MODEL BUILDER

SEPTEMBER 1978

volume 8, number 80

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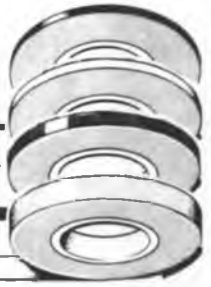

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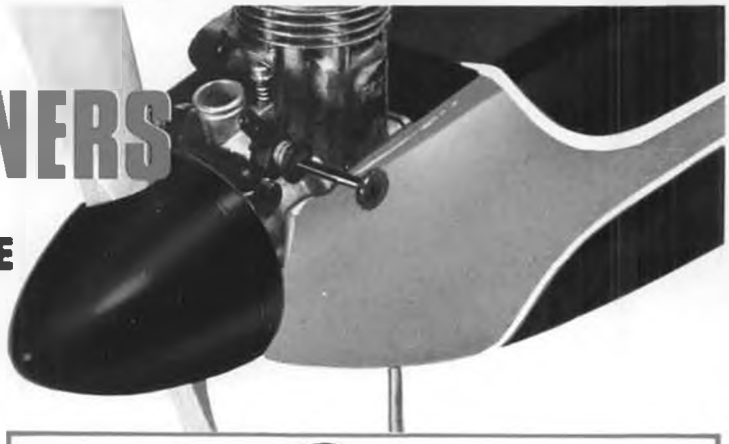

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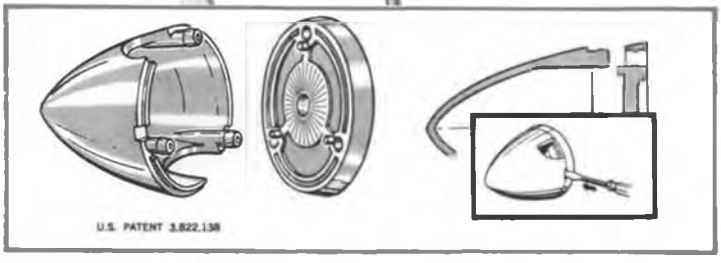

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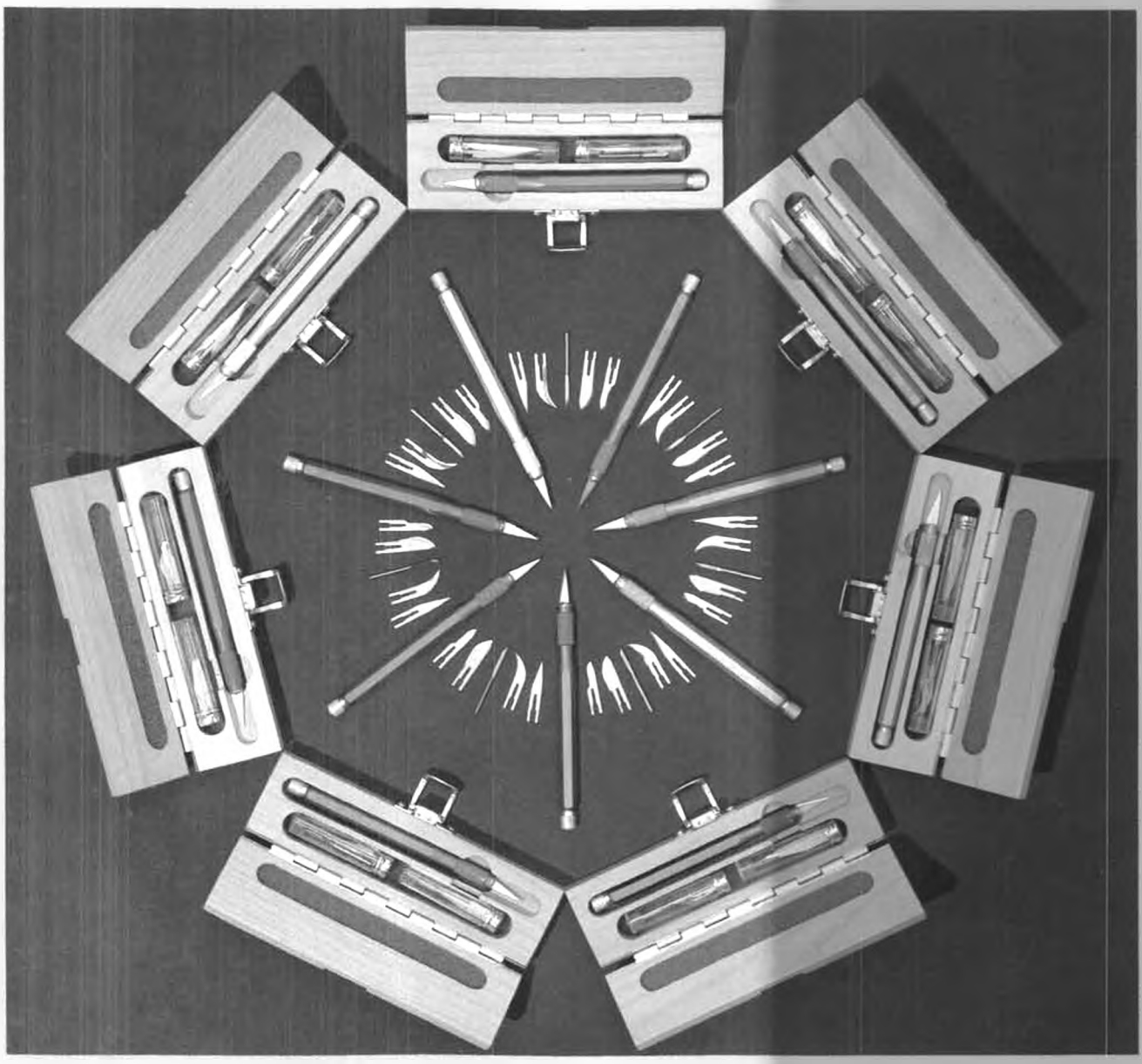

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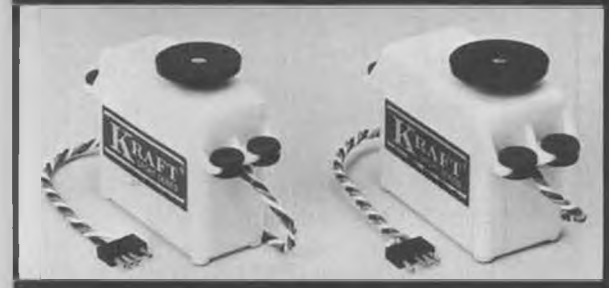

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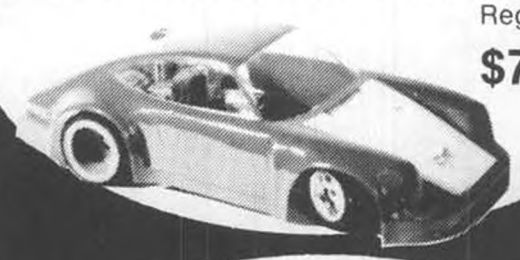

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Nancy, R/C soarer.
R/C Pattern World Championships.
Peanut Fokker D VI.
LSF Tournament story.
Bi-Prentice, R/C bipe trainer.

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

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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.

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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.
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Yankee Gull R/C glider 8' to 12' span.
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Mr. Mulligan 3-views.
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Ryan ST 3-views.
Tethered Cars, R/C sail.

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Mongster QM biplane R/C pylon racer.
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Three profile Peanuts.
Deperdussin 3-views.
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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.

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Bonzo stand[illegible] R/C sport pv[illegible] scale.
Counterf[illegible] ailless A/1 [illegible]ic.
Shoes' [illegible] R/C QM.
Pear[illegible] aylorcraft on [illegible]ts, also big one.
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Profile F4U Corsair C/L stunt, .40 power.
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PT-3 Scale Views.
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Fabulous PEA POD, R/C sailboat.
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R/C Spirit of St. Louis, semi-scale, .049-.09.
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Finish painting of rubber scale models.

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Slope soaring technique.
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MODEL BUILDER

SEPTEMBER

1978

volume 8, number 80

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

COVER At this year's Morgan Hill "World War-II Scramble" (see page 32), Earl Thompson's Westland Lysander won for him the Hill Country Craftsmanship Award and also the Documentation Award, as presented by Rare Birds, an aviation history research group Insufficient power hampered its flight, dropping it to second place in Precision Scale Photo by Monty Groves.

Kilburn Adams' radio controlled steam powered launch brings back memories of the great Bogart Hepburn movie "African Queen Steam power has become tremendously popular with boating modelers and the construction of this ribbed and mahogany planked vessel is completely detailed beginning on page 61

from Bill Northrop's workbench

• • •

1978: MILESTONE YEAR . . .
75th ANNIVERSARY OF
POWERED FLIGHT

The following is a salute from the Aerospace Industries Association.

"In the coming year, you will be seeing a lot of the emblem shown above, the Department of Transportation's symbol for powered flight's diamond anniversary. The circular area represents the world, divided into two hemispheres; in the center, the Wright Flyer is superimposed on the outline of a modern jet. The emblem signifies the impact on the world of the extraordinary progress achieved in aviation's 75 years.

"Flight's diamond anniversary is one of a number of notable aerospace milestones to be commemorated in 1978. Among others are the 70th anniversary of military aircraft development, the 20th anniversary of American space flight, and the 20th anniversary of the first commercial service by U.S.-built jetliners.

"On December 17, 1903, Orville and Wilbur Wright made not just one flight but four, each of greater duration than the previous one. The accomplishments of that memorable day at Kitty Hawk set a theme for the story of flight — ever farther, ever faster, ever higher, ever improving efficiency of flight vehicles as the pace of aerospace progress steadily accelerated.

"Seventy years ago, in February 1908, the Signal Corps of the U.S. Army contracted with the Wrights for the first military airplane, which was demonstrated in 1908 although not formally accepted until the following year.

"A half century later, a new aerospace era began with the launch, under military auspices, of the first U.S. spacecraft on January 31, 1958. Underlining the American intent to emphasize peaceful applications of space, President Eisenhower signed — on July 29, 1958 — the National Aeronautics and Space Act. Just two months later — on October 1 — the National Aeronautics and Space Administration officially commenced operation.

"In the same month — October 26, 1958 — came still another aerospace milestone when the first American jet transport, the Boeing 707, went into regular airline service with Pan American World Airways.

"These multiple anniversaries serve as reminders of the leading role of the United States, its aerospace and airline industries, its military services and its space agency, have played in advancing aviation and space technology and utility. On this diamond anniversary of flight, Aerospace Industries Association extends a salute to the thousands of American aerospace pioneers who followed where the Wrights led; their efforts have enhanced world security, improved the global pattern of commerce, and provided a foundation for the forthcoming era of expanded space benefits."

We're a little late bringing this to your attention, and perhaps, because we're modelers, you may think the message does not apply to us . . . Far from it, as the anniversary commemorates powered flight, beginning with the Wright Brothers on Decmeber 17, 1903. Well, the Wrights were building and flying models well before that date (possibly even before John Pond!), so we have every right to feel that we are part of the celebration.

One more comment . . . With the age of space travel upon us, it is mind-boggling to realize that all of this has happened within the single life span of a great many of our senior citizens, a mere speck in the total time that man has lived on this earth!

THINGS TO DO

Wanna combine a vacation in Hawaii with some good competition flying?

The 10th Annual 50th State Championships, sponsored by the Hawaii Radio Control Aircraft Association, takes place on two consecutive weekends: August 26 and 27, for Pattern, 500 Class Racing, and Formula I; and September 2 and 3, for Sailplane, Helicopter, Sport Scale, and IMAC Biplane.

Write to Contest Director Frank Gomes, 2241 Noah St., Honolulu, HI 96816. •

OVER THE COUNTER

• Decisions, decisions, decisions! Out of the many Top Flite maple props, which prop to use for optimum performance can sometimes be a problem. But because different types of flying and different conditions require different props, there has to be a wide choice. Now, selection of the proper one is made easier for you with an up-to-date prop chart from Top Flite, available FREE from your local dealer.

This chart will help you select the best prop for free flight, control line, slow or fast combat, speed flying, R/C pylon, sport scale, scale, or pattern flying.

All Top Flite propellers are now available in maple only, and feature a high-luster, fuel-proof finish. The maple reduces splintering and nicking, and is easier to balance. The design is of true aerodynamic pitch and a highly efficient airfoil, to deliver maximum thrust. The hard maple also allows for proper tightening of the prop nut or spinner assembly.

At various prices, depending on size, and available at most hobby stores. From Top Flite Models, 1901 N. Narragansett Ave., Chicago, IL 60639.

* * *

A number of our writers, myself included, have mentioned in recent months the need for more hardware designed specially for the presently popular 1/2A R/C airplanes. We'll never know if Du-Bro Products thought of it before we did, but that really isn't important. What *is* important is that it has done something about the problem, starting with what is probably the worst building bottleneck of all: "How am I going to hook up the ailerons?"

Du-Bro's new 14-piece 1/2A Strip Aileron Linkage Hook-Up Kit takes care of the problem completely. It includes torque tubes, nylon rod ends, mini-kwik-links, and everything necessary to complete the connection from the servo to the ailerons. And the assembly is adjustable . . . both in horn and pushrod length.

The kit even includes brass tubing for torque tube protection, so wing-holding rubber bands (yeeck!) will not restrict movement.

Catalog No. 231, $1.49, from Du-Bro Products Inc., 480 Bonner Rd., Wauconda, IL 60084.

* * *

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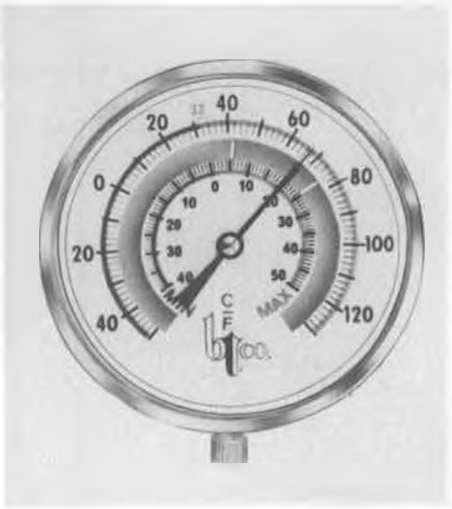


Maxi-Mini thermometer from Jensen Tools & Alloys.


Karoden Hobby Products' one-piece filter face mask.

HB .40 marine engine.

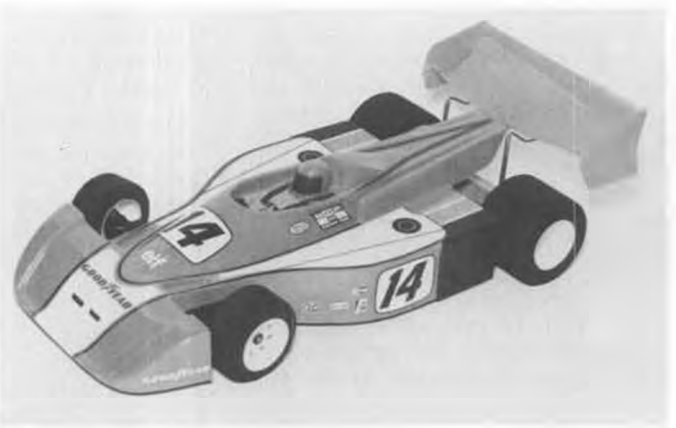

HB .21 car engine.

HB .61 marine engine.

Cast aluminum engine mounts for big engines, from Quarter Headquarters.

Flex-Mask, vinyl masking tape, from Karoden Hobby Products.

MRP's electric-powered Challenger.



Renault Formula One racing body, from MRP.

Vintage Aero's profile Pietenpol, Cougar, and DeHavilland 6.

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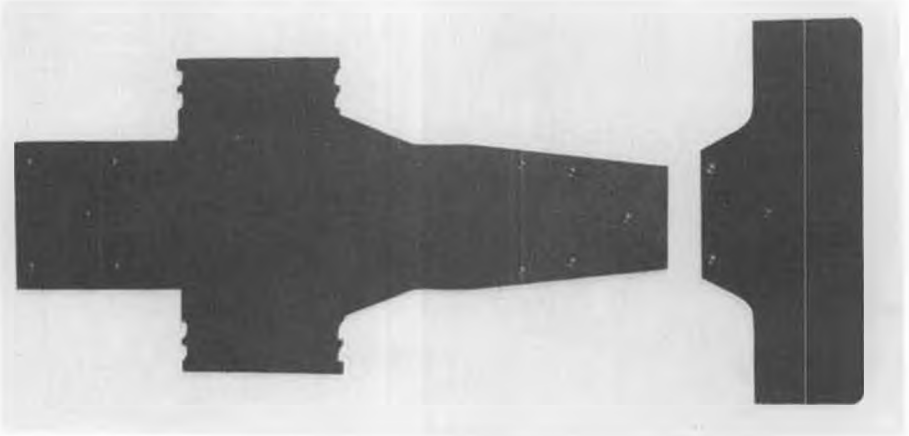
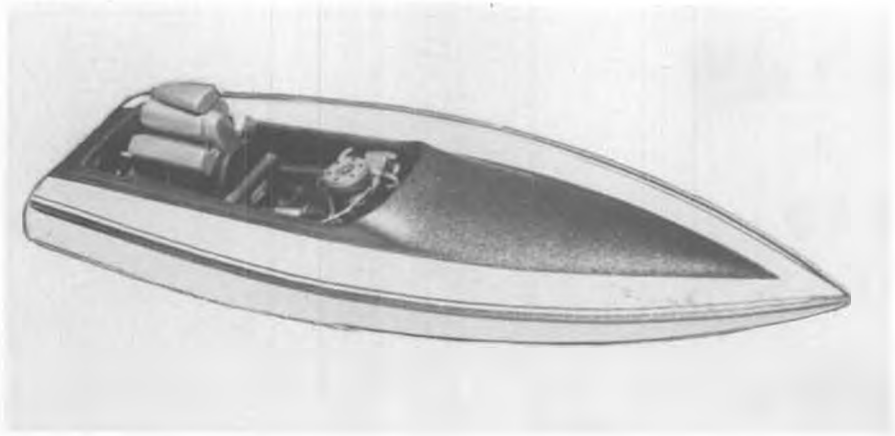
World

What's this? A Who's Who list of radio manufacturers? Though it may read like that, it is really meant to be a list of all the radios for which Novak Electronics now has servos, batteries, and switch harnesses. They all have the proper electronics, wiring, and plugs, and are perfectly compatible with the originals.

The servos are the best part of the news! Having teamed up with Dick Rehling, of D & R Products, Bob Novak has developed the Bantam Midget, patterned somewhat after the original and now 100% battle-tested D & R Bantam, only this one is



Super Kydex Chassis and Bumper, from "The Pipeline."

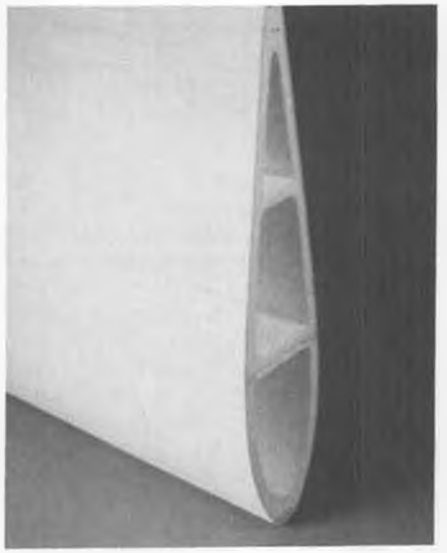


Model "K" racing runabout, by J.V.S. Products.

Steve Muck's stern-drive hardware kit.

Pica Products' pressure-sensitive decals.

All Top Flite props are now made from maple.



Hollow-core foam wings, from J&K Foam Wings.

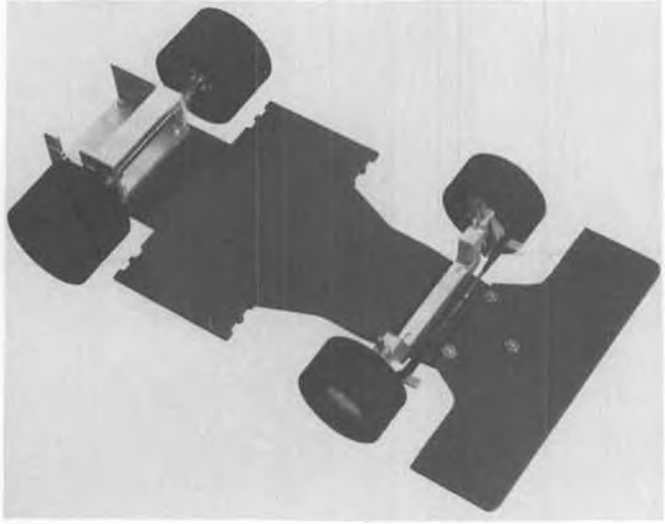
much smaller. It measures 1.125 inches high x .6 inches wide x 1.43 inches long, weighs .846 ounces, yet produces 21 inch ounces of torque. This figure compares favorably with many larger servos, and will be right at home not only in 1/2A's and such, where space is at a premium, but also in .60 size models.

Output is rotary only, with a wheel, arm, or adjustable arm. Stop-to-stop time is .3 seconds for 100 degrees.

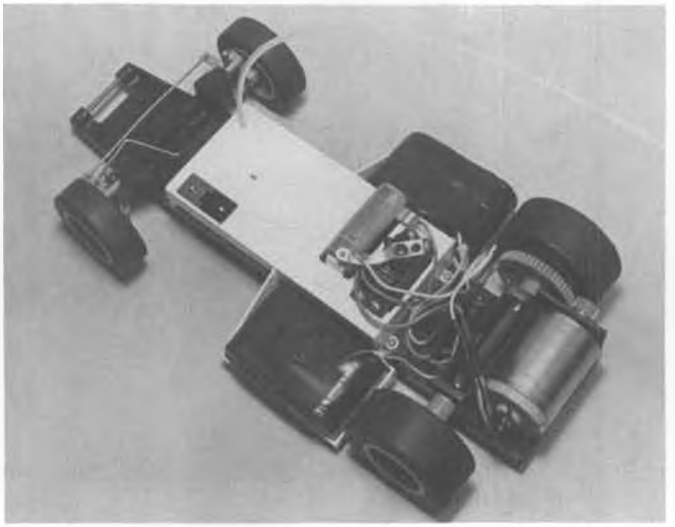
All of these components are available in a variety of colors to match your existing system, and can be purchased either in kit form, or factory assembled and tested.

Servo kits are $26.95; assembled, $29.95. Batteries, in 100, 250, or 450 MAH are $14.95 kit, or $15.95 assembled. Switch harnesses are $6.95 in kit form, one dollar more when purchased assembled. Servo trays, either vertical or side mount, are $1.00, as is a bulkhead-type switch mount.

For more info, or if you have a positive pulse digital system not

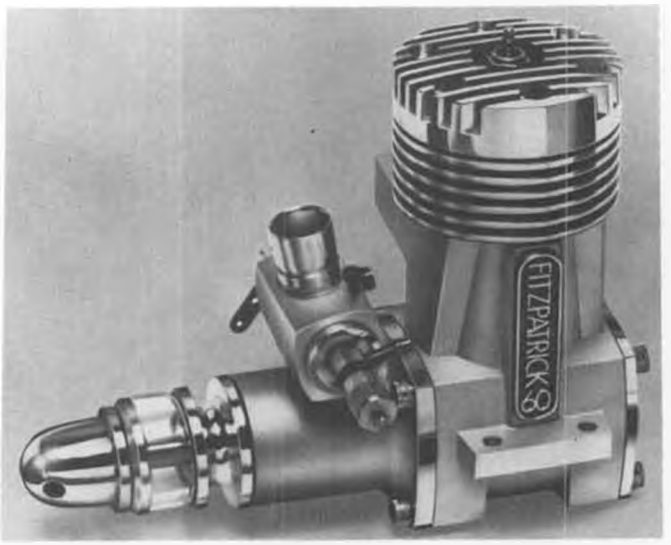


Electric car components by The Other Pottols Throttle Shop, on "The Pipeline" chassis.



MRP's Challenger, sans body.

"Lectra-Start", on-board starting system, from Eastcraft Specialty Products.



Swiss Craft's Fitzpatrick .60 is now available.

mentioned, contact Novak Electronics, 1915A Evergreen St., Santa Ana, CA 92707.

* * *

HB engines are now in the U.S.! Helmut Bernhardt Feinmechanik, of West Germany, manufacturers of top quality, high-performance engines now has available its complete line of control line, free flight, and R/C car, boat, helicopter, and plane engines for modelers in this country.

HB's come in displacements of .12, .15, .20, .25, .40, .50, and .61, in airplane versions, and all except the .15 and .50 are available as marine engines. The .40 and .61 can be had in PDP (Perry Directional Porting) versions, and any of the .40's and 60's can be purchased factory equipped with Perry Fuel Pumps, and Perry Pump Carburetors.

All marine versions are supplied with water-cooled heads, steel flywheels, and special Perry carbs. There is also a .21 Racing Car Engine, which incorporates a heat sink head, and large air cleaner. It is an extremely light engine, weighing less than 8.5 ounces, and is rated by the manufacturer as operating reliably in the 3,000 to 28,000 rpm range. Power output is claimed as .83HP at 25,000 rpm.

Accessories and spare parts are always available from stock, as is a complete catalog of engines, accessories, and parts. The latter, along with any specific information you may request about these fine examples of German workmanship, should be requested from Bavarian Precision Products, P.O. Box 6, New Canaan, CT 06840.

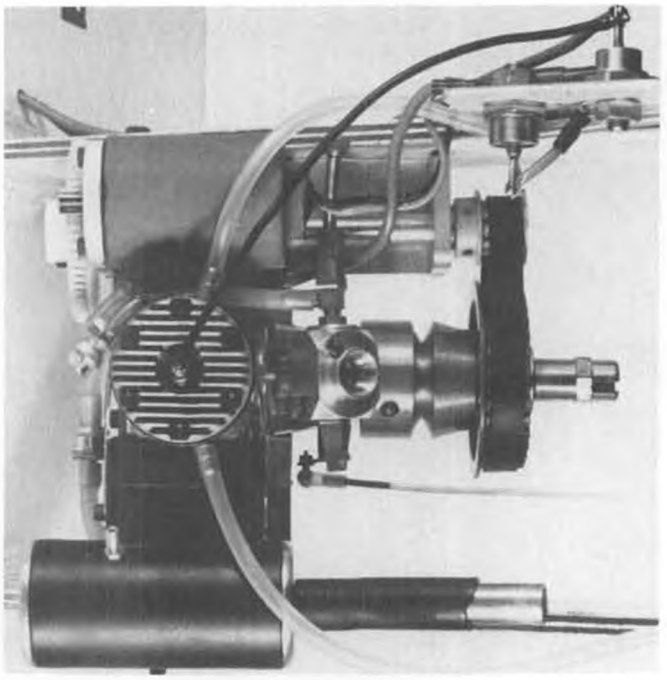
* * *

Renaults, anyone? Model Racing Products has just added them to its long list of R/C car racing bodies. These Formula One bodies are available in both 1/12 and 1/8 scales, clear or painted, and come complete with wing.

The 1/12 scale sizes are No. 933, clear, at $11.00; and No. 933P, painted, at $15.00. In 1/8, No. 2310 is clear, at $20, and No. 2310P is painted, at $30.

Another recent release from MRP is its economy Challenger kit, a fully ROAR-legal, competitive electric machine rated at 30 mph. It features an 05 ROAR-legal motor with 6 GE fast-charge batteries for power. A controlled flex, independent suspension chassis is used, which is

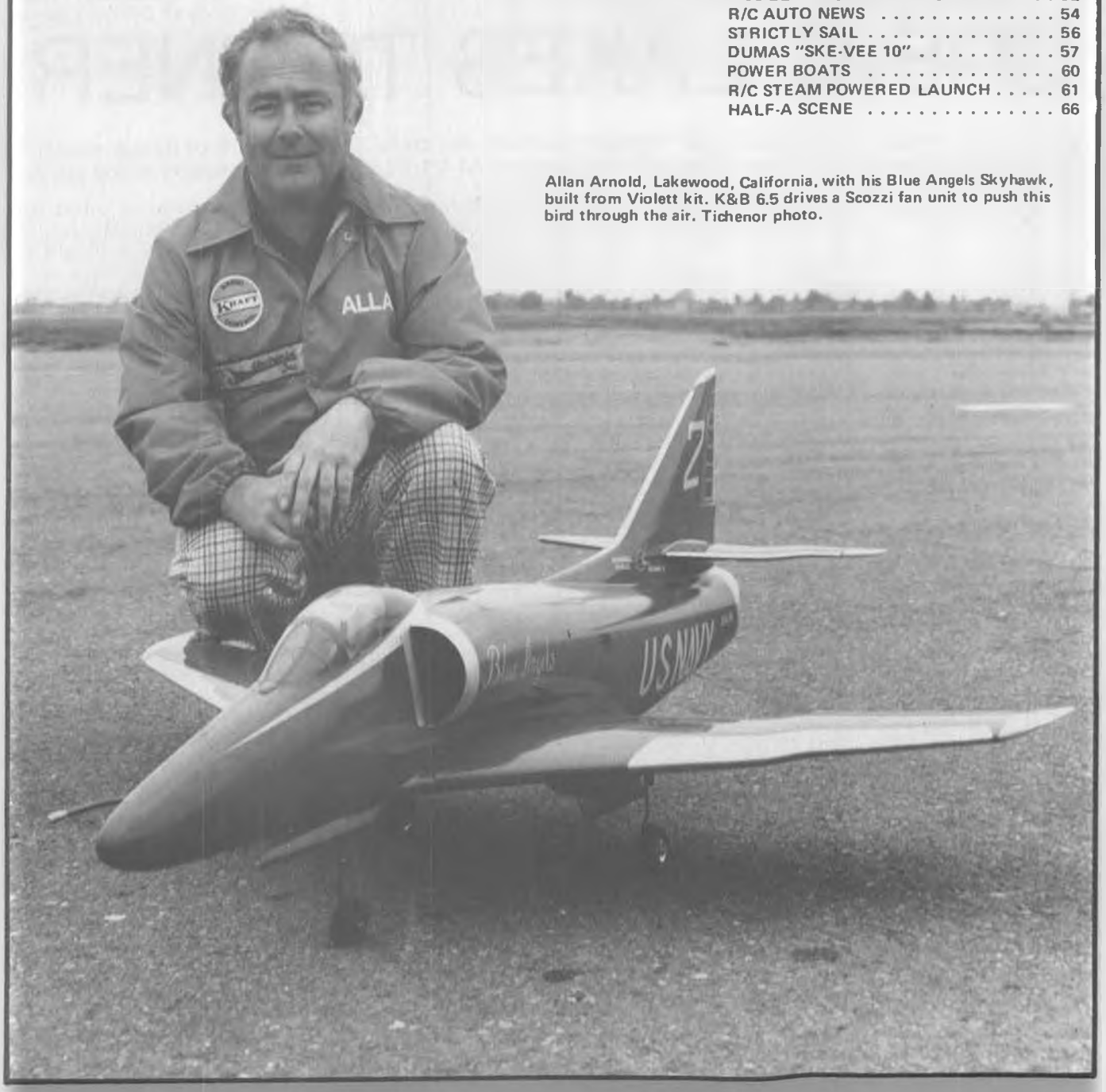
Continued on page 140



Assembled view of Eastraft's "Lectra-Start".

Israeli Gabriel rocket from Centuri Model Rockets.

R/C WORLD



Allan Arnold, Lakewood, California, with his Blue Angels Skyhawk, built from Violett kit. K&B 6.5 drives a Scozzi fan unit to push this bird through the air. Tichenor photo.

PHOTOS BY EVERETT COYLE

GREAT LAKES TRAINER

By BILL NORTHROP . . . Designed when rudder-only was all you could fit into a model of its size, the GLT is now a natural for small-size 3 and 4-channel radio systems. At 1-1/2 inch scale, it transports in one piece.

• Two circumstances brought about this ego trip. For one, the feature R/C aircraft construction project originally planned for this month wasn't quite ready to publish. And for the other, we received our second letter in about 12 years from Everett Coyle, of Yuba City, California.

Everett's first letter, received while we were R/C editor of M.A.N., included photos of, and told about, the Great Lakes Trainer he had built from our plans and construction article in the June, 1958 issue of American Modeler. Incidentally, AM was then a Street & Smith publication, with editorial offices in New York City, when Al Lewis, AMA's first president, was editor.

The second letter from Everett arrived just recently, and in it he enclosed some photos of the G.L.T. he had built almost 20 years ago . . . still going strong after some minor facelifting and the addition of modern radio.

The Great Lakes was this writer's first commercial literary effort and first scratch design/building project . . . you might know it would be scale, and a biplane! Plans were drawn using Wylam 3-views as published in May 1956 M.A.N., and some construction ideas were taken from a control line G.L.T., possibly by Vern Clements, also from an earlier M.A.N.

Everett Coyle says there are four old timers in this photo, the Great Lakes, a Babcock "Breezy Jr.,", Ohlsson Pacemaker, and Everett himself!

Using standard free flight procedures, we added stab area and wing dihedral . . . after all, this was to be rudder-only R/C, and when we say "only", this means *only* . . . the length of engine run was determined by the amount of fuel in the tank . . . period! Incidentally, the original was powered (?) by a McCoy .09 engine. Only a few takeoffs were ever accomplished . . . most flights began from a hand-launch. Very little R/C was needed, as the ship had a natural, wide turn to the left. You simply heaved it off a little to the right of the wind and calmly watched as it navigated the perimeter of the field, finally passing overhead to begin the second lap at about 25 to 30 feet of altitude . . . scale speed has been around longer than you think!

R/C in the original consisted of the great Kraft Single receiver, using a single IAG-4 "hard" tube. It required two 22-1/2-volt hearing aid batteries for the "B" supply and two 1-1/2 volt pen cells in parallel for the filament, or "A" supply. The remaining two cells in the 4-cell Acme battery holder provided 3 volts for the escapement. Rudders were pri-

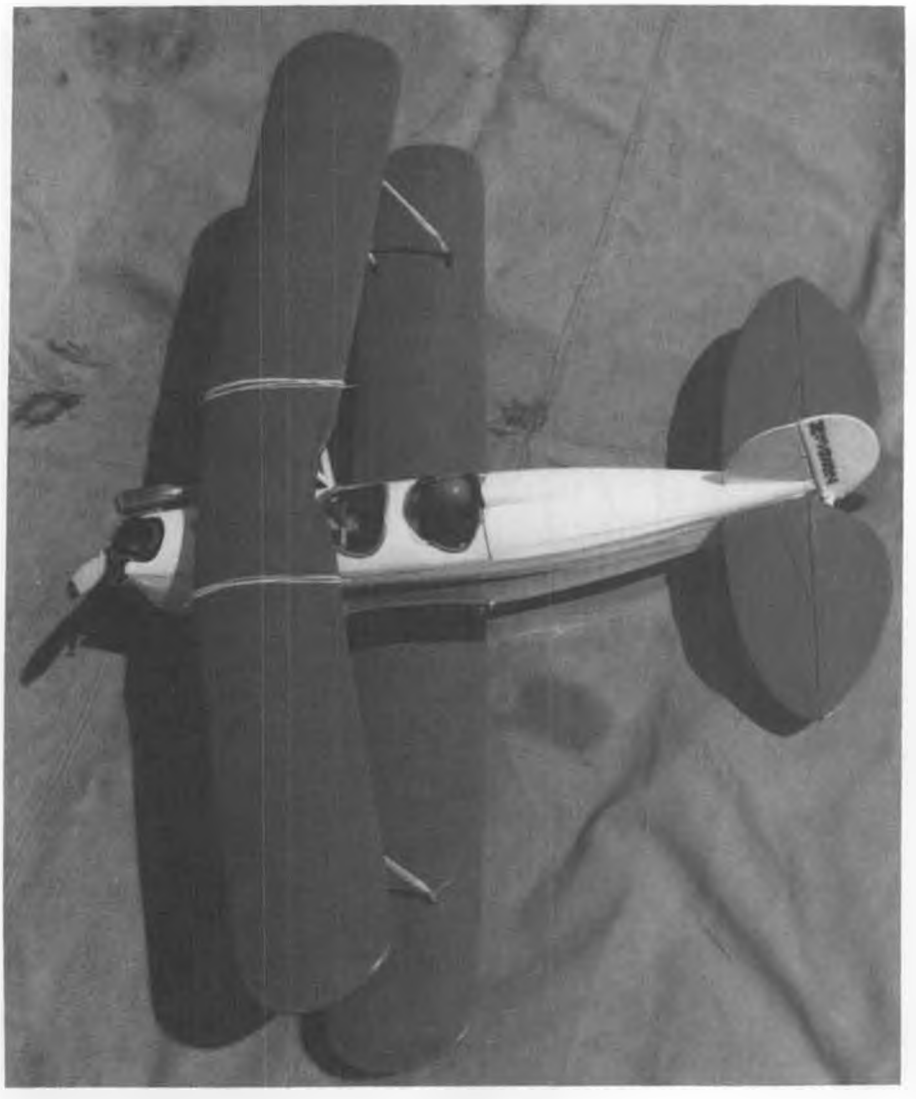
marily operated by torque rods in those days, so we devised the cute little "L" shaped slot in the rudder to maintain the scale hinge line. It never gave us a problem.

The nose shape may seem a little strange. From previous experience with low thrust-line models, we decided that the normal upright engine version might give us some offset problems (having to use excessive down-thrust), so selected the inverted Cirrus cowl, which raised the scale thrust line. Actually, the upright version looks a lot better, and the thrust is not all that different. Besides, with today's constant-trimming radios, why worry . . . Simply invert everything forward of bulkhead 'B', and relocate the motor bearer holes in 'B' accordingly.

Speaking of today's radios, the 1-1/2 inch scale G.L.T. ought to be just a ball with rudder, elevator, and throttle. The extra weight and work of adding ailerons would not seem worth it to us. If you decide to go the whole route, drop the bottom wing dihedral to 1 inch and take it all out of the top wing.

Everett modified his G.L.T. with a radio hatch on top, lower dihedral, and larger engine. Ailerons really not necessary, unless you go to scale dihedral.

We haven't detailed a modern radio installation . . . they are all pretty much the same . . . just keep everything well forward. Surprisingly, the original model required a small amount of tail ballast; this in spite of nylon fabric covering and many coats of clear, orange, and black Aero Gloss dope.



The classic swept-back top wing of the 'Lakes came about because the straight-winged prototype came too tail-heavy. Talk about dumb luck!!

The following construction text is taken almost verbatim from the original article.

FUSELAGE

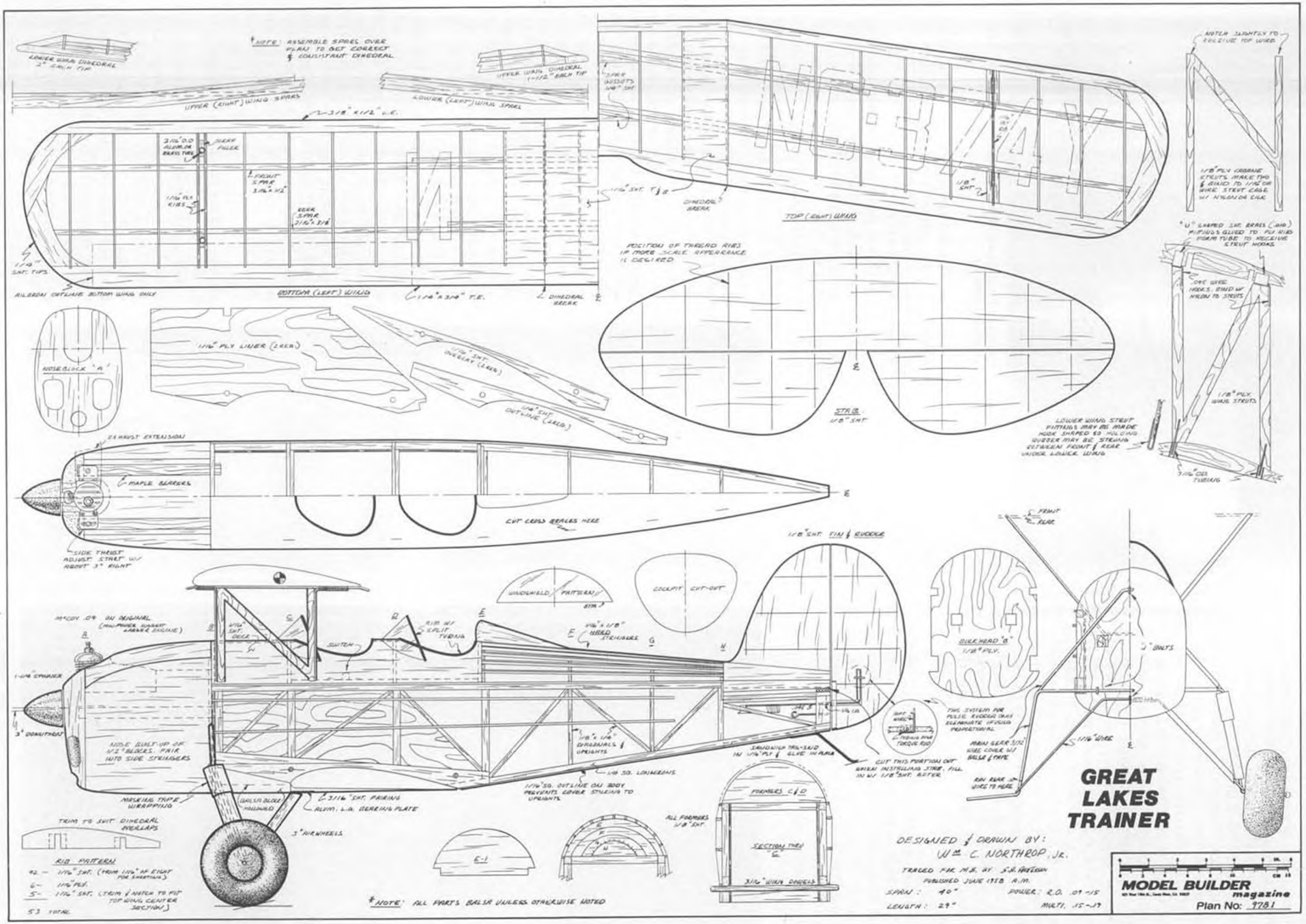
This is built in conventional manner (I'm showing my age, this isn't too conventional any more), with 1/4 sq. longerons, 1/4 sq. and 1/8 x 1/4 uprights and diagonals. The liner of 1/16 plywood is added (contact cement works best here) before sides are joined. Bulkhead at "B", cross braces at "C", top cross brace at "D", and a temporary cross brace at bottom "D" are used to start the assembly of fuselage sides. Allow this much to dry, watching alignment, before pullings ends together and inserting remaining cross pieces.

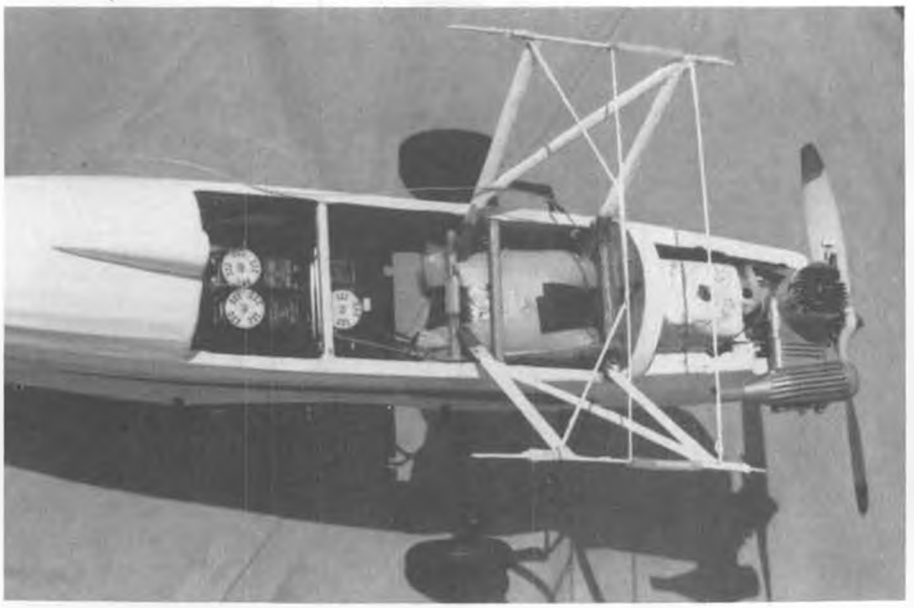
Add formers "C" through "H". Be sure the smaller "E-1" former is toward the tail. Stringers are next. Turtle-deck stringers which butt against "E" should be rock-hard 1/16 x 1/8 to resist pull of covering material. Side stringers are 1/16 x 3/16, tapering to 1/16 x 1/8 at "B" and 1/16 sq. at "G".

Cut cabane struts from 1/8 plywood. Form 1/16 wire struts and wing supports, bind and solder using ply struts as spacing guides. Now glue the ply struts to the wire cage and bind together with nylon or silk. Key the strut assembly to the body by cutting notches out of the ply liners. Leading edge of cabane assembly butts against bulkhead "B"; 1/4 inch balsa blocks fill in around struts to tie unit securely to body.

Forward decking of 1/16 balsa can now be put in place. I used 6 inch wide stock and covered "B" to "E" in two sheets with a joint at "D". Contact cement did this without using one pin. Glue maple motor mounts in place, using care to get exact alignment of mounts.

Before building up nose out of 1/2-inch stock, mount motor in order to check clearances. Mount-


GREAT LAKES TRAINER
DESIGNED & DRAWN BY: WM. C. NORTHROP, JR.
TRACED FOR M.B. BY S.D. THOMSON
PUBLISHED JUNE 1978 A.M.
SPAN: 40"
LENGTH: 29"
POWER: R.O. .09-.15
MULTI .15-.19
MODEL BUILDER magazine
Plan No: 9781
TOP (RIGHT) WING
BOTTOM (LEFT) WING
UPPER (RIGHT) WING SPARS
LOWER (LEFT) WING SPAR
FUSELAGE SIDE
FUSELAGE TOP
FUSELAGE BOTTOM
FIN & RUDDER
STAB.
ELEVATOR
LANDING GEAR
WINDSHIELD PATTERN
COCKPIT CUT-OUT
NOSE BLOCK "A"
NOSE BLOCK "B"
FORMERS C & D
SECTIONAL VIEW
ALL PARTS BALSA UNLESS OTHERWISE NOTED



Ya say ya want accessibility? Only penalities of large hatch are some structural weakening and ingestion of exhaust residue. Cross-wires add cabane strut rigidity.

ing system shown, using aluminum tabs, allows minute changes of side thrust. Cut outline of nose block "A" from solid or laminated stock, hollow out to clear needle valve, exhaust, fuel line, etc., then glue in place. Side and bottom blocks can now be added. A good strong glue for this purpose is Fullers or Elmers white glue. They dry clear, a little slower maybe, but rock hard. Cut another block to serve as removable hatch in top of nose. Notch to fit down over bulkhead between tank and batery compartment and hollow out to clear tank. Glue blocks inside front for hatch to rest on. Now nose can be carved into final shape while holding hatch in place using only your expendable fingers.

LANDING GEAR

Bend gear to shape using 3/32 and 1/16 wire as shown. J-bolt 3/32 pieces to bulkhead "B", and, where the pieces meet, bind and solder along full length. Strut of 1/16 wire starts and ends at J-bolt in bulkhead "B". The rear end rests against bottom of wing center section to which is glued a piece of sheet aluminum. This allows plenty of spring action. The 1/16 wire strut and main vertical strut are faired with balsa as shown. Solder short length of wire to struts to prevent twisting of fairings. Remaining struts are streamlined with 1/16 sq. rounded on two corners, glued to back of wire strut and then wrapped with three layers of masking tape. Main strut is wrapped at top with about six layers of tape to indicate upper part of Oleo. Three-inch wheels may be soldered or nylon-buttoned on. Skid is 1/16 wire bent to shape, sandwiched in 1/16 ply and glued into place.

Fuji .19 provides lots of power. Original had McCoy .09 . . . not enough!

TAIL

Stabilizer, fin and rudder are cut from 1/8 balsa. Unless barn door size balsa is available, stabilizer must be made in two pieces. Use favorite hinges for rudder. I used 1/2 inch wide nylon strips cut on the bias. Cut slot out of rudder for torque rod and add 1/16 x 1/8 stiffeners on each side of lower rudder leading edge. Thread ribs under tissue covering may be added before color is put on for extra realism.

WINGS

Assemble spars over plan, being careful to get proper dihedral built in. Make sure you have left and right hand spar assemblies for top wing. Cut rib template from aluminum. Drill pin-size holes at corners of spar notches. Flash on back of holes grips wood and also marks ribs for notching, but pushing pin through holes marks notches better. Leave five ribs blank for top wing center section. Notch these to fit during assembly. Ribs at spar overlaps will also have extra notches cut to fit during assembly. Build center sections first, then tip up to build left and right panels. Make sure 1/16 ply ribs in bottom wing form a tight fit for 3/16 brass or aluminum tubing. Cover bottom of top wing before adding brass strut fittings.

Original model is nylon covered, followed by four to six coats of thin nitrate and then three-coat Aero-Glossed the colors of the prototype: black body, rudder, landing gear and wing struts; orange wings, stab and body trim and gold pinstripe. Original model weighed 2-lb. 5-oz. with radio, motor, batteries, etc., less covering. Nylon covering and all dope added only 1-1/2 to 2 oz.

FLYING

Everyone has his pet method for testing a new model before full flight. I always try to perfect a good glide, and with rudder-only, a straight-in glide without flare to avoid unnecessary ballooning on the first powered flight. Then with engine plugged for cruising I let it roll away. Incidentally, masking tape on the nose and wing tips will save

Continued on page 95

Everett Coyle's model is going on 20 years of age! Has been through minor face lifting, Monokote recovering, and new radio installation.

Bill Seidler, Hollywood, Florida, U.S. Pattern Judges Association Vice-Pres., designed and built this 2-inch scale Travel Air D4D. A Webra 90 and Rev-Up 16 x 4-1/2 prop pull it straight up and out of sight.

R/C WORLD

By BILL NORTHROP

• Most every R/Cer equipped with an experimental nature, who has gone beyond the kit assembly stage, has probably envisioned the possibility of flying small, lightweight, slow-moving R/C model aircraft indoors. With the continual reduction in size and weight of R/C equipment in recent times, and the advent of small, lightweight electric power systems, the possibility of safe, controlled, indoor radio controlled flight seems imminently feasible.

In order to stir the inventive mind and the innovative builder into action, a goal has been set for indoor R/C flight. As a special feature of the second annual International Modeler Show, set for January 6 and 7, 1979, in Pasadena, California, cash prizes will be awarded for the best show-time demonstrations of radio controlled indoor flight using rubber, CO_2, and electric power. To add to the fun, a fourth category will be included . . . lighter-than-air, electric power.

Models will be required to fly, under complete control, over a figure-8 course, above the exhibit area at the show. Not only must direction be controlled, but also altitude, as the models must navigate the course while staying above the 8-foot high exhibit back-drops, and also keep clear of the 25-foot high ceiling structure. Incidentally, manufacturers with exhibit material reaching higher than 8 feet above floor level will be located so as not to obstruct the predetermined course layout.

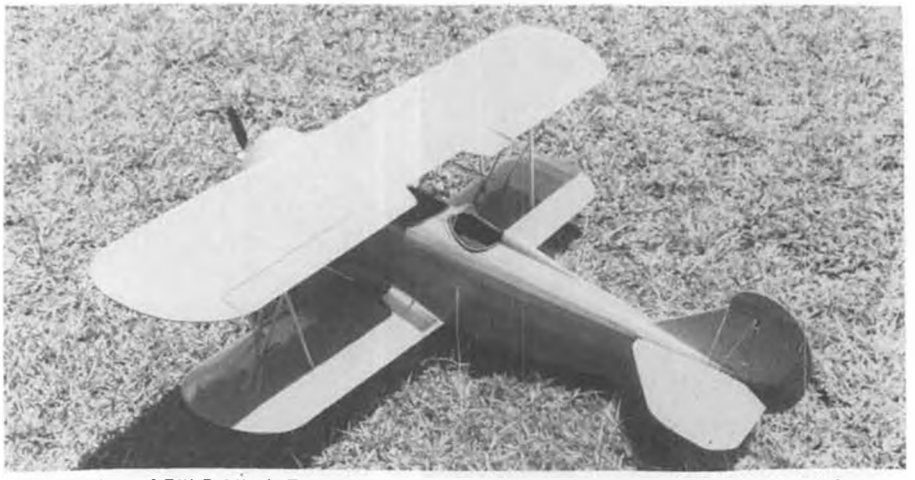
The course layout, a figure-8, as already mentioned, will be set up within the exhibit hall at the Pasadena Center, which is approximately 130 by 240 feet, without any floor-to-ceiling obstructions. Starting in a center area which will be cleared for other indoor demonstrations, the models must fly around four "pylons" located approximately 35 feet from each corner of the rectangular show area. Pilots will be allowed to follow their models around the course.

All models, and their pilots, will be required to qualify their ability to safely negotiate the course at the exhibit site on Thursday night, January 4, when the backdrops will have been erected, but before exhibitors have installed their show material. Depending on the number of entries, all or a portion of the qualified models will be allowed to fly over the exhibit area during the show. Specific times will be selected for these flights, so that adequate precautions and attention from spectators and exhibitors will be afforded during the flights.

Specifically, heavier-than-air models will seek the most duration in any single flight while following the figure-8 course, and this will be divided into three power categories: rubber, CO_2, and electric. An additional cash prize will be awarded for the longest single flight overall, regardless of power. Internal combustion engines will not be allowed.

Tentatively, there will be only one restriction on aircraft design, size, weight, etc., and that is a maximum wing loading of 4 oz. per sq. ft. The intent here is to keep the models light and slow-flying. This is also the reason for basing the competition on duration rather than distance.

On the other hand, LTA (lighter-



Another shot of Bill Seidler's TravelAir. Covered with Super Coverite, it's finished with 3 coats of nitrate and one of Hobbypoxy red.

than-air) models could take all day completing one circuit of the course, so they will compete on the basis of distance (number of complete and/or fractions of the course covered). The only restriction on LTA's will be the gas used . . . it must be non-combustible.

At this time, the cash prizes are estimated to be $300 for the LTA, and $150 for each power category of heavier-than-air model, plus a $250 prize for the greatest overall HTA duration (single flight). Additional sponsors may result in higher cash awards. Guiness Book of Records is being contacted for possible publication of these new record categories.

Anyone interested in entering this record trial competition should notify the **International Modeler Show**, or **Model Builder Magazine**, so that additional information may be forwarded as it develops. Write IMS at P.O. Box 127, Costa Mesa, CA 92627, or **Model Builder**, at 621 West 19th, Costa Mesa, CA 92627.

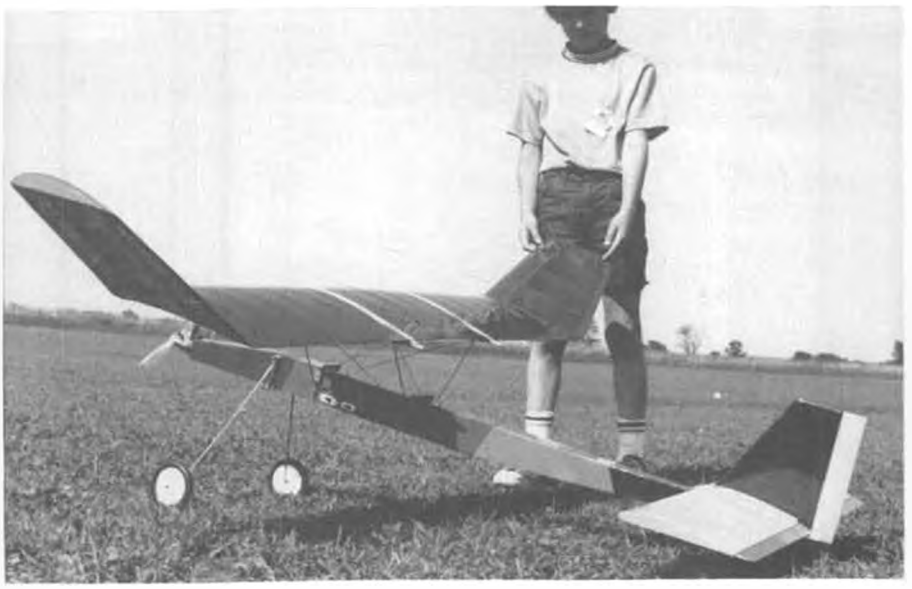
"KNOW YOUR AILERONS BUT DON'T FORGET THE RUDDER"

The above is the theme for an interesting release from the FAA under the title, "Tips on the Use of Ailerons and Rudder." The advice is certainly not restricted to full-size aircraft.

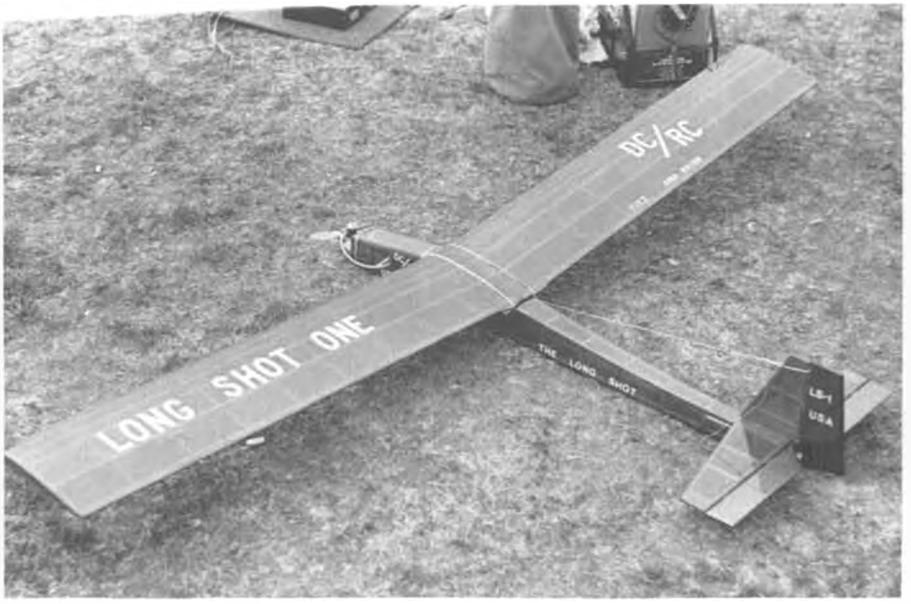
"Recent stall/spin accidents indicate improper use of rudders. Through coordinated use of rudder and ailerons, involvement in this type of accident can be greatly diminished.

"The slip stream helps the rudder maintain its effectiveness, even at slower speeds when much of the effectiveness of the ailerons has been lost. The rudder, therefore, is the tool for coordinated control as the aircraft approaches, enters, and recovers from a stall. In the 'older days,' students were taught from the beginning that approaches to and recoveries from stalls were done with the rudder only, while keeping the ailerons in neutral position. This changed more than a decade ago when the FAA flight test guide started allowing the use of ailerons in these situations. This came about because modern aircraft generally have less elevator travel and do not stall as completely. Also, well designed ailerons are still effective at lower speeds. It was never intended, however, to omit using the rudder in stalls and recoveries therefrom.

"To have the proper insight for flight control, pilots need to understand lift and drag properties of ailerons. When ailerons are streamlined (neutral), both wings generally display the same characteristics. Rolling the aircraft, however, to the

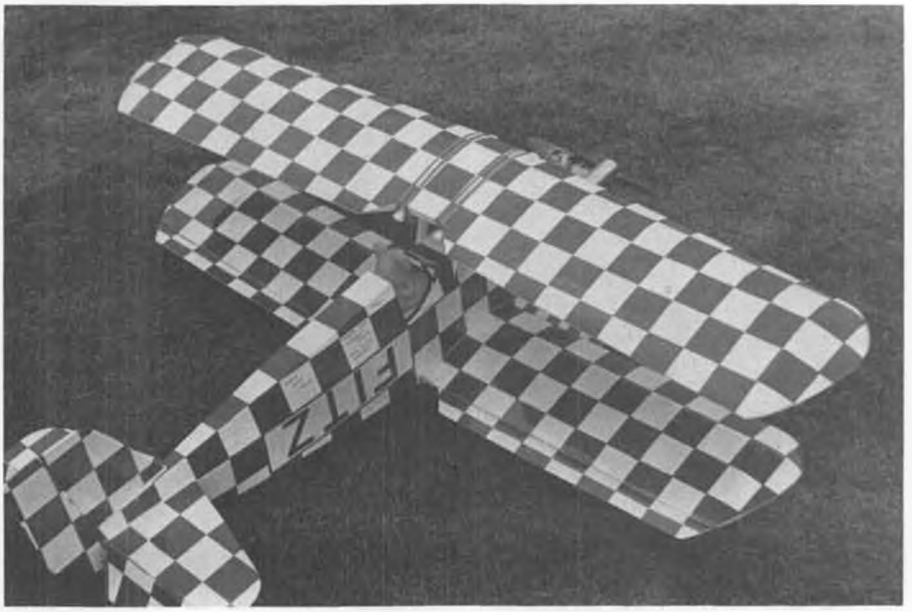


The "Dragonfly" (MB Feb. '76) has become an R/C modeling institution. Paul Dietrich, 9, flies this one belonging to his Dad, Tom, in Antioch, Illinois.



DC/RC member Ed Fitzwater's 3/4-size test plane for long range record attempts. Span is 6 ft., Monokote, TD .049.

Don Clark, partner in Soaring Products, makers of Thermal Sniffler, at DC/RC winter Fun Fly. He's holding Graupner Cumulus.



Ed Fitzwater's Phaeton Bipe (Balsa USA kit) is leading a checkered career. Name on side indicates which side is normally up.

left for example, the left aileron comes up and the right one goes down.

"Attempting to raise a wing by applying down aileron creates more lift on that wing, by increasing the camber (curvature) of the wing. The increase in camber also increases the drag on the wing with the down aileron. If this increase in drag is not corrected by aileron design or proper application of rudder, the aircraft will yaw toward the wing with the down aileron (adverse yaw). This yawing action will cause a decrease in the speed of the wing in relation to the other wing. When operating near stall speeds, this yawing action, with the difference in speed of the two wings, can result in an earlier stall on the wing with the down aileron. This early stall on one wing will greatly increase the probability of a spin.

"The above is not difficult to demonstrate. We can, on most single-engine, propeller-driven aircraft, easily maintain directional control in a straight-ahead, power stall with the rudder alone. On the other hand, if you put your feet on the floor and attempt to use only ailerons to maintain heading and/or the wings level through the same stall, you will have a much less responsive aircraft and, at least some of them, will spin toward the lower aileron as the stall occurs. This proves that below certain speeds, ailerons become ineffective. A demonstration like the above should convince most pilots that proper use of rudder would help prevent stall/spin accidents. Rudders and ailerons should be used together for coordinated flight, and while modern aircraft do respond to ailerons alone, omitting the rudder can spell disaster at slow speeds. The often forgotten training maneuver of delayed stall recovery, using rudder alone to maintain heading and level wings as the nose of the aircraft passes through the horizon, was an excellent one. It is no longer used since it is not a required flight maneuver, but it is a good demonstration and confidence building maneuver.

"A pilot who flies through a stall or slow flight regime without using rudder at all, fighting for control, slamming the ailerons from stop to stop, is not in full control of the aircraft. Unfortunately, this is seen with increasing frequency. As pilots, we should make an effort to be on the lookout for this mistake and start using the rudder anytime the ailerons are being deflected. Ailerons and rudder work together for coordinated flight, and the habit must be built with conscious effort if we are to remain masters of our aircraft throughout the speed envelope."

INTERNATIONAL NOTES

Geoff Franklin, Leicester, England, has shared judging chores with us at several World Championships, runs all R/C aerobatic contests for the SMAE (Society of Model Aeronautical Engineers, Ltd., England's "AMA") plus their Nationals, and is on the R/C Technical Committee. His letter regarding National Championships and where they are headed focuses on the SMAE, but certainly strikes home in many areas of our own AMA Nats. Listen up.

"The time has come to rethink the way our National Championships should be run. For years we have been trying to get our hobby recognized as a sport, yet we do not even run our National Championships like a sport.

"What other sport can be entered without the competitor having to go through eliminators. Darts, snooker, car racing, etc., all have eliminators to find the top contestants for a grand final, SO WHY DON'T WE?

"I propose that our next National Championships be preceded by a series of eliminators run at all our events prior to the Nationals in order to sort out the *top ten*, or

Al Bedford and his "Square Bear", at DC/RC winter Fun Fly. Funny white stuff is called snow.

Ed Fitzwater and son, Richard, with Super Kaos .40. Getting impression he flies upside down a lot?

The Central Connecticut R/C Club members at Farmington, Connecticut flying field, Memorial Day, 1978. Photo by Bud Gay, Bristol, Conn.

whatever is a manageable number, to compete in the "Grand Final", the National Championships. At the moment, aerobatic, and pylon run six S.M.A.E. contests a year, so scale, thermal and helicopters could to the same.

"My own idea of a manageable number of contestants would be: Aerobatic — 10, Pylon — 20, Scale — 10, Thermal — 10, Helicopter — 10.

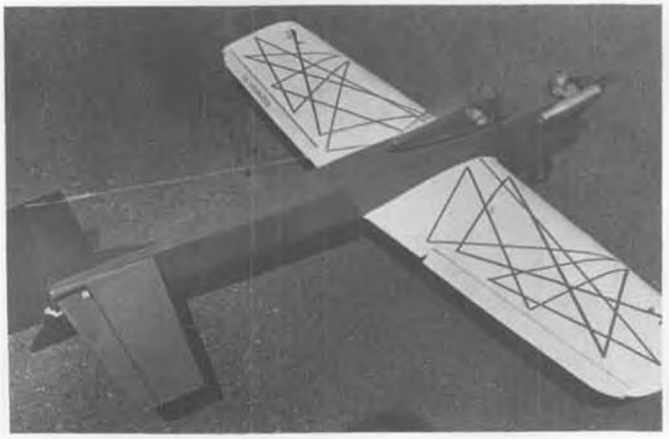
"This then would give more importance to the events, and would allow Event Directors and helpers more time to find the Champion, which after all, is the name of the game. We end up at the Nationals, then, with sixty R/C fliers who are tops in their events, to do battle for the supreme title. We would only need one flight line or area for all events. This would mean less staff, a reduction in costs, and no need for miles of runway. What is more important, it would give the spectator a central site at which to base himself in order to see the best there is in all types of R/C flying. Trade tents and stands could also be based in this central area, and the job of crowd control would be easier and safer.

"Flying times could be divided fairly between all events, giving all time to run a good contest. On the last day, flying could be over by midday, and prize-giving could follow. The prizes would be handed out by ALL officials of the S.M.A.E., as, at present, 99% of our members do not know who they are or what they look like, and this cannot be good for our image, especially as we are trying to sell the S.M.A.E. to all modelers. After the prize-giving, the trade could fly demonstrations to entertain the crowds, leaving the contestants free to pack up and make their way home. As for free flight and control line, they could do the same if they so wished, which

Continued on page 144

This Andrews "Trainermaster" was built by Keith Palmer, Bristol, Conn. Power is an Enya 45, Futaba radio, Monokote covering.

Jack Anderson, Avon, Conn., built this Enya 60 powered Super Kaos, finished with Aerogloss and Glaskote. Futaba radio. Worm's eye photos by Bud Gay.



Top View of Ed Fitzwater's Super Kaos .40. Flaperons and anhedral stab are special features.

Dave Platt's 3-inch scale BU 133 Jungmeister. Uses Webra 90 for power. Bill Seidler photo.

Mitch Poling calls his original design the "Astro Sport". Model uses the Astro 15 power system, 49-inch span, 430 sq. in., 3-1/2 lbs. Mitch has also successfully flown the model with floats! Simple construction uses all-sheet balsa fuselage and tail surfaces, single-spar flat-bottom wing.

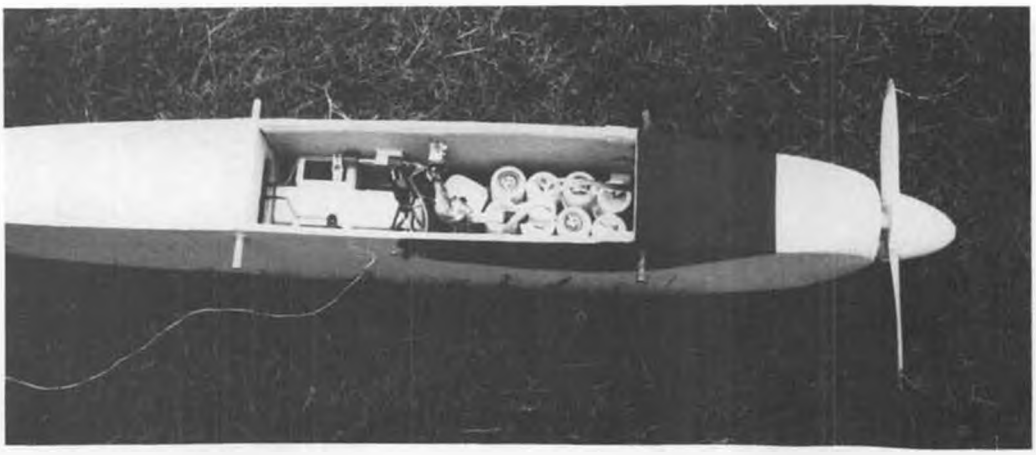
ELECTRIC POWER

By MITCH POLING . . . New to *MODEL BUILDER*, but definitely not new to the subject, the author will be here monthly to discuss the latest developments and to answer your questions.

• Electric power is one of the newest areas in modeling, even though it is one of the oldest as well. It started for me in 1972, when I saw a Mattel Super Star. It was an excellent free flight with plenty of power for its 5-1/2 ounce weight and 100 square inches. Mattel uprated the power a year later, and I found it would carry an Ace Baby rudder-only radio and get five minute flights with two AA nickel cadmium cells replacing the original 100 mah cells. It weighed 7-1/2 ounces in this configuration, with the equivalent power of a Cox .010, which was just right. The Super Star is no longer made, which is a great pity, as it is one of the very best electric fliers in its size range (despite being a ready-to-fly plastic!). The motor and battery are still around, in the form of the E-Power module made by Monogram. It retains the good power characteristics of the original. I recommend it as the best electric equivalent of the .010 on the market. The configuration of the housing is awkward, however, so usually the battery is cut off and rewired so it can be replaced more conveniently in the plane. It makes an ideal indoor

TABLE I

MOTOR	GLOW ENGINE EQUIVALENT	PROP	RPM	TYPICAL AIRCRAFT FLYING WT
E-Power	Cox .010 TD	7-1/4 x 4	3500-4000	5 to 8 oz.
Astro 020	Cox .020 TD	5-1/4 x 3	12,000	12 to 18 oz.
Astro 05	Cox Medallion .049	7-1/4 x 3	12,000	28 to 46 oz.
Astro 15	Cox Medallion .15	8 x 4	11,500	3-1/4 to 4 lbs.



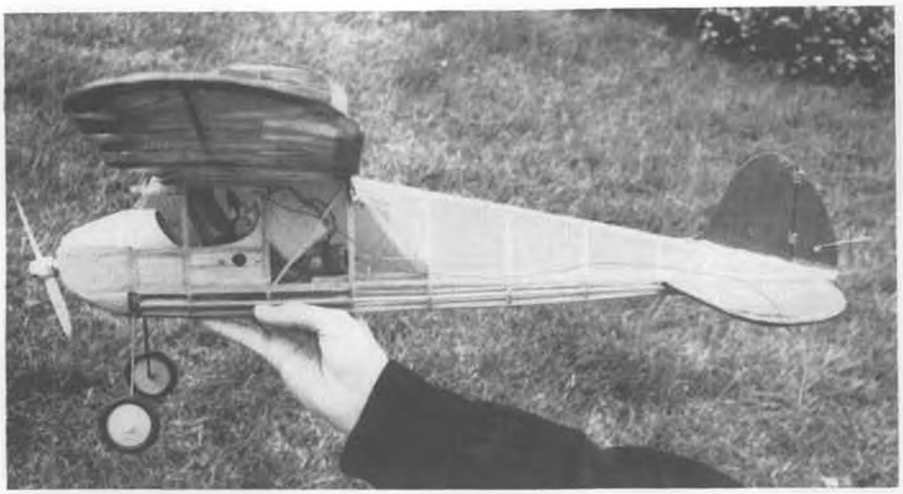
Close-up view of the radio and motor battery installation in Mitch's Astro Sport. Note that the motor switch is set up so that full-up elevator control turns the motor on and off. Motor batteries have been removed from their plastic case, probably for better cooling.

unit, and a neat plane for this is the "Insider", by Leo Vartinian. Leo tells how to modify the E-Power unit and build the plane in the April 1978 issue of Model Aviation.

My R/C modification of the Super Star was published in the September 1974 issue of American Modeler (now Radio Control Sportsman), and later I started writing a column on electric power in AAM. I thought a year or so of writing would be about all I could handle, but I'm still writing four years later! It does get to be habit forming! My emphasis is on the "how to" aspects in electric power because it is new, it is different, and there are no experts to consult at the flying field, hobby store, or modeler's club to give help to the novice. Most of the questions I get concern which equipment to use, charging, wiring, and building. Since I have used electric power in control line, free flight, R/C planes, boats, and cars, I have a lot of answers, so feel free to send in questions. Fortunately, there are some really excellent electric units on the market, so we can get off to a good start. The ones I have *personally* used are listed in Table I, along with their characteristics.

The typical flying weights are the ones that I have used and will give good performance. The weight is much more important than the wing area and loading. If the weight is right, the plane will fly right. This is a point I can hardly emphasize enough. I've gotten a lot of letters asking why planes didn't fly right, and almost invariably they were too heavy for the motor that was used. Table II lists the equipment and planes that I have used or that I have seen in use and fly well.

These units cover the size range from very small to medium size. The Astro 25 is equivalent to a sport .25 glow engine and flies a Falcon 56 (Carl Goldberg) and the Bushmaster (Astro Flight) quite well, but I haven't used it yet. I would welcome information from those flying the Astro 15 and 25, as I have tended towards flying the smaller planes. I have been flying my own design, the Astro Sport, with the Astro 15 quite a lot lately and I am quite pleased with the performance. It has performance much like the gas 15's, and is really great for winds when my smaller planes are grounded, or for those crowded flying sessions on Saturdays and Sundays when everyone seems to be zooming around at 100 mph. Of course, for the ultimate in power in speed, the Electra 225 offered by Astro Flight is about it. It uses twin Astro 25's, and does close to 100 mph, too speedy for me! Live better electrically till next month!•



Mitch Poling's Request, built from a Micro Models kit, uses the Astro 020 power unit, Ace single-channel R/C. Transparent plastic covering shows all.

Poling's Olympic II, powered by Astro 05. Won second in powered sailplanes at Model Builder/Astro Flight contest in January, 1978. Sandra Smith Poling, M.D., is the other model in photo.

Poling's Berkeley Brigadier won first in Electric O.T. R/C event at Model Builder/Astro Flight contest. His was the only O.T. electric model that flew!

TABLE II

UNIT	EQUIPMENT	PLANE
E-Power	Ace R/O Baby	Super Star, Electro Flea (my design)
Astro 020	Ace R/O Baby Cannon mini 2 channel	Dick's Dream (Ace R/C), Guppy (Ace R/C), School Boy (Top Flight), Jr Electra Fli (Radio Control Sportsman), Ehling Request (or any other 020 replica old-timer).
	U/Control	Lil' Jumping Bean (Carl Goldberg), Jr Flight Streak (Top Flight)
	Free Flight	Any old-timer 020 replica, Curtiss Robin (Flyline), Monocoupe (Flyline)
Astro 05	Two channel	Electra Fli (Astro Flight), Monocoupe (Astro Flight) Super Monterey (Astro Flight), Partenavia P-68 (Astro Flight), Wanderer (Mark's Models), Drifter (Craft-Air), Olympic II (Cox) Jr Falcon (Carl Goldberg), Ranger 42 (Carl Goldberg), Berkeley Brigadier (John Pond plans)
Astro 15	2 to 4 channel	Fournier RF-4 (Astro Flight), Pierce Paragon (Pierce Arrow), Quickie 500 (Gene Spickler), Astro Sport (my design).

Line-up of scale models at this year's Mint Julep meet, held at Rough River, Kentucky. This was the first year that a separate scale event was held. Sportsman and Expert classes attracted a total of 22 entries. Photo by Cathy Underwood.

1 TO 1 SCALE

By BOB UNDERWOOD

PHOTOS BY AUTHOR
UNLESS NOTED OTHERWISE

• The drive home from the contest was uneventful. Thank heavens it was, since Brad's mind certainly wasn't on the trip. The miles of Kansas unwound, allowing him to mull over the two days of competition. Each time he went through the events of the previous two days, he was a little more upset or confused.

Brad had been into R/C for almost two years, and had modeled a little in the years before. He considered himself a pretty fair builder, with the exception of the fact that his finishes were still a little rough. He'd spent quite a bit of time with the trainers and actually felt pretty much at home with the P-51 that he had selected for his first scale effort. It flew well enough, although maybe it was a little fast at times.

He'd looked forward to his first contest. The last couple of weeks had been a little hectic, trying to get the model finished and a test flight or so on it beforehand. It was really lucky that his buddy, Ken, had dropped by to see the new plane, otherwise Brad would have shown up without a muffler and wouldn't have had a legal bird.

As far as the contest went, Brad had to admit that it had gone smoothly and was well run, but he really felt that he had not had a chance, as far as the competition was concerned. At first glance, it appeared that the old-timers, or the "names", were favored, and this was what really upset Brad. He sorta felt like the guy who was looking for a job, but could only find offers that said "experience necessary". How the heck do you get the experience? How does the new competitor stand a chance of taking home some hardware?

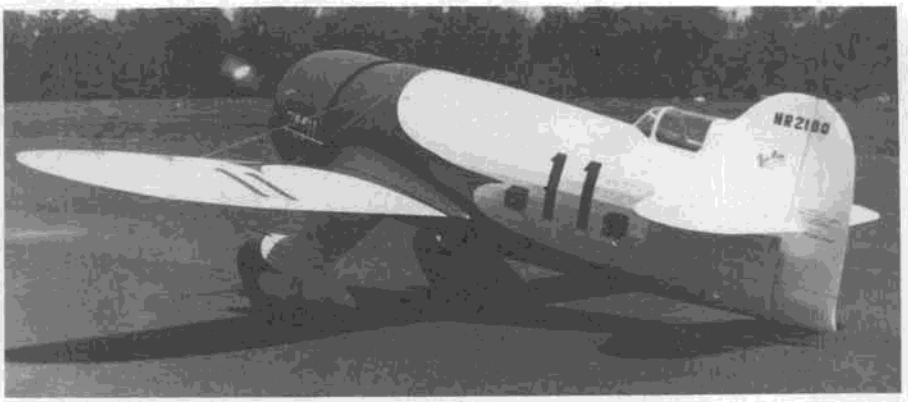
As he turned into the driveway at

Bob Underwood's DH-88 Comet won first in Expert class at Mint Julep. Model weighs 12-1/2 lbs., has 900 sq. in., powered by two HP .40's.

Dolly and Bob Wischer, with Bob's Pober "Pixie". Both Wischers are expert modelers.

Skip Mast's scratch-built P-51 had engine troubles at Mint Julep, could not get in a complete flight.

Bob Godfrey has an O.S. 4-cycle .60 in his Waco F-3. Bet it sounds realistic!



Joe Naber did an excellent job on this Gee-Bee S-2, seen at contest put on by the Greater St. Louis Modeling Association. Model was damaged when it ran into the grass on takeoff.

Cessna 172 by Hank Pohlman won first at St. Louis contest. Prototype of Sig kit.

Lynn Elston painted his Fliteglas P-51 like Bob Hoover's full-size Mustang. Model was flown at Mint Julep and St. Louis contests. Photo taken at St. Louis meet.

home, his problem had not been resolved in his mind. Several things had crossed his mind, such as developing a class that would take care of the beginner. Maybe they could eliminate the really good ships from his class, or maybe the really good pilots. What to do?

Brad seems to be caught in a problem found all too often in our modern times. He's trapped in the "instant syndrome". Whether it's pudding or potatoes, we want it *now*. It doesn't work that way in competition. Hopefully, we can help Brad see that most winners labor long in the vineyard before they can savor the wine (California wine, of course). The skills required to be a winner develop through long periods of learning, and perhaps failing. The skill required to produce a beautiful finish didn't come in a box of Crackerjacks. The guy who put up a beautiful flight routine didn't develop it by flying a hammock in the back yard.

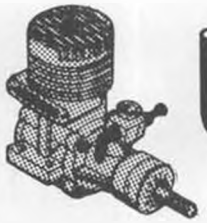
It's true that Brad would stand a better chance to win if we developed a beginner's class, or eliminated some of the top competition, but a stubborn fact remains that he would still have to contend with the fella who came better prepared, no matter at what level he's operating. No set of rules can legislate mediocrity. How about giving him some positive hints on how to approach

Continued on page 107

John Foreman placed second in Sportsman class at Mint Julep with his Super Fli equipped with smoke system.

Well-known scale modeler Bud Atkinson flew his colorful Hawker Hunter to third place in Expert class at Mint Julep.

FUEL LINES



GEORGE ALDRICH
P.O. Box 1426
Mission, TX 78572

DALE KIRN
283 N. Spruce Dr.
Anaheim, CA 92805

OTTO BERNHARDT
17119 S. Harvard
Gardena, CA 90247

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

D. KIRN

• One of the most asked questions regarding 1/2A engines is "which Cox engine parts are interchangeable and what performance (if any) can be expected?" There are many combinations that will work, so I will answer this question by breaking the engines down into two categories: Cox reed valve engines, and Tee Dee/Medallion engines.

COX REED VALVE TYPE ENGINES

All of these engines (Babe Bee, Golden Bee, Black Widow, QRC) have the SAME common parts: crankcase, crankshaft, prop drive plate, crankcase gasket, reed valve, reed retainer spring, piston and rod assembly, glow head (No. 302-1) and gasket, neoprene tank gasket, fuel line and spring (inside tank), needle valve and spring. The crankcase and prop drive plate are anodized on the Black Widow and Golden Bee.

The parts that are added to these common basic components determine the performance output and duration of running time. They consist of the cylinder, tank front (with reed and reed retainer), and die cast tank back assembly.

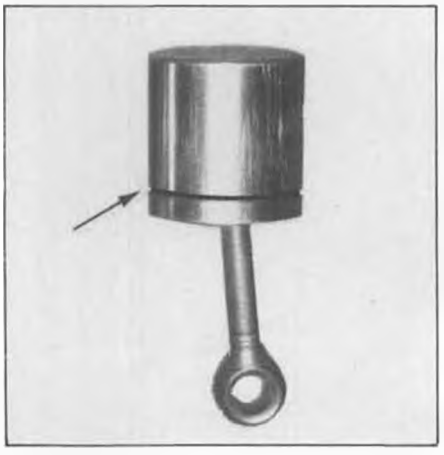
The Babe Bee tank front has the smallest fuel capacity and uses the backplate that has the two vents cast in place next to the needle valve. The Golden Bee/Black Widow/QRC tank front is common (except for color) and has two vents pressed into the tank for control line stunt flying. It also uses a die cast backplate, but has no tank vents. This tank has more volume, thus will run longer than the Babe Bee.

THE POWER OUTPUT OF MOST COX ENGINES IS DETERMINED BY THE CYLINDER PORTING (BYPASS AND EXHAUST). When Cox introduced the Babe Bee and the Golden Bee, they used the same cylinder on both models. The cylinder had a No. 2 stamped on it (either under, or in, the exhaust port) and only one bypass groove. The Black Widow cylinder has two bypass grooves and a No. 1 stamped on the cylinder. It produces more power (500-1000 RPM, depending on prop size) than the single bypass. The QRC cylinder also has two bypass grooves but NO FREE PORTING. Its power output (with a muffler in the closed position) is comparable to a Babe Bee or Golden Bee. The cylinder has a No. 6 stamped on it and the top cylinder fin has been milled with two flats to accept a Cox wrench for safe cylinder removal.

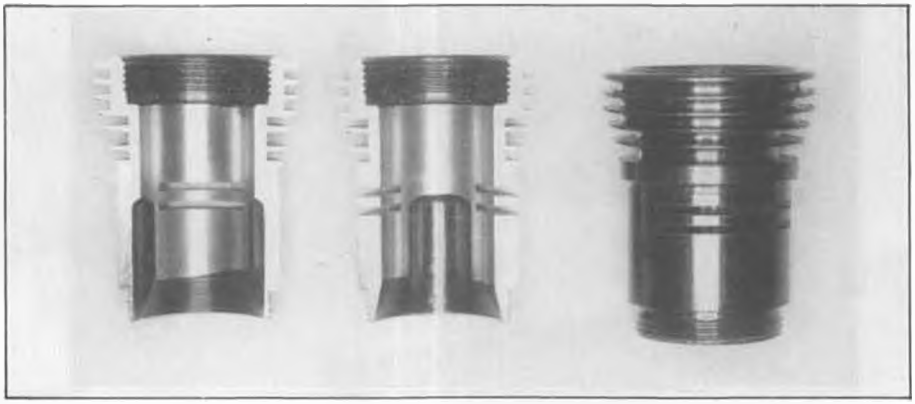
Several other cylinders have been produced by Cox for their various production engines that are used in ready-to-run cars or planes. The numbers stamped on the cylinder range from 1 through 8!! Each number represents a variation in either the bypass configuration or the exhaust width or height. Nos. 4 and 5 are still in use for the Tee Dee engines. Early in 1978, Cox developed another cylinder that will be phased into many of the reed valve engines (see photo). This new cylinder uses a unique exhaust porting arrangement of two thin slots. The double bypass grooves are slightly higher than on previous cylinders. Advantages of going to this modification are two-fold: slightly less noise level, and the elimination of free porting. It has already made its way into the market place in several of the plastic planes, cars, and the QRC .049. This cylinder porting is made in two styles. One has the top fin milled with two flats (used on the QRC) while the other does not. This is the only cylinder now that does not get a number stamped on it for quick identification.

ALL COX CYLINDERS ARE INTERCHANGEABLE ON EITHER THE BABE BEE OR TEE DEE TYPE CRANKCASE. Any of the double bypass cylinders will produce more power than one having a single bypass, and in the process will consume fuel at a faster rate. If power is your criteria, use only a double bypass cylinder. There is very little (if any) gain in putting a Tee Dee cylinder on a Black Widow. However, there can be a gain with this swap if you enlarge the venturi opening to approx. 5/64 inch diameter. Care must be used not to make the venturi hole too large. If you do, the engine will lose its ability to suck fuel properly and become very hard to start and adjust.

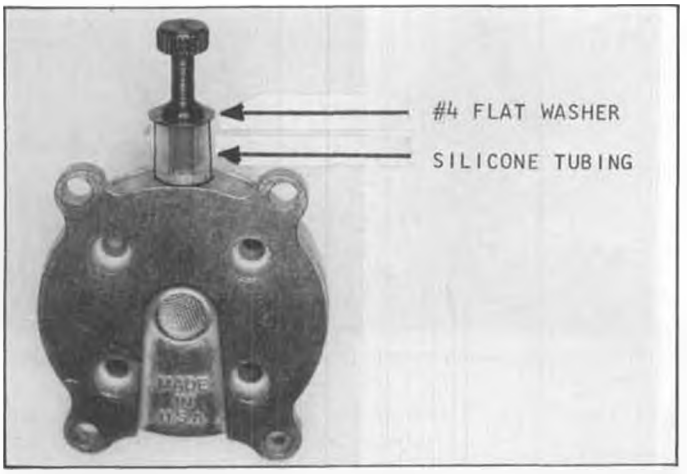
The standard glow head (Part No. 302-1) is used on the Babe Bee, Golden Bee and Black Widow. The QRC uses the high compression head (Part No. 1702) and three head gaskets. Either glow head can be used on ANY Cox .049 or .051 size cylinder. Using a high compression head on a brand new engine can lead to starting troubles UNLESS you use 3 or 4 head gaskets. This shows up by the engine "rocking" the prop back and forth several times



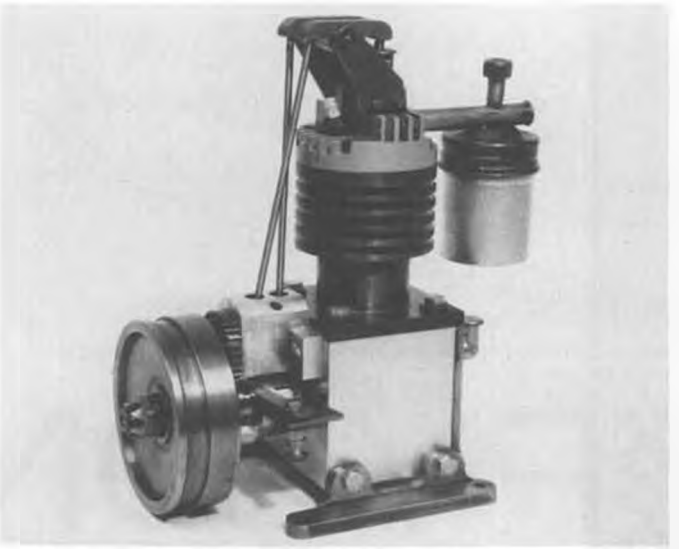
Identification groove on .051 piston and rod assembly avoids confusion with .049 unit.



New cylinder porting, from Cox. Major difference from older porting style is in exhaust area. New exhaust openings are two thin slits (approx. .030) on each side of cylinder. This modification was made to help reduce noise level and eliminate free porting on reed valve engines.



Needle valve modification; for Babe Bee, Golden Bee, Black Widow, and QRC engines. (1) Remove needle valve and spring. (2) Replace spring with No. 4 flat washer. (3) Install 1/4 inch piece of silicone tubing over NV threads. (4) Re-install needle valve into backplate.



Don Weaver, San Pedro, Ca., built this .77 cu. in. engine from drawings in the Nov. '38 issue of Model Craftsman. John Morrill photo.

during the starting process. Add one gasket at a time until this condition stops.

There is one other engine part that can be of value to those of you who insist on using an electric starter on your reed valve type engines. Cox makes a BRASS prop drive plate which they use on all of their car engines that have the new style exhaust slots and a turbine flywheel. The brass drive plate will last considerably longer than the standard aluminum one while using an electric starter. Thousands of these car engines have been sold and many show up at garage sales and swap meets. They usually can be bought at a very reasonable cost.

One last hint on helping your engine that has the die cast backplate obtain a more consistent needle valve setting. Replace the needle valve spring with a no. 4 flat washer and a short piece of silicone tubing (see photo). This prevents air from getting into the needle valve threads. Some needle valves will quickly lose their thread fit caused by excessive vibration (weak engine mount area or unbalanced prop). When this happens, it becomes very difficult to get a peak adjustment.

TEE DEE AND MEDALLION ENGINES

There are only four (4) common parts on these engines: Crankcase, prop drive plate, crankcase cover, and glow head gasket. Major differences are in the crankshaft porting and the number of bypass grooves in the cylinder. The Medallion crankshaft has a round port opening, while the Tee Dee uses a rectangular port opening with more than double the area. The plastic carburetor housings (Tee Dee or Medallion) are interchangeable on both engines with no noticeable difference in power output. You can quickly "detune" a Tee Dee by replacing the crankshaft with a Medallion shaft, or leave the Tee Dee shaft in and replace the Tee Dee cylinder with the Medallion cylinder (only one bypass groove). Or you can "soup up" the Medallion by replacing the cylinder and piston with a Tee Dee cylinder and piston. If you put the Tee Dee shaft and 1702 glow head on, you now have a Tee Dee performance engine with a Medallion carb assembly.

The crankcase assembly (crankcase, plastic carburetor housing, and aluminum retaining nut) on the Tee Dee .049 and .051 are the same, except for the color of the plastic housing . . . red for the .051 and black for the .049. What makes the .051 different is the larger cylinder bore and piston size (.004 in. bigger). The quickest way to check for the .051 is to look for a groove near the bottom of the piston (see photo). It is impossible to run an .049 piston in an .051 cylinder, or vice versa.

A final word on the various spinner and prop screws. All Cox .049/.051 engines have a common thread size (5-40) and are interchangeable.

OTTO BERNHARDT

• A letter arrives by mail. "Dear Otto: I recently made a trade with a fellow for a like-new VIPER 88 which I intended to mount in my Sailplane. I was told that the engine had only been run for ten or fifteen minutes and still needed break-in, but when I fired it up I discovered it would not hold compression when it was warm and would soon stop of its own accord. Although I am using plenty of oil in the gasoline, it does not seem to help. What do you suggest I do?" Good question, but what shall I

Continued on page 104

Using a 3-prong cam puller to remove the prop driver on an S.T. X-40, prior to removing the ball bearings.

Using a mandrel for removing the rear ball bearing, after heating the entire unit over a gas flame.

At one point in time, the Cosmic Wind wore this "Little Toni" outfit. It changed often.

Size of model doesn't show in this photo, except grass looks smaller than usual.

PYLON

"GO FAST AND Turn Left!"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

• Goodyear Trophy Race . . . John Paul Jones . . . Oshkosh . . . National Air Races . . . Tony LeVier . . . Fort Wayne . . . Fish Salmon . . . Cleveland . . . Cosmic Wind; all are names which conjure up images of Air Racing's finest hours.

The general public vicariously unleashed the pent-up emotions and expectations of WW-II in their support of the colorful and dangerous game of speed. Thousands of people flocked to various airports around the country on Sunday afternoons to watch these heroes of the air do battle in their little airplanes. Gradually, during the mid-60's, interest in air racing began to die. Perhaps it was the ever-larger courses required to fly, thus taking the aircraft out of the spectator's sight for longer periods of time; or maybe it was just the booming economy that allowed people more time and more money to pursue their own personal interests. Whatever the reason, even the current surge of interest in air racing will never recapture those days. The innovative, individualistic homebuilder seems to be a breed of the past, and when these aircraft and their builders pass on, they will not be replaced.

R/C Formula I racing captures some of the flavor of those days with the rules being set to reflect upon the planes designed for the full-scale Goodyear event. Still, Form I is more of a horsepower race than anything else, and to the spectator, who is forced to remain 500 to 600 feet away from the action, a plane with a 4-foot wingspan is a little hard to identify with, even discounting the liberties taken with scale fidelity.

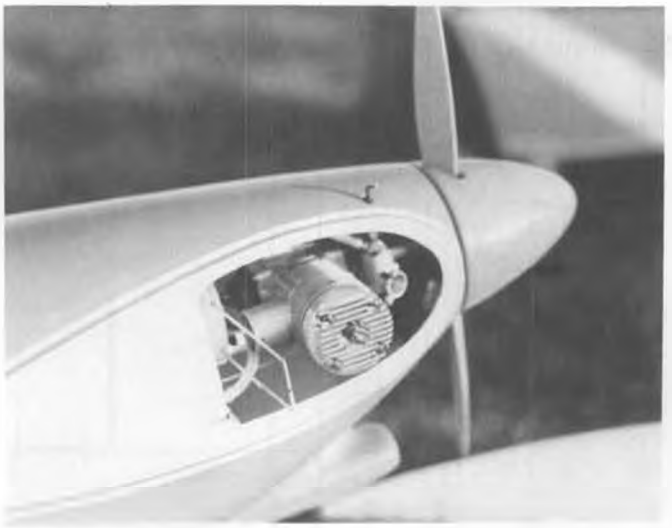
Throw all of the problems, possible exciting ideas, nostalgia, and **MB**'s Bill Northrop's suggestion of Quarter Scale airplanes together and let a dyed-in-the-wool racer stir the mixture up and see what he comes up with . . . a new racing event. Yes, we proposed a new event back in the June, 1977, issue of **MB**. The response received was understated, to say the least; ranging from a high of, "Where will I find the time . . . I already fly QM, Form I, Sport Pylon, 1/2A, and Quickie 500," to a low of, "Stick it in your ear!"

So we just let the idea die its own slow death, until we saw Bob Seigelkoff, of CB Associates, 21658 CLoud Way, Hayward, California 94545, at the 1977 California Nats, along with his 1/4 Scale Cosmic Wind. After checking it out, and watching him fly his plane in the Pattern event, and Warren Avery fly his in Sport Scale, we had the hots for it again.

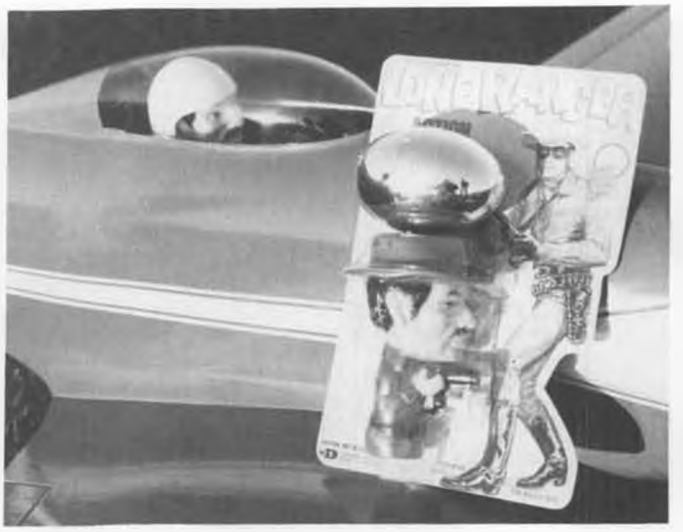
Bob was kind enough to provide us with a kit, and we were on our way. This time, we'd be a little

Test kit came from C.B. Associates before Bridi took over. Balsa covering on foam, and motor mount not included.

Now you can dig the size. Jim is 6 ft. tall.



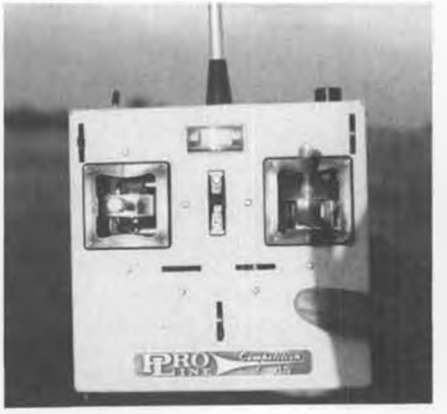
New Super Tigre X 60 has more than enough power to pull "Big Toni". An excellent pattern engine.



Squirt gun from 5&10, plus Leggs panty hose container, and a little paint, and you have a 1/4-scale pilot!

Flight is majestic and scale-like. Is this the answer for pylon racing?

On a slow fly-by it's rock-steady. Try *that* on your Form I!



Close! Two batteries failed just after landing on first test hop. Note switch 'on' and meter reading.

smarter . . . build the plane first and demonstrate it at every race we attended; let the enthusiasm build on its own, and soon the racing fraternity will demand that a 1/4-scale racing event be held.

Our trip to the boneyard delayed the project for several months and, figuring scale documentation wouldn't be a problem, we neglected to use this otherwise wasted period in our life to pursue documentation. Well, we sure learned a lesson in a hurry. Upon finally tracking down information on the Cosmic Wind series of aircraft, specifically the Little Toni version, we are now the proud possessor of four different three-view drawings, all by respected authors, none of which agree on things like color scheme, areas, or outlines. Add to this the fact that the airplane had been rebuilt and repainted on numerous occasions, and the project becomes even more difficult.

Research led me to Mr. John Penhallow, of 74 Marty Ct., Newbury Park, CA 91320, who has been most helpful in providing drawings, photographs, and further sources of info. Here's a quote from one of John's letters, to give you a small indication of the kind of things you can run into:

"This is an example of the problems you'll have if you're not careful with your research, i.e., the 1949 Minnow used the 1948 wing, landing gear, and engine on a new fuselage and tail. The 1948 and 1949 aircraft used N21C/#4. In 1950 (or late 1949), a new wood wing and landing gear were put on the 1949 airplane, and the 1948 airplane was reassembled. The "new" airplane (wood wing) was (is?) race No. 6, Miss Cosmic Wind. It was back in California in the early '70's, and may still be there. There was only *one* long fuselage. It was race No. 4 in 1949 and No. 6 thereafter."

My basic research indicated that three planes were built by the original LeVier and Associates (all engineers or test pilots with Lockheed), but photos and drawings indicate various planes numbered from three to seven, including one mid-wing version. This doesn't include the fact that at least one, if not two, of the series wound up racing in England, which will undoubtedly increase the color schemes available, and also might include some airframe modifications. Also, even while the planes were in America, the paint schemes changed almost as often as the owners.

(Note: I just found out that the mid-wing aircraft was an entirely new plane; completely contrary to earlier research, which had indicated it was a composite of an earlier plane and some new parts!).

Once getting into the research game and becoming more and more frustrated, we gave up trying to super-document the plane, and selected a three-view and a color photograph which were very close to matching. We will go with minimum scale proof, should we elect to enter a scale contest.

Suffice it to say, there is enough variety, just in this series of planes, to please most any modeler, and at the same time, have a variety of different-looking planes, all based on the same kit. All the while the above was going on, there was a change in kit manufacturers (shades of the real

Continued on page 113

R/C FORUM with

Hal deBolt

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

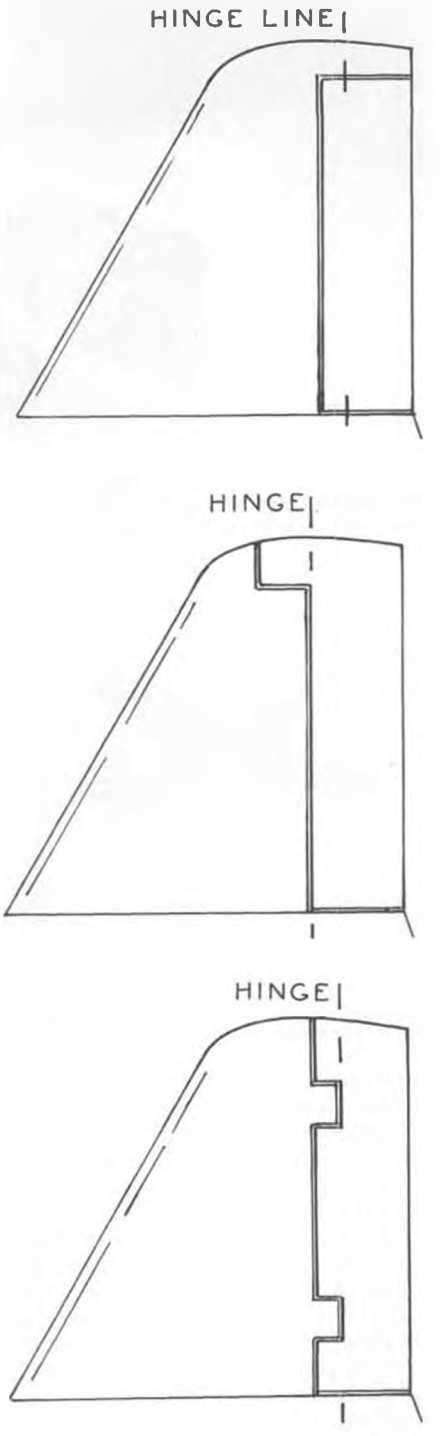
Mail in your questions or concerns.

• As a result of the ever-increasing interest in the big planes (1/4 Scale, Mammoth Scale, call them what you like), coupled with the higher and higher flying speeds of the more normal-sized models, questions about the ability of our R/C systems have arisen. Such questions are logical, if you assume that our equipment was designed and built to fly normal-sized model aircraft only. Most of our equipment was developed just for model aircraft use; however, the designers may have been looking out of the corner of their eye at other applications when it was done. Quite often the applications (other than model aircraft) that have been found for our equipment are very interesting. The additional demands which these applications have required provide some good experience upon which to base the use, in other than normal ways, of standard R/C gear. This experience would seem to indicate that most R/C equipment is capable of considerably more performance than is required to fly a normal-sized model.

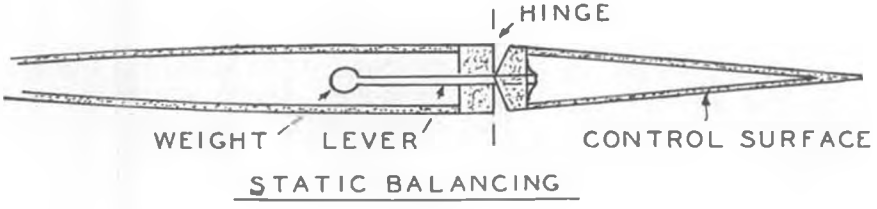
Years ago, as an example, the Bramco Corp., which produced fine reed type systems, had several interesting projects. At that time, the Alcoa Corp. built a jet-powered speedboat for an attempt at the World Speed Record. The speed expected was very high for a boat, way above any speed for which experience was available. At about the same time, John Cobb of England had blown up a similar boat after topping 200 MPH. The Alcoa people simply had no idea what would happen when their boat approached its top speed, and it would appear that they were "chicken" about it. Who could blame them? High-speed tests with R/C seemed to be the logical answer. As you can guess, the reliability and performance of the Bramco system of that day was a far cry from what we have today. Yet, the Alcoa jet-boat was outfitted with a Bramco system, as the heart of the control system, and many successful tests were performed with it.

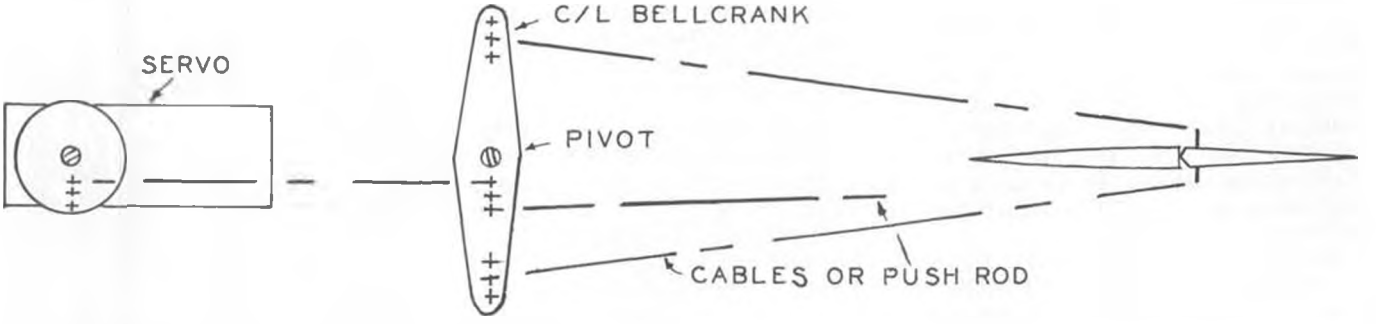
Another successful Bramco project involved a major appliance manufacturer. This corporation wished to show the public a "Kitchen of Tomorrow", in which much of the work would be automated. It wasn't that the automation could not be done, but it was a fact that if it was simulated by the use of R/C, it would be much simpler and cheaper for show purposes. So it was that the

Continued on page 95

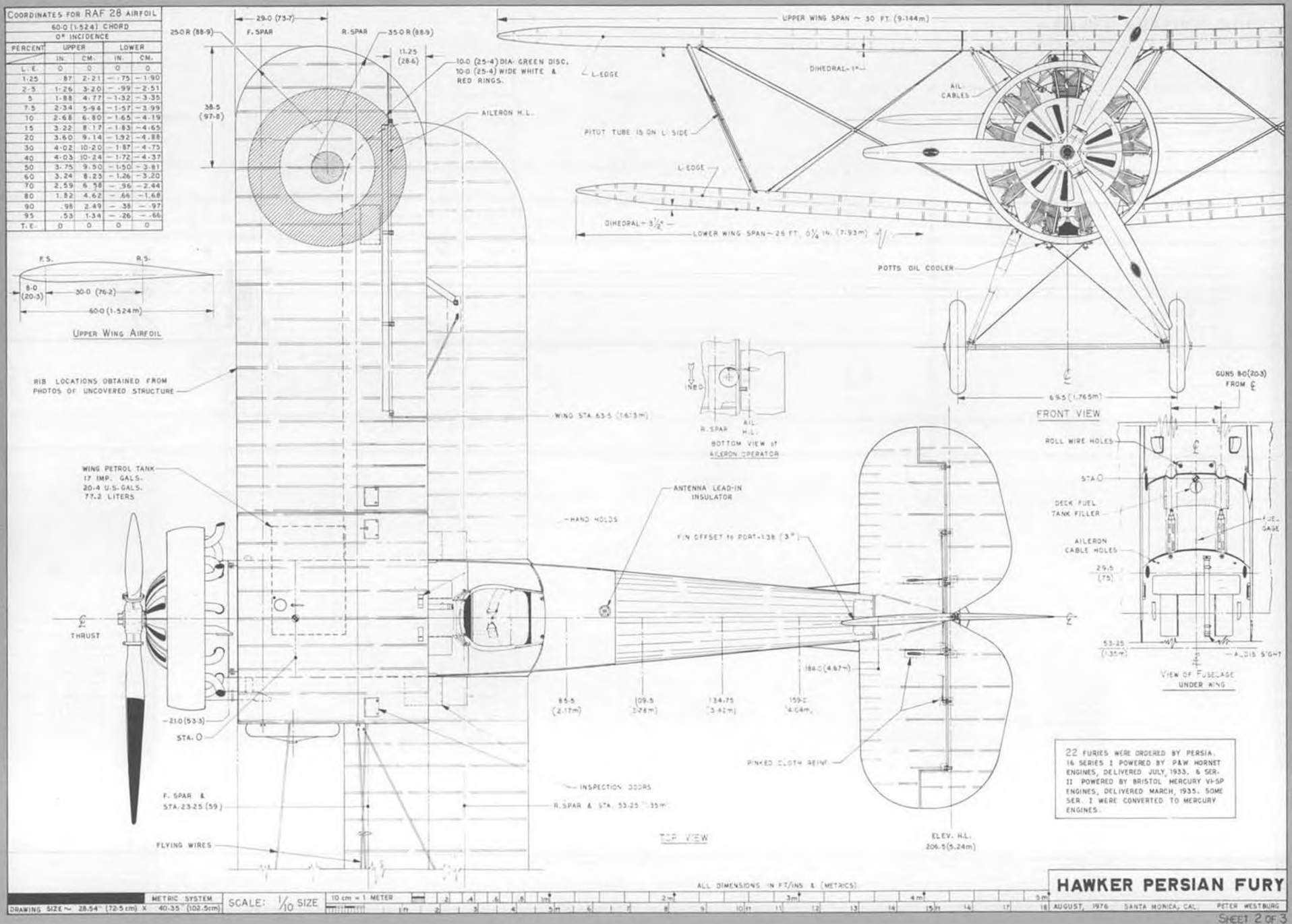


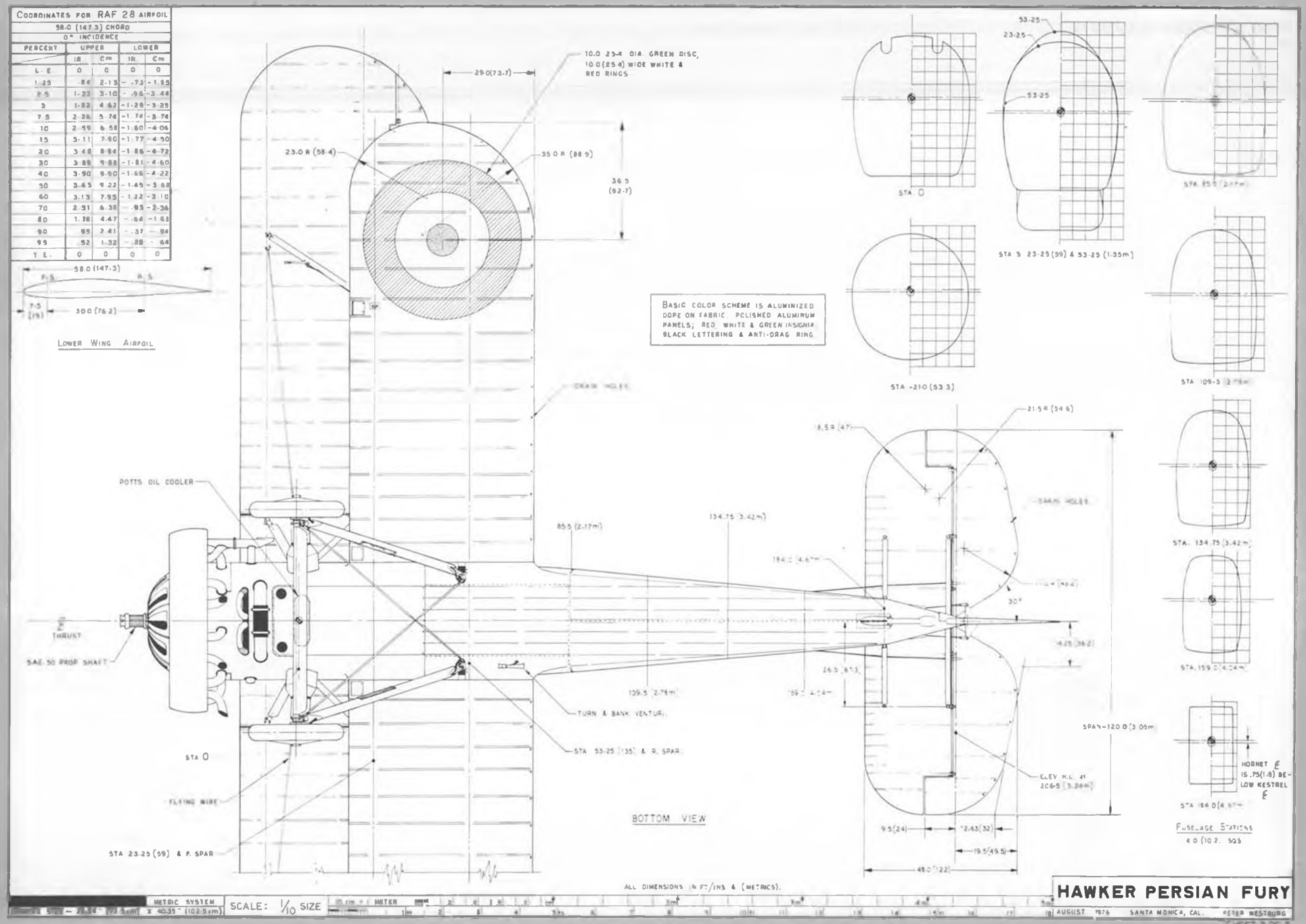
Aerodynamic balancing.





Walking beam installation, used to remove control system loads from the servo.


COORDINATES FOR RAF 28 AIRFOIL
60-0 (1-524) CHORD
0° INCIDENCE
PERCENT | UPPER IN. | UPPER CM. | LOWER IN. | LOWER CM.
L.E. 0 0 0 0
1.25 .87 2.21 -.75 -1.90
2.5 1.26 3.20 -.99 -2.51
5 1.88 4.77 -1.32 -3.35
7.5 2.34 5.94 -1.57 -3.99
10 2.68 6.80 -1.65 -4.19
15 3.22 8.17 -1.83 -4.65
20 3.60 9.14 -1.92 -4.88
30 4.02 10.20 -1.87 -4.75
40 4.03 10.24 -1.72 -4.37
50 3.75 9.50 -1.50 -3.81
60 3.24 8.23 -1.26 -3.20
70 2.59 6.58 -.96 -2.44
80 1.82 4.62 -.66 -1.68
90 .98 2.49 -.38 -.97
95 .53 1.34 -.26 -.66
T.E. 0 0 0 0
F.S.
R.S.
8-0 (20-3)
30-0 (76-2)
60-0 (1-524m)
UPPER WING AIRFOIL
RIB LOCATIONS OBTAINED FROM PHOTOS OF UNCOVERED STRUCTURE
29-0 (73-7)
F. SPAR
R. SPAR
35-0 R (88-9)
25-0 R (88-9)
38-5 (97-8)
11-25 (28-6)
10-0 (25-4) DIA. GREEN DISC, 10-0 (25-4) WIDE WHITE & RED RINGS.
AILERON H.L.
WING STA. 63-5 (1-613m)
WING PETROL TANK 17 IMP. GALS. 20-4 U.S. GALS. 77.2 LITERS
HAND HOLDS
ANTENNA LEAD-IN INSULATOR
FIN OFFSET to PORT-1.38 (3")
THRUST
21-0 (53-3)
STA. 0
F. SPAR & STA. 23-25 (59)
FLYING WINGS
INSPECTION DOORS
R. SPAR & STA. 53-25 (1-35m)
85-5 (2.17m)
109-5 (2.78m)
134.75 (3.42m)
159-0 (4.04m)
184-0 (4.67m)
PINKED CLOTH REINF.
TOP VIEW
ELEV. H.L. 206-5 (5.24m)
INBD.
R. SPAR
AIL. H.L.
BOTTOM VIEW of AILERON OPERATOR
UPPER WING SPAN ~ 30 FT. (9.144m)
DIHEDRAL- 1°
AIL. CABLES
L. EDGE
PITOT TUBE IS ON L. SIDE
DIHEDRAL- 3½°
LOWER WING SPAN ~ 26 FT. 6¼ IN. (7.93m)
POTTS OIL COOLER
69-5 (1.765m)
GUNS 80 (20-3) FROM ℄
FRONT VIEW
ROLL WIRE HOLES
STA. 0
DECK FUEL TANK FILLER
FUSELAGE
AILERON CABLE HOLES
29-5 (75)
53-25 (1.35m)
A. LOBIS SIGHT
VIEW OF FUSELAGE UNDER WING
22 FURIES WERE ORDERED BY PERSIA. 16 SERIES I POWERED BY P&W HORNET ENGINES, DELIVERED JULY, 1933. 6 SER. II POWERED BY BRISTOL MERCURY VI-SP ENGINES, DELIVERED MARCH, 1935. SOME SER. I WERE CONVERTED TO MERCURY ENGINES.
ALL DIMENSIONS IN FT/INS & (METRICS)
METRIC SYSTEM
DRAWING SIZE ~ 28.54" (72.5cm) X 40.35" (102.5cm)
SCALE: 1/10 SIZE
10 cm = 1 METER
HAWKER PERSIAN FURY
AUGUST, 1976 SANTA MONICA, CAL. PETER WESTBURG
SHEET 2 OF 3


COORDINATES FOR RAF 28 AIRFOIL
58.0 (147.3) CHORD
0° INCIDENCE
PERCENT | UPPER IN | UPPER Cm | LOWER IN | LOWER Cm
L.E. 0 0 0 0
1.25 .84 2.13 -.73 -1.85
2.5 1.22 3.10 -.96 -2.44
5 1.82 4.62 -1.20 -3.25
7.5 2.26 5.74 -1.74 -3.74
10 2.59 6.58 -1.60 -4.06
15 3.11 7.90 -1.77 -4.50
20 3.48 8.84 -1.86 -4.72
30 3.89 9.88 -1.81 -4.60
40 3.90 9.90 -1.66 -4.22
50 3.65 9.22 -1.45 -3.68
60 3.13 7.95 -1.22 -3.10
70 2.51 6.38 -.85 -2.36
80 1.78 4.47 -.64 -1.63
90 .95 2.41 -.37 -.94
95 .52 1.32 -.28 -.64
T.E. 0 0 0 0
58.0 (147.3)
R.S.
7.5 (191)
30.0 (76.2)
LOWER WING AIRFOIL
29.0 (73.7)
10.0 25.4 DIA. GREEN DISC, 10.0 (25.4) WIDE WHITE & RED RINGS
23.0 R (58.4)
35.0 R (88.9)
36.5 (92.7)
BASIC COLOR SCHEME IS ALUMINIZED DOPE ON FABRIC. POLISHED ALUMINUM PANELS; RED WHITE & GREEN INSIGNIA BLACK LETTERING & ANTI-DRAG RING
DRAIN HOLES
POTTS OIL COOLER
85.5 (2.17m)
134.75 (3.42m)
184.0 (4.67m)
109.5 (2.78m)
159.0 (4.04m)
THRUST
SAE 50 PROP SHAFT
TURN & BANK VENTURI
STA 53.25 (135) R. SPAR
STA 0
FLYING WIRE
STA 23.25 (59) R. SPAR
BOTTOM VIEW
8.52 (47)
21.52 (54.6)
30°
26.5 (67.3)
SPAN-120.0 (3.05m)
ELEV H.L. at 206.5 (5.24m)
9.5(24)
12.63(32)
19.5(49.5)
48.0(122)
53.25
23.25
53.25
STA 0
STA 23.25(59) & 53.25 (1.35m)
STA 85.5 (2.17m)
STA -21.0 (53.3)
STA 109.5 (2.78m)
STA 134.75 (3.42m)
STA 159.0 (4.04m)
HORNET ℄ 15.75(1.8) BELOW KESTREL ℄
STA 184.0 (4.67m)
FUSELAGE STATIONS
40 (102.) 505
ALL DIMENSIONS IN FT./INS. & (METRICS).
METRIC SYSTEM
SCALE: 1/10 SIZE
METER
HAWKER PERSIAN FURY
AUGUST 1976 SANTA MONICA, CAL. PETER WESTBURG
SHEET 3 OF 3

More successful than Norwegian Fury with Armstrong-Siddeley Panther engine, was this Persian Fury with Pratt & Whitney Hornet and 3-blade Hamilton Std. prop. Unfortunately, it was noseheavy.

The FOREIGN FURY

PART TWO

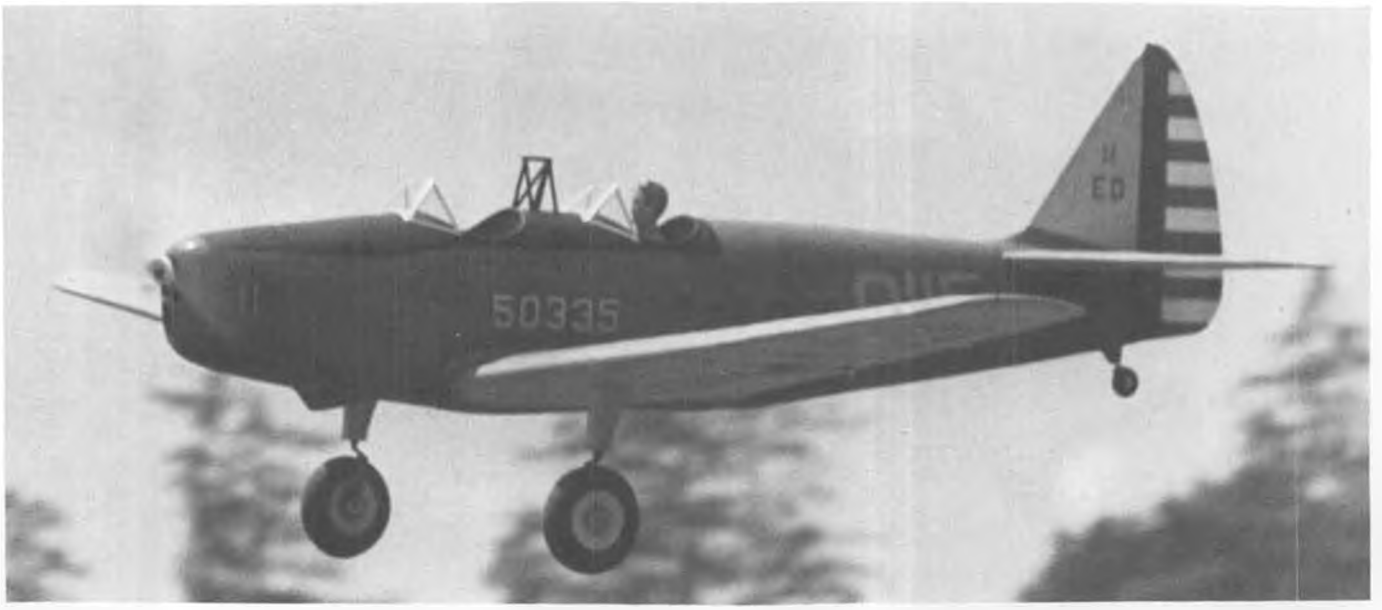
By PETER WESTBURG

• Sidney Camm firmly believed that the only engine that should be put in an airplane was the inline. He would have preferred to do without the drag and weight of the radiator and coolant. Others felt as strongly about the air-cooled radial engine.

Continued on page 125

Substituting Watts wooden prop made P&W powered airplane more manageable. Banked concrete road in background is famous Brooklands racetrack.

Persian markings were green upper, white and red equal segments on the rudder; cocardes on wings with a green center disc, white inner and red outer circles. Fin and rudder area larger than on standard Fury.



Jim Follini's 1/4-scale PT-19 was flown at the Scramble by Lee Taylor. Ship weighs 28 lbs. The PT-19 is a natural for modeling, with its generous dihedral, long tail moment, and large tail surfaces. Colorful pre-WWII paint scheme is attractive.

MORGAN HILL WW II SCRAMBLE

Text by PATRICIA GROVES, photography by MONTY GROVES . . . The annual gathering of R/C scale war birds continues to be one of the biggest attractions at Hill Country Air Museum, Morgan Hill, California.

• With its traditional Armed Forces Day opener, the World War II Scramble led off Hill Country's 1978 flying season. For this first in a triad of scale modeling events, 71 models mobilized at Hill Country Air Museum in Morgan Hill, California.

The May 20-21 meet, sponsored by **Model Builder** Magazine and ProLine Electronics, was blessed with beautiful weather and fine flying conditions. And with so many models present, spectators sure didn't lack for something to look at . . . from first takeoff to final landing.

When pre-registrations reached 47, CD Bob Morse and Scramble Manager Don Loughridge knew that the 4th annual gathering was, "good grief, still growing. And the guys who pre-registered sure made our life easier."

With some forewarning of an expected traffic jam in static judging, Scramble officials from the Pioneer R/C Club of Santa Clara and the Hill Country Flyers devised a different approach to static judg-

Earl Thompson, in white jacket, placed second in AMA Precision Scale with his fantastic scratch-built Westland Lysander. Won the Hill Country Craftsmanship Award.

It's only natural that Nick Maire should build a model of the Piper L—4 . . . he used to fly the full-size plane!

Hill Country's host and owner, Irv Perch, enjoying the action.

Bob Frey and Kent Walters, both from Arizona, do a pre-flight check on Bob's P–40. Note Bob's flying garb.

Gene Ageno's "born again" Stuka on landing approach. See text for interesting origin of this model.

Dave Parson's rare, scratch-built Martin-Baker M.B. 5. One of the few "single sample" models at the Scramble.

ing the Sport (B.O.M. rule) and Team (no B.O.M. rule) Scale entries. Otherwise, some of the Sport/Team models "probably wouldn't have been judged until 4 a.m. Monday morning."

So, while static judging of the four AMA Scale entries was handled in the traditional manner, Sport and Team Scale entrants were judged in the ready box just prior to their takeoff. Something "new" always encounters a predictable amount of complaining, but essentially it worked quite well. And the presence of flying props, rather than scale props, bothered only the photographers and some modelers. Not the judges.

They'd been told to ignore props altogether, since these planes should be regarded as though "in flight" anyway.

At 9:19 a.m. on Day One of the Scramble, the first combatants rose from three flight lines. From then on until Sunday afternoon, all three lines were in constant operation.

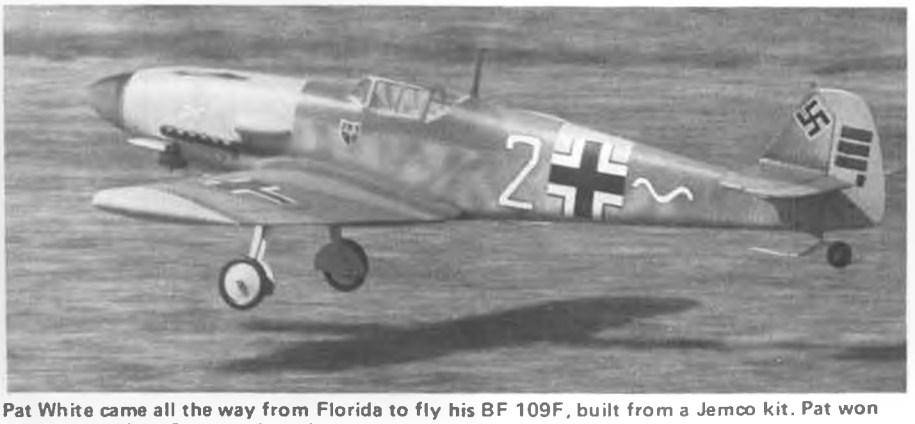
Grand Champion and winner in AMA Scale was Ukiah Prop Busters' Dave Lovitt. Points scored in static and the three rounds of flying earned him and his Ki 43 (Oscar) the overall #1 slot and the 5-channel radio awarded by ProLine's Jerry Bonzo.

Lovitt's lone Oscar was among the few single-sample aircraft at the Scramble and was a refreshing change from the "squadrons" of Spits, 190's, and Jugs. Would you believe it . . . enough Mustangs were there to make up a Fighter Wing!

Hard times dogged AMA Scale entries. On his third flight, Lovitt's Oscar suffered a non-scheduled

CD Bob Morse (left) and Scramble Manager Don Loughridge did an excellent job.

ProLine's Jerry Bonzo was co-sponsor with MB of the WWII Scramble.



Pat White came all the way from Florida to fly his BF 109F, built from a Jemco kit. Pat won the Scramble's X-Country Award.

John Lockwood, of Clovis, California, placed first in Sport Scale with his F4U Corsair. John is a smooth and precise flier. Model was built from a Royal kit.

This beautiful FW-190, built from a Platt kit, was one of 16 models that didn't return from a mission.

In addition to his Lysander, Earl Thompson brought this scratch-built Fairchild PT-26, done up in Norwegian markings.

A landing gear malfunction on John Lockwood's Corsair made for some exciting moments on touchdown.

Dave Lovitt won the Grand Championship and first in AMA Scale with his Ki 43 Oscar.

encounter with the ground. In Second Place, Earl Thompson's outstanding Westland Lysander earned 431 static points but was disabled by an underpowered engine on its first flight. A disastrous first flight also crippled Ron Grigsby's high static-scoring C-47. Jack Watson's Fourth Place Spitfire, though quite low in static, was the only AMA entry to survive the contest.

In Sport Scale, John Lockwood of Clovis, California, won out over 54 other contenders with his F4U. Lockwood's consistent pilotage is a strong factor to his consistent placing.

The Sport Scale winners' circle contained other U.S. Navy aircraft: Hot on Lockwood's heels came Kent Walter's Second Place finisher, a Goodyear Corsair. And coming in Third was Tom Minger's N2S-5 trainer.

Of 12 Team Scale entries, Gene Ageno of Sunnyvale, California, took top honors with his "born again" Stuka. When its previous owner gave it an ignominious burial in a convenient garbage can, Ageno retrieved it, rebuilt it, and flew it to glory. That resurrected Stuka, however, had two U.S. Army attackers right on its tail. Rounding out Team Scale placings were challengers M.L. Rush, whose P-38J placed Second, and Rich Westlake's AT-6C in Third.

Judged and awarded the Bob Holman Trophy for Most Unusual

Tom Minger's N2S-5 is a copy of a full-size version based at San Carlos, California.

Aircraft at the Scramble was Don Parson's Martin-Baker M.B. 5. Parson's building skills and flying ability showcased this stunning (Sport Scale) WWII British fighter.

The Hill Country Craftmanship Award was presented to Earl Thompson of Livermore, California. This Michelangelo of modeling came to the Scramble with a superb Westland Lysander whose cockpit seemed to be waiting for a "short people" to jump in and take off. Thompson's well-thought out scale documentation was also the Judges' choice for the Documentation Award presented by Rare Birds, an aviation history research group.

When there are 71 models to feast your eyes on, modeling variety is a delight. Joining Parson's single-sample M.B. 5 was Jim Meister's good-flying F6F . . . a Jemco kit, of course. And then there was Bob Thacker's military Staggerwing. From Caruther's, California, M.L. Rush's P-38J was the only example of its type and one of the few twin-engine types at the meet. On the side of the Allies, a Hawker Fury was brought by Dennis Griggs of Brookdale, California.

In addition to Minger's "Yellow Peril", other single examples of WWII trainers were a PT-19 (Howard Bailey, Riverside, California) and a PT-17 (Frank Shoening, Monterey, California).

Overall Grand Champion Dave Lovitt picking up his loot at the end of the contest. Dave is a member of the Ukiah Prop Busters. One of his prizes was a 5-channel ProLine radio.

Hopefully, Dave Grip (Hamilton AFB) will return to Hill Country in August and enter his realistic P-26A in the Golden Age contest . . . an era better suited to its prewar color and markings.

It was heartbreaking to see the crashes of such planes as Dale Sebring's unique Maachi 202 and Doc Keith's metal-clad Hein. An abnormally high rate of attrition . . . 16 major crashes . . . marred the contest. While it may have made things exciting for the spectators, it nevertheless was a source of major concern to veteran modelers and observers . . . not to mention the contest management!

It was a situation for which, sadly, too few legitimate reasons could be found. The weather conditions were perfect. There were no mid-airs and no known radio interference.

Fortunately, there was plenty of good flying to go around. Those able to complete three rounds usually did so through consistent flying and caution.

The number of out-of-state Scramble entrants continues to grow. Besides Arizona and Nevada, contestants came from New Mexico and Colorado. Perenial long distance participant, Floridian Pat White, again drove out from Lauderdale Lakes. His cross-country trek once more earned him the Scramble's X-Country Award. Pat says: "If

Fourteen-year-old Scott Tennyson was the youngest competitor at the Scramble.

Gary Korpi's B-25 claws for altitude. His was one of only a few twin-engine models at the Scramble. Ship was modified from a Royal kit.

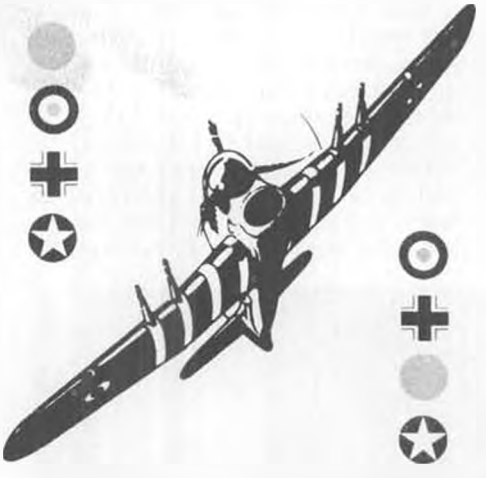
Buz Watson's Stuka, built from a D&B kit, was one of the most colorful models at the meet. Did a complete somersault on landing . . . and survived!

my car holds out, I'll be back next year."

During the daily demonstration flights, Ken Willard showed his singular knack for coming up with ingenuity in modeling. His clever handling of a "formation flight" of four Blue Angels jets was pure magic.

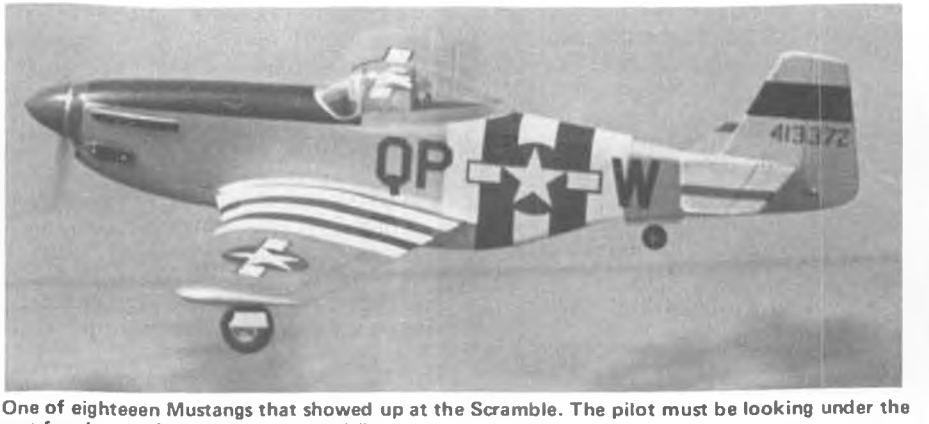
After the last round of flying on Sunday, contestants teamed together and performed while everyone waited for the final scores to be tallied. Southern Californians Jim Meister (F6F) and Bob Robeson (F4U) followed Willard's Blue Angels demo with some fancy aerobatics of their own. Then, not to be outdone, members of Arizona's 1/8th Air Force countered with a precision aerial ballet flown by Kent Walters (FG-1) and Bob Frey (P-40E).

The grand finale to the whole afternoon was in seeing a demo of Paul Sherlock's 33 lb., 16 ft. span, all-foam model of "Howard's Goose". Sherlock's twin-engined version of Hughes H-4 Hercules struggled . . . then lumbered into the air . . . and the crowd went wild! •



Over 50% of the Scale Squadron's total membership was present.

Doc Keith gets the "go" signal from Hank Pajari. Keith's metal-covered Hien was a victim of one of several unexplained crashes.



One of eighteeen Mustangs that showed up at the Scramble. The pilot must be looking under the seat for the relief tube, as he is not visible.

"Big Oz", of Root's Hobbies (Oakland), brings his Hien down for a low pass prior to landing. Note the receiver antenna along the bottom of the fuselage.

P-47D by Gerold Davis was done up in the colors of the 353rd Fighter Squadron. A consistent flier throughout the contest.

CD Tom Williams did an excellent job of running probably the biggest man-on-man glider contest ever held.

Grand Champion, Bill Nibley, of the San Fernando Valley Silent Flyers. Bill flew a Pierce Paragon to victory.

California NORTH/SOUTH Challenge

PHOTOS BY VERN BROESAMLE

By DAVE THORNBURG . . . A special report on a very special contest. Take the Tricathlon system and throw in man-on-man competition, and soaring becomes a whole new ball-game. An expert tells all.

• One hundred and twenty-one contestants showed up at Visalia this year for the annual California North/South Challenge, making it almost certainly the biggest U.S. glider bash of 1978. The contest was long and hot and tough and unpredictable . . . just exactly the way a glider contest ought to be . . . and when the dust had cleared, Bill Nibley of L.A. was the only pilot still on his feet.

Two things made the contest memorable for us also-rans. The first was the quality of building and flying in evidence; I've never been to a contest of this size in which there were NO wing failures on the winches, NO kamikaze attacks on the spectators, NO exploded-view landings, and only a couple of mid-airs, neither too serious. The level of coolness and professionalism in the sport is definitely on the rise!

If only Colonel Bob Thacker had had the good taste to stay home with his patched and mutilated Paragon, I could honestly report that the level of craftsmanship of the ten dozen ships on the field was far above average. Even with Bob's ship thrown in, the average was slightly above normal. (As the report progresses I'll look for other vicious things to say about the people who finished in the top five.)

The second memorable characteristic of the contest was the scoring system. Everyone hates what they don't understand, and few people took the trouble to understand it. It was complex, but not difficult. It was basically just the familiar old Tricathlon system, in which each flight is scored three ways. You could earn a maximum of 700 points for staying up the full seven minutes, 200 points for landing on the whole minute, and 100 points for your distance-from-the-spot. But the kicker was this: each of these were scored man-on-man. If you got a 94 landing . . . and that's a good landing, at least in my book . . . you left yourself open. If one of the other five flyers in your heat bettered you, he got the hundred points for first, and you got second, which was only 75 points!

The precision scoring was even tougher. If you were off by one second, and another flyer was right on, you lost fifty points. The trick to winning was simple: fly a perfect flight, every flight! The lesson here is the same one you learn driving the California freeways: don't leave a hole, no matter how small, or some turkey will squeeze in front of you. And that, I suppose, is what competition is all about.

A lot has been written about the relative merits of the man-on-man system. Frank Deis of Alabama has pointed out that, no matter how many rounds are flown, the only two people who are likely to come out *exactly* where they belong in a man-on-man contest are the top pilot and the worst pilot. Everyone in between is subject to a certain amount of mathematical unfairness. Others have observed that man-on-man takes most of the luck out of the air, and puts it instead into the draw; in other words, you no longer have to worry about being sent up to fly in sick air, since you can still squeeze as many points out of it as the chaps who flew earlier, when any fool

Hi Johnson's beautiful sailplane was built from components listed in his Super Wings catalog. Handled, flew well.

Dave Thornburg points the direction he wants his "Bird of Time" to go: up! Dave won fifth place overall. Don Edberg times.

could max. But you now have to worry about being unfairly (?) matched against Harley Hotshot, who's won the last 39 contests in a row, and can loosen Monokote with his withering stare.

Both of these objections . . . and they're really the same objection, stated differently . . . are valid.

But a lot can be said in favor of the man-on-man principle, and the North/South Challenge said it well. First, flying man-on-man makes each heat a miniature contest. You stand in the ready area eyeball-to-eyeball with the five other fliers in your "contest". You size up everybody else's airplanes. You ask questions designed to keep your opponents alert ("You *sure* you hooked them spoilers up, Bufo?"). You trade information ("Air looks super, off downwind, there."). You sweat.

Finally you step up to the winches. They assigned you to the worst of the six winches? Don't worry . . . they did exactly the same thing to the other five guys, too. You launch.

Only one guy in the group fails to get a higher launch than you, and he's flying a "Lil T" on escapements. Already you've learned something: you need to look at the towhook position on some of those other airplanes, and you might want to get someone to critique your winch

Mike Reagan and his Mirage, designed by Blaine Rawdon. Ship has a semi-symmetrical airfoil and is very light.

Mark Smith looking for the bird that just autographed his model (not really). Note the flaps on Mark's ship.

technique, as well. Then the "Lil T" pulls in beneath you in your thermal and climbs right up through you like the Souls of the Blessed. Voila! You've learned something else: you'd better swap planes with that "Lil T" man, throw away his wings and tail, and take up softball with the fuselage! (A properly-built "T" fuselage will go nine innings plus overtime, as long as you don't hit the ball with the open wing saddle.)

If you can find a better way to improve your flying skill, a better way to "prove" which plane/tow-hook/launch gets highest, I'd be happy to hear it. And the bonus is, *somebody wins every miniature contest.* Whereas there's only one overall contest with one overall winner, there are hundred mini-contests (six-man heats) with a hundred potential winners ... so almost everyone has a chance to be top man at least once. ("In the future," Andy Warhol said, "everyone will be famous for fifteen minutes. . .")

An added attraction at this year's North/South was the "personal challenge". Each six-man heat had three northerners pitted against three southerners. You challenged a man from the opposite team, and won or lost points for your team according to whether or not you beat him in duration, precision and landing points. The idea was ingenious: for the first time in the history of the North/South, *everyone's* flying counted. In the past, the scores of the top five north flyers were summed up, and they invariably (forgive my selective memory) were higher than the scores of the top five southerners, so the north was declared winner.

This year, by some fluke, the south won. Computer analysis of the score sheets indicates that the northerners apparently flew so exceedingly well that they managed to *eliminate each other!* Proof of this lies in the fact that there were only three northerners left in the top ten flyers by the end of the contest! Now that's skill!

Trophies went, as promised, to every member of the winning team: sixty southerners filed past the CD's test and received a T-shirt emblazoned with "WINNING TEAM MEMBER, NORTH/SOUTH CHALLENGE 1978". I like the idea of a trophy that's machine-washable. For years I tried to prop my sagging ego up with conventional trophies, and found the pot-metal was hard on my thin side.

Tom Williams of Craft-Air was overall CD for this year's North/South, and most of the innovations were his. With a ton of help from the Central Valley R/C people, and the San Fernando group, and Assistant CD Chuck Beeman, and everybody who pitched in to run winches and time and score, Tom pulled it off. It was the biggest man-on-man I've ever attended, and on the whole it went smoothly.

Unidentified pilot launches an Aquila early Sunday morning. Not a really important photo, but it's too pretty to pass up.

The scoring was unpopular because of its complexity, and because it multiplied the chances for human error. But this proved a virtue: when the afternoons grew long, and tempers grew short, people took out their anger on the scoring system, and it kept them from lynching the CD. When I've helped lynch a CD in the past, I've invariably been sorry about it later, because CD's are getting harder and harder to come by these days . . . even in a gentlemen's sport, like soaring.

FINAL SCORES

OVERALL
1. Bill Nibley 4650
2. Greg Auman, Jr. 4625
3. John Newman 4400
4. Col. Bob Thacker 4400
5. Dave Thornburg 4375

PRECISION
1. George Noritake 850
2. Bob Thacker 850
3. Fred Weaver 800
4. Greg Auman, Jr. 800
5. Bob Sutton 800

DURATION
1. Don Edberg 3500
2. Greg Auman, Jr. 3500
3. Keith Kindrick 3500
4. Fred Weaver 3400
5. Bill Nibley 3400

LANDING
1. Bill Nibley 500
2. Jon Lowe 475
3. Dave Thornburg 425
4. Clarence Nikkel 400
5. Scott Whitney 375

All ties settled by 2-minute precision flyoffs. •

Ant's-eye view of Reinhold Gerner's Nieuport 17. Scale is 3.6 inches to the foot; 103-inch span, 24.2 lbs., Quadra engine. Model is a prototype of a kit by Practical Scale of Germany.

MAMMOTH SCALE

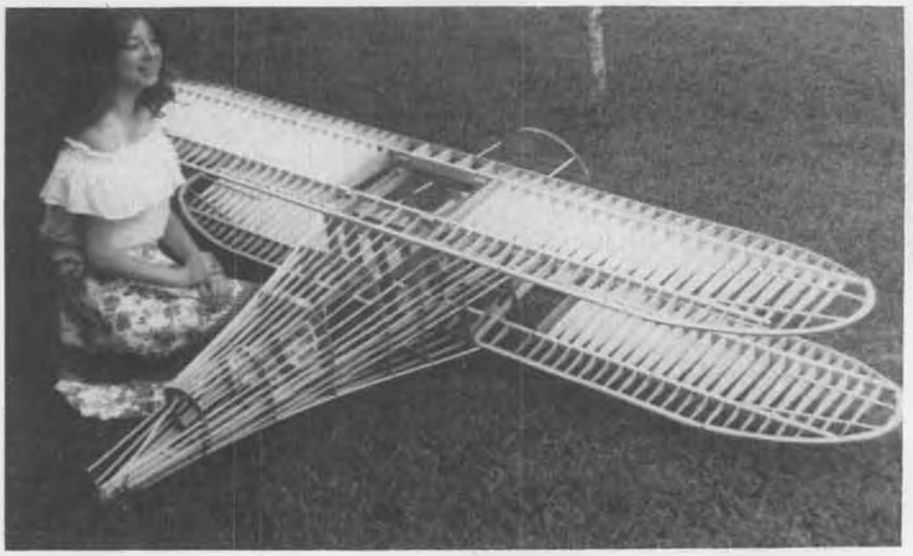
By RON SHETTLER

• What do you call something that a lot of people were hoping for, some were afraid would happen, and others didn't know what they would do if it did? The "bridge" which large models are providing between full-sized aviation and models could be one answer. Like a lot of other things in the world, it depends on where you sit. If you are talking about the impact large (very large) models have had on our modeling lifestyle in the eyes of the modeler, manufacturer, model aircraft associations throughout the world, hobby shops, and the general public, it could vary greatly. If it isn't now the fastest-growing segment of our hobby, it certainly is the most noticed, in that it has forced many agencies to take us seriously. In the past, there was too big a bridge between models and full-sized aircraft, even though we belonged to the same international organization (through the FAI). Too many "full-sized" members of this organization and others had previously thought of our aircraft as toys. It's not difficult for them to relate a 1/4 or 1/3 size aircraft to their own, and one having stepped out of their lofty cockpits to examine our workmanship, engineering, equipment, and flying ability, they should realize that the same step can be taken from there to regular-sized models. They then will conclude that they don't have an exclusive on the word "aviation" and our love of flight. I realize that many of our best pilots and aviation men were modelers first, but many are not, and those who are, find it difficult to admit in public that they'd rather park their 747 and go flying (meaning model aircraft flying).

Reinhold Gerner with his Nieuport. The model is reported to be very easy to fly, and is aerobatic with a Quadra engine. See text for kit availability.

To me, the sudden popularity of large model aircraft means that I don't have to defend model aviation any longer. The full-sized boys accept us. Probably the best service we give our model organization is that we effectively form that link. To the competitive expert, it means that it's a whole new ball game, where previously in pattern, for example, the top men were so good, and the equipment so refined, that the difference between any of the top men could depend on luck (or the lack of it) and the ability to find totally bionic judges to fairly evaluate their efforts. In short, Vegas next go-around should prove very interesting. To the rest of us, that lofty peak has been leveled just a little.

For the modeler such as myself, who likes to attend fly-ins such as the popular EAA functions, a 1/4 scale "fly-in" has a lot of appeal. It would be great to get together with other 1/4 scale enthusiasts, just to fly when you feel like it and enjoy each other's company. I guess it's best described as a potluck supper. You go there to enjoy, and bring along something for someone else to enjoy. Perhaps our bridge will bring some of this fun and enjoyment into some of the present contests, which are just short of declared wars.



Yipes! Owen Morris, of Seabrook, Texas, is currently building this 1/4-scale Beechcraft Staggerwing. He must be one of those who *likes* to build wings.

The ribs on Owen's Beechcraft are made from balsa and meat tray foam.

Although these are hopefully in the minority, we could well do without them.

As to the manufacturers generally, those who have done their best to produce safe, quality products which they can be proud of, will be really happy, because now you will be taking a good look at those products themselves, not just the price tag. Propeller manufacturers will no longer have to think of their products as being expendable, like fuel, but will be called on to produce better products. Engine manufacturers will have to reverse their thinking and get out of the horsepower race, and, like full-sized aviation, come up with things like economy of operation, reliability, ease of maintenance, repairability, etc., in a basic engine that will be around for a long time, allowing lower prices due to better use of development costs.

Now to the area which holds all the cards as to what will happen in the future. The model aircraft associations throughout the world are going to have to accept the fact that large models are here to stay, and they will have to make a decision on what they will do with them. In the past, these organizations have largely devoted their funds and machinery towards competitive events, despite the fact that the majority of support (financial, at least) comes from the sport and occasional contest flyer. Events for large models are certain to be demanded soon, and the model associations should be given a hand by the manufacturers and those who are pioneering large model flying. If we want realistic rules, the associations need help and realistic figures to work from.

Weights, wing areas, and other factors related to safety should be first. Events popular to flier and spectator alike are already being experimented with, and should not pose any problem. The control line people have a built-in safety factor, in that if their pull-test requirements are met, and the area of operation is kept clear, most acidents are limited to this area. Free flight and radio controlled models do not, and this places a greater responsibility on the builder, flier, field chairman, contest director, and rule maker alike.

Too often I have read in model magazines or heard someone say, "He stayed up all night and got it repaired just in time to fly in the next round," and, "He just got it finished in time to enter. The paint isn't even dry," and, "He doesn't want to risk flying it before it's been judged." We know that, built properly and flown in an area suited to them, large models can be safer than their smaller cousins; however, we can go them one better. Let's use some of the good advice from the construction manual for Concept Models' new 1/4 scale "Fleet" (Thank you Romy Bukolt);

"Assemble the entire finished aircraft. Once again, check alignment of all flying surfaces. Check for correct movement of all control surfaces. Check Center of Gravity (Balance Point). It is better to be a little nose heavy than tail heavy. Start engine and run for at least 5 minutes at idle and at high speeds. Watch controls for radio interference. If you have a helper, range check the radio and controls with the engine running. Shut down the engine and check the airplane completely, particularly all the screws for tightness, including the hatch, stabilizer, fin, N-struts, landing gear, and cowl. Check control linkages, servo mounts, and control surface hinges for looseness. If everything checks out OK, you're ready for test

Maj. R.H. Jacquot took this photo of his 1/4-scale J-3 Cub, built from a Practical Scale kit. Well-detailed model is powered by a Quadra.

View of fully-detailed interior of Maj. Jacquot's J-3.

flying."

To add to this, if you haven't flown your model extensively and don't know what it will do if it stalls, how it handles in crosswind takeoffs and landings, etc., and if you haven't done the entire flight schedule you intend to do at a contest, you and your model are not ready for competition flying. Don't worry about your reputation or ego. Think of what would happen to the model if it crashed and, worse still, hurt someone. On that first flight, take a notebook with you, and before you take off, note the position of all control surfaces and their travel. If you built a kit, how do these compare with the suggested movements? If it is a scratch-built plane, how do they compare with similar known characteristics of existing models? Test fly your model at an uncrowded field, or at least on one at which the fliers will give you a break by not flying while you make a brief test hop. Resist the temptation to wring it out on that first flight, even if all systems seem go. Instead, try control responses and low speed characteristics. Try a few simulated landings and overshoots at a height that will allow room for correction, then land. Try to set your trims for hands-off flying. Remember that you asked your fellow fliers to give you a break, don't abuse it.

Now, if you are lucky enough to have an airplane that "flew off the board," great. If not, and you can't always be lucky, read on. Take a look at the trim on the transmitter. Before you make the necessary adjustments, make sure they are not required because of a shift in flying surfaces, servo trays, etc., or loose control linkages. If you don't mind someone looking over your shoulder while you are flying, give him your notebook and talk out loud, so he can scribble down your comments such as, "soft on aileron control", "real sensitive on elevator", "holding a bit of down stick with full trim applied", etc. If you are the average modeler you wouldn't be able to remember half of it once you are safely back down on the ground, especially if you have had problems. With the notes, you'll be able to trim out the model on as few flights as possible. Don't be lazy . . . don't fly it on the sticks. Use your trims.

In the first article, I wrote about the need for a good audio tach to check the RPM where it means something . . . in flight. I asked for a schematic or construction article. Well, now we can give you better than that. This last week we received the literature and owner's manual for the US-made "Sonotrak", which is a combination audio tach and Doppler effect speedometer. This enables you to check in-flight RPM in 3 ranges: 0-10,000, 10,000 to 20,000, and 20,000 to 30,000. Once the correct range has been selected, the pitch can be matched to the engine for zero beat by using the RPM control, and the RPM can be read directly off the scale. The course your model flies has an effect on the readings, but all this is explained in the comprehensive booklet. The correction factors are also supplied, if any are required. The thing that turned me on was the second feature, which is the advertised ability to accurately check speed in flight, also wind speed at altitude, etc.

Last week I had to run acceptance tests for our Artic drones, and I had to have answers which were as accurate as possible. Radar isn't always the answer, as hand-held units can have their readings affected by a rotating prop. After a few frantic phone calls by both Wayne Chou of Wings Engineering, 19 Sea Beach Drive, Stamford, Connecticut, and by us, we finally found a way to get the Sonotrak package to us in time for the tests, the logistics of which seemed to be more complicated than the Berlin airlift. It arrived in time, and I would like to say that we took it out of the box, installed the battery, flew the airplane, took the readings, compared them with radar, and found them totally accurate. I would like to say that, but it didn't work that way. First, like the best of musical instruments, you have to learn to use it and practice using it. The more you practice, the faster and more accurate your readings will be. The pilot has to keep the heading constant and the RPM steady through the run. If you change power settings, the readings are out the window. Second, we rediscovered one more item, in that the tone of the Quadra and other large engines is greatly different than that of standard model engines. Wayne went to considerable lengths to make his tack sound like a standard model engine with a directly-driven prop throughout the speed range of the instrument, making it relatively easy to match frequencies and pick up accurate readings, both in RPM and speed. For example, it is relatively easy to match two engines of the same type,

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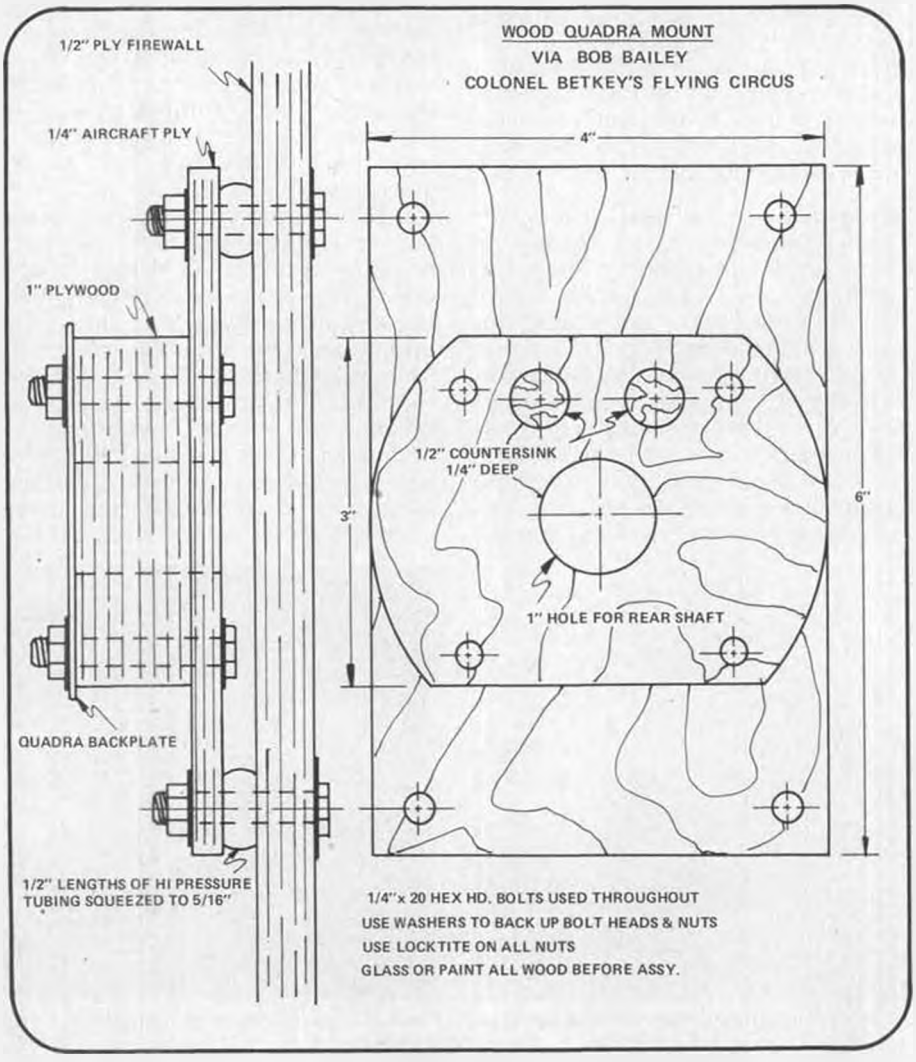

FAMOUS R/C AIRCRAFT..... NO. 2

By HAL DEBOLT . . . First advertised in the spring of 1952, this aircraft served as the training tool for thousands of early R/C experimenters, which is what everyone was who tried this fascinating "new" hobby during the first years after the Citizens Band came into effect.

• The Live Wire Trainer was the first R/C model design offered in kit form. The kit came out just before the Citizens Band, as we know it, was put into effect. At the time, there was a non-licensed band at 465 mhz, and a system that was quite successful was offered by Citizen-Ship Radio Corporation. This equipment, and the "Trainer", probably started many of today's "old timers" into R/C. During its lifetime, which spanned a decade, between 40 and 50 thousand of these kits were produced. Originally announced at an industry trade show at a price of $6.95, the hobby distributors were reluctant to order it, feeling that the price was MUCH TOO HIGH, and what future could there possibly be in R/C models!

What is probably more interesting is how something as original as this gets into production, and turns out to be most successful and an answer to a new need. If you lived as a control line flier in those days, and were serious about flying model aircraft, your dreams were about what you could do with your models, if they just did not have those darn wires attached to them. You could even have attempted, as I had, to fly them on 300 to 400-foot lines, just to get some simulation of untethered flight. Free flight had proven OK, but the real dream was to have control of that free flight model so that it would respond to your every whim!

In the fall of 1950, the Buffalo Club was one of the strongest control line groups in the country. The club held many records and was a contender at the Nats. One of our best members had gone away to school, and had got caught up in the R/C interest of that time. Our club held its annual big control line meet in the fall, and as a sidelight, Tom (his last name skips my mind) came home for the meet and demonstrated his new-fangled R/C model. While I was busy racing and setting a couple of new speed records, I kept Tom's performance in the corner of my eye . . . waiting for the normal crash, I suppose. The usual R/C'er just did not fly ALL AFTERNOON in those days without a failure of some sort! Much to my surprise, Tom flew at will, and when the day ended, he still had his original prop on the model!

I had been carefully watching R/C for some years, feeling that sooner or later it would be the answer to my control line dreams. At the end of the contest I had a long talk with Tom, and he indicated that the time had arrived when you no longer needed to be an electronic wizard to make R/C work. He also stated that a new system that required no

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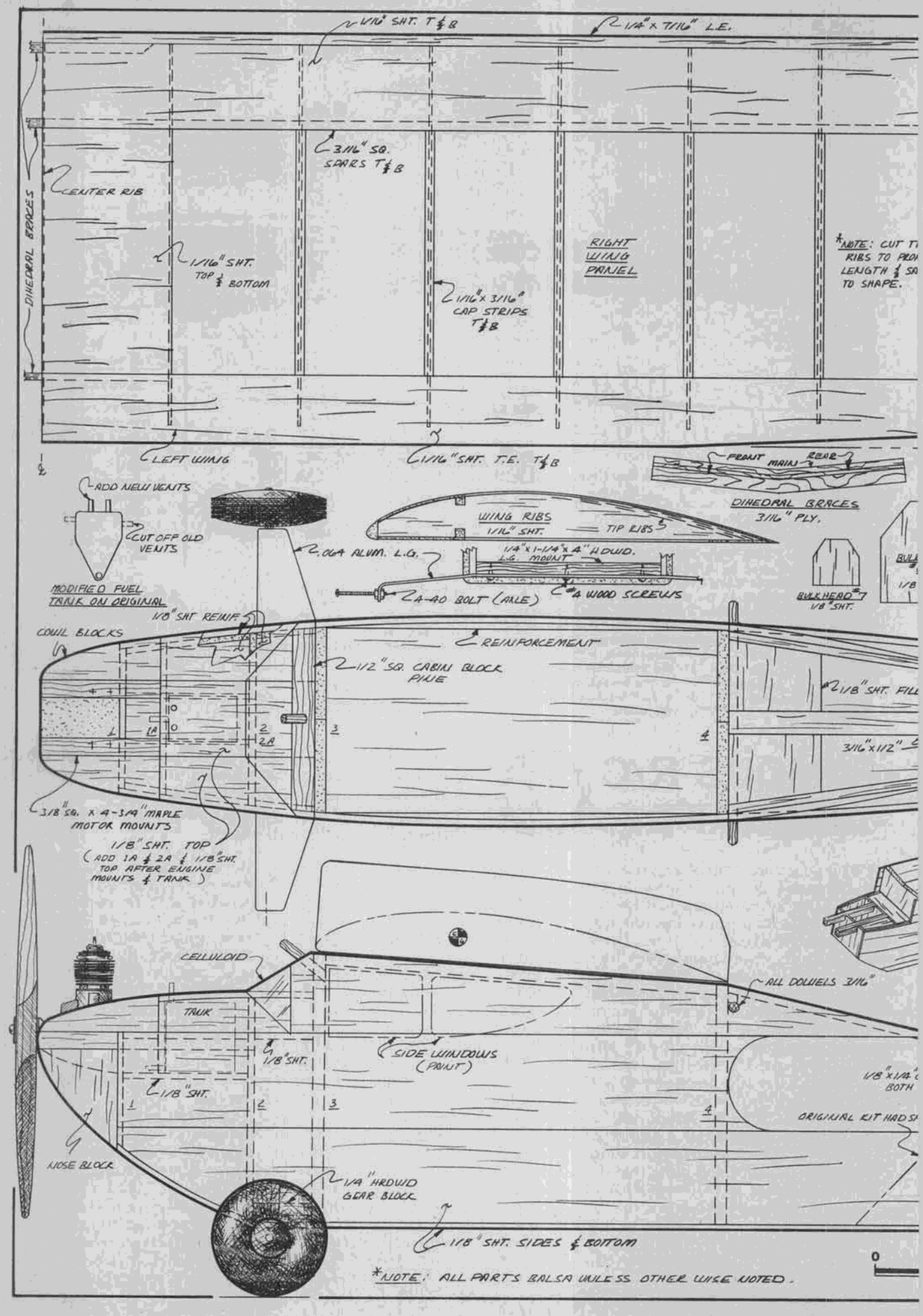
1/16" SHT. T & B
1/4" x 7/16" L.E.
3/16" SQ. SPARS T & B
CENTER RIB
DIHEDRAL BRACES
1/16" SHT. TOP & BOTTOM
1/16" x 3/16" CAP STRIPS T & B
RIGHT WING PANEL
*NOTE: CUT T RIBS TO PRO LENGTH & SA TO SHAPE.
LEFT WING
1/16" SHT. T.E. T & B
FRONT MAIN REAR
DIHEDRAL BRACES 3/16" PLY.
ADD NEW VENTS
CUT OFF OLD VENTS
MODIFIED FUEL TANK ON ORIGINAL
WING RIBS 1/16" SHT.
TIP RIBS
.064 ALUM. L.G.
1/4" x 1-1/4" x 4" HDWD. L.G. MOUNT
4-40 BOLT (AXLE)
4 WOOD SCREWS
BULKHEAD #7 1/8" SHT.
1/8
1/8" SHT. REINF.
COWL BLOCKS
REINFORCEMENT
1/2" SQ. CABIN BLOCK PINE
1/8" SHT. FILL
3/16" x 1/2"
3/8" SQ. x 4-3/4" MAPLE MOTOR MOUNTS
1/8" SHT. TOP (ADD 1A & 2A & 1/8" SHT. TOP AFTER ENGINE MOUNTS & TANK)
CELLULOID
ALL DOWELS 3/16"
TANK
1/8" SHT.
SIDE WINDOWS (PAINT)
1/8" x 1/4" BOTH
ORIGINAL KIT HAD S
NOSE BLOCK
1/4" HRDWD GEAR BLOCK
1/8" SHT. SIDES & BOTTOM
*NOTE: ALL PARTS BALSA UNLESS OTHER WISE NOTED.
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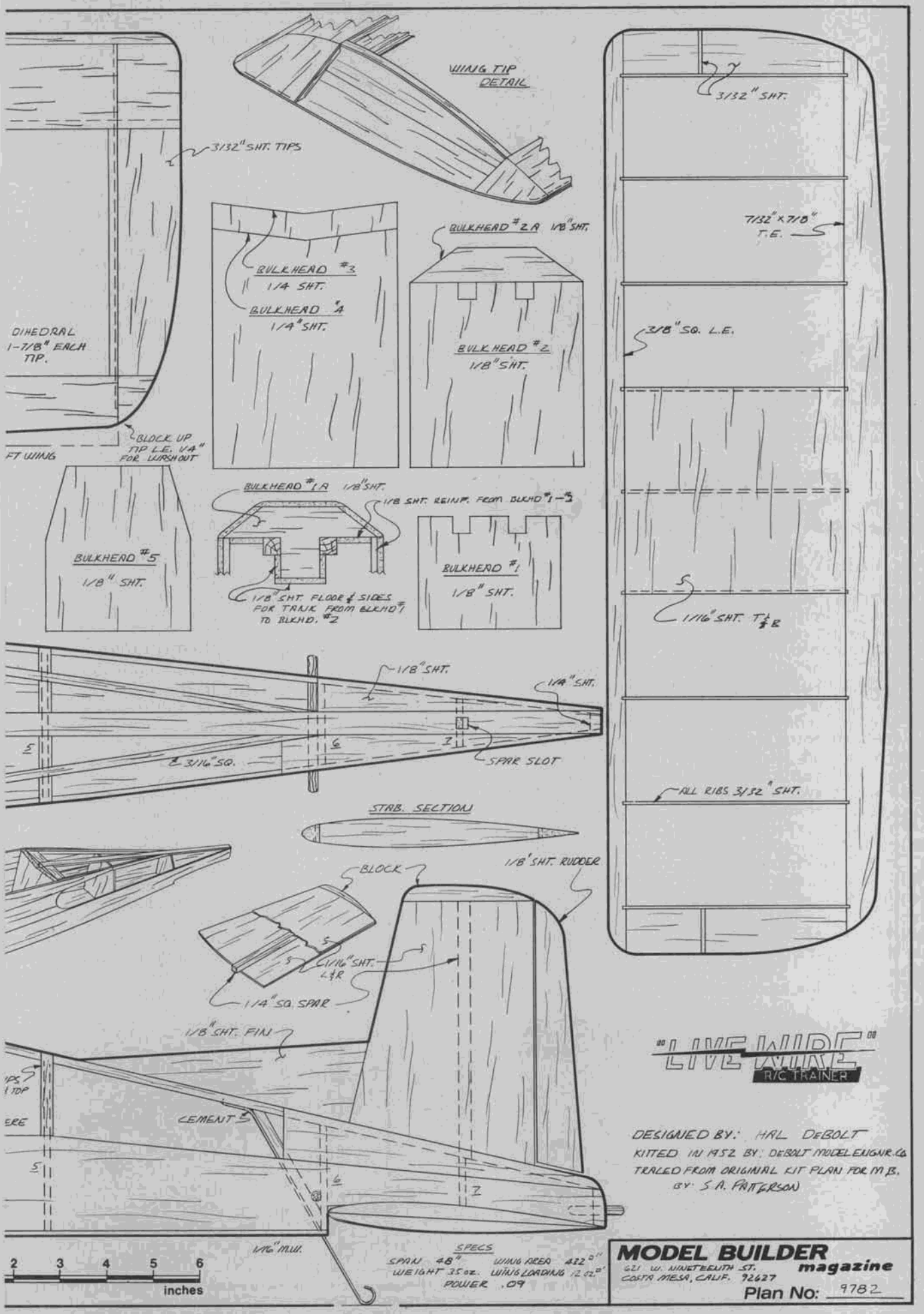
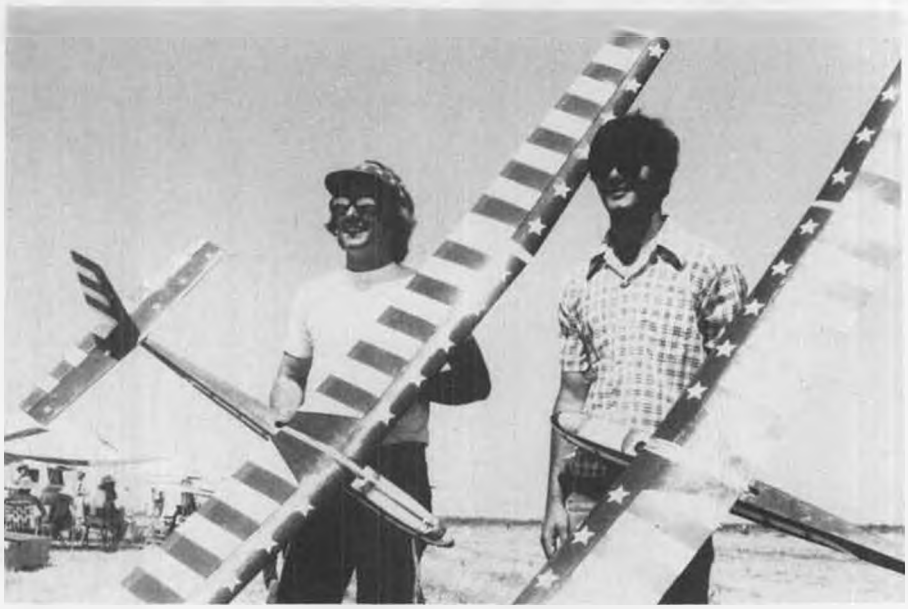


FULL SIZE PLANS AVAILABLE – SEE PAGE 144



The two newest LSF level V fliers are No. 5, Marvin Qualls (left), and No. 6, John Newman. Both hail from the Central Valley R/C Club. Ships look like Paragons.

R/C SOARING

by Dr. LARRY FOGEL.

• R/C soaring is more a participant sport than a spectator sport. It's far more fun to get out there and do your own thing than simply watch others sail around the sky. It's still better to fly with others . . . to share the social aspects of this addiction.

The ultimate is competitive flying. Here's where you can hone the edge of your skill, face those who consistently demonstrate an ability thought unachieveable only a few years ago, and enjoy the camaraderie of enthusiastic fellow flyers.

But contest flying isn't a bed of roses. There are thorns. Before we consider some of these, let's vicariously enjoy a recent exciting event . . . the North/South Challenge Meet. Al Doig provides us with the following "report" (and photos) of this years event:

"To the surviving members of the Armies of the North and the South and to the memory of those who did not survive, this volume, which records the events of one of the greatest and most decisive campaigns of the war between the North and the South, is most respectfully dedicated.

"Can you believe anyone brash enough to schedule a major soaring meet on Mother's Day, or anyone brave enough to attend? Well, let me tell you about one hundred and twenty potential divorcees and two days of glory on the hallowed Doe Avenue Battleground in Visalia, California, and about the seventh North/South Challenge.

"The North/South Challenge Meet is an annual battle between California flyers living North of Bakersfield, California and flyers living South of that city. It began in 1970 and, except for 1973 and 1974, has been held each year. It occurs at a location roughly halfway between Los Angeles and San Francisco and is alternately hosted by the North and South clubs. The North has won every year except 1975. This year the South was the host and determined to win.

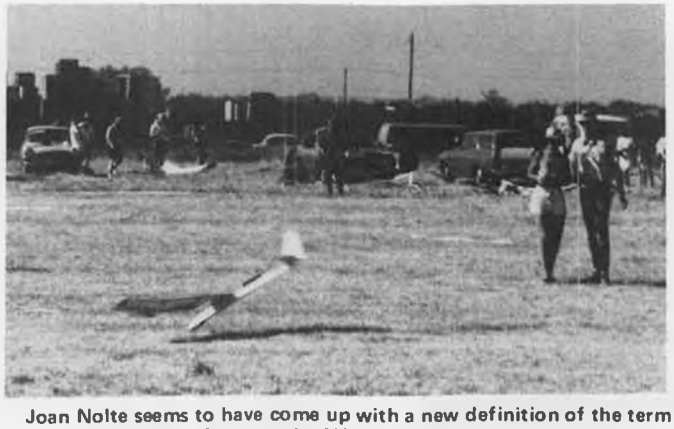
"The task was six rounds of Precision/Duration Tricathlon, with a seven-minute target. Scoring was man-on-man with six flyers launching in quick sequence . . . three from the South and three from the North. Each flyer challenged a person from the other side to a duel, which awarded 3 points to the victor in 7-minute duration, 1 point for a victory in precision (a bell-curve around each minute), and 1 point for the closest landing.

DAY ONE

"It was *hot!* A capricious, thermal-generated wind created downwind, upwind and crosswind launches that placed a premium on the super-launch. Big, thick, high-lift wings and/or light airplanes were in their element. Ships like the Paragon, Windrifter, and Olympic II did well. Ships like the Challenger were giving away 50 feet on launch. Conditions were such that sometimes you needed every foot to get to where the thermals were.

"Because it is a 6-hour drive for contestants in the outlying precincts, the CD, California's Tom Williams, decided to run the contest from 0800 until dusk, hoping to get in four rounds, with only two the second day. However, after sitting in 95 degree weather, with stickers in their socks, for 8 hours, most guys wanted to pack it up after three rounds. When the Boy Scout 'Union' pulled their guys off retrieval duties at 5 o'clock, Tom called a pilot's meeting for a vote (under a flag of truce) to halt the battle after three rounds with only two rounds on Day Two. There was little doubt to the vote and the battle-weary troops ran for motel swimming pools. As the

Dave Thornburg waiting for his flight group to launch. The lift must be el stinko . . . note the wringing hands.



Joan Nolte seems to have come up with a new definition of the term "angle of attack". Scene at the N/S Challenge.

Rebel yells faded in the distance, Dave Thornberg, from the North, flying his 'Bird of Tyme', was leading the individual scoring and the South was ahead of the North by 100 points. Sixty-three mass launches had been made, with 378 individual flights. Each launch averaged 8 minutes. With a 7-minute target and conditions such that someone maxed nearly every launch, the efficiency was not too shabby.

DAY TWO

"Another scorcher, with some really wild dust devils marching through the encampment. One was particularly violent, ripping down shelters and throwing aluminum chairs into the air. The cry 'dust devil' sent everyone running for their airplanes. A large piece of black plastic was picked up and went out-of-sight overhead to the cry of 'Go Sailaire!' These miniature tornados are common in the San Joaquin Valley all summer and can quickly smash an unguarded sailplane.

"Dave Thornberg made a valiant effort to defend his standing, but ran out of air over the lumber yard. Dave is such a super guy, even the Rebels were cheering him over the cars and back to the landing qualification area. Anyway, the South won for a change, 619 to 482. As a nice gesture, all 50 members of the winning team received T-shirts declaring their victory. Due to the scoring, there were numerous fly-offs, using 2-minute precision. Finally the smoke cleared and prize giving took place with Bill Nibley (S), Greg Auman Jr. (S), John Newman (N), Col Thacker (S), and Dave Thornberg (N) in the first five places.

EPILOGUE

Hi Johnson's models, built from components listed in his Super Wings catalog. ASA fuselages, foam core wings. Pretty ships!

"One thing needs noting. Our manufacturers deserve a cheer. Despite the riche moisson they get from us working stiffs, they *do* participate. From Craft-Air, (California) Tom Williams was the contest director, and I think he did a heck of a job. From Cox/Airtronics, Lee Renaud relieved the hardworking Rick Pearson several times to run the flight line and stayed with it a long time. Mark Smith, chief honcho of Mark's Models, and Hi Johnson, from the company of the same name, were timing and helping everyone but themselves (see winners). Hi even demonstrated how to run a stress test on a fence using only a sailplane. And several smaller manufacturers gave in equal measure including to the raffle.

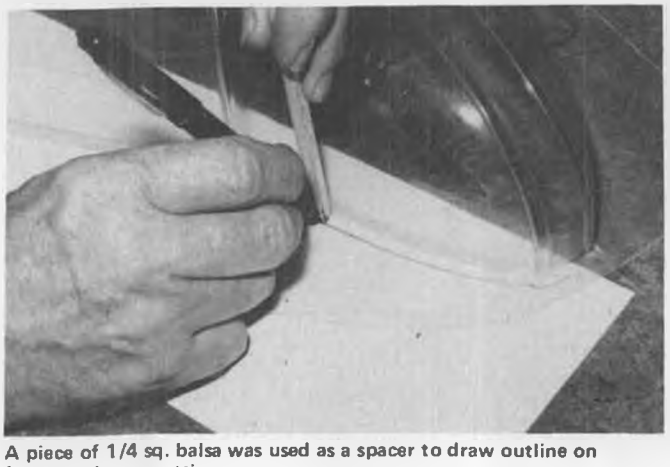
"One problem with a big contest like this is that many people come to have a good time, but don't. When it's no longer fun, why come? We forget that many contestants bring their families, and daddy coming back to the motel at 7 p.m. after sitting in the dirt all day just doesn't do much for the sport. We either need to limit the number of contestants to about thirty (not too practical), or start running three-day, low-key contests on holiday weekends. We need to start making the tasks unobtainable or at least more difficult. We need to make contest conditions pleasant enough that people don't vote to eliminate part of the contest. Can you imagine baseball teams voting to eliminate the seventh game of the World Series? Anyway, it was fun. Thanks, fellows."

As you can see, spirits run high in such contests. They can be a worthwhile experience, but all too often, I've been discouraged by the distance you have to travel and by the long wait between flights. This is a participant sport. *I want to fly*, not simply wait around most of the day for a few brief cracks at the thermals.

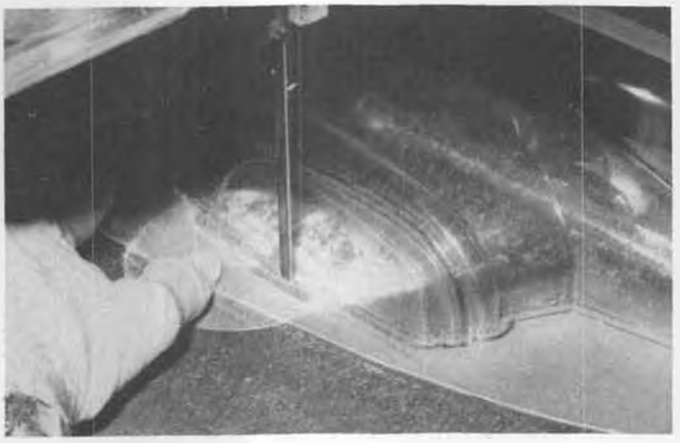
Continued on page 115

Mark Smith, Rick Pearson, and Dave Thornburg bringing in fresh batteries on Sunday morning. Col. Bob Thacker is still asleep at motel in background.

CVRC pres. Chris George with 11 ft. Olympic II, designed by brother Steve.



A piece of 1/4 sq. balsa was used as a spacer to draw outline on flanges prior to cutting.



Bandsawing the shells from the rest of the sheet.

CHOPPER CHATTER

By JOHN TUCKER

PHOTOS BY AUTHOR UNLESS NOTED

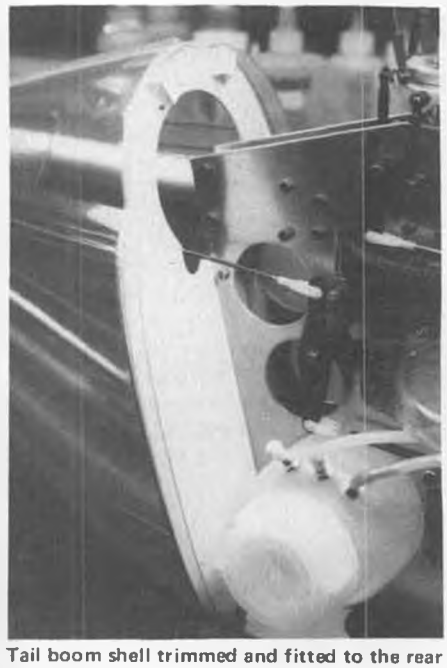
• Lately, it seems as though I have less and less time to spend in the workshop, because I have so many other things to do in the pursuit of making a living. I'm sure I'm not unique in this . . . there must be a general increase in everyone's work load today. Anyway, you'll have to excuse me for not getting the Schluter Bell 222 fuselage article finished before now, for the above reason. Actually, it's not really finished yet, but all I have to do is paint it and test-fly. The basic construction is finished, so we'll go right into that.

SCHLUTER BELL 222

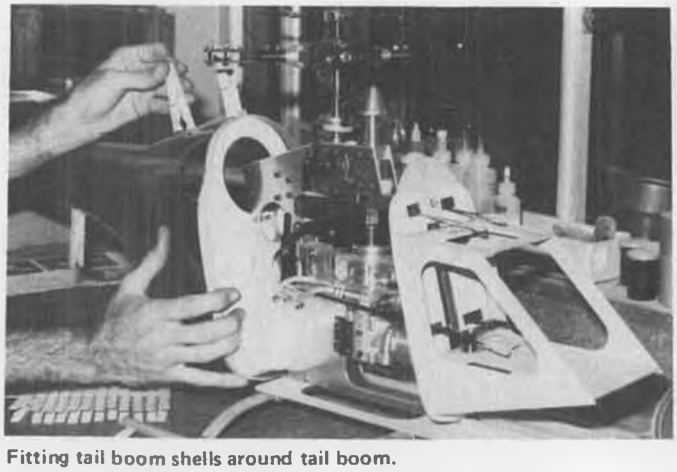
As you know, the Schluter 222 Heli-Boy kit makes an extremely agile aerobatic helicopter, but its looks are along the lines of most other trainer-type choppers, in that it has a small body shell up front, and a long aluminum tail boom sticking out the rear. Now, this configuration is what really keeps the weight down and makes it such a sparkling performer, but Deiter Schluter recognized that there are a few of us who don't need all that capability, and would prefer a scale-like chopper. To that end, he designed a plastic shell to fit around the Heli-Boy trainer, changing it to the Bell 222 configuration.

The Heli-Boy trainer usually weighs about 8 to 8-1/2 pounds, and the addition of the Bell 222 fuselage brings it to about 10 to 11 pounds. For a .60-size Schneurle engine, that still leaves a lot of power to zoom around the sky, but its aerobatic performance is bound to be a little bit slower. You can still loop and roll it, but I wouldn't want to try the inverted spins and snap rolls that are rapidly becoming so popular with this machine.

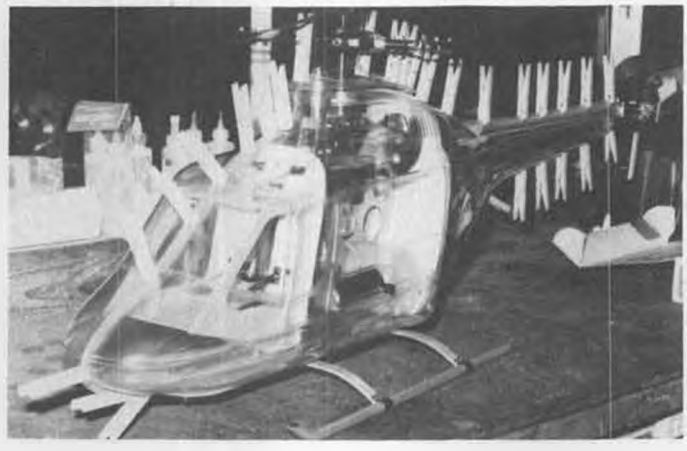
As you unpack the fuselage kit, you'll find several large sheets of clear plastic, molded into the shape of the front and rear body halves. Additional sheets contain the tail



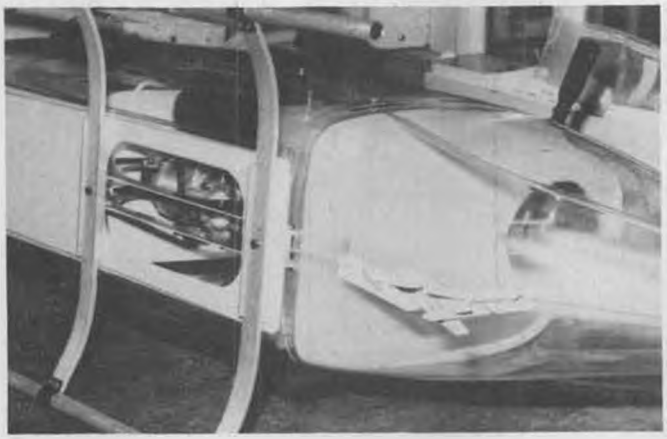
Tail boom shell trimmed and fitted to the rear plywood former.



Fitting tail boom shells around tail boom.

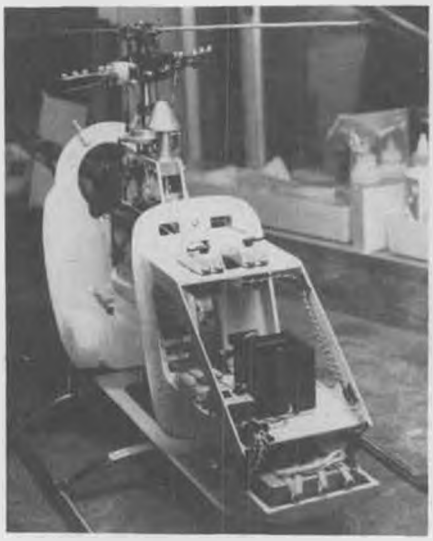


Clothespins are used to fit fuselage shell halves around plywood formers.

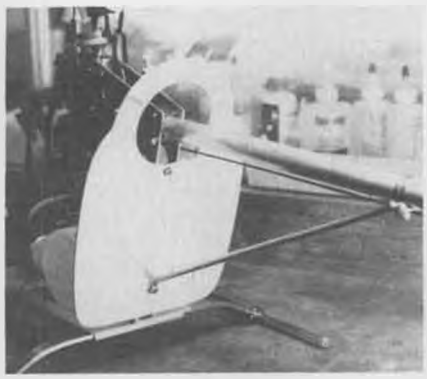


The plywood flooring is installed before fitting the plastic shells to the frame.

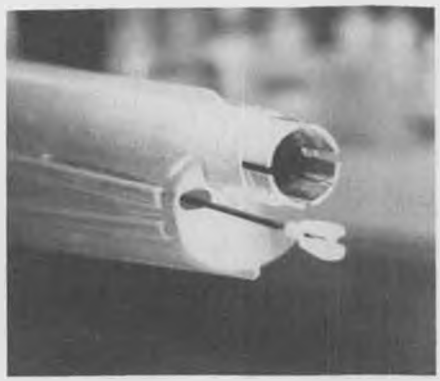
Wood tray that holds (front to rear): receiver, radio battery, gyro battery. Hooks are for rubber bands.



Framework completed. Bulkheads, receiver, servos, and gyro installed.



Floor and rear bulkhead in place. Tail boom brace is not a part of the kit.

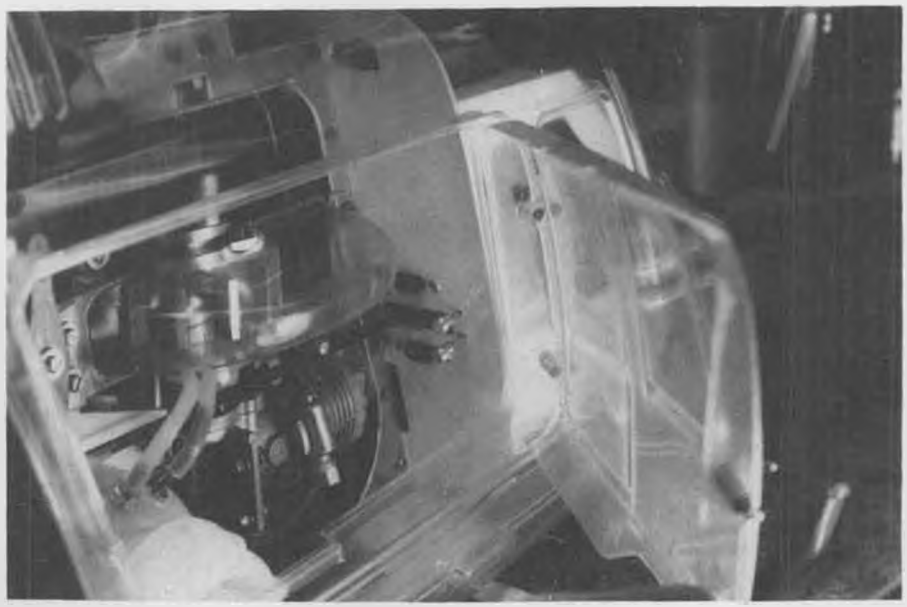


Tail rotor control rod at aft end of tail boom shell.

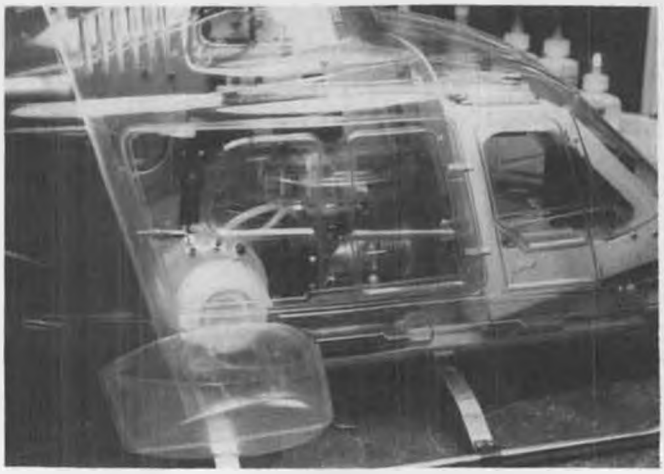
group and removable doors. The remaining molds are cemented together to make the landing gear fairings. An additional package contains the PVC cement, tail skid wire, small dowels for pegging the doors, and two of the neatest spring door latches you've ever seen! Unfortunately, the 4-page instruction booklet is written in German; however, the average modeler will have no difficulty whatsoever, since there are seven very clear pictures that show various stages of assembly. I doubt that many of us read the instructions anyway! Ha!

The first step, as in any new kit, is to lay out all the parts and pieces on the workbench, and see where everything goes. Once you have this in mind, you should cut the large sheets into smaller units for easier handling. Be careful not to cut too close to the edges of the forms; you will need about 3/16 of an inch of flashing all around the edges for cementing the halves together. The clear plastic furnished in this kit is rather unusual, in that it is almost unbreakable, is completely fuel-proof, and even acetone won't touch it. It is also very strong and will resist crash damage as well as, if not better than, the usual fiberglass shells! The PVC cement supplied, or the newer cyanoacrylates (Hot Stuff, Zap, etc.), must be used to obtain a good bond between halves.

For cutting the plastic, I first tried scissors . . . they worked well, except for the heavier sheets, so I tried tin-snips. Even these were tough to use, so I finally tried the bandsaw. Now, that was the answer. I could even cut backwards, on the backside of the blade (by friction), and I was able to trim the whole thing in about 15 minutes. Before doing the actual cutting, I roughened up the surface of the plastic sheets with fine steel wool, so that it would readily accept the ink markings I made to outline the flashings. These lines are drawn about 1/4 inch away from the body to allow for cutting errors. After cementing, final trimming was done with a power sander.. This works very well, and is the fastest way to do

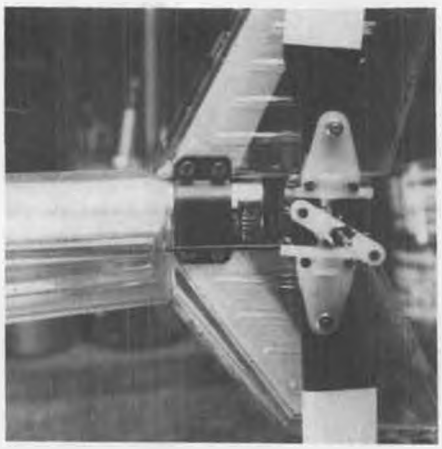


Right side door open, showing the engine installation, charging jacks, and switch. Note the transparent plastic cooling fan shroud.



Sponsons cemented in place on the front fuselage shells.

Door latch and pin details on left door. Note that the exhaust exits through the door sill.



Close-up of tail rotor components. Note plywood insert in fin.

the job.

The basic technique is to cut out the matching halves, place them together in alignment, and hold them securely with clothespins, spaced about one inch apart. Obviously, if you use the PVC cement, you will have to coat the edges, press them together, and pin very quickly before the cement sets up! I personally prefer to pin the halves securely first, and then run Hot-Stuff all around the inside of the seam.

Ths way, you can work at your own pace and make sure everything is lined up before cementing. When dry, the clothespins may be removed, additional Hot Stuff added to the outside seam if necessary, and final trimming completed. This procedure should be repeated for the front body shell, tail boom shell and sponson shells.

The vertical fin and T-tail stabilizer are finished in the same way, except that you will have to cut and cement the plywood spars inside the tail group *before* cementing the two halves together. A word of caution here; the plywood spars are used for holding the tail group to the body, by means of a steel strap, so be careful to set the spars as close to the root edge as possible, and give yourself plenty of room to drill the clamp holes. I would strongly recommend that you make several dry runs, and assure yourself that you have it "in the bag", before cementing it all together. This tail group will require the most careful trimming and fitting in the entire kit, but the result will be the strongest tail assembly you've ever seen on a chopper.

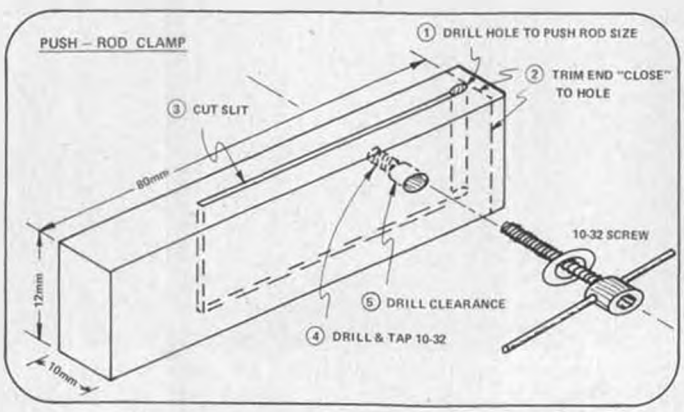
Next come the sponsons. After they have been assembled, you can hold them in place on the fuselage stub-roots with scotch tape, and cement them firmly to the body. Take a little time here to make sure they are level before cementing. You might also want to hold off on this step until the rest of the body is finished, since these sponsons really do get in the way when working on the fuselage doors, etc.

Pushrod adjusting tool. Text tells how to make one.

Speaking of doors, they should be trimmed to the indicated size, and cut-outs made in the body shell to accept the doors. Make the cut-outs first, then trim the door edges to fit the opening. The doors are retained by two small wood dowels on the forward edge of each, and a spring latch on the rear edge. The photos show adequate details.

Oh yes, during your initial cutting of the plastic, save your scraps! Among them may be a small plastic trough, about 2 inches long, that you thought was part of the molding

Continued on page 133



Pushrod clamp in use with the ball-link tool described in the June 1978 MB.

Flight INSTRUCTOR

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

• At the beginning of last month's column I commented that I'd started receiving some letters with questions in the mail. Well, I think mentioning it was a mistake, as I haven't received anything since, except bills and NSRCA renewals (Sal's blacklist must be working). Most of my friends around the contest circuit won't believe it, but I'm running out of B.S. for this column and I need your questions desperately.

Last month I left off with the statement that in my next column I'd cover the balancing of an aircraft. The best starting point for balance is to put it where the plans indicate! In about 90% of the cases this will be the best point, as it was determined by the guy who designed the airplane. If the plans don't indicate a balance point, or if it is an original design, then balance it between 25% and 33% of the chord and try it. The chances are good that it will fly fine at this point for most sport flying, but I know that most competitive flyers will want to "Tweek" it in to that "optimum" point. First, you must understand once again that this "optimum" point will be tailored to each pilot's preference and may not be the same for all pilots. For example, I balance the Phoenix slightly more tail-heavy then Don Lowe does because it feels better to me, but I balance the Curare the same as Hanno Prettner calls for on the plans, and it feels fine to me. Norm Page always liked his airplanes very nose-heavy, which made the amount of elevator correction used in rolls very non-critical, but which also makes the timing of the elevator more critical to avoid changes in heading during the rolls. Conversely, I fly slightly tail-heavy, which makes the amount of elevator used more critical but the timing less critical. CAUTION! When in doubt, balance it nose-heavy. This is particularly important on first flight attempts with a new airplane.

As you may have gathered from the above, I base much of my balance adjustments on how the airplane rolls. Another factor I use in determining balance is how the airplane acts on landing approach. With the elevator throw adjusted to a comfortable amount in normal flight (full up gives me a loop about 75 feet in diameter), I see how much up elevator is required to maintain a good glide on the approach. This is really a matter of feel, but it should require about 1/8 to 1/4 of the up elevator to maintain a good glide. If it requires more than this, then it is probably nose-heavy. Also, when nose-heavy, it will usually be difficult to adjust the approach speed, and consequently the amount of elevator needed to flare will be inconsistent. When the airplane is tail-heavy it will require very little elevator to maintain the glide, but will tend to get the nose up and slow down too much. If this goes too far before you do something to correct it, it will stall, probably snap, and crash. Again, when in doubt, balance it nose-heavy. During the looping maneuvers a more nose-heavy airplane will usually track better, but will require more relaxing of the elevator at the top of the loop and more increase in elevator at the bottom, whereas a tail-heavy airplane will tend to fishtail and wander off heading unpredictably. When making balance adjustments, keep in mind that the fuel level will affect balance considerably, and proper balance will be a compromise between a full tank and an empty tank.

It may seem strange to some that I haven't mentioned spins in this discussion of balance point, but I balance the airplane for the other maneuvers and then adjust the elevator throw to determine how it spins. It's ironic, however, when I think about it, as I have the reputation of doing great rolls and lousy spins! It's a good thing there are more rolls than spins in the pattern or I'd be in trouble.

In the above we have discussed longitudinal balance, but there is also the lateral axis to contend with.

For a starting point, the airplane should hang with the wings level if you pick it up by the prop shaft and the top of the fin. Again, on 90% of the airplanes, this will be correct, but fine tuning it becomes complicated. First, I must repeat something I said in an earlier column. The aileron gap must be sealed virtually airtight, or you will go crazy trying to make any fine adjustments. This can be done by applying tape to the bottom hinge gap, being careful not to restrict aileron travel (apply tape with aileron in full up position!). Now that the ailerons are sealed, adjust the rudder trim to obtain normal straight tracking through a normal-sized loop. Make a sharp pull-up and note which wing drops. If the left wing drops only slightly, this is normal and cannot be trimmed out (it is caused by "P" factor), but if the right wing drops, or the left wing drops substantially, then add a half ounce to the opposite wing. Now go back and trim the rudder again for a normal loop, and repeat the whole process. When it seems to be right for inside loops, try it for outsides. It may require some compromise between inside and outside, but that's what trim is all about anyway. Here again, different planes require different balance, but I've found that the Phoenix generally likes to be about a half ounce left wing heavy, whereas the Curare seems to be fine when balanced level. This is probably due to the 0-0 thrust set-up on the Phoenix, whereas the Curare has both downthrust and rightthrust: but that is still another subject that I must cover some time in the future. I remember a German pattern design back about 1968 or so called the Compromise, and I cannot think of a more appro-

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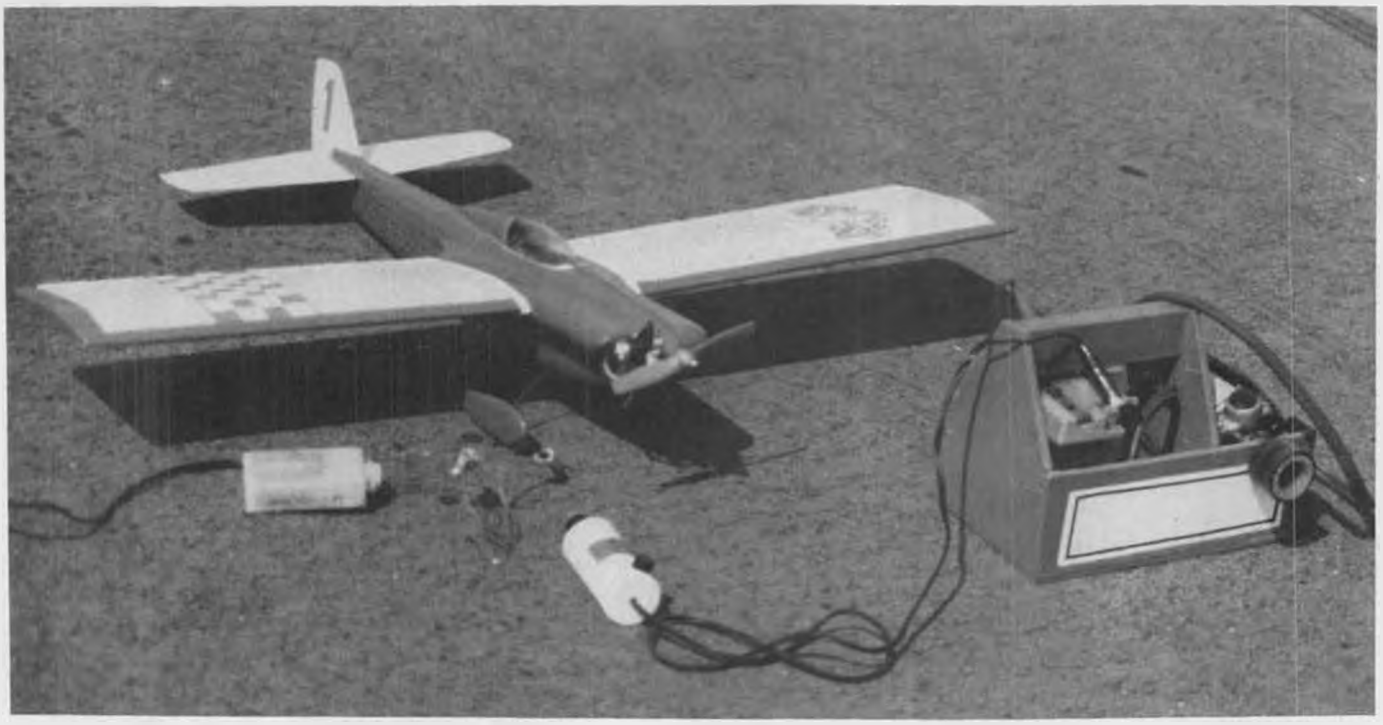


All fueled up and ready for action! Ship is a smooth, fast flier, and should be fairly competitive in 1/2A racing events. Note the Astro Flight electric starter, an important part of any 1/2A flier's field equipment.

PRODUCT$ IN U$E

MODEL MERCHANT'S 'RICKY RAT', reviewed by CHARLIE VIOSCA

• If you want to build a 1/2A racer that is competitive, A.M.A. legal, and quick to build, then you should consider the "Ricky Rat" pylon racer by MODEL MERCHANT, P.O. Box 3792, Irving, Texas 75061. MODEL MERCHANT is a kit manufacturer, and all leading distributors and hobby shops carry its kits. If your hobby dealer doesn't have a Ricky Rat kit in stock, get him to order it for you.

This neat kit has a good set of instructions, complete with photos illustrating each step of construction. The fuselage is molded of plastic, the wings are foam sheets, the tail surfaces are pre-cut from balsa, and all hardware is furnished. If you are an average builder, you should be able to finish the model in a couple of nights.

Let's go through a few of the building steps, to show how easily this kit goes together.

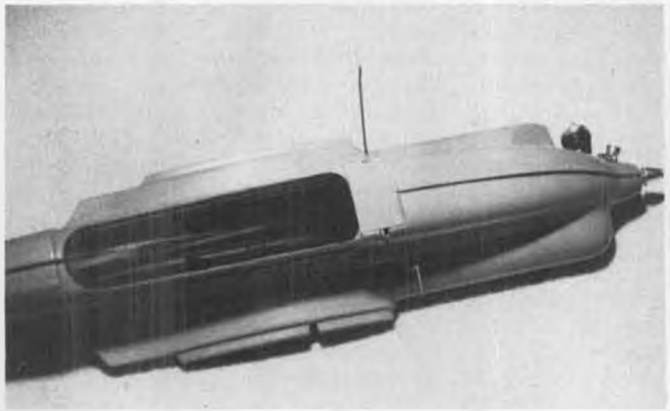
Since the fuselage is molded plastic and both halves are pre-joined at the factory, you will have to cut out openings for radio, engine, tail, and wing spars. That's all there is to the fuselage.

Next is gluing the plastic firewall and plywood reinforcement together, installing the engine mount, and gluing into fuselage. When set, install engine.

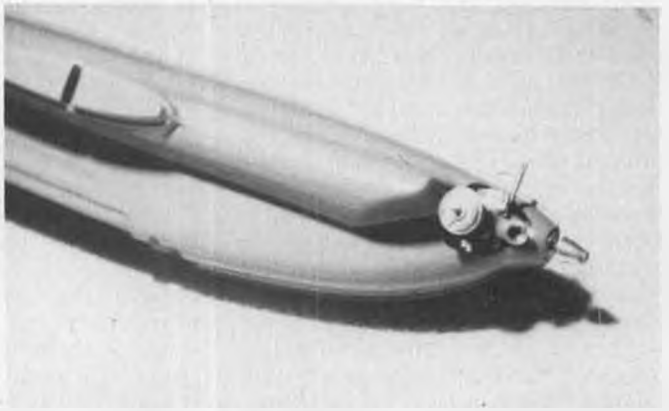
The method of wing construction needs comment, since it is unusual. This wing has no ribs. There is an upper wing skin, lower wing skin, and main spar. After marking the foam sheets (upper and lower wing skins), the spar is glued into place on the lower panel. Then the upper panel is glued into the spar. Next the trailing edge is glued together. The wing tip and leading edge are now glued into place. I must caution you to be sure to glue the trailing and leading edges together accurately, or you will build a warp into the wing. Now install the ailerons onto the wings, and the wings onto the fuselage.

The next step is gluing the tail together, and, after covering it with a heat-shrink film, the fin/rudder combination, along with the horizontal stabilizer and elevator, are glued into place on the fuselage.

The canopy and wheel pants are added afterwards, and painting and trim can be done if desired.



Bottom view of the fuselage, showing the radio compartment and landing gear mounting.



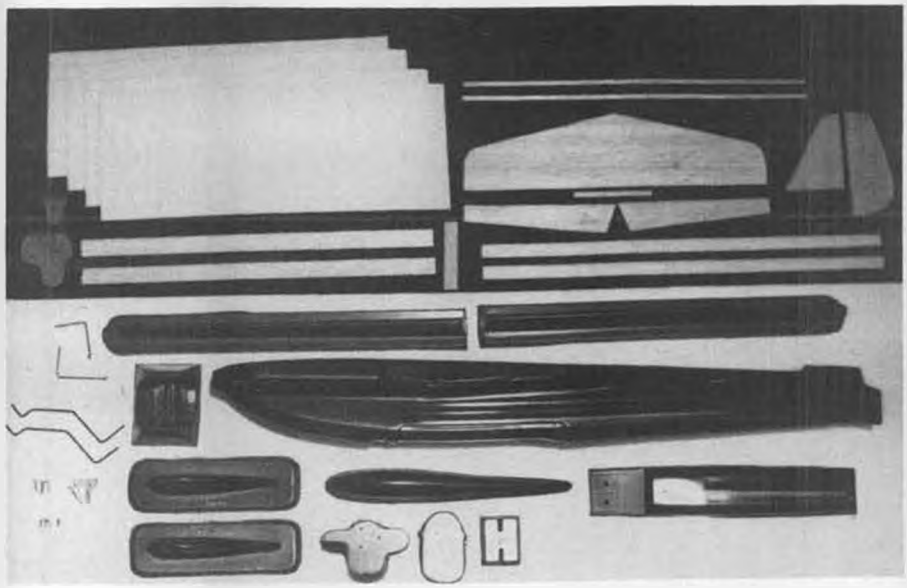
Close-up view of nose with engine installed. The cut-out in the wing stubs is for the full-depth wing spar.

Installing the radio and fuel tank are all that are needed to complete the model. A one-ounce Sullivan tank was used in my model, along with an EK "LRB" radio. The battery was installed in the forward compartment, under the fuel tank, and the "brick" unit was installed just aft of the spar. I used 5-minute epoxy to glue a 1/8 inch plywood rail on top of the spar to provide a mount for the radio, rather than run screws directly into it (this would weaken the spar). Another rail was put across the two sides to support the brick. Switch mounting was easy with the Du-Bro Kwik-Switch mount, No. 203. The balance point should be no less than a 1/4 inch in front of the spar.

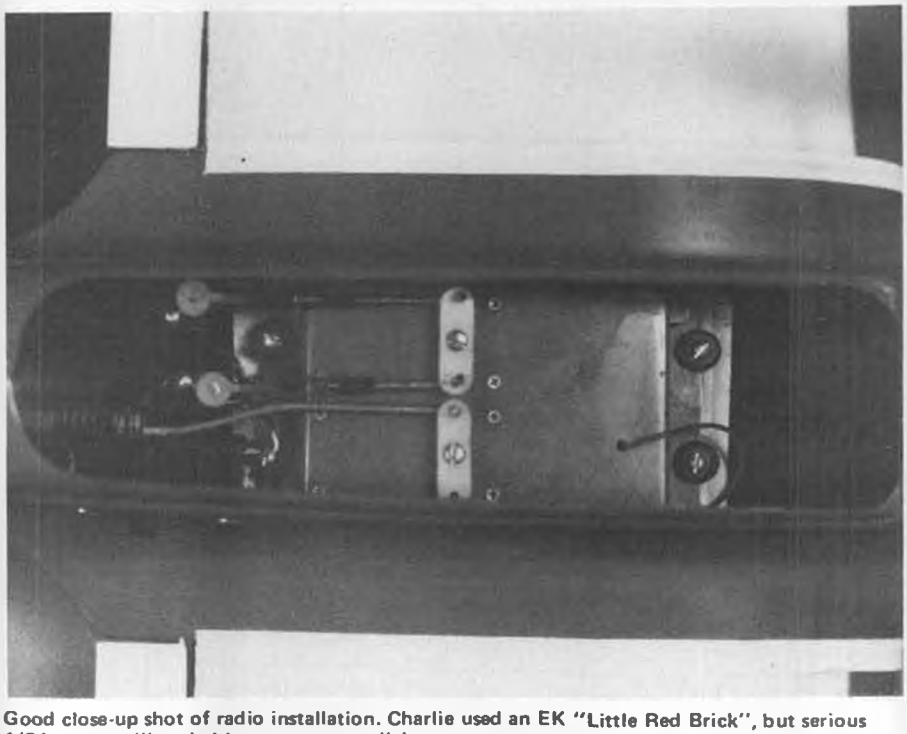
A Cox TD .051 was selected as the power plant. Several years ago, I had a chance to visit the Cox manufacturing facilities in Santa Ana, California. I was so impressed by what I saw that I am still talking about it. I wish all modelers could visit this plant and see just how these fine engines are made. The ease of starting, reliability, simplicity, and power of these engines have made them extremely popular. It works the other way, too ... what these engines have done for modeling can't be measured, only appreciated.

I was really surprised at how well and easy the Ricky Rat flies. It felt very smooth on the controls and was not overly sensitive. Docile is the best word that describes the flight characteristics. Loops, split S's, and rolls are a delight, and in addition to racing, this model is a pleasure to fly for sport.

Should you choose to build this nice-looking 1/2A pylon racer, I'm sure you will be pleased with the fast, easy construction and the competitive flying ability of the model.●



Kit contents. Plastic fuselage shells come pre-joined, modeler has to cut openings for engine, tail surfaces, radio, and wing spars. Foam wing skins wrap over and under spars.



Good close-up shot of radio installation. Charlie used an EK "Little Red Brick", but serious 1/2A racers will probably want to use a lighter system.

Model Merchant's kit makes into an attractive airplane. Note the simulated stringers molded into the fuselage shells.

Landing gear details. Landing gear leg is sandwiched between wheel pant and scrap piece of plastic.

Perfect setting for the 1st World Cup R/C Car Races, the actual Monaco Grand Prix straight, in front of the timing and scoring towers. In fact the Monaco G.P. timing and lap counting equipment was used. Note long straight to left, and two switch-backs.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• Most serious R/C car racers know that the 1st World Cup R/C Car Races were held at Monaco, on May 25 through 28, 1978. Six top drivers of each country were invited. U.S. drivers invited were Butch Kroells, Bill Jianas, Gene Husting, Art Carbonell, John Thorp, and Roger Curtis. All were able to attend the race. Formula cars were specified and the track was rather large, with racing in the counterclockwise direction. EFRA-legal mufflers were required.

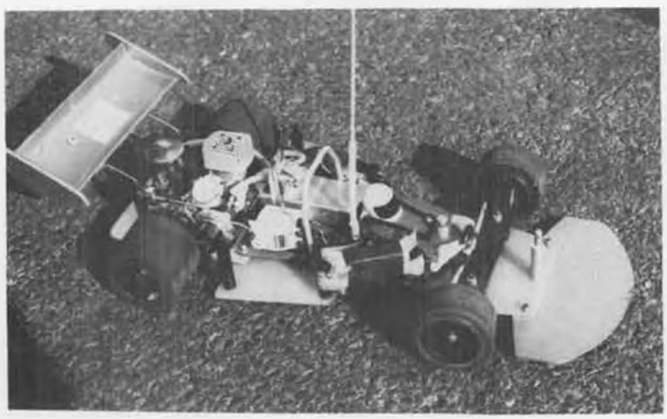
The "A" main event drivers and finishing order were:

1. Phil Greeno ..... G.B.
2. Debbie Preston ..... G.B.
3. Phil Booth ..... G.B.
4. Keith Plested ..... G.B.
5. Ronny Ton ..... Neth.
6. G. Stanzani ..... It.
7. Gino Ghersi ..... It.
8. P. Bervoets ..... Neth.

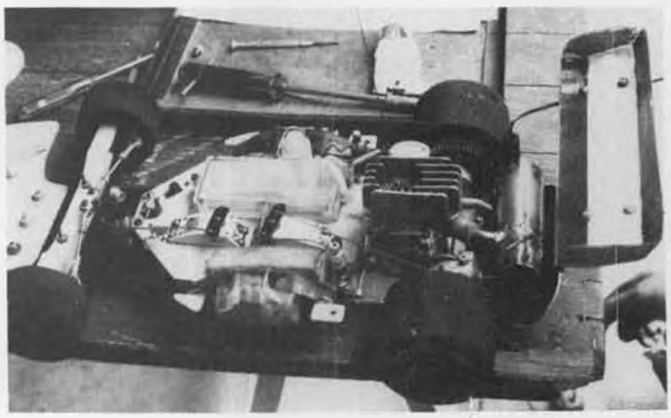
Congratulations to the English team for a superb showing! It looks like they were really ready for this one. The Netherlands and Italy also did extremely well, placing two drivers each in the 'A' main event.

The U.S. drivers and their finishing places were: Gene Husting, 'B' main 8th; John Thorp, 'C' main 2nd; Art Carbonell, 'C' main 7th; Roger Curtis, 'D' main 5th; Butch Kroells, 'E' main 6th; and Bill Jianas, 'F' main 3rd. It appears the Europeans did to the U.S., what the U.S. did to them at the 1st World R/C Championship race. The U.S. driver's complaints after the Monaco race sound similar to the European's complaints at the First World Championship race. We'll get back to this later.

To get an idea of what really went on, I talked with John Thorp, Gene Husting, and Roger Curtis. It seems everybody had a good time and had no excuses for not doing better.



Greeno's winning car, OPS powered. Rx and steering servo forward to counterbalance muffler weight.



Ronnie Ton's ST powered car with trick muffler. Fast car. Muffler innards kept secret.

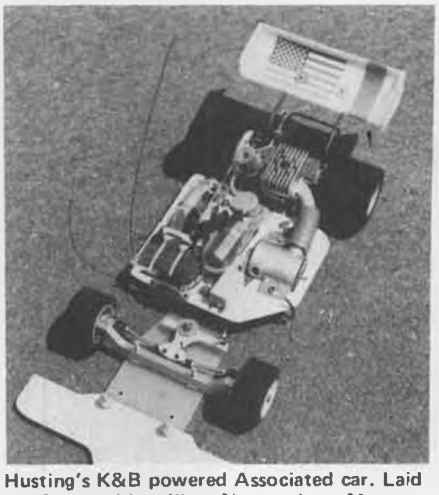
The 'A' Main drivers (l to r): Booth, Preston, Bervoets, Greeno, Ghersi, Plested, Stanzani, and Ton.

Like 90% of drivers, Greeno used sticks (and tongue). Also a top pylon racer.

They all felt that several of the U.S. drivers were going quite well, but that it was the "little things" that did them in. Anyway, they answered questions and gave comments about the cars, engines, track, races, and drivers. I hope the account presented here reflects their feelings.

The race schedule called for two days of practice, and then four qualifying heats of fifteen minutes duration for all drivers. Prior to the main events noted above, there were two semi-mains of thirty minutes duration each for the sixteen top qualifying drivers. The top four drivers of each eight-driver semi went to the 'A' main. Too bad the race was set up this way, because Gene Husting had 101 laps in his semi for 5th place, which topped the 3rd and 4th places, of the other semi. Phil Greeno and Gino Ghersi were the semi winners.

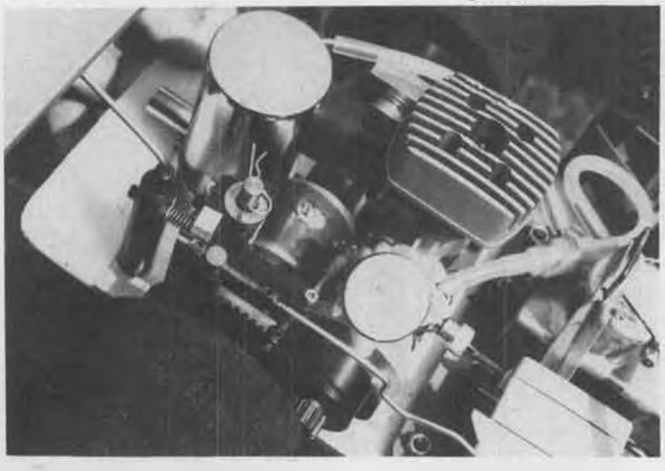
In the 'A' main event, Ghersi stretched out almost a full lap lead on Greeno in second place. Ghersi's engine died when pitting (blown plug), but he was back in the race near Greeno. By the second fuel stop, Ghersi again had almost put a lap on Greeno, and again the engine had blown a plug and died in the pits. Ghersi ran out of plugs, and lost valuable time and many places in the race while trying to get more plugs. Meanwhile, Debbie Preston was running a smooth race and moved up to second place. Her car developed some hop problems near the end of the straight, caused by a tire coming unglued from the rim. A tire/wheel change dropped Debbie back to about fifth, but consistent driving brought her back to second at the end of the race.



Husting's K&B powered Associated car. Laid out for good handling. Not reqd. on Monaco course.

The track was located on the actual Monaco Grand Prix straight, in front of the timing and scoring towers. The Monaco Grand Prix timing and lap counting equipment was used for scoring. Within a minute after each race, the results were printed, and Xerox copies were immediately distributed to all competitors. There were about 75 non-racing officials. The 25 track marshals wore orange coveralls, and the other officials had light-blue shirts with official markings, and navy blue pants and ties. What organization! Each driver had half of a 4 x 8 table, under a covering, for a work space. Bleachers about 20 rows high were at each end of the track, and a 30-row stand was to the left of the drivers . . . and were full all the time. There was standing room only, along the 300-foot back straight, and it was 5 and 6 people deep most of the time. The grandstands were full all day Sunday . . . about 4000 people . . . and the seats cost about 3 dollars. You get the feeling that everybody wants to be a race driver, since they have stickers all over their cars, and race through the streets. Lots of people recognized Butch Kroells.

Continued on page 122



Close-up of Greeno's car shows differential, brass muffler, and dry weather carburetor inlet bell.

Victory circle. Crowd applauds Green, who in turn, sprayed them all with magnum of champagne.

Matt Jacobson's "Magnum" One-design is 52 inches O.A., displaces 18-1/2 pounds, and carries 910 sq. in. of sail.

STRICTLY SAIL

By ROD CARR

• R/C match racing is a phase of our sport that is gradually gaining ground. In the EC/12 Class, the impetus came from the Mini-America's Cup. Under the present deed of gift, that event will be sailed in Newport, RI, during the time that the prototype 12-meters are racing. Since these events occur every 3 to 4 years, we are left with a gap between them. To fill this hole, the Potomac R/C Sailing Association has instituted an annual event, titled the POTOMAC MATCH CUP. A fleet of 10 boats of the EC/12 class is used. Entry to the select fleet is passed on previous performance. The goal is to attract the best skippers to the event. Similar methods for choosing a field of entries have been employed to choose the 3 boats per frequency that some classes set as a maximum for their ACCR's. Part of the philosophy is to maximize the time each individual boat can sail on the water.

The following is the text of the Regatta Notice for the 1978 Potomac Match Cup. (Note: A bout with his favorite surgeon has caused the Regatta Director, Bob Harris, to postpone the event until the fall of 1978.)

1978 POTOMAC MATCH CUP

I. Any AMYA member who is a member of the Class may apply to register for this event, provided only that his boat meets the Class Rules and is equipped with legal radio equipment capable of operation on at least 2 frequencies. Registration must be received by 5 p.m. EST, Monday, May 8, 1978. Registration preference will be accorded to those also applying to compete in the Divisional Regatta to be held on the following day.

II. Registration fee is $10, non-refundable, except that registration fees will be returned to applicants whose registrations cannot be accepted for any reason, and except that $5 will be returned to accepted registrants who appear for the competition at the place and time specified in the announcement.

III. Within the preference specified in I above, the following will be accorded preference in registering, if their applications are received no later than 5 p.m., Friday, April 28.

1. 1st, 2nd or 3rd place finishers at the U.S. Mini-America's Cup qualification match races held in Newport, RI in September, 1977.

2. 1st, 2nd or 3rd place finishers (U.S. Skippers only) at the regatta held for those eliminated from the Mini-America's Cup qualification match races held in Newport, RI in September, 1977.

3. One skipper officially nominated by his home club, which, having an active fleet in the class, submits the skipper's name and asserts that he/she is the most qualified in the Club's match racing competition.

Following 5 p.m., Friday, April 28, all other applicants will be considered under the provisions of I above. If there should be more applicants than available places in the competition;

1. All names of those also applying to sail in the associated Divisional Regatta will be "put in the hat", and the required number of names will be drawn at random by an individual not at interest.

2. If available places still remain, all other names will be similarly treated.

Please note: Registration fees must accompany applications; checks will be held until all competitors are identified. As soon as possible, accepted checks will be deposited and all others returned.

The 10 boat limitation is a result of the number of heats required to allow each boat to sail against every other boat once. As seen in the table below, it goes up rapidly. To calculate the number of heats for any given number of boats (n) simply use the following formula:

$$HEATS = n^2 - n / 2$$

Multiply n by itself (n-), subtract n, then divide the result by 2.

BOATS	HEATS
2	1
3	3
4	6
5	10
6	15
7	21
8	28
9	36
10	45

Even at 45 heats, it takes a well-organized committee to run off that number in a day. Dennis Ryan, EC/12 Class Secretary, has developed a heat schedule which allows every boat to sail against every other boat. No boat sails in back-to-back heats. This means that, immediately upon the completion of one heat, the next may commence. The 2nd pair should be in the water, ready to launch toward the starting line.

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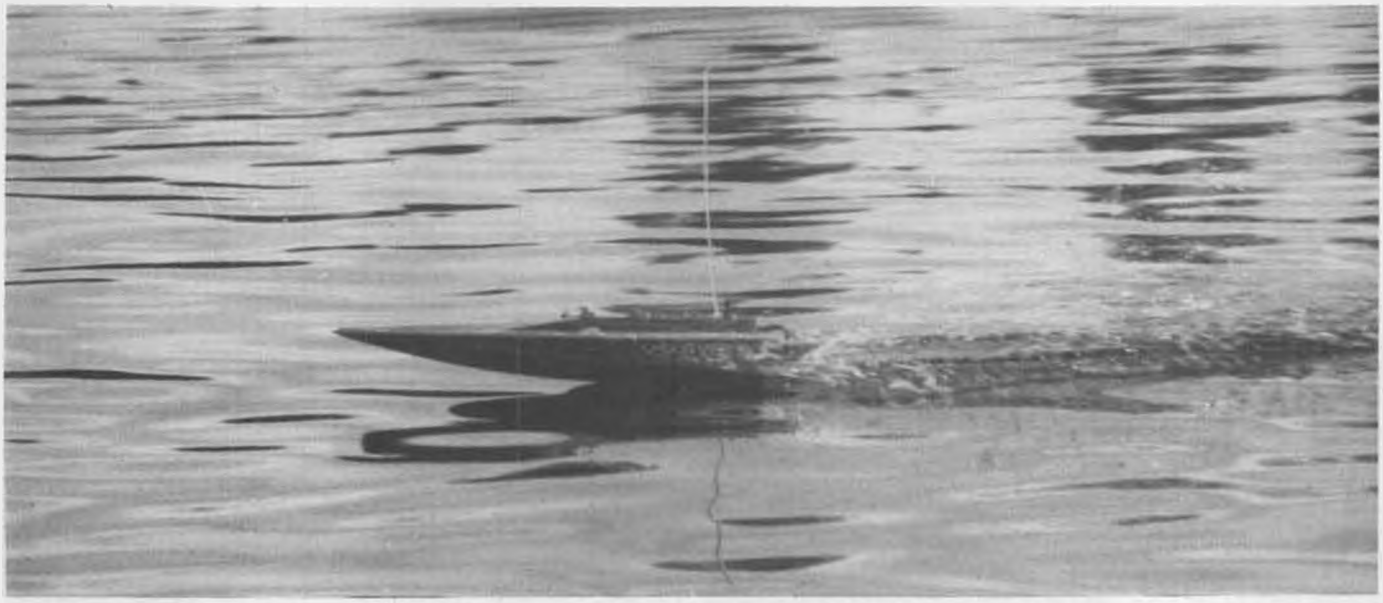


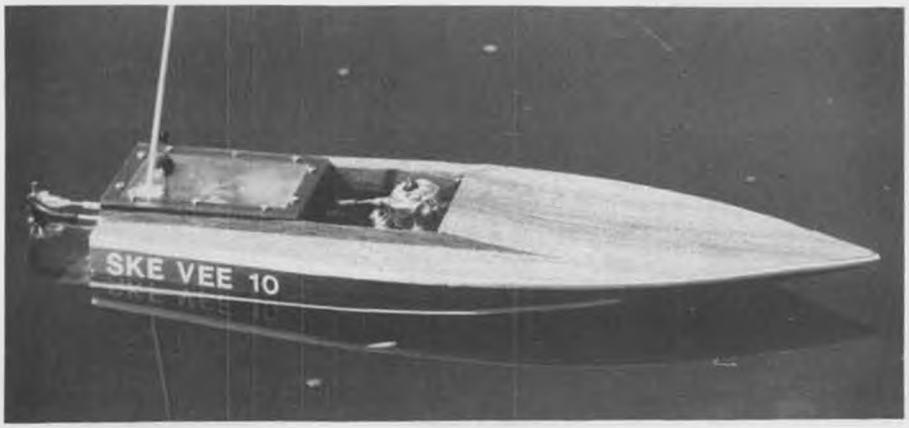
PRODUCT$ IN U$E

DUMAS "SKE–VEE 10", reviewed by JERRY DUNLAP

• During the past fifteen years, I've had the opportunity to attend a number of meetings and read a batch of books dealing with the topic of personal motivation and development. I'm sure many of you have attended similar conferences. Many large corporations send their management people off for weekend retreats. The themes are usually something like "Dare To Be Different", "Think Big", or "You Can Do It". Well, in this article, I'm going to ask you readers to try doing something just the opposite of "Thinking Big". I'm going to ask you to consider the possibilities of "Thinking Small". I don't mean thinking small in your job and family experiences, but in your modeling experiences. Of course, models are already small compared to see the real objects they are patterned after. However, the majority of model R/C boats usually run from two to four feet in length and use from .21 to .65 cubic inch model engines for power. It could well be that the spiraling cost of model engines, kits, hardware, and fuel will soon begin forcing more of us to take a serious look at our big models. It could happen. Who would have thought ten years ago that most of us would have at least one economy car if we were a two car family? (But then, who would have thought we'd be paying anywhere from 57¢ to 75¢ for a gallon of regular gas?) Plywood that I used to buy for $2.80 a sheet is now over $6.00. The cost of fuel has easily doubled in the twelve years I've been in R/C boating. But the ever-increasing costs of our hobby are just mirroring all the other increases in our economy. However, friends, there is a way to fight back! "Think Small".

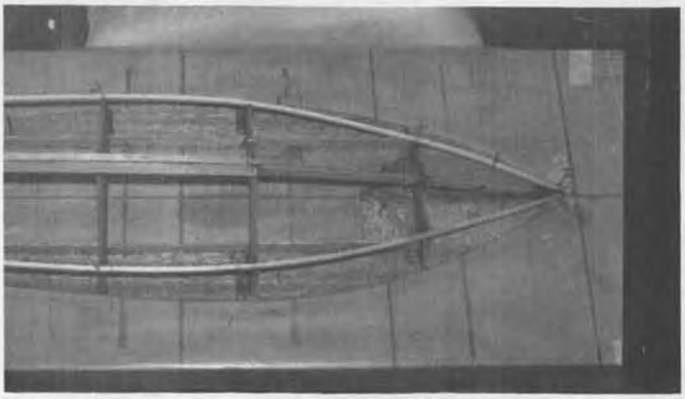
With the introduction of fuel efficient, high power .10 size model engines, a whole new dimension has been added to model power boating. Jay Brandon, your leader of "The Model Boat People" at Dumas Boats, provided me with the means of exploring the smaller side of R/C model boating. During a phone conversation last fall, Jay was telling me about the fun they were having in Tucson running .10 size model boats. When I expressed an interest in finding out about this type of model boating, Jay graciously consented to provide the whole package. And so it came to be that a few weeks later a Dumas "Ske Vee — 10", hardware kit H-27, and an O.S. Max .10 arrived in Tacoma. The "Ske Vee — 10" is basically a blending of two types of models. The "Ske" refers to the ski boat deck configuration that many will recognize as typical of the Dumas "SK — 20/40" kits. And of course the "Vee" relates to the bottom design which happens to be about 20 degrees at the transom.

When I first opened the kit, I had some reservations about some of

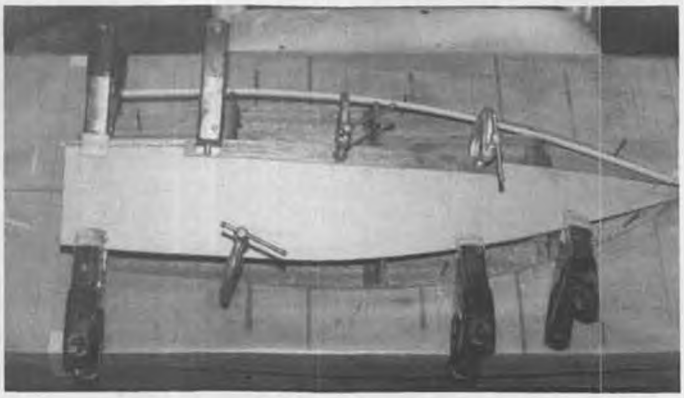


Lots of freeboard still remaining on this 18-1/2 inch model. Radio box sealed with rubber gasket. Du-Bro Kwik switch knob for radio.

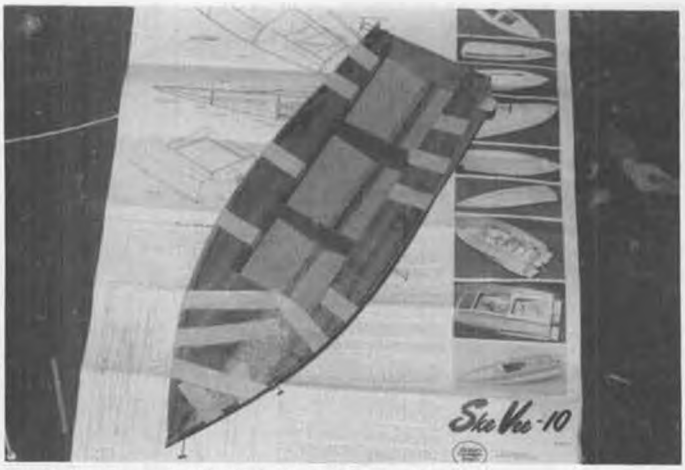
Kit material, hardware, and engine laid out for inspection.



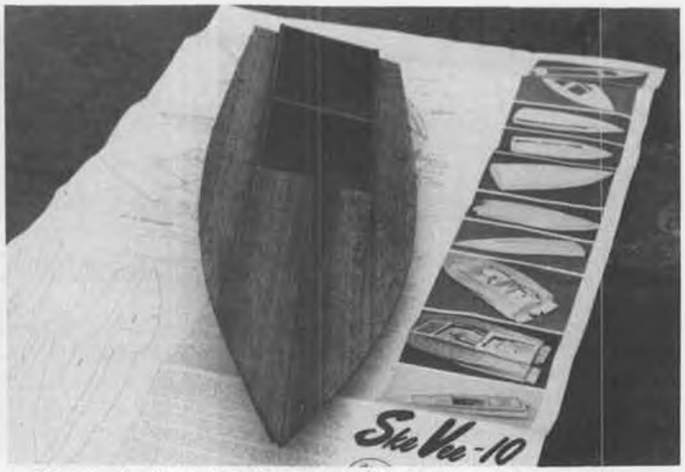
Sub-deck and framework are attached to flat building surface.



Clamps are most necessary tool in boat building. Don't start a project without them.



Tape also does a holding job, here it's the side pieces.



Use lots of pins to hold the decking in place.

the wood. The one-ply mahogany sheeting for the deck was initially suspect. However, my concerns were later eased when I discovered that the builder actually makes a double-ply deck by laminating two deck sections together. In fact, the deck came out so well on my boat that I elected to just paint it with clear and have a natural wood deck. I don't personally like to use the three-ply material supplied in the kit for frames. However, such material does have more than adequate strength when all the sheeting is attached, and its use does help in keeping down the overall price of the kit. All the other material was quality birch plywood and spruce. The directions supplied with the kit were typical of Dumas kits . . . well written with excellent photos depicting stages of construction. I've always felt that Dumas has done an excellent job in providing plans for their model boats. Other than building my own designs, I've built more Dumas kits over the past dozen years than those of any other model boating manufacturer. Since Dumas offers more model boat kits than anyone else, I guess that isn't all that amazing.

The H-27 hardware kit is a flex-drive system intended for small motor application. The only part of this hardware package that might cause problems is the soft brass used for the rudder. Although the rudder never bent while actually running the boat, I did bend it a couple of times just setting the boat down, so the advice here is to be cautious when handling the boat out of the water. I found the flex-drive very useful in testing different prop depths.

Any of you readers who might be considering designing and building original designs of ski boats or deep vees could benefit from taking

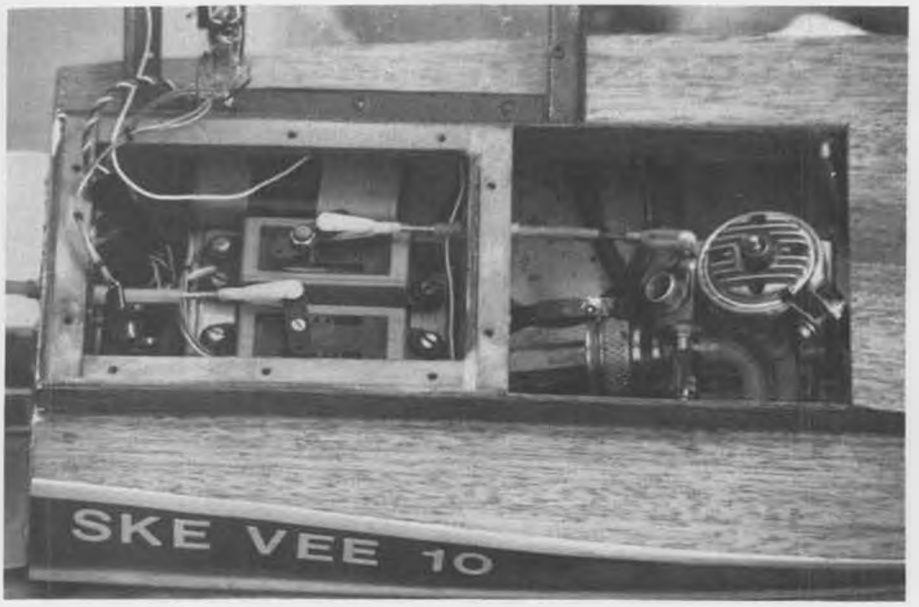
The O.S. Max 10, with Octura Kool Clamp and Dumas flywheel and universal.

Transom shot, showing Dumas rudder/strut assembly and K&B aluminum prop.

notice of how Dumas kits are assembled. Typical of most of the Dumas kits I've built, the "Ske Vee — 10" is assembled upside down on a flat building surface. This particular building technique is an excellent method to help assure a true-running surface. I use the same technique when building my own designs. Assembly of the "Ske Vee — 10" begins with pinning down the subdecking on the flat building surface. Small wire brads or map tacks work well for this task. The frames are then attached to the subdeck and the keel and bottom chine stringers follow. The use of five minute epoxy will greatly speed up the framing of the "Ske Vee — 10". I had the hull framed and one of the bottom pieces attached in one evening's building session. Sheeting the framework isn't any problem, since there are no severe bends for the sheeting to make. Modeler's pins, masking tape, and clamps are the items needed to keep the sheeting in place while the epoxy sets. I have been using Devcon "Slow Cure" epoxy adhesive lately for affixing sheeting to frameworks.

This particular epoxy has a working time of about 15 minutes and hardens in one hour. The boat is removed from the building surface for attaching the side and deck pieces. All the sheeting pieces are cut very close to size and only a minimum of trimming is necessary.

Since installing a .10 size motor takes up quite a bit of space in the engine compartment area, I created a forward fuel tank compartment by simply cutting open the frame ahead of the engine compartment. This allowed me to wrap a two ounce fuel tank in foam and insert this tank in front of the engine. This allows for excellent fuel draw and also places the weight of the fuel on the centerline of the hull. The foam around the tank seems sufficient to prevent its moving while the boat is running. As can be seen in the pictures of the motor compartment, the O.S. Max .10 takes up most of the available room forward and aft.



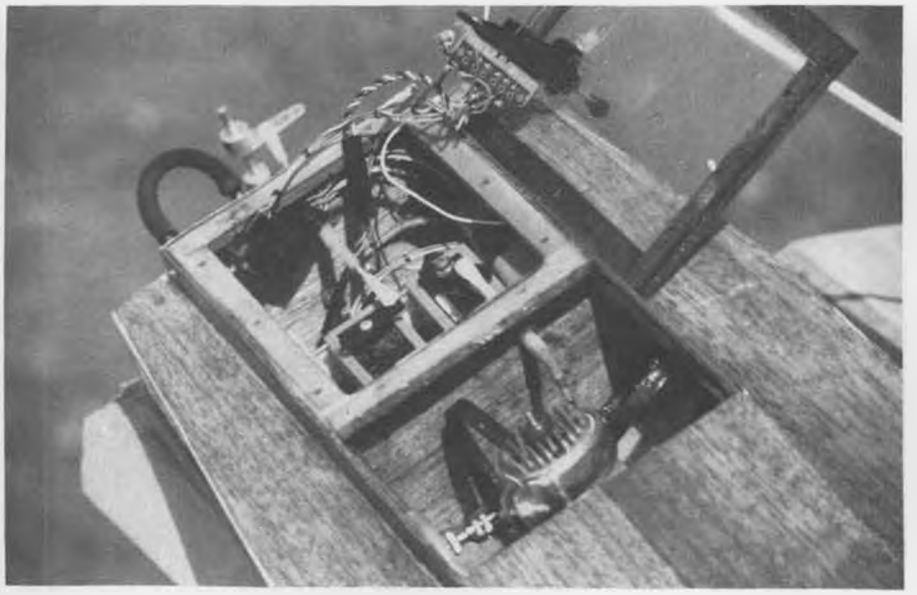
Engine and radio compartments. Belt in engine compartment for starting engine. Note linkages.

It was necessary to make a motor mount for the motor. 1/8 inch aluminum was used for the motor mount and a hacksaw, power drill, and file were the required tools. The motor on its aluminum mount should be attached to the wooden motor bearers and prefitted into the motor compartment before the flex-drive is installed. It was necessary to do some reworking of the wooden mounts to get the engine to sit as low as possible and still have sufficient clearance for the flywheel and starting belt. Yes, I planned to use my electric starter. I don't want to ever rope start another model engine if it can be avoided! Once I was satisfied with how the engine was located, the flex-tube for the cable drive was installed. The tubing exits through the bottom, 3 inches in front of the transom. The tubing should exit through the radio compartment bulkhead so as to allow the cable to slide into the universal without any binding. Use plenty of epoxy around where the tubing exits the hull. A piece of brass tubing is supplied to glue into the hull where the flex-tube exits. Epoxy will stick better to the brass than the flex-tube.

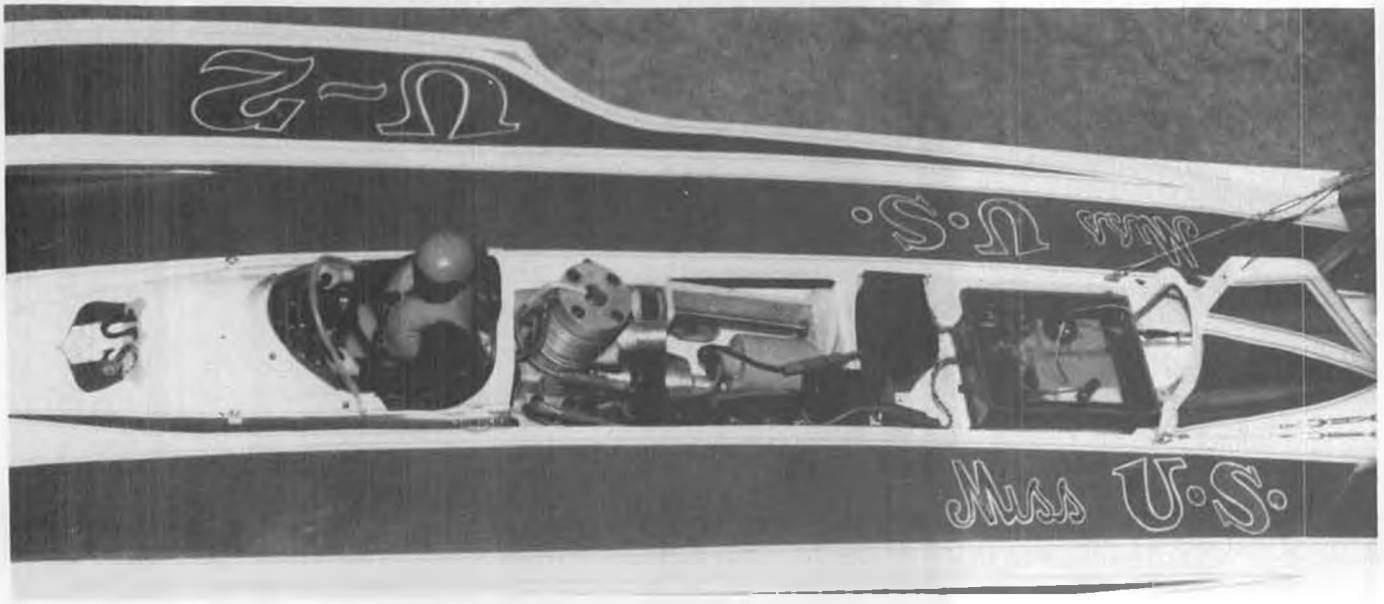
The rudder/strut assembly bolts to the back of the transom and the strut is slotted to allow for adjustment of the strut depth. The kit even

Continued on page 119

Paul Dunlap, 6, holds Dad's boat. He likes to run 'em too.



Another view of engine and radio compartments.



Eastcraft's "Lectra-Start" system installed in Doug Riha's 1/8-scale unlimited, "Miss U.S.". He's from Darien, Illinois. Assembly and installation was completed in 4 hours. Unit had no problem cranking hefty OPS 60.

R/C POWER BOATS

PHOTOS BY AUTHOR

By BOB PREUSSE

• Eastcraft Specialty Products, 709 Longboat Avenue, Beachwood, New Jersey 08722, has developed the "ultimate" accessory item, especially for scale hydro, deep-vee, and sport enthusiasts. It is called the Lectra-Start, and is a radio-controlled, on-board, starting system. Now, with your transmitter, you can start the engine while your boat is in the water. Think of the realism that this offers scale boaters, and also, the practicality of being able to restart during racing or sport running.

Gary Rheault, of Eastcraft, has over 20 years of modeling experience designed into the starter. He claims that "anyone capable of building a radio-controlled boat can successfully install this device, provided that there is enough space available in the model, and the proper unit is selected." Proper installation and maintenance will provide long, trouble-free service.

Lectra-Start systems come complete with all hardware, mechanical and electrical components. In fact, no extra parts are needed, just basic shop tools. Assembly and installation of the unit in our test boat, which was a 1/8 scale unlimited, Miss U.S., belonging to Doug Riha of Darien, Illinois, was completed in only four hours. For Doug's boat, we used system No. 201B, which is designed for .40 to .80 size engines.

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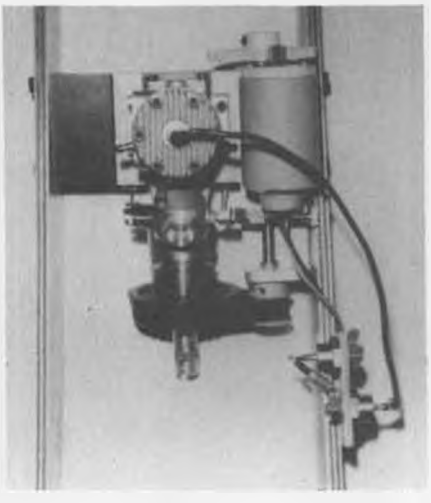
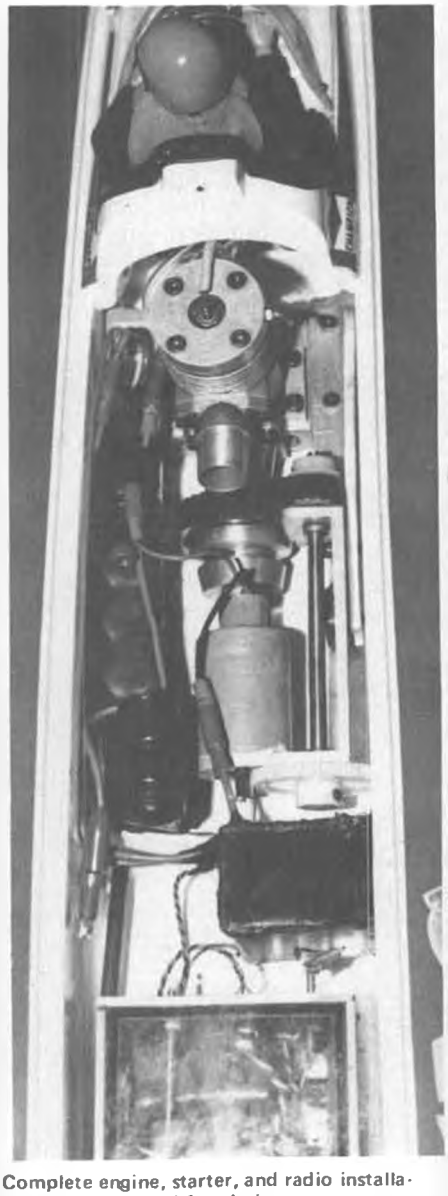
All of this is included with Electra-Start system . . . plus instruction manual.



Lectra-Start as displayed at trade shows, on Webra .40, less power unit.



Complete engine, starter, and radio installation. Pipe removed for clarity.

R/C Steam-Powered LAUNCH

PHOTOS BY THE AUTHOR

By KILBURN ADAMS . . . Believe it or not, steam powered model boating is tremendously popular throughout the world. This very typical launch from the "Gay Nineties" era is nothing but class, from stem to stern.

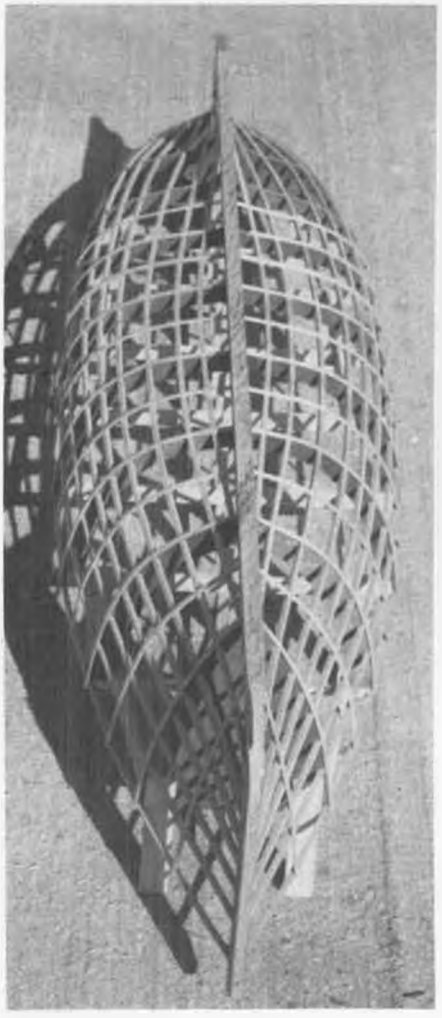
• Steam launches are thought by many marine historians to be among the most graceful craft to travel the waterways of yesteryear. This particular one is typical of the steam launches of the "Gay Nineties", with its fantail stern, plumb bow, and sweeping sheer, and may evoke memories of the movie "African Queen".

Five channels of R/C are used to control steering, forward/reverse, throttle, whistle, and burner control, but the burner control is not really necessary. The R/C model was scaled to fit the Saito line of imported, ready-to-run steam engines. I chose the twin-cylinder version for its self-starting capability, since it has no dead centers. These engines can be purchased with or without the reverse, but the reverse seems especially fun on an R/C boat. Steam engines obtain reverse by changing the valve timing 180 degrees, and this makes reversing quick and easy. Steam engines also put out high torque at very low RPM, and can turn large propellers at low RPM. The power and speed of this boat have impressed all who have seen it cruising the local pond.

Since realism was one of the important goals of this project, the various woods were chosen much as they would have been in a full-sized launch. The R/C gear was hidden under the rear seat, but the beautiful engine and its brass accessories are in full view. All equipment and floorboards with seats are removable for easy servicing and cleaning, when necessary.

This project is not particularly difficult, but will require dedication to the job. Access to a table saw, jigsaw, and Dremel tool will be required. Many of the brass parts can

Not exactly a week-end project, but when you receive compliments on the beautiful natural finished mahogany planking, set off by the polished brass steam system, it will all be worth it. Engine shown is obsolete. See Hobby Shack ad for newest Saito (Japanese) steam power systems.



With bulkheads, keel, ribbands, and ribs in place, hull is ready for mahogany planking.

Aft and forward views of completed hull, with steam drive installed. Note steering servo, normally hidden by stern seat.

be made from hobby store tubing and strip stock. Small pullies and turnbuckles can be purchased from Proctor Enterprises or model shipbuilding supply companies. Other small parts may be found in your spare-parts box. The whistle valve can be made from a tire valve and valve stem. These parts are brass, and therefore rustproof. Small parts can sometimes be chucked in an electric drill and worked with file and sandpaper, when a lathe is not available. Small brass machine screws can be obtained through model railroad hobby shops. Wood can be ordered from Craftsman, Dept. LX-18, 2729 Mary, Chicago, IL 60608. Their 144-page catalog is 50¢.

The glues used in construction were mainly epoxies. It is best to have two types available: one for quick set and one which will allow longer working time. Much of the work can be done using something like Sig "Quick-Set" epoxy, which has a working time of five minutes. "Hot Stuff" was used to fasten trim strips along the gunwales and edges of seats, etc., because it does not result in glue oozing out where removal would be difficult.

Construction should begin by preparing the frames for mounting to a building board. All frames will have vertical strips of wood attached to aid set-up to the building board.

The hull will be built upside-down, so cut the vertical strips to hold each frame the correct distance off the board. The building board should be straight and warp-free. Particle board 3/4 x 12 x 60 inches works well. Draw lines 90 degrees to the center line of the board at each station location. Before gluing the frames to the board, assemble the stem, keel, filler piece, and stern post, and attach this assembly on the center lines which has been drawn on the board. Glue scrap supports between frames, and between each outer end of the frames and the building board, to give proper alignment. Check each frame for proper spacing, vertical alignment, and make sure each is 90 degrees to the

A portion of mahogany ply flooring, with bench/storage seats and servo console. How about the fringed "Surrey" top!

Servos operate rudder, burner, reversing lever, throttle, and whistle. All hidden by rear seat.

You can almost hear the methodic "huff-puff" as the launch passes by. Note steam coming from stack. Plans show how to make working whistle . . . as necessary as the rudder!

The radio/servo hider! Rear seat is boat's radio "hatch".

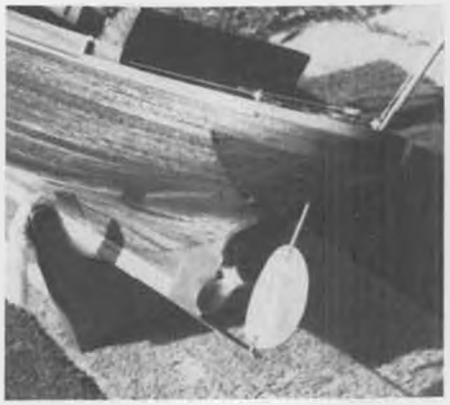
center line. Cut out the curved stern formers with a jigsaw, and epoxy to frame no. 10 and to the stern post.

Using a 1/8 x 1/8 x 36 inch strip of spruce, check fairness of all frames. Fairness can be checked by laying the strip across the frames fore and aft, and looking for low or high spots in the curve of the strip. If you do this carefully, your eye can detect very small discrepancies in the required shapes of the frames. Any high areas on the frames can be carefully sanded down. Low areas can be built up later. When satisfied with the fairness of the frames, begin notching the frames to accept 1/8 in. sq. ribbands. Place the ribband closest to the gunwale first. Use the strip previously used for checking fairness to align and locate the positions of notches for ribbands. Cardboard gauges can be made for locating each notch for the ribbands. The gauge is used to get the spacing of one ribband from another to be approximately the same. Dividers could be used in place of gauges.

After all of the ribbands have been glued into place, the 1/8 x 1/16 spruce ribs can be individually boiled in water, to make them limber, and then glued over the ribbands. When all ribs have been glued, again check for fairness and sand any highs. Now is the time to fill the lows, by gluing on another rib to any frames that are low. If only a partial buildup is needed, this can be accomplished by sanding down the double rib.

Planking the hull can begin when the hull is fair. Start at the gunwales and work toward the keel. Always plank in right and left pairs. This will help assure that the hull ends up symmetrical about the centerline.

The first three plank pairs will have to be prepared for bending around the stern. This is done by sawing into the backside of the plank, in the area of major bending. The easiest way to do this is to clamp a strip of wood to the jigsaw table, behind the blade, to control the depth of cut on the planking. The cuts can be spaced about every 1/16 inch, and should be a little deeper than 1/2 the thickness of the planks. These areas of bending should then be soaked in hot water to make bending easier.



Typically large prop for steam power. Plenty of rudder.

Getting the planks to stay in place while the epoxy is setting can be most easily done using clothespins and "C" clamps to clamp planks to the ribs and ribbands. Some of your

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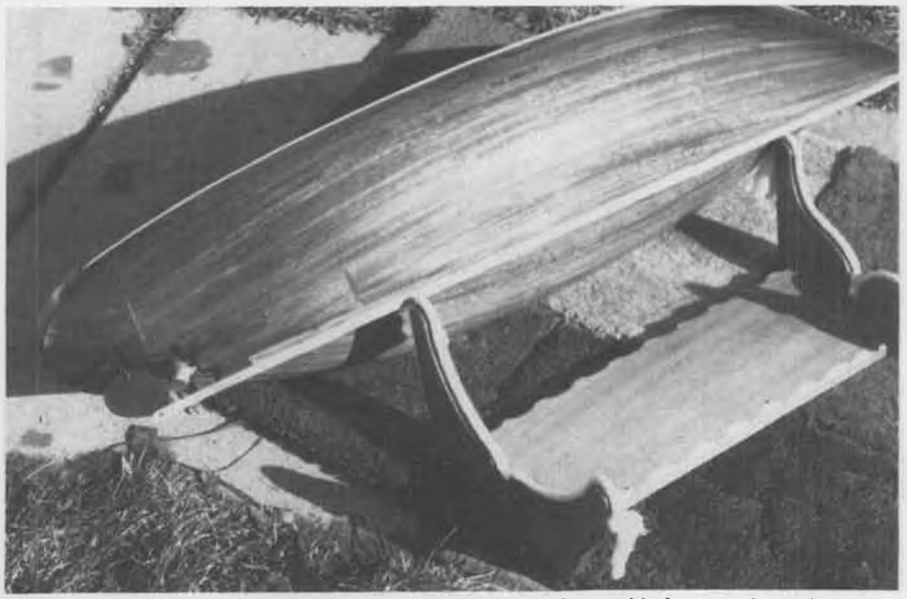
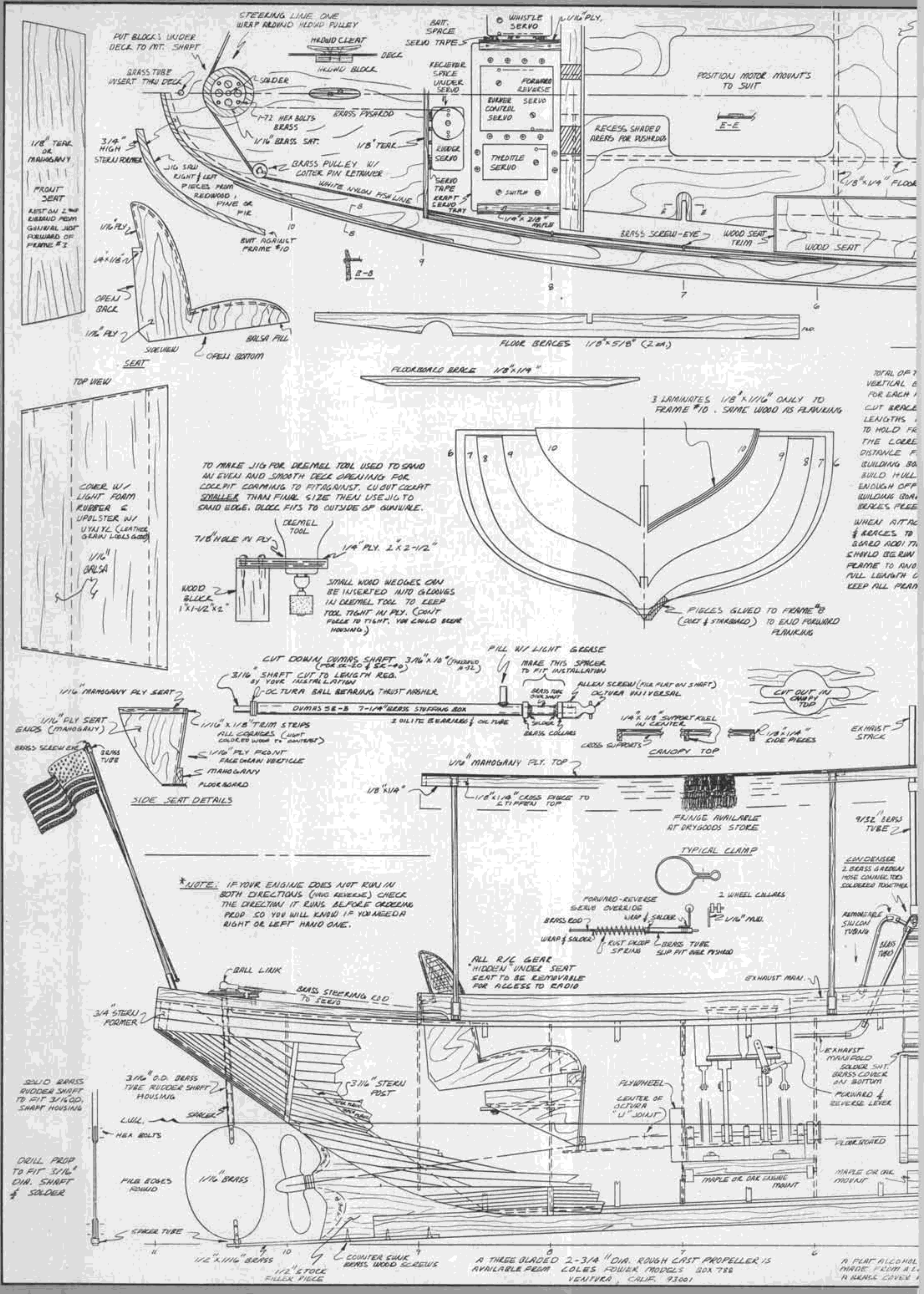
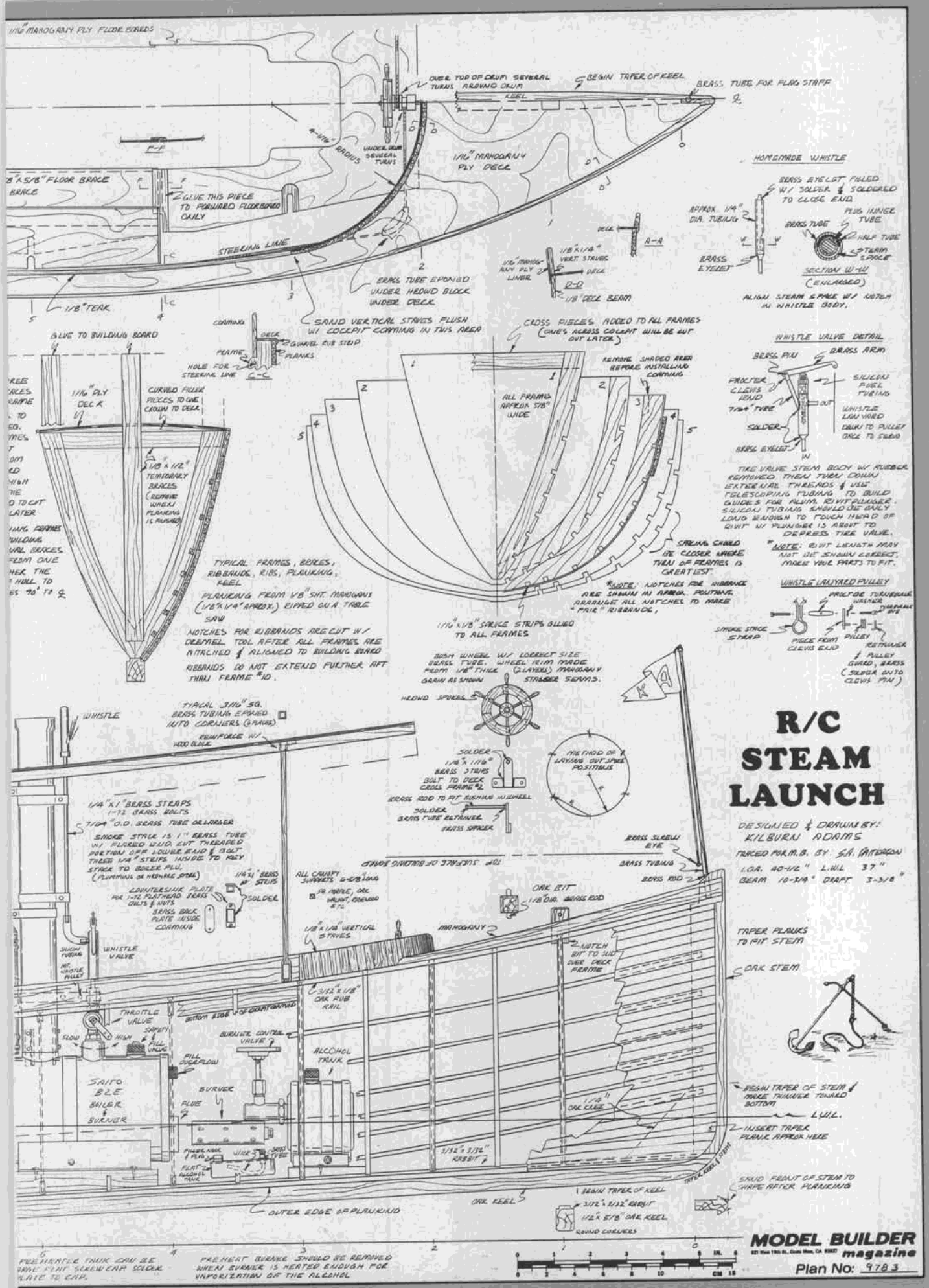


Planking is not difficult . . . it's tedious. Lay up a few each day, and before you know it . . . you're still not finished!


STEERING LINE ONE WRAP AROUND HOOD PULLEY
PUT BLOCK UNDER DECK TO MT. SHAFT
BRASS TUBE INSERT THRU DECK
SOLDER
1-72 HEX BOLTS BRASS
1/16" BRASS SHT.
BRASS PULLEY W/ COTTER PIN RETAINER
WHITE NYLON FISH LINE
BRASS PUSHROD
1/8" TEAK
DECK
WHISTLE SERVO
1/16" PLY.
BATT. SPACE
SERVO TAPE
RECIEVER SPACE UNDER SERVO
FORWARD REVERSE SERVO
BURNER CONTROL SERVO
RUDDER SERVO
THROTTLE SERVO
SERVO TAPE
SWITCH
POSITION MOTOR MOUNTS TO SUIT
E-E
RECESS SHADED AREAS FOR PUSHROD
1/8" x 1/4" FLOOR
BRASS SCREW-EYE
WOOD SEAT TRIM
WOOD SEAT
3/4" HIGH STERN FORMER
JIG SAW RIGHT & LEFT PIECES FROM REDWOOD, PINE OR FIR
BUTT AGAINST FRAME #10
1/8" TEAK OR MAHOGANY
FRONT SEAT
REST ON 2ND RIBBAND FROM GUNWAL JUST FORWARD OF FRAME #1
1/16 PLY
OPEN BACK
1/16" PLY
SIDE VIEW
OPEN BOTTOM
BALSA FILL
SEAT
FLOOR BRACES 1/8" x 5/8" (2 EA.)
FLOORBOARD BRACE 1/8" x 1/4"
TOP VIEW
COVER W/ LIGHT FOAM RUBBER & UPOLSTER W/ VYNYL (LEATHER GRAIN LOOKS GOOD)
1/16" BALSA
3 LAMINATES 1/8" x 1/16" ONLY TO FRAME #10. SAME WOOD AS PLANKING
TO MAKE JIG FOR DREMEL TOOL USED TO SAND AN EVEN AND SMOOTH DECK OPENING FOR COCKPIT COAMING TO FIT AGAINST. CUT OUT COCKPIT SMALLER THAN FINAL SIZE THEN USE JIG TO SAND EDGE. BLOCK FITS TO OUTSIDE OF GUNWALE.
DREMEL TOOL
7/8" HOLE IN PLY
1/4" PLY. 2" x 2-1/2"
WOOD BLOCK 1" x 1-1/2" x 2"
SMALL WOOD WEDGES CAN BE INSERTED INTO GROOVES IN DREMEL TOOL TO KEEP TOOL TIGHT IN PLY.
PIECES GLUED TO FRAME #8 (PORT & STARBOARD) TO END FORWARD PLANKING
CUT DOWN DUMAS SHAFT 3/16" x 10" (FOR SE-20 & SK-40)
3/16" SHAFT CUT TO LENGTH REQ. BY YOUR INSTALLATION
OCTURA BALL BEARING THRUST WASHER
DUMAS SE-3 7-1/4" BRASS STUFFING BOX
2 OILITE BEARINGS & OIL TUBE
FILL W/ LIGHT GREASE
MAKE THIS SPACER TO FIT INSTALLATION
ALLEN SCREW (FILE FLAT ON SHAFT)
OCTURA UNIVERSAL
BRASS COLLARS
CUT OUT IN CANOPY TOP
1/4" x 1/8" SUPPORT KEEL IN CENTER
CROSS SUPPORTS
CANOPY TOP
1/8" x 1/4" SIDE PIECES
EXHAUST STACK
1/16" MAHOGANY PLY SEAT
1/16" PLY SEAT ENDS (MAHOGANY)
1/16" x 1/8" TRIM STRIPS
ALL CORNERS (LIGHT COLORED WOOD TO CONTRAST)
BRASS SCREW EYE
BRASS TUBE
1/16" PLY FRONT
MAHOGANY
FLOORBOARD
SIDE SEAT DETAILS
1/16" MAHOGANY PLY. TOP
1/8" x 1/4"
1/16" x 1/4" CROSS PIECE TO STIFFEN TOP
FRINGE AVAILABLE AT DRYGOODS STORE
9/32" BRASS TUBE
TYPICAL CLAMP
CONDENSER
2 BRASS GARDEN HOSE CONNECTORS SOLDERED TOGETHER
*NOTE: IF YOUR ENGINE DOES NOT RUN IN BOTH DIRECTIONS (HAS REVERSE) CHECK THE DIRECTION IT RUNS BEFORE ORDERING PROP SO YOU WILL KNOW IF YOU NEED A RIGHT OR LEFT HAND ONE.
FORWARD-REVERSE SERVO OVERRIDE
2 WHEEL COLLARS
BRASS ROD
WRAP & SOLDER
1/16" MUD.
REMOVABLE SILICON TUBING
BRASS TUBE SLIP FIT OVER PUSHROD
ALL R/C GEAR "HIDDEN" UNDER SEAT SEAT TO BE REMOVABLE FOR ACCESS TO RADIO
EXHAUST MAN.
BALL LINK
BRASS STEERING ROD TO SERVO
3/4" STERN FORMER
EXHAUST MANIFOLD
FORWARD & REVERSE LEVER
SOLID BRASS RUDDER SHAFT TO FIT 3/16 O.D. SHAFT HOUSING
3/16" O.D. BRASS TUBE RUDDER SHAFT HOUSING
3/16" STERN POST
FLYWHEEL
CENTER OF OCTURA "U" JOINT
FLOORBOARD
HEX BOLTS
DRILL PROP TO FIT 3/16" DIA. SHAFT & SOLDER
FILE EDGES ROUND
1/16" BRASS
MAPLE OR OAK ENGINE MOUNT
MAPLE OR OAK MOUNT
SPACER TUBE
1/2" x 1/16" BRASS
1/2" STOCK FILLER PIECE
COUNTER SUNK BRASS WOOD SCREWS
A THREE BLADED 2-3/4" DIA. ROUGH CAST PROPELLER IS AVAILABLE FROM COLES POWER MODELS BOX 788 VENTURA, CALIF. 93001


1/16" MAHOGANY PLY FLOOR BRACES
OVER TOP OF DRUM SEVERAL TURNS AROUND DRUM
BEGIN TAPER OF KEEL
BRASS TUBE FOR FLAG STAFF
KEEL
UNDER DRUM SEVERAL TURNS
1/16" MAHOGANY PLY DECK
STEERING LINE
1/16" TEAK
BRASS TUBE EPOXIED UNDER HEADED BLOCK UNDER DECK
SAND VERTICAL STAVES FLUSH W/ COCKPIT COAMING IN THIS AREA
GLUE TO BUILDING BOARD
1/16" PLY DECK
CURVED FILLER PIECES TO GIVE CROWN TO DECK
1/8 x 1/2" TEMPORARY BRACES (REMOVE WHEN PLANKING IS FINISHED)
HOLE FOR STEERING LINE
C-C
CROSS PIECES ADDED TO ALL FRAMES (ONES ACROSS COCKPIT WILL BE CUT OUT LATER)
REMOVE SHADED AREA BEFORE INSTALLING COAMING
ALL FRAMES APPROX 5/8" WIDE
SPACING COULD BE CLOSER WHERE TURN OF FRAMES IS GREATEST.
*NOTE: NOTCHES FOR RIBBANDS ARE SHOWN IN APPROX. POSITIONS. ARRANGE ALL NOTCHES TO MAKE "FAIR" RIBBANDS.
1/16" x 1/8" SPRUCE STRIPS GLUED TO ALL FRAMES
TYPICAL FRAMES, BERES, RIBBANDS, RIBS, PLANKING, KEEL
PLANKING FROM 1/8" SHT. MAHOGANY (1/8" x 1/4" APPROX.) RIPPED ON A TABLE SAW
NOTCHES FOR RIBBANDS ARE CUT W/ DREMEL TOOL AFTER ALL FRAMES ARE ATTACHED & ALIGNED TO BUILDING BOARD
RIBBANDS DO NOT EXTEND FURTHER AFT THAN FRAME #10.
HOMEMADE WHISTLE
BRASS EYELET FILLED W/ SOLDER & SOLDERED TO CLOSE END
APPROX. 1/4" DIA. TUBING
BRASS TUBE
PLUG INNER TUBE
HALF TUBE
STEAM SPACE
BRASS EYELET
SECTION W-W (ENLARGED)
ALIGN STEAM SPACE W/ NOTCH IN WHISTLE BODY.
WHISTLE VALVE DETAIL
BRASS PIN
BRASS ARM
PROCTOR CLEVIS END
7/64" TUBE
SOLDER
BRASS EYELET
SILICON FUEL TUBING
WHISTLE LANYARD DRAWN TO PULLEY ONCE TO SEND
TIRE VALVE STEM BODY W/ RUBBER REMOVED. THEN TURN DOWN EXTERNAL THREADS & USE TELESCOPING TUBING TO BUILD GUIDES FOR ALUM. RIVET PLUNGER. SILICON TUBING SHOULD BE SNUG ENOUGH TO TOUCH HEAD OF RIVET W/ PLUNGER IS ABOUT TO DEPRESS TIRE VALVE.
*NOTE: RIVET LENGTH MAY NOT BE SHOWN CORRECT. MAKE YOUR PARTS TO FIT.
WHISTLE LANYARD PULLEY
PROCTOR TURNERULE WASHER
SMOKE STACK STRAP
PIECE FROM CLEVIS END
PULLEY
RETAINER
PULLEY GUARD, BRASS (SLIDES ONTO CLEVIS PIN)
BUSH WHEEL W/ CORRECT SIZE BRASS TUBE. WHEEL RIM MADE FROM 1/8" THICK (3 LAYERS) MAHOGANY GRAIN AS SHOWN
STAGGER SEAMS.
METHOD OF LAYING OUT SPOKE POSITIONS
SOLDER 1/4" x 1/16" BRASS STRIPS BOLT TO DECK CROSS FRAME #2
BRASS ROD TO FIT RUNNING IN WHEEL
SOLDER
BRASS TUBE ELTRINER
BRASS SPACER
TOP SURFACE OF BUILDING BOARD
WHISTLE
TYPICAL 3/16" SQ. BRASS TUBING EPOXIED INTO CORNERS (6 PLACES)
REINFORCE W/ WOOD BLOCK
1/4" x 1" BRASS STRAPS 1-72 BRASS BOLTS
7/64" O.D. BRASS TUBE OR LARGER
SMOKE STACK IS 1" BRASS TUBE W/ FLARED O.D. CUT THREADED PORTION OFF LOWER END & SOLDER THESE 1/4" STRIPS INSIDE TO KEEP STACK TO BOILER FLU. (PLUMBING OR HARDWARE STORE)
1/4" x 1" BRASS STRIPS
SOLDER
LOUVERED SMOKE PLATE FOR 1-72 FLATHEAD BRASS BOLTS & NUTS
BRASS BACK PLATE INSIDE COAMING
SILICON FUEL TUBING
WHISTLE VALVE
ALL CRUSHY SUPPORTS 1-1/8" LONG
SEE MAPLE, OAK, WALNUT, EBONWOOD ETC.
OAK BIT
1/16" DIA. BRASS ROD
1/8" x 1/16" VERTICAL STAVES
MAHOGANY
NOTCH BIT TO SLIP OVER DECK FRAME
TAPER PLANKS TO FIT STEM
OAK STEM
3/32" x 1/16" OAK SUB RAIL
BOTTOM EDGE OF COAMING
THROTTLE VALVE
SLOW
HIGH
SAFETY & FILL VALVE
BURNER CONTROL VALVE
ALCOHOL TANK
FILL OVERFLOW
SAITO B.L.E. BOILER BURNER
BURNER FLUE
FILLER NIPPLE & PLUG
WICK
3/8" TUBE
FLAT ALCOHOL TANK
3/32" x 3/32" RABBIT
OAK KEEL
BEGIN TAPER OF STEM & MAKE THINNER TOWARD BOTTOM
L.W.L.
INSERT TAPER PLANK APPROX HERE
TAPER KEEL & STEM
SAND FRONT OF STEM TO SHAPE AFTER PLANKING
OUTER EDGE OF PLANKING
OAK KEEL
BEGIN TAPER OF KEEL
3/32" x 3/32" RABBIT
1/2" x 5/8" OAK KEEL
ROUND CORNERS
PREHEATER TANK CAN BE MADE FROM SCREW END SOLDER PLATE TO CAP.
PREHEAT BURNER SHOULD BE REMOVED WHEN BURNER IS HEATED ENOUGH FOR VAPORIZATION OF THE ALCOHOL
R/C STEAM LAUNCH
DESIGNED & DRAWN BY: KILBURN ADAMS
TRACED FOR M.B. BY: S.A. CATERSON
L.O.A. 40-1/2" L.W.L. 37"
BEAM 10-3/4" DRAFT 3-3/8"
MODEL BUILDER magazine
Plan No: 9783

Jerry Smith, Osceola, Indiana, took a few minutes off from drawing "Here's How" sketches for RCM in order to produce this fine P-39 from a House of Balsa kit. Cox TD .049, 24 oz. weight, R/S Perfect Paint finish.

The 1/2-A SCENE

By LARRY RENGER

• I have some good news and bad news. The good news is that I now have possession of most of the existing .09 and .10 engines in current production, so I can test them. The bad news is that I haven't got the time to do the work for a couple of months! Very frustrating situation to be in. The list is impressive: Webra "Speedy" with schneurle porting, ball bearings, insert head, and tuned pipe; Cox .09 Tee Dees . . . stock, Davis Diesel converted, and Cox (old) throttle conversions; Max 10 FSR with throttle and muffler; Enya .09 TV; Fuji .09 TV, Cox Medallion .09 and .09RC; Kingkat diesel; and PAW diesel. I'll wade through break-in and run tests as quickly as time permits. I am building a Pilot QB10L with interchangeable engine mounts for a flight test bed. The plane is ready to cover, at least. I'll have to use ballast to maintain overall weight and balance point for a fair comparison. Any of the above engines should perform well, but I may just have to put the Webra in a class by itself, due to the more advanced design, compared to its competitors.

Hey! There are some nifty catalogs available that you should own. First is ACE R/C's Silver Jubilee catalog . . . Yup, 25 years in the toy airplane racket. Paul Runge and now his son, Tom, have spent a lot of time dedicated to searching and providing the specialty items that the dedicated modeler needs. They are very much aimed at pleasing you, the readers of "The 1/2A Scene", by specializing in the smaller engines and models. Drop them a line to congratulate them, and send a buck along to get the catalog. That's: ACE R/C, Box 511D, Higginsville, MO 64037.

Next catalog is a specialty one which has a lot of British kits and engines. Dave Shipton of Hobby Hideaway has combined his sales catalog with a good set of diesel operating instructions. Dave imports most of the diesels made, especially the ones from the land of fog, tea, crumpets, and flat (FAI) combat models. Send your buck and a half to: Hobby Hideaway, RR 2, Box 19, Delavan, IL 61734. He also stocks Veron kits!

Third catalog is a big one from Hobby Shack. Cost is $3, but it's gorgeous, with lots of color photos. Hobby Shack doesn't advertise in **MB**, so be sure to tell 'em we sent you! The H.S. catalog is especially good because, in addition to most standard items, they import a lot of fantastically well-done kits from Japan. Their prices will have your local hobby dealer sending me nasty letters for mentioning this catalog at all. Send your dinero to: Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92708.

Neil Whitman turned out these glass-fuselage hydros. O.S. Max 10 on left, twin Astro 02 electrics on right. He's O.F.B. of WCN's.

On to airplanes: Nelson Whitman (of 125 Great Pond Road, Simsbarry, CT 06070) sent photos of a hydro model done up in two different power versions. The one powered by an O.S.10 weighs in at 34-1/2 oz. The second model gets its go from a pair of ASTRO .02's and hauls 38 oz. He did the hulls in glass, and the wings are classic built-up construction. Wing area on each is 371 in ^{2}. He has experimentally tried Robart 1/2A retracts on the tip floats. As an aside, Nelson arrived at the same model scaling equation I did, and correlated a bunch of models to verify it.

I was pleased to discover the photo of Tom Hutchinson's "1/2A Maverick" F.F. in my mailbox. Tom

Don Bekins won the high-time award at the first West Coast R/C SAM Champs. Shown here with Playboy Sr.

John Pond grinds the wing tip of Bob Von Konsky's KG into the dirt, while being interviewed by TV reporter.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• To most of the country, Memorial Day is the day of the Indianapolis 500, but in California, this weekend is an extremely popular date for contests. Among those are the Free Flight Championships at Taft, the California Pattern Champs at Madera, the big WAM control line contest, and now, for the first time, an Old Timer Radio Control Annual.

The idea of a three-day O.T. radio control contest was first mentioned to the columnist by Otto Bernhardt. It was Bernhardt's opinion that, with five California SAM Chapters devoted to O/T R/C flying, it was time the clubs put on a cooperative meet. Several people were contacted at the Fresno Free Flight Annual, with the idea of locating the R/C meet at Fresno, as this appeared to be the most centrally located area for all participating clubs.

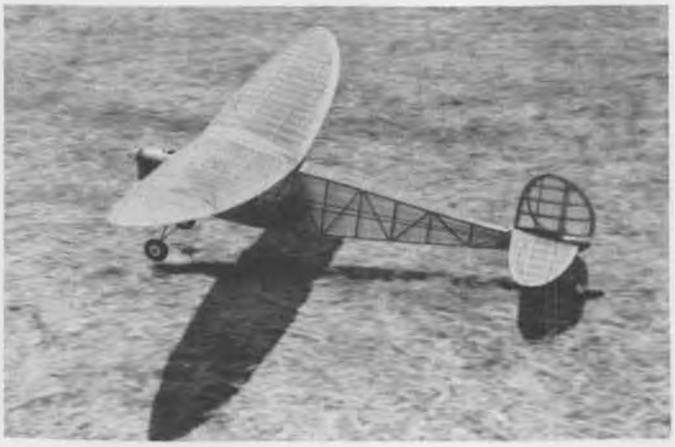
The possible conflict with the U.S. Free Flight Championships was considered, and a poll taken of all clubs. The general consensus was that those who flew free flight would attend the free flight meet, and those interested in the radio control phase would attend the proposed Fresno bash. Despite all croakings and predictions of dire consequences, this is the way it worked out with both meets enjoying excellent turnouts and success. So, this month's column will be devoted to the First O/T R/C Annual, and we will cover the old-timer activity at the U.S. Free Flight Championships in the next issue.

At the first club meeting under the tentative name of the West Coast SAM O/T R/C Association, the columnist presented a program of flying that would cover three days of activities, including a victory banquet and a MECA Collectogether (under the direction of Dick Dwyer). At this meeting, Russ James was approved as Contest Manager, PR man, and chief cook and bottle washer. This turned out to be the smartest move of all, as Russ did an outstanding job of setting things up.

One of James' first projects was the location of a field within 15 minutes of the Fresno Airport Holiday Inn. Incidentally, in reserving a block of 50 rooms, James was able to get a good concession in rates and save the boys money, as all rates are generally raised over this important holiday. James finally came up with a field located about seven miles east on Shaw St., in a picnic-type RV area known as Clovis Lakes. Here was a place you could get full hookups, let the family enjoy the area facilities (swimming, riding, etc.), while the modeler went across the bridge to fly his creations.

Actually, the field was a bit of a shock, as it had not been graded as originally proposed. As it turned out, after John LeSuer and the gang thoroughly policed the site, filled in a few campfire holes, etc., the place looked fairly presentable. Probably the biggest pain was the access to the field, as no less than three gates had to be opened and closed. After

Dave Brodsky working on the Veco .60 ignition conversion in Ted Kafer's Flamingo. Model is an excellent flier.

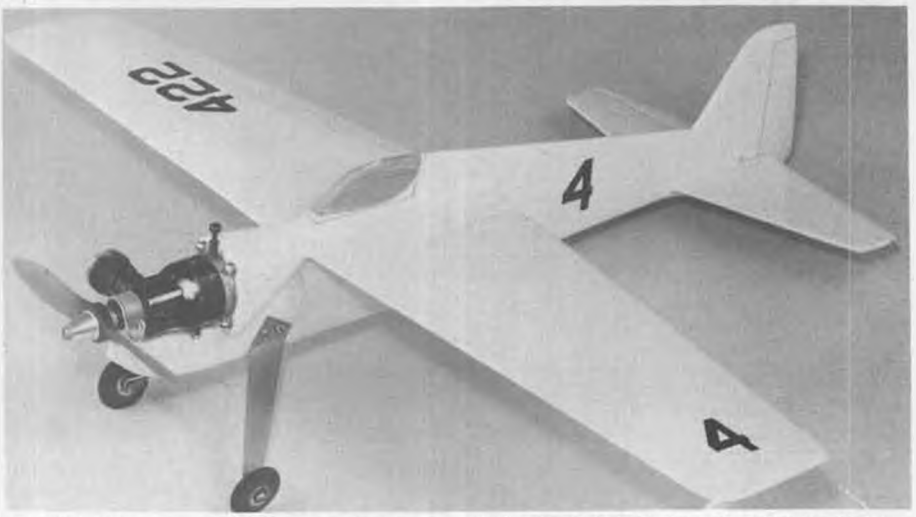


Roy "Willie" Turner's beautiful Clipper just breaking ground. Turner is running for Lt. Governor of Oklahoma.

is now kitting the design; it is available for $15.50 from RM Enterprises, 3255 NW Crocker Lane, Albany, OR 97321. The Maverick was selected as one of the NFFS top 10 models of the year. With 260 in ^{2} wing, it is one of the larger 1/2A models around. Geodetic wing, elliptical tips and stab, and a built-up pylon all show that this is a state-of-the-art model. Tom kits an FAI power model and nordic glider, too.

Third model is new from Midwest, the "Lil Quickle". It's a competition-proven control line design by Jerry Karmer and Russ Sandusky. There are sisterships, the "Plumb Crazy" and "Miss San Bernardino". Features in this model are the inclusion of formed aluminum landing gear, bellcrank, and leadout wire. For sport you could use a Golden Bee or Testors 8000, with string control lines, but to Go Fast use a hopped-up Black Widow, high nitro fuel, and solid steel wire lines or cable.

For you ancient engine freaks, there is a source for OK Cub engines and parts! Charles Briebeck, OK Engines, Box 40, Mohawk, NY 13407, has all of the old factory stock. An .049 goes for $4, an .074 for $5.50, an .09 for $6, and a .14 for $8. Each order requires $1.50 packing and shipping charge. There is a possibility that he has some .049 and .074 diesels at $12, too. The information was provided by Phil Mahoney, White Hollow Rd., RR1, Box 223, Lakeville, CT 06039.



Lil Quickie is a competition racer. Part of a new stable of fast half-A's from Midwest Products.

BEGINNERS WORKBENCH

One of the most difficult things for the beginning modeler to do is the trimming out process for a new airplane. Faced with inexperience in aeronautics, combined with less-than-perfect building skills and throwing in a small or nonexistent amount of flying time, the beginner cannot usually tell precisely where his problems come from.

Trying to cover the entire scope of trim-out is beyond the capacity of this column, but I can hit an area each month for awhile. This month, let me deal with models that snap roll, either in flight or on landing approach.

A sudden, complete loss of lift on one wing is what causes the extremely fast flip that a model does in an inadvertent snap maneuver. When you pull full up elavator, you bring the entire wing to near its stall angle. By throwing in rudder or aileron you begin to turn by raising one wing to an even higher angle of lift and reducing the other wing's angle slightly. Done properly, this makes you roll in the direction you want. If you go too far, however, the higher angle wing will stall, starting at the tip and proceeding inwards. You end up with less lift on the high angle wing, and your model flips rapidly out of its turn to the opposite side. The rotation is in a direction that aggravates the condition even more.

Note that a purposeful snap roll is quite different. There you do not bring the wing to a stall, you are using the high angle of attack at full flight speed to give an extreme lift, and thus get fastest rotation coupled with a rapid deceleration and the "tail hung out" look.

Anyway . . . what do you look for to cure a model that snaps all by itself? First, make sure that the wings have a small (3°) but equal amount of "washout" (trailing edge higher than leading edge, and no other warps); this helps make the center of the wing stall first. The model will automatically drop its nose without rolling over on its back.

Be sure the wing is well aligned to the airplane's fuselage, and that the rudder is on straight and vertical. Check the stabilizer alignment, too. A tilted stab acts a bit like a rudder, and a tilted rudder has some elevator effect. These misalignments can

Continued on page 116


Maverick 1/2A, a new "pro" kit by Tom Hutchinson's RM Enterprises. One of NFFS "10 Best" for 1978.

Here's looking at you! See text to "get picture" on this photo.

An added event at the R/C Champs was O.T. Electric Scale. From l to r, Bob Sliff (3rd), with Monocoupe; Bruce McAvinew (2nd) with GeeBee; Bob Boucher (1st) with Monocoupe.

Bob Sliff won O.T. Electric Duration with this Playboy Cabin (geared Astro 10).

some consultation, this was finally reduced to one, located on the highway.

As you can see, the contest had its growing pains, like every new item. To offset the small annoying problems, the weatherman cooperated beautifully, giving clear blue skies, small breezes, and temperatures of 89, 96, and 101 degrees. Being quite low in humidity, one simply waited in the shade for his turn to fly, and thoroughly enjoyed the meet.

As Ross Thomas said, "This is the best-run meet I have ever seen." This was due in no small part to the girls, Marge Bernhardt and Maryann Pond, who manned (womaned?) the registration and processing desk for three straight days, with no words of complaint. Even the contestants thought they were simply great.

A new system of flying, long advocated by this columnist, was instigated at this meet. Called "Poker Chip" timing, the method of flying and timing consisted of a simple procedure. Every entrant in a particular event was given one poker chip, good for one "free" timed flight. After the initial flight, it was then up to the contestant to time someone else in order to earn a poker chip for another flight. Surprisingly enough, this brought about an amazing camaraderie, as many of the hotshots (who are normally too busy to time) discovered a lot of new friends who fly against them. Best part of all, from this Contest Director's viewpoint, was that he didn't have to holler "timer" once during the three-day contest. This system is well worth considering for any major meet.

Russ James was still active at the hospitality room (provided by the Holiday Inn people), welcoming the newcomers and getting TV coverage on the meet. The writer was interviewed by reporters from CBS Channel 30 and Channel 47. All flying action appeared on the local TV stations in the news reports. We can use all of that we can get!

Not content with that, James successfully promoted the use of a new RV vehicle, which was used as the impound area for the transmitters. This was a boon, as it kept all transmitters cool, and very few radios had problems from the heat wave.

As to the flying, what can you say? Superb weather made for superb flying. Probably the most sensational performance was turned in by Don Bekins, who took 25 out of a possible 40 first place points. Amazing! Don is a real dedicated modeler, and delights in flying as much as he can. As a matter of fact, after each day's flying was over at 3:00 p.m., Don promptly went over to the water pond and started flying old-timer R.O.W. models. How about that?

Bob Boucher of Astro Flight, Inc., was on hand to put up trophies for the two electric events he sponsored. It was truly ironic that he had to pay an entry fee in the very events he was sponsoring! Nevertheless, Bob, another dedicated modeler in electric flying, took a first in the Electric O/T Flying Scale pattern event, which, for a change, was a switch from the standard duration events. This proved to be an extremely attractive event for the spectators, who thoroughly enjoyed the flying scale antics.

The winner of the Electric O/T duration event was Bob Sliff, flying a Playboy Sr. Cabin powered with an Astro 10 geared motor and an Astro 15 battery pack. The model performed well, but needed every break he could garner, as the Turner Special flown by Bruce McAvinew flew excellently. Actually, Bruce blew the meet when he was unable to get the Turner down from a tremendous height in the allotted

Al Hellman hooks up the antenna on his pretty Scientific Mercury, which placed fifth in Class B Glow. Al is active in all phases of O.T. R/C.

Marge Bernhardt (left) and Maryann Pond (middle left) did an excellent job of handling the contest paperwork. Mrs. LeSuer (middle right) and Neva Nickolau help pass the time.

time span of five minutes. He ran a minute and twenty seconds over, seriously reducing his five minute "max" flight to 3 minutes, 40 seconds. Rough to get those big floaters down!

The contest enjoyed an international flavor when Gordon Breckin of Vancouver, B.C., Canada, put in an appearance. On the third day of the meet, he was pressed into service as the Official Fueler. With his array of hypodermic needles, he quickly gained the name of "Doctor Gordon", which soon found favor among the modelers, who insisted on a "Call for Doctor Gordon". More fun!

The contestant traveling the longest distance was Roy "Willie" Turner, coming all the way from Oklahoma City in his very swank motorhome. Willie is running for Lt. Governor in the Oklahoma primaries and, of course, the boys had a field day teasing Turner. At the Victory Banquet, Roy showed he was a great sport by delivering a typical speech that was a speech to end all modeling complaints. It was indeed hilarious, and we are so proud of Willie (as he is affectionately called by Phil McCary) that we hope he makes it to Lt. Governor.

Man! There won't be any trouble with flying sites in Oklahoma from then on!

Another item promoted by Russ James was the invitation to Dick Dwyer to put on a Model Engine Collectors Association (MECA) "Collectogether". Staged in the same room as the Victory Banquet, this was thoroughly enjoyed by collectors and modelers alike. Dwyer had a flock of prizes for the best displays, and darn few guys went home disappointed. The only gripe Dick had was that he failed to meet the guarantee on the bar by 25 dollars. Whassa matter, men? Trying to stay sober for those hot trades?

As previously noted, the Victory Banquet was held on the second night, and trophies awarded for the first two days of flying. Thanks to Otto Bernhardt, who procured the trophies, Willie Turner, who donated many prizes, Phil McCary and Larry Clark, who promoted merchandise, and especially Bill Cannon, who donated a Cannon two-channel miniature R/C set, the meet didn't lack for incentive to compete.

Seems like everyone got something. Even Joe Bridi, stopping over from a successful second place in the California Pattern Championships, showed up for the dinner and promptly won the door prize of a Buzzard Bombshell. Now we have another hot dog to worry about! We're gonna gettum all yet!

Financially speaking, the contest came within 40 dollars of breaking even. We could cut that down even more if we could locate the two who didn't pay for their plate at the dinner. We are open to receiving an anonymous letter, enclosing $16.80 ($8.40 a head), to help reduce the deficit! Don't be bashful, fellows, send it in!

Based on the success of this meet, a bigger push will be made next year to get out better publicity. Despite all the notices sent out, Barnet Kernoff claimed, "This was the best-kept secret of 1978!" Hopefully, with the new West Coast SAM Vice President, Jim Adams (a shoo-in, as he is unopposed) directing things, a few of the tasks could be better delegated, as the writer found himself swamped with work. Also, Russ James should again be contacted, as he did an outstanding job of PR work with the little he had to work with. If there is such a thing as a learning curve in staging these contests, next year should be a real winner!

Might also mention that Jim really has his work cut out for him, as the contest calendar is getting badly overcrowded. With five O/T R/C SAM Chapters, three SAM F/F Chapters, and several independents, steps will have to be taken to coordinate the overall contest picture. The R/C association is pretty well organized now, and integration of dates with the free flight groups should be the first order of business.

Thought I would never get around to listing the winners, huh? Well, here they are, along with the models they used:

SATURDAY, MAY 27
CLASS C IGNITION

1. Don Bekins (Playboy)	1041
2. John LeSuer (Lanzo)	668
3. Karl Tulp (Lanzo)	600

Don Bekins' Air Trails Sportster on GeeBee floats. Overzealous S-turns to lose altitude on landing approach resulted in an unscheduled landing in trees bordering lake!

How do you win a contest when you've just broken your hip? Have your buddy fly your model, that's how! See text.

O.T. R/C at its best. George Dickinson scratch-built this Quaker from M&P kit plans. Power is a Dennymite. Kraft radio.

4. Roy Turner (Clipper)	467
5. Phil Bernhardt (Ehling)	421
CLASS A GLOW	
1. Don Bekins (Zipper)	962
2. Bill Squire (Zipper)	836
3. Ross Thomas (Playboy)	831
4. Bob Sliff (Playboy)	134
5. Al Hellman (Guff)	121
CLASS C. GLOW	
1. Bob Sliff (Playboy)	1038
2. Ed Solenberger (Challenger)	974
3. Bill Squire (Playboy)	870
4. Don Bekins (Playboy)	852
5. Ross Thomas (Playboy)	797
ELECTRIC DURATION	
1. Bob Sliff (Playboy Cabin)	975
2. Bruce McAvinew (Turner Special)	653
3. Bob Boucher (Buccaneer)	596
SUNDAY, MAY 28	
ANTIQUE CLASS	
1. Don Bekins (Lanzo)	1499
2. John LeSuer (Lanzo)	1402
3. Karl Tulp (Lanzo)	1240
4. Ted Kafer (Flamingo)	1236
5. Bob Sliff (Ehling)	844
CLASS A-B IGNITION	
1. Don Bekins (Playboy)	786
2. Bob Sliff (Playboy)	609
3. John LeSuer (Clipper)	497
CLASS B GLOW	
1. Ross Thomas (Playboy)	906
2. Bob Sliff (Playboy)	850
3. Ed Solenberger (Challenger)	770
4. Don Bekins (Playboy)	754
5. Al Hellman (Mercury)	422
ELECTRIC FLYING SCALE	
1. R. Boucher (Monocoupe)	
2. B. McAvinew (Gee Bee D)	
3. B. Sliff (Monocoupe)	
TEXACO	
1. Ross Thomas (Lanzo)	55:19
2. Don Bekins (Lanzo)	45:58
3. Bob Sliff (Ehling)	24:04
4. Karl Tulp (Dallaire)	23:31
5. Bob VonKonsky (Lanzo)	23:16
.020 REPLICA	
1. Don Bekins (Playboy)	925
2. Ed Solenberger (Strato Streak)	707
3. Jack Jella (Clipper II)	667
4. Ted Kafer (Playboy)	550
5. Al Hellman (Strato Streak)	503
SWEEPSTAKES	
1. Don Bekins	25 points
2. Bob Sliff	19 points
3. Ross Thomas	14 points

Needless to say, with such a tremendous performance by Don Bekins, he easily won the high-point award for Sweepstakes, the two-channel mini-Cannon set. A real great prize!

Gordon Breckin, of Vancouver, Canada, was in charge of allotting fuel to the .020 and Texaco ships at the R/C Champs. Here he fuels up Ted Kafer's .020 Playboy.

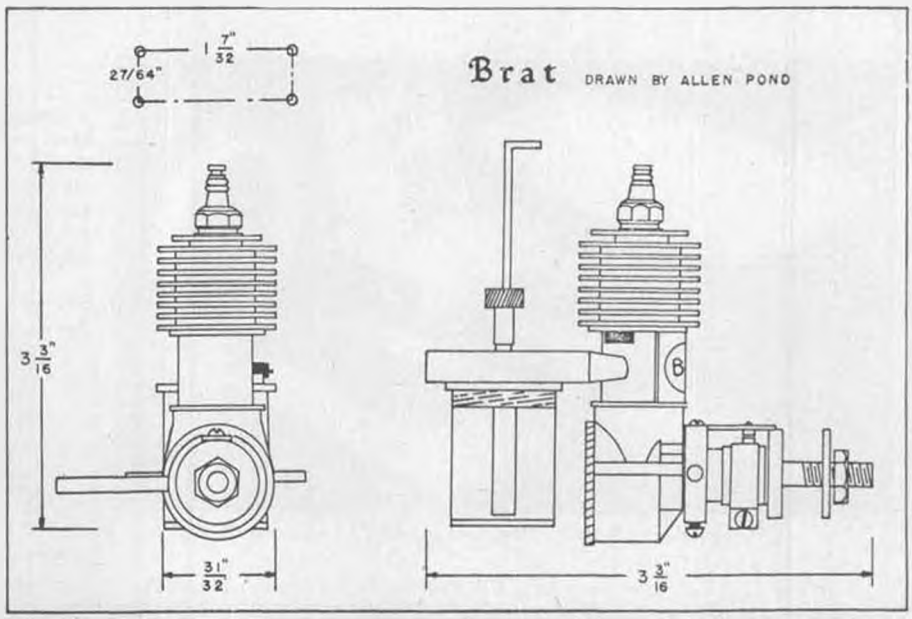
MOTOR OF THE MONTH

It was 1937 in the Los Angeles area, a real hotbed of model aviation at that time, and the precision model was king. With the large soarer unnecessary (in direct comparison to the huge floaters being produced on the East Coast), the popularity of small models increased.

Small models had obvious advantages: low cost of construction, quicker to build, easy to transport, and best of all, they didn't break as easily! It was then that Jack Keener, living in Los Angeles at that time, produced a fairly reliable engine of approximately .14 cu. in. displacement.

Although the claim of easy starting was made, this was only in comparison to the other small en-

Continued on page 136



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Kit B-27
Length 30" Beam 11"
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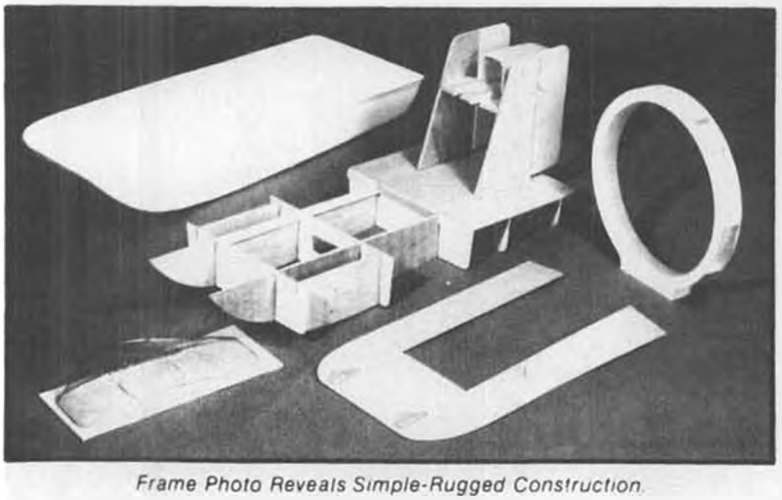

Frame Photo Reveals Simple-Rugged Construction

About The Kit:

Designed for 2 channel R/C or tether control and .15 to .35 engines. Maintaining top quality and simple construction. All Balsa and Plywood parts are accurately die-cut, with precision vacuum formed Plastic hull and cabin. Hardware package including R/C hardware. Full sized Plans, plus Decals for Sport model or Coast Guard version.

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- ☐ Catalog of entire line of airplane, control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50¢ enclosed
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- ☐ "Secrets of Control Line and Carrier Flying" including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions 25¢ enclosed

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LIGHT WEIGHT

POWER

SPEED

BANTAM MIDGET

BY NOVAK ELECTRONICS

Finally, you can purchase a servo that is light enough to fly a 1/2A airplane, and strong enough to fly a big .60. NOVAK ELECTRONICS proudly announces the introduction of the BANTAM MIDGET SERVO. By working closely with Dick Rehling, of D&R Products, we have been able to produce a servo that has the power, strength, speed, and durability to perform in any type of airplane. These new servos use the highly advanced Signetics 544 IC, offering internally regulated power supply, dynamic braking, linear ramp timing, and an exclusive temperature-compensated dead-band circuit. Servo reliability is further enhanced by the use of the Clarostat conductive plastic potentiometer and external silicon drive transistors.

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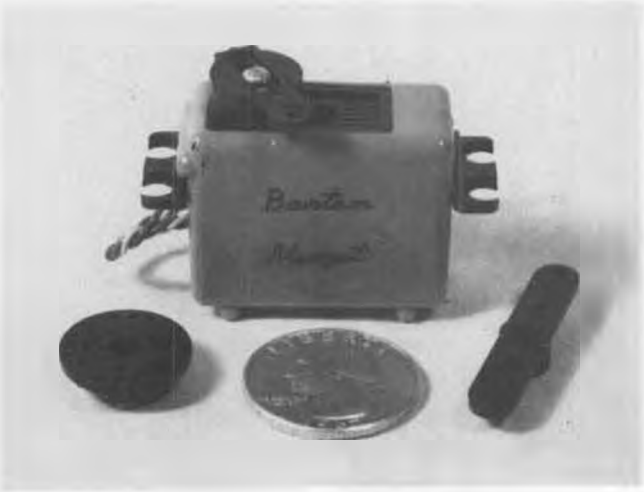
Choose one of our colors to mix or match with your existing equipment. Tell us your radio manufacturer, and we will supply servos, battery packs, and switch harnesses with the proper plugs and specifications to match your system.



Actual Size

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SPECIFICATIONS FOR BANTAM MIDGET

TORQUE: . . . . . 21 oz. in.
TRANSIT TIME: . . 0.3 seconds/100 degrees
SIZE (inches): . . . . . 1.125H x 0.6W x 1.43L
WEIGHT: . . . . . 24 grams, or .846 ounces
OUTPUTS: Rotary wheel, arm, adjustable arm. Compatible with ALL digital radio systems, except Pro Line.

BANTAM MIDGET, Assembled	$29.95
BANTAM MIDGET, Kit	26.95
Battery, 100 MAH, Square (35 gms, 1.2 oz.) . .	$15.95
Battery, as above, kit	14.95
Battery, 250 MAH, Square (60 gms, 2.1 oz.) . .	15.95
Battery, as above, kit	14.95
Battery, 450 MAH, Square, (100 gms, 3.5 oz.) .	15.95
Battery, as above, kit	14.95
Battery, 450 MAH, Flat, (100 gms, 3.5 oz.) . . .	15.95
Battery, as above, kit	14.95
Switch Harness	$7.95
Switch Harness, Kit	6.95
Switch Mount, Bulkhead type	1.00
Tray, Bantam Midget, Vertical	1.00
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WHEN ORDERING, PLEASE SPECIFY YOUR BRAND OF R/C SYSTEM AND COLOR PREFERRED (WHITE, BLACK, RED, BLUE, YELLOW, ORANGE, IVORY).

COD, Shipping, Handling, and Insurance	$2.50
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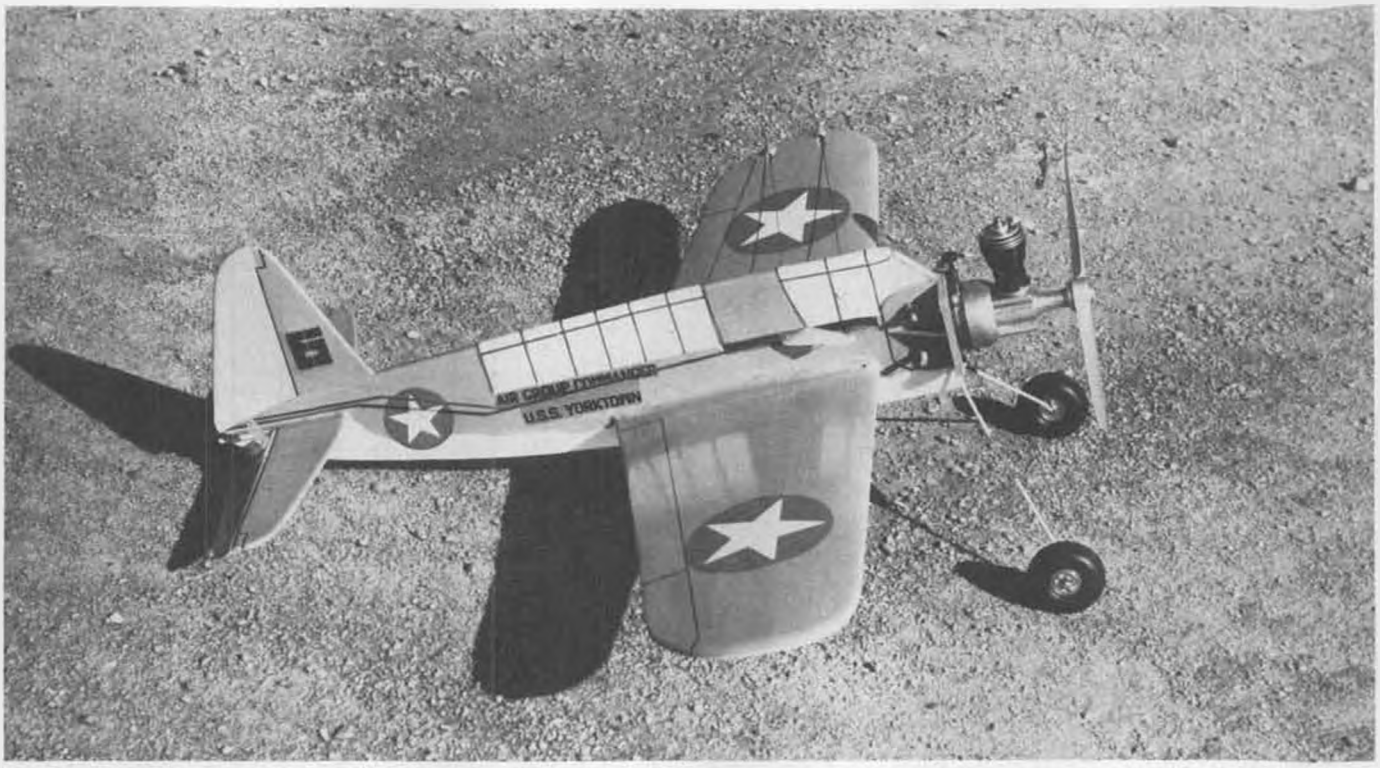
FREE FLIGHT AND CONTROL LINE

It's hard to believe that this is only a 1-inch scale (32-1/2" span), Tee Dee .049 powered free flight . . . until you realize that ace modeler, Jack McCracken built it. The 14 oz. Beechcraft 17G has had numerous stable flights (with pendulum ailerons), taking off from smooth surfaces, or hand launched over grass with the gear manually retracted. Photo by Fernando Ramos.



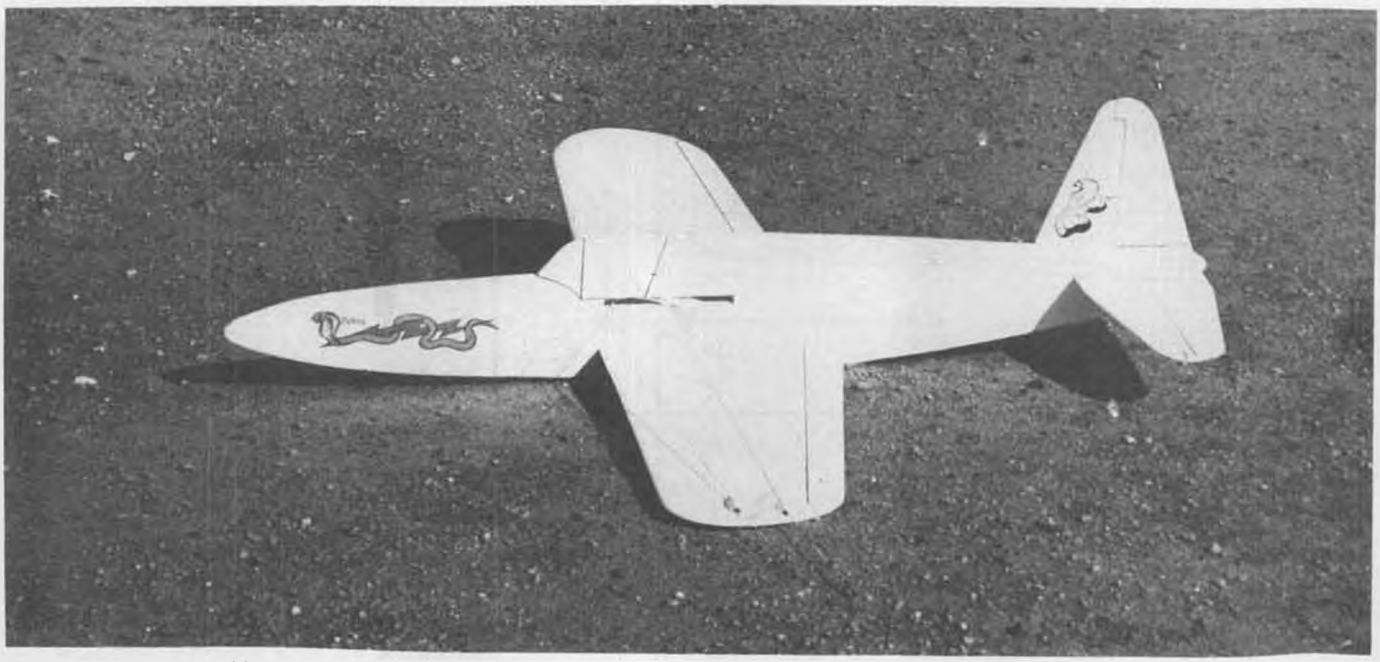
The Kingfisher makes an attractive 1/2A model. The Kingfisher is basically the same airplane as the Cobra, except that the nose has been sawed off and replaced with engine and landing gear, and the rudder has been cut and offset to the right.

COBRA / KINGFISHER WHIP/ U-CONTROL

By DAVE KINGMAN . . . An excellent project for the young beginner in modeling, the Cobra is quiet and takes very little space to fly. The Kingfisher is the very logical second step. All very basic. A 2-for-1 plan.

• It's no disgrace to crack up a gas model, but repairs cost time and money. Unsatisfactory first flights discourage many from pursuing control line model training to a succcessful end. Understanding why some novices fly models into the ground should help others avoid doing the same.

Nervousness, due to fear of breaking the model, is a villain. Some newcomers to control line flying say engine noise contributes to nervousness. When they have completed several laps without a crash, most want to end first flights because they are dizzy, or just want to quit while they are ahead. Practice will



The Cobra is an easy and inexpensive model for learning the basics of control line flying. One thing's for sure: the neighbors aren't going to scream and yell because of the noise! Once whip-flying has been mastered, the Cobra is easily modified to the Kingfisher configuration.

change that, but we are concerned with the very first flight attempts now.

Is there a simple, quiet control line model that can be landed safely whenever the operator is ready? Consider the Cobra. Instead of having an engine, it is whip-flown by muscle power. A typical U-Control system is installed. Eighteen-foot control lines leave the handle, run through an "eye" loop at the tip of a nine-foot bamboo pole, then attach to leadouts at the model's left wing tip.

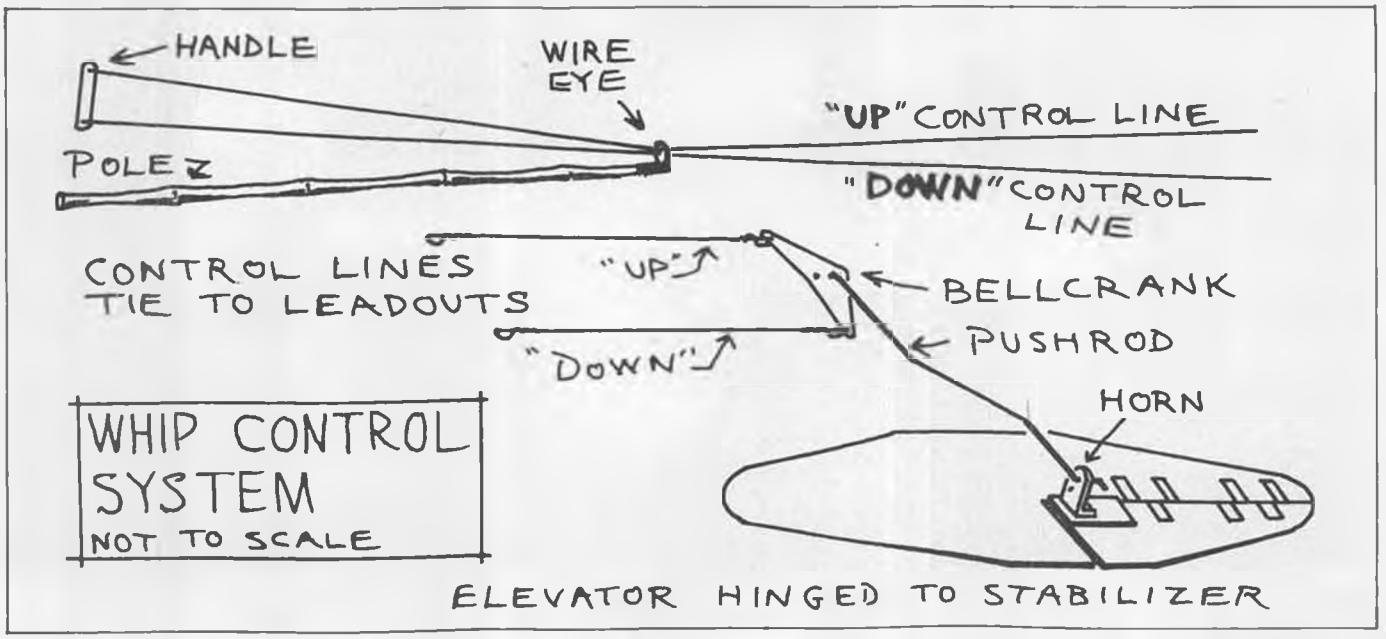
When the flier raises the pole with one hand, the model is pulled off the ground. His other hand holds the control handle in the neutral position as he turns counterclockwise to start the flight. The Cobra follows the pole and assumes flight attitudes regulated by the control handle. Wrist movements bringing the top of the handle back towards the flier (up-elevator control) will cause the Cobra to zoom upwards; pushing the top of the handle towards the model (down-elevator control) will produce a dive. The first goal of whip-powered flying is level flight.

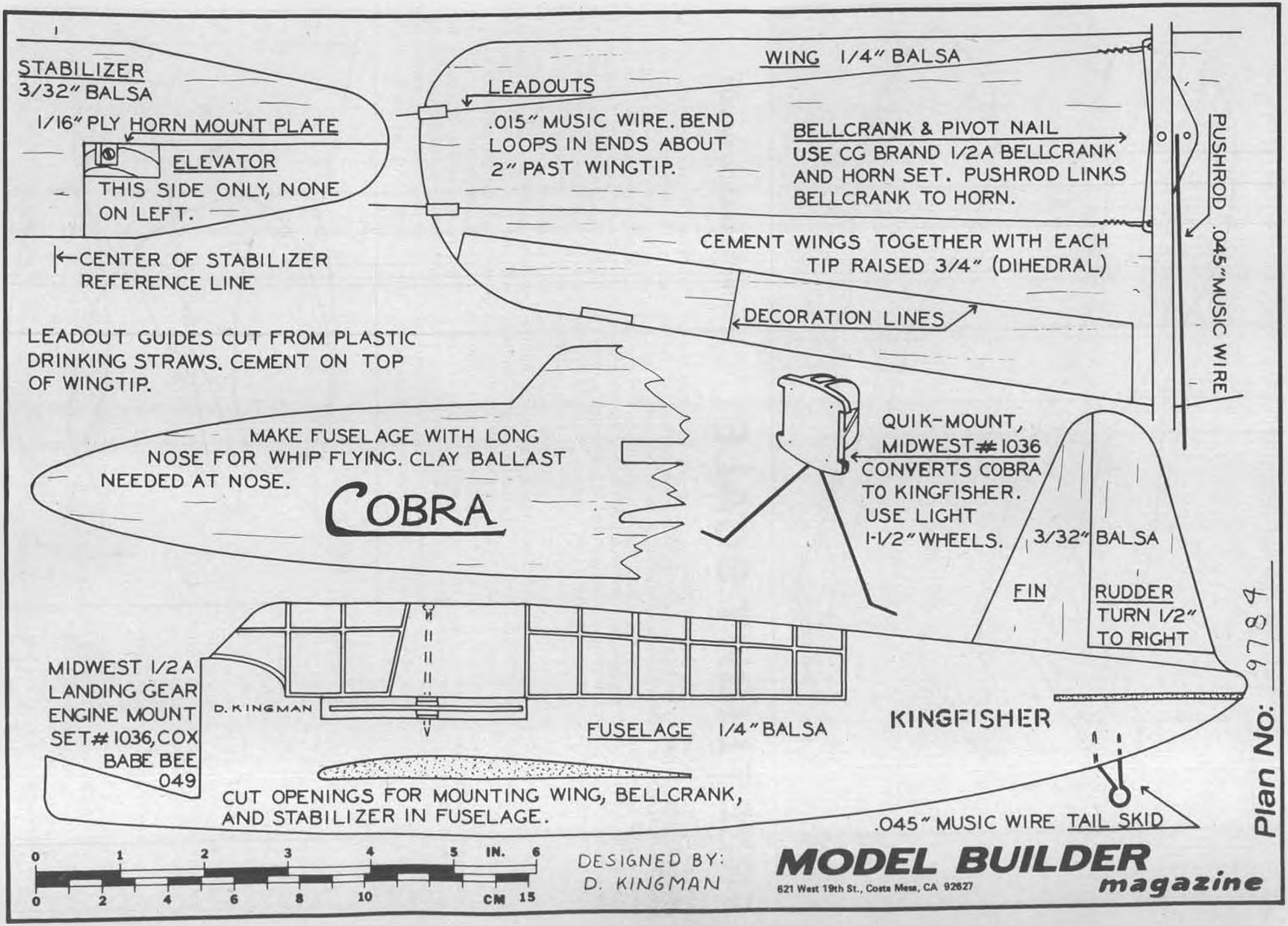
Nervousness should be reduced, because returning the pole to the launch position will prevent the model from hitting the ground. No engine noise means calmer nerves for the flier and his neighbors. A dizziness problem? Not when a flight can be safely ended any time the pilot stops turning! With increased proficiency, longer control lines can be used, and a friend can hand launch the Cobra into level flight. Whip flights are started with the control handle towards the bottom of the pole. When the plane is flying level, the handle can be moved towards the tip to allow a larger diameter flying circle. Lowering the tip of the pole also provides a larger circle, as the Cobra moves farther from the flier . . . and closer to the ground!

The author's four-year-old son, Guy, getting ready to fly the Cobra. The pole is held in one hand, the control handle in the other. Note the glob of clay on the model's nose.

At first, we used No. 8 cotton thread for control lines. They worked OK, until one flight when the wind started jerking the model around. The lines broke first, followed by the model. Heavy thread is probably strong enough for slow, smooth flying. Sig brand dacron flying lines, or lines supplied with ready-to-fly plastic gas models, are recommended for flying both whip models and .049-powered sport gas models. Your control handle can be as simple as a toothbrush (minus bristles), cut to a 5-inch length. Tie a control line through a hole in each end, and you're in business. If you buy a handle, choose a light one for

Continued on page 131





FULL SIZE PLANS AVAILABLE – SEE PAGE 144

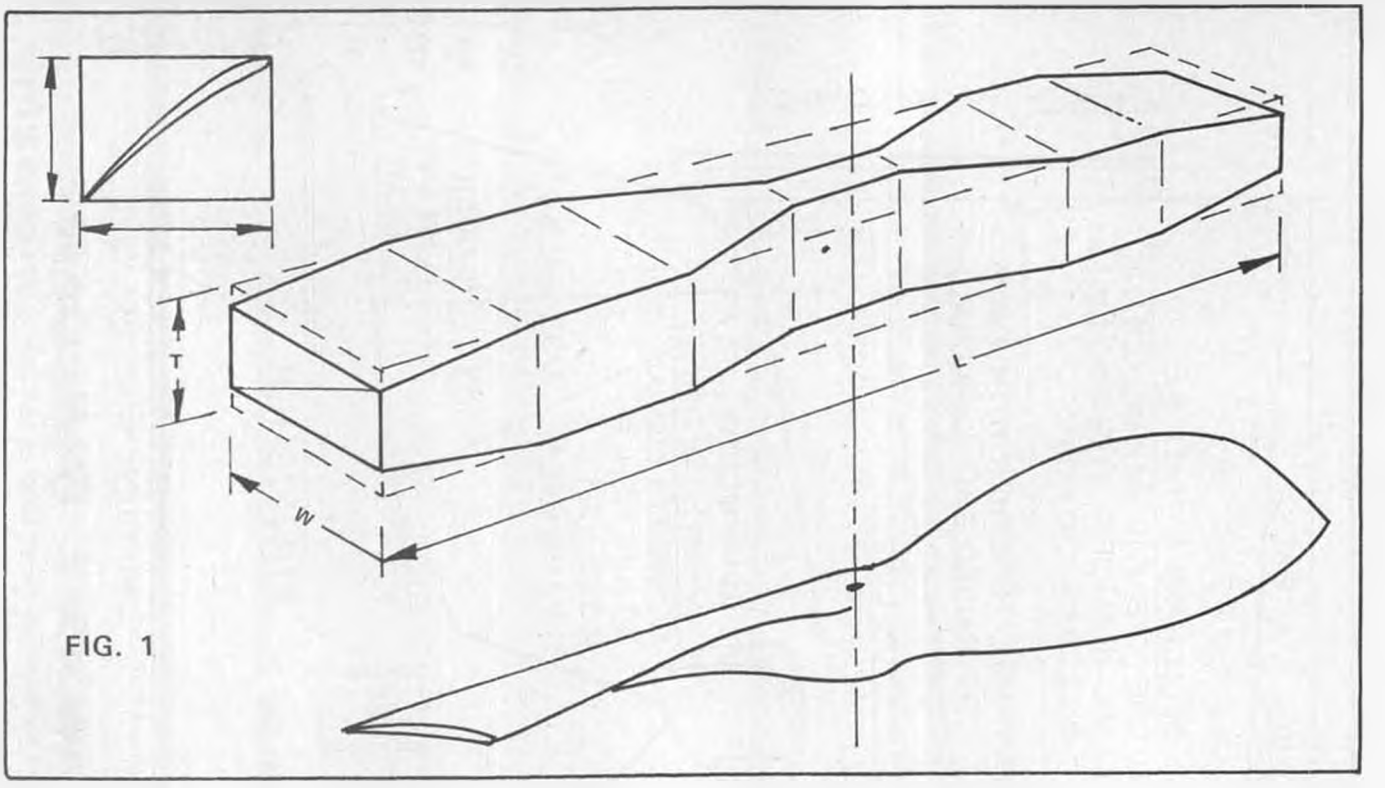


FIG. 1

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Well, I have finished Flyline's Heinkel 100D, and have had a chance to test-fly it. The kit really makes a neat-looking model. However, I have one quick hint before describing its flying characteristics. When the model was painted with Floquil, I masked the entire canopy. I didn't want to go through the hassle of carefully masking the canopy frames, so that they could be painted at the same time as the rest of the model. Instead, I did the following, which I found to be much easier and neater. I bought some 1/8-inch striping tape, the kind R/C'ers use to pinstripe their models. I cut several lengths, much longer than required, and stuck them lightly to the side of a clean bottle. I then lightly sanded them with some very fine sandpaper, and painted them with the Floquil paint. When dry, they were put into place and trimmed very carefully. One word of caution: the tape curls very badly, so remove it from the bottle slowly and carefully. Make certain that the strips of tape are long enough to handle easily. I think you will find this much easier than masking the canopy frames prior to painting.

George James had built and completed his Heinkel some time before I did, but, fortunately for me, he didn't have the time to test his. Therefore, he and I had a chance to fly together. This gave me more data to pass along as well as proving interesting to see how two similar kit-built models performed during the flight tests. My model weighs 1.25 oz. without rubber. George had not weighed his, but the weight was comparable. I prepared an 18-inch loop of 1/4-inch Sig rubber. For testing, this proved to be satisfactory. The balance point was checked, and it was found that the model balanced perfectly without the aid of any additional ballast (Incidently, there is no balance point marked on the plans. I used the front main spar for my point of balance). I put about two hundred turns on the motor and hand-launched it over the proverbial tall grass. The Heinkel took off straight as a die, and all looked well; then it suddenly banked off to the right as the power ran down. George's first flight was identical to mine. After several adjustments, we came to the conclusion that both the wing and tail were set at the same angle of incidence. If you study the plan, you will see that this is the case. The model would porpoise in flight, which is usually an indication that there is no angular difference between the wing and the tail. George put some up elevator on his model; the difference in the flight pattern

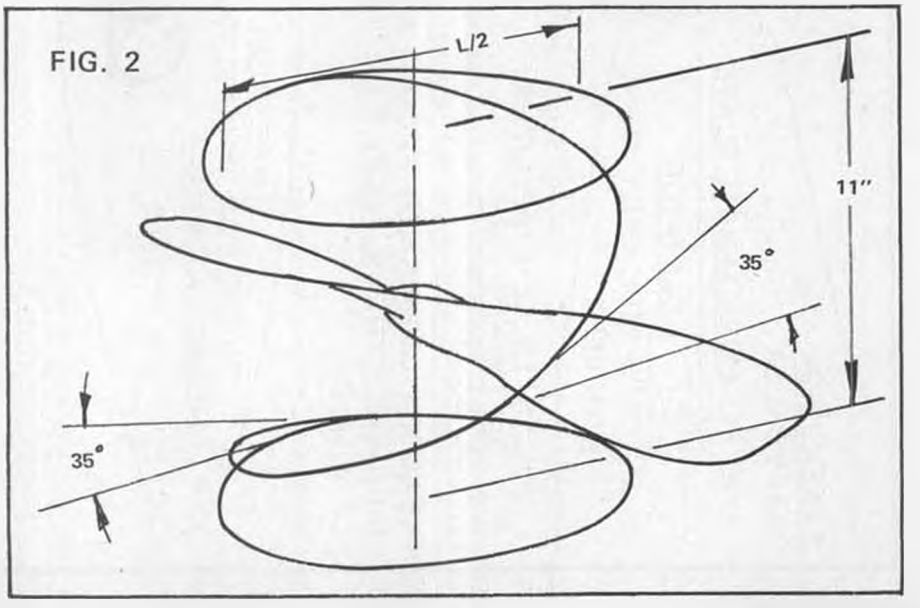


FIG. 2

was unbelievable! I did the same with mine, along with a bit of left sidethrust, and the flight was just super.

I personally feel that the plastic prop provided in the kit is not very efficient. I am going to carve one with the same diameter, but with more pitch and blade area. This will require more rubber, which I want. For a hand launch, 1/4-inch rubber was OK, but for an R.O.G. takeoff it didn't provide, at least in my case, enough power to give the model much altitude. However, for a sport model, a 1/4-inch loop is enough power. The Heinkel, like the rest of Flyline's outstanding kits, will give you many hours of enjoyable pleasure, both in building and flying.

While still on the subject of Flyline, if any of you have purchased one of their Curtiss Robin kits recently, and found that the plans do not fit the printed parts, don't write nasty notes to the manufacturer. Seems as though Flyline's printer took it upon himself to make one batch of Robin plans to a different scale than asked for. The error wasn't discovered until several kits were sent out. If yours happens to be one of them, just drop Flyline a note, or send them your incorrect copy of the plans, and they will gladly send you the correct set. They apologize for any inconvenience caused by this.

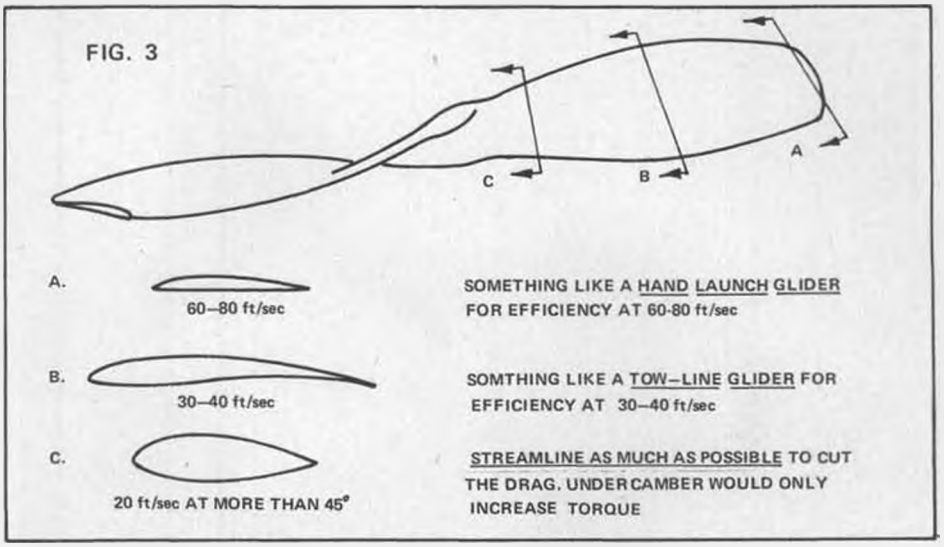


FIG. 3

Fulton Hungerford certainly needs no introduction, as far as we scale modelers are concerned. Fulton, for the past several years, has manufactured spoke wheels of all sizes and styles, for all of our modeling needs. However, some of you might not be aware of some of his other modeling contributions that have helped many of us get more out of this hobby of ours. Over the next several months, I will be passing along some of this man's great ideas and experiments, which I hope will prove useful.

The first of these deals with propellers. You have probably read many articles which deal with propellers, but how many of you have really put the information into actual use? There is no doubt that competitive free flighters who fly Wakefield and unlimited rubber models know a tremendous amount about propellers. How about the average scale modeler? Too often, it is so much easier to use the plastic prop that comes with the kit, than to carve or laminate one for the model you have just completed. Yet, in order to be competitive, the propeller is one of the most important considerations. Where does one start? What size block should be used? What size block gives what pitch? Fulton sent me the following material some time ago; hopefully, it will be of some use the next time you have to carve a prop.

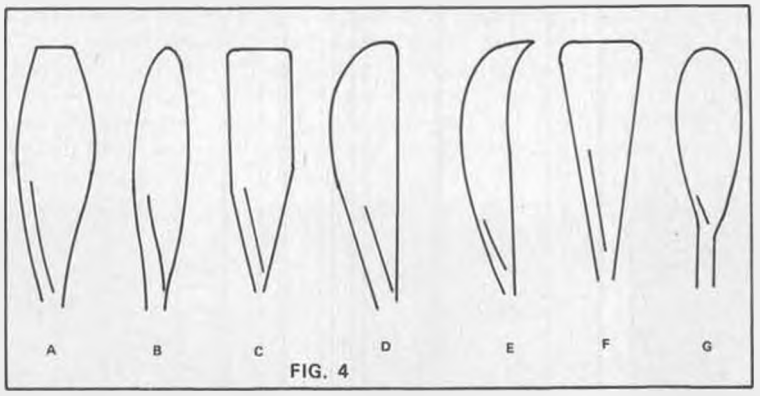


FIG. 4

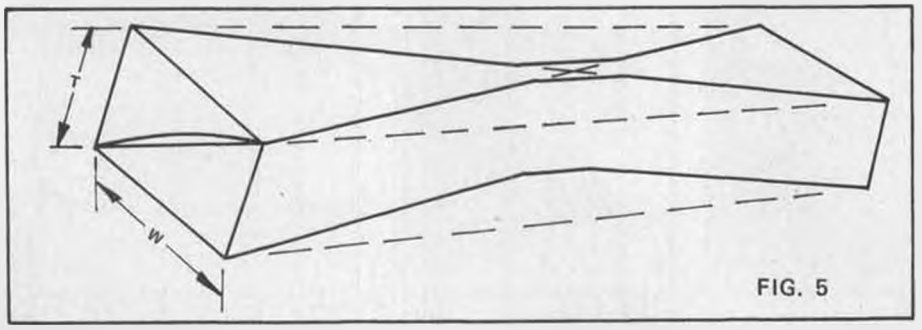


FIG. 5

TABLE I

T	W	Pitch Angle at Mid-Blade	Prop Blank Dimensions
1	1	45	1 x 1
1	1.04	44	1 x 1-1/16
1	1.07	43	1 x 1-1/16
1	1.11	42	1 x 1-1/8
1	1.15	41	1 x 1-1/8
1	1.19	40	1 x 1-3/16
1	1.23	39	1 x 1-1/4
1	1.28	38	1 x 1-1/4
1	1.33	37	1 x 1-5/16
1	1.38	36	1 x 1-3/8
1	1.43	35	1 x 1-7/16
1	1.48	34	1 x 1-1/2
1	1.54	33	1 x 1-9/16
1	1.60	32	1 x 1-5/8
1	1.66	31	1 x 1-11/16
1	1.73	30	1 x 1-3/4

Take a look at the sketch in Fig. I. Assume that you wanted to carve a prop from a 1 x 1-1/2 x 10 block of wood. If carved in the conventional manner shown in the sketches, and referring to Table I, you would get a 34° pitch at the center of each blade. Now, with each complete revolution of the prop, the center of the blade would describe a helix with a diameter of L/2, assuming zero slippage (see fig. 2).

The formula for pitch is:

π x L/2 x Tan. of Pitch Angle. In this case, 3.1416 x 5 x .67 = 10-1/2 in.

Continued on page 120

Big John Ballard changing engines in a Rat at the '77 Nats. Looks like an HP .40.

Jed Kusik is on the U.S. team competing at the World Champs, in Woodvale, England.

Doss Porter getting ready for his first (and last) combat match at the '77 Nats.

Control line

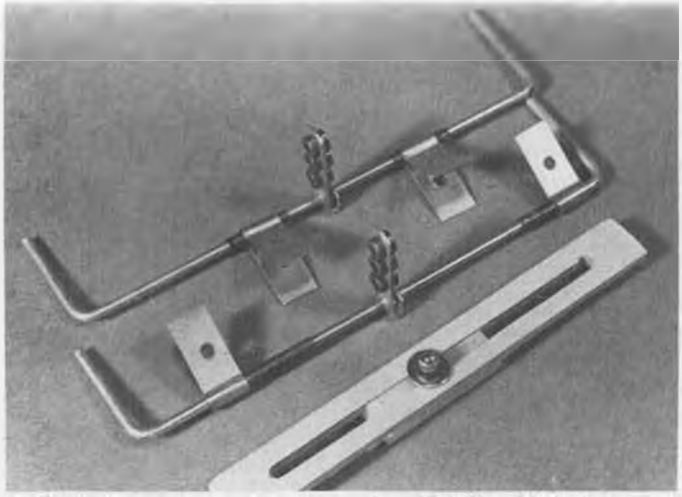
By "DIRTY DAN" RUTHERFORD

• Having always been a bit of a rabble rouser, I am almost ashamed that the situation that exists within the pages of **MB**'s "new look" has, until now, escaped mention in the C/L column.

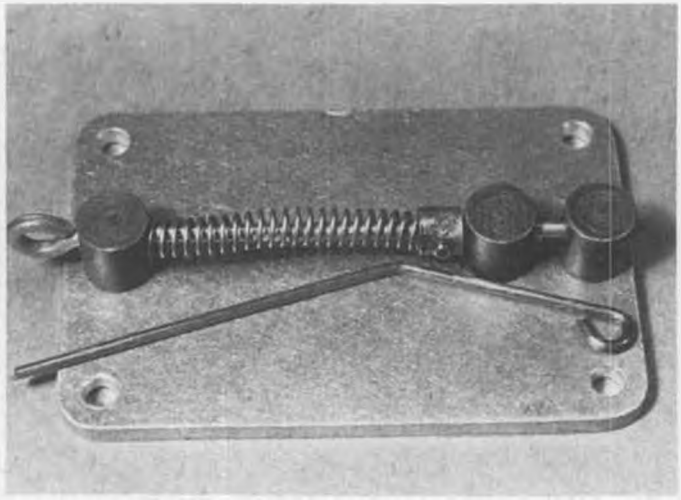
The situation is that the C/L column is being stuck in the very back of the magazine. Why, you might ask. Indeed, I asked myself the same question. Lots of times. All of the usual answers came to mind, a few of which can't be printed, but then it hit me. The REAL reason the C/L column is way back here, dividing the beginnings of articles and the "continued from page" stuff, is simple. After all, everybody knows that any form of entertainment, whether it be a THC (Too High Concert), TV show, nightclub act, or whatever, is divided so as to build up to a climax, closing out on a big note, leaving the entertained . . . entertained and ready for more.

Magazines, being basically an entertainment medium, are structured in much the same way. The table of contents is a real drag, "from Bill Northrop's workbench" is primarily a social calendar, except when an error is made in the previous issue, and then it is a catalog of apologies. Next is Eloy's "Over The Counter" section, which starts to get interesting. Then into the R/C stuff, and so on down the line (*down the line? wcn*). There are highs and lows, but most important of all, the magazine is leading to the kicker, the climax, the Big Finish . . . the good ol' C/L column.

Gee, now that we are here, and the whole burden of making this issue big is on my shoulders, I can't think of anything really smashing to write about. However, there is hope, in that more than one of you (23 by actual count) have shown a preference for the usual trash thrown into the **MB** C/L column, so we'll just go



Pre-bushed flap horns, and plywood-and-nylon adjustable leadout guides, from Control Specialties.



Spring-loaded launching stooge, from Control Specialties. See text for address.

right down that same path one more time. In just a few lines. First, however, I want to say that I do like **MB**'s new look, and still find it to be the most worthwhile of all modeling magazines. Each month I read a huge stack of modeling magazines from all around the world. **MB** is still the best; please don't tell Unca' Bill I said that, though.

LAST MONTH

There should have been a VMP (Very Mysterious Picture) in last month's column. Remember, it was a piece of shiny wire all bent up and funny looking? If you happened to have figured it out, why didn't you write in with the Big Answer? The prize was something really outrageous, a lifetime supply of the famous Brakurphingur Custom propellers, as used by the equally famous Bob (Stunt) Hunt.

The fact that there was no announcement that this was indeed a contest shouldn't bother you . . . it sure doesn't bother me much.

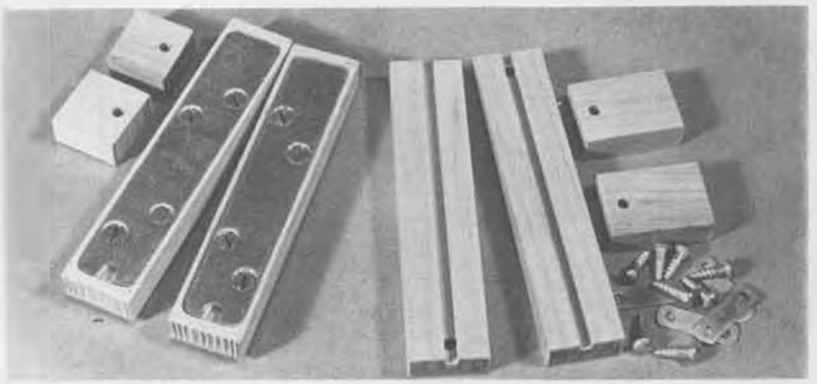
This month's column features yet another picture of that strangely-bent piece of wire, only this time it is fairly obvious that what you are looking at is a "stooge" for launching C/L models when no helper is about. Pretty neat, isn't it? Look closely and you'll see a lock, preventing accidental release, a guide for the release line, etc. Also note that as the release line is pulled, tension on the trigger is increased, until when it finally lets go, it does so very cleanly and positively.

Do Not write to me asking for details on making one of these things. I have no sketches or drawings of it. In fact, I've got one right here in front of me and couldn't make a duplicate of it, so I certainly couldn't help you do one. I just thought it was a neat thing that you ought to see.

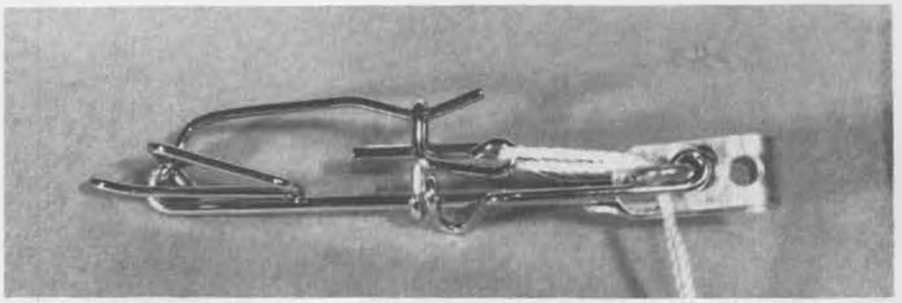
Incidentally, the stooge was made by Obie St. Clair, of Eugene, Oregon. He is the guy who (get ready now) *really* invented C/L flying. I'll let you think about that one for a bit. And, yes, I will certainly read all of the letters saying, "Jim Walker invented C/L flying, stupid", that are bound to come raining out of my mail box for months to come. I can back up what I say, can you?

FOR A STOOGE YOU CAN BUY

Several of the pictures in this column show off just a few of the things being made available to the serious C/L and R/C fliers, and one of them just happens to be a launching stooge. OK, so you R/C guys don't have any use for the stooge, but how about the nose weight/extension shaft pieces, turned from brass? Developed primarily for the C/L Stunt fliers, they might find a home in many an R/C model. Same goes for the maple landing gear blocks, either the standard type with strap retainers for the torsion gear, or check out the high-zoot version with the aluminum plate holding the gear legs in. The plate is retained by countersunk 4-40 screw which go through the plate, maple block, and then into 4-40 blind nuts. Nothing left to chance here.



Other goodies available from Control Specialties include pre-notched maple landing gear blocks, both with and without the aluminum retaining plates.



In case you're not very fast, that bent-wire contraption in last month's column was a launching stooge. Here's another view of it.

Still more goodies from Control Specialties are these nose weight/extension shaft pieces, turned from solid brass. Just right for that tail-heavy model . . . C/L or R/C.

Rounding things out are the adjustable leadout guide and the prebushed flap horns. Very nice stuff, and all of it is available from the folk hero of the Stunt circles, Bob (Where Have I Heard That Name Before) Hunt. Write to him at Control Specialties, 205 Wood Ave., Middlesex, NJ 08846. Ask for the catalog, you'll find these and a lot of other neato things designed to make your C/L (and R/C) modeling a lot easier.

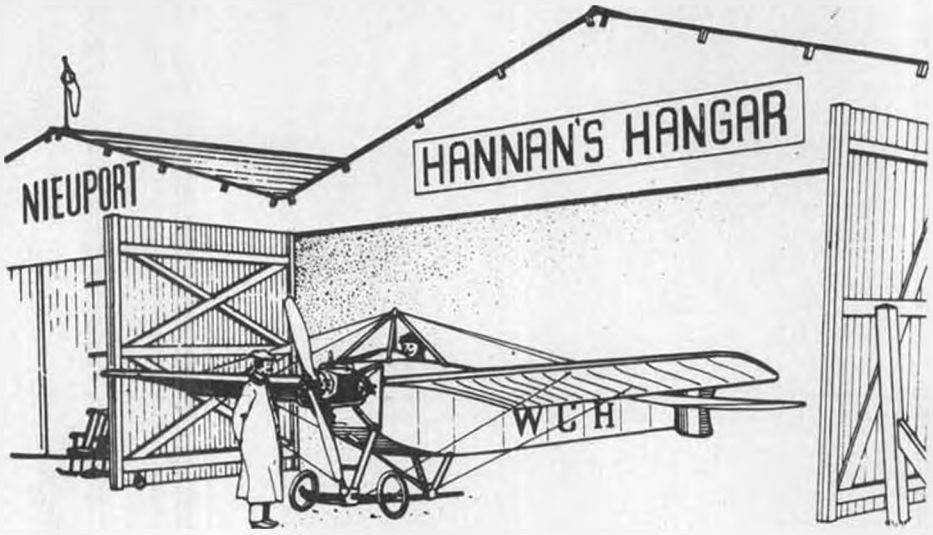
Although The Hunt will take your order direct, Bob is selling to Local Hobby, so if they are really sharp, some of his stuff may already be close. One way or the other, check it out.

SHADOW RACING

That's the name of the company. I assume it is Walt Perkins, who is the man behind the shadow, or is it Walt who is Racing his Shadow? In any case, Shadow Racing, 1100 S.E. 28th St., Ocala, Florida 32670, now has a printed flyer listing all (or most) of the products they have available, especially for that select group of the most serious C/L Racing fliers who exists, the FAI Team Race Freakos.

Although the TR guys are very into what they are doing, unfortunately they are almost a zero in this country, with TR being the big thing way across the oceans. This makes getting the necessary bits 'n pieces

Continued on page 130



John Novak, Chester, Va., took this 1945 photo of a well known modeler of today. Know who it is? Tune in next month.

. . . this month's load of aeronautical trash.

• We're kidding with our sub-caption, of course, and would like to express our thanks for the continued support and encouragement received from our readers . . . not to mention the patience and tolerance granted by Bill Northrop and the staff of **Model Builder**. Truly, it is a pleasure knowing all of you!

SOBERING THOUGHT FOR THE DAY

Bruce Walthers, writing in *"Craft Train News"*, reports: "The income of the U.S. Government is *250 million dollars an hour!"*

TAUBE BOOK APPEARS

Col. John A. de Vries, well-known for his scale model articles, has written a publication devoted to Tauben, those bird-like pioneer flying machines. Produced by at least 54 different manufacturers, these graceful aircraft appeared about 1910 and practically vanished after 1914. Author de Vries found himself involved in a worldwide search for documentation while preparing this volume, and freely admits that, in spite of seven year's effort, a few of these birds have yet to be conclusively tracked down and identified. Still, his five-country sleuthing uncovered a remarkable number of rare specimens, many of which fairly cry out to be reproduced in model form. To ease that task, he has thoughtfully incorporated nine different sets of drawings. Eight of these are general arrangement presentations by Richard M. Zasadney, while the other is a highly detailed three-page deliniation by Paul R. Matt, who also published the book. Included are hundreds of photos and perspective drawings, descriptive text and an appendix table of specifications.

Flightmaster Bill Stroman has become recognized as the local Taube specialist, but from what this book reveals, there are plenty of these rare creatures not yet modeled. Ordering information for this and other publications in the Historical Aviation Album series is available for the price of an unused postage stamp. Write to: HAA, P.O. Box 33, Temple City, CA 91780. As usual, we appreciate a mention of **Model Builder** when ordering.

CECIL PEOLI REMEMBERED

One of the most famous model builders of all time was Cecil Peoli . . . a name synonymous with "twin pusher". Plans for his record-breaking models were widely published in aviation magazines, and even in prestigious *Scientific American*. One of his pushers was also kitted and marketed for many years by the Ideal Aeroplane & Supply Co., Inc., as well as a line of propellers bearing his name.

However, his exploits as a designer and flyer of full-size aircraft seems relatively little known. Andy Anderson has shed some fresh light on the subject in the March 1978 issue of *World War 1 Aeroplanes*. In a story about engine designer L.E. Rausenberger, he presents a 3-view drawing of a Cecil Peoli pusher powered by a V-12 engine of 150 hp, vintage 1914. Also featured is a good close-up photo of Cecil Peoli in the cockpit of the machine.

A limited number of these issues are available for $1.25 from: WW 1 AEROPLANES, 15 Cresent Rd., Poughkeepsie, NY 12601.

CLOSE ENCOUNTERS OF THE THREE KINDS

Barry and Sol Berman had an

Contents of new Czechoslovakian kit, designed by Milan Kacha, features balsa printwood, plastic wheels and prop, decal sheet. Completed model on right, a Champion "Citabria". Semi-profile fuselage encloses rubber.

unexpected thrill during a recent visit to the renowned Torrey Pines glider flying site, near La Jolla, California. While it is usual to see hang gliders and R/C sailplanes in profusion in the slope-lift from the high cliffs overlooking the Pacific, on this particular occasion the Goodyear blimp joined in the fun! Actually, it was cruising serenely by, close to the ocean, well below the flying site. As a result, the R/C models and hang gliders were actually flying ABOVE the blimp. Frustratingly, neither of the Bermans had thought to take along a camera.

AMA FILMING SESSION

Speaking of cameras, Jay Gerber, who produces movies for the AMA, spent several days on the West Coast getting footage for his latest project, to be devoted entirely to flying scale models. Thanks to a good turnout including members of the Scale Squadron, Flightmasters, and Scale Staffel, Jay was able to capture good action shots of R/C, C/L and F/F scale aircraft.

MUSEUM NEWS

According to Ed Leiser, Curator of Exhibits, the new San Diego Aerospace Museum will open on the 17th of December, 1978, to celebrate the Wright Brothers flight of 75 years ago.

The modeling press has helped significantly to spread the word about the tragic fire which destroyed the previous collection, and the response has been most gratifying. A recent contributor was Dave Linstrum, editor of the VTO column in Model Airplane News. Dave is donating 100 magazines from his own collection to this worthy cause. Having lost his home to fire during 1976, he could strongly identify with the need. While searching through the ruins he remembers finding two spools of vintage Pirelli rubber "melted into a glob". The magazines will form a part of the new Aerospace technical library of the museum, which in the past has been so helpful to model builders conducting scale research.

Donations in the form of funds or aviation memorabilia are still welcome: Emergency fund, S.D. Aerospace Museum, Room 203, Casa Del Prado, Balboa Park, California 92112.

HOW TRUE

"A tank full of fuel is only a tank full of time". Sage advice from the General Aviation Manufacturers Association, Ohio State University, and the FAA. We also liked this line from an FAA Bulletin, concerning aircraft preventative maintenance: ". . . IF IT AIN'T BROKE, DON'T FIX IT."

MAYBE YEAST WOULD HELP WITH THE LIFT?

Meeting of Gee Bee enthusiasts (l to r): Ron Harrison, Dottie Miller, Tom Nallen, Henry Haffke (holding his R-1/R-2 Hybrid R/C model), and Pete Miller, one of designer/builders of original.

Original Embryo Endurance design, inspired by Heath Parasol. Model and photo by Dick Bewamin. Does 1 minute plus.

Peanut gyro cluster (l to r): Cierva C.6, by Warren Shipp; Kay Gyroplane, and W.R.K. Gyro by Hannan. Flying sessions are a study in frustration!

Frank Zaic seems to be the father of this clever idea: Many model plans call out "soft wire" for holding adjustments in tail surfaces and trim tabs. Trouble is, the stuff is difficult to glue properly, and often breaks loose when bent. However, by employing the paper-covered wire bread wrapper dealies, adhesion is a cinch. Some brands of garbage bags also use similar fasteners, which are twisted around the bag top to keep it closed.

AMERICAN AIR RACING SOCIETY

Rudy Profant was thoughtful enough to send us sample copies of the AARCS newsletter, which might have appeal for the racing enthusiasts in our audience. Featured are sketches of "Golden Agers", historical information, and in one of the issues we received, scale drawings of a Menasco Pirate engine.

The Society concentrates on the 1929-1939 era, and conducts research, draws plans, compiles photographs and encourages the

Continued on page 111

PHOTOS BY WILL NAKASHIMA

(l to r): Jim Scarborough, USFFC business mngr.; Irv Aker, Open Sweeps winner; Paul Stober, Grand Champ; Parker McQuown, Junior Sweeps winner; Bob Boyer, Senior Sweeps; and Joe Norcross, CD. Kneeling, Mike Thompson, High Time AMA Gas winner.

U.S. 1978 FREE FLIGHT CHAMPIONSHIPS

By JIM SCARBOROUGH . . . The NFFS Championships at Taft, California, continues to be the biggest free flight competition of the year.

• Suppose they had a contest, and there was no place to park? Well, that wasn't a problem this year, although the field was rather jammed. The biggest problem this year was a lack of motel rooms in Taft. The town of Taft sits on the Elk Hills oil reserve, and there is a lot of activity by the oilmen. They had most of the rooms taken over. I stayed at a hotel, and got the last room they had! Many of the contestants had to make the 35-mile drive into Bakersfield in order to find accommodations. This was unfortunate, but didn't dampen the enthusiasm of the large troop on hand.

I arrived about noon on Friday, in order to set up the field. I was really astonished to see the amount of cars and campers already present. It turned out that some of them had been there since Tuesday! The amount of cars on hand and all the test flying going on made it look as if a contest was already in progress.

After getting the field marked off and posting all the signs, we set up registration. We started registering people Friday afternoon, and this certainly took the crush off Saturday morning. Jean Bogart did a really great job of handling the 302 people who signed up for the meet. Sweepstakes and team registration were handled once again by my wife, Judy. Bill Bogart, Jean's husband, took care of the finances.

This year's meet was truly international in flavor, with no less than 6 countries represented. Mexico led the way with a 9-man contingent. Canada had 4 fliers present, and

The Nordic area was a scene of constant activity. A/2 was won by Harry Grogan, who beat out Bob Isaacson in a two-way fly-off.

Bill Gibbons flew his unlimited rubber ship in the early morning calm air.

Bill Morgan, of Fresno, Ca., placed second in C Gas with his Satellite.

What a time to discover you've been standing on an anthill ! Jerry Clark with Shocer.

Bill Moore came all the way from Texas to fly his Country Boy 450 in A Gas.

Paul Andrade flew this Cox .051-powered Orbiteer in Class A Gas.

Phil Nakashima finished his Tadpole just before the meet, won second, his first trophy!

New Zealand had a very strong competitor in Ron Magill (more on him later). Finland was represented by an exchange student, who registered but only helped with timing, since he had no models with him. Pierre Chaussebourg's coupe was proxy flown by Bob White to 5th place, and gave France represntation. The United States was well represented with people from all over.

The people who had been there a few days said the temperature had been quite chilly at night, and fair to warm during the days. The Weather Bureau predicted a warming trend, and they proved correct. Saturday, the first day of competition, wasn't too hot. It ranged up to perhaps 90°, and hit that only for a brief period. Flying got off to a fast start at 6:30 a.m. with an unlimited Mulvihill get-together. One flight, go for broke. This event was sponsored by Bob Meuser and was well received. No less than 27 competitors contested one another, with Bob White besting Roger Gregory, 9:40 to 8:16! Mind you, this is a one-flight total, flown before 7:30 a.m. I wouldn't have thought you could get 27 modelers up that early in the morning, let alone get them to fly! This good showing was to continue to the Mulvihill event later in the day, when 32 contestants vied for top honors. Check the results; you'll note that most of the names are not the usual ones you see in the listings.

The winner, Mack McClintock, went on to win the hotly contested (29 entries) coupe event. Mack scored this double win over some of the nation's top rubber fliers. Coupe had 4th and 5th places won by Mexico and France, respectively. On Saturday, Mike Thompson scored high time of the meet by winning A Gas with a fine 43:28. C Gas, won by Randy Archer with 33:10, had a 3-way tie for fifth. Two of the three contestants lost their ships, and the other had an overrun to end up at 25:00. The contest management gave all three a trophy.

A/2 glider had a two-way flyoff, with Harry Grogan beating out Bob Isaacson 24:30 to 23:53. This event had some international flavor, with Canadian Peter Allnutt taking 4th.

Perhaps the hottest-going event is P-30. Open/senior had 23 entries, and junior had 13. Rich Rohrke won the event with an excellent 17:58. The top 3 winners maxed out. Junior P-30 was won by Myron Watts with a good 7:20. This was the largest junior event, beating out Hand Launch Glider, the usual junior leader.

Saturday night saw the action move to the gyms in town. As usual,

Well-known R/C Pylon flier, Joe Foster, won Class D Gas with his Buck.

Fred Ginder, from Fresno, Ca., fires up his Class A ship. Who needs an electric starter?

Jack Moreland flew his Shocer 750 in C Gas. K&B .41 is mounted at an angle, probably so the rear exhaust will clear the pylon.

Bob Meuser has gotten a lot of use out of his .020-powered Payload model. Event was won by E. Elliott.

they were extremely hot and humid. You can't run the air conditioning, as the air gets too turbulent. This year we tried something new, in that Easy B and Novice Pennyplane were flown together rather than separately as in the past. This enabled gym No. 2 to become available after 10 p.m. for hand launch glider testing.

There was quite a battle in open indoor HLG, with only 1.2 seconds separating the top 3. Phedon Tsiknopoulos beat the two perennial winners, Ron Wittman and Lee Hines. Phedon had 60.8 seconds to Ron's 60.4! If memory serves me, it wasn't too long ago that America's oldest teenager, Bob Meuser, won this event. Junior hand launch had David Turgeon beating the great junior flier, Joey Foster, 52.7 to 51.4. In indoor Peanut, I almost had the 4th place trophy engraved with Hal Cover's name ahead of time, since he's won 4th more times than I can remember, but this year the worm turned; Hal won the event!

As usual, Easy B and Novice Pennyplane were won by the old master, Clarence Mather. Cezar Banks was bridesmaid in both these events. The Meusers made a showing in Novice Pennyplane. Well, they should, since Bob pushed for the event! *(Now wait a minute! "Novice" Pennyplane won by the old "master"? Who's kidding who? If you're going to have Novice Pennyplane, then limit the entry to novices; modelers who have never placed in the event. Sure, have a no-novice Pennyplane event so the novices will know what times they should shoot for. wcn)*

As the sun rose on Sunday morning, you could feel that the day was going to be a scorcher. In two words, it was! It was over 100° for most of the day.

As most of you are aware, California has had a very wet winter. This gave rise to an unusually large amount of grass, which was quite dead and dry by the end of May. The

Bill Ruff with Class C entry. Motorcycle is indispensable piece of free flighter's equipment.

Bill McConachie, left, and Les DeWitt tied for first in Wakefield.

Glenn Schneider holds two national records, tied for first in B Gas at USFFC. Glenn is shown above with his Class A G.Y.S.O.B.

Happy Dick Myers with his Nordic. Placed third in A/2 with 20:57.

Well-known glider flier, Lee Hines, and wife, stroll over to the Nordic area. Lee looks satisfied . . . must have maxed again!

Bill Xenakis, left, with Dad, was doing well until he lost his 1/2A Starduster. Placed 2nd.

Bill Chenault came from Texas to fly his Mini Pearl in 1/2A. Dick Myers looks on.

field had an extremely high fire danger. I'm glad to say we only had two fires the entire weekend. One of them, out of sight of the flying field (the smoke was visible), was started by a motorcycle being used to look for lost models. This fire covered quite a bit of ground and was put out by the Fire Department. The second fire was started at noon on Sunday by a couple of young fliers lighting a fuse. Just about everybody on the field grabbed a shovel, blanket, or water jug, and ran to fight it. We were fortunate in quelling it before it covered much more than an acre, and long before the Fire Department arrived.

Hal Cover completed his domination of the scale events, winning both rubber and gas scale. However, he proved he is mortal by allowing John Oldenkamp to win outdoor Peanut, though Hal was second!

Ray Smith working on his Class C Starduster. Made an adjustment after 3 maxes, crashed.

Outdoor Hand Launch Glider had a healthy 35 entries. Bob Boyer beat out Richard Mathis (barely!) by 3 seconds, 8:54 to 8:51. Fifth was our New Zealand friend, Ron Magill. Ron entered sweepstakes and made a strong showing. He was second in the hotly contested open race. Ron had a boxful of models that he kept losing. But he was lucky, as they were found and returned in time for him to continue flying. I don't believe he lost any for good.

I want to mention that Old-Time Rubber had 21 entries. It, like most of the non-power events, was up in entry. Ray Berens won with a perfect 15:00. The Georgia transient, George Perryman, was 5th with 9:35. But get this: his granddaughter, Stephanie, won junior O/T rubber with 12:32! That time would have won 2nd place in open. Take a look at Marty Thompson's time in .020 replica. His 30:00 minutes left the 2nd placer, Sal Taibi, in the dust.

As the sun settled on a hot, dusty day, the gumbanders brought out their Mulvihills for an unlimited dusk flight. This was sponsored and won by George Perryman. His 6:38 beat Bob White's 5:09. Compare these times to the 6:30 a.m. times. Quite a difference.

Darkness arrived at last. Once again the field came alive to the roar of engines and eerie green chemical lights. Just as the sun set, a light wind started blowing. At night, any wind is murder, as it makes retrieval a nightmare. Thanks to help from Jack Moreland, who wasn't flying, I was able to get all three of my flights in.

Continued on page 117

Al Heinrich getting ready to fire up his Scientific Mercury. Flew in C Cabin.

Jerry Clark flew his modified Shocer at the USFFC. Ship goes up like a rocket!

Bob Boyer (left) won Senior Sweeps at USFFC. Helper is Mike Archiveque.

FREE FLIGHT

By BOB STALICK

• About the time this issue hits the newsstands, you will be standing in line at the 1978 Nationals, waiting for a timer; or you will be frantically trying to get that supership ready for the FAI Team Selection finals at Taft, CA; or you'll be thinking about getting out and doing some trimming on your models so that you can get in on some of the best flying weather of the year, before the contest season draws to a close; or you just might be sitting there in front of the old TV, with your feet propped up on a stool, holding a tall, cool one. If none of the above are true, then maybe you ought to leaf back to Dirty Dan's column, 'cause you just might not be a free flighter, and what is going on in this column this month just doesn't suit your fancy. But if your fancy is suited . . . read on!

THREE-VIEW OF THE MONTH

Dave Hagan's EZB, "The Fink Foiler"

How dare he, you ask? How dare he feature an indoor model right now, during the height of the outdoor season. Now, lissenup, Bunky! If you've never flown indoor during the "outdoor season", you might not know what you've been missing. First off, the sites are much more available in summer (schools are usually not in session, and those gyms are still there), and the flight times in the summer months are generally better than in the cool of the winter. Thermals are everywhere . . . inside or out. Well, enough of this rationalizing. I decided to feature the Fink Foiler because it is an unusual and excellent airplane . . . so there.

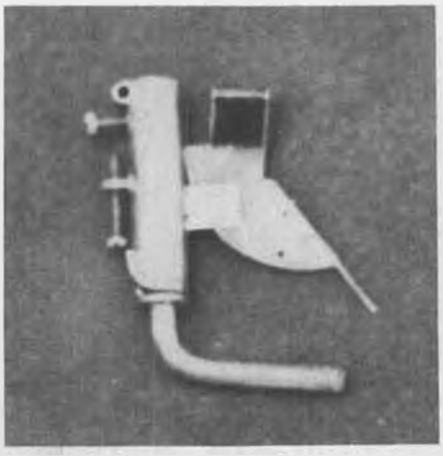
Dave Hagan first began indoor flying about 18 months ago, when he started appearing at the Willamette Modelers Club indoor sessions, and his first attempts looked promising, but seldom competitive. As the season wore on, his flying got progressively better. This last season, however, it was apparent that Dave had done a fair amount of work in the interim, because his name began to appear in the winner's circle very often. At the last meet of the year, Dave showed up with this model, with the vow that he would crush Stan Fink's EZB record of 9:32 and break the 10-minute barrier that has existed in the South Albany Gym ever since we've been flying there. Here's what Dave has to say about this ship:

"The real significance of this model is that it was the first to beat 10 minutes at Albany. True, I hadn't paid my entry fee when I put the flight up, and Foggy's (timekeeper, Earle Moorhead) watch stopped, but we had a second watch on it and I believe the 10:16 was posted as official.

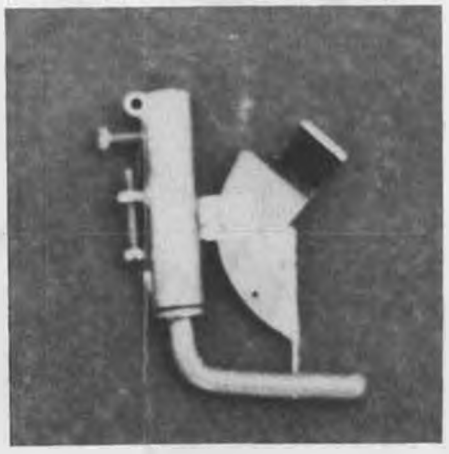
"I got the idea from Dieter Sibermann's FAI indoor design from 1976, and also discussed several features of the design with Doug McLean in Seattle. The droop of the tail boom is mainly to get wing/stab elevation without using long wing posts . . . a significant savings in weight. The result is a high thrust line, which doesn't hurt.

"The large, highly-cambered stab helps to counteract stalling under launch torque. One of the main ideas was to use the large stab in conjunction with a rearward C.G. and large elevation between wing and stab. This transfers some of the lead to the rear, so that the stab provides lift, rather than just stabilizing. I believe this is part of the 'tandem theory'.

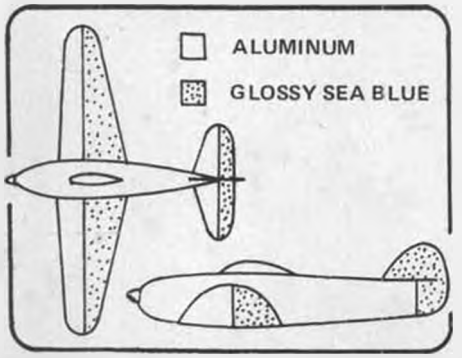
"The 'Foiler' is actually more rigid than the Pymm (EZB design by Dave Pymm). Trim problems on both new models were due mainly to oversize rubber. Both were flown on .047 in. rubber, partially wound. Had I anticipated the good performance, I



Swedish-built towhook described in text. Shown here in the open position.



Swedish towhook in the captive position.



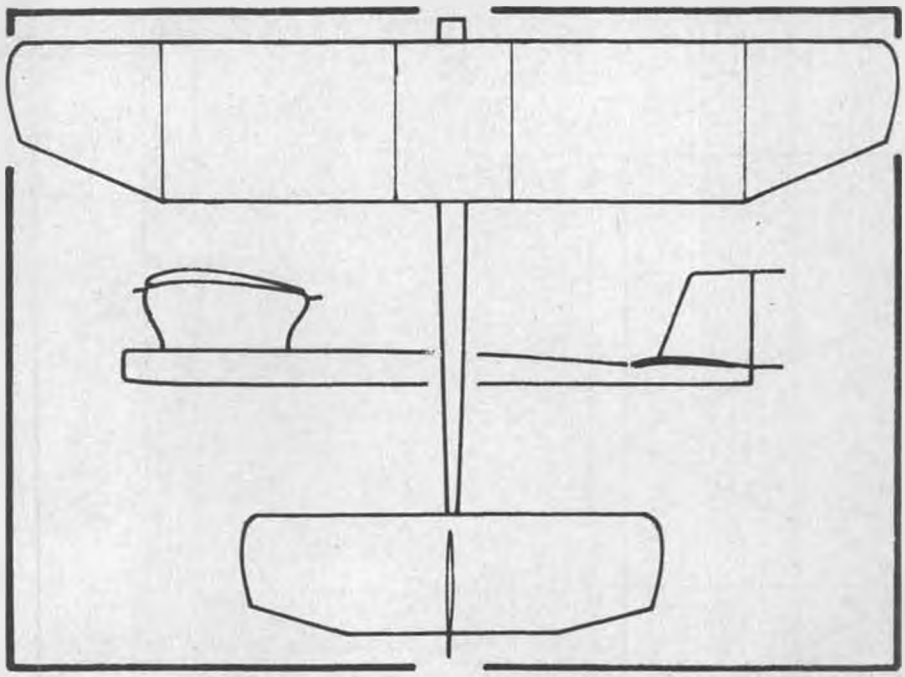
The government again triumphs over good, common sense! A military study, with 26,784 observations, selected the above as the best for visibility. In our opinion, it's the best for losing sight of your model in the shortest distance! Stick to a dark bottom surface and bright on top, and use 'flash' tape.

would have stripped sizes down to about .040 in. The best EZB fliers use the latest microfilm winding techniques. They wind full winds, then back off turns to a predetermined torque value. Stan Chilton quoted me something like .7 inch/ounce."

Thanks, Dave. There are some good suggestions in Dave's comments, and even if you are not thinking indoor just yet, consider the Fink Foiler when your thoughts drift in that direction.

SEPTEMBER MYSTERY MODEL

I have had to compete against this design many times here in the N.W. It comes in all sizes, but the general shape remains the same. The performance must have been truly spectacular when it first hit the contest scene in the 1950's, because it is outstanding even now. The power pattern is always a 3/4 turn spiral to the right, with a smooth transition into a right glide. I guess there are times when this doesn't happen, but it always did when I was flying against it. If you know what this hot little ship is, drop a card or letter to Ye Editor, Bill N., with your answer. A prize awaits the winner . . . he or she with the first correct answer.



SEPTEMBER MYSTERY MODEL

DARNED GOOD AIRFOIL — SI 63008 (A-2)

Not much information is available on this section, except that it was designed by S. Isaacson specifically for use in rough weather A-2 applications. From a study of the section, it would seem that the forward high point would make it quite docile to trim. The drooped leading edge puzzles me just a bit, but together with the fairly sharp leading edge, it should turbulate well. The flat trailing edge undercamber would make it very adaptable to circle towing without problems. Should be worth giving it a try.

Ernie Linn, at a recent contest, suggested to me that I seek to have **Model Builder** publish a complete set of all of the Darned Good Airfoils. Might be a worthwhile idea. What do all of you out there in **Model Builder** land think? What does Bill N. think? *(Bill N. thinks reproducing so many airfoils all at once might take up too much space in the mag. If there's enough interest, we'll make up a special reprint of complete sets for a nominal cost. wcn)*

NEW SWEDISH TOWHOOK

A picture accompanying this article shows off a new towhook, which is being built by Sture Eriksson, Torparegatan 46, 461 00 Trollhattan, Sweden, and it is being marketed by him at $14.00 U.S. currency, postpaid airmail. The fascinating thing about this towhook is that it is identical in principle to the Wayne Drake towhook, featured a few months back in this column, with a couple of excellent additions:

1) It has adjustable spring tension without taking the assembly apart, and 2) It has a screw-adjust system for changing the amount of zoom offset.

NATIONAL FREE FLIGHT SOCIETY ANNOUNCES ITS 10 MODELS OF THE YEAR AWARDS

The NFFS has just announced its selection for the 10 Models of the Year Award. Here are the models and their designers:

INTERNATIONAL CLASS (FAI)

F1A (Nordic): AL-29, by Andres Lepp (USSR). F2A (Rubber): Unnamed model by Kim Dong Sik and Team (N. Korea). F3A (Power): Speed Cream, by Thomas Koster (Denmark).

AMA OUTDOOR

Large Power: Gysob (Class C), by Ed Bellinger. Small Power: Maverick (1/2A), by Tom Hutchinson. Rubber: Great Speckled Bird, by George Perryman.

INDOOR

Rubber: Cat Walker, by Jim Richmond. HLG: Coot, by Stan and Mike Stoy.

SPECIAL AWARDS

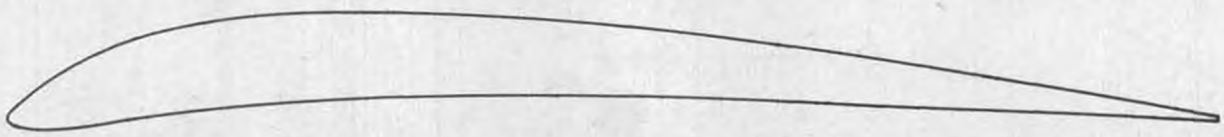
Robert Meuser, for his "No Non-Cents" Indoor Pennyplane. Flying Aces Club of Bridgeport, Connecticut, for originating Peanut Scale.

THERMAL DETECTORS FOR SALE

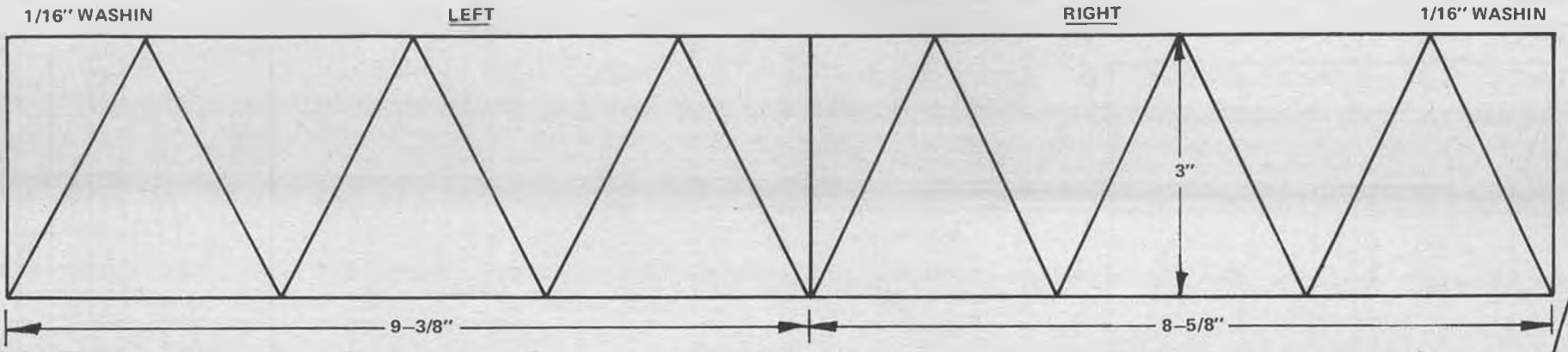
From the Minneapolis Model Aero Club newsletter comes the information that Greg Thomas is selling complete thermal detector units that measure small changes in barometric pressure, as well as temperature. To date, the detector has worked flawlessly in field tests.

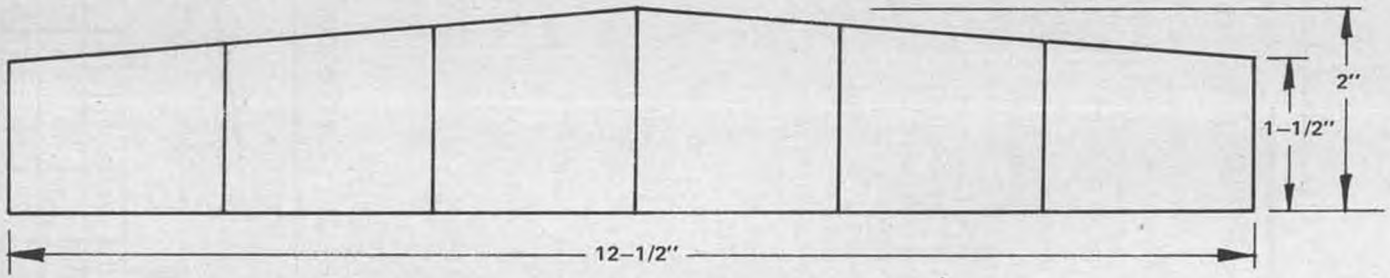
Continued on page 123

DARNED GOOD AIRFOIL — S I 63008



STATION	0	2.5	5	10	20	30	40	50	60	70	80	90	100
UPPER	0	2.3	4.5	6.7	8.3	8.7	8.4	7.8	6.6	5.3	3.6		0.2
LOWER	0	-1.0	-0.9	0	1.2	1.6	1.8	1.8	1.5	1.2	0.6	0.1	0



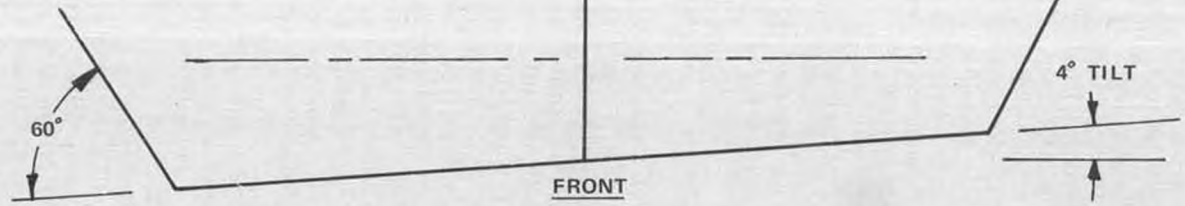


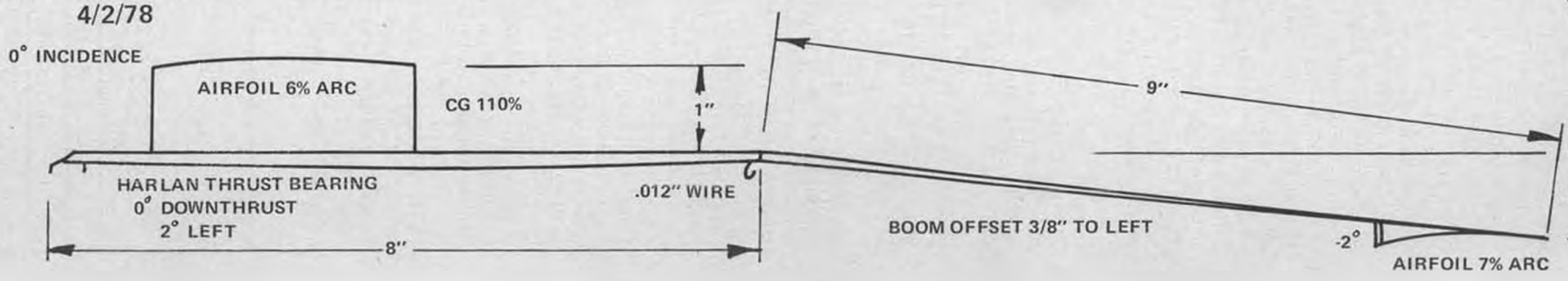
MOTOR
16–1/2"x .047"
1977 FAI
RUBBER

12 x 24
.010" 4 lb
"C" GRAIN
wt. .081 oz

HAGEN EZB

Wt. .0303 oz
.776 gram
TIME 10:17
(FIRST OFFICIAL FLIGHT)
4/2/78





SOPWITH PUP

By JOHN BLAIR . . . One of the winners in our 1976 Parcel Post Proxy Peanut contest, this excellently detailed model is on permanent display in Model Builder's office. Also a fine flier.

• The Sopwith Pup is universally considered to be one of the all-time classics. In service from 1916 to 1917, it performed with considerable success; its superb maneuverability and ruggedness enabled the Pup to remain effective in action even after its speed and armament had been far surpassed.

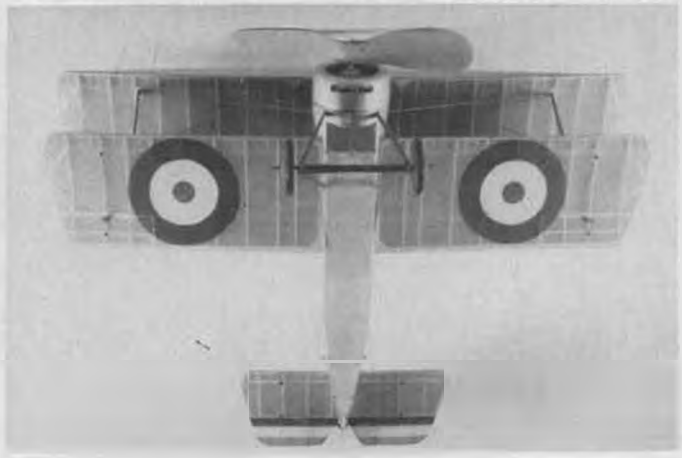
The Pup also scales down well. Its proportions and flying qualities as a peanut are delightful. It looks "right", sitting on the table or circling overhead.

Along with most aircraft of the period, the Pup's construction was very model-like, and can be reproduced almost piece-for-piece without much sacrifice of flying ability. The plans, then, show almost exact scale structure, especially in the wings and tail. If a lighter, simpler model is desired, such details as false ribs and aileron structure may be omitted, and the ribs spaced farther apart. Built as shown, the model will weigh approximately .75 oz.; carefully omitting part of the structure could reduce this to .50 oz. or less.

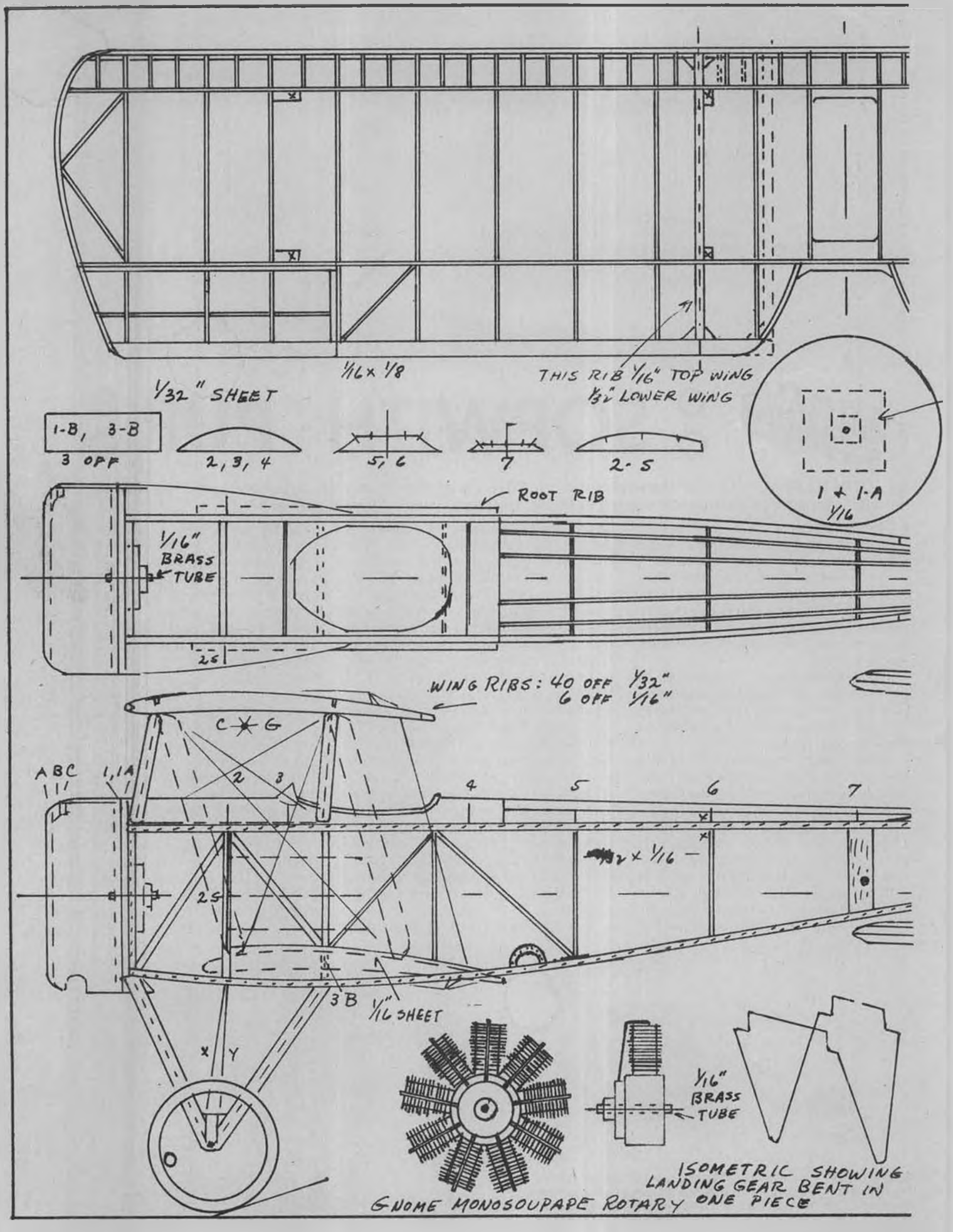
The construction may be as straightforward or complicated as your choice of detail demands. The first step, however, is a departure from the customary. Begin by preparing some non-stock wood. If no balsa stripper is available, careful work with a good straightedge and a very sharp Uber Skiver will be OK. Prepare a supply of 1/32 x 1/16 strips for fuselage cross-members, stringers, wing spars, etc. Some 1/32 x 3/32 is required for elevator ribs and spar, and some 1/32 x 1/8 is needed for strut fairings. Sand a piece of 1/32 sheet down to about 1/64, for wing ribs and fuselage top decking. Strips of 1/32 x 1/16 basswood are required for laminating the flying surface outlines.

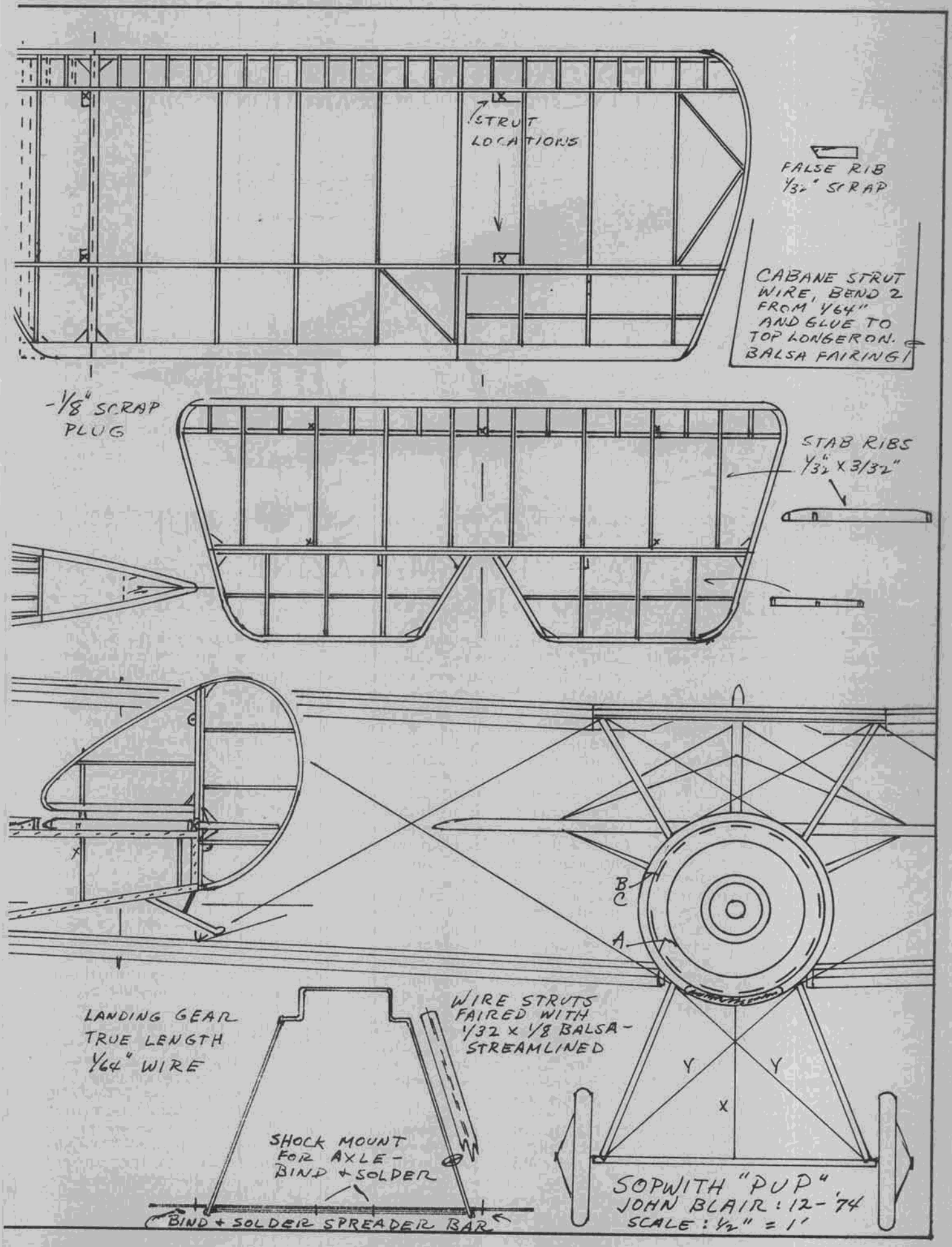
The fuselage "box" is built with 1/16 sq. longerons. The first three bays from the the nose have 1/16 sq. cross-members; from there back, use 1/32 x 1/16, except for the tail post. After former 1-A is positioned on the nose, remove bottom cross-pieces 1 and 3, and install the landing gear wire, with formers 1-B and 3-B sandwiching the wire in place. Next, install the cabane strut wires by gluing them directly on the top longerons. The top decking will cover and strengthen this joint. The top decking may be installed as one piece, but the side, from 1 to 2-S, is a compound curve, and will have to be planked with 1/32 x 1/4 strips. From 2-S back, the side streamlining is completed by three short 1/32 x 1/16 stringers, and is tissue covered. A corner of the side sheeting will have to be cut away to install the lower wing root rib, which is part of the fuselage. The wing panel is

Continued on page 94



Second highest in scale points, WW-I, at the 1975 Model Builder Proxy Peanut contest, the Pup still flew 18 seconds, placing 4th. Note scale false ribs and spacing. Engine rotates. Carved hardwood prop.


1/16 x 1/8
THIS RIB 1/16" TOP WING
1/32" LOWER WING
1/32" SHEET
1-B, 3-B
3 OFF
2, 3, 4
5, 6
7
2-5
1 + 1-A
1/16
ROOT RIB
1/16" BRASS TUBE
WING RIBS: 40 OFF 1/32"
6 OFF 1/16"
C G
A B C
1, 1A
2
3
4
5
6
7
2S
3B 1/16 SHEET
X
Y
1/16" BRASS TUBE
ISOMETRIC SHOWING LANDING GEAR BENT IN ONE PIECE
GNOME MONOSOUPAPE ROTARY


STRUT LOCATIONS
FALSE RIB 1/32" SCRAP
CABANE STRUT WIRE, BEND 2 FROM 1/64" AND GLUE TO TOP LONGERON. BALSA FAIRING!
-1/8" SCRAP PLUG
STAB RIBS 1/32" X 3/32"
B
C
A
LANDING GEAR TRUE LENGTH 1/64" WIRE
WIRE STRUTS FAIRED WITH 1/32 x 1/8 BALSA - STREAMLINED
Y
Y
X
SHOCK MOUNT FOR AXLE - BIND + SOLDER
BIND + SOLDER SPREADER BAR
SOPWITH "PUP"
JOHN BLAIR: 12-'74
SCALE: 1/2" = 1'

Peanut Pup . . . *Continued from page 91*

butted directly against it.

Turtledeck formers and 1/32 x 1/16 stringers are installed next. Note the triangular gussets which fair the turtledeck into the stabilizer.

Cut a spreader bar for the landing gear from 1/32 wire, and an axle from 1/64 wire. Bind and solder the axle to the spreader and then the spreader to the landing gear legs. The result is a scale-action, shock-sprung landing gear. Glue the landing gear legs between two pieces of 1/32 x 1/8 balsa and streamline. The spreader bar can be faired with 1/16 sq. glued to the front and back, and then streamlined. Be careful not to glue the axle and foul its action. Cabane struts are faired in the same manner as the landing gear.

Wheels are made from 1/8 balsa. Stick a pin through the wood to act as a center. With a ballpoint pen in a school compass, scribe the diameter and rim lines on both sides of the sheet. Do the same for the cone-shaped outer disk. A short length of 1/16 brass or aluminum tubing serves as a bearing. Take care in locating the tube, in order to get a true-spinning wheel. After assembly, paint the "tires" flat black, and the rest of the wheel khaki.

The rotary engine is worthwhile, because you will certainly need the ballast. The cylinders should be made from 3/16 dowel, wrapped with thread. Push rods are bent pins, or scrap wire. If the engine is not fixed to the propeller, it will act as a bearing washer, and thus put no load on the rubber motor. The dummy engine is painted silver, and the cowling built around it. The engine will not go in through the front of a completed cowling.

Glue the 1/8 balsa plug and bearing support to former 1, and install the 1/16 tube bearing. Glue rings A,B, and C together, cross-grained for strength. Put engine in place on a temporary shaft. Locate the assembled front ring by lightly tack-gluing 2 or 3 pieces of scrap around the perimeter. As the covering of 1/32 sheet progresses, these locaters can be removed. Check carefully and frequently for true alignment. When completed, put the unit in place on the fuselage, and sand the cowling and fuselage nose as a unit to insure a perfect fit.

I like to make forms for laminating from cardboard, both to save expensive balsa and to make a permanent form which can be saved for future use. Shape the core of the form from corrugated boxboard, and cement a "rim" of thin cardboard around the perimeter. Make sure the rim conforms to the inside of the shape to be laminated. To use the form, place a strip of plastic wrap on it, followed by the white-glue-coated 1/32 x 1/16 basswood strips. Hold the laminations in place with pins and rubber bands. The plastic prevents sticking . . . both laminations and form emerge undamaged.

Elevator tip trailing edges are laminated from 1/32 x 1/16 basswood. The leading edge is 1/16 sq. balsa. The front spar is 1/32 x 1/16, hinge-line spars are 1/32 x 3/32, and the rear spar is 1/32 sq. After installing the 1/32 x 3/32 ribs and false ribs, the stab unit is sanded to a slight lifting section. The rudder is built in a similar fashion, except that 1/32 x 1/16 material is used throughout. Note that when the model is assembled, the rudder is supported above the stab, and does not touch it.

Wing construction is quite conventional. The leading edge is rock-hard 1/16 sq., placed on edge. The tips are laminated from 1/32 x 1/16 basswood. The tip bows must curve (in side view) to conform to the undercamber of the wing. The spars are hard 1/32 x 1/16. The spars are designed into the top of the wing, both for turbulation and to prevent "sway-back" dihedral. Ribs are 1/64 sheet. The only way to cut this many

ribs is by the "stack" method. Cut ribs from 1/16 sheet, to use as templates.

Aileron construction is a bit complicated. The strongest wing results when the aileron structure is built without cutting either the tip or trailing edge: the structure is there, showing through the covering, but cannot operate. Two full-depth aileron spars, 1/32 x 3/16, are pinned in place, packed up from the plan with scrap 1/32 (to preserve the undercamber). The wing ribs are then installed. Cut off those three ribs which involve the ailerons, and use the rear portions as aileron ribs. An additional aileron end rib must be cut from scrap. The rear wing spar ends and butt-joins with the aileron unit. The diagonal braces shown are 1/32 sq. The last parts to be installed are the false ribs. They are cut from 1/32 x 3/32 stock, and butted between the leading edge and front spar. When dry, they are sanded to the proper nose contour. Note that the lower wing is slightly different from the upper (dotted lines). The dihedral break shown is, of course, for the upper wing only. Scale dihedral is 5/16 of an inch under each tip, and is sufficient for indoor flying.

The covering is superfine tissue. If you can find some dull off-white tissue, it will match the unbleached cotton used on the real Pups. If you must use a bleached white, tint your clear dope with a few drops of brown (Try a sample to see how much).

I like to apply tissue with thinned-out white glue, especially on undercambered wings. After all units are covered and water-shrunk, give each panel a coat of the tinted, low-shrink clear dope. This is a good time to check that each wing panel has 1/16 of an inch of washout. You just can't appreciate how much this helps the flying qualities of a model until you try it!

Before final assembly, apply all insignias, numbers, etc. To determine which scheme to use in decorating your Pup, by all means get a copy of "Profile Publications, No. 13: The Sopwith Pup". My model is finished as a Naval Pup: khaki on all top surfaces, clear underneath. The photos in this publication also explain the rigging quite clearly, as well as that wealth of variation in detail which helps the scale modeler dress up his individual model.

In the final assembly of your Pup, try to mount the top wing with slightly less incidence than the lower. This prevents both wings from stalling at the same time, for increased stability. When everything is in place, install the interplane struts (1/16 x 3/16, doped khaki). Before permanently sewing and gluing the rigging threads in place, make sure that all washout, etc., is as you want it. There's no point in having to rig it twice!

My model uses a hand-carved pine prop, but a cut-down 6-inch plastic one will work fine.

Balance the model at the point shown. Adjust the glide with elevator, and powered flight by shimming the nose block. Power is a 12-inch loop of 1/8 rubber, if the heavy, detailed model is made. A more stark, lighter plane might fly on 1/16 rubber, with greatly increased duration.

Watch out, Red Baron!! •

Great Lakes . . . *Continued from page 15*

the appearance of those members through those get-acquainted flights. If the plane fails to rise, rev the engine up a little and/or remove some thrust, *but leave that glide alone*. When trim and stability seem proper, pull out the intake plug and have at it!

Well, in this day and age, test gliding has sort of gone out of style. With the balance point properly located, and surfaces at the approximate incidence angle specified, proportional control provides all the in-flight trim that is necessary to carry a model through its first test flights. Unfortunately, some modelers are content to leave an airplane untrimmed if the radio can overcome its mis-alignments. In our opinion, you can separate the real modelers from the hackers by checking their transmitters. If all the trims are at neutral, and the flier can calmly let go of the sticks, scratch his nose, and watch the plane fly along on its own, he's just about qualified to be a free flighter, and that's what real modeling is all about. •

R/C Forum . . . *Continued from page 28*

"automated kitchen" was a hoax, perpetrated through the use of a model airplane control system! Obviously, much of the work that was performed was far more than we would ever ask from such equipment.

Many of the major aircraft corporations have used R/C for test work. Among them, Bell Aircraft made good use of practically stock model gear. A great deal of the initial testing of air-cushion vehicles by Bell was done in this manner, and the results were excellent. In fact, the corporation was so happy with the success, that they used the same system to perform tests with ejection seats for the space industry!

Continuing with more modern applications, the Calspan Corp. has been deeply involved with the safety aspects of automobiles under crash circumstances. Obviously, if you wish to know what actually happens in a crash, you must perform the crash. Some of the more intricate crashes required remote control, and R/C systems provided the means.

More spectacular yet is the "Spiral Car" developed by Calspan. As you may have seen, this car does a neat 360 degree roll in the air and lands on its wheels. The secret is in the shape of the ramp from which the car takes off. Computers quickly told what the shape should be, but

who was to prove the computer's logic? You guessed it, R/C was used for the initial testing, and it probably saved a few hospital bills in doing it!

Industry has applied the use of our systems to control machinery for a great many years. One example is a giant multi-million dollar printing press, which required 4 men's constant attention to control it. By using R/C, the jobs were cut from 4 to 1, and the control became almost as automated as the machine itself! We have all seen pictures of steel mills and such, in which an overhead crane is shown with the man in the little cab way up high. Another man is down below guiding the hook. By taking the man out of the cab and giving the hook man a transmitter, R/C removed one more job and actually made the task simpler!

These are just a few examples of the use of our R/C gear outside of modeling, and it should give you some idea of its capabilities. By means of R/C, impossible feats have been performed, danger removed from others, and cost reductions have been made. In addition, much of the work has been done better than it could have been in any other way.

What is important for the use of this R/C gear in modeling, is that industry has proven it for us in many respects. They have proven its reliability through DAILY use, under very exacting conditions. Also, the environment in which industry uses it is much different. It is often subject to abuse, considerable vibration, and outside interference; yet the performance is there. Quite often, modifications and additions to the R/C gear are required, of course, but the basic system must do most of the work, and it does it well.

Probably the most frequent question regarding the use of "standard" R/C equipment in oversize model aircraft relates to servo and battery power. Do the servos have enough power to move large surfaces in flight? Because of the application, is more than normal battery capacity required? Most manufacturers produce servos of varying power as standard items. Naturally, the choice of the most powerful model would be wise, when weight and size are not a problem. These more powerful models also have another advantage, in that the mechanics are stronger. When more than normal power is used, the mechanics can be subject to more stress, and this can be important. Battery capacity is another consideration. The amount of current which a servo draws is almost directly proportional to the power being supplied by the servo. As an example, a servo may draw only 20 ma. when operating with no load on it. This can skyrocket to 100 ma. and more as the load is increased. The operating load with a "normal" servo is somewhere around 40 ma. It is not particularly good for a servo to constantly use 100 ma. or more. If possible, probably 60 to 80 ma. should be the maximum. In any case, it can be expected that the servo power required will be HIGHER as the size of the model increases, no matter how the servo is used. While this will be true of the servo, the current required by most receivers will remain the same. The advice would appear to be to FIRST determine a reliable battery capacity for your system in normal use. Then increase the size about one step for the larger model. For example, if the "normal" battery is 450 mah, as many are, increasing it to 550 mah should provide ample insurance for the increased load expected.

As was suggested in the preamble of this discussion, industry has found the shortcomings of most R/C gear to be the amount of servo power available, and the reliability of the servo mechanics under heavy loads. For these reasons, they have often found it more desirable to use our servos as "slaves" to operate other mechanisms. Often, the model-type servo will simply close a switch which operates some other actuator. Other times, it will be connected to an "isolation" device, such as a rugged gear train or lever. These isolation devices actually receive the abuse from the machinery involved.

The use of an isolation device in the controls of oversize and/or high-speed models would seem to be a smart idea for us to use, also. The simplest of these devices is a "walking beam". There are several advantages connected with the use of a walking beam. First, of course, is that all loads created by vibration, and the weight of the control surface, are ISOLATED from the servo. Such loads are absorbed by the pivot of the walking beam. Second, the maximum power of the servo can be used with the least amount of battery drain. The servo arm has several holes in it, of course. The hole closest to the axis provides the greatest power, while using the least current to do it. When a walking beam is used, this inside hole on the servo arm can be used to move the beam, and widely-spaced connections on the walking beam will provide the necessary amount of control movement.

An additional though when asking a servo to produce more power, is that the thrust produced must be absorbed through the servo's mounting. A overloaded servo tends to "collapse" its shock mounting, reducing its effectiveness. By isolating the servo, this effect can be held to a minimum.

Last month we discussed "old-fashioned" R/C systems, and the point was made that many of them flew quite large models for us. These systems did the job with servos of FAR LESS power than we have today. Speaking of power (and not to be assumed as a criterion for servo operation), while developing the original "Multi-Servos", it was found that a servo which produced 16 oz. of static thrust could operate any normal model control, while

using an acceptable battery drain. Most of today's average servos develop at least double that power; obviously we have an excess of power for normal use. Then there were the times when the little power produced by an escapement successfully operated the controls on a large model.

This is all past history, of course, but now we see the question arising: How to be sure of having ample power from a common servo when larger control surfaces are used?

When R/C was in its infancy, many designers turned to full-scale aircraft for ideas. With an R/C model, a control surface may weigh 1 oz. or so. In full scale, such a surface can easily weigh many pounds. In full scale, a very important consideration is "control pressure". If we think about it, the reason is obvious. A pilot is often expected to operate the controls for many hours at a time; Lindberg, as an example, flew for over 33 hours at one sitting. You just cannot have a control system which requires a lot of effort to operate. The figures for how much pressure is tolerable are not immediately available, but it would seem that they are very much in proportion to our model's requirements.

In recent times, it would appear that we have taken advantage of the ability of the newer R/C systems by using the simplest control surfaces possible. No regard is given to control pressures at all. It would appear that if we *did* consider control pressures, and used the design requirements to reduce them, we could operate most any model control we would like with a normal servo. It is a fact that, in past years, when control pressures were considered, we had successful operation with far less servo power than we have now.

How are control pressures minimized? First, by static balancing. Most controls are hinged near the leading edge, causing gravity to pull them down. To alleviate this problem, the control surface is built as light as possible, and a lever is constructed forward of the hinge line. Ballast is then added to the end of this lever to create a balance. In flight, the airflow will tend to neutralize a control. This cannot be used to perform all the work, because, in doing the work, an unwanted force is created. However, SOME of the airflow's neutralizing ability is often used to keep the weight of the static balance to a minimum. The amount is usually a compromise found by trial and error.

The use of aerodynamic balancing is very widespread, especially with high-speed aircraft. Quite often, the balancing is applied so cleverly that it is hard to realize that it exists. The theory behind aerodynamic balancing is to use the airflow to ASSIST in moving the control surface. Its main drawback is that it cannot begin to assist until AFTER the control commences to move from neutral.

The principle behind aerodynamic balancing is very simple. Visualize a control and its hinge line; as the airflow strikes the surface, any area which is AFT of the hinge line will tend to return the control to neutral. In so doing, it will create control pressure. By the same token, airflow striking control surface area FORWARD of the hinge line will tend to move the surface farther from neutral and reduce control pressure.

The simplest form of aerodynamic balancing is to move the hinge line back from the leading edge of the control surface. Theoretically, if the hinge was at 50% of the chord of the control surface, there would be aerodynamic balance. This is not true, of course, as the forward area is affected by the structure ahead of it (fin, stabilizer, wing, etc.). Another

limitation of its use is drag; the forward portion creates considerable drag when it is working, thus too much cannot be tolerated. However, a judicious use of aerodynamic balance can be very helpful in reducing servo loads.

Another method of creating aerodynamic balance is to design the control surface so that a portion of the control surface is ahead of the hinge line, so as not to be obstructed by the structure ahead of it. This is often seen on rudders and ailerons, such as the "elephant ear" ailerons used on the WW/I Fokker D-VII, and later on the Travel Air 2000.

In summary: use free-moving hinges which are not affected by pressure from any direction. Have the control operating mechanism terminate in an auxiliary device BEFORE it is attached to the servo. Build the control surfaces as light as feasible. Balance the surfaces, both statically and aerodynamically.

An interesting sidelight to this is what is done to reduce control pressures on jet-type aircraft. At full speed, such pressures are so great that a pilot would have to fight to move a control. The answer to this is to use a servo to perform the actual work. The hydraulic or electric servo is operated by a simple switch or valve, sometimes a potentiometer, none of which create any pressure. The control lever is connected only to a switch or valve, not to the surface itself. As a result, such a system has NO control pressure. To get the proper control "feel" for the pilot, a system to provide pressure to the control lever HAS to be added to the system!

One of the things that has made the large models more interesting is the availability of large engines to power them. The design concept of our normal model engines is not particularly acceptable when you go above their usual size. For example, we get excellent horsepower and tolerable economy from engines of .60 cu. in. and smaller. When the displacement goes above that, we get an increase in power, but at a large loss in economy. Fuel costs are at a point where any increase in consumption really affects the pocketbook.

These large engines are being adapted from industry, and obviously fill a need. Operating on gasoline instead of model fuel, they use very little fuel, by comparison, and at a much lower cost. Gasoline does not adapt itself very well to the use of a glow plug . . . at least no one is offering a way to use it with a glow plug. Without a glow plug, spark ignition is required, using either a coil and batteries, electronic ignition and batteries, or a magneto. All of these have a shortcoming when used with a radio control system, in that the R/C system can be affected by the ignition system. So, what is the solution. With today's autos we do not see it, but years ago our cars provided an excellent example. The auto ignition used to affect the car radio. Anytime we create an electronic spark, a radio frequency is generated, very short in range, but often quite powerful. In fact, the first radio built used spark emission as a means of generating an R.F. signal. The auto makers solved their problem by adding interference rejection circuits to the radios themselves by "shielding" the receivers, and by the use of suppresion in the spark plug wiring. We can learn from their experience.

The interference is created by the ignition points breaking the low-voltage circuit. This sparking is handled quite well, usually, by the capacitor used in the breaker point circuit. The bigger culprit is the high-voltage circuit and the burst of current required to fire the spark plug. This is an excellent R.F. generator, but, unfortunately, cannot be eliminated.

There are two ways in which we can fight it in our models. First of all, and very happily, most of the modern R/C receivers have a considerable amount of interference rejection built into them. Outside interference has long been a problem with R/C models. As a result, R/C engineers battled with interference, and have done a commendable job of conquering it, especially by encasing the receivers in metal boxes, as the metal is an excellent shielding. Modern radios are quite compatible with ignition engines, providing we use just a bit of caution.

The interference from an ignition engine is very short in range. Therefore, mounting the R/C gear as far from the engine ignition system as possible is of great help. This includes any portion of the R/C gear since the wiring acts as an excellent interference conductor. Another smart move is to provide a metal shield between the engine ignition system and the radio. Aluminum is fine, and a simple thin layer on the first full-size bulkhead behind the engine would suffice.

If you wish to go further, the use of an automotive-type spark plug cable could help. However, this suppressive cable has a relatively high resistance, and it is possible that a particular ignition system

K&B engines IN REVIEW!

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K&B 6.5cc (.40) Front Rotor
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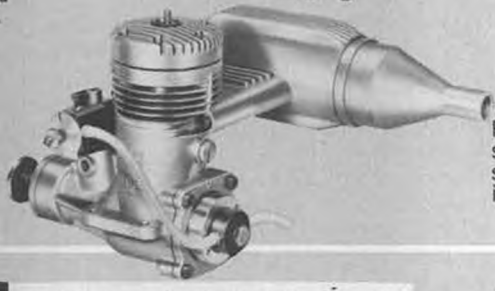

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would not tolerate it. If a problem should occur, keeping the lead as short as possible would help. Otherwise, the coil output would have to be increased to compensate for the added resistance of the suppressive wire. On the bright side, experience is showing that our modern R/C systems are quite capable of excellent operation with ignition-type engines. A little precaution seems to be all that is necessary.

It has recently come to our attention that a completely shielded, transistorized ignition system is being produced and sold by 77 Products, 17119 So. Harbor Blvd., Gardena, CA 90247. They can also convert just about any glow engine over to ignition operation. Send them 75¢ for their product and information booklet.

SOAP BOX

Flying fields continue to be a predominate topic of conversation in modeling circles, and why shouldn't they be; without a place to fly, we have no hobby! After all these years we appear to have a proven solution to the problem; the various governments are willing and able to provide us with flying sites! For those who do not have a civic flying site, the question always is, how to get one. The subject will interest many R/Cers, and we wish to discuss it. However, the obtaining of a government-sponsored site is directly related to another factor of modeling which we often overlook. Before getting into the procedure, let's realize that publicizing our hobby/sport is very important. Government officials are simply not going to be concerned about something that they do not know exists.

When providing government-sponsored facilities, officials are concerned with two things: how much public interest there is in the activity, and how many people are engaged in the activity in the area. Both of these items are directly related to the exposure given to the hobby in the area. R/C is a hobby which can fascinate the general public, even though they might not wish to personally get involved. It is a pretty good spectator event. Out of every crowd that is interested enough to watch, there are always a few who would like to give it a try; these are potential newcomers. You obviously cannot create these possibilities by keeping what you are doing a secret. You can make them more than possibilities by telling and showing the public what you are doing. Good publicity costs nothing, monetarily. It does require some effort initially, and constant vigilance to keep it going. But this is a small price to pay for the gains that can be had through it.

Publicity is not hard to obtain. The media is hungry, and more than willing to provide coverage. With the competition between T.V., radio, and all the papers, there are never enough INTERESTING items to fill their agenda these days. T.V. has set aside a certain amount of time for local activities on news programs, radio stations offer "spots" to non-profit organizations, and the newspapers often have special sections just for such things as interesting hobbies and R/C.

All that usually needs to be done is to let the media know something is happening. If you are starting from scratch, make an appointment with one of the media's news editors. Show him and tell him about an R/C model; you have something interesting enough that he will take it from there. Invite him to a club activity, he will be sure to have someone there to cover it. If you do not get action the first time, follow it up in a short while. You may have hit at the wrong time, for any one of many reasons, on your first try. Once the ball starts rolling, you will be surprised how it can snowball if you just keep giving it a little push.

The key to publicity is activity. When someone *does* something,

that is news. Surprisingly, the doing does not have to be something *you* would consider spectacular. What is old hat to you, can very well be new and exciting to many others. So, something as simple as a weekly flying session can often be enough for a starter. A healthy club is one that has scheduled activities; mall shows, auctions, symposiums, contests, fun flys, banquets . . . you name it. All of these are activities and therefore news, meat for the media. However, the media cannot read your mind, so you must keep them informed as to what is happening.

Public exposure, such as you will get, produces a better-informed people who will UNDERSTAND what you are doing. Many will be interested in the show that you provide, and will be sympathetic to your needs. Before long you will find that you are no longer that "toy airplane nut" down the street. When you go before the recreation officials to present your case, the results will depend directly on the picture you create for them. If publicity has already painted the background for you, it will be much easier to fill in the details and get satisfactory results.

Just as people are interested in what you are doing, so it this column. We want you to be part of it. Let us have your thoughts. YOU WILL GET AN ANSWER! •

Mammoth . . . . *Continued from page 42*

swinging the same prop at the same speed, with a little practice. You can also match a .15 and a .60 for frequency or RPM, but it takes considerable practice, far more than we had time for during our trials. However, we did manage some very accurate comparisons with other equipment, about 3 to 5 MPH difference in the speed range of 60 to 70 MPH, and found that the accuracy goes up as the speed goes up.

Practice and proper procedure will improve that. Wings Engineering now has a Quadra and hopefully will have a tone match for it and other large engines.

There is one problem with an audio tach and that is that you can't operate it with a lot of other aircraft in the air, or with someone breaking in his engine on the field a few feet from where you are flying. You definitely have to distinctly hear your own aircraft in the air. If you want to get the most out of your model's performance, this instrument will be a big help and a good one for clubs to consider purchasing, rather than the individual modeler. Remember, it's only as good as the person operating it, and depends a lot on how much time he is willing to spend learning how to operate it properly.

In the June issue of **Model Builder** we discussed airscrew vs. rotating wing theory in props. It's interesting to note that airspeeds of my bulky cargo-carrying drones averaged out at 65 MPH on two-way level runs with no flight correction angle required. Eight thousand in-flight RPM on three different brands of 18 x 6 props, in airscrew theory (100% efficient and no slip), would limit speed to around 45 MPH, and no props are 100% efficient.

Next month, we'll be writing about construction tips, with photos, etc., but one flying tip I'd like to emphasize is to resist the temptation to push, pull, restrain, or otherwise manhandle your aircraft on the ground by hanging onto the vertical fin, no matter how handy it is. It puts tremendous stress on it, and it could eventually end up failing in the air. I found out the hard way and should have known better.

Credit for the wooden Quadra motor mount goes to Bob Bailey, of Colonel Betkey's Flying Circus. The

advantage of this mount is that you don't need to weld or form metal. Don't forget to use Loctite on the bolts. This mount is used on his 25 lb. Nosen Gere Sport with banner tow, bomb bay, etc.

Photo credit for the 1/4 scale J-3, kitted by Practical Scale of Germany and superbly built by Maj. R.H. Jacquot, Box R, APO New York 09102, goes to Maj. Jacquot. Scale dummy engine, full interior. Quadra engine uses scale-like exhaust outlet. Airflow 18 x 6 prop, scale diameter. Mammoth scale allows practical detail. Photo credit for Pratical Scale's prototype Nieuport 17 is the proud owner (he must be proud, I'm jealous), Reinhold Gerner of West Germany. Scale 1:3.3, span 2.63 meters, weight 11 kilos. Very easy to fly and is aerobatic with the Quadra engine. Wheels and all Practical Scale kits will be handled in Canada and North American by Polaris Products, Inc., 2514 Hwy. 97N. Kelowna, B.C. V1X 4J4, Canada. In the U.S.A., it's Condor Hobbies, 17835 Sky Park Circle, Suite E, Irvine, CA 92714.

Remember to send along your good, clear, black-and-white photos (color photos do not reproduce well) to either **Model Builder** or myself, Ron Shettler, Pottery Rd., R.R. #3, Vernon, B.C. V1T 6L6, Canada. Let us all know what you are doing in the way of Mammoth Scale models. •

Steam Launch . *Continued from page 63*

clothespins can have wood removed from inside their jaws, to allow larger gripping size. Small scraps of wood can be used as wedges between a ribband and plank to hold the plank tight against the preceding plank. It is a good idea not to lay more than one plank per side until the epoxy has set. If planking progresses at only a few planks per day, it seems to take the drudgery out of the job. You can be preparing other parts, building whistles, valves, etc., during the rather long planking period. The important thing is to lay planks *every day*. Once you get five or six pairs of planks in place, you can begin the smoothing and sealing process described later. You will be surprised at your progress in just a few weeks of laying planks at the rate of just a few a day. A vertical disc or belt sander works well in tapering planks.

As planking progresses beyond the first three pairs, all planks will stop at the laminated rib over frame no. 10. From this frame aft, you will begin planking with the center plank laid along the stern post and tapering smoothly into the stern planks previously laid. Additional planks in the area from frame no. 8, aft along the turn of the keel toward the propeller shaft to frame no. 10, will require laying planks on edge to build extra thickness, and quite a bit of splicing and fitting will be necessary in this area. This hollow-shaped area will be sanded to shape using a dowel wrapped with sandpaper or emery cloth. Some roughing out can be accomplished with the coarse sanding drum of a Dremel tool.

In order to obtain a natural finish on the hull, and to seal cracks, epoxy should be used as a surface filler on the planking. After rough sanding the planking, epoxy should be rubbed into the wood, and any excess removed by scraping before the epoxy sets up. When the epoxy has hardened, the surface may be scraped again, using a single-edge razor blade, until you have produced a smooth surface. This should be done carefully to avoid scratching the wood with the corners of the blade. It might be a good idea to practice this on some scrap wood before attempting the actual hull. After the hull is scraped smooth, apply more epoxy and scrape off the excess. When hard, scrape again until smooth. Repeat this sequence until the hull is smooth, all cracks are filled, and all grain is filled. Wet-or-dry no. 400 paper can be used to further smooth the hull. Polyurethane varnish can then be applied. Five or more coats, applied with a one-inch wide "poly brush", gives a nice finish. The foam "poly brush" is inexpensive, reusable, does not leave brush marks, does not shed, and can be purchased in most paint stores and some hardware stores. Try it, you'll like it. All wood parts should be finished with varnish. The inside of the hull should be well sealed with at least three coats, but five or six coats would be even better. I used high-gloss varnish on the exterior of the hull and deck, but used satin finish on all interior parts.

With planking completed, you will be over the roughest part. The remainder of construction is straightforward and should need no explanation, other than the notes on the construction drawings.

If you use one of the Saito steam engines, you may have trouble reading the English-written-by-Japanese instructions, and so a few words about the operation of the engine are in order. The boiler should be filled with distilled water until the open overflow bleeds water. The oiler should be filled with the supplied cylinder oil, and bearing reservoirs should also be oiled.

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Stroke	12 mm	12mm	12mm
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No load RPM	5400rpm (B2E)	5000rpm (B2F)	4800rpm (B3)
Horsepower	.00344 @ 550rpm 450g torque	0.24 @ 2800rpm 650g torque 900g max torque	0.3 @ 2700rpm 850g torque 850g max torque
Length	80mm	115mm	145mm
Width	70mm	70mm	70mm
Height	110mm	100mm	100mm
Weight	500g	875g	915g
Engine displacement	1.35cc	2.7cc	4.05cc
Recommended boat length	90cm	1 - 1.3m	1.2 - 1.4m

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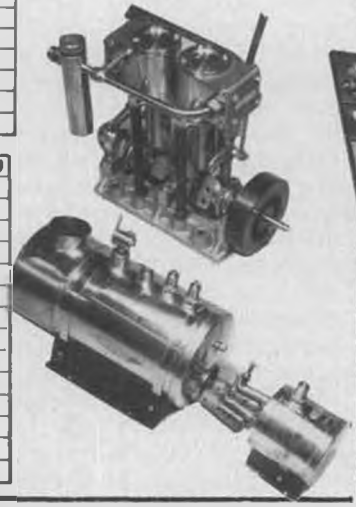
Burner fuel	Alcohol	Alcohol	Alcohol
Engine type	T1D	T2DR, T3DR	T2DR, T3DR
Length	225mm	300mm	350mm
Width	75mm	75mm	75mm
Height	125mm	120mm	120mm
Weight	820g	1260g	1600g
Alcohol capacity	80cc	100cc	140cc
Burn time	20 min.	20 min.	20 min.
Boiler safety valve pressure	2.5 kg	2.5 kg	2.5 kg
Burner safety valve pressure	1.5 kg	1.5 kg	1.5 kg
Endurable boiler pressure	45 kg/cm	45 kg/cm	45 kg/cm
Endurable burner pressure	60 kg/cm	60 kg/cm	60 kg/cm
Boiler working pressure	2 kg/cm	2 kg/cm	2 kg/cm
Burner working pressure	0.4 kg/cm	0.4 kg/cm	0.4 kg/cm



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The burner valve should be closed until after the burner has been preheated properly. Preheating is done by putting a small alcohol burner under the main burner assembly. This heats the vaporization chamber, to cause vaporization of the alcohol. After several minutes of preheat, the burner valve can be opened and the burner lit with a match. If, on first opening the valve, liquid alcohol comes from the jet, then the burner was not heated sufficiently. If you had a flame-up from the raw alcohol, close the valve, blow out the fire, clean up the excess alcohol, and start over with preheat. When properly operating, the burner will have a forceful blue flame and a roaring sound similar to a blowtorch. The burner used for preheating can then be removed. The burner is supplied with a cleaning needle, and it may be necessary, after several hours of operation, to remove the screw plug at the rear of the jet and push the cleaning needle completely through the jet, to clean any gunk from the jet. Lifting out the front floorboard and removing the two mounting screws for the burner tank will allow you to service the burner more easily. You should *not* use rubbing alcohol in your burner, but rather, a good grade of stove alcohol, available in marine and paint stores.

Remember that all major components of the launch should be easily removable. The canopy just slips off the support poles, and the poles slip out of their mounting sockets. The boat can then be operated without the canopy.

All steam connections should be made with silicone rubber tubing (model airplane type), which will allow the floorboards to slip out without removing the engine and boiler. The condenser can be slipped out of the way to allow removal of the main floorboard assembly. The main floorboard assembly carries the two side seats, rear seat support, and servo tray, so make all pushrods quickly removable. The floorboard just rests in position; no screws are necessary.

The pushrod controlling the forward/reverse lever on the engine should have the spring override and shock absorber shown on the drawings, to avoid causing undue wear on the valve linkage components caused by overtravel on the control. The throttle should be set up so that, when at full low throttle position on the transmitter, the throttle valve on the boiler is not fully closed without also moving the throttle trim lever on the transmitter to full low throttle trim position. This is done to help prevent unnecessary strain on the throttle servo when stopping the engine with low throttle position. At full low throttle position and low trim position, you should have a fully-closed throttle.

At first, my boat was operated with no trim ballast, but I have since added ballast to the bow section to get the boat on the designed water line. No other changes have been necessary, and I have been very pleased with the boat. It looks good on the water, and also makes an interesting and beautiful display model. Take your time, do a good job, and you will have a valuable and unusual model. How many steam launches have you seen at the pond lately?

If you decide to build the model, it is assumed that you will purchase the full-size plans from **Model Builder**, since the exact shape of the frames is important. I hope this article will result in a new interest in the fine, classic designs of years past. Radio control seems so fitting for operation of these quiet and graceful models. ●

Fuel Lines . . . *Continued from page 25*

tell him? One of the most difficult tasks I can think of is to try analyzing someone's problems by mail. All kinds of possible causes come to mind, some more common than others. This is a subject we have all been confronted with at one time or another, and I would like to take this opportunity to render my opinion on it.

Chances are, the worn-out engine this fellow has was probably the victim of ignorance relating to proper model engine care and operation. This can apply to glow engines as well as ignition engines, although ignition engines are more demanding of a proper break-in procedure.

Unless you have purchased your new engine from someone who specializes in customizing model engines, your engine will have come directly from the manufacturer's assembly line which assembles hundreds of them each day. Small errors are bound to crop up. I have handled many engines of different manufacture that have had no head, crankcase, or exhaust pipe gaskets, loose cylinder head bolts, and even machining chips inside the crankcase. To the unsuspecting purchaser, these things can cause lasting effects on his engine and additional expense for repairs.

So, step number one: at the risk of inviting criticism, I recommend that before you fire up your newly-acquired engine, whether new or used, take it apart and check it over carefully for condition. This is very important and will also familiarize you with the internal configuration of your engine.

Extreme care should be exercised when disassembling an engine for the first time; however, there is nothing difficult about it. Keep your work area clean and orderly, placing the disassembled parts on clean towels. Inspect each component carefully for defects. In a used engine, check to see if all the parts are indeed there and not missing, such as ball thrust bearings on the crankshaft, and that they are installed correctly. Gaskets should be checked for breaks or other defects and, if necessary, replaced. Bearing

surfaces should be checked for wear. All baked-on grease and carbon deposits should be removed. A clean can of kerosene is recommended for cleaning all parts, and an air compressor is invaluable for the finishing touch.

A few points that should require special attention: in used engines that have piston rings, check to see that the rings are free to move around in the piston ring groove. If they do not, soak them well in dope thinner, and then, with your fingernail, apply pressure against one end of the ring and try to make it turn around in the groove. Sometimes you must hold and maintain this pressure for a few seconds before the ring will start to move. Sometimes repeated soakings in thinner are also necessary. *Do not*, under any circumstances, try to pry the ring out of the piston ring groove unless you intend to replace it with a new one. Any distortion of the piston ring will make it useless for compression seal.

Reassembly of your engine after cleaning and inspection is quite simple, but requires reasonable care. Each moving part should be oiled before assembly, and after assembly it should be tested for proper fit before the next component is installed. For example, after installing the crankshaft, make sure it turns freely, without any sign or feel of grit before attaching the connecting rod and piston. After installing the cylinder liner, turn the engine over again with your fingers before installing the cylinder head. After all bolts are installed and tightened, the engine, without a plug in the head, should turn freely by finger pressure alone. If not, you had better look for causes of drag or binding before proceeding any further.

Now that everything is back together, the break-in is all that remains before installing it in your model. This is not an involved operation, but certain conditions must be met. Mount your engine on a sturdy stand. Choose a small-diameter, low-pitch propeller that has been balanced, and install a spinner for electric starting. If you have an ignition engine and wish to run it in using the ignition system, you will have to include all of the support equipment (coil, condenser, and three-volt battery). Fuel for engine break-in should be the equivalent of FAI fuel or a mild glow fuel, not to exceed 5% nitro content, and should contain castor oil. The use of alcohol-based fuels for breaking-in a new motor is recommended instead of gasoline, because it will allow cooler running temperatures. On a rich four cycle, you can actually hold on to the cylinder fins without burning your fingers. The thing we are trying to accomplish during this break-in period (which should take about an hour) is a mating of moving and stationary parts with a minimum of wear.

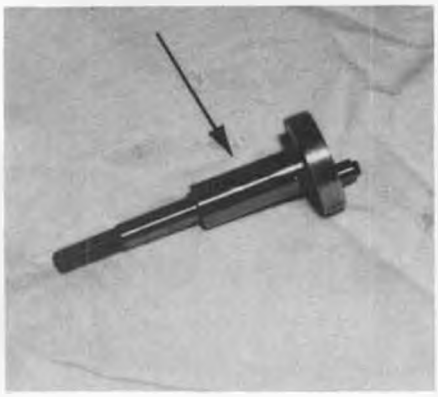
The small-diameter, low-pitch prop requires no appreciable power to turn, the alcohol causes the engine to run cool and the castor oil provides excellent lubrication. Infinitesimal machining marks are gently removed and piston ring surfaces are work hardened and mated. Start with a very rich mixture and gradually lean it out. I like to start with as rich a mixture as the engine will tolerate; run it for two minutes and stop it for two minutes to cool. Before restarting, close the needle valve 1/2 turn and repeat the process. Continue this procedure until your engine cannot be leaned out any more without stopping. When you have arrived at this point, your engine should be able to run wide open without slowing down for at least two minutes. If it does not slow down, you may consider the job finished. If it does slow down, additional running-in may be necessary. At this time, your ignition engine may be switched to operate on gasoline. Next month my subject

will include ignition fuels and lubricants. I would sincerely appreciate your comments or questions. •

ALDRICH

• There has been a lot of bad advice printed about the fitting (re-fitting) of ball bearings in model engines over the years. This month we'll cover the right way and the wrong way to fit the bearings to the crankcase and the crankshaft to the bearings.

The most undesirable thing with any ball bearing set-up is to have the bearing's outer race spin in the case. When this happens, shaft misalignment is almost certain to occur. This allows the shaft to drag on the crankcase between the front and rear bearings. The photo shows the gaul marks caused by shaft misalignment. In this instance, the bearing was not turning in the case, but the shaft bore in the case was not true with the bearing bores. Either case of poor alignment can cost 1000 to 2500 rpm, plus cause overheating of the case/shaft area. Careful lapping of the shaft to the case, or use of an expandable lap (see photo), can cure minor problems with misalignment. Lap just enough to eliminate the drag problem. Take out too much, and fuel will pour out the front bearing. Continued gauling means you'll have to replace the crankcase.



The best advice we can offer to those not really experienced with bearing/shaft fit, and bearing fit to the crankcase, is to *leave it alone*.

In spite of all that one may hear, most bearings are not fit overly tight in the crankcase. On occasion, a bearing may be fit too loose. This can be cured by applying a very small amount of Loctite to the bearing outer race, and assembling the whole lower unit. Tighten the prop, make sure everything spins freely, then heat the case over a gas stove for about 45 seconds. This will start the Loctite setting up. Check with your local bearing supply for accelerating primers that aid in speeding up this process. Remember, use too much and it's liable to run over, into, and around, the bearing balls, and when it sets up the shaft ain't gonna turn no mo'. We use a Q-Tip (see photo), and only wipe on enough of the solution to make it barely visible on the outer race surface.

Of all the engines made today, there are two basic systems used in the fit of the ball bearings to the crankshaft and crankcase. Note that we always include the shaft and case when referring to bearing fit, because one isn't right without the other.

K&B uses a system whereby the shaft is a tight fit to the bearing inner race, and the bearing outer race is a light, "heated drop fit", to the case. This means that when the case is at normal room temperature, the bearings would require a press fit. This type of set-up is generally very free-spinning. This results from the nec-

essarily generous bearing internal clearance, since the tight fit of the shaft to bearing inner race takes up some of the bearing's radial play. If this type of fit is tried with radial play of say, .0003 to .0005 inches, the most notable thing that will happen is that one or more of the balls will split or crack, locking up the whole unit.

The most commonly used set-up is seen in the Super Tigre, O.S., H.P., Webra, Rossi, etc., engines. With this system, the bearing outer race is held firmly in the case by a "shrink" fit, and the shaft is a light push fit in the bearing inner race. Again, the internal clearance of the bearings must not be too tight. One of the usual mistakes made is to buy "instrument" bearings to replace the factory units, thus getting a very close-fitting bearing that will crack the balls and/or fail. When replacing bearings in an engine, the best type to use employs a phenolic retainer. They are expensive, and some of the sizes are very rare if not impossible to obtain, but the phenolic retainer has a tendency to dampen harmonic vibration and will generally last a long time. We ran one set in a S.T. G-65 for three seasons with no problems. The internal clearance can be a bit closer with this set-up, say .0005 to .0007 inches but as with the K&B set-up, it is most important that the outer race *does not* spin in the case.

Bearing removal is made easy by the rear mandrel shown in the photo. It is machined from aluminum to a light push fit to the bearing inner race. We do not like to use an oven or propane torch to heat a crankcase, but instead prefer a gas flame, as with the kitchen stove or a bunsen burner. By laying the mandrel on the stove grill, with the case in the flame for 45 seconds to a minute, and at the same time applying a propane torch to the mandrel, the rear bearing will normally come right out on the mandrel. Many times all that is needed is to heat the case for 45 seconds and, holding it with a glove or cloth, tap the rear of the case on a folded rag, and the rear bearing will fall out on the rag. While the case is still hot, use a short piece of phenolic rod or wooden dowel to push the front bearing out.

To reassemble a ball bearing unit, it is best to do it all at once, while it is hot. A pair of asbestos gloves or a couple of pieces of old bath towel will prevent burned fingers. First, slide the rear bearing onto the shaft and drop the whole thing into the hot case. Now slide the front bearing on the shaft and into the case. All that remains is the prop driver and tightening the prop. Before trying to spin the shaft, apply a few drops of light machine oil and give the end of the shaft a light tap on the end, to seat the front bearing. Allow the whole assembly to cool before assembling the rest of the engine.●

1 to 1 . . . . . *Continued from page 23*

the competition scene, and perhaps become the better-prepared competitor.

What is your motivation, Brad, for wanting to enter competition? We hear people speak of the "hardware hunter", the "must" winner, as well as the individual who says that "I

don't want to compete . . . I only want to build for my personal pleasure." Or perhaps you've heard him say that he's just doing it for the heck of it, and that he really doesn't care about winning.

There is a plausible strain in any of the reasons that Brad might give for wanting *or not wanting* to compete. I am constantly amazed at the number of "non-competitors" who become intimately involved in the contest scene, whether it be as an observer or organizer.

Brad needs to consider his model. If he really loves a P-51, he must bear in mind that his model will have to be head and shoulders above the competition, since there might be six entered in the same contest. It would help if he could find documentation for a more obscure version, or paint scheme that will help to set his apart from the others. A good model is a winner, no matter what, but a more commonly presented model probably invites more direct comparison with other models of the same subject. How about picking the more obscure "Widget 10", since no one has ever done that one! Granted, the judge should always base his judgement on a direct comparison between the model and the presentation; however, it has to be difficult to completely shut out some direct comparison between similar models.

Probably one of the biggest problems that our friend might have could be found in the rule book area. Even though he had spent six months building, he was not aware that he needed a muffler until his friend had brought it to his attention. How well has he studied the rules he will be using for competition? How many options is a touch-and-go worth? Are you limited to the amount of documentation you can use? What does the "Builder of the Model" rule mean? What maneuvers can he elect to do, especially if he happens to have a non-aerobatic model? Was he aware that parts could not be changed or removed between static judging and flying, except as noted? Is there a time limit in the event? What about weight and engine size?

The Brads of the world often have a rule book problem. The modeler who is more familiar with it as the edge. When all else fails, read the book!

Another "reading" problem often faces the beginning competitor. It is distressing to see an individual fail to "read" the situations which develop at any contest. To elect to do a touch-and-go with a twenty-mile-per-hour crosswind on the runway will not contribute to your winning. It pays to study the flights of other contestants, for much can be learned in "reading" the manner in which the judges see the flying. We will not raise the question of judges' objectivity here, but certainly one must realize that any judging includes some amount of subjectivity. Lay that aside for the time being as a Pandora's box of its own. Consider such things as placement, type of fly-by, etc.

A little item of thought is the position you take when you fly. How many times have you watched the judge lean to one side so that he can see around the contestant standing right in front of him. Or perhaps he stands so that the landing approach forces the judges to stand or move to see the model. Stand where you can be heard but not seen, the reverse of the old maxim.

The next suggestion for Brad must be weighed very carefully and used properly, or it can become a liability rather than an asset. By and large, judges seem to appreciate information relative to the aircraft you are flying. Interweaving this information in the flying pattern at appropriate points can help achieve a total picture for the judges. Perhaps the information could include items such as aircraft size, uses, performance, and capabilities. Be warned, however, that some judges might question whether you are questioning their expertise in the field. This is rare, but must be considered.

Be certain that such information is accurate. Judges often have extensive backgrounds in full-scale aircraft and historical aviation information and to feed them a line will certainly not enhance your standing. Make certain that you fly your model in a manner that fits your description.

Check your score sheet, Brad, after both the static judging and the flying. The static score sheet often contains comments that are valuable to you for future reference. If not, talk to the judges, especially the low one(s), and try to determine what caused them to downgrade your model. This can be an excellent learning process. The purpose is not to debate the issue, but simply to glean what you can from the information.

With the flying, checking after the first round can help you determine what maneuvers might best be eliminated or substituted. While they shouldn't be, some of those old "automatic tens" still seem to be about. Those are the ones that give you ten, even if the gear goes up and down, bang-bang. If you notice that the model before yours has a landing gear that cycles through a staggered retraction over a period of six seconds, you may not wish to show yours as an option. An 8 for a well-done maneuver is better than risking a 5 for your bang-bang retracts. Three points in a Sport Scale contest is sometimes a big margin.

Check beforehand also, as to whether you can alter your flight pattern from round to round. While it shouldn't be a problem, some contests have been known to not allow it, or at least tend to dis-

courage it. This makes your original selection more critical.

A last consideration must be your deportment on the field. While this may seem an unnecessary consideration, it unfortunately is not. To watch a contestant jump up and down and shout oaths at his model, because it seems to fail in *its* performance, is disheartening. To blame an inanimate object for our failings reveals a lack of maturity. It doesn't happen often, but it does happen.

We've gone on at length. The purpose is not to stimulate the "hardware hunter", but to simply make a competitive venture less frustrating. Rules are seldom perfect and often may not seem to fit our needs. They can be changed. However, you can also operate within their structure until a more perfect set is developed.

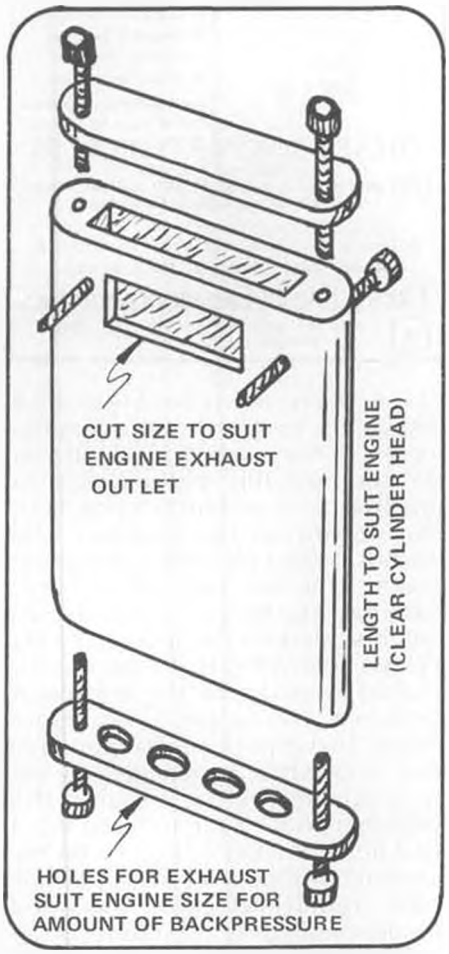
Competition can be fun. Not only does it bring you into contact with a great group of guys and gals, but it can sharpen your skills in every area. Not everybody wins the trophy. Generally it's the best-prepared person who does.

SILENCE DEPARTMENT

You say you've got a problem? You say the cowling only leaves you less than an inch to get the muffler in? You say you don't want to leave that muffler hanging outside? Tell you what you can do. . .!

Du-Bro makes a six-inch length of the aluminum material that can be used for exhaust extension. By cutting a hole in the side of the stock to fit the engine exhaust, you can fashion a stack that will hug your cylinder head and requires less than 3/4 inch of space. End caps can be easily made from soft aluminum stock. In hardware stores and home improvement centers, the Reynolds rack contains several types of materials that you can use.

Many of the newer engines have tapped mounting holes for mufflers. This makes attachment very easy. If a strap is needed, remember to use some type of centering device to hold the muffler in its proper position over the exhaust opening. This type of installation is especially useful for an inverted engine.



Exhaust made from Du-Bro extension stock. Starp can be used, but some kind of centering device is needed to line up with engine stack.

ONE MORE TIME

As a Short Shot last month, I suggested that you might like to investigate the offerings of Caltronic Laboratory in California. After a conversation with the owner, Alfred Wolff, I decided that it would be wise to bring it up again. Mr. Wolff has one of the most refreshing approaches to business that I have been exposed to in a long time. He is not only willing to provide things which are normally only found in large industrial quantities, but he generally ships within a day. Add to this a request he made in our conversation; he would like very much to hear from modelers as to the type of materials or tools that they might need, that cannot be obtained routinely at the present time.

I promised Mr. Wolff that I would undertake to make such a request of the modeling community. Listed below is just a smattering of the offerings, in order that you may get an idea of the line already provided:

Stainless screws 0-80 to 10-32, various heads (including Phillips).

Brass screws 0000-160 to 2-56, various heads.

Threaded brass rod 0000-160 to 2-56.

Dowel pins and shafting in stainless.

Drills, taps, and dies down to 0000-160 size.

Tubing, nickel, silver, and brazing items.

A flock of different types of sheet metal and bar stock.

Miniature precision bearings.

Stainless steel coating material.

Micrometers, etc.

Mr. Wolff will supply any size order and the prices are most reasonable. Each package contains varying quantities of screws, but are priced, for the most part, at $1.00 per package.

What types of materials do you need for that new project of yours? Perhaps Cal Lab can come to your aid. Forward your suggestions to me and I will compile them in a group. If you contact Cal Lab, please indicate that you learned about it in **Model Builder**. Write to: Caltronic Laboratory, 461 S. Cochran Ave., P.O. Box 36356, Los Angeles, CA 90036.

HIDE IT!

In Sport Scale, it probably makes little difference; however, we've noted some very nice models that are marred by switches, charging

jacks, and antennas with big old, gummy rubber bands hanging out all over the place. Why not do a little hiding?

There are many types of internal switch "turner-oners" on the market which require a piece of thin wire, etc., to operate. Use a little ingenuity in placing such items. For instance, a little right-angled piece of wire blends in very nicely with a panel line, and is hardly visible. A charging jack can hide under an inspection panel, but is still accessible with a little effort.

Cockpits are very logical places as well. There is always a multitude of pull-type things that can be attached to a switch. It does help to let your pit crew know where such things are, since it's frustrating to retrieve a model and not know how to shut the darn radio off.

Some people have been known to have the switch hidden in a cockpit, and have the cabin door close and lock with its own itty-bitty key. The last time I ran into that was with Steve Sauger on the U.S. scale team. Bless his heart, it always seemed that we were looking for a key that I had to use my bifocals to find.

The rules allow you to add an antenna to the model between the static judging and flying. In many cases, there is no problem with allowing it to stretch out down the length of the fuselage inside. If you do not trust this method, due to possible radio problems, bring it out the bottom of the fuselage and anchor it right along the bottom. It makes it far less noticeable, but is external. Maybe you can utilize an antenna mast on the aircraft as well. PLEASE remember that if you leave it tucked away during the judging, it behooves you to get it out before flying. That experience happened to me, and while I managed to get through the flight, it scared the bejeebers out of me to learn that I had flown the whole flight with the antenna wrapped in a neat little ball, right around the servos. This is not recommended as a method of allowing you to keep a model for any extended period of time.

What are some of the methods that you have used to hide those non-scale items? Let's hear about them.

HINTS THAT HAVE SERVED ME WELL

Have you ever noticed that if you try to fly while holding down elevator, you make the local rollercoaster look like a kiddy car? Very often we have observed that, on maiden flights of scale-type models, they tend to be plagued with tailheavyitis. While the run down the asphalt or grass is uneventful, you suddenly find that you are flying a helicopter as your Widget 10 hangs on its prop.

Hopefully, your lightning reflexes have caught the problem and you have fed in down elevator which, with a little bit of luck, has allowed you to bring a bit of sanity to the model's attitude. You are still faced with the prospect of having to hold down elevator to get the baby down safely.

I have made it a practice of making the first flight with some down elevator trim in the model, with the trim lever in a center position. You are much less likely to be faced with the helicopter syndrome. Granted, you may have a down trim problem, but I am sure that you have discovered that a very acceptable flight attitude can be maintained while holding up elevator on the stick, if the trim lever will not bring you to a trimmed condition.

A note of caution must be sounded in using this technique if your craft is a taildragger, rather than tricycle gear. As you pick up speed, it is very easy for the model to go over on its nose if you do not watch it carefully.

Some scale models, in fact many, utilize a washout condition in the wing to accommodate thin, tapered wing tips and other "problems". Some years ago I encountered a problem that has prompted me to use a technique that *assures* me of having maintained a washout condition, throughout the final stages of the building, up to the flying.

The problem that developed some time ago centered around the fact that a build-up of covering and paint between the main wing structure and the flaps caused them to droop ever so slightly. As I completed the model, I aligned the ailerons with the flaps, which in turn caused *them* to droop ever so slightly. The initial flight resulted in a very sensitive craft which flew on the verge of a snap, throughout its very brief encounter with the elements. Since the CG was quite far forward and one could see the washout in the main wing structure, I was at a loss as to the nature of the problem. Careful examination finally revealed the case of the drooping ailerons. I turned two turns of up aileron into each of the two clevises and flew the model again. It had become a tame pussycat, and flew like a trainer.

Since that experience I have always cranked in a turn or two of up aileron into both ailerons before that maiden flight. This year, my Sport Scale offering, a DeHavilland DH 88, has very thin tapered tips, and the practice has been main-

tained.

SHORT SHOTS

Where is the mail, fellas? Several possibilities occur to me: no one is reading this column, everybody agrees with everything I've said (Ha! Fat chance), everybody disagrees with everything I've said.

I really expected some feedback regarding the comments made several months ago concerning big models. I haven't heard a word. Is there anybody out there?

On your Sport Scale model, do you need to come up with the struts on the retracting landing gear legs, but don't want to become a metal bending specialist? Locate some of the smaller size of black rubber (neoprene) fuel tubing. With just a tiny bit of tension, when the gear is down, it will look right. When the gear folds, so does the "strut". Try it, you'll like it.

Remember the wise words of Dale, "With scale you cannot fail, 'cause there are always new heights to scale." •

Hannan . . . . . *Continued from page 83*

construction of models and full-size reproductions. Memberships are available for $5.00 per year: American Air Racing Society, P.O. Box 121, South Euclid, OH 44121.

THE FIRST FLIGHT SOCIETY

Yet another organization has been brought to our attention. Appropriately addressed P.O. Box 1903, Kitty Hawk, NC 27949, the First Flight Society offers membership to anyone interested in the history, origin and future of flight. Fees range from as little as $1.00 for junior members, through $500 for permanent membership. Our thanks to Tom Elliott for this information.

MOVE OVER, BLERIOT!

Florence Bakken sent a clipping to the Hangar, showing a photo of the first powered hang glider to cross the English Channel. Pilot David Cook made the trip to Calais, France in a little more than an hour in a craft which strongly resembles a Volmer Jensen design. A nine hp engine mounted above the wing provided the urge. By contrast, Louis Bleriot utilized a 25 hp powerplant, and covered the same distance in the opposite direction in 37 minutes.

VINTAGE PLURAL?

Russ Brown asks the musical question: "In referring to more than one Farman, should we use Farmen?"

"DARING" GOEHRING UPDATE

Manpowered flight enthusiast Clyde Goehring has completed his aircraft, which has now been moved to a new hangar at Palomar Airport, Carlsbad, California. Scheduled are a series of static thrust tests, to be followed by towed flights for control familiarization. Resplendent in yellow covering with red Gee Bee-type scallops, the craft attracts attention from every passerby. Goehring is a long-time model builder, and is currently building a replica of an original old-timer, powered by a Brown Junior ignition engine.

CROSSWINDS

The Cleveland Free Flight Society publishes one of the finest newsletters we receive, and in addition to presenting scale information, 3-views and model plans, the publication offers perceptive philosophy, such as this from Editor Dennis O. Norman: "Free flight modeling, particularly rubber power scale free flight modeling, is an aspect of the hobby with which almost everyone has dealt. Most probably think that they "passed through" or "outgrew" rubber power scale free flight for more sophisticated things like R/C, U/C, etc., but more and more of us are coming to realize the joy, beauty, and relaxation that can be had in building tissue and stick models again. Many of us were frustrated in our younger days by our inability to build models of this type. And of those of us who could build them, all too many could never get them to fly. There are probably hundreds of thousands

and perhaps even millions of people in the world today who tried to build a stick and tissue model at some time in their youth, were frustrated by the experience, and who have never tried to do so again. It is regrettable, but those who are taking a second look now will have to agree that there is a great resurgence of interest in this area of the hobby. If the 1930's and 40's were the "Golden Age" of stick and tissue modeling, then the late 1970's must surely be regarded as the "Renaissance" of the pastime. New materials, techniques, tools, etc. are being developed, with the result that stick and tissue rubber powered scale models are now performing as never dreamed of in the youth of today's enthusiasts."

THE PECKS IN EUROPE

Bob and Sandy Peck, of Peck-Polymers, are taking a long-overdue vacation. And the model builders of Europe have really rolled out the red carpet for them with a marvelous show of hospitality. John Blagg, spark plug of the effort to gain FAI recognition for free flight scale, gives this insight into the sort of reception the Pecks received. "David Deadman and his wife Jenny gave a party to show Bob and Sandy Peck that Free Flight Scale is alive and well over here. Jenny and David live in a large Victorian house in S.E. London. It is just as well, as some thirty scale "bods" arrived, all with scale models. I have never seen such a large collection. They were displayed on tables, hung from the ceiling, and hung from picture nails. I did not count them, but I should say there must have been eighty plus. Bob and Sandy arrived with their friends Tom and his wife. Ron Moulton arrived with a chap from the Cross & Cockade outfit. We had a wonderful time, and I think Bob and Sandy enjoyed themselves. They showed movies of your scale meetings, with shots of Walt Mooney, Clarence Mather, Bill Stroman and many more. The party broke up round about midnight."

CO_2 ENGINE SPARES

Bill Mitch favored us with this one: "I have found a good source of "O" rings for CO_2 engines. I get them from the throwaway type of cigarette lighters. You tear the lighter apart so the valve can be unscrewed, and behold! There is the "O" ring . . . just the right size for the tank seal. It will also fit the head seal on the Telco and Shark engines."

PASSENGERS GALORE

According to the Air Transport Association, about 63% of all Americans over 18 have flown in an airplane. That's approximately 94.5

million people!

PARTING SHOT

From "The West Coaster": "There is one sure way to slow down inflation: turn it over to the Postal Service!" •

Pylon . . . . . *Continued from page 41*

thing!), with Bridi Hobby Enterprises, 1611 E. Sandison St., Wilmington, CA 90744, picking up the kit manufacturing rights. The kit is being handled through the normal distributors and hobby outlets, and should be readily available.

The kit consists of the basic molded fiberglass fuselage, cheek cowls and wheel pants, along with foam wing and tail surface cores. The quality of the fiberglass parts is of the highest, with only a very minor amount of pin holes and surface imperfections. One cautioning note, though; on our fuselage, the joint line was not on the centerline; not a major problem as long as you're aware of it and don't use it for a locating line. The size of the boxes (yes, more than one) the parts come in might lead one to believe the parts are heavy. Such is not the case; the weight is entirely reasonable, even considering the large size.

The foam wing cores in our kit proved to be a slight problem. Our normal building procedure of epoxying the balsa skins on, while the cores and their sheaths are laid flat on a true building surface, and then laying a 100 lb. steel plate on them, normally insures a straight wing. Much to our surprise, we found the wings were bowed from the tip rib to the root rib. Even worse, one wing panel had the bow going down and the other had it going up! It appears that the hot wire had sagged while the core was being cut, and one foam block was inverted while being cut. Even though my more aerodynamically-minded friends assured me it wouldn't affect flight performance, when I looked at the wing it sure looked odd. I'm sure my mind's eye exaggerated the fault, but I just couldn't leave the defect in. So, I sanded the bows out, coming very close to going all the way through the 3/32 balsa wing skins. Again, this really shouldn't present a problem if you sand the foam cores straight, prior to sheeting them. I spoke with Joe Bridi at Toledo, and he assured me the problem had been corrected since his company took over kit production. The only other criticism I have of the kit is that there are some errors on the plans, as related to the full-scale version, and you really should correct these prior to starting construction. The written instructions are very detailed and comprehensive, and it would be superfluous of me to try to improve on them.

Only one other cautioning note . . . don't expect to be able to gloss over small imperfections in workmanship, expecting the large size to cover them up. It doesn't happen. If anything, it magnifies the smallest imperfection by calling attention to the area. It's not easier to get away with sloppy building habits, but harder.

While at the 1978 Toledo Show, we happened by the World Engines (8960 Rossash Ave., Cincinnati, Ohio 45236) booth and engaged in conversation with fellow **MB** columnist Dave Brown. Dave proceeded to show us the new wares for 1978, one of which was a Super Tigre X-60. Since the Super Tigre X-40 and the Form I Little Toni had done so well in racing over the last several years, it seemed natural to continue this great combination.

We took the salesmanship hype with a grain of salt, that is, until we fired up the engine on our test stand! Now, we don't claim to be an engine expert, but when something performs head and shoulders above the competitive product which sets the norm, we know it. And *that* is just what this Super Tigre X-60 does.

After a minimal break-in period, we were taching a Top Flite 11-1/2 x 7-1/2 hard maple prop at 14,200; this without a tuned pipe or special pump and carb. Once installed in the airplane, along with a Robart pump, we're able to turn a Top Flite 12x6 maple prop at 12,800 to 13,000 rpm without excessively loading the engine down. The rear exhaust configuration presented a minor problem in this aircraft, but should prove to be a blessing for Pattern fliers, as it readily lends itself to being fully enclosed in the fuselage should you desire to mount the engine upright, thereby creating a

drastic reduction in drag. It also lends itself to side mounting and running the pipe over or under the wing, by using an offset pipe adapter.

One very interesting feature of the X-60 is that it is an ABC (aluminum piston/chromed brass sleeve) engine with a ringed piston. Along with the sturdiness Super Tigre is renowned for building into their engines, it makes this engine a wise investment, rather than just a purchase. Our test engine (less pipe) weighed in at a scant 18 oz., and in our opinion, will be the Pattern engine to beat in 1978.

With an all-up weight of 10 lb., 3 oz., and wing area in excess of 800 sq. in., the power and wing loadings are well within reason for making a good-flying airplane.

Okay, that's just the gingerbread leading up to the main event. HOW'S IT FLY?

After having read uncountable numbers of flight reports of new kits, magazine plan projects, and having test flown probably over 100 airplanes personally built, it seems trite to say it. but she flew right off the boards. Very little trim was necessary to get it to fly straight and true. Airspeed is in the neighborhood of 70 to 80 mph. Stall characteristics are gentle and forgiving, with plenty of time to recover. The sheer size and more realistic scale speeds make everyone at the flying site stop what they're doing and *admire* the plane. Landings are a dream, and true to what the full-scale version must have been like. You can slow it down to a full stall three pointer or keep the power up enough to make a wheel landing and run it tail-high across the field for as long as you like.

All in all, it's been an interesting and spiritually rewarding project. I feel safe to say that, should you care to duplicate it, you too will be well pleased that you did.

One comment I must pass along concerns a close friend of my family whom I have observed snickering or smiling benignly while I've waxed enthusiastic over this modeling hobby of ours. Well, his attitude has been changed by this airplane. I can't quite put it into the right words, but his attitude has changed to one of respect and possibly budding enthusiasm for the hobby. And I think that says more than anything else.

Now, let's see . . . where's that ad I saw for a ten-horsepower chainsaw engine? Where did I put those proportional dividers? Where's that 3-view of the Gee Bee?

See you at the Quarter Scale races! •

Instructor . . . . *Continued from page 51*

priate name for a competition airplane.

Among all of the questions I've been asked lately, the most common is: "Which is better, the Curare or the Phoenix?" Well, the answer to this is that they are quite different, and each has its good points, but which is better is a matter of not only opinion but situation. The Phoenix is a fast, flashy, impressive type of airplane which does extremely good-looking rolling maneuvers. It's negative points are that it is difficult to spin well, and it is critical to trim (throws, differential, balance, sealing of surfaces, etc.). The Curare, on the other hand, is less impressive but more technically precise, and is an airplane which is easier to fly and less critical to trim. What does all this mean? Well, you will have to draw your own conclusions, but I feel that for a rank novice perhaps the Curare is better, due to its ease of flying and the fact that it's easier to trim. For the advanced novice and the middle classes, the Phoenix is better because of those all-important impression points. And for the top-level Masters flyer, it's a toss-up between impression and precision. I've found that as long as I paint it bronze and white, everyone still asks "which Phoenix is that?" I wonder what a Bootlegger or U.F.O. would look like in bronze and white?

DEAR DAVE: I've got an airplane which baffles me. It will do a large loop ok, but when I try a tight loop it snaps out on top. What would you suggest? R.D.

DEAR R.D.: I hate to keep harping on this, but seal the ailerons; if this doesn't help, then I'd bet on a warped stab. This can probably be straightened by splitting the skin diagonally and twisting it straight before re-gluing it. Don't feel bad . . . I built three Phoenix's with warped stabs and had to do this. One took third in Switzerland and the other second at Springfield, so it must work!

DEAR DAVE: I've heard many different opinions as to what is an ideal trainer. Some say a four-channel shoulder wing, while some recommended a high wing with three channels. What's your opinion? T.P.

DEAR T.P.: In my opinion, the four-channel shoulder wing is a better bet if, and only if, you have an

instructor who is willing to spend a lot of time with you. If you don't have an instructor, and must teach yourself by the school of hard knocks, then I suggest a powered glider type of airplane with rudder, elevator, and throttle control.

DEAR DAVE: What do you think of the new Masters qualifying system? R.C.

DEAR R.C.: CENSORED!

That's about all for this month, but I must again enter a plea for some questions from our readers, as I'm afraid this column can't last very long without them. Send them to: Dave Brown, 8534 Huddleston, Cincinnati, OH 45236. Send S.A.S.E for a personal reply. •

Soaring . . . . . *Continued from page 47*

Open-winch contests (you fly whenever you like within the time set aside for that round) are often plagued by "sandbagging". Many pilots choose to demonstrate their ability to wait for good air. By these rules, winning requires playing the odds on the ground, as well as being skillful in the air.

The result is a show contest which ceases to be fun. Recently, flying "man-on-man" has been used to overcome this difficulty, scaring pilots "in the same air" by having them fly at the same time. But frequency conflicts cause delays, and it's difficult to coordinate a sufficient number of pilots for each simultaneous launch.

Perhaps Don Harban, of Encinitas, California, has the answer. He writes:

"After attending several contests where duration scoring was accomplished by using various man-on-man concepts, I was impressed with the objective fairness of determining relative duration scores based upon flyers all flying in the 'same air'. Unfortunately, this benefit is obtained at the cost of slowing the contest to a snail's pace while winches and open frequencies sit idle. During one particularly frustrating contest recently, I concluded that there must be a better way, and I believe that the system suggested herein will combine the best of both man-on-man and conventional open-winch or assigned-flight-order concepts.

Basically, this is accomplished by running the event in a fashion which will keep as many available frequencies and winches in service as possible (assigned-flight-order or open-winch). Rounds are flown in a conventional (hopefully well-organized) fashion, with the exception that the launchmaster assigns each flyer a number at the time he launches. This number (the *flight number*) is entered by the timer on the flyer's scorecard and turned in after the flight is completed, along with the flight time (duration) and landing score. The *flight number* is assigned from consecutive number starting with 1 and continuing through the total number of flights put in during each round (the Launchmaster could use a simple hand counter to keep track of the flight number). When the scorecard is turned in, the scorekeeper enters the flyer's name, flight time and landing score on a scoring sheet arranged in the order of *flight number*. Then, the flyer's duration score is determined by normalizing his flight time against the best flight time included in the three previous flight numbers, the three subsequent flight numbers, and his own flight. For example:

(Max. Score = 500, Max. Time = 7 Min.)

FLIGHT NO.	NAME	TIME	SCORE
75	D.L.	7:00	—
76	A.D.	2:53	—
77	R.T.	4:21	—
78	L.L.	6:55	6.92 7.0 × 5.00 = 494
79	M.C.	5:25	5.42 6.92 × 500 = 391
80	A.M.	6:00	—
81	W.H.	3:21	—
82	M.M.	4:01	—

"As you can see, Flight No. 78 would receive a score of 494 points, since his time of 6:55 (6.92 minutes) was 99% of the best score of the six

other pilots nearest him (best score being No. 75's 7:00). Flight No. 79 would receive 391 points, since his time of 5:25 (5:42 minutes) is 78% of the best time (6:55) of the six other pilots nearest him.

"This relatively simple system scores pilots who fly together at approximately the same time and under the same conditions, much the same as man-on-man systems. The contest, however, is run on a continuous basis, other than the method of scoring the duration, and should proceed with no more delay than a conventionally scored event."

I'd certainly appreciate receiving your comments on this idea and on contest flying in general. But perhaps we should take a more relaxed point of view and encourage more fun-fly contests. Cecil Haga of Arlington, Texas, describes a "Soarathon" . . . a two-day, 14-hour meet. Arriving at the site, you are assigned to a team by frequency. The task is to maximize time in the air for your team within the seven best flying hours of each day. There are no landing points. The trick is simply to keep flying. That ought to be fun!

The Torrey Pines Gulls hold a wide variety of contests including balloon busts, limbo events, beer can "bowling" (knock down as many beer cans as you can in a touch-and-go flight), carrier landing (touchdown and stop on a 9 x 3 ft. runway at the edge of the cliff), maximum time aloft within a marked 100 x 100 foot square, and even a two-minute judge-your-own-time contest. Here, the timer is required *not* to indicate the time until after touchdown. The pilot tries to land as near to two minutes as possible while being required to perform some simple arithmetic problems during the flight in order to prevent his mentally marking time. If I remember correctly, Warren Tiahart visited with San Diego for that event and walked off with First Prize.

Many other fun-fly events are possible. How about combining the score for slope and thermal flying to bring these different tasks into a single contest? How about maximum hands-off-controls time over the slope? What about maximum time while flying inverted over flat country? How about pylon racing for weight-limited thermal aircraft (classed by size)? How about bombing runs with release of a small sack of flour? Or, one I really enjoyed: two 12-foot pylons are set about 200 feet apart at the cliff edge. Another is placed inland some 200 feet from the mid-point of the first two. Your task is to fly over the cliff, gain altitude, then proceed inland and turn around the pylon *below its top*, then return to the edge of the cliff for another circuit. You count the number of triangular laps made by each pilot in, say, three minutes. To make this even more difficult, simply move the third pylon further inland. It's a fun contest, demonstrates both strategic and tactical skill, but most important of all, it brings the fliers together to share a joyful experience. Can we find a way to preserve the best features of competition and lose the worst? •

Half-A . . . . . *Continued from page 67*

cause the model to act as though the controls are too sensitive or the wing is warped. Make all corrections, then recheck the alignment.

The final major area to check is whether you have too much elevator, rudder, or aileron throw, or bad center of gravity location. The only way to check these factors is by experiment. First compare the center of gravity location to the point called out on the plans. The center of gravity should be at or ahead of the called-out position, never behind. If that doesn't do it, reduce elevator area or throw. Move the pushrod in on the servo or out at the elevator horn to reduce the throw. Try reducing the aileron or rudder area, or reduce the control throw as you did on the elevator. By the way, if you have to reduce the aileron area, cut the aileron span down at the tips. More fixed portion of the ailerons at the tips will reduce the tip-stalling effect.

Faintly possible, but unusual, sources of tip stalls or snap rolls are: unbalanced wings, poor airfoil design, excessive downthrust angle, and inadequate vertical tail area.

In case you are wondering why there is a camera picture included, I wanted to give you, my readers, a bit of education on taking pictures. Good photos of your models will be a pleasure to you for years after the airplane has gone to its reward. I have a photo album with most of the models I built over the last twenty years. The album reminds me of a lot of beautiful days and good times. The other benefit of improved photo quality is purely selfish on my part: I'd like more of you guys (persons?) to send me high quality pictures of your models for this column!

Anyway, the camera shown probably represents an all-time high in picture quality per dollar. Although this type of camera, a twin-lens reflex, is awkward in some ways and has very few modern features, it will take pictures which are indistinguishable from those taken by cameras costing five times as much! It will "out shoot" any 35mm camera you care to name for pure quality in the final print. The secret is in a reasonably good lens combined with a large film size.

Yashica is the only remaining manufacturer of inexpensive twin-lens reflex cameras. Rollei and Mamiya make more expensive versions. A multitude of similar cameras was made up until about 10 years ago, and can be purchased for as little as $30. If you don't know enough to judge the condition of a

used camera, buy one of the new Yashicas as shown for about $120 at your nearest discount store. The film is 120 (10 shots) or 220 (20 shots) for 2-1/4 x 2-1/4 inch size negatives.

What you don't get is easy close-ups or interchangeable lenses. Mild close-ups, telephoto, and wide-angle shots are all possible with some add-on accessories. I recommend getting a good camera grip/trigger release as an aid to easy holding and steady shooting. The limits to picture quality with this camera, or any other good one, are the steadiness with which you can hold it, the quality of the place you have the film processed, and your own imagination in setting up the picture situation.

Have a good month and go flying! •

NFFS Champs *.Continued from page 87*

Two of them were OOS before 5 minutes, but I managed to get 4th. The winner, Bob Scully, was the only one who managed to max out.

For the most part throughout the contest, the wind was no problem. At times it would be dead calm, and then, when lift moved across the field, the air would blow briskly for a minute or so.

Monday, the final day, started off with a 6:30-to-7:30 champagne flight in Wakefield. This was a single flight, shooting for a bottle of champagne. Bob White beat out Joe Foster 3:45 to 3:12. I don't know if Bob drank the champagne or what, but he didn't place in Wakefield later in the day! Les DeWitt ended up in a tie for first with Bill McConachie at 25:00 minutes. They both elected not to risk losing a model on a 5-minute flyoff flight, since it was late in the day.

Class B gas also had a tie for first between Bob Scully and Glen Schneider at 30:00 minutes. A flyoff between them made Bob the winner.

Entries in A/1 were low this year. Bob Critchlow won open with 28:00 minutes. He quit flying because he was tired.

Irv Aker won rocket again with 9:27. Entries were low in this event; the reason could be that there is no fuel available.

The grand champion was Paul Stober, who beat open sweepstakes winner Irv Aker by a very narrow margin. Irv's downfall came when he folded the wing on his Class C gas model and had no spare. The senior sweeps winner was Bob Boyer. Junior sweeps went to Parker McQuown. The team entry was won by the "Three Bobs". This team, consisting of Bob Bicknell, Bob White and Bob Piserchio, barely nosed out the "Black John's Slough Gang".

The meet had nearly 700 entries. This was very comparable to last year's slightly over 700. Most all power events were down in entry, while all the non-power events were up. This could reflect the rising costs of engines and materials required to build an 800-square-inch airplane.

A really nice touch to this year's meet was an area set aside with benches under awnings, for drinking and eating. This area was catered day and night with food and drink. And I do mean drink. We had a bar set up, serving any mixed drink you'd care to order. The caterer says he'll do it again next year.

Speaking of next year, the Contest Director, Joe Norcross, has decided he's had enough. He's stepping aside after 3 years at the helm, so any of you who would like to steer this big meet, please step forward. I'm also calling it quits after 8 years. I've been involved in all 8 USFFC's, and have been business manager for 6 years. So, there are two jobs open for anyone interested.

I want to thank our Assistant CD, Lee Hines, for a good job running the indoor events.

We took an opinion poll this year to determine the directions that future USFFC's might take. Believe it or not, opinion was nearly split down the middle on such diverse things as adding a day to the meet, or which class of A/1 to fly. Adding a day to the meet barely nosed out the nays, and FAI A/1 barely beat out AMA A/1. It will be up to the new management whether any of these changes will be implemented, though I will be available for advice.

Remember, the theme of the USFFC is "bigger and better". Look for next year's ninth running to be just that.

A GAS OPEN	
M. Thompson	43:28
J. Kelley	38:51
M. Kerzie	30:00
C. Wright, Jr.	26:25
B. Valentine	26:03
C GAS JUNIOR HI TIME	
C. Moore	13:31
B GAS	
B. Scully	30:00
G. Schneider	30:00
R. Secor	22:56
R. Doig	20:00
G. Voss	19:10
1/2A JUNIOR	
B. Morgan	21:05
S. Adikes	12:20
D. Khalidy	11:24
S. Gillespie	5:18
P. McQuown	4:50
A/1 JUNIOR	
D. Turgeon	8:23
P. Nakashima	7:06
F. Diez	5:42
A GAS JR.	
C. Nadulski	15:00
P. McQuown	12:47
T. Kerzie	11:29
S. Adikes	7:40
PAYLOAD	
E. Elliott	11:22
J. McDemoth	7:26
S. Wittman	7:11
B. Haught	6:33
R. Wittman	6:03
FAI POWER	
R. Simpson	21:00
D. Sogden	20:49
B. Hartill	20:46
H. Mathies	20:14
D. Galbreath	20:05
CLASS D GAS	
J. Foster	36:50

B. Vinson 17:45
T. Blizzar 14:36
H. Mathies 13:39
R. Beebe 13:18

UNLIMITED MULVIHILL
B. White 9:40
R. Gregory 8:16
G. Perryman 7:00
J. Quinn 6:36
D. Rowsell

C GAS
R. Archer 33:10
W. Morgan 29:55
C. Tanaka 27:28
J. Diefries 26:28
M. Schulz 25:00
B. Bicknell 25:00
E. Carroll 25:00

ROCKET
I. Aker 9:27
B. Boyer 8:56
J. Haught 5:54
B. Haught 5:23
R. Wittman :51

1/2A GAS OPEN
M. Azura 35:00
B. Xenakis 30:00
W. Meyer 22:18
E. Weiler 18:14
R. Archer 17:08

A/1 OPEN
B. Critchlow 28:00
B. DeShields 11:49
H. Grogan 10:07
G. Xenakis 9:58
S. Geraghy 9:43

P-30 OPEN
R. Rohrke 17:58
I. Aker 10:21
B. White 9:00
J. Quinn 8:56
R. Harper 8:08

P-30 JUNIOR
M. Watts 7:20
S. Perryman 6:37
D. Turgeon 6:30
E. Altizer 6:29
C. Dimaio 6:25

CHAMPAGNE WAKEFIELD
B. White 3:45
J. Foster 3:12
B. Piserchio 3:10
I. Aker 3:01
J. Brown 2:23

SCALE GAS
H. Cover
B. Stroman
B. Warner
B. Haight
H. Warner

COUPE
M. McClintock 15:30
C. Cogar 9:58
I. Aker 9:51
J. Aldayturriaga 9:21
P. Chaussebourg (proxy by White) 9:12

NITE AMA GAS
B. Scully 15:00
P. Stober 14:53
R. Archer 14:47
J. Scarborough 14:36
W. Morgan 12:58

OUTDOOR PEANUT
J. Oldenkamp
H. Cover
C. Mather
H. Haupt
B. Warner

OHLG OPEN
B. Boyer 8:54
R. Mathis 8:51
G. Sussex 8:45
B. DeShields 6:57
R. Magill 6:33

WAKEFIELD
L. DeWitt 25:00
B. McConachie 25:00
B. Vanderbeek 20:49
W. Drake 20:34
W. Ghio 20:30

SPECIAL MULVIHILL (DUSK)
Uncle George Perryman 6:48
Big Bob White 5:09
Slim Irv Aker 3:45
Bearded John Oldenkamp 2:15
Crash Thunderbug :55

SCALE RUBBER
H. Cover
B. McConachie
B. Warner
H. Haupt
S. Wittman

OHLG JUNIOR
E. Altizer 5:02
D. Turgeon 5:02
J. Foster 3:57
C. Moore 3:32
D. Khalidy 2:16

MULVIHILL OPEN
M. McClintock 42:31
W. Langenberg 36:00
A. Hotard 28:00
J. Patton 26:38
M. Bristol 15:00

MULVIHILL JUNIOR
C. Dimaio 11:21
S. Cover 11:12
D. Steinmetz 9:54
J. Kendy 9:10
J. Foster 8:18

NOVICE PENNYPLANE
C. Mather 350 sec.
C. Banks 340 sec.
E. Hoffman 329 sec.
M. Meuser 279 sec.
B. Meuser 277 sec.

INDOOR HLG JUNIOR
D. Turgeon 52.7
J. Foster 51.4
P. McQuown 51.3
M. Archiveque 47.7
Y. Suh 33.3

A/2
H. Grogan 24:30
B. Isaacson 23:53
D. Myers 20:57
P. Allnutt 19:56
D. Zink 19:51

INDOOR PEANUT
H. Cover
M. Mulligan
H. Haupt
S. Hales
B. Warner

EZB
C. Mather 594 sec.
C. Banks 496 sec.
R. DeShields 400 sec.
B. Boyer 322 sec.
T. Buxton 317 sec.

C OLD-TIME CABIN
F. Emmert 13:31
P. McCary 13:09
B. Oslan 11:59
B. Norman 11:52
L. Norman 11:26

B OLD-TIME PYLON

J. Otis	20:00
D. Weitz	15:00
B. Norman	14:47
L. Norman	13:42
S. Taibi	13:40
B OLD-TIME CABIN	
A. Heinrich	18:49
L. Norman	11:10
A. Faykun	8:29
B. Dittmer	7:43
B. Cohen	5:00
INDOOR HLG OPEN	
P. Tsiknopoulos	60.8
R. Wittman	60.4
L. Hines	59.6
C. Bank	57.2
G. Sussex	57.1
A OLD-TIME PYLON	
W. Wiley	22:20
B. Norman	21:16
M. Thompson	16:41
B. Chandler	12:54
R. Calvo	12:26
A OLD-TIME CABIN	
L. Boyer	15:00
T. Heiser	13:42
B. Norman	12:05
B. Chandler	11:36
B. Chambers	8:46
30 SECOND ANTIQUE	
J. Adams	20:00
S. Taibi	14:46
L. Norman	14:28
L. Boyer	12:25
F. Emmert	12:17
CLASS C PYLON	
D. Weitz	33:18
B. McBride	28:03
A. Heinrich	18:07
C. Silva	17:54
K. McBride	17:13
020 REPLICA	
M. Thompson	30:00
S. Taibi	20:36
B. Oslan	14:36
A. Gallas	13:44
C. Archer	10:35
OLD-TIMER RUBBER	
R. Berens	15:00
C. Werle	12:27
A. Richardson	11:56
W. Wiley	10:46
G. Perryman	9:35
020 REPLICA (JUNIOR)	
J. Campbell	7:37
O.T. RUBBER (JUNIOR)	
S. Perryman	12:32
S. Cover	3:55
GRAND CHAMPION — Paul Stober	580
OPEN SWEEPSTAKES — Irv Aker	571
SENIOR SWEEPSTAKES — Bob Boyer	445
JUNIOR SWEEPSTAKES — Parker McQuown	262
HIGH TIME AMA GAS — Mike Thompson	43:28
WOMENS HIGH TIME — Leslie Norman	14:28
TEAMS	
1. Three Bobs: Bob White, Bob Bicknell, Bob Piserchio	623
2. Black John's Slough Gang: Glen Schneider, Paul Stober, Cliff Tanaka	616
3. T-Bugs: Irv Aker, Jack Moreland, Jim Scarborough	526

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Ske-Vee ..... *Continued from page 59*

has small aluminum ride plates that can be screwed into the transom. The use of this hardware package made the installation very quick and simple. I would recommend it for any similar type installations in .10 size boats. However, it will be necessary to use brass tubing inserts to adapt props with 3/16 inch diameter shaft openings. The shaft on this hardware kit is 1/8 inch and although one plastic prop is provided with the kit, it didn't work at all with the O.S. .10 for power. Two small pieces of brass tubing around the shaft or inside a 3/16 inch diameter prop will provide the proper spacers. I reworked one of the aluminum props provided by K&B Manufacturing for their .21 Outboard and it pushed the "Ske Vee — 10" very well. What I did was remove some of the blade area on the leading and trailing edges. A friend told me that he had successfully used a J.G. Products C-7 on his "Ske Vee — 10". Since the prop can be surfaced (part of the blade is above the bottom of the boat), it is possible to use props that were originally intended for use on .21 size engines. Since I have an ample supply of the aluminum props from K&B, I plan to experiment more with blade area and shape. One of the pictures has a good view of the rudder/strut assembly and the prop used on my boat.

Radio installation proved to be very simple and straightforward. Even though the radio compartment might seem small, there was ample room for the RS 3-Channel system that was installed in the boat. For control linkages, I used Sullivan Products Golden Rod that was left over from the last airplane I built.

Rather than use the wooden radio hatch as provided in the kit, a plexiglass hatch cover was cut to the proper size. A DuBro Kwik Switch turns everything on and off, and the antenna runs through a piece of plastic tubing. Since I plan to use this radio system in an airplane again someday, I didn't go with a wire whip antenna. Just a hint when mounting your DuBro Kwik Switch; always have it set up so that pushing the switch down turns on the system.

This will prevent accidental bumping from turning the system off. And I might add that it is a NAMBA rule that all boats entered in NAMBA competition have the radio switch mounted so that "on" is in this direction. And another hint that can't be repeated enough times; never launch your boat until you have moved your rudder. Every now and then I see someone's boat launched with the receiver turned off. So wiggle that rudder first, then launch. Inform your helper to look back at your prior to his/her releasing the boat.

The "Ske Vee — 10" received my

typical "quick and dirty" paint job. This entails filling all cracks and holes with auto body putty, sanding the hull smooth, and applying K&B Super Poxy primer. This is followed by a bit more sanding and a final coating of Super Poxy color. Striping tape and stick-on letters complete the process. As mentioned earlier, I did elect not to paint the deck because the mahogany looked so nice. This is the first model boat I've built in many years with a natural wood deck and I think it looks rather nice.

Running the "Ske Vee — 10" turned out to be a very enjoyable experience. I really had no idea what to expect in the way of speed or handling characteristics. The O.S. Max .10 responded very quickly to the application of the electric starter. We first tried the plastic prop supplied in the hardware kit and it proved completely unsatisfactory. It might be a good prop for use with an .049 or .051 engine, but it just wasn't right for the .10. The reworked K&B aluminum prop was then tried and the boat took right off. The first few runs were made at a fairly rich needle valve setting, since the engine was brand new. Even with a rich setting, the boat skipped along quite nicely, and turns in either direction were smooth and precise. No turn fin was used and one didn't seem necessary. The engine was run without its muffler and was less noisy than the outboards that were on the water at the same time. After a couple of rich motor runs, we tweaked in the needle valve and let the engine hum. I would venture to guess that the "Ske Vee — 10" was running tight around the 20 mph mark. For a boat that size, it seemed like it was moving very well. It didn't take a great amount of rideplate adjustment to achieve a good steady ride. A slight amount of bending of the right plate on the outside edge corrected the torque problem.

This type of model boat would lend itself very well to small ponds and events calling for something more than just going fast and turning right. It would seem that smaller boats could run events where turning both directions would be required. Slalom type courses could easily be set and driving skills would be tested as well as just flat out speed. I'm not suggesting we need another racing class at the national level; Lord knows we have plenty of classes at the present time. However, for a fun-to-run club class, the .10 size engine and boat has lots of possibilities.

If you've been looking for something different to build in the way of a model powerboat, "Think Small". And "The Model Boat People" at Dumas Boats have the boats and hardware to allow you to go from the "thinking" to the actual "doing". See your local hobby dealer or write directly to Dumas Boats, 790 S. Park, Tucson, AZ 85719. Remember this, "Bigger isn't always better". So "Think Small" and you just might find yourself having some big fun.●

F/F Scale . . . . *Continued from page 79*

Therefore, the finished prop would have a diameter of 10 inches and a pitch of 10-1/2 inches.

TABLE II

T	W	L	Pitch (in inches)	Pitch Factor (P/L)
1	1	10	15-3/4	1.57
1	1-1/8	10	14	1.40
1	1-1/4	10	12-1/2	1.25
1	1-3/8	10	11-1/2	1.15
1	1-1/2	10	10-1/2	1.10
1	1-5/8	10	10	1.00
1	1-3/4	10	9	.90

A propeller blade derives its thrust by exactly the same formula as the wing derives its lift. However, the fastest-moving part of the propeller is the tip, with the center of the blade traveling at about half that speed. A 5-1/2-inch North Pacific plastic propeller will unwind 1000 turns of 1/8-inch Sig rubber (1 loop) in about 40 seconds. This is a fact, not an assumption. *Assume* that the propeller rpm decreases at a steady rate, turning, say, 3000 rpm at the moment of release, and reaching 0 rpm at 40 seconds. The *average* would then be 1500 rpm. Assume also, that the North Pacific prop has 30° of pitch at the mid-blade position. The maximum attainable airplane speed (with zero drag and slippage) would be:

$$3000 \times L/2 \times \pi \times \text{Tan. } 30° \times \frac{1 \text{ min.}}{60 \text{ sec./min.}} \times \frac{1 \text{ ft.}}{12 \text{ in.}}$$

$$\frac{14954 \text{ in. min.}}{60 \text{ sec./min.}} \times \frac{1 \text{ ft.}}{12 \text{ in.}} = 21 \text{ ft./sec.}$$

$$\frac{21 \text{ ft.}}{\text{sec.}} \times \frac{3600 \text{ sec.}}{\text{hr.}} \times \frac{1 \text{ mile}}{5280 \text{ ft.}} = 14 \text{ mph.}$$

PROP TIP SPEED

The equation for propeller tip speed is as follows:

$$\text{rpm} \times \frac{\pi \times L}{\text{Cos. pitch angle}} \times \frac{1 \text{ min.}}{60 \text{ sec./min.}} \times \frac{1}{12 \text{ in./ft.}}$$

Our 5-1/2-inch North Pacific prop would have a maximum tip speed of:

$$3000 \times \frac{17.27}{.866} \times \frac{1 \text{ min.}}{60 \text{ sec./ min.}} \times$$

$$\frac{1}{12 \text{ in./ft.}} = 83 \text{ ft./sec.}$$

Fulton compiled this data by doing static tests in his shop, not by flight testing. The propellers used were the North Pacific props, and some of Fulton's own hand-carved props, up to six inches in diameter. The equation for propeller tip speed is slightly different for larger props, such as those used on Wakefield models. Larger props are more efficient, so slippage is not a major factor. The model actually gets up to flying speed in a matter of one or two seconds (usually they are launched at a speed greater than the normal flying speed). During most of its powered flight, a Wakefield is very close to its flying speed, so it will be a good *assumption* to take the *average* rpm to get the flying speed.

A Wakefield prop 24 inches in diameter, with 24 inches of pitch, unwinds 400 turns in approximately 40 seconds. This translates to an average of 600 rpm (10 rps). The models's flying speed would be:

10 rps x 24-inch pitch = 20 ft./sec.

The equation for propeller tip speed on large props is as follows:

$$\frac{\text{rpm } \sqrt{(\text{Dia.} \times \pi)^2 + \text{Pitch}^2}}{60 \text{ sec./ min.} \times 12 \text{ in./ft.}}$$

(Diameter and pitch are measured in inches.)

In this case:

$$\frac{600 \sqrt{6261}}{720} = 65.9 \text{ ft./sec. average}$$

Of course, the higher torque of the fully-wound rubber motor would yield a greater tip speed immediately after launch, but there is doubt that it would double the *average*. Maximum tip speed is probably 80 to 90 ft./sec.

PROPELLER BLADE AIRFOILS

From the above calculations and guesses, it appears that rubber-powered models travel at near 20 ft./sec., with propeller tip speeds on the order of 60 to 80 ft./sec. To be effective at those speeds, the tips should not be undercambered much. The middle of the blade can be undercambered some at the trailing edge, but near the hub, the prop does not need undercamber at all (see fig. 3). It appears that the area close to the hub is very inefficient, and is required for strength only. In the case of folding props, where this area is reinforced with metal, wire, etc., the best shape appears to be a sharp-edged symmetrical foil, so that it does not create any drag.

SHAPE OF PROPELLER BLADES

Blade shape must have something to do with performance. Refer to fig. 4 above.

A) Similar to many hand-carved balsa props; really a very good all-around prop shape.

B) Intended to be like piston-powered real airplanes. Tip speeds are higher than possible with rubber. Very efficient at high speeds. Fulton believes that slippage causes them to unwind too fast on models. Never had much luck with these props.

C) Contradiction in uses. Very similar to the shape of most turbo-prop propellers, where the speed approaches supersonic velocity, yet the same shape of the best of the commercial plastic jobs for small rubber models. North Pacific prop blades are similar to this shape. Tip speeds are probably around 80 ft./sec. at most.

D) Quite common shape for rubber power, yet Fulton has had better performance from shapes A and C.

E) Scimitar blade. Perryman uses it, and has probably won more rubber-power events than anyone.

F) *If* Perryman's reason for the scimitar blade is to increase the area at the tip, then F should be studied too.

G) *If* Perryman is right, then G would be inferior to E or F. It has a pleasing shape, but the area is more toward center of the blade.

SUMMARY

Using Table I or II, and knowing what pitch and prop diameter you desire, you can select the rectangular cross-section area you need to achieve the pitch.

Example: A 1 x 1-1/2 inch block of wood will give a 34° or 35° pitch, regardless of the length of the prop. A pitch angle of 35° at the mid-blade position will give a 10-inch prop 10-1/2 inches of pitch. For any length other than 10 inches, simply multiply by the pitch factor (last column in Table II) to get inches of pitch. Obviously, a 1 x 1-1/2 inch block of balsa is too big for a 6-inch prop, so if a 6-inch dia., 6-inch pitch prop is wanted, then go to Table II and select a pitch factor of 1.00, and, since it lines up with 1 x 1-5/8, multiply that dimension by 6/10 and get 5/8 x 1 inch for carving.

Fulton believes that real airplanes measure pitch angle 3/4 of the way from hub to tip. He used 1/2-way from hub to tip. Table I gives Degrees of Pitch vs. Block Cross-Section for mid-point of the blade. When carving a blade for shapes A through D, and even G, Table I is OK. But watch out for E and F!! Those shapes will not start with a blank like the sketch shown. Take F, for instance, or any wide-tip blade.

Lay the blank out like Fig. 5.

Now suppose you wanted a 10-inch prop with 10 inches of pitch.

L Tan 0 = 10; Tan 0 = 1/ = 18°

We would then need a block 1 x 3-1/4 inches, or just exactly twice as wide as the block was for the 10 x 10 prop with the shape like A or C. Maybe that is why A and C are so popular.

This ought to be some food for thought, and should give a good starting point the next time you want to carve a prop for your new scale model. Don't let the math deter you. I'm not much of a math freak, but I think I can handle the little required here. •

R/C Auto . . . . *Continued from page 55*

and many knew about R/C cars, even in customs, which helped our traveling drivers.

Oh yes . . . forgot to mention that the start procedure was by lights. At 30 seconds prior to the start, a flashing amber light was displayed. At 3 seconds another steady amber light came on, whereupon the pit men released the cars to move up to the starting line. Then a green light signaled the start. A TV monitor and instant replay was used to determine jump starts, with a penalty of one lap. Several penalties were assessed.

What did the drivers from G.B. have, to make them winners? The little things added up for them. The G.B. cars and engines weren't the fastest; but the cars were set with light (or no) braking at the idle position, and you had to push the trigger for full brake; three of the four 'A' main cars had differentials; and the team had many varieties of tires, from rain tires to soft gumballs. Gene Husting and the other American drivers found that they had brake overheating problems with their normal brake set-up, whereas the G.B. drivers braked hard at the end of the straights and coasted through the corners. The many varieties of tires, and the differentials, allowed the G.B. cars to practice under all conditions, from damp to dry and sticky. The practice time allowed the drivers from Great Britain to learn the track better and finish on top. Apparently, some of the Europeans had not driven on a track like the one at Monaco; however, there was a race there last October, and many must have competed and passed on information.

The track layout was rather wild. The back straight was 90 meters (295 feet) long, with the corners at each end having a radius of about 2 meters (6 feet). On the front portion of the track were two esses, with the offset about equal to the track width (5 meters). The corner markers were heavy donuts, about 1 meter in diameter and 2 in. thick, set with the edge on the lines. Needless to say, the cars had to be kept away from the markers. The long back straight allowed the cars to get up to about 60 mph (100 km/hr), and any crashes or outside wall brushing were disastrous. In general, it was like a drag race between corners, where you had to brake hard, and if you had super reactions you could really go through the esses. Apparently, Ghersi and Carbonell were about the quickest there. The track surface was good, but maybe a little bumpy at the end of the back straight.

Because of the track type and layout, engine power really helped. It is interesting to note that Phil Greeno used an OPS, Debbie Preston a K&B, Ronny Ton an S.T., and Gino Ghersi a K&B. Gene Husting lent Debbie one of his K&B 3.5cc engines with a Perry 61 pumper and carb, and she ran the race using 40% nitro. Ronny Ton was faster than most, using a Super Tigre with a rather large muffler and small engine exhaust port. Ghersi had the fastest car, powered by a K&B, but Phil Greeno won, using an OPS. Most of the U.S. drivers went with 60/61 size standard carbs, not pumpers, and gave away some H.P. They were expecting that more handling problems would occur. However, you can bet they had some front plates with pumpers in their boxes. Thorp seemed to think that, as a team, the Italians had the most horsepower.

Everybody (Curtis, Husting, and Thorp) seemed to talk about the others, rather than themselves . . . probably because they didn't do as well as they expected. On the first qualifying heat, a damp track kept most from doing well. Thorp and Jianas didn't do too well, Husting decided not to run, but Carbonell ran good for top first-round time.

In the second qualifying round, Jianas crashed on the back straight, mangling his car pretty badly, and Carbonell lost his muffler. In the third round, Carbonell had glow plug problems, and Jianas discovered that the heat crash also bent the power pod and broke the engine case. Curtis also had a back straight crash, busting his car up pretty badly. Carbonell decided to go all-out on the last round and only make one pit stop. But luck wasn't with Art, and his car ran out of fuel on the track. By the fourth round, Husting (helping Debbie with the borrowed engine) discovered the English drivers were using little or no brake at idle, and had to push the

trigger for full brake. Husting set his car up this way, and became one of the top 16 drivers to qualify for a semi-main. Carbonell's first-round time held up for the 'C' main, and Thorp put in a consistent (but slightly slow) time to get into the 'C' main also. Obviously, the rest of the U.S. drivers had problems similar to those described above.

Why didn't the U.S. drivers do better? I think it was primarily because of no (or very little) preparation. Many factors enter into what I call preparation, the first point being that we seldom run Formula road races here in the U.S. Formula road races are run occasionally on the East Coast, but are practically non-existent here on the West Coast. How can a driver go to a race and do well, if he hasn't competed in that type of race before? Possibly 2 to 5 years ago, the drivers competed in a formula car road race, but the required car set-up has changed drastically in that period of time, with the increased engine power available. Certainly the track length, layout, and set-up were factors, but a car that performs well in competition on U.S.-type tracks would have been better than a car with completely unknown handling and reliability characteristics.

Another side of preparation is that several of the cars were being built just before leaving for the race. Building and finishing a car just before a race is not too bad, if you are just putting improvements and changes into a proven car, but to expect a new, untested, unproven set-up to perform is foolish. Most of the U.S. cars had only a minor amount of track time on them . . . enough to see that they handled reasonably well and got around the track. But there is nothing like competition to prove the handling and reliability. It appears that most of the U.S. team were experiencing new car "bugs" at Monaco . . . hardly the right place to be sorting out a car.

To help the U.S. do better in the future, we should consider running the open-wheel car race at the ROAR Nationals like a Formula Road Race, and run in the opposite direction as the G.T. and Sports cars. As per my usual recommendation, let the Indy oval race be the ROAR-recognized oval championship race. It would also be nice if the various regions had formula road mini-series races (two or three dates). If we have a national formula road race and some regional races, at least there would be a firm basis upon which to select a team to represent the U.S. in this type of race. I am not sure if there was any ROAR input requested for this year's team, but I certainly would recommend (to EFRA or any race organizers) that, in the future, ROAR be contacted concerning any invitation-only U.S. teams.

Now that World racing events are becoming more common, it's time that ROAR national events were tailored a little more to international-type events, such as formula road racing. If you have comments or recommendations, please write to me, Chuck Hallum, P.O. Box 4658, Irvine, CA 92715. •

F/F . . . . . *Continued from page 90*

The unit's chief advantage, the article says, is that it teaches one how to read air; to differentiate between major and minor thermals, and to reinforce sensory data with some tangible data. The unit is designed and engineered with the same attention to detail as Greg lavishes on his scale models. Although the asking price of $97.50 may appear steep, the unit is absolutely top-notch, and Greg's profit margin is negligible. For further information, contact Greg Thomas, 6829 Sheridan Ave. South, Richfield, MN 55423.

VISIBILITY: WHAT'S THE BEST COLOR AND WHERE SHOULD I PUT IT?

The following treatise, complete with references, yet came from the Kent (Washington) Strat-O-Bats Newsletter, "Bat Sheet", and adds more information to this interesting area of free flight study.

VISIBILITY

"Visibility is important to outdoor free flighters; if the timer can't see your model you don't max, and if *you* don't see it you may not get it back. Aircraft visibility is also important in full-size aircraft, for both safety and military considerations. Thus, there has been some research done on the subject, although there don't seem to be any final answers.

"Surprisingly, the color used is not as important as the contrast between the airplane and the background (sky, clouds, or trees). At sufficient distances, the hue (dominant light wave length in a color) can no longer be perceived, although the airplane is still visible. What does make a difference is the lightness of the color; the degree to which the brightness (luminous intensity) of the color approaches that of white under the same conditions of illumination. For high visibility, we want high contrast and thus a great deal of difference between the brightness of the airplane and the background. Therein lies the problem: the background may be white (a cloud) or dark (fir trees at Hart's Lake Prairie).

"Further complicating matters is that visibility on a slant path into the sky is greater than a horizontal (ground level) path; under conditions when the ground visibility is 10 km (6 mi.), the slant path visibility to an object 100 to 200 m (about 400 ft.) up in the air may be 15 km or more. In addition, air turbulence and dust decrease your visual range, and these conditions tend to be greater as altitude decreases. On the other hand, at higher altitudes (greater than 500 m), the contrast of the airplane and sky decreases. The net result for model airplanes is decreased visibility as the model approaches the ground; you may lose sight of it as your DT'ed model descends.

"As for what colors to use, it would seem best to use neighboring 'hard' colors such as red and yellow, rather than 'soft' ones, such as blue and green. More importantly, make sure they are very bright or very dark.

"So how should I paint it, you ask? Unfortunately, there's no consensus on the perfect scheme. One military study, with 26,784 observations on paint schemes, found that the best one for visibility *and* orientation (R/C glider fliers take note) was as diagrammed herein. Unfortunately, most of those observations were against white, grey and black background, and later work shows a highly significant difference between grey and sky blue backgrounds. Another study found that fluorescent red-orange with a white center stripe was best. One author claims that solid color schemes are superior to any two-toned ones. Merve Buckmaster, in *Airborne*, recommends light colors on top and dark underneath, to maximize contrast against dark objects on the horizon and the sky above.

"In any case, keep your eye on it! Visual acuity is highest in your fovea, which covers only about 3° of your visual field. As we all know, glimpse away for a second and you may lose it forever. 'Flash' tape is most helpful, as an occasional glint provides a strong stimulus, even if many degrees away from your foveas. Strobe lights, anyone?"

"References (move over, NFFS Sympo):

"Wagner, H.G.; et al 'Studies to improve visibility of aircraft. . .' *Aviation Medicine 20*, 102-133 (1949).

"Overington, I. *Vision and Acquisition* (Crane, Russel & Co.: NY) 54-55, 69-70, 330-334.

"Fenderman, P. & Siegel, A. — 'Aircraft detectability and visibility' *Biological Abstracts 37* #2147 and #3233.

"Knox, G. & Kisher, G. 'Contribution of the visual sciences to national defense' *The J. of Psychology 13* 381-388 (1942).

"Adlen, M. *Vision and Highway Safety* (Chilton Book Co.: NY, 1970) 175.

"Buckmaster, M. 'Retrieving free flight models' *Airborne* magazine."

NEW PRODUCTS OF INTEREST

Pettit Thixotropic Epoxy: This is a new epoxy formula which was sent to a number of us writer types to test out. Along with the epoxy came a couple of cans of polyester filler material, which I haven't had the time to work with yet. However, the Thixotropic has been tried, and when used in the right application, it is the best material I have found. It is a thick, almost gel-like epoxy when mixed, and it literally sets right where you put it, without running or dripping. Because of this feature, it is excellent for making glue joints at points of stress, such as dihedral joints, firewall mounting joints, and any other places where exact fits are not likely to occur. It is heavy, and the curing time, in our experience, is a bit longer than Pettit would have you believe. Ted and I used it to glue in dihedral joints and plywood ribs on our latest Simplex wing. We mixed it up one evening and socked everything together. The next evening, the joint still felt a bit tacky to

the touch, but the joint was solid. The next morning, about 30 hours after the epoxy was mixed, the joint had set solidly and was completely cured. There were no gaps that hadn't been filled, and the bond was very strong. I would recommend that you give this new product a try; it has a lot to offer to free flighters (and others, too).

Competition Products' A-2 Fiberglass Tailbooms: This company, which is operated by Jim Walters, is now selling tailbooms designed especially for A-2 applications. They are not fishing pole blanks, but made from high-modulus "S-Glass". Thin wall and large diameter, these booms are very light, yet maintain adequate stiffness for a no-flutter catapult launch. Two types are available: Lite, .70 in. diameter tapering to .40 x 40 inches long. Weight is 32 grams, with trimmed length to 30 inches weighing 22 grams. Super Lite, thinner wall thickness. Weight is 23 grams, with trimmed length weighing approximately 18 grams. Super Lite booms are slightly more fragile, but still strong enough for A-2. The price is $7.50 each plus $1.50 for postage (50¢ for each additional tailboom). Be sure to specify type.

Competition Products also handles graphite fibers. Approximately 40,000 fibers come in a ribbon about 1 inch wide x .003 in. thick, and are applied using thin epoxy resin. A small amount of sizing keeps the fibers arranged in the ribbon, to allow handling prior to application. A 3 ft. length is $1.00. Postage is an additional 75¢ for up to 15 feet of fiber. Contact Competition Products through Jim Walters, 240 S.W. 184, Seattle, WA 98166.

Well, gang, that about wraps it and ties it for another month. I thought it appropriate this month to end up with an epoxy joke from the pages of the U.S.A. Modelers newsletter, "Dope Bucket":

Beginner: "Say, Joe, this new epoxy I bought last week just doesn't seem to be any good." Old Pro: "Well, what seems to be the matter?" Beginner: "I don't know, but I'm already on the second tube, and it doesn't work either!" Thermals!•

Fury . . . . . *Continued from page 31*

Two attempts were made to install air-cooled radials in Furies; one was totally unsuccessful, the other so-so. Early in 1932, the Norwegians ordered a Fury to be powered by the Armstrong-Siddeley Panther IIIA of 530 hp. Radial engines are supposed to be more compact than long inline engines, but when the Panther was installed . . . and though it was crowded against the firewall . . . the C.G. wound up 9 inches farther forward than on the Kestrel powered Fury. The result was an alarmingly nose-heavy airplane. The Norwegian sent the airplane back to Brooklands where more testing and head scratching was done, but nothing could correct the basic deficiency. The Vikings finally accepted the airplane but scrapped it two years later.

More successful was the Persian Fury, though it too, had problems. The Persians had a license to sell and service Pratt & Whitney engines in the Near East; when they ordered 16 Furies they accordingly specified that the P&W Hornet be installed. The same nose-heaviness plagued the airplane and on one run, it wound up on its nose. Both the huge Watts wood prop and a Hamilton Standard 3-blade adjustable were used, with no clear advantage to either. The real problems came when the Furies were put into operation.

The Hornet was fitted with a radial crankcase shutter. Running hot, the shutter was opened to cool the crankcase oil; running cold, the shutter was closed to keep the oil from congealing. With ground temperatures from 120° to 130° and a temperature of 65° at ten thousand

feet, the gradient was severe, and if a pilot neglected to watch his engine temperature, trouble developed. Trouble developed with the Hornets and the radial shutters were removed. The situation worsened; engine life was greatly reduced. The exasperated Persians ordered Bristol Mercury VI engines on the second batch of Furies, and nearly all of the first batch were retrofitted with the engine. The Mercury had an advantage over the Hornet; it exhausted forward into a collector ring encircling the crankcase and thence aft. With so much heat already in front of the crankcase, the additional hot air of the desert had little effect. The last Fury in existence was a Persian Fury. Minus the engine, it was set on fire in 1948 in a training exercise for airport firefighters.

The original color scheme of the Persian Fury was all aluminum, with polished metal panels. The anti-drag ring was black enameled and the Arabic script was black. The national insignia was red, white and Kelly green. In 1942, one Fury stationed at Meherabad had a red anti-drag ring with black markings, a red rudder with black markings, red wheel discs, and a red band around the fuselage just ahead of the stabilizer. In the middle of the band was a gold Persian crown, ahead of the band the same Arabic script in black. The upper fuselage, and apparently the upper surfaces of the wings, was desrt sand from the anti-drag ring to the red band. •

Live Wire . . . . *Continued from page 43*

electronic knowledge was about to be offered on the market, for use in the new C.B. 465 mhz band. Everything fell into place for me. It was the end of the competition season, here seemed to be the answer to my C/L dreams, and I had accomplished about all one could in C/L.

My R/C started off with a "Rudder Bug" (**MB**'s first historic R/C subject, May '78) and "Aerotrol" equipment, like Tom's. This outfit was bummed off of a flying buddy, George Swank, who had put it together without much success. With a little help from Tom, and a lot of tribulations which would be a story by themselves, we finally flew successfully. The first successful flight was like giving a youngster his first ice cream cone . . . I just had to have more! The result was nightly trips to the flying field, and fly until dark.

We did have the outfit working and we did fly, but we soon discovered the shortcomings of R/C models of that day. Buffalo weather is not all as bad as you read in the papers, but there is one part of it which no one can deny; the wind blows consistently, and if you fly models in Buffalo, they must be capable of windy weather flying. To make a long story short, the "Rudder Bug" did not take too kindly to the wind, and a search of available data did not turn up another R/C design that was any better.

If there is one attribute I have concerning my modeling, it is ambition and the will to go to great lengths to find answers. At this time, a good friend of mine, Bill Winter, was at the top of the list of R/C fliers of that day. My obvious approach to the wind problem, among others, was to ask Bill's help. During many discussions with Bill, we came to a mutual conclusion; the design and construction of an R/C model could stand a vast improvement in many areas. After the initial determination of the problems involved, we got a little bit scientific about it all and compiled a list of features that a good R/C design should have. The original list was considered, modified between us, and added to, until we felt that we had an ideal combination.

The future would prove that we did more than a fair job of it. When you considered the requirements listed, you wondered how they could possibly be accomplished with the knowledge of the day. It would take a complete break-away from what was the "norm" for R/C models in those days. Remember, the first R/C models were "stick and tissue" variations of free flight models. In fact, the "Rudder Bug" was the first of what could be called all-out R/C designs. In difference to other designs of the day, the new one needed to be quick to build and not have a zillion pieces to stick together. It had to be rugged; you should be able to fly it into the ground, strap the wing back on and fly again, as you could not with

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anything that existed. It needed to be functional: plenty of room for what is now outsized R/C gear, and something a guy could get his mitts into for the needed adjustments, etc.

Performancewise, it needed to be responsive to the control (rudder-only); punch the button and something should happen *NOW*, not later. It should fly level, like a real plane, not always reaching for more sky. Most important, of course, it should be capable of flying in reasonable winds, so that you could to flying WHEN YOU WANTED, not when the weather dictated. We take all these things for granted nowadays, and it is wonderful that our abilities have developed to that point; however, you must realize that in 1950, this was like reaching for Utopia!

There were 14 strong points on the final list, and Bill concluded that, if they could all be incorporated into one model design, we would have it made. With my ambition, I set out to do just that, and within a period of 2 months, with help from Bill's wisdom and the modeling of George Swank, we found that we had accomplished the objectives just about to the last letter.

The first design was not the Live Wire "Trainer", as many think. Instead, it was a much larger design, which was simply labeled the "Live Wire". Later on, as the "Trainer" kit proved successful, a small run of several hundred "Live Wires" was produced and labeled the Live Wire "Senior". This design eventually was developed into another very popular R/C kit that many will remember as the Live Wire "Cruiser". The reason for the small initial run of "Seniors" was the kit cost; being a big plane, and R/C being so new, the $14.95 price tag looked astronomical; we needed to find out if *anyone* would pay that much for a model kit!

When I finished the "Senior" design layout, George Swank and I proceeded to build one each simultaneously. The R/C gear would be the new 465 mhz McNabb (Citizenship) system; the power a K&B and Fox .19. Both models were completed and test flown within a month. Initial test flights were *hand glides* from a high railroad bed into a flat field . . . we wanted to be sure the radio actually worked in the air before taking a chance with power! Also, there was more than a little concern about the flying ability of such a radical model design. I guess the record shows how successful this approach to R/C was. Within the next two months, George and I placed first and second at both the Canadian Nationals and the King Orange meet in Florida, flying against the finest R/C'ers of the time. Obviously, such success was not our *ability*; we simply had a far superior machine than did the more experienced flyers.

Would you believe that we were so elated with R/C that, even though we were at the top in C/L flying in the country, both George and I hung up the C/L equipment and neither of us picked up a handle again? So it was that we were off to more and more new things to do, new ideas to try and new goals to accomplish. None of this has ever ended for George and me, and hopefully it never will!

This is supposed to be a story of the "Trainer"; however, it never could be fully appreciated unless you knew how it all came about. In 1950, a good R/C system cost about the same as today, yet we had far fewer dollars in our pockets. R/C systems were precious . . . they also required constant maintenance and tinkering, which was just as difficult to do in a model fuselage as it is

today. It would be good if the R/C gear was easily removable as a unit, so that it could be passed from model to model and easily worked on. The heart of the Live Wire R/C designs became a *removable* R/C unit. A box, which held all the equipment, slipped into and out of a fuselage with ease. This box was 3-1/2 x 4 x 8 inches in size, so that all Live Wire fuselages had to be that big at the wing location, no matter what the overall fuselage size was. For that reason,the "Trainer", being rather small, took on a rather pregnant look, and was more than once nicknamed the "Guppy".

Actually, this deep-bellied design proved to have a hidden asset. The engine was only an .09, thus the small prop did not need a great deal of prop clearance, so a short, flat, sheet aluminum landing gear could be used. The asset was that most "prangs" were the result of a spiral dive (caused by the rudder being locked hard-over), and the earthly contact was more flat than nose-in. With the "Trainer", such a prang simply bent the short dual gear, or popped it off, so that the fuselage would go skipping along the ground with little damage. Remember, one of the things near the top of the 14-point list was that you had to be able to prang and still fly again!

Speaking of engines, later on, we got the ability to have an "on-off" type engine control. This resulted in the use of a Mills .08 diesel in the "Trainers". This engine had the first "rotor-barrel" carburetor, and was the start of what we have today. It was a giant step when we could actually have the low engine speed and under power! Another asset of the Mills was that it would turn a 9-4 prop at the same speed that it turned a 9-8: Thus, you test flew with the 9-9-4, and when that proved that proved that the model flew at minimum speed and the radio worked, you switched to a higher pitch to get performance. Some proof of the ability of the "Trainer", the Mills .08, and the removable R/C unit . . . later on, when full-house reeds came about, a full-house Schmidt reed system "R/C Unit", weighing 48 oz., was slipped into the original "Trainer" and flown very successfully! This little 48-inch model and .08 engine carried a payload of 4 lbs.

The structural design of the "Trainer", of course, initiated what is in general use today. The designer, being C/L oriented, knew more about the ability and usage of sheet balsa for construction than did other R/C designers of that period. Thus, these Live Wire designs took full advantage of sheeting, gaining much simplicity and ruggedness. As far as aerodynamics is concerned, the Live Wire design took a marked departure from the practice of that day.

Free-flying models had never been developed to fly flatly and penetrate the wind; instead, they were expected to climb and ride with the wind. The control for flat flight and penetration was gained by developing a force arrangement that provided proportional lift between the wing and stabilizer. Thus, as speed increased or decreased, the change in lift would be proportional between the two surfaces, keeping the craft on an even keel. Problems with penetration occur because the wing develops proportionally more lift than does the tail. Wind is actually an increase in flying speed, or airflow, over the craft. Without the proper proportion, the wing lifts the

nose, drag increases and penetration is lost. Although this could not be applied to its ultimate in a rudder-only design, such as the "Trainer", the model was capable of windy-weather flight.

Another of today's taken-for-granted things was also developed in the Live Wire design. The first "Trainer" had a free flight-type airfoil, as it was thought that such a small model, by comparison, would need much more lift from the wing. With this airfoil, the penetration was not acceptable, and it took a change to a lower drag airfoil to obtain the desired objective.

This "Trainer" design evolved into many things new to R/C. It originated as the "Senior", which was a model nearly double in size and .19-powered. It was carried over into the bigger "Cruiser", and given a scalish look in the "Champion", which is still seen today. With some further mods it became the "Equalizer", and in a larger version the "Over and Under", which were the first designs to fly inverted and perform outside loops. Later on, it gained a second wing and became the first successful R/C bipes in various sizes. Condensed even more, it became the first 1/2A type and was known as the "Kitten". Quite an accomplishment for a little old R/C design that had more "belly" than any self-respecting model really should have! If you would like to see what the good old days really were all about, give the "Trainer" a try; it will show you well, and in a hurry . . . •

C/L . . . . . *Continued from page 81*

to put a TR model together a real challenge in long-distance buying for the average C/L modeler. Shadow Racing can help a lot here, as they are offering molded fuselage shells, magnesium crutches (engine mounts to you), shut-off/refueler kits, a bunch of glass props, decals, etc. The killer item here is a retracting gear mechanism. Made of magnesium and titanium (maybe with a bit of unobtanium thrown in), it only weighs 40 grams and includes wheel, bellcrank, plans, and assembly instructions. The retract unit is centrifugally activated for retraction, and down-elevator kicks the gear leg back out in the breeze, a spring-return system insuring positive action here. All this for only $200.00 . . . that is not a typo, two hunnert thin ones . . . thought I was kidding about the unobtanium, didn't you?

FAST—FILL PLUGS

Still with the C/L Racing side of things, one of the big problems in the last couple of years has been in getting fast-fill plugs that work right. No more problems, now that Joe Klause has released his own version of this very necessary piece. Joe sent me one awhile back, and I promptly destroyed it (another story for another time). Joe didn't catch on to my act and sent a season's supply (I can play the freebie game as well as anybody around). Since then I have been using the Kustom Kraftsmanship fast-fill plugs a lot, though mostly on R/C cars. They work very well, accept being repeatedly and violently violated with a long, thin tube, only to seal right back up, containing the fuel and pressure within the tank. Joe's KK line of products is widely distributed through select distributors, so Local Hobby should have them in stock. Or contact Joe direct, he is a regular **MB** advertiser. Look up his ad for the address.

FROM LARRY HOFFMAN

Gary James ran into this Slow Rat duo down in Texas, and asked if I wanted to hear from them. Naturally I'm always looking for material, and told Gary to get them to send text and pictures. The text came, and we'll look at that in a minute. But Larry had color film in his Brownie, a no no for magazine reproducible pictures. Sorry, you should see the Foxy Lady holding the models. Talk about things being BIG in Texas . . . "Dirty Dan,

Via Gary James, I found out that you might be interested in some pictures and descriptions of some of our Slow Rats and related details. Larry Miller and I have been flying together for about four years in Slow Rat. Our Slow Rat efforts have been successful from the start. We have won 14 out of the 20 contests we have entered.

"We started off running Super Tigres and standard outboard tanks, just like everybody else. Speeds were like 80 mph. We went to inboard tanks in '76 to get a more consistent engine run. The inboard tanks made the runs very consistent, but the setting would richen in the air. To overcome this, Miller, being the brains of the outfit, engineered a carb arrangement. Our fuel system has remained virtually unchanged since. The settings will not change from the first lap to the last.

"Two weeks before the '76 Nats, Miller got two HP 35's from Aldrich. The motors have always run perfectly; they were bullet-proof. It just took us a while to learn how to use

them, as in proper streamlining, props, and pitting techniques. At the Nats, we were running mid-16's and managed a respectalbe 4th. By September '77, we were running high 14's and hadn't lost all year. The motors were really great and dependable; now they are oiled and wrapped up, due to uninformed rules makers.

"The airplanes we are flying now are powered by stock K&B 5.8's and are running 15 flat. With this set-up we have run 2:48 for a heat and 5:59 for a final. Things are looking good, if we can keep everything together.

"We have built 10 airplanes . . . stabs have gotten larger, wings stubbier, and the C.G. further back. The front ends are very streamlined. Streamlining has gotten us almost 10 mph.

"The pitting technique takes a lot of practice. We run a one-man pit now, with a hot glove and automatic primer. Good pits cost us 9 to 12 seconds. Miller pits, I fly. I used to wait for him to get it started, now I'm just trying to be ready when he let's go. It's fast!

"Bill Lee finally beat us the first week in April. Stubblefield, his pilot, is just a little bigger than I am. That was the only meet we have lost since the '76-'77 King Orange. That's 9 out of 10.

"Miller is a cropduster, so it is very hard for him to get off during the season, but he will make it to the Nats this year. I really think Nashville will have to find a hat with a little white rabbit in it this year.

"There are no secrets to Slow Rat, no magic. It just takes a desire to win. With this will come the time, the money, and the luck.

"Wow, that sounds pretty good. Wonder if it will work in Combat. Larry Hoffman"

With this issue due to be out just before the Nats, the Nashville Rats will no doubt be aware of Larry's letter. Shoot-out at the Slow Rat circle. Ought to be very interesting. I find it interesting that Hoffman and Miller are onto the K&B 5.8. Killer engine for sure, it makes a lot of power, but some people have been saying they can't get them to restart very well. For those, here is a team that does get them to restart in stock condition. Maybe the use of a prime tube is the secret here.

ANOTHER LETTER

This time we hear from Dave Sears.

"Hi Dirty;

Here is a note to confirm the release of the HP35F and HP35R C/L engines. We expect to have engines for delivery before May 31st. At this time, price is not firm, although I expect the price to be between $90.00 and $115.00.

"The FR-DS and RR-DS engines will have many touches usually found only on engines that have been breathed on: chrome liner, lapped piston, lapped ring (fitted with minimum end gap), fine-adjustment needle valve, extra head shims, etc., etc.

"Orders may be placed with us at: Nelson Model Products, 6929 W. 59th St., Chicago, Illinois 60638, (312) 586-7101.

Thanks,

Dave Sears"

On the off-chance that you didn't catch all of that, Nelson and Sears are taking HP 40's, both front and rear intake versions, and making short-leg cranks for them, bringing the displacement down to a Slow Rat-legal 35. The trick that qualifies the engines for Slow Rat rules is that the engine must not only be of 35 size, but it must also be an original equipment item and nationally available.

Making the short-leg shafts, plus doing the other good stuff, is a lot of trouble, but it does offer the serious racer a very competitive engine. Granted, this was not supposed to be the way things would work out when the engine-restricting rule was proposed for the '78-'79 AMA rule book, but such is life when heads-up competitors are willing to go to almost any length to go faster than the other guy. •

Cobra . . . . . *Continued from page 76*

these small models.

Want to build a Cobra? Start by tracing the long nose pattern on transparent paper. Align your tracing over the Kingfisher fuselage plane by matching the windshields and openings for wings and bellcranks; that gives you a Cobra fuselage pattern. Make the fuselage from one piece of 3-inch wide sheet balsa. As with all balsa parts, the fuselage is best sanded before other parts are attached to it.

Loop 13-inch leadout wires to the bellcrank, but don't loop the other ends of them yet. Mount the bellcrank with a finishing nail pushed down through the fuselage top. A 1/16-inch diameter nail about 1-5/8 inches long is good.

The rudder for Cobra doesn't need to be turned to the right, since whip flying in windy weather isn't a good idea anyway. Cut out the fin/rudder in one piece. Cut the stabilizer/elevator in one piece, then trim the elevator from the stabilizer. Glue the elevator horn mounting plate on top of the elevator, and attach the horn. The horn is

on top of the elevator because, if it was on the underside, it might snag on the grass during belly landings. Cloth hinges or hinge thread, available at hobby shops, come with instructions for hinging the elevator to the stabilizer. Try for a hinge job that has no slop, but allows free elevator movement.

Temporarily secure the stabilizer in its fuselage slot with straight pins. Bend the pushrod so that "Z" bends at each end fit through holes in the bellcrank holes. When the pushrod shape allows the bellcrank and the elevator to be in their neutral positions at the same time, cement the stabilizer to the fuselage. We limit our Cobras to about 1/8 inch of elevator down movement for the first flights. Just stick a pin through the fuselage so that the elevator hits the pin head and stops moving down, just below the neutral position. Remove the pin after a dozen or so flights.

Cement the fin to the fuselage, then set the fuselage aside while you build the wing. The wing is cut from one piece of 1/4-inch balsa 6 inches wide. The right wing panel is not shown on the plan, but is the same shape as the left. Narrower sheets can be used to make front and rear wing sections, if 6-inch sheets aren't available. Sand the wing to a streamlined airfoil cross-section; use the wing opening that you cut in the fuselage for a template. Cut through the wing at the center, front to rear, to produce separate left and right wings. Bevel the cut ends so they butt together when each wing tip is raised 3/4 of an inch off the work bench. Rejoin the wings with epoxy, leaving the tips raised until the joint is set.

Three or four nails, such as those used for the bellcrank pivot, should be inserted full-length into the right wing tip, for tip weight. Make two small notches on the left wing tip, in the positions shown, for the leadout guides. Secure the tubular guides in the grooves with epoxy. Carefully glue the wing into its opening in the fuselage. Place each leadout through its guide, then bend a loop in the end. The loops should align when the elevator is neutral. Make sure that the control system works smoothly; no hang-ups or sticking can be tolerated.

Models used only for whip flying don't need to be painted. If your Cobra will later be converted to the gas-powered Kingfisher configuration, finish it with hot fuel-proof dope. Engine fuel would soak into unfinished wood and ruin the model.

Stick a lump of clay on the end of that long nose. Place one finger under each wingtip, about 1-1/2 inches back from the leading edge, and add or remove clay until the model balances level. This is only a starting point; add or remove small amounts of clay, according to how the model flies. A tail-heavy model will be very hard to stabilize in flight and will want to flop around. A nose-heavy model will want to dive all the time. Your Cobra will probably be just right, but refer to the last sentences if you should have problems learning to control it.

When you have "whipped" the problems of whip flying, read and heed the rest of this article. You'll learn how to transform your trusty Cobra into a 1/2A control line trainer, the Kingfisher.

The Vought-Sikorsky OS2U-3 Kingfisher was a WW II U.S. Navy scout plane. Usually seen with floats, a wheel-type landing gear could replace the floats when duties called for dry land operation. One of the few surviving OS2U-3 Kingfishers served with wheels in the Mexican Naval Air Force. U.S. Civil Service employees restored that airplane to a float configuration, typical of Kingfishers catapulted from battleships and cruisers. It is on the deck of the battleship "Alabama", on permanent display in Mobile.

Items needed to change the Cobra

to a Kingfisher are a Midwest Quik-Mount engine mount and landing gear set, wheels, and an .049 that will fit the mount. The engine must have an integral fuel tank; we used an inexpensive Cox Babe Bee engine. The entire nose can be removed with a vertical cut at the windshield, or a section representing the lower cowl area can be left, as shown on the plans. Dope the bare wood exposed by cutting, then attach the Quik-Mount and engine per manufacturer's instructions. Nothing to it!

Add a 6-3 prop and a wire tail skid. If you use light wheels, the model will probably balance level when supported by fingertips at the leading (front) edge of the wing. If it balances nose down, wrap a bit of solder around the tailskid to bring the nose level. Cut a rudder section from the fin. Cement it back on with about a 1/2 inch of offset towards the right. Don't be concerned if the rudder inhibits elevator-up movement; the 1/2 inch of up available should be plenty for this little ship. It's enough for mine, as experience has shown. No limit on down control should be needed, due to previous training with your Cobra.

Go fishing with your old whip pole; you don't need it for gas models. You *do* need some good 1/2A flying lines, about 25 feet long. Always make takeoffs with the wind blowing from behind the model. Expect fast acceleration and a short takeoff run! Hold full up control during the roll, but be prepared to change that to prevent the well-known 4/5 of a loop on takeoff. Start to level off as soon as the Kingfisher is airborne. You will enjoy engine-powered control line model flying, but don't try to land this one until it runs out of fuel! •

Choppers . . . . *Continued on page 50*

process. Well, it isn't! This little trough is to be trimmed into 6 equal lengths and used as straps to hold the dowels and spring latch in place on the inside of the doors. Plastic scraps may be used as reinforcements inside the seams, wherever desired.

Right about here, you'll have to make a decision. Are you going to use skids, tricycle gear, or retracts? I personally prefer the skids (it saved lots of extra work), and I think the chopper looks neater that way. However, you'll have to decide for yourself and make up your own method of attachment. The plans clearly show how to install the tricycle gear, and retracts could be installed in much the same manner.

Now you'll need to do a little woodworking. In the kit you'll find plywood sheeting to be used for 3 additional formers that hold the shell in place. The largest former is cut to size and mounted on the rear edge of the Heli-Boy frame. This former should be trimmed so that the tail boom shell (rear fuselage section) will snap into place around the former; a molded lip on the body will hold it secure. Make sure the large hole will accommodate the tail rotor pushrod without binding. The long narrow former is cut out and installed on the bottom of the frame. Its purpose is to provide a bottom for the front body shell. This shell has a groove all the way around it; the groove fits the outline of the bottom former. It is held in place with a huge rubber band all the way around the bottom groove.

The top side of the main body shell is also held in place with another rubber band, but it's pretty flimsy up there, particularly around the rotating parts, so I glued two small hardwood scraps to the top side of the rear former, and drilled holes so that small wood-screws would anchor the two body shells together and to the former. See photos for details. The third semi-circular former is added to the existing front former (part of the radio box), but may be eliminated if you don't need extra support in that area.

The final handiwork is cut and trimmed as required for easy assembly and disassembly of the body. Don't forget to make a cut-out in the body for your particular muffler. If the skids are used instead of the tricycle gear, the lower former makes an excellent location for the radio. See photos for a neat radio tray that fits into the lower aluminum channel.

Most any kind of finish is satisfactory for the Bell 222. I always use a primer and K&B Super Poxy for a durable, glossy finish. I suggest that the entire body be dulled with fine steel wool, so that the paint will stick better to the plastic surface. IMPORTANT . . . For gosh sakes, mask off your windows before sanding and painting! This also applies to the inside of the windows, to protect them from paint overspray inside the chopper. I had a good look at Dr. Richard Smith's completed 222 before he painted it, and it reminded me of a ghost ship. A bit unusual, but you might like it unfinished!

I might be able to talk Richard into sharing the details of his "super muffler", designed for the 222 . . . really unique, and you can't believe the sound it makes! How 'bout it, Rich? Another idea was a paint job on the inside of the chopper! Difficult to paint inside the tail boom, but the clear plastic outside gives an unusual sheen to the model; however, I really think it looks better finished in the conventional manner.

FINAL APPROACH

Hopefully, the next issue will review Charlie Gilbert's latest collective pitch machine. He has tentative plans to market it in the near future, so no more details until the next issue.

This month's handy tool for helicopter modelers is a companion to the ball-link tool described in an earlier issue. It is a tool designed to hold wire pushrods firmly, while adjusting the plastic ball-links during trimming. I've pinched the pushrods so often that I have grooves in my fingers, and I just hate to mar or scratch those control rods with pliers (that's where they always break!). This little tool will clamp the pushrods and provide a handle so you can twist to your heart's content, and *know* the rod is not turning!

Start with a small piece of medium-hard aluminum bar stock, about 10mm x 12mm x 80mm. At one end, drill a hole all the way through the bar, equal to the size of your pushrods. Use a drill press to insure a right-angled hole. Next, saw off, or file, the end next to the drilled hole so there is a small amount of metal left in front of the hole. Now, using a metal-cutting band saw (or milling cutter), make a slit about 60mm long through the hole and down the length of the bar. Drill another hole crosswise to the saw cut and tap one side for a machine screw (10-32 is fine). The other side is drilled to clear the machine screw. Braze or silver solder a wing nut on the machine screw, and install it, with a washer, into the tapped hole. All that remains is to file lightly, as necessary, to let the pushrod snap into the slot, and tighten the wing nut. I'm sure the drawing and photo will be more explicit than my instructions. Until next month, then, I'll BCNU. •

Power Boats . . *Continued from page 60*

It comes with a standard 7-cell, 500 MA pack, or, as Doug selected, a heavy-duty, 7-cell 1000 MA pack. The total system weight is 23 to 28 oz., depending on the battery pack. The price tag of $89.95 seems fair, considering the quality of workmanship of the Lectra-Start.

Other systems available are No. 101B, which is designed for .19 to .30 size engines, and comes complete with a mini 6-cell or standard 6-cell 500 MA pack; for the large scale boats, No. 301B can handle the O&R mills. When ordering a system, Gary requests certain information so that Eastcraft can recommend the best system for your needs, as well as to make your project a success and minimize installation time. Please supply: engine make and size, front or rear intake, flywheel make and model, distance from rear of engine to front of flywheel, diameter and threads-per-inch of your crankshaft, and engine mount make and model. For ease of installation, Eastcraft recommends using a K&B mount, or Octura Multi-mount.

The systems come complete with detailed step-by-step installation instructions. Be sure to read them thoroughly before installing the system. We especially found the wiring diagram and the pulley/clutch assembly drawings to be most helpful while working through the text. Like they say, "one good picture is worth a thousand words".

You should select an engine that is in fairly good shape. Gary recommends an engine that has proven relatively easy to start, yet has not lost most of its compression. The higher the compression of your engine, the lower the cranking speed. However, the starter in the Miss U.S. has no trouble cranking a

strong OPS .60. Depending on the system, you can expect 25 to 80 starts per charge. Also, you should check the crankshaft to make sure it is straight. There are steps mentioned in the instructions to check this alignment. An extension is added to the crankshaft to accommodate the starter pulley/clutch assembly. Great care is taken by Eastcraft to ensure the concentricity of the extension. The pulley/clutch assembly should line up perfectly; just be sure the crankshaft is straight.

The system is designed to fit in a standard 5-inch motor mount, between the marine engine and the engine bearers, as shown in the photo. A variation to this installation, which proved successful on the Miss U.S., was to mount the starter in the radio compartment to allow for the scale cowling. Gary provided Doug with a 14-inch shaft to replace the normal length, and Doug modified the drive unit. Thus, the starter is hidden and yet still very effective. I want to say, though, that whenever you deviate from the manufacturer's intended assembly or use, do not blame him if you are unsuccessful.

Although Eastcraft recommends using a third channel to activate the starter, it is possible to use a two-channel radio. The Miss U.S. was set up so that when you apply full left rudder and full left trim (which, of course, is almost never used), the servo arm depresses a micro-switch.

On the day of our test, Doug got everything ready, fueled up the tank, and, as per the instructions, gave the engine a prime. The other boaters just stared with their mouths open as the Miss U.S. was set in the water, and then Doug proceeded with full left rudder to start the system cranking over. Without exaggerating, it was just like watching one of the big Thunderboats fire up out of the pit area. The realism is something else!

With proper maintenance, the system should give long, trouble-free operation. Periodically check for proper belt tension, apply Loctite 242 to all screws and bolts, lubricate the clutch assembly, and remove excess fuel and oil from the belt and pulleys. If you have any questions, write Eastcraft Specialty Products for more information. HAPPY STARTING! •

all given copies. All that is required is to fill in the upper right hole with the number of the winner. About 25 of these will easily fit on an 8-1/2 x 11

HEAT NO.	WINNER
SAIL NO.	SAIL NO.

page. (I'd try to con the scorekeeper in to keeping a separate total against a list of sail numbers, so that total wins would be postable as the events went along. It helps to keep the interest up as ties are broken and so on.)

Presented below are the heat lists for 7, 8, 9, and 10-boat match racing events. The column of letters represents the boats entered, the numbers after them are the heats they sail. (When you make this up, replace the letters with individual sail numbers.) Give each skipper a 3 x 5 card with his sail number and the heat numbers on it.

7 BOATS (21 HEATS)

BOAT	HEATS
A	1, 4, 8, 11, 15, 18
B	1, 5, 9, 13, 17, 21
C	2, 5, 8, 12, 16, 20
D	4, 7, 10, 13, 16, 19
E	3, 6, 9, 12, 15, 19
F	3, 7, 11, 14, 17, 20
G	2, 6, 10, 14, 18, 21

8 BOATS (28 HEATS)

BOAT	HEATS
A	1, 5, 9, 13, 17, 21, 26
B	1, 6, 12, 16, 20, 23, 25
C	2, 6, 9, 14, 19, 22, 27
D	4, 8, 12, 15, 18, 21, 27
E	3, 7, 10, 13, 18, 22, 25
F	3, 8, 11, 14, 17, 23, 28
G	2, 5, 10, 15, 20, 24, 28
H	4, 7, 11, 16, 19, 24, 26

9 BOATS (36 HEATS)

BOAT	HEATS
A	1, 5, 11, 15, 19, 23, 28, 32
B	1, 6, 10, 14, 20, 25, 29, 33
C	2, 7, 10, 15, 22, 27, 31, 36
D	4, 9, 14, 18, 21, 26, 32, 36
E	2, 6, 11, 16, 21, 24, 30, 34
F	3, 8, 13, 18, 22, 25, 28, 34
G	5, 9, 13, 17, 20, 24, 31, 35
H	3, 7, 12, 16, 19, 26, 29, 35
I	4, 8, 12, 17, 23, 27, 30, 33

10 BOATS (45 HEATS)

BOAT	HEATS
A	1, 7, 11, 17, 24, 30, 33, 37, 44
B	1, 6, 12, 18, 22, 29, 34, 38, 41
C	3, 7, 12, 16, 23, 28, 35, 40, 45
D	5, 9, 14, 19, 23, 27, 31, 37, 41
E	3, 8, 13, 17, 22, 26, 31, 36, 42
F	5, 10, 15, 20, 24, 28, 32, 38, 42

Sailing . . . . . *Continued from page 56*

Scoring is easily done in a clever format Dennis developed. In the figure, we see the heat number in the upper left quadrant; sail numbers of each boat in the lower quadrants. These three are filled out prior to race day. The regatta director, scorer, and race committee are

G	4, 9, 13, 20, 25, 30, 34, 40, 43
H	2, 6, 11, 16, 21, 27, 32, 36, 43
I	4, 10, 14, 18, 21, 26, 33, 39, 45
J	2, 8, 15, 19, 25, 29, 35, 39, 44

One requirement of this system is the absolute necessity that every boat have dual frequency radio capability.

Match racing requires an instant recall of the racing rules. While it is fair sailing which determines the winner, it is nevertheless true that he who commits a foul finishes second. Different styles are employed. Some skippers will attack with the idea of forcing an infraction. Others, sure of superior boat speed, will avoid the other boat. Some hang back, then seem to magically appear just to leeward of you, luffing you over the line early, then charging to weather while you reround to start late.

The literature on match racing is mostly buried in bits and pieces in the accounts of the America's Cup matches. Two good references that don't fit that category are given below. They should be in every serious yachtsman's library.

Stuart H. Walker — Advanced Racing Tactics, W.W. Norton & Co., 1976, pp 20-22, 177-194, particularly.

Joachim Schult — Tactics and Strategy in Yacht Racing, Dodd, Mead & Co., 1970, in general.

On other news ... I have just received the newsletter of the Minuteman MYC of Needham, Massachusetts. They have a busy schedule this season and are drawing skippers from Marblehead, Mass., Mystic, Conn., and Rhode Island, to their activities. Very popular among their club events are the handicap races.

We discussed the Narragansett MYC's handicap scoring system in a previous column, and it is apparently working successfully for the Needham Club. If I go through the regatta reports, I find the following boats all sailing together at one time or another: EC/12, Santa Barbara, Soling, Star 45, Scheel 50, J-Boat, Friendship, 50/800 — Bingo, Vintage and others.

If you live in the New England area, contact any of the following for further information:

Minuteman MYC, c/o Needham Park & Recreation, Town Hall, Needham, MA 02192, (617) 444-5100.

Commodore Dave Mainwaring, 87 Hawthorne Ave., Needham, MA 02192.

Vice Commodore George Rowse, 85 Robinson Ave., Pawtucket, RI.

Newsletter Editor Jack Sullivan, 222 Manning St., Needham, MA 02192.

I am most interested in obtaining newsletters from any clubs that put them out. Let me help advertise your club's activities here in the pages of **Model Builder**. Remember to send in your AMYA dues to AMYA Secretary, 2709 S. Federal Highway, Delray Beach, FL 33444. I will field questions if accompanied by a stamped, self-addressed envelope. Rod Carr, 7608 Gresham St., Springfield, VA 22151. ●

Plug Sparks . . *Continued from page 71*

gines on the market, which were miserable to start. Brats ran pretty fair, and according to Karl Carlson, who produced about 100 Hex head-type Brat engines (which he called "repro" engines), Brats started fairly easy. Nowadays, with better batteries, better wiring techniques, and better coils, it is no great surprise.

Jack Keener made about 5,000 Brat engines in all, first beginning production at his shop at 2429 W. Washington in Los Angeles. Continuing production of Brat engines, Keener moved to Oakland, where he resides today.

The 1938 version, which is illustrated featured a bore of 17/32 of an inch and stroke of 5/8 of an inch. With an overall height of 3-1/4 inches, the motor weighed in at 3-1/3 ounces. Although claims of 3500 to 7500 rpm were made, most Brats turned in the 5 to 6000 rpm area.

The Keener Aircraft Industries sold the Brat engine for $16.50 complete. This included transparent fuel tank, coil, condenser, plug, propeller, and a can of S.A.E. 70 wt. oil! How about that last item for the unhappy modeler who had no motorcycle shop in his town, and 70 wt. oil was hard to find!

MOTOR OF THE MONTH REVIEW

Some readers have asked this columnist if he would list, by date, the engines that have appeared in this column. For those you are missing, you can try this magazine for back issues. Here they are:

April 1975 ..... Brown Jr. B
May 1975 ..... Ohlsson Gold Seal
June 1975 ..... Baby Cyclone E
July 1975 ..... OK .60
August 1975 ..... Orwick .64
September 1975 ..... Atom .09
October 1975 ..... Dennymite
November 1975 .... Mighty Midget
December 1975 Atwood Champion
January 1976 ..... Super Cyclone
February 1976 ..... Rocket
March 1976 ... Ohlsson Miniature
April 1976 ..... Madewell .49
May 1976 ..... Bantam .19
June 1976 ..... Arden .099
July 1976 ..... Ohlsson Twin
August 1976 ..... Syncro Ace

November 1976 ..... Elf Single
December 1976 .....Husky Junior
January 1977 ..... Forster .99
February 1977 .. Anderson Spitfire
March 1977 ..... Ohlsson .23
April 1977 ..... Elf Four
May 1977 ..... Trojan Jr.
June 1977 .....Tiger Aero
July 1977 ..... Brownie
August 1977 ..... Comet .35
September 1977 .... Golden Eagle
December 1977 ..... Megow .199
January 1978..... OK .49
February 1978 ..... Wasp .60 Twin
March/April 1978 .....M & M .292
May 1978 ..... Marvin Jr. A
June 1978 ..... Little Dynamite
July 1978 .....Torpedo Special

You will notice several gaps. These occurred during write-ups of the SAM Championships and the Old Timer Events at the Nationals. We try to get one every month, but there are times when we have too much material.

Next month, we'll try to list all the old-time gas model plans that have been presented. You'll be surprised at the number that is available at **Model Builder** magazine headquarters. Of course, we will continue to run them for a long time. The columnist has over 400 plans himself!

THIRTY YEARS AGO, I WAS. . .

Ken Hamilton, one of the early spark plugs of the Flightmasters Club, sent in the most interesting letter received in quite some time. This columnist feels that you, the reader, might get a kick out of his old modeling days. Incidentally, this letter was brought on by sending Ken an old Modelcraft Douglas 0-38 plan that he had drawn for Barney Snyder. The plan brought out the following memories.

"Barney and Peg (Snyder), at that time (1935, I believe, perhaps late 1934), had a small shop in a one-story row of stores on 54th Street, in a residential neighborhood. It was located a couple of blocks west of the old L.A. Railway streetcar Div. 5 Car Barn. This building is still there, being used as an RTD bus garage. Barney and Peg had opened there in about 1932 or 1933, living in the back, and driving some old American car that we knew only as 'the foreign car'.

"Barney initially had balsa, tissue, dope, wire, rubber, wheels, and noseplugs. That was about it! (What a change there has been in the range of hobby offerings nowadays!) He soon offered some simple designs of his own, for which he made up kits. I recall a 15-inch rubber speed job; straight wing that slid back and forth on a flat fuselage for trim, with aluminum wire tips and empennage outline. I painted mine with red dope, added wheel pants, and spinner . . . looked sharp! Barney bought it for his display model.

"Barney then decided to put on a contest for that model only, and sold quite a few kits. A classmate friend decided he was going to win, and went all-out to lighten the model. He couldn't understand what was wrong when he had to put the wing clear back to the fin in the first flights at the contest. He had lightened everything thoroughly, except the aluminum wire on the tail!

"Barney bought a 45-inch wingspan Vickers Gun Bus from me for $4.00 in early 1934. It was enlarged from a Joe Ott design that was originally 30-inch span. It flew terrific, a big four-bladed fan pushing it up and right on through near-stalls. I needed the four bucks, but couldn't approach the folks for it in those hard times. Barney saved the day. I recall Peg was not too happy about the deal, but the model hung in the shop for a long time.

"About this time, Barney developed a line of flying scale rubber models (one was a SPAD), and asked me to build one of each kit during the 1935 summer vacation. He offered a nominal fee for each, which looked good to a school kid in those times. There were perhaps 5 models, and it couldn't have been more than 20 or 25 dollars for the whole lot. My dad flatly refused to let me do it, rather pushing me to enter the Richfield Jimmy Allen contest. I said I couldn't do both, and Barney's money was sure. My dad said so was the Jimmy Allen money, I could win. He was right, I did!

"There were five equal categories. I chose to build the Northrop Gamma, solid model, all balsa, fuselage hollowed, painted cream all over, with blue stripes and trim, complete with Northrop circle and bird on fin (These were the Richfield Eagles). I spent most of the summer on the model, and the photos of it still look good.

"Barney Snyder sold kits of wood and specially-pigmented Richfield colors. The wood was balsa blocks, cut to size. Richfield supplied the plans. I hollowed my fuselage, put in a sheet aluminum pilot's seat, sliding canopy, working surface controls using positively-acting push-pull rods and bellcranks, with torque tubes through the wings to operate the ailerons. The wing flaps could be lowered and raised with a sort of emergency brake handle. The antenna would pay out at the tail cone and could be reeled in.

"Dudley Steele, a Richfield corporate pilot, was one of the judges, and literally went "ape" over the

controls, poking his fingertip to the control column. He raved about the positive controls, calling it to the attention of the other judges. Another Gamma with a superior finish and working controls was considered, but the thread stretched over the pulley had come loose, and the controls barely twitched. My model was accurate in outline and contour, neatly and smoothly painted, but no one ever told me about filling the grain; hence the balsa grain showed. In spite of this, in successive elimination meets, I won a pen and pencil set, then $35.00, and a final prize of $100. Richfield Oil Co. then exercised their right to buy the model for display in the lobby of the old black-and-gold downtown office. They only paid $50,00, but what an impressive contract I signed to release the model!

Anyway, after that I did the Douglas 0-38 plan for Barney, as he wanted it 'right now' to kick off a new line of deluxe kits. After trying most kits, I decided to go out to the Griffith Park National Airport to look over the Douglas 0-38 planes. From them, I got all my markings and ideas for structure. After finishing, I never did hear how successful Barney's kit was.

"To wrap it up, Barney was a good-hearted guy, always helping young modelers in those depression times. He gave employment to a couple of my classmates, made his company grow, and brought out many kits of lasting fame; Miss Tiny, Pacific Ace, Spook 72 and 48, to name a few."

Ken feels that SAM should set up some sort of recognition for those early hobby dealers who really pioneered modeling. This item will be placed on the SAM agenda, for consideration by the membership.

ELECTRIC O/T EVENTS
SAM CHAMPS

Although most of the contestants are aware that there are going to be two electric events at the New Jersey SAM Champs, not too many are aware of just what is cooking. Here is the dope:

.020 ELECTRIC F/F (Joe Beshar, C.D.)

1. Power: Astro Flight .020 Electric Motor.
2. Battery will be checked for no-power condition and charged for two minutes, using Astro Flight rapid-charger with a Deans 2-prong female battery connector.
3. Hand launch. Six attempts to make three official flights. Anything over 10 seconds is official.

ELECTRIC R/C O/T (John Pond, C.D.)

1. Any old-timer conforming to the SAM Rules, and using any size electric motor.
2. Two minute motor run. Ten minute flight with 50 point landing circle.
3. Flights over ten minutes will be penalized one point per second over.
4. All flights will R.O.G.

Remember, these are special events; hence, the trophies are being provided by Bob Boucher of Astro Flight. This man is simply great for his donations and promotion of O/T electric events!

DENNYPLANE CONTEST

For a long time, Red Barrows and the writer were seriously considering building a fleet of Dennyplanes, in conjunction with Otto Bernhardt. This was all brought about by the appearance of a Dennyplane cowl die for spinning aluminum cowls from flat, aluminum sheet discs. However, due to pressure of business and various other sundry projects, the idea never got off the ground.

Recently, at the First Annual O/T R/C Contest, Otto again displayed a vacuum-formed cowl that was nothing short of beautiful. This again revived the idea of holding a Dennyplane Only Contest. The writer wanted to go as far as requiring Dennymite engines in them (the original had a Pacific Airmotive, the forerunner to the Dennymite motor); however, this idea died as Otto pointed out that Dennymite engines were not that plentiful, and in some cases, sadly lacking in power.

We are presently talking about a radio control contest but there is no reason why we can't have a free flight event, too. Write us and let the columnist know what you think of this event. We are hot to go, but don't know what kind of support to

expect!

IT COULDN'T HAPPEN TO A NICER GUY. . .

Bill Cohen and Tom Heiser have been flying buddies since they were young. Bill worked on the New York Police Force for many years, finally moving to Orange County to go into business for himself.

Tom also moved west, to Rock Springs, Wyoming. Tom, having been talked into joining the SCAMPS, came down to Taft for the U.S. Free Flight Champs last year. This year, Bill again invited Tom to come down for the SCAMPS Texaco Meet.

Well, wouldn't you know it. By the time Tom showed up, Bill had the misfortune to break his hip while riding his big Harley Davidson motorcycle. Well, it didn't take long for Tom to get talked into proxy flying Bill's airplane.

In less time than it takes to tell it, Tom wins the Wahl Brown Junior and the high-time prize, a beautifully-engraved plaque (featuring a three-view drawing of a Brown Jr.). The win was probably the best therapy in the world for Bill Cohen. Besides, what else are buddies for, if not to bring a little cheer to a nice guy!

POST 1942 O/T EVENT

In talks with Vic Cunningham, Jr. (proprietor of Brand X Products) at the recent International Modelers Show, held at the Los Angeles Convention Center, he has offered to sponsor a post-war event at the next SAM Championships (Salt Lake, 1979).

These events have been tried before, but were found to lack interest, as entries were poor. Biggest problem was that pre-WW-II designs were being allowed to enter, which actually gave the modeler two events for the price of one model. Vic proposes three trophies for the following tentative rules:

1. All designs shall have been published or kitted after January 1, 1943, and not later than December 1952. No model qualifying as an old-timer shall be permitted to enter this event. No original designs will be permitted.

2. All models shall be ignition powered. Plan shall show ignition installation.

3. This shall be a standard three-flight event, with five-minute maximum time flights and motor run of seventy seconds.

4. All models shall rest on three points, consisting of two wheels and tailskid, or one wheel and two points. All models shall rise off ground (R.O.G.) in a conventional manner, not exceeding a ten-degree takeoff attitude.

The newer fellows coming into this old-timer game, who have never known anything but Korda Powerhouses, the Eagle line of models, Yogi, Spearhead, etc., and the later designs such as the Civy Boy, and Sandy Hogan, will have another chance to try their luck.

Hopefully (if properly publicized), this may bring out a few of the fellows who have been lost to radio control these many years. Now, if we can just talk Lin Haslin, Rocky Mountain SAM Vice President, into putting this on the 1979 SAM Champs Contest agenda, we'll be in business!

ANOTHER GOOD GUY GONE. . .

If the good guys don't stop dropping dead, this column is going to sound like the obituary section of the newspaper.

This time, in a telephone conversation with Everett "Woody" Woodman, Contest Manager of the 1978 SAM Championships, Woody revealed the sad news that Jack Florenzie had died of a heart attack on May 7, doing what he loved most; flying model airplanes.

Jack, who was scheduled to be the Contest Director of the Free Flight events, was thoroughly enjoying the 50th Flying Aces Anniversary put on by the Carstens concern. From all reports, this was a great shindig with all the picnic trimmings.

However, Jack insisted on flying his electric model. Some of the wiser

boys were shagging the model for him, as Florenzie did have a history of recent heart problems. They couldn't watch Jack all the time, so when, after patching the model, he again flew, he collapsed on the upgrade of the hill. Truly a shame, we're going to miss Jack.

WHAT IT IS ALL ABOUT

The wrap-up of the column this time can be summarized in one word: "sportsmanship". This columnist viewed what he thought was an outstanding act of unselfishness.

Don Bekins was on the line to start his Playboy Senior. Without any warning, Ted Kafer's Flamingo came whistling in for a landing, ending up on the outer dihedral panel joint of Don's airplane. Of course, the joint was damaged and the ribs crushed. It looked like Don was going to have to scratch that event.

Ross Thomas, one of his main competitors for the Sweepstakes prize, promptly volunteered one of his Playboy wings for Don to use. Inasmuch as the BOM rule was not being enforced at this contest, this was a perfectly legitimate and generous offer.

Well, luckily Ross Thomas won Class B Glow, with Don taking fourth, but there was always the possibility Don could beat Ross with his own wing! As the columnist said, "That's what it's all about." It's nice to win, but were you having any fun along the way? C'mon over and enjoy this O/T fun. It's great!! •

Counter . . . . . *Continued from page 10*

equipped with mag wheels and foam tires. The exclusive one-piece mounting plate fits 95% of the available radios.

Also included is a ribbon-wound, high-current resistor, as well as a charger for the Ni-Cd batteries. All Jerobee and MRP racing bodies and accessories will fit. Under $90.

For a full color catalog, send 50¢ to JoMac Products, 12702 NE 124th St., Kirkland, WA 98033.

* * *

Push-button engine starts? It isn't for all of us yet, but boaters can now have that privilege: Eastcraft Specialty Products has announced that the development and testing is complete, and that the "Lectra-Start" on-board starting system is now available.

The Lectra Start consists of a powerful electric motor, belt drive, and clutch assembly, and is powerful enough to start even the largest engines in common use. The package includes the battery, hardware, and all mechanical and electrical components necessary. It is easy to install, can be done in one evening, and can rapidly be transferred from one model to another. Current for the glow plug is provided from the one source, and one charge is good for 25 to 50 starts. Various models are available, one being light enough for .15 size engines.

The various models and sizes presently in production are:

201-B/LT .15-.30, $84.95
201-B/STD .40-.60, $89.95
201-B/HB Racing .60, $94.95
301-B/R Roper, $109.95
301-B/O&R O & R, $119.95
301-B/Q Quadra, $129.95

A charger for the battery is also available at $9.95.

For more information and complete literature, write to Eastcraft Specialty Products, Marine Division, 709 Longboat Ave., Beachwood, NJ 08722.

* * *

Locally, we pylon race fans insist that every year, Bakersfield is hotter than it's ever been before. I hear that free flighters at Taft do the same. The weather and temperature must also be a topic of conversation at the annual Misery Meet in the Seattle area. And how about the guys at International Falls, Minnesota? Yes, we all talk about how hot or cold it is . . . and what are we doing here?

Now, you can pinpoint that temperature, and even have a running check of whether it is going up or down, all for $7.50. The Maxi-Mini thermometer from Jensen Tools & Alloys will do all that for you, instantly telling you the present as well as the hottest and coldest temperatures. Of more practical value than as a temperature conversation piece is knowing the exact temperature, so necessary for you nitro-adding addicts.

The Maxi-mini has a range of -50° F. to +130° F., along with an equivalent Celsius scale, and is only 2-3/4 inches in diameter.

This is only one of over 3000 hard-to-find items, tools, and instruments listed in the free catalog, yours for the asking from Jensen Tools & Alloys, 1230 S. Priest Dr., Tempe, AZ 85281. Tell them **MB** send you.

* * *

A super-quick way for rubber fliers to get into the Mini-profile contest events is flying your way in, with the help of Vintage Aero.

Three new Peanut-size profile models, a DeHavilland 6 and Pietenpol Air Camper, both at $2.25, and a $1.97 Nesmith Cougar, are available.

The kits all feature complete building materials, requiring only glue and tools for completion. The covering includes preprinted insignia, wing ribs, and numbers; any additional coloring desired can be added with marking pens. No heavy dopes or paints are necessary.

Unique step-by-step building and flying instructions are included, so that even the less experienced modelers can assemble and fly these scale-like airplanes successfully.

Now available at most leading hobby shops. From Vintage Aero, 1 The Glen, Tenafly, NJ 07670.

* * *

SWISS CRAFT, 7342 Fulton Ave., North Hollywood, CA 91605, announces that after six years of engineering development and field testing, its new "Fitzpatrick .60" engine, claimed to have a 1000 to 2000 rpm edge over its nearest competitors, is now ready for production and delivery. This increases in rpm and power is reported to be a direct result of many new design innovations, plus selective custom hand-fitting.

An ABC piston/cylinder assembly, Schnuerle porting, and a special carburetor insure ultra-reliable starting and superb out-of-the-box performance, with no break-in being required. Unexcelled idle, quick response, and smooth transition are also features of this new .60.

Robust and ruggedly built internally, it is equally well-finished externally. In fact, its beautiful jewel-like looks will be the first thing to catch the eye.

The Fitzpatrick .60 is completely manufactured in California, so parts availability and service will not be a problem, now or in the future. It is available direct only, and is priced at $150. Write directly to SWISS CRAFT if further information is required. Tell 'em we sent ya!

* * *

Not too long ago, in the July **MB**, as a matter of fact, we introduced you to "Wing Sox" . . . washable polyester carrying and protective bags for sailplane wings.

They have proven so popular that the line has been extended, and now includes custom fit "Sox" for the Aquila, Olympic II, AS-W 15 and 17, Monterey, Super Monterey, Californian, Cirrus, Centurion II, Libelle, Midwest Hawk (8 and 10 foot), Paragon, Pierce 970, Windfree, Wanderer 72 and 99, Windrifter, Windrifter SD-100, Sailaire, Butterfly II, Viking Mark I and II, SB-10, Javelin II, Albatross, and the Anser.

They are all priced at $19.95, even the ones for the larger birds (which were originally priced higher). From GBS Enterprises, P.O. Box 1701, Burbank, CA 91507. Tell them **MB** sent you.

* * *

Out Dallas way, Penny Muck's father, Steve, has released news of a new stern-drive hardware kit for converting the popular "Lil' Dolphin" to an inboard installation.

The kit includes the motor mount plate, engine bearers, stainless steel drive and rudder brackets, strut with Oilite bearings, stuffing box, teflon tubing, rudder, water pickup, engine cable collet, flex cable assembly with drive dog, thrust washer, and prop nut. In other words, everything you will need except what goes at both ends; engine and prop.

Ask for complete information and price on Kit No. 63, from Steve Muck's R/C Model Boat Supplies, 6003 Daven Oaks, Dallas, TX 75248.

* * *

WHO is that masked person? It isn't the Lone Ranger, or even Patty Hearst! It is just a modeler doing the smart thing; protecting his lungs from one of the many hazards we constantly expose ourselves to. In addition to good ventilation, we should also wear some sort of protection to filter out wood dust, fiberglass, glue, paints, etc.

Karoden Hobby Products has a one-piece filter face mask designed especially for this purpose. It will work well against most of the mentioned pollutants, and is so light, cool, and comfortable that you will soon forget you are wearing it.

The Uni-Mask, as it is called, is economically priced at 6 for $1.49.

Also from the same company, we have an ultra-flexible vinyl masking tape, called Flex-Mask. This tape is available in two widths, 1/8 and 1/4 inch, both flexible enough to go around a 1/2-inch radius without wrinkling or lifting. It is extremely thin, for minimum ridge between colors, and is coated with a low-tack adhesive that will prevent lifting of undercoats. The tape comes in economical 108-inch rolls, at $2.75 for the 1/8-inch roll and $2.95 for the 1/4.

All these products are available either at your hobby dealer or direct from Karoden Hobby Products, P.O. Box 434, Bergenfield, NJ 07621.

* * *

NEWS for 1/12-scale electric R/C car drivers! Shown mounted on the Super Kydex Chassis are the latest in electric car components, from The Other Pottols Throttle Shop. They include front axles, designed to utilize either MRP or Jerobee spindles, and a modular rear end motor mount combination which is made for mid or rear-motor configurations. An adjustable feature of

this motor mount allows for gear ratio changes. All necessary mounting holes have been drilled and tapped. The axles for MRP and Jerobee spindles are $8.95. Motor mounts are $17.50. Also available are adapters to mount hex-type wheels onto round axles, at $7.95 per pair, and a gear puller, described as being perfectly engineered, at $4.95.

All from The Other Pottols Throttle Shop, P.O. Box 992, Saratoga, CA 95070.

The Super Kydex Chassis and Bumper is available from a new supplier in this field, "The Pipeline", P.O. Box 1868, Fremont, CA 94538.

They are strong and durable components engineered for optimum competition performance. The just-right rigidity allows excellent handling and maximum traction, and has a high impact resistance.

These chassis are precision cut, drilled and machined to complement the custom hardware from The Other Pottols, also in stock at The Pipeline.

For pricing info, contact Judy at The Pipeline, who will also exchange your dollar for a complete catalog of R/C car and boat supplies and accessories.

Tell them all that you read about it in **MB**.

* * *

A new company devoted primarily to items for Mammoth Scalers has recently appeared on the horizon. It is Quarter Headquarters, in San Francisco, and its first offering is a series of cast aluminum mounts for the most popular engines used in these big birds.

Currently available for the Webra .91, OS Max .90, Moki 1.5, and Suevia 1.5 engines, these mounts are heat-treated and machined to provide perfectly aligned surfaces. They come already drilled and tapped for the specified engine, and include firewall and engine mounting screws and nuts.

The price of the .90 size mounts is $16.95, and $18.95 for the 1.5 sizes, plus $1.50 postage and handling.

Currently under development, and possibly in production by this time, are exhaust manifolds for the above engines, mounts and manifolds for the Quadra, and a 1/4-scale instrument kit.

Complete information and specs are available from Quarter Headquarters, P.O. Box 12321, San Francisco, CA 94112.

* * *

Those all-important numbers and insignia can now be obtained for a large assortment of scale models from Pica Products, 2657 NE 188th St., Miami, FL 33180.

They are produced using a new process that permits reproduction on incredibly strong and thin mylar sheeting. It is pressure sensitive for ease of application, and the colors are fuel and fade-proof. Styles range from World War One to current insignia and numbers; in two sizes, for 1-3/4 to 2-inch and for 1-1/4 to 1-1/2-inch models.

Check your local shop first for prices and exact types, or write Pica Products, being sure to mention where you first read about them.

* * *

An interesting new concept in lightweight foam wings has been developed by J & K Foam Wings, of Cypress, California.

These wings are available completely balsa covered, including leading and trailing edges, and have had parts of the core removed to provide the maximum possible strength-to-weight ratio. A partial-span plywood spar is installed to assure adequate center section strength.

Currently available for the Gieseke Nobler, Genesis, Stilleto, and Shark controlliners, more of these wings are underway, and your favorite design can be constructed from your rib outlines. R/C wings are also available to your specifications, and are available either with hollow or solid cores.

The covered wings, as shown, weigh from 3-1/4 to 4 ounces for a 35-inch wing, from 4 to 5 ounces for a 46'er. Stabs and flaps are also available, as required.

Prices average $39, postpaid, for

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TRADE YOUR USED RADIO on a new ProLine System of your choice We offer surprising values on trade-ins. Check with us before you buy ProLine anywhere! We carry a complete line of fine R/C products for the discriminating modeler The Great Western Aeroplane Factory, P O Box 8885 Boise, Idaho 83707, (208) 376-0624

AERO HOBBIES — Rubber and CO_2 specialists — kits, rubber, accessories from Peck, Vintage Aero, R/N, Classic, Moorehouse, Micro-X, SIG Lee's, Keil Kraft, Flyline and others Catalog 35¢ Send to Aero Hobbies, Box 115, East Glastonbury CT 06025

the control line wings mentioned; prices for other control line or R/C wings are dependent on size and complexity. Uncovered cores, either hollow or solid, can also be ordered to your specifications.

Write for details and pricing, and include the exact dimensions and requirements of your dream project. J & K Custom Foam Wings, 10261 Janice Lynn, Cypress, CA 90630.

* * *

Centuri Model Rockets has announced the availability of the Israeli Gabriel, the latest "Strike Force" model rocket kit in a series that also includes the Russian SAM-3, the Italian Sea Killer, and the Boeing ALCM Cruise Missile, whose first target was the B-1 Bomber.

The Gabriel kit features die-cut balsa fins, balsa nose cone, and authentic Israeli decal markings. Though it has the appearance of a two-stage rocket, it requires only one "C" engine for flights to over 1000 feet. Recovery is by a 14-inch military camouflage style parachute.

All of these flying model rocket kits can be obtained from Centuri, P.O. Box 1988, Phoenix, AZ 85001.

* * *

J.V.S. Products, well-known manufacturers of R/C boats, announces its new scale "K" racing runabout, for the new mono class.

Its performance is described as outstanding, being the most responsive and predictable mono ever produced by J.V.S. It is easy to drive for the beginner, but has the necessary speed to make it a winner for the expert driver.

This model comes ready for your engine, hardware, and radio. The deck and hull are bonded, motor rails are installed, and radio box, with simulated 427 Chevy engine cover, is included. It comes with metalflake or solid colors blended to a scale-appearing two-tone paint job.

The length of the Model "K" is 36 inches, with a beam of 11-1/2. The average weight is 3-1/2 pounds, and it can be powered with a .35 to .65

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Change of address notices must be received one month before date of issue that new address takes effect. For prompt service, old label MUST be attached. Post office will not forward copies unless you pay extra postage. Duplicate issues cannot be sent.

MODEL BUILDER, 621 West Nineteenth St., Costa Mesa, Ca. 92627

ADVERTISERS INDEX

MODEL BUILDER

engine.

Price? Only $89.95. For more details, contact J.V.S. Products, P.O. Box 452, Anza, CA 92306. •

R/C World . . . *Continued from page 19*

would mean we would be back to a united Nationals, because I am sure no one wants a split Nationals, which is what will happen if we are not careful.

"I am sure that on this basis we would cover costs and probably make a profit, especially with good advertising, and with contestants from abroad we would be well on the way to making OUR National Championships what WE want, THE BEST IN THE WORLD.

"If needed, a jamboree could still take place on some other date over a 2 or 3-day weekend to raise money for teams, etc., and all the R/C fliers we need could come and show their skills. Trade demonstrations could also be organized on the same dates. Why let clubs do it when the S.M.A.E. could do it better. We have the staff AND the know-how.

"Well gentlemen, give it some thought, imagine how big it could get. I am keen to help in any way I can, and I have a good staff of helpers who will do the same. I have talked to most of the R/C fliers and event directors from this year's Nationals, and they are ready to give it a try, so, what can we lose? NOTHING."

* * *

Camille Gerard, our rotund W/C judging friend from Schouweiler, Luxembourg, reports that the single schedule "Swiss Pattern", which was turned down by the FAI in favor of the "ABC" program, would be flown in that country's team selection contest, which is over at this time. We'll give you the results as received.

Incidentally, it has been pointed out that the new FAI pattern does not actually become effective until January 1, 1979, so it is not necessary, or even official to use it before then. •

The Futaba FP-3S provides precise, single-stick control of rudder and elevator.

RC glider and ½A pilots rejoice. The long anticipated single-stick version of our popular dual-stick 2E is now available. Plus, we've added something extra... a third channel. That makes our new FP-3S system ideal for additional throttle, flap or spoiler control.

And each 3S system includes a matched set of our incredible S20's, the micro-mini servos that proved good things (and high performance) come in very small packages.

Three channels. Dual S20's. Single-stick. And just $149.95. The FP-3S. It's our formula for soaring.

The 3S system sports two tiny S20 servos and a double-tuned, RF amplified 3 channel receiver.

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THE LARGEST SELECTION OF AAA AIRCRAFT BALSA AVAILABLE ANYWHERE

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1/16 x 1/16	.08
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1/16 x 1/4	.14
1/16 x 3/8	.16
1/16 x 1/2	.19
1/16 x 3/4	.26
1/16 x 1	.31
3/32 x 3/32	.09
3/32 x 1/8	.10
3/32 x 3/16	.11
3/32 x 1/4	.13
3/32 x 3/8	.17
3/32 x 1/2	.21
3/32 x 3/4	.27
3/32 x 1	.35
1/8 x 1/8	.11
1/8 x 3/16	.13
1/8 x 1/4	.17
1/8 x 5/16	.18
1/8 x 3/8	.20
1/8 x 1/2	.24
1/8 x 3/4	.34
1/8 x 1	.39
3/16 x 3/16	.16
3/16 x 1/4	.19
3/16 x 3/8	.22
3/16 x 1/2	.27
3/16 x 3/4	.36
3/16 x 1	.42
1/4 x 1/4	.23
1/4 x 3/8	.28
1/4 x 1/2	.31
1/4 x 3/4	.44
1/4 x 1	.55
5/16 x 5/16	.27
5/16 x 3/8	.36
5/16 x 1/2	.41
5/16 x 5/8	.51
5/16 x 1	.60
3/8 x 3/8	.41
3/8 x 1/2	.47
3/8 x 3/4	.54
3/8 x 1	.65
1/2 x 1/2	.52
1/2 x 3/4	.70
1/2 x 1	.87
5/8 x 5/8	.64
5/8 x 1	.94
3/4 x 3/4	.88
3/4 x 1	1.00

36" BALSA TRIANGULAR CUT

1/4 x 1/4	.31
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3/4 x 3/4	.58
1 x 1	.76

BAGS OF BALSA

Bags of Balsa	1.98

STICKS
48" Lengths

1/8 x 1/8	.14
1/8 x 1/4	.20
1/8 x 1/2	.29
3/16 x 3/16	.19
3/16 x 1/2	.37
3/16 x 3/4	.44
1/4 x 1/4	.30
1/4 x 1/2	.39
1/4 x 3/4	.51
5/16 x 5/16	.39
3/8 x 3/8	.49
3/8 x 1/2	.55
3/8 x 3/4	.72
1/2 x 1/2	.64
1/2 x 3/4	.88

48" AAA SHEETS

1/32 x 3	.84
1/16 x 3	.89
3/32 x 3	1.06
1/8 x 3	1.21
3/16 x 3	1.48
1/4 x 3	1.74
3/8 x 3	2.20
1/16 x 4	1.32
3/32 x 4	1.49
1/8 x 4	1.70
3/16 x 4	1.96
1/4 x 4	2.32
3/8 x 4	2.98
1/16 x 6	2.45
3/32 x 6	2.60
1/8 x 6	2.84
3/16 x 6	3.20
1/4 x 6	3.82
3/8 x 6	4.40

ROUNDED EDGE AILERON & ELEVATOR STOCK

1/4 x 1	.70
3/8 x 1	.82
1/4 x 2	.95
3/8 x 2	1.08

LEADING EDGE
36" Lengths

1/2 x 3/8	.54
3/4 x 5/8	.82
1 x 3/4	1.10

TAPERED CUT
36" Lengths
Tapered to 1/16" Edge

1/4 x 3	1.33
1/4 x 4	1.80

SHEETS
18" Lengths

1/32 x 2	.22
1/16 x 2	.25
3/32 x 2	.28
1/8 x 2	.31
3/16 x 2	.40
1/4 x 2	.51
3/8 x 2	.55
1/32 x 3	.30
1/20 x 3	.32
1/16 x 3	.33
3/32 x 3	.40
1/8 x 3	.46
5/32 x 3	.52
3/16 x 3	.58
1/4 x 3	.64
5/16 x 3	.74
3/8 x 3	.83
1/32 x 4	.49
1/16 x 4	.53
3/32 x 4	.61
1/8 x 4	.71
3/16 x 4	.79
1/4 x 4	.93
3/8 x 4	1.18

SHEETS
36" Lengths

1/32 x 2	.44
1/16 x 2	.51
3/32 x 2	.56
1/8 x 2	.63
3/16 x 2	.80
1/4 x 2	1.02
3/8 x 2	1.10
1/32 x 3	.61
1/20 x 3	.64
1/16 x 3	.66
3/32 x 3	.79
1/8 x 3	.93
5/32 x 3	1.05
3/16 x 3	1.16
1/4 x 3	1.28
5/16 x 3	1.49
3/8 x 3	1.65
1/32 x 4	.98
1/16 x 4	1.16
3/32 x 4	1.21
1/8 x 4	1.40
3/16 x 4	1.57
1/4 x 4	1.84
3/8 x 4	2.37
1/16 x 6	1.94
3/32 x 6	2.15
1/8 x 6	2.37
3/16 x 6	2.50
1/4 x 6	3.15
3/8 x 6	3.70

ODDS & ENDS PACKAGE OF BALSA

Package	1.59

BLOCKS
3" Lengths

1 x 1	12
1 x 2	22
2 x 2	30
1 x 3	30
2 x 3	40
3 x 3	59

BLOCKS
6" Lengths

1 x 1	23
1/2 x 2	29
3/4 x 2	36
1 x 2	41
1-1/2 x 2	48
2 x 2	55
1/2 x 3	38
3/4 x 3	47
1 x 3	56
1-1/2 x 3	65
2 x 3	.75
3 x 3	1.16
1/2 x 4	.55
3/4 x 4	63
1 x 4	70
1-1/2 x 4	88
2 x 4	1.07
3 x 4	1.54
1/2 x 6	.79
3/4 x 6	.92
1 x 6	1.07
1-1/2 x 6	1.33
2 x 6	1.50
3 x 6	2.32

BLOCKS
12" Lengths

1 x 1	.42
1/2 x 2	.55
3/4 x 2	.70
1 x 2	.82
1-1/2 x 2	.92
2 x 2	1.07
1/2 x 3	.68
3/4 x 3	.86
1 x 3	1.07
1-1/2 x 3	1.28
2 x 3	1.53
3 x 3	2.31
1/2 x 4	1.07
3/4 x 4	1.23
1 x 4	1.45
1-1/2 x 4	1.72
2 x 4	2.07
3 x 4	3.06
1/2 x 6	1.48
3/4 x 6	1.72
1 x 6	2.03
1-1/2 x 6	2.61
2 x 6	3.05
3 x 6	4.52

BLOCKS
18" Lengths

1 x 1	.59
1 x 2	1.23
2 x 2	1.51
1 x 3	1.51
2 x 3	2.31
3 x 3	3.47
1 x 4	1.97
2 x 4	3.13
3 x 4	4.62
1 x 6	3.10
2 x 6	4.50
3 x 6	6.77

BLOCKS
24" Lengths

1 x 1	.81
1 x 2	1.62
2 x 2	2.13
1/2 x 3	1.30
1 x 3	2.13
2 x 3	3.06
3 x 3	4.62
1 x 4	2.66
2 x 4	4.16
3 x 4	6.10
1 x 6	4.10
2 x 6	6.10
3 x 6	9.00

AIRFOILED SHAPED SHEETS

3/16 x 3 x 36	1.24
1/4 x 3 x 36	1.40
1/4 x 4 x 36	1.90

36" TAPERED TRAILING EDGE

1/8 x 1/2	.31
3/16 x 3/4	.40
1/4 x 1	.51
5/16 x 1-1/4	.63
3/8 x 1-1/2	.72

18" BALSA ASSORTMENT

Box	7.50

BULK BALSA - 3" x 36"

Not Stamped or Sorted
Sold Only in Standard Packs
Standard Packs in ( )
Price Shown List Per Sheet

1/32 x 3	(25)	.47
1/16 x 3	(25)	.50
3/32 x 3	(20)	.59
1/8 x 3	(15)	.69
3/16 x 3	(10)	.84
1/4 x 3	(10)	1.04
3/8 x 3	(10)	1.28

PLANKS
36" Lengths

1 x 1	1.16
1/2 x 2	1.60
3/4 x 2	2.05
1 x 2	2.38
1-1/2 x 2	2.72
2 x 2	3.05
1/2 x 3	1.92
3/4 x 3	2.49
1 x 3	3.07
1-1/2 x 3	3.77
2 x 3	4.51
3 x 3	6.82
1/2 x 4	3.18
3/4 x 4	3.63
1 x 4	3.93
1-1/2 x 4	5.10
2 x 4	6.14
3 x 4	9.20
1/2 x 6	4.35
3/4 x 6	5.10
1 x 6	6.10
1-1/2 x 6	7.65
2 x 6	8.97
3 x 6	13.60

C-GRAIN AAA
8 - 12 LBS.

1/32 x 2	.50
1/16 x 2	.56
3/32 x 2	.62
1/8 x 2	.68
3/16 x 2	.85
1/4 x 2	1.07
3/8 x 2	1.16
1/32 x 3	.65
1/16 x 3	.72
3/32 x 3	.85
1/8 x 3	.98
3/16 x 3	1.21
1/4 x 3	1.33
3/8 x 3	1.71

VH - VERY HARD

1/16 x 3	.72
3/32 x 3	.85
1/8 x 3	.98
3/16 x 3	1.21
1/4 x 3	1.32
3/8 x 3	1.71

CONTEST BALSA
4 - 6 Lb. Stock
Very Light

1/32 x 3	.72
1/16 x 3	.77
3/32 x 3	.90
1/8 x 3	1.03
3/16 x 3	1.27
1/4 x 3	1.39
3/8 x 3	1.76

FROM A WORLD CHAMPION . . .

Years of experience go into the making of a World Champion. Sig is proud to feature here one of the best. Les McDonald (Miami, Florida) and his beautiful Stilleto are pictured with the awards that accompanied their winning the 1976 World CL Aerobatics Championship. The trophies are, from left to right: the Steve Wooley Cup, the FAI Gold Medal, and the World Cup. Read what Les had to say in a recent letter about one of our most unique products.

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Les McDonald

Photo by
Don Pinckert

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Like its full size brother the FMC XR311, built for duty with the armed forces, this MRC-Tamiya 1/12 scale replica was engineered to offer high performance capability on-and-off the road. It extends the mobility of R/C wheeled vehicles into areas normally the province of tracked units, opening a whole new area of challenge for the R/C car enthusiast. Unlike toy-type R/C cars, you'll derive a good deal of satisfaction from assembling this precision kit . . . and in doing so you'll be able to understand it, service it when needed and enjoy it as a hobby . . . because a toy it certainly is not.

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Once assembled the superb engineering becomes evident. You'll find actual torsion bar suspension which stabilizes all four wheels for taking on rough road environments. Operating, double wishbone, independent suspension on each wheel allows it to move quickly, over punishing, uneven terrain. It can climb vertical obstacles up to 2", and take on a 45° incline with ease.

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Nothing has been overlooked in its design. A sealed transmission keeps dust and grime off the gears. Run it in your yard, driveway, cross country or across-the-street. MRC-Tamiya's XR311 is aggressive and built for the road. Extraordinarily engineered features include proportional steering; a 540 Mabuchi high power motor; two forward and two reverse speeds; easily adjustable gear ratios 9.3 to 1; 16.1 to 1; 21 to 1; semi-pneumatic tires; posi rear end for sure grip; rugged ABS plastic body; long lasting Delrin gears. It gives you everything, power, control and reliability . . . on and off the road.

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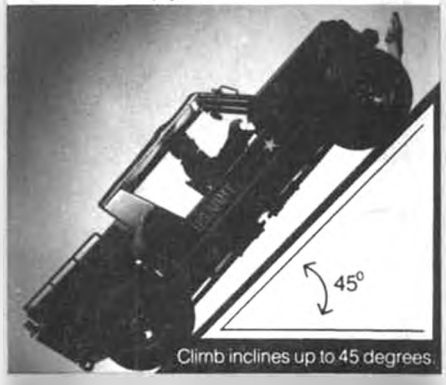
Actual torsion bar suspension system along with operating, independent wishbone suspension on each wheel help you run on uneven terrain.



Climb inclines up to 45 degrees.

Accommodates dry cells or rechargeable nickel cadmium batteries. MRC two channel radio recommended, although any comparable two channel radio is sufficient. Radio and batteries not included.

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