original, and seem to have lost none of their thermal-seeking abilities. They are still easy on the tow, circle tighter, can be zoomed harder, and are better in "still" air. I don't know what will happen at the upcoming FAI Finals or at other important meets in A/2 glider, but the Simplex will be there.

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1978 Version
The Boeing Management Association Contest is now announced. This is one of the premier contests in the U.S.A., and it's for anyone under the age of 19. This year, \$2500 worth of scholarships will be provided for the three winners. In addition, a sizeable number of excellent trophy and merchandise prizes will go to event winners. The dates are July 8 and 9, at Kent, Washington. Some realignment of the events this year have stressed the necessity of the contestant being a well-rounded modeler. No longer will it be possible to concentrate in only F.F.

events or U.C. events and expect to win. There are 16 events spread among F.F. indoor and outdoor, U.C., R.C. Sailplane, and Rocket. For more information, drop a line to: The Boeing Management Association, P.O. Box 3707, Seattle, WA 98124, attention Ted Caputo, Orgn 4-1800, Mail Stop 17-26.

GULL WINGS AND PYLONS
I've viewed the designs of George Perryman over the past few years and wondered why they featured gull wings. Now, in an article in Bugs Buzz (Thunderbugs MAC), I read where John Ferrer has a P-30 with a gull wing. The reason . . . the gull gives him a pylon effect and yet contributes to the lift without the dead weight of a pylon. In addition, John's model features a rolled tube fuselage, and weighs 43 grams ready to fly. It made two maxes at a recent Orbiteers Annual and blew the third when John forgot to anchor the noseblock. Maybe a new trend will be started, and we'll see more gull wings on designs where there is a wingspan limitation. I wonder what the effect of this line of thinking would be if applied to indoor models?

A SHAGGY GLIDER STORY
From a recent Hawks Newsletter (Boeing Hawks MAC) comes the following story from Joe Pontecorvo, who is an ex-Hawk now living and working in Belgium.

"... As I told you, I was doing some A/2 flying. I went to a local contest at Leopoldburg, Belgium. On my fifth and last flight, the DT failed and my A/2 disappeared high and still climbing. I won first place, but left the contest minus my ship. Two days later, I received a call from a German speaking woman. With the assistance of a neighbor, I discovered she had my model, so I set out to retrieve it . . . in Germany. "The ship had crossed the Belgium border flying east, crossed that part of Holland which extends down between Belgium and Germany,

and landed in Wassenberg, Germany . . . a total distance of about 65 Km. (40 miles)." Moral of the story . . . be sure you have your name tag on the model, with the correct address and phone number; and if you are flying in Europe, it probably wouldn't hurt to have it written in several languages, how about: English, German, French and Hebrew?
CHANGE OF EDITORS

One of the most interesting and provocative F/F newsletters on the scene today is the "Monthly Bat Sheet". It's put out by the Kent Strat-O-Bats in Washington. Steve Helmick has served as its editor for the past year, but he recently turned the reins over to Tom Cashman. The usual staff of writers and others remain the same, but in the future, all correspondence should be directed to Tom. His address is: 2521 S.W. 323rd, Federal Way, WA 98002. If you don't already get this newsletter, you should. A mere \$2.00 per year (no matter how long it takes) will get it to you.

Well, that about wraps and ties it for another month. Keep writing those cards and letters. I get around to responding to them periodically, so don't despair.

In the meantime, build, fly, repair, think, and practice. If none of these work, pray for thermals. ●

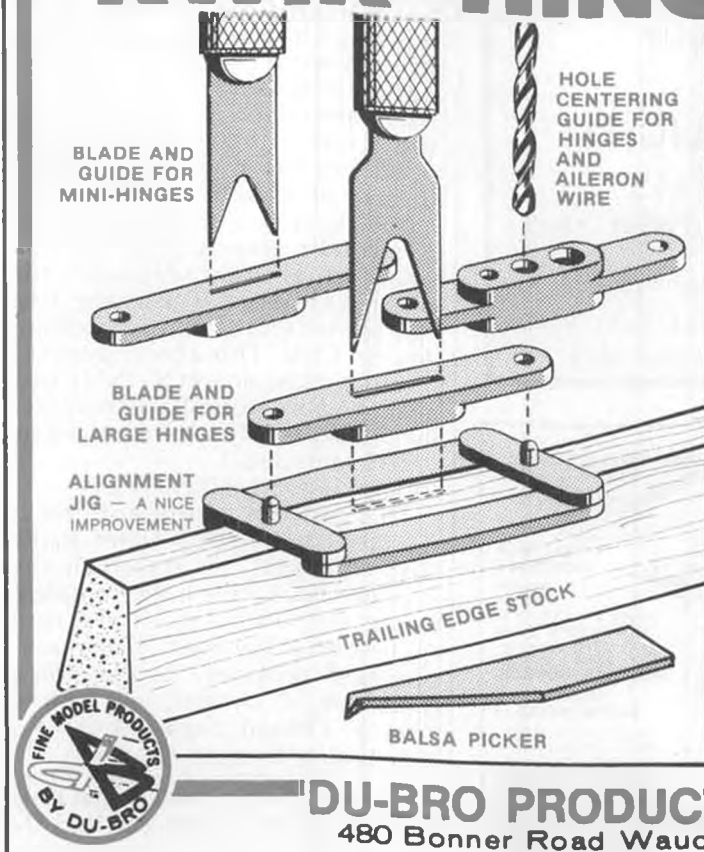
Soaring Continued from page 31

degrees of turbulence in the boundary layer (assuming a wing loading of 20 ounces per square foot and an initial speed of 20 mph). Plotting these indicates that a speed of 160 mph would require a dive from 4,000 feet if the drag coefficient is 0.015 and the boundary layer is all turbulent. This same speed would be obtained in a dive from 1,500 feet if the drag coefficient was as low as 0.008 and the boundary layer was entirely laminar. In terms of realism, this indicates that you would have to climb to several thousand feet before starting the vertical dive. It's hard enough to see a model sailplane at such altitude, and impossible to see it when it starts its vertical descent showing minimum profile. There seems to be a need for reconciling some recent claims with the physics of the situation. I look forward to learning more on this matter.

Perhaps it's time we think about soft wing technology for RC sailplanes. "Soft wings" use either aerodynamic or aerostatic pressure to maintain their configuration and rigidity. They're relatively simple to construct, light in weight, easy to store and transport, and may even have certain technical advantage in terms of airfoil shape.

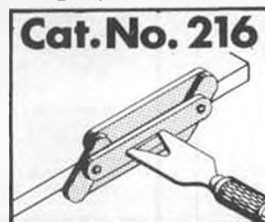
To illustrate; parachutes are "soft winged vehicles" (primarily intended

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to produce drag). Sure they can maneuver, but their "penetration" is strictly limited. The Parawing is an outgrowth of the early work on flexible kites, performed by Frances Rogallo at NASA. The Army studied the Parawing to assist the airdrop of cargo. The first premeditated jumps with a Parawing were made in 1966 by members of the Golden Knights, the U.S. Army demonstration team, at Fort Bragg, North Carolina. Now this device has become the mainstay of hang gliding. Maximum lift to drag ratio on such craft is in the order of 3.5, occurring at the minimum stable angle of attack.

The Parafoil was originated by Domina Jalbert. Since 1964, the Air Force has shown in interest in this device. In 1965, during tether tests at the University of Notre Dame, two students were inadvertently lifted from the ground, thus beginning live parafoil flights. It soon became routine to tow students to several hundred feet altitude, release the tow rope, and let them glide back to earth. Later work demonstrated the reliable deployment and inflation of the parafoil. It seems to have good flight performance and easy flareout on landing. In essence, this craft is rectangular in planform with a double-surfaced airfoil. The wing is divided into cells, which are

pressurized by the ram air. Once inflated, the air within the wing remains stagnant. Here again, the maximum L/D is low compared to that of modern rigid wing sailplanes (See Feb. '78 "Over the Counter").

But new configurations appear from time to time and significant advances are bound to take place in soft wing technology. Let's give some thought to soft wing radio controlled sailplanes. Here's a challenge for those who enjoy being creative.

A new launch system is now available from Hi-Flight Model Products, 43225 Whittier Ave., Hemet, California 92343. This electric winch has a heavy welded steel frame, a 12-volt motor, and a finely matched aluminum drum (as well as a roller-bearing turnaround). It weighs 40 lbs. without the battery, and provides three different speeds for launch. It can be driven from your car battery or a similar battery mounted on a base plate at your flying site. I expect to see quite a few of these at coming contests.

If you haven't already done so, now's the time to become a member of the National Soaring Society. Here's your way to support RC soaring. The National Soaring Society represents your interest within the Academy of Model Aeronautics. It provides valuable communication and a monthly

journal covering detailed activities for design and flying. All you need do is send your name, \$10, and your AMA number, to the NSS Secretary, Dave Cook, Star Route, Granby, Colorado 80445. ●

Plug Sparks . . . Continued from page 23

The black ink, when thinned, turned out to be brown. Dubery found out that inks are not just a dye, but have a content (in the old days, shellac) that makes the dye stick to the paper. This (naturally!) shrinks and hardens certain tissues. So back to raw shellac crystals dissolved with alcohol. This provided a thin, light, clear dope (or sanding sealer). However, the Fairey Swordfish aircraft were fabric covered, so plenty of clear dope and thinner were available. Adding talcum powder made up a suitable sanding-sealer, although heavier than the shellac substitute.

Dubery's girl friend was certainly puzzled, when upon receiving a pair of fabulous new nylon stockings for the second time (from PX at Argentia), she was requested to send back the first worn-out pair! This also formed part of the covering.

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flown at Machrichanish R.N. Air Station, in Western Scotland. Imagine working on a 1/24 size Taylor Cub while on standby or in the briefing room of the HMS Biter; building a fuselage, going on a night strike after a U-boat detected by destroyer screen and then coming back (after debriefing) and making the wing! Dubery said this was probably the best occupational therapy of all, as his enthusiasm for modeling was so absorbing he had no trouble staying alert after an operational flight. Probably the biggest thrill of all was the first "glide over grass" with his precious Taylor Cub. The accompanying photo is a genuine ROG flying shot against a background of blast-proof living quarters. Those were the days... 35 years ago!!

ROUND ROBIN FIRMED UP

This portion of the column is directed to the Old Timer Radio Control flyers. As stated in the previous issue, here is the complete flying schedule for all Western O/Ters who like their "black box" operated airplanes. (Unless noted otherwise, all contests will feature Texaco, Limited Engine Run, and .020 Replica Events.)

About the only contest that is up in the air as far as dates go, the SAM 49 Texaco, may be moved up to August, the only other open month.

A quick review of the upcoming contests is in order. The SAM 27 people have announced that the kick-off contest for 1978 will feature loads of merchandise instead of the usual hardware. The Kimes Ranch located on the Old Sebastopol Road will be the site.

SAM 30 will be putting on its meet, known as the "Brown Valley International". This meet will feature trophies, merchandise, and a first-rate cookout. Those who attended last year had nothing but the highest praise for this meet.

The SAM 21 Texaco at Taft will be held on the same day as the SCAMPS Texaco, featuring free flight up to 9 a.m. This annual (the fourth) features only Texaco model flying in a site perfect for this type of event. SAM 49 will also feature a similar meet in June.

Of course, the Pond Commemo-

DUCO) was unavailable. So, nothing to do but beg the old tooth brushes from his shipmates. In those days, they were made of cellulose acetate, so when dissolved in acetone (thanks to the ship's doctor), they made a passable cement of various hues.

Finally; rubber for power. The first source was recovering the elastic from his young lady's discarded under-garments. But a more useful source was discovered in the cockpit back seat, consisting of cotton-covered bungee cord normally used for holding down the parachutes in stowed position. A real labor of love was involved in picking the cotton covering off the bungee cord!

With the aforementioned materials and "second-hand rubber", it was surprising what duration could be obtained from the small models. Experiments with propeller design paid off. Starting with four-inch diameter props, very accurate design and meticulous execution in hard wood (or balsa) made a tremendous difference in duration. Dubery also developed a non-helical pitch design that has appeared in recent Wakefields as an innovation credited to a German enthusiast. A generation late by Dubery's

standards!

Briefly stated, the theory is that at the tips there is an acceleration due to air inflow beyond the propeller tip and at the hub, and acceleration due to air parting over the fuselage. This leads to an increase in geometric pitch required at these points. Experiments aboard the HMS Biter, in the hangar, proved the greater efficiency even with a small four-inch airscrew.

None of the experiments were very scientific as the hangar leaked badly, giving numerous drafts. Vic did find duration increased with careful trimming. Rise-off-Wildcat-tailplane (how about that!) of 30 seconds were commonplace. (Heck, we'd like to do that nowadays!)

Some of the models that survived the rigors of shipboard travels, were

Schedule of West Coast R/C Old Timer activity for 1978

February 19	SAM 27	Kimes Ranch, Santa Rosa
March 12	SAM 30	Browns Valley "International"
April 9	SAM 21 Texaco	Taft
May 7	SAM 21 .020 Annual	Hill Country, Morgan Hill
May 27-28-29	W/C SAM R/C Champs	Fresno
June	SAM 49	Taft
July 23	SAM 27	Kimes Ranch, Santa Rosa
Sept. 10	SAM 21	Santa Teresa Park, San Jose
Oct. 14-15	SAM 26 Pond Comm.	Santa Maria
Nov. 12	SAM 30	Schmidt Ranch, Elk Grove
Dec. 4	SAM 49 Texaco	Taft

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rative in October is the biggie, put on by SAM 26 and the Tri-Valley Club. This one you don't want to miss!

BRAINBUSTERS ANNUAL

While recounting some of the contests of last year, the columnist received the nicest writeup (and good photos!) from Ed Sullivan, secretary, handyman, you name it!

Interestingly enough, the Brainbusters field is a dairy ranch just outside of Richmond, Virginia. The farm keeps an alfalfa field, about one mile long by 3/4 mile wide, which the farmer allows the club to use. Planes going off the field get in real trouble in a hurry, as the James River is just on the other side of a wooded area (another obstacle!). To help things out, several corn fields are on the opposite end of the field, also separated by a line of trees. They fly strictly Category III rules, which keeps engine runs down to 15 seconds for old-timer flying.

Wouldn't you know it! On the day of the contest, rain was forecast, and rain it did... everywhere but where the contest was held. Despite an intensive publicity program, the

attendance (compared to last year) was terrible. Ideal conditions prevailed until the wind came up later in the day. The corn fields claimed many a model!

Everyone thinks C.C. Caldwell flies only rubber, based on his wins in this phase of modeling. No such thing! "Caldwell" flies the Swoose (Parmenter design) and knows how to make this fine machine go. Incidentally, Johnson came all the way from Houston Space Center for this meet. That's real dedication to his friends at NASA Langley Field! Best part of it all is that he didn't go home empty-handed, winning one first and two seconds.

Reporter Ed Sullivan snuck off with the .020 event, despite heavy competition from Mike Poorman. Mike also grabbed a second in the Class A-B Event with his Zipper.

Prizes were pretty well spread around, as there were no real big winners. Despite the weather, everyone enjoyed a good contest and a chance to renew old acquaintances. Everyone had fun, and as Ed Sullivan put it, "That's what it's all about".

S O S MEET

That's what Jimmy Dean, Newsletter Editor of the SCAMPS "Hot Leads" called the recent old-timer meet put on by the San Diego Orbiters. Seems like only a trickle of information and publicity was available on this meet; hence, the title, "Secret Orbiters Seance".

Well, it's fun once in awhile to let the other fellow know you are interested in their meets. Perhaps Jim will stir up enough notice in the San Diego club that they will indeed put out notices to all interested modelers.

Held at Elsinore on October 29/31, the Old Timer events were dominated by Sal Taibi, who took a first, second, and third. In the thirty-second antique, it was Larry Boyer with his trusty old Comet Clipper. Maybe we should adopt a handicap system similar to what was used by the Western Associated Modelers several years ago. The first win on a particular model would call for a 5% handicap, the next win 10%, and so on until the modeler built an entirely new model. Might be one way to get some new stuff in the air.

SAD NEWS

Well, the grim reaper made off with another couple of nice guys. First off, Woody Petersen, a SAM 21 member and new prospect for the new SAM 49 Club, suddenly died of a heart attack on November 24, 1977. All the fellows are going to miss his easy-going manner, as a better winner you couldn't find; unassuming, friendly, and a real down-to-earth guy.

In the Midwest, via the CIA gang and Harry Murphy, comes the report that Dutch Hess, a real stalwart of the Chicago Aeronuts, passed away. As Murf sez, it just seems like yesterday he donated a real nice old-timer engine to help raise money in a raffle. At the last Chicago O/T meet in the fall, there was Dutch sitting out enjoying the fun and helping whenever he could. They are going to miss that boy!

FUN NEWS

According to the headlines of the Willamette Modelers Club (NWC) in Portland, Earle "Foggy" Moorhead finally built a model after much talk and loss of bets. Although it was only a Square Eagle P-30, that's real progress. When do we finish the Lanzo Record Breaker? SCIF TEXACO

It truly was a shame that the SCIF Texaco meet at Taft conflicted with the Pond Commemorative at Santa Maria on October 16. Worst part about it all was that only about 60 miles separated the two meets. Well, it isn't the first time, and probably won't be the last time there is a conflict of dates. (Actually,

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in his capacity as SAM Vice-President, the columnist has been trying to get a yearly schedule of non-conflicting O/T meets.)

Although the weather wasn't that great for thermals, Terry O'Meara managed a flight of 55:36 with a Cannon powered Heit "Scram". Jim Adams, who has won so many times before, was again second with his old reliable Bunch-powered Ehling Contest Winner.

A new trophy for the "Most Spectacular Flight", made up of a gold turkey on a marble base, was easily won by Chris Christensen, of Bakersfield. His model broke the dethermalizer string on takeoff, and the most spectacular series of snap-loops then ensued. Fortunately, the model wasn't badly damaged at the end of the power run.

RED KNIGHT IGNITION ENGINES

Maybe the columnist is a little backward on the latest things, but it was quite a surprise to him at the latest Region II MECA Collectogether held at Fremont, when he discovered that Bruce Chandler was offering an R/C ignition version of his Black Knight series.

Actually, these engines are basic O.S. engines that have been fitted with Super Cyclone (or Spitfire) type

points. The exterior is completely finished in red crackle enamel that effectively changes the appearance of the entire engine.

Chandler Engineering, 7858 Faralone Avenue, Canoga Park, CA 91304, is offering a complete line of Black Knight engines ranging from .15 to .36 cu. in. displacement. In the Red Knight series, only two engines are being offered at present: .29 and .36 size.

For those R/C oriented modelers, it may be of interest to you to learn that R/C ignition events are going to be held at the 1978 SAM Champs, with similar rules to those ignition events staged at the 1977 Las Vegas SAM Champs.

FREE PLUG DEPARTMENT

Just received a list of partial kits made by Schmidt Custom Kits of 11948 Franklin Blvd., Elk Grove, CA 95624. If I thought Gene Wallock of P&W had a few O/T partial kits, then Schmidt would be the colossus of partial kit.

On his list were no less than 70 different old-timers for which he will cut ribs and formers. Unlike P&W, Schmidt provides, as his name implies, custom made kits. He stocks no kits, makes only to order, and will make new ones if the demand war-

rants it. In short, if you don't like to cut out parts for any particular plane, contact Schmidt. He will probably make you up a custom kit.

Schmidt is also handling the Y&O propellers presently being manufactured by Bill Schwagerman of Bills Mail Order Hobby. The 16-inch props are quite reasonable, costing only \$2.00 each. He is also providing five-foot lengths of spruce in any size up to one-inch square. Four-foot lengths will have sizes ranging from 3/16 to 1/2 inch square.

GOOF TROPHY

We're gonna wrap up this month's column by talking about some real club fun; namely, a goof trophy. These awards, which are never known for their aesthetic beauty, are not the most highly coveted trophies.

As the name implies, the award is given for the best goof of the day. However, the best fun is to have a perpetual trophy which is awarded every month. In the San Francisco Vultures, this popular pastime of passing the trophy around worked like this:

Once a fellow becomes the recipient of the trophy (in this case of the S.F. Vultures, it was a fur-lined

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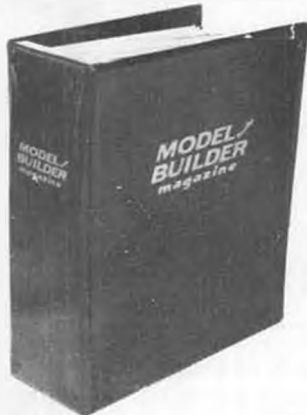
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ing the model he thought he had lost. As he exclaimed, "Now I can get in my last flight", he promptly run over someone's tail. The trophy was immediately awarded.

Directly after this, Bill Wild went to a radio control contest and left his transmitters home. While he was standing around, wondering what to do, he observed this columnist packing his car. With a sigh of relief at the completion of the task, J.P. slammed the trunk shut, neatly severing the Buzzard Bombshell tail which was still sticking out. That trophy really made the rounds that day!

So, men, get yourselves a goof trophy. The laughs generated at each meeting are well worth the effort of making one up. You'd be surprised, once you are the owner, how hard it is to get rid of the darn thing!

Power Boats . . . Continued from page 43

Angeles, California 90045. J.G. props are packaged very clean and well polished. In fact, they only required minimal shaping and balancing treatment. Jim Gale points out that blade area is an important factor, just as diameter and pitch. Taking the same diameter and pitch and cutting down the blade area, will result in more RPM. Nothing magic,

just common sense. When using the prop selection chart, remember to consider the factors outlined at the beginning of this section.

REWORKING PROPELLERS

When reworking b.c. props, you must prepare the prop by heating it in excess of 650°. A propane utility torch works nicely for this step. Have a metal bowl or can filled with water nearby. Once the prop has reached the desired temperature noted by the dull orange color, drop the prop carefully into the water. The sudden change in temperature will soften the b.c. and allow the prop to be reshaped, filed, or sharpened. Caution is advised throughout this process, and also, be sure to leave the prop in the water so that it cools sufficiently. Don't rush.

A necessary procedure with all props will be sharpening the leading edge of the blades and squaring off the trailing edge. The leading edge of the concave side of the blade must remain sharp and should not be rounded with emory paper. This area is very critical to the performance of the prop. If it is not clean and sharp, the prop will not cut through the water properly. Thus the leading edge should be thinned, primarily on the convex side of each blade. By placing the prop on a stub 3/16 driveshaft locked in place with a collar and drive dog, you will be able to file the leading edge with the assembly secured in a vise. File the b.c. carefully and, of course, sharpen blades equally.

Most props require the trailing edge to be squared off at 90° to the inside and outside blade surfaces. The casting usually leaves the corners rounded. Turn the prop over on the stub shaft and lock it in place. File in back-and-forth motions at a right angle to the trailing edge. Move from the tip of the trailing edge to the hub area. Be sure not to curve the trailing edge in anyway.

To reduce lift, try one of these proven methods. Carefully remove material from the trailing edge of each blade near the hub. File from the tip to the hub, removing very little from the tip and proportionally greater amounts of the trailing edge towards the hub. Another suggestion is to cup the leading edge so that prop entry is softened.

Dial-a-Prop, 840 E. 64th Street, Indianapolis, Indiana 46220, produces mandrels in two sizes. As shown in the photo, these mandrels are very helpful to the boater in cupping blades . . . Or how about straightening out those bent props for the unplanned assault of the shoreline? Also, if you want to build your own hot props, then Dee Hughey has everything you'll need;

thundermug suitably mounted on a mahogany base), he must catch another modeler in a goof. This does not mean he can hear about and award it at the next meeting. He must be present when the incident occurs.

The club has found from past experience, this encourages participation in club activities. How else do you get rid of this endearing trophy? A couple of examples are in order.

While at a free flight meet, Bill Yerby came tearing across the field on his motorcycle, gleefully carry-

SCALE CLASSICS!



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Five exciting and historically important aircraft in plastic kit form, featuring a selection of configurations and decal markings.



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blades, hubs, prop dies, pitch gauge, silver solder kit, copper, posts, spacers, etc.

MEASURING PITCH

Propeller pitch has a direct relationship to rpm. If you want to hit the 100 mph mark, then turn a prop with 5 inches of pitch at over 21,000 rpm. Of course, that's providing that the prop moves with 100% efficiency through the water. That doesn't sound too difficult, except no one has ever done it.

Hughey Boats, P.O. Box 68328, Indianapolis, Indiana 46268, has developed a very useful propeller pitch gauge. It is an accurate way to determine the pitch of all size props, and even to check the varying amounts of pitch on each station along the blade. The whole idea is to help the boater know the exact pitch of each prop so that he can record its success with a particular boat.

Included with the Hughey Pitch Gauge are complete step-by-step instructions, pitch chart, and a wallet-size mph speed chart. As demonstrated in the photos, the pitch gauge is also useful for re-working and straightening blades.

BALANCING

Another necessary step will be to balance your props. At the rpm we are turning, the prop must be perfect. In the photo you will see a simple, yet very effective prop balancer made by Charlie Pottol, of Saratoga, California. It was made from bar stock. The base and side pieces are 1/2 inch thick. Affixed to each side is a single edge, razor blade. A Mayes Orbit Level is attached to the base and, of course, is used to measure adjustments made to the three cap screws which are support legs.

The prop is slipped on a short piece of shaft and placed across the razor blades. Keep removing material from the convex side of the blade which tends to point downward. Proceed with this operation

until the prop balances.

Before buffing and polishing, be sure to strengthen the b.c. props by baking them in the oven at 610° to 625° for 3 hours. Then remove the prop and let it cool gradually to room temperature.

Maybe some of you have other suggestions or prop tips you wish to share with our readers. Please drop me a line.

Museum Continued from page 11

about anything you could imagine. Bud and Dotty spent several hours alone . . . all alone . . . checking out the beautiful and brilliant built-ups of days gone by. Bud emphasized the word "alone", because two floors below, the museum was teeming with thousands of tourists, all of them completely oblivious to this fantastic display of aviation history condensed into model form.

"The Aerospace exhibit is great," says Bud, "but the real hidden treasures are the models . . . as always."

Counter Continued from page 9

This is also true in the case of kits for these types of systems, such as those available from Charlies R/C Goodies, with a line ranging from two-channel (dry) kits at \$99.95 to five-channel full nicad kits at \$199.95.

Versatility seems to be the name of the game, as the transmitters can be ordered with any desired stick arrangement, including 3-axis single sticks, and can later be added to exactly as desired with the conversion kits available.

The transmitters are ultra small, being 1-11/16 x 4-13/16 x 5-5/16 inches in size. A pre-assembled, tuned RF section is provided, having an output of 750 milliwatts on 72 MHz. The receiver is double-tuned, with FET RF amp and mixer, and dual AGC and CMOS decoder. The cur-

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rent drain is a low 8 mils.

Two servo types are available; one is the standard size CE-4 at 1.25 ounces, featuring 4 lbs. thrust. The Sub-Mini CE-8 is 19/32 x 1-7/32 x 1-7/32 inches, 1.25 ounces with 3 lb. thrust. One assembled and calibrated servo is received with each kit to aid in transmitter alignment. A choice of 450 or 500 mah batteries is standard with all but the Sub-Mini Flite Packs, for which 100 or 250 mah cells can be ordered.

System weights, with two servos, is 6.7 ounces for the Standard and 4.1 ounces for the Sub-Mini Flite Packs.

A complete brochure is available for 25¢ in coin or stamps within the U.S., or \$1.00 to foreign countries, from Charlies R/C Goodies, P.O. Box 192, Van Nuys, CA 91408.

* * *

Retracts by Rom Air are in use by too many flyers, well-known and otherwise, to need any introduction. This Freon operated system fits into 1-inch thick wings, and adds only five ounces with a two-wheel gear; seven ounces for tricycles. The set comes complete with all tubing and valves necessary, and is backed up with extremely rapid parts and service availability.

What does need some introduction are some of the latest develop-

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ments from Rom Air. It now has a flat-mounted nose gear, for some of those scale projects, such as the Bridi "Shrike", that don't have room for an upright firewall-mounted unit. It also has 90-degree rotation mains, such as required for said "Shrike", and for some of the scale fighters such as the P-40 and the very popular F4U. A special set is available for the Platt FW-190.

All Rom Air's come with 5/32 struts, which are easily bent to the required length. As our birds seem to be getting heavier and heavier, you may now obtain the set of your choice with 3/16 inch struts, on special order only.

Rhom Products Mfg. Corp., 924 65th St., Brooklyn, NY 11219, will be glad to send you all information on its complete line. And if you have any special requirements, ask for suggestions . . . they've probably already solved your problem.

Millcott Corporation, manufacturer of high quality radio systems for those applications requiring extras in quality and features, has available a 3-channel system based on its Specialist 6 and 8-channel sets. Called the Specialist Three, it is definitely out of the "basics only" class of small systems available; and

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SPARROW HAWK F9C-2 (3 sheets)	\$11.50
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CURTISS HAWK P6E (3 sheets)	\$14.50
2" scale R/C, 63" span	
GRUMMAN J2F-6 "DUCK" (4 sheets)	\$19.50
1-1/2" scale R/C, 58" span	
LOCKHEED P 38 (2 sheets)	\$12.50
1" scale C/L, 52" span	

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designed for the competitor or advanced flyer.

Like its big brothers, the Specialist Three transmitter is housed in a vinyl clad case, of compact 5.15 x 5.6 x 1.8 inches in dimensions. It uses a Bob Dunham semi-open gimbal stick assembly with mechanical trims and conductive plastic pots. The third channel control lever is conveniently located on the upper left-hand side of the case.

Except for the number of channels, the airborne system is identical to that used with the other Specialists; the same metal-cased receiver for maximum crash protection, and the miniature MC-2 servos so well proven. These servos are small and light enough for most applications, including 1/2A, yet powerful enough for all normal flying. Either standard clockwise rotation or reversed servos can be had as specified with your order. The system is normally equipped with a 500 mah battery, however, either 225 or 450 types are available.

Of primary interest to the Vee-tail or flying wing builder is the Specialist's bi-directional electronic mixer, which is standard equipment, and which can be ordered for use with "ruddervators" or "elevons";

or for "flaperon" action. The system can be custom-tailored to your exact requirements.

Available on all 72 and 53 MHz frequencies. Inquire at your dealer, or from Millcott Corp., 1420 Village Way, Unit E, Santa Ana, CA 92705.

Wanna get in the air fast with a twin? Or get in the air with a fast twin? Then have a look at the "Twin Stik Trainer", for .19 to .30 engines, from Midwest Products Co.

The kit features all Micro-Cut balsa construction, pre-formed landing gear, complete hardware package, including hinges, screws, a nylon steerable nosegear bearing, and aluminum engine mounts. The Twin Stik has a 54 inch wingspan, is claimed to be an exceptional flyer with one dead engine. It requires a four-channel system for control.

Look for this \$49.95 kit at your nearest Midwest Products dealer, or write for info and availability to Midwest Products Co., 400 S. Indiana St., Hobart, IN 46342.

Two new designs have just hoisted anchor at Steve Muck's R/C Boats in Dallas, Texas.

One is the "Lil' Lightning" tunnel outboard hull for the K&B .21 outboard engine and two-channel radios. It is designed by the well-known George Campbell, of Arleta, CA, and features all pre-cut pieces. The frames and formers are cut from high-quality birch plywood, the stringers, sheers and bracing are all of spruce strips.

The kit also includes a fiberglass rear cowl, hardwood rails, and a plexiglass cover for the radio compartment. The building manual includes 26 photos depicting the various phases of construction.

The "Lil' Lightning" is 30 inches long, 12 inches wide, and weighs less than 5 pounds. It is designed to accept the new auto-trim by K&B. Only \$48.95 for the complete kit.

Steve's other new boat is the "Mini Dolphin", for .09 to .15 R/C marine engines and two-channel radios. It is 22 inches long, with a width of 7-1/2.

This kit also comes with cut-out bulkheads, deck sheers, and cabin sides, and aircraft quality plywood sheeting, plexiglass radio box cover, turn fin, motor mount plate, and engine bearer blocks. It requires a Dumas No. 2326 or 2327 hardware kit.

Complete with photo-illustrated building-instructions, the "Mini Dolphin" is claimed to hold its own with the best .10 size boats at the lake.

Both of these new kits are at, or on

the way to, your favorite boat dealer. For more information, write Steve Muck's R/C Boats, 6003 Daven Oaks Drive, Dallas, TX 75248.

Among the little known facts of aviation is that Icarus was one of the first to use solar energy in flight. It turned out that it helped him test his ejection seat. . .

For you later pioneers, there are still many possibilities, now made somewhat easier with the appearance of a new card-like Silicon Solar Cell, designed to replace or back up dry cells in industrial applications. Known as the Eduprod Solar Battery, it measures 3-1/4 x 2-1/8 x 3/16 inches, and weighs only .9 ounce. It is composed of 16 individual chips wired in series, of the same type as used on the NASA Voyager series space craft.

The cell will convert sunlight or tungsten bulb equivalent into electricity rated at 6.0 volts at 25 milliamps over a recommended temperature range of 28 to 100 degrees Celsius. It can be used to power equipment designed for the popular 4.5, 6, or 9-volt dry batteries, and comes complete with a 9-inch wire lead connected to a 9-volt battery type snap-on terminal.

The Eduprod Solar Cell is available at \$26.95 postpaid, from Educational Products, P.O. Box 606, Mineola, NY 11501.

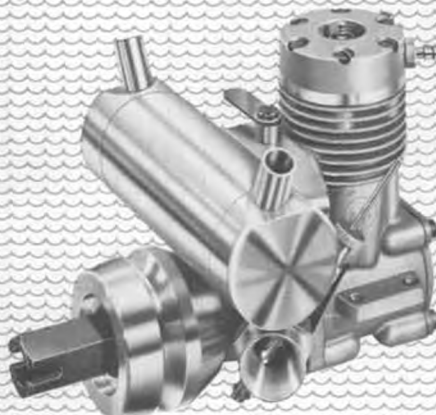
An electric winch capable of launching all classes of R/C gliders in all wind conditions, has just become available from the manufacturer, Hi-Flight Model Products. It is to be known as the Hi-Flight 12, is powered by a conventional 12-volt automotive battery, and features a single foot control that allows the flyer to select slow, medium, or fast winch speed as dictated by the glider size and wind conditions.

Low speed is typically used for line tensioning and launching of light birds into high wind. Medium speed is used for standard class gliders in low wind or unlimited ships in high winds. The highest speed will launch the heaviest sailplanes with ease. An isolation switch is provided to eliminate high speed when desired.

The Hi-Flight 12 is built on a rugged welded steel frame, and uses a rebuilt 12-volt starter motor and machined 2-inch core drum. It comes complete with all electrical components required and a ball bearing turnaround, but less battery, for \$179, FOB.

A Hi-Flight 12 Kit is available, including all of the components less

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This K&B Inboard is specifically designed as a marine engine. Powerful, rugged and dependable, it will provide countless hours of high performance operation. Easy to start. No break-in required. Precision machined U-Joint Nuts fit most existing ball drives.

Features include:

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Features include:

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- Flywheel designed for cup electric starter
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- Integral cavitation plate and skeg
- Tough transom mounting plate to withstand stress of flat-out racing.



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motor, and winch, at \$98. Motors are available separately for \$22.50, and drums for either 6 or 12-volt winches are \$24.95 each. All direct from Hi-Flight Model Products, at 43225 Whittier Ave., Hemet, CA 92343. COD orders are welcome.

Tuned pipe manifold headers, as necessary for the attachment of tuned pipe or tuned pipe mufflers to your K & B, Kraft, OS or Webra .60 engines, are now available from Jenesco Engineering, 1649-1 W. Sepulveda Blvd., Torrance, CA 90501.

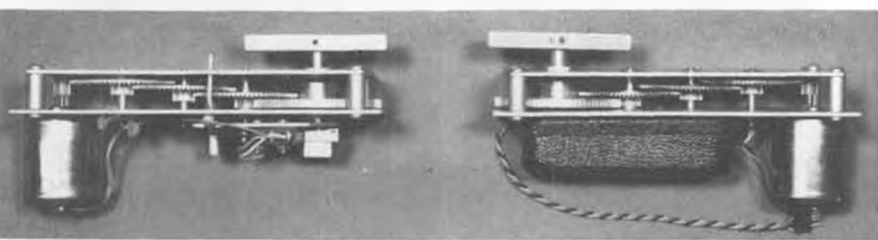
These headers are manufactured

of 6061-T6 aluminum, and are equipped with the proper size socket head screws and fittings as necessary for a neat, but secure installation.

The price is \$17.00; and models for other engines will be available in the future. Inquire directly from Jenesco about a header for your favorite mill.

The 1977-1978 edition of the Aeromodeller Annual, printed by Model and Allied Publications and edited by Ron Moulton, has just appeared. As with past editions, this 5-3/8 x 8-1/2 inch, 144 page booklet

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The Probar W-1 is mechanically operated by a separate, neutralizing servo. The Probar Propo W-2 is designed to plug directly into the receiver, and requires no extra batteries. Specify Kraft, Futaba, or no connector. Both winches are fully assembled and tested, ready to install. All mounting hardware, switch pushrod (W-1 only), and winch arm blank are supplied.

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covers all kinds of popular model designs, from hand-launch gliders to an actual working model of a 1925 Monosoupape rotary engine.

It covers many phases of radio control, controline, free-flight and rubber power modeling, including many popular and successful designs from around the world. It also includes sections on specialized subjects within the various categories, all aimed at helping the reader become better informed and more of a threat at the next competition. General subjects, such as engine silencing, in theory and practice, and an up-dated report of the recent man-powered aircraft success, are also included.

The source of material is worldwide; from Australia, via **Model Builder**, to Poland. If you are serious about the hobby . . . take a close look at this one.

For price and availability, write

Argus Books Ltd., Argus House, 14 St. James Rd., Watford, Herts, England.

The Southwestern Top Cat, a six-foot R/C glider, has been recently introduced as an A.R.F. by Pioneer Models & Accessories, P.O. Box 31, Ona, WV 25545. It is only necessary to join the wings, stab, cover if desired, and go fly. The "Top Cat" has been hand-built and sanded to exacting specifications, and comes complete with all required hardware.

This sailplane weighs 15 ounces, less radio. It uses an underchambered wing of 486 sq. in. area, and is claimed to be an excellent trainer for thermal or slope soaring. It can also be flown with an optional power pod.

The A.R.F. Top Cat is priced at \$54.95, and for a limited time is

being supplied with a free roll of covering as an introductory offer. If not yet at your dealer, it may be ordered direct. Be sure to mention **MB** when you write.

If you build and paint, you'll want to take a good close look at a recently-announced product. It is called "Softglas", and it is designed to fill, seal, and prime balsa wood surfaces, though it will work equally well on most other building materials, such as fiberglass, hardwood, metals, or cardboard.

This one-step process can be brushed or sprayed, dries ready-to-sand in from one to two hours, and will fill and seal imperfections up to 1/8 inch wide. It dries strong, yet flexible, easily sands into a fine powder that will not clog sandpaper. It can be mixed with micro-balloons for filling large holes, or as a molding material such as for fillets. "Softglas" does not require primer over it before final paint application . . . which can be lacquer, dope, enamel, epoxies, and most commonly used model finishing materials.

One quart of "Softglas", priced at \$7.95, should cover the average size airplane, though possibly some of the larger .60 sizes may require somewhat more. For further information, inquire from Ohio Superstar Model Products, Box 2522, N. Canton, OH 44720.

If you are at all serious about R/C gliders, and care about staying abreast of the latest developments, you can't be without a copy of a catalog/instruction booklet just released by "Super Wings", 11015 Glenoaks Blvd., Pacoima, CA 91331.

This company offers foam wing cores and accessories on a custom basis only for the "pro" builder and flyer; available for a large number of popular kit designs, such as the "Aquila", "ASW-15", and Graupner "Cirrus". A complete list, including the airfoils used for each, is included in the catalog. Included also is information on the line of Wing Pin Tongue materials recommended and available. A number of interesting looking ASA plastic glider fuselages and "Super Wings" Greenskin covering are described.

In addition to the catalog listings, the booklet is a mine of information on the treatment of foam core wings, including a large number of clear concise how-to illustrations. The text describes tools, adhesives, techniques; and a discussion on the relative weights of foam wings versus other methods of construction. If you are contemplating your first

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38/600	\$25.00	Internal A-class	\$35.00
West Coast 12-Meter	\$30.00	Star 45	\$30.00
Vanguard "J"-boat	\$40.00	T&A Petrel	\$30.00

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Department MB
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Santa Barbara, CA 93101

foam wing, glider or not, you should certainly read this information about adhesive application, finishing, and what is referred to as "wing tuning".

We think you'll agree it is well worth the \$1.50, from the above address. Tell them **MB** sent you.

* * *

Even to us non-boaters, the name Jerry Dunlap is familiar. And knowing full well that a competition modeler is only as good as his equipment . . . if Jerry uses it, it must work. "IT" in this case is a Model 3-20, 3-bladed model boat prop available from Rick's Jewelry Repair and Mfg., reportedly used by Jerry on his record-holding .21 outboard deep-vee.

The 3-20 prop has been extensively tested also on .21 inboard deep-vees and outboard tunnels. It is made of beryllium copper, is an investment casting, and is priced at \$6.95 plus 75¢ for handling and shipping. Rick's is at 1220 Ocean View Hwy., #6, Longview, WA 98632.

* * *

Are you a user of the Cox or Rossi 15's? If so, you are well aware of the fact that these high-revving powerplants require the best in motor mounts in order to produce those last few hundred RPM that will keep

you out in front of the competition.

The CB-30 mount, as manufactured by CB Enterprises, is highly recommended. Of course, you have to drill and tap it, and in some manner, remove part of the mounting flange so as to provide clearance for the rear exhaust and pipe, if used. You can now avoid this unpleasant chore by purchasing a precision drilled and machined mount for your .15. They are priced at only \$6.85, plus \$1.00 for postage and handling, and available directly from R/C Etc., P.O. Box 127, Costa Mesa, CA 92627. ●

Sailing *Continued from page 41*

competition. A total of 53 events have already been put on the calendar, sponsored by 49 AMYA Sanctioned Clubs. With earlier deadlines for this schedule than in previous years, I'm sure that the final version will be almost double the length of the preliminary. Also, one must remember that not on the schedule is a real raft of sailing . . . the local series and events that each club schedules for its own members. As an example, our local Club, the Potomac R/C Sailing Association, is holding a one-day match racing event for EC/12's, as well as the Eastern Divisional for that class. Not

on the schedule, are 14 other events for the 12-meter fleet and the 50/800 fleet that make up this club's membership, plus an "open" fleet of still undefined extent. Other nearby clubs have a similar commitment relative to their local schedules. Looks like we might have 300 to 500 days of actual organized sailing (occurring in duplicity on the weekends, of course!!!).

ROSY LOOK INTO THE FUTURE

Based on the past year in business and in competition, I see a definite slowing in the annual growth rate. This is, in a large part, due to the retirement of a number of key individuals who are just plain tired of scoring and judging while others are sailing. In my opinion, 1978 is going to be the year of "FISH OR CUT BAIT." Each club is going to have to meet head-on the problems of declining memberships, or formula class evolutions, of members who won't carry their share of the administrative and logistic load, and so on. I have experimented this past season with a "GUEST REGATTA DIRECTOR" program. Details have been discussed in a previous column, but in short, the idea was to receive second-place cumulative points in exchange for a day of running a local regatta. The idea being to encourage skippers to put

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their transmitters down for one session and get experience in the administrative end of racing. Out of a 16-boat fleet and a 7-regatta season, I got three takers. Two didn't need the score boost . . . Bob and Chris Harris, who finished 1st and 3rd in fleet; and a third . . . Art Walters, who gained significantly to wind up 4th in Fleet, in a combination of improved sailing and his day in the barrel as Guest RD. Those in the fleet who had the most to gain showed absolutely no interest, apparently preferring to take home a 12th Place ribbon rather than admit, once and for all, that they really need to study the rules a bit, as well as figure out just what a heat list is all about. I don't know what this year's Fleet Captain will do. It's his game in 1978.

The one sure place that we are going to make or break our hobby is going to be in the information-passing arena. Right now you are reading the only monthly coverage

of R/C yachting activity in the entire USA. I must doff my weatherbeaten hat to **MODEL BUILDER'S** fearless editor, who took a chance on us way back in the early 70's, long before AMYA had gotten past a mimeographed newsletter (no offense, Rich!). If you thumb through the other mags on the stand, you'll find a powerboat column in every one of them!!! They are looking for a sailing contributor, but that's been going on for a good long time. Can you spell your own name? Got any opinions you'd like to see spread from coast-to-coast (and overseas. wcn)? Are you finally ashamed enough of taking, taking, taking from the hobby and never giving anything in return?? Well hear this . . . now is your chance.

Another problem we have got to cure is that of converting every new design into a fiberglass mold because some turkey thinks he is going to get rich. It just doesn't happen. And each time a new fiberglass hull

hits the water, the lack of information about it, the lack of a lines drawing or of a good estimate of her comparative strengths on the water . . . all these contribute to the continued second class status we will enjoy in formula class racing against an international challenge. Good design work for the formula classes is going through a period of extremes now. Since we do not have the hull lines available to us, there is no way for any of us to go out and purposely build something that is a cross between a BINGO and a WIND II, or a mating of a WARRIOR II and a BOOMERANG. The closest we have ever come was Chip Bullen's LIBERTY 76. Chip said he took features from all the boats he came across. What he did was really blend his feelings about a series of boats. Without the guidance of the workers before him, there is just no way that Chip or anybody else is going to be able to work on an evolutionary family of hulls. Forest Godby's work on the WIND 50/800's and 10-Raters is as close as we have gotten to that.

Our Canadian friends have done quite the same, with the notable exception of the symmetrical 50/800 which was published in "that English magazine" a few months ago. The list is long, from CHINOOKS to SAMARAI's, that sail the waters, but whose lineage is misty, and whose parentage is quite in doubt.

I guess part of the reason that I put the time into TRACER was to really try to make a measurement of the A-Class within AMYA. I had to go to Australia for a designer who was willing to contribute to the sport. (Let me doff my sou'wester to Adrian Brewer!!)

I predict that if a formula class challenge is sailed, the American's will have their heads handed to them. I can't diminish the accomplishment of the present holder of the Mini-America's Cup. But it was at his urging that our Club is sponsoring the Potomac Match Cup. Harris will tell you with no hesitating

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that the next time the Mini-America's Cup is on the block, it will be won in 4 races to 3. But he won't tell you who the winner will be!!!!

Remember to mail your 1978, \$5.00 dues to AMYA Secretary, Bob Crysler, 2709 S. Federal Highway, Delray, Florida 33444.

I'll field questions for a stamped, self-addressed envelope. And I'll out-and-out beg for your input to this column. Both Jay Selby, of RCS, and I, are tired of whistling in the dark . . . Rod Carr, 7608 Gresham St., Springfield, Virginia 22151. ●

Remotely . . . Continued from page 18

cover story in last month's MB, Dick Tichenor turned in the following report.

The West Coast ducted fan enthusiasts had an exciting event take place at Mile Square Park in Southern California in late January. Bob Violett brought his latest A-4D model out from Maryland to fly with some of the local jet-setters. Flying with Bob was Larry Wolfe, with his Mirage III, and Alan Arnold, with his A-4D, built from one of Bob's kits.

Each of the three put in a few check-out flights, and then came the piece-de-resistance, the three jets flying in formation. Watching high speed low passes and rolls in formation is quite a mind-blower, and a thrill that the spectators will not soon forget. To our knowledge, this is the first time that three ducted fan powered models have been flown together.

A few evenings later, Alan Arnold hosted a ducted fan seminar at his home. Bob Violett graciously shared his years of fan experience with over a dozen members of the Scale Squadron, who are currently building jet-type models. Alan, Bob, and Larry are to be congratulated on their success with ducted fan powered flight, and their willingness to assist other modelers.

TEMPUS SURE DO FUGIT

We were surprised to find that it's been over a year since we published our first article on Mammoth Scale (January '77 MB). At that time, our concept was of huge, open-structured, lightweight scale models out of the Classic Era, using large-propped and/or gear reduction .60 size engines. Our aircraft specifications were somewhat loose, but generally suggested not less than 1/4-scale, with the exception that biplanes need not exceed a span of 8 feet, nor monoplanes exceed a span of 10 feet. What we left out at that time was a *minimum* span.

Since that article was published, the popularity of Mammoth Scale has really exploded. However, with the introduction of larger engines capable of turning big props at low-speed and high torque, the self-governing feature of weight control using nothing larger than a .60 engine, was lost. On the other hand, it has proven out that the bigger planes, though quite a bit heavier, still enjoy slow, scale, flight speeds.

In deference to the wider choice of scale subjects, we conceded to leave the word "Classic" out of the word description, but also to widen the choice of scale subjects, we emphasized last month that the name Quarter-Scale should be avoided.

Well-known eastern scale modeler, Nick Zioli, reinforces this last point in a letter that obviously crossed paths with our February issue.

"I've been following your Mammoth Scale event ideas with interest. If this is for 1/4-size models, then it might not be what you think. When is a 1/4-size Mammoth Scale not a Mammoth Scale model? When it's a model of any airplane with a 20 foot wingspan or less.

"Instead of setting a scale (1/4), why not set a minimum wing area. I would envision 1600 sq. in. for monoplanes, and 2000 sq. in. for



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biplanes. This is twice the size of the Circus Circus acrobatic models required for 1978. I think this would maintain a large size model you desire. They are a lot of fun to fly. There are many good airplanes that are just too big at 1/4-scale.

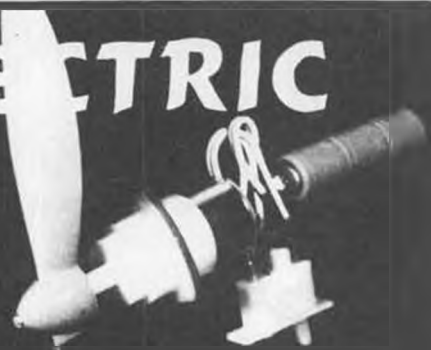
"I am trying to get some work done on a Mammoth Scale F4U-1 Corsair. It's not 1/4-scale, but it is Mammoth! Span is 93 inches, length 72, and wing area is 1650 sq. in. Power will be a Max 60 with Du-Bro reduction. It's all built up, and mostly all fabric covered."

Well, Nick, we were about one second ahead of you on the "forget quarter-scale" bit, but your idea on minimum wing areas may be just the specs that are needed to control size. (Good Grief! Our 9 foot span Aeronca, still not finished after 10 years, would be "out"! It's area is only about 1280 squares.) Perhaps one thing more is needed, and that's something to show the FAA that we're conscious of our responsibility when it comes to safety in the air . . . a maximum weight . . . say 25 pounds.

We'd like to hear from our readers on this subject. Of course, as mentioned in this month's "Workbench", Ron Shettler, the Quadra

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man, will be writing a regular column on Mammoth Scale, beginning with the next issue. So at that time, we'll turn your answers over to his department.

TEXAS SCALE CHAMPS

While we're on the subject of large scale, the 5th Annual Texas Flying Scale Championships, will feature a category for R/C Jumbo Scale. The requirement here is quarter-scale, or, a minimum of 80 inch wingspan.

Actually this scale champs is not just R/C. In addition to events for

Jumbo and regular Sport Scale, the contest will feature gas, rubber, and Peanut Scale free flight, plus sport scale control line. All of this takes place Saturday and Sunday, June 10 and 11, in Abilene, Texas. For more information, contact the Contest Director, Jerry Farr, 2802 Robertson Dr., Abilene, Texas 79606. ●

Workbench . . . Continued from page 6

construction article in our very first issue back in September of 1971, Bob Upton. It is a model of his own full-size Baby Ace, which incidentally, because of the modifications he has made, is officially known as the "Upton Baby Ace". The model is quarter-scale, and uses the DuBro belt-reduction drive system.

THINGS TO DO

A lot of Southern Californians are being confused by the apparent scheduling of two modeling trade shows only a week apart. The 3rd and 4th weekends in April. We'll try to set you straight.

The International Modeler Show is the newest of the two shows, and is for modelers only . . . along the lines of the Dallas, New York, and Toledo shows . . . no crafts, and no

model railroading. This show was announced more than a year ago, and is scheduled for April 28, 29, and 30, at the new Los Angeles Convention Center. It will feature radio and TV coverage, will have static display competition in many categories, will host a District 10 AMA meeting on Saturday evening, and many of the nation's leading radio, engine, and kit manufacturers will be displaying their products.

The MAC Show, which for several years had been scheduled in the Anaheim Convention Center, has moved to Long Beach and just recently announced its show date for April 22 and 23. Sponsored primarily by the Southern California Hobby Industry Association, the well-known MAC Show features crafts and model railroads, along with model airplanes, boats, and cars. It will also have static model display competition and many craft seminars.

* * *
If you happen to be dropping by Burlington, Ontario, Canada a couple of weeks later, May 6 and 7, to be exact, you might want to take in the 8th annual Radio Control Model Aircraft Exhibition and Flying Show, sponsored by the Stoney Creek R/C Club. It's at the Nelson Recreation Complex, 4235 New Street, in Burlington. There will be model exhibit competition in many categories, distributor displays, swap shop, and two flying shows daily.

DIRTY WHO?

That famous author and photographer, A. Nonny Mouse, has laid claim to another piece of valuable literature. In the February issue, we published Part II and/or the conclusion to a learned piece on the ways and means of constructing and getting the most out of .049/.051 powered 1/12-scale R/C race cars.

Quite by accident, and also because no one else would accept the by-line, this article was not credited to its rightful creator; our one and only half of the Smith Brothers, "Dirty Dan" Rutherford. In case you didn't recognize his delicate prose, a brief perusal of most any Control Line column in a recent issue of **Model Builder** will set you straight.

LSF LEADER

In an election that saw 39% of the membership cast ballots (can any organization beat that!), Gordon Pearson (LSF410), of South Lyon, Michigan, was elected to the presidency of the League of Silent Flight for the 1978-1979 team.

Elected with Pearson were: Vice-President, John Nielsen (LSF 240), Wilmette, Illinois; Secretary, Waren Tiaht (LSF 241), Troy, Michigan; and

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SELLING MODEL AVIATION LIBRARY: M.A.N., Aeromodeller, Air Trails, books. Write for list. Ray Hansen, 3033 Rutgers Avenue, Long Beach, CA 90808.

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Treasurer, Keith Finkenbinder (LSF 601), Naperville, Illinois.

The League of Silent Flight lists 2736 members, including the USA and twenty-two foreign countries. MIKE RETIRES

The string-bean half of the Top Flite duo, Mike Schlesinger (of course, the other is Sid Axelrod), is hanging up his executive Monokote iron on February 17. On that date, he will retire as President of Top Flite Models, Inc., of Chicago. Sid Axelrod has been named president to succeed him, and Bob Nickels has been promoted to the office of vice president.

Sid and Mike started the model airplane kit company in 1945 and operated as partners until 1975, when the company was purchased by William C. Nickels, president and owner of Replogle Globes, Inc., also of Chicago.

THE RELUCTANT RADIALS

It is with deep regret that we must announce the indefinite suspension of production on the magnificent Hargrave 5 and 7-cylinder radial engines. The manufacturing company, Technopower Enterprises Ltd., of Shannon Ireland, partly owned by the engines' designer, Glenn Hargrave, met with some

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unfortunate financial setbacks during 1977, which forced it to discontinue any plans to produce the radials for some time to come.

Glenn has acquainted us with a few of the details regarding the company's financial problems, and

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we are sorry to say that Glenn and his partner seem to have been dealt with in a somewhat less than ethical manner.

There is, however, still a dim light at the end of a long, long tunnel. Glenn says, "Every bit of energy is being put into getting this show back on the road, and rest assured that the radial project is a labor of love, not one we get rich on; and for that reason alone, together with all the effort over seven years to perfect them, they will continue . . . if somewhat delayed. I would like to apologize through the pages of your magazine to all those who have shown interest in the engines."

One thing sure . . . we're going to keep the faith.

IN CLOSING

We always like to finish up with something that will leave you chuckling, and this time we've got a good one that is credited to Charlie Palermo, of Houston, and a member of the Manned Spacecraft Center Radio Controlled Club.

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THE MOTOR . . . high efficiency, heavy duty, special purpose design. 23mm armature supplies power enough for most .09 size models. Complete with prop drive nut, washer and mounting hardware.



THE CVR . . . the "brain" of the flight pack. It prevents over-discharge. Lets one battery operate radio, servo and motor and features a special servo-controlled, on-off micro switch that allows gliding between periods of powered operation.



THE BATTERY . . . nickel cadmium 9.6 volt, 600 mah pack with internal thermal circuit breaker and plug-in polarized connectors. Enough power for both motor and radio. Fast-charge on-the field from your auto's cigarette lighter.



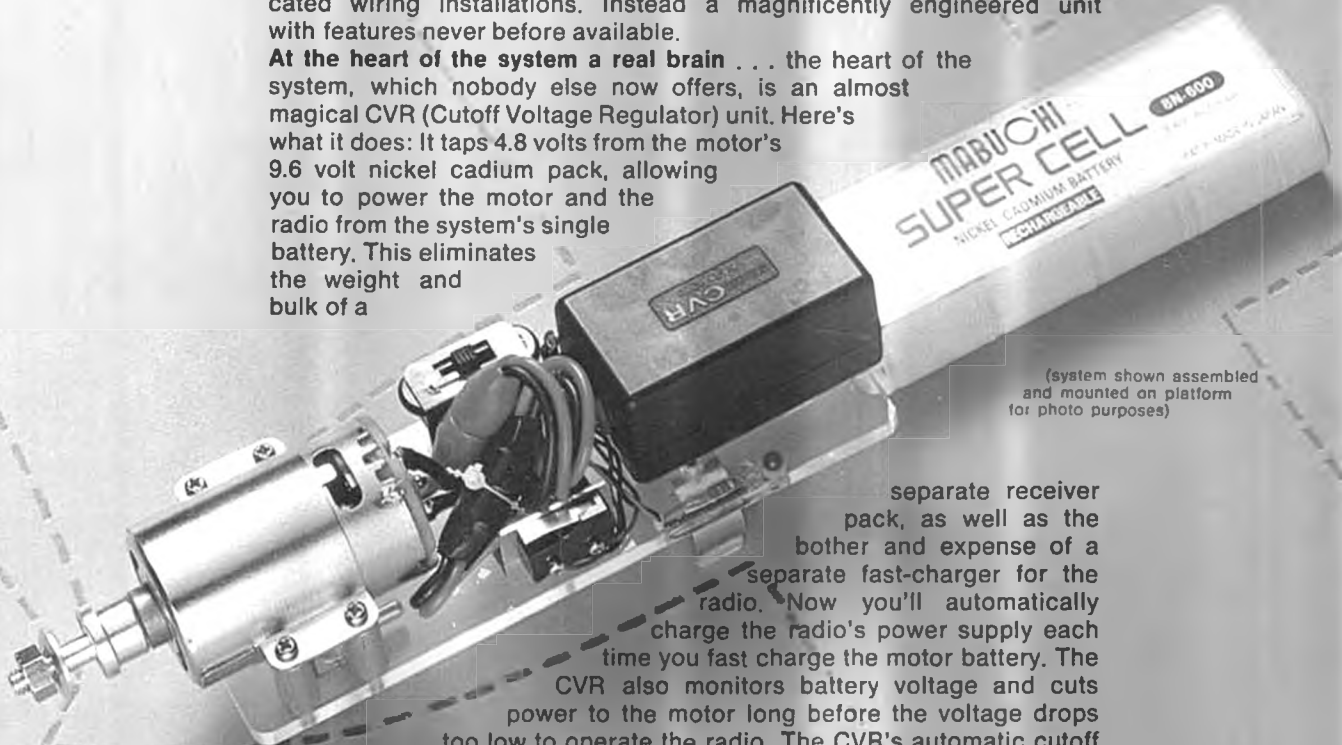
THE CHARGER . . . built-in ammeter monitors charging. Designed to fast charge from your car battery in less than 25 minutes. When used with the rest of the system has cutoff to prevent overcharge.

MRC-Mabuchi all electric power system for planes, boats, cars

There has never been anything like it before

At last there's a ready to run electric power system for .09 size models that's complete in one box. No separate components to buy, no complicated wiring installations. Instead a magnificently engineered unit with features never before available.

At the heart of the system a real brain . . . the heart of the system, which nobody else now offers, is an almost magical CVR (Cutoff Voltage Regulator) unit. Here's what it does: It taps 4.8 volts from the motor's 9.6 volt nickel cadmium pack, allowing you to power the motor and the radio from the system's single battery. This eliminates the weight and bulk of a



(system shown assembled and mounted on platform for photo purposes)

separate receiver pack, as well as the bother and expense of a separate fast-charger for the radio. Now you'll automatically charge the radio's power supply each time you fast charge the motor battery. The CVR also monitors battery voltage and cuts power to the motor long before the voltage drops too low to operate the radio. The CVR's automatic cutoff also prevents deep discharge of the battery pack which could otherwise dramatically shorten battery life. With other electric power systems you have to guess when to shut-off the motor so as not to damage the batteries. The MRC-Mabuchi CVR does it for you.

Easy and sure . . . we've engineered all the hassles out of electric model power. This is the simplest, most carefree way to go electric. There is nothing else like it.

See it at your hobby dealer. If he can't help you write us directly.



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