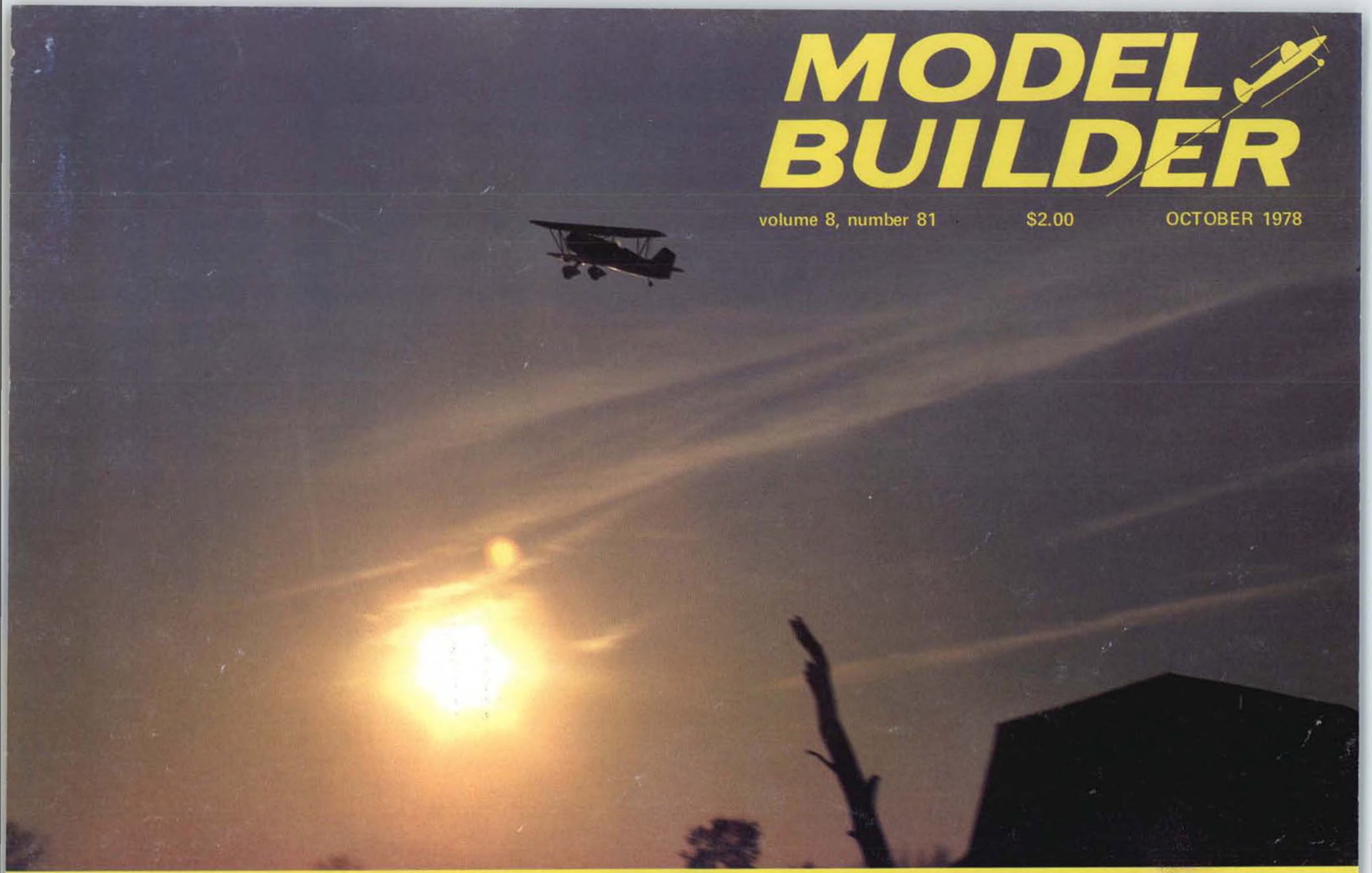
MODEL BUILDER

volume 8, number 81 $2.00 OCTOBER 1978



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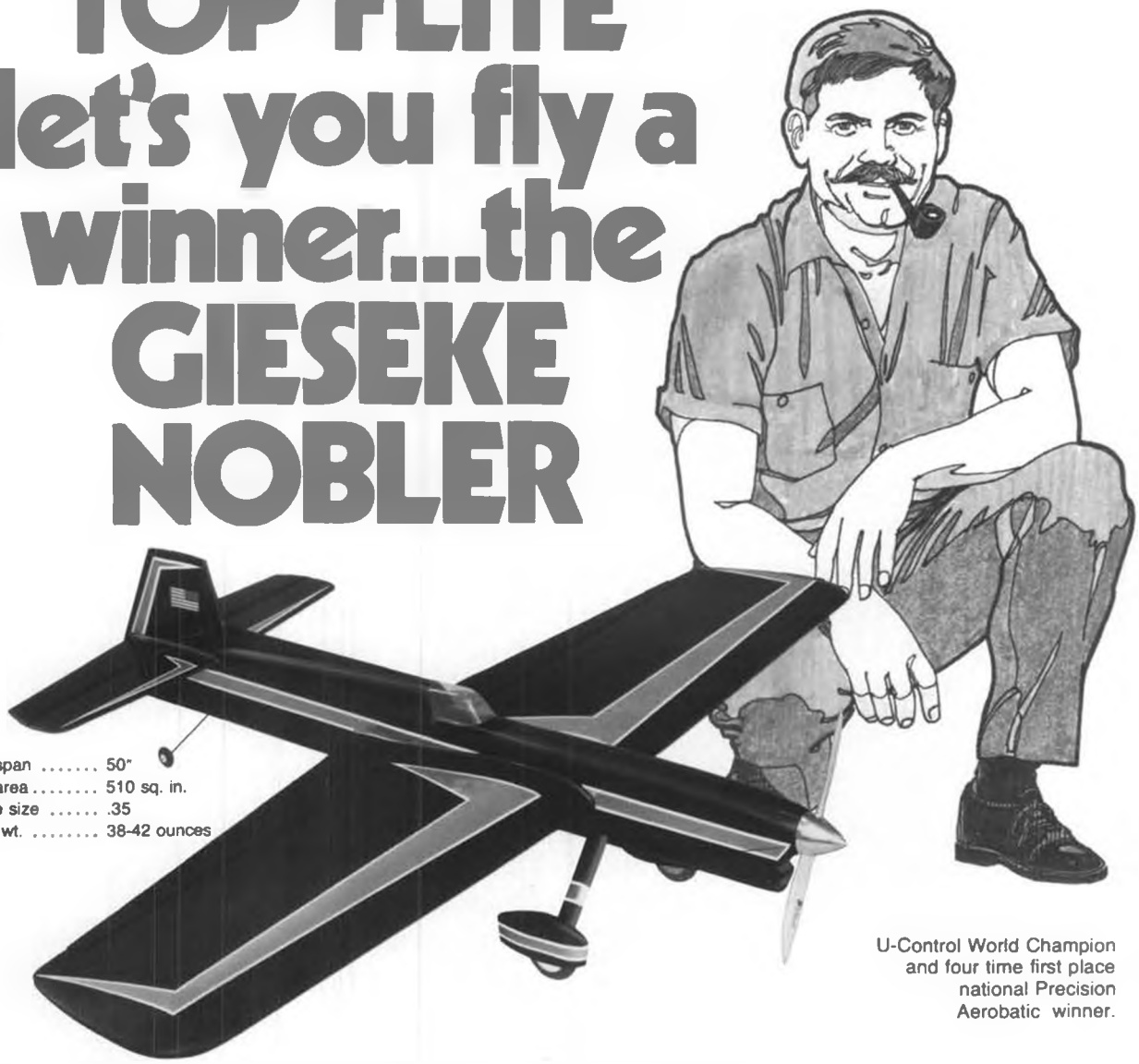

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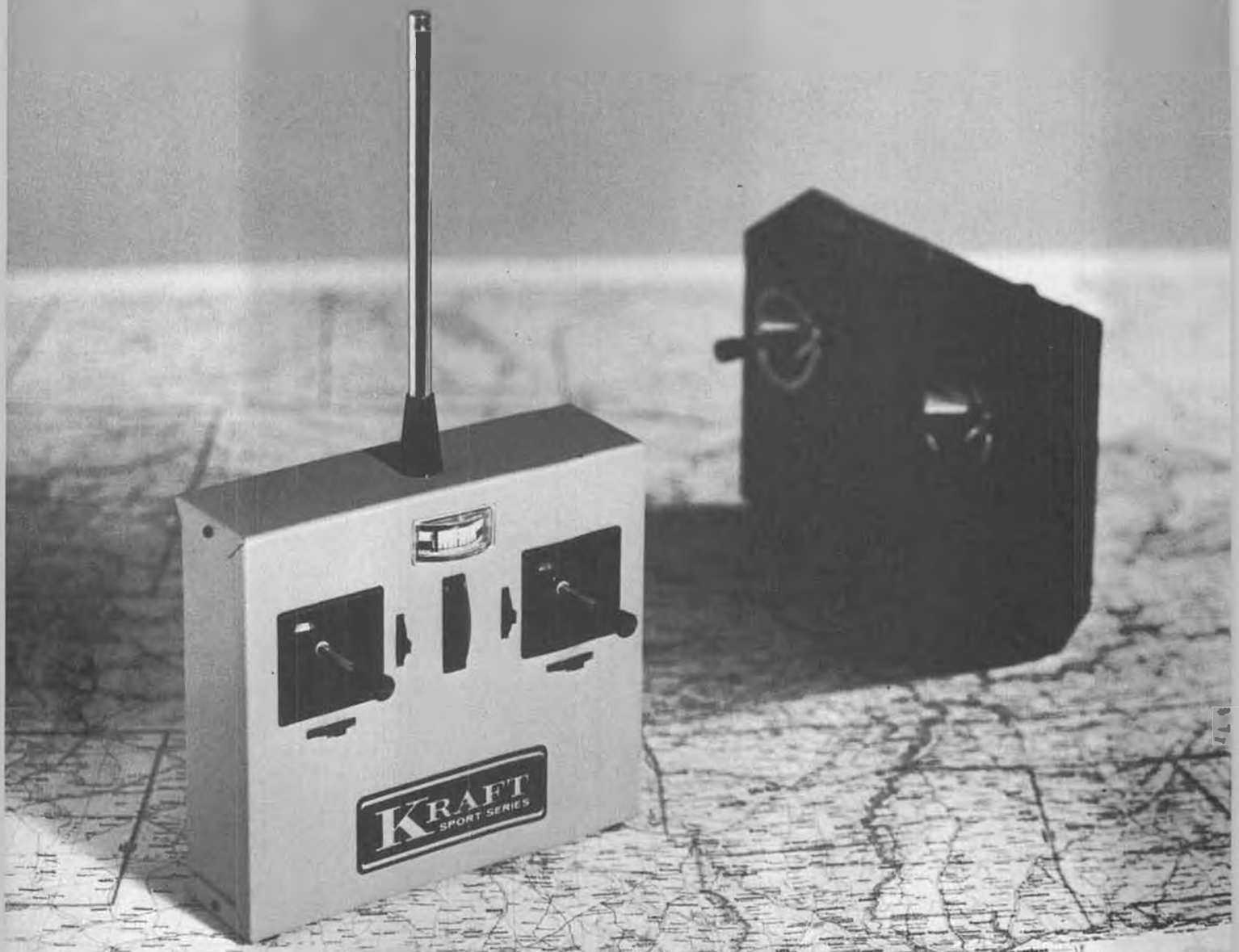

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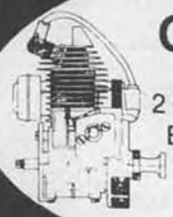

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Peanut Fokker D VI.
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Peanut Laird LC-DC.
Volksplane 3V-1 3-views.
How to build light "wire" wheels.

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White Trash, famous R/C soarer.
Peanut Ord-Hume.
Chet Lanzo's famous rubber Puss Moth.
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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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Calif. Coaster R/C glider. Sheet wing.
Three profile Peanuts.
Deperdussin 3-views.
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SAM-5 A/2 Nordic.
1912 Avro G rubber.
Comanche C stand-off R/C scale.
Travelair 2000 2" scale R/C, by Editor.
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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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MODEL BUILDER

OCTOBER

1978

volume 8, number 81

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

Subscriptions $20.00 per year, $37.00 for two years. Single copies $2.00 Add $3.50 for postage per year outside of U.S. (except APO).

Published monthly by MODEL BUILDER Magazine, 621 West Nineteenth St., Costa Mesa, CA 92627. Phone (714) 645-8830.

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

COVER: "Evening Patrol." This photo depicts that "one more flight" many of us have taken at the end of a pleasant day of sport flying. You should be heading home . . . but the air is smooth, the field is almost deserted, the batteries have plenty of charge . . . and why pump the fuel back into the can? Dick Barron, Grand Blanc, Michigan, provided this portrait of his 2-inch scale Curtiss Hawk P-6E, climbing into the sunset.

from Bill Northrop's workbench . . .

ROLLED PEANUT

"A funny thing happened on the way to the Peanut Contest" . . . well actually, it happened *at* the contest . . . and it wasn't too darn funny at the time. We're referring to our 1978 Parcel Post Proxy Peanut contest, which is reported elsewhere in this issue.

Most of us are pretty well acquainted with the annoying habit of fairly stiff paper that has been rolled up for some time. Like a window shade with a broken ratchet, if you open it up and let go, it quickly returns itself to its rolled position. If this is a large piece of paper, about 3 or 4 feet, it seems to take at least 4 ten-pound sand bags to keep it somewhat open.

Here's the scene . . . Fernando Ramos wanted to take photos of many of the Peanut entries. He set up a small studio, with lights, camera on tripod, and, of course, a background. One of the best backgrounds is a large piece of paper, that curves from a flat position where the object to be photographed is placed, and goes up behind the object. This arrangement forms a smooth transition from horizontal to vertical, eliminating a hard "horizon line" behind the object. You'll see examples of each, in the Peanut Contest report.

Well, the piece of paper that Fernando happened to use for his well-intentioned background turned out to be one of those inanimate objects with a fiendish nature. Trusting it to do its job properly, Fernando fixed it in place, turned on the lights, placed a model in position, set and focused the camera, and proceeded to document the Peanut entries on film.

Things went along fine until Bill Hannan's entry, the Farman Moustique, was placed in position. What possessed the inanimate object to become animated at this precise moment is a mystery. Did the lights heat up the outside surface of the paper and shrink it, increasing its desire to roll up? Did it want to break up the friendship between Bill Hannan and Fernando Ramos? Did it somehow know that the Moustique was headed toward possible victory and wished to be a spoiler? Did it not like French aeroplanes? Or (note the license, in photo on page 68), was it simply anti-feminist? Anyway, with the Farman in position, the paper suddenly returned itself to its rolled position, model and all!

Fortunately, the model had already been static judged, but unfortunately, it had not been flown. Through the miracle of Hot Stuff and the steady hands of Fernando Ramos and Walt Mooney, the Farman's broken wing spars were straightened and rejoined. The "wire" rigging, which was originally added for static points, now became a functional part of the aircraft, and held the wing in proper alignment. When proxy flier Ken Johnson took over, he had little difficulty in obtaining a flight average of 40 seconds and total victory for the Farman . . . best in the Golden Age class, and with its highest total points of 130, Grand Peanut for 1978.

In a fine gesture of sportsmanship, Bill Hannan has donated his Grand Peanut award, a Kraft KP-2AS radio, to Butch Hadland, of England. Hadland's entry, an exceptionally clean 110 Monocoupe, with a record of long flight times, arrived safely from England in its wood case, only to be stolen from a locked room in the Cal. State Long Beach gymnasium building. No one who saw the model doubted that it could have been stiff competition for the award.

WHERE'S BOB?

This month, you won't find a "1-to-1, SCALE" column, by Bob Underwood. Ordinarily, such deliquency of duty would result in the addition of 10 bottles of "Hot Stuff" to a gallon of the Goof-Off's favorite glow fuel. However, Bob luckily has a fair excuse.

Most R/C scale followers are aware that Bob is a member of the 1978 U.S. R/C Scale team, which will be flying for international honors in the World Championship in England, just a few weeks from when this is being written. In fact, by the

Continued on page 143

FLASH!! HIPERBIPE 2nd, USA 2nd WOW!!

OVER THE COUNTER

Ace R/C's Digipace I, automatic charger and discharger for radio batteries.

Ken Willard's "Minimousetang", by M.E.N.

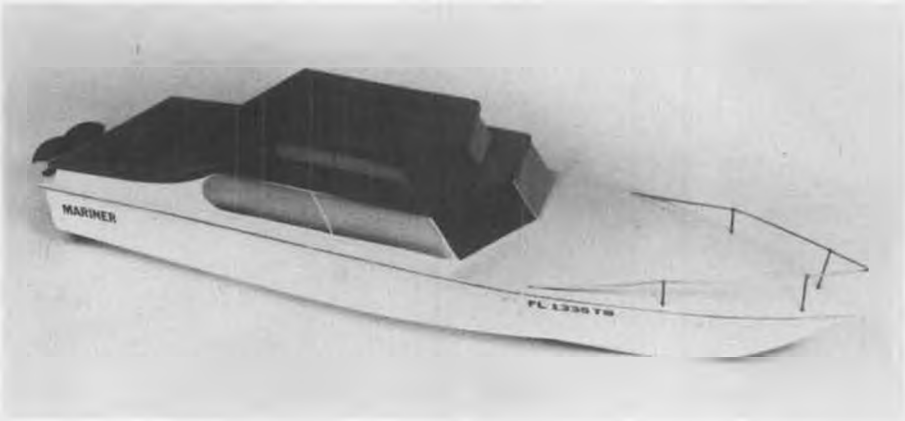
• Ace R/C, Inc., has recently developed a very sophisticated test instrument that will be a great help in spotting those airplane-eating defective ni-cds. It is called the "Digipace I", and provides for automatic discharging and recharging of both the receiver and transmitter batteries, either simultaneously or independently, and records and displays the discharge times on a four-digit LED readout.

The Digipace can be used for three different transmitter voltages; 6, 9.6, or 12 volts, and can charge receiver batteries at either 20 or 50 milliamps. It is the only device of this type that has these two important features.

Since the Digipace is completely automatic, learning to use it is a cinch. And if used faithfully as per the instructions, it will save you grief and dollars somewhere along the way. Available now, assembled, calibrated, and tested, for $94.95.

Ace R/C has another new item, which is either a bargain or someone goofed when they priced it. In any event, there is now no excuse to be flying around with an alkaline battery-equipped transmitter that may roll over and die any minute, due to dead cells. Ace has a conversion kit, which includes two 4.8-volt (4-cell) ni-cd packs, a charger, and all the hardware, including socket, plug, AND an LED charge indicator, for the low price of $19.95.

Some new shop and field items to make a modeler's life easier have also been introduced recently by Ace. One is a top quality vinyl tape from 3M, that, in addition to masking, can be used for holding battery and receiver cases together, or securing anything to most anything. This one is red, 1/2 inch wide, 36 yards long, for $2.95. The other item is 1/8-inch thick, one-side sticky, fairly dense foam rubber that can be used for equipment protection in small airplanes that have little space to spare. It also makes good wing



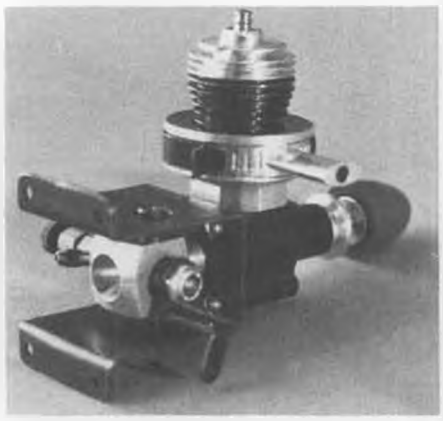
MRC's ready-to-float "Mariner".

"Cobra Jet" speedboat from MRC.

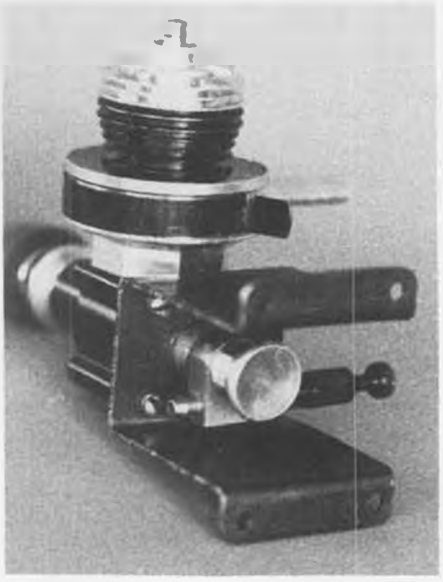


R/C models by Flite Line Products are, clockwise from l to r, the "E Z Trainer", "E Z Fli", "E Z Sport", and the "Skooter II".

Cox Tee Dee. 049 with 1/2A Tarno-Carb.



Black Widow with 1/2AR Tarno-Carb and 1/2AR Reed Housing and Motor Mount.



Black Widow with Tee Dee carburetor and Tarno 1/2AR mount.

saddle cushion material. Two inches wide, 36 inches long, $1.49.

And who would ever think that we'd see a reliable throttle for reed-valve engines! I guess it is a sign of just how popular the little airplanes and engines are. Ralph Cooney designed it, Ace R/C brings it to you, and it will fit all Cox rear reed-valve engines.

It doesn't cut top rpm, and will effectively control idle down to less than 3000 rpm, at only a few grams of weight. All this, and the use of your muffler, too. Only $2.50.

And for those who have it, and wish to flaunt it, try an "R/C Ace" T-shirt. Or maybe "I love R/C", or the "Ace R/C" logo is more your style. Either is available as an iron-on transfer, to be applied to your own shirt, jacket, or jumpsuit. They are of the right dimensions for adult-size garments; cotton or cotton blends will be best. Only $1.49 for the Ace logo, the others are $1.98.

All are now or soon to be at your dealers, or direct from Ace R/C, Inc., Box 511, Higginsville, MO 64037.

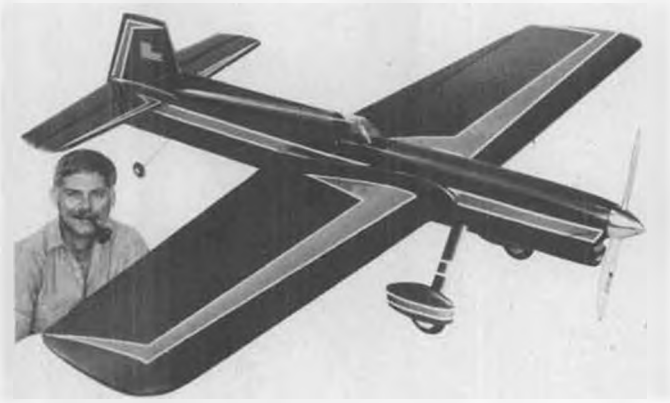
* * *

Peanut Scale fans can now add three kits (six airplanes) to their list of future projects. Sterling Models, Inc., has added three double kits to its line of these popular little rubber flyers. The include a Corsair/Zero, a Stearman/Taylorcraft, and a Jenny/Spirit of St. Louis, all priced at $3.95, and will be available in early November.

And what controlliner has not heard of the "Ringmaster"? It is still around, or maybe we should say, it is around *again*, as it is now to be had in an updated version, using today's modern building techniques. The wing is built on a board to assure a true frame, for the best flying ability. The revamped "Ringmaster", at $18.95.

All from Sterling Models, Inc., 3620 "G" St., Philadelphia, PA 19134.

* * *

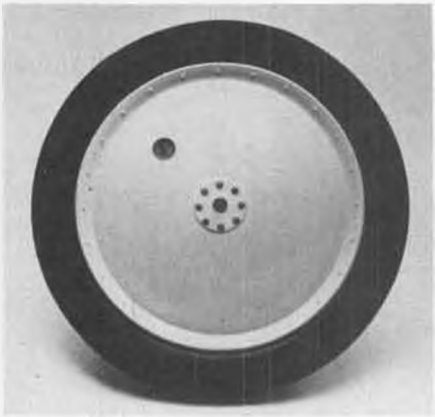


The Gieseke Nobler, available soon from Top Flite Models, Inc.

MRC's ready-to-fly "Trainer Hawk".

Williams Bros.' 6-5/8 inch diameter Vintage wheels.

At last! A 1/4-scale pilot, from Williams Bros.



New 6-1/2 inch Golden Age wheels from Williams Bros.

"Glaskote", the "ultimate finish", by Coverite.

"Spin-A-Prop", boat prop balancer, from The Pipeline.

The Minimousetang, a new Ken Willard design, has just been announced by Model Engineering of Norwalk (M.E.N.). This is a small, 35-inch wingspan, 15-ounce plane designed for quick building and lots of flying fun.

M.E.N.'s kit features "Thru-Cut" die-cutting, combined with "Tri-Square-Loc" assembly for ease of construction. This high-quality kit includes rolled plans, instructions, complete hardware, canopy, and pre-shaped landing gear.

The "Minimousetang" is priced at $24.95, and will be available at most hobby stores. For more info, write Model Engineering of Norwalk, 54 Chesnut Hill, Norwalk, CT 06851.

* * *

For those of you with little or no building time, MRC has just what you need for maximum enjoyment of what modeling time you *do* have. It has just introduced two new ready-to-fly planes, and two new ready-to-float boats.

The planes are molded foam, high-wing cabin-type configurations, for two or three-channel control. The "Trainer Hawk" is glow

Another quarter-scale pilot! This one from Dave Platt Models.

Steam-powered R/C boats, kitted by Saito and marketed by Hobby Shack. From top to bottom, the "Chiba Star", "Kamomee", "DDK 116", "Hercules", and "Star".

Prather Products has three new sizes of Drill Jigs.

After-Run Engine Oil, from Prather Products.

Just one of several clock kits from Westwood Clocks 'N Kits.

powered, using the reliable MRC-Enya .15 TV engine, which comes already installed, as do the fuel tank, control rods, and horns. Also included is a muffler, spinner, plug, prop, wheels, wing hold-down rubber bands . . . in fact, everything but the radio and fuel.

The same airplane, in a taildragger configuration, is also available in an electric version, called the "Electra-Fli", and uses the MRC-Mabuchi electric power system. This unit features a very efficient CVR (Cutoff Voltage Regulator), which allows one battery to operate both the drive motor and the radio. It automatically cuts power to the motor long before the voltage drops too low to operate the radio, so you can come home safely and under complete control.

The CVR also prevents overcharging, as well as deep discharge of the batteries. Included with the electric drive system are the motor batteries (600 mah ni-cd cells), and a fast charger that will operate from a 12-volt battery and will recharge the system in only 25 minutes.

Both the Trainer Hawk, at $98, and the Electra-Fli, at $189.95, are excellent trainers and sport flyers, and will perform right out of the box.

The boats are both fiberglass, with brightly colored gel-coat finish. Two types are available. One is a flat-bottom semi-V pleasure yacht, called the "Mariner"; the other is a speedboat, called the "Cobra Jet".

The Mariner uses an MRC-Enya .35BIII TV Marine engine, while the Cobra Jet uses the MRC-Enya .40 TV Marine. Both have waterproof radio boxes installed, also control horns, fuel tanks, mufflers, plugs, and starter belts. The radio installation can be done in less than an hour, and you can head for the nearest pond.

In addition, both MRC boats are equipped with MRC's Turbo-Trol jet propulsion system, which offers uncommon maneuverability and control, even in the most unfriendly waters. There is no prop shaft or rudder to be damaged in the event of running aground, and no dangerous externally exposed propeller. It

Continued on page 138

Sport Scale Grumman "Hellcat", now available from Jemco.

Jemco's new Sport Scale T-6 "Texan".

R/C WORLD

After a 15-year layoff from model building, Russell Davis, Tucson, Arizona, tackled "Big John", MB editor Bill Northrop's 1963 design (Sure hard to come up with something original these days, isn't it, Chuck?). Power is a Webra .91, turning a 16 x 4-1/2 prop. At 11-plus pounds, the wing loading is still only 17 oz/sq. ft. Only exterior modification is in the fin and rudder shape.

The dawn of modern R/C modeling! The year was 1951, before Citizen's Band, and it was happening in Selinsgrove, Pennsylvania, forerunner of the famous Labor Day series at Indian Town Gap, Pa. Note the ground-based transmitters, and monstrous antennas. Identities anyone?

R/C WORLD

By BILL NORTHROP

EXPERTS AREN'T ALWAYS

If you're new at the R/C flying game, it can be a confusing series of experiences. Even if you've been at it a while, but are about to try, for the first time, an entirely new (to you) facet of the hobby, it can be almost as confusing as that initial big step.

Most confusing of all is the continual flow of conflicting "factual advice" you get from the "experts", which leads to another piece of advice from this "expert" . . . the most important decision you must make is . . . whose advice will you follow.

Our suggestion along this line, is to go to the flying field. This is the place where the experts are separated from the "experts". You don't have to ask any questions . . . just observe. At club meetings and in the hobby shops, you'll meet and listen to many authorities on this and that, with a string of opinions a mile long. However, at the flying field, you'll really get to know who blows a lot of smoke and who knows what they're talking about. Again, we're not referring to the modelers who come out to stand around with their hands in their pockets, kibitzing and/or casually watching . . . and we're not talking about eager and helpful friends or family members who are in the pits, helping with all the necessary related paraphernalia . . . we are talking about the people who are pumping fuel, checking controls, cranking engines, and then taxiing their planes out to the runway, taking off, flying, landing, and returning their planes to the pits. These are the experts. Their level of expertise may vary, but if they do all of the above with any degree of confidence, then they have been through enough of the beginner's traumas to be worthy of the rating.

The same technique applies even after you have become a confident R/C pilot, but are attempting some new phase of the hobby for the first time. Now you seek out the specialized expert . . . not the armchair theoretician, but the expert who is actively successful in the type of modeling you are about to try.

All of the above was brought to mind by a letter and photos sent to us by Floyd Fitzgerald, of Pontiac, Illinois. Floyd recently won the "Best Scale Achievement" trophy at the First Annual Great Plane Fly-In contest, sponsored by Great Planes Distributors and the Champaign County R/C Club, and CD'ed by Eric Meyers.

This was Floyd's first venture into scratch-building and scale, after 5 years of "going fast and turning left with Quarter Midgets", and he proved beyond a doubt one of our favorite theories . . . If everyone listened to the "experts", nothing new would ever happen!

Floyd selected a great subject, the Grumman Ag-Cat, and built it to 2-2-1/2 inch scale. While it was under construction, he listened to all the "experts" tell him that, "It'll never work . . . tail moment's too short!" "Taildraggers are a bear to handle!" "You can't use scale incidences . . . it'll never fly!", etc., etc. Incidentally, the Ag-Cat has an interesting force set-up. The wings are at 6-1/2 degrees positive, and the stab is at 4-1/2 degrees positive. The net result is that the plane has a whole bunch of built-in downthrust, which means that it flies along like a bloodhound . . . nose down, which is just great for pilot visibility while crop dusting.

Any modeler who has designed and built biplanes can see right away that this is a perfect set-up for proper flight trim, and luckily, Floyd

Some of the 1951 Selinsgrove gang (L to R): Carl Schmaedig, Howard McEntee, unknown, Norm Tanberg, Fred Collins, Fran McElwee, and unknown. Identities please?

stayed with it, and was justly rewarded. He even stayed with the 3 degrees of built-in right fin, to counteract torque, and this also worked fine! (Keep this in mind on your Mammoth projects. The force set-ups, with big props turning at low rpm's, will probably call for this big ship trim that is often left out of models.)

The model is built of conventional materials (balsa and ply), covered with heat-shrink film, and all struts and rigging wires are functional. A Kraft radio provides control, operates servos in each wing for ailerons, and is totally unaware of any ignition noise from the O&R industrial ignition engine. At 18 pounds, the engine is a little on the overworked side, turning an 18 x 6 Top Flite prop. Fuel is fed to it from a tank in the scale position; the upper wing center section.

One warning from Floyd: Check your plastic film covering adhesive . . . it may be glow fuel proof, but not gasoline proof!

Floyd has installed a spray system that spreads four pounds of water, but it is not very visible. He's working to improve that . . . and probably will, if he can find the right expert!

THE DUAL BEANIE

Our autogyro man in Antony, France, Georges Chaulet, has been investigating twin rotors . . . not the type with which Skip Ruff had so much success (Skip's Focke-Achgelis was published as a construction article in our April '75 issue, and many of our reader/builders have enjoyed the fruits of his design). On this model, the rotors were mounted on fuselage outriggers, with more than enough clearance between the tips.

Georges, on the other hand, has been building and successfully flying intermeshing twin-rotor autogyros, similar to the post-World War II Kellett and Kaman synchropters. Along with photos of his various experimental models (the first rubber powered free flight version can be seen in "Hannan's Hangar"), Georges sends the following discussion about . . . "Synchrotors".

"The first aircraft to use the intermeshing rotors was the German Flettner 265, flown in 1939. It was driven by a single pilot. It was rapidly followed by the 282 Kolibri (Hummingbird), featuring two places, of which 22 units were built, mainly for observation aboard naval craft.

"After WW-II, the egg beaters were built by Kellett, the Centre Aeronautical Societe in France, and the Kaman factory, which was able to produce a well-known line of synchropters.

Floyd Fitzgerald and his first scratch-built scale project after 5 years of QM, a 2-1/2-inch scale Grumman Ag-Cat. Read about ship and trophy in text.

Floyd's "Cat" about to spray water. All-up weight is 18 pounds.

The O&R engine in Fitzgerald's Ag-Cat. MB will have plans in near future.

Tail wheel detail on the Ag-Cat. Ship handles well on ground.

Bob Florence's Travel Air 2000, built from MB Editor's plans (MB July '72) is 2-inch scale. Flies beautifully on O.S. 61 "4-banger".

Note streamlined rigging wire attach point covers, and turnbuckles.

"The principle of the intermeshing rotors can be easily applied to the autogyros. The only problem is to keep both rotors turning at the same speed, which is obtained through a simple couple of gears.

"Angle between the two rotor shafts is 14 degrees (it may be between 12 and 17 degrees, approximately). As there are no gears exactly tailored to a 14° angle, you may use flat gears, which can be put in place as near as possible. The defect is that when a shock happens, the gears have a tendency to 'jump' or disengage. But I found that this problem does not happen in flight, so it is but secondary.

"Here is the general layout of a synchropter: Weight must be kept to a minimum (4.5 lbs. for the Synchrogyro). Blades have a Clark-Y airfoil, set at 0° angle. The rotors themselves have a 17° incidence. Motor is horizontal, and tailplane also, with a symmetrical airfoil. The center-of-gravity is located exactly on the rotor's axis. This means that when you hold the model by the rotor heads, the rotors are horizontal, while the fuselage is 17° nose down.

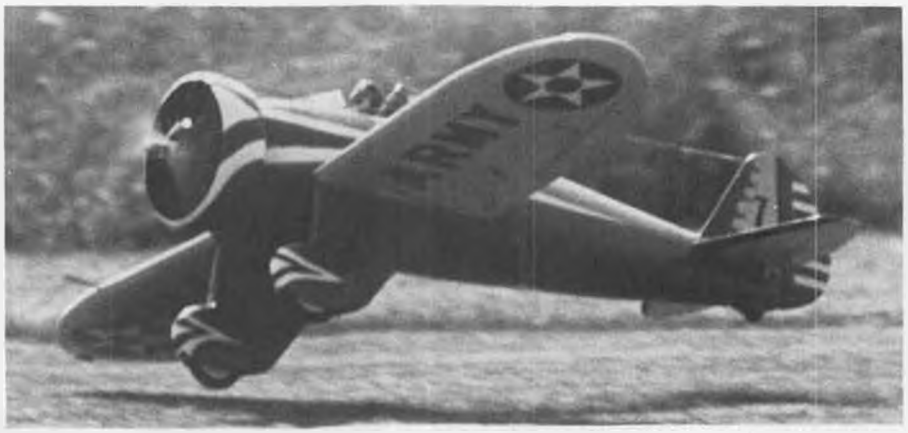
"Engine is turning in a reverse direction, driving a normal prop. This is obtained by moving the carburetor 90°, which makes the motor turn in a reverse direction. The prop has the minimum pitch, and also the minimum diameter, to minimize the torque. But, as it has to give thrust, I use a 3-bladed Tornado prop.

"Surfaces are made of balsa sheet covered with aluminum plastic film. Fuselage structure is entirely made of dural, fitted with pop rivets.

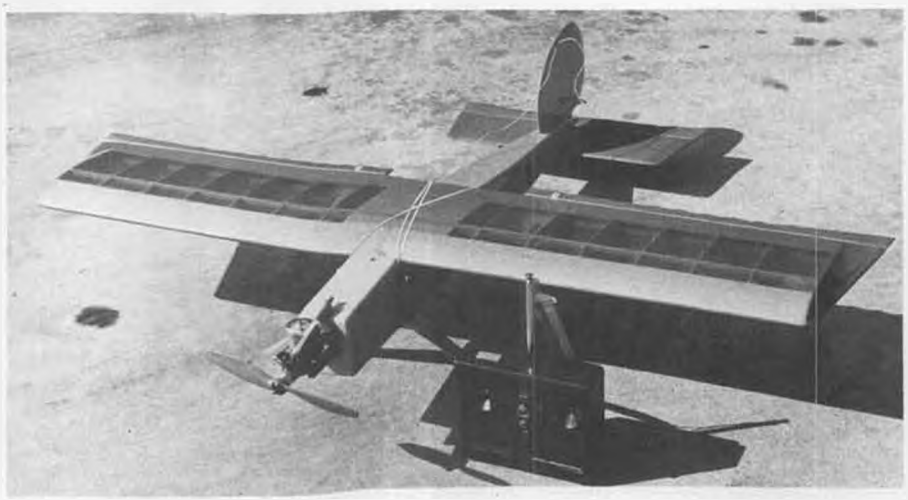
"Two servos are used; one for the rudder, and one for the motor. Up and down motion is obtained only by gas control. No prerotator is necessary. I just pull two or three times on one of the gears, facing the wind, and the rotors start turning. Then I throw the model, and it flies at 15 mph, approximately. Piloting is extremely simple, because of this slow motion, and the reduced number of controls. I recently tried to pilot a plane . . . I had never done it before, being always involved with choppers . . . and found that the airplane was far more difficult to drive!

"So, it appears that a *stable* autogyro seems the best machine to learn piloting."

Georges indicates that if there is enough interest in his R/C twin-synchrotor autogyro, he will prepare a complete construction article



Demonstrated at the Morgan Hill WW-II Scramble, Dave Grip's scratch-built P-26A, about to make a 2-point landing! Monty Groves photo.



Steve Whittman's Midwest Little Ugly Stik really scats at 2-1/2 pounds with Cox Conquest 15 power! Cox Sanwa radio.

Georges Chaulet, Antony, France, has had great success with this R/C twin-rotor "synchrogyro". See text.

Free flight synchrogyro test ship flies overhead.

for **MB's** readers. He has one vote from this editor already . . . how about you?! Drop us a card.

'NUTHER KINDA VIBRATION

Charlie Palermo, in a recent issue of the Manned Spacecraft Center R/C Club newsletter, reminds us about a source of vibration in R/C power models that is often overlooked . . . propeller tracking.

"A lot has been said and written about the importance of balancing your propellers in order to reduce vibration to within almost acceptable limits. However, not much, if anything, has been printed about another propeller check that should be performed, which can uncover a cause for severe vibration, even with a prop that has been 'balanced'. It's called *tracking*, but not many of us perform it. This check reveals whether or not both blades follow the same exact circular path. If they do not, the induced vibration can be just as severe as an otherwise unbalanced prop.

"The tracking procedure is simple and takes but a few moments of time. The first step is to remove the glow plug (or spark plug) to allow for ease of manual engine rotation. Position the prop vertically. Place a straight-sided object up to the prop so that the tip barely touches it. Now slowly rotate the prop 180°. The other tip should be in the same spot, relative to the object, as the first tip was. If so, no problem! If not, the resultant wobble during an engine run can generate as much vibration as a prop that has not been mass-balanced. The common causes of prop wobble are either a bent prop shaft or the shaft hole in the prop not being drilled exactly normal to the hub. With any given degree of shaft/hole misalignment, the amount of tip displacement increases as the prop diameter increases . . . and so does the induced vibration! If you fly the 'big ones', using 16 to 22 inch propellers, then a track check is mandatory with each new prop installation."

NEW COMMITTEE

AMA has announced that, as of May 29, a new R/C Helicopter Advisory Committee has been ap-

Continued on page 142

Heart of intermeshing twin rotors is simple gear mechanism. Note 90° rotated carburetor for reverse running.

Flying the R/C Synchrogyro is easier than flying a fixed wing plane, according to Chaulet. He'll furnish construction article for this one, if there's enough interest. Only rudder and throttle are controlled.

Two .60 powered Deep "V" boats at full speed. Note how little of the boat hull is actually in the water.

THE FASTEST GROWING R/C SPORT.....

POWER BOAT RACING

By CHARLIE VIOSCA . . . Everything you ever wanted to know about power boats, but were afraid to ask. It's easier to get started than you might think, and once hooked, you'll probably never give it up.

• The radio control hobby has been around for a long time, but model boating has really taken hold in the past few years, mainly due to the fact that most of the hardware is readily available in good hobby shops. Boat kits, engines, radios and associated hardware are easy to obtain, and there is quite an assortment of manufacturers from which to choose.

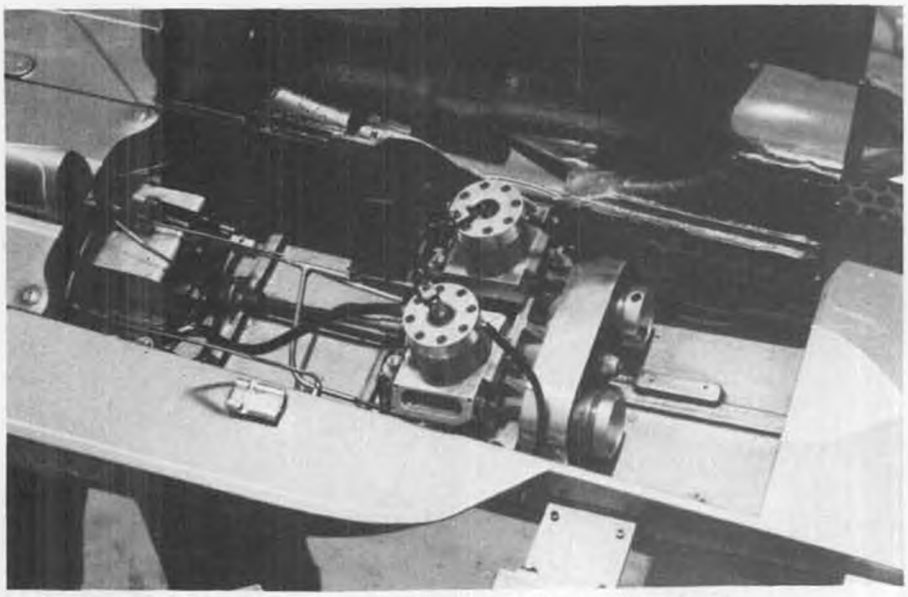
The boat engine is usually a model airplane engine with a water-cooled head or jacket and flywheel. Most competition boaters use racing engines with exhaust throttle, tuned exhaust pipes, and venturi intakes. There are six I.M.P.B.A. engine classes; this does not include the class for electric power boats. Of the six, the three most popular are: C (.21 ci or 3.5 cc), D (.40 or 6.5cc), and E (.60 or 10 cc). I will briefly touch on some aspects of model boat racing. However, if you desire a detailed copy of the rules, contact the organization of your choice. In Dallas, we race under I.M.P.B.A. rules (24310 Prairie Lane, Warren, MI 48089). N.A.M.B.A. rules differ (Route A, Box 19, Lower Lake, CA 95457), but many members race in both organizations with no difficulty.

If you are interested in forming a club, find out which organization has the most clubs nearby, so the various members of your club can travel to compete.

The oval course we use in heat racing is run clockwise, with three buoys at each end of a straight-away. Total distance is 1/3 of a mile. There is a starting buoy in the middle of the front straight-away where the competitors stand to race. Heat racing is done over the oval course. Classes "C" and "D" usually run five laps, and E, six laps.

Hull types are mono (one continuous wetted surface when at racing speed) and hydro (two or more wetted surfaces when at racing speed). Deep "V" is a mono hull, while the outriggers are hydro hulls.

The outboard engine, mounted either on a hydro or mono, is a good way to learn to drive, as it is not too fast. A good hot 40 or 60 outrigger is not recommended for a beginner. At the present time, N.A.M.B.A. and I.M.P.B.A. have a special class for outboard powered boats. The outboard has proven to be very popular, and is a simple way to get started in boating. Speed trials are run over a 1/16 mile straight-away course with a timed run in each direction, which is necessary to be considered for a record. Computed speed is the average of the two runs.

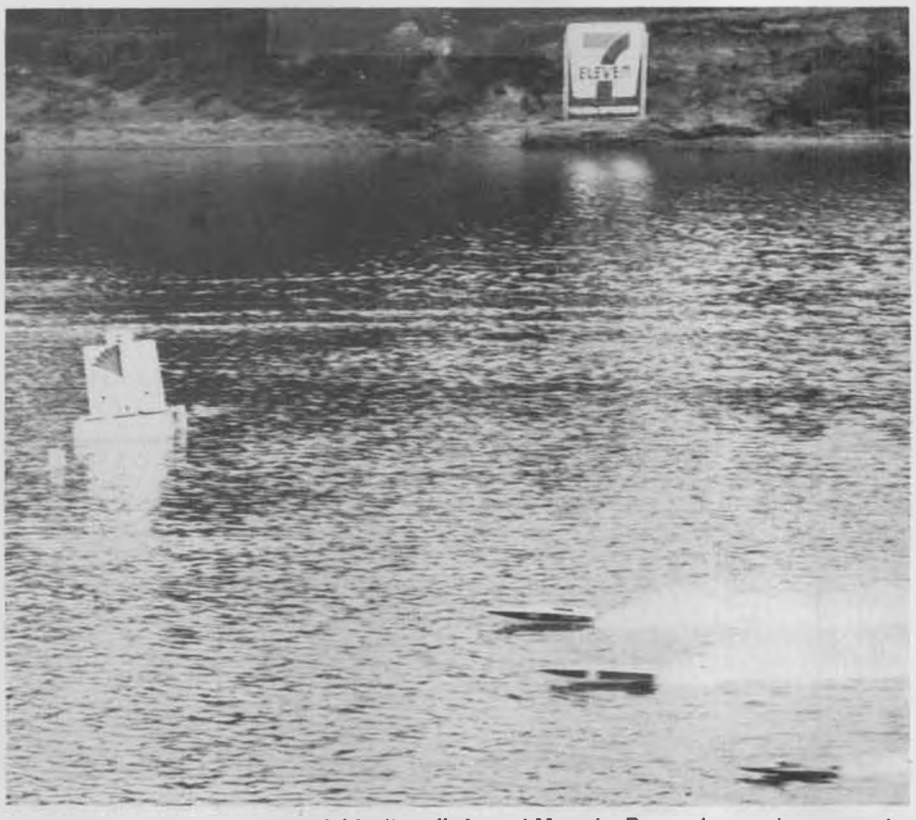


Close-up of twin-60 installation in the King/Cupit boat. Clean and functional.

Except for the size of the turn markers, this photo could be mistaken for full-scale action! These are .40 powered hydros.

Deep "V" enduro is a 15-minute race over the oval. The engines are started, and the boats are launched at the start of the clock. This is called a Le Mans start. The boats complete as many laps as they can in 15 minutes. If a boat quits on the course, a retrieve boat returns it to the pit to be restarted and launched again. Since the retrieve boat has the right-of-way, it sometimes creates some thrilling racing! The boat making the most laps in 15 minutes is the winner. For each buoy cut or touched, one lap is deducted from total laps. In heat racing, we use a clock (usually on a float in the lake) at the starting buoy. When a heat begins, there are three minutes to the start of the race, and of these three minutes, 2-1/2 minutes is called "pit time." A boat must be launched within these 2-1/2 minutes. After this time expires, you are not allowed to launch your boat.

The last 30 seconds is called "mill time," and when this time expires, the race is on. All boats, when launched, have to go completely around the course (called "milling the course"). Five minutes is allowed to complete the required laps.



Boats head for starting line as clock hits "zero". Annual Muscular Dystrophy race is sponsored by 7-Eleven. Dallas club has raised $10,000 over last 3 years.

Starting the twin OPS .60's in Louis Durand's hydro.

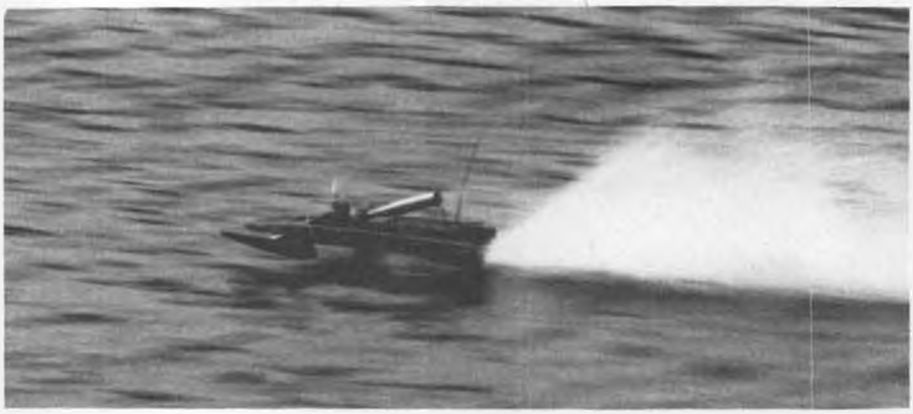
In heat racing, 50 points are deducted for each buoy you touch or cut. If a boat hits another boat, it is disqualified for that heat. First place in each heat gets 400 points; 2nd, 300; 3rd, 225; and 50 on down to 8th place. Twenty-five points are awarded for starting, but not finishing. The winner is determined by adding points for all heats, and the highest total is first, next highest is second, etc. This is done in each engine class of Mono, and each engine class of Hydro. Our monthly races have three heats in each class, and take about four or five hours to complete. Our two big annual races take two full days, and we run five heats in all classes.

Boat sizes vary from about 14 inches long for .20 class, to 36 inches for .60 class. They weigh from 4 lbs. to as much as 14 lbs. Their speeds vary from 20 mph to 70 mph, with the .40 class Hydro holding the I.M.P.B.A. world record of 80 mph. As with any type of racing, mechanical problems usually eliminate most of the boats that do not finish. Dunking the boat probably takes the next highest toll, and poor strategy the least. The fastest boat does not always win . . . consistency is the most important element. With boat racing, the competition is where the fun is.

Before getting started in boat racing, visit a club (if you are fortunate enough in having one in your area) at practice sessions or races, and go to a club meeting. See what engine class and type boat appeals to you. ASK QUESTIONS!

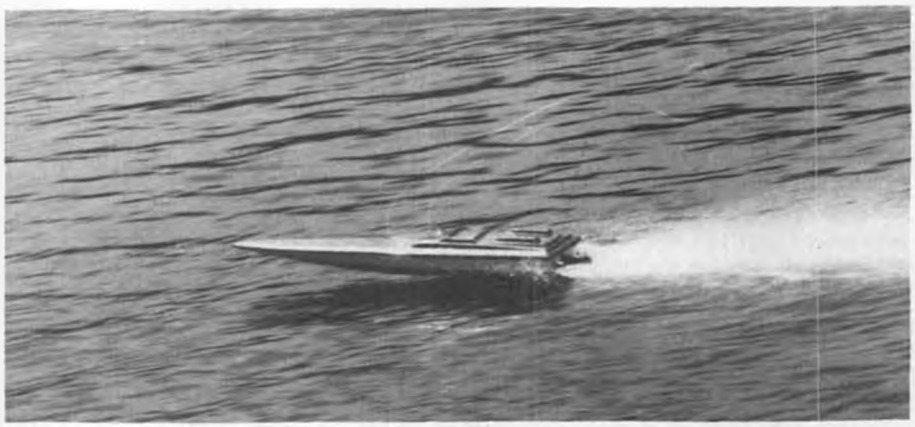
What are you waiting for? Go visit your hobby shop, buy your equipment, and get started in the fun of model boat racing. ●

Louis Durand's Twin OPS .60 powered hydro throws up a wall of water spray as it negotiates a turn.



A .40 powered "outrigger" hydro. Note tuned pipe, rooster tail, and that just the prop and rudder are in the water.

The author's "Hot Shot" tunnel hull, with K&B .21 outboard. Tunnel hull is a hydro, but is in separate class from inboards.



Twin .40's in a 60 mono hull. White curved lines are cooling water squirting from head outlets. Black line is antenna.

"GUSSETS"

By BRAD SHEPHERD . . . The author's idea of a "could be" scale model is this sporty mid-wing aerobatic ship. The model lends itself well to slight changes in shapes and colors, to suit individual tastes.

• Have you ever dreamed of building your own personal flying machine?

As a youngster, I used to spend many Saturdays at our local grass strip airport. Mom would fix me a sandwich, and I would walk about three miles along the bayfront to get to the field where I'd spend time wiping oil off the Airknocker C-3, the Waco, and the Piper. For this I would get a hop in one of the planes. It was the late 30's, and most folks were still pretty poor, our family included. This was my way to be around airplanes and get an occasional flight. Airplanes have been a part of my life ever since those early days, in the form of building and designing rubber, F.F., HLG, control line, and finally R/C models. However, I have always had this vague dream of building my own full-size aircraft.

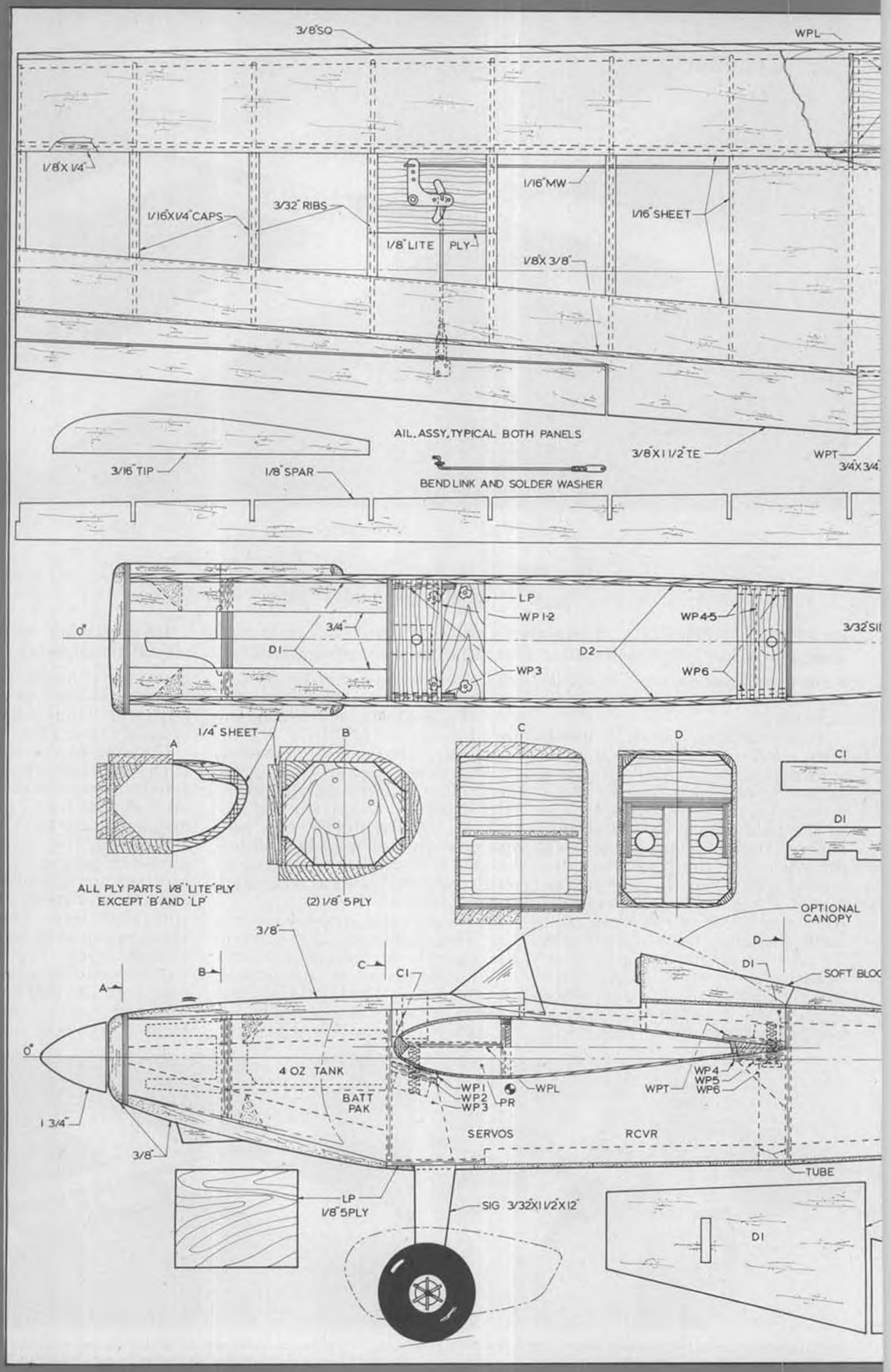
Six years in the air arm of the Navy, marriage to a beautiful woman, raising four children with the attendant expenses, and now I find myself well into the middle years, with not enough money to build a real one but still having the dream, so an R/C version will have to be enough for the present.

There are some who say I'm in a rut. 'Tis possible, but that's one of the varieties of the aging process and it does get pretty comfortable. Sir Geoffrey (DeHavilland) was known to say, "If it looks right, it'll fly right." Anyhow, I'm walking in good company, as George Owl's success will attest to, and this is the way I would do it if I were ever able to build that dream.

The wing would be full cantilever with two tapered spruce spars, generous amounts of ply sheeting to take about five G's, and the remainder would be capped, covered and doped. The fuselage would be semi-monocoque, a welded tube box back to the trailing edge of the wing, have formers, and be covered with aluminum. The rear of the fuselage would be monocoque, ala George Myers' "Little Toot". The stabilizer and fin would be welded tube with ply sheeting. The elevators and rudder would be made from light welded tubing, then

Brad is justly proud of his little bird. Model looks something like his "Doubler" design, kitted by Sig.

If you build Gussets, build two and put one away. If Brad ever gets around to building the real one, you'll have a scale model!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WPL
1/8"X 1/4"
1/16"X1/4" CAPS
3/32" RIBS
1/8" LITE
PLY
1/16"MW
1/8"X 3/8"
1/16" SHEET
AIL. ASSY. TYPICAL BOTH PANELS
3/16" TIP
1/8" SPAR
BEND LINK AND SOLDER WASHER
3/8"X1 1/2" TE
WPT
3/4"X3/4"
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A
B
C
D
C1
D1
ALL PLY PARTS 1/8" LITE PLY
EXCEPT 'B' AND 'LP'
(2) 1/8" 5 PLY
OPTIONAL
CANOPY
3/8"
SOFT BLOC
4 OZ TANK
BATT
PAK
WP1
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PR
WPL
WPT
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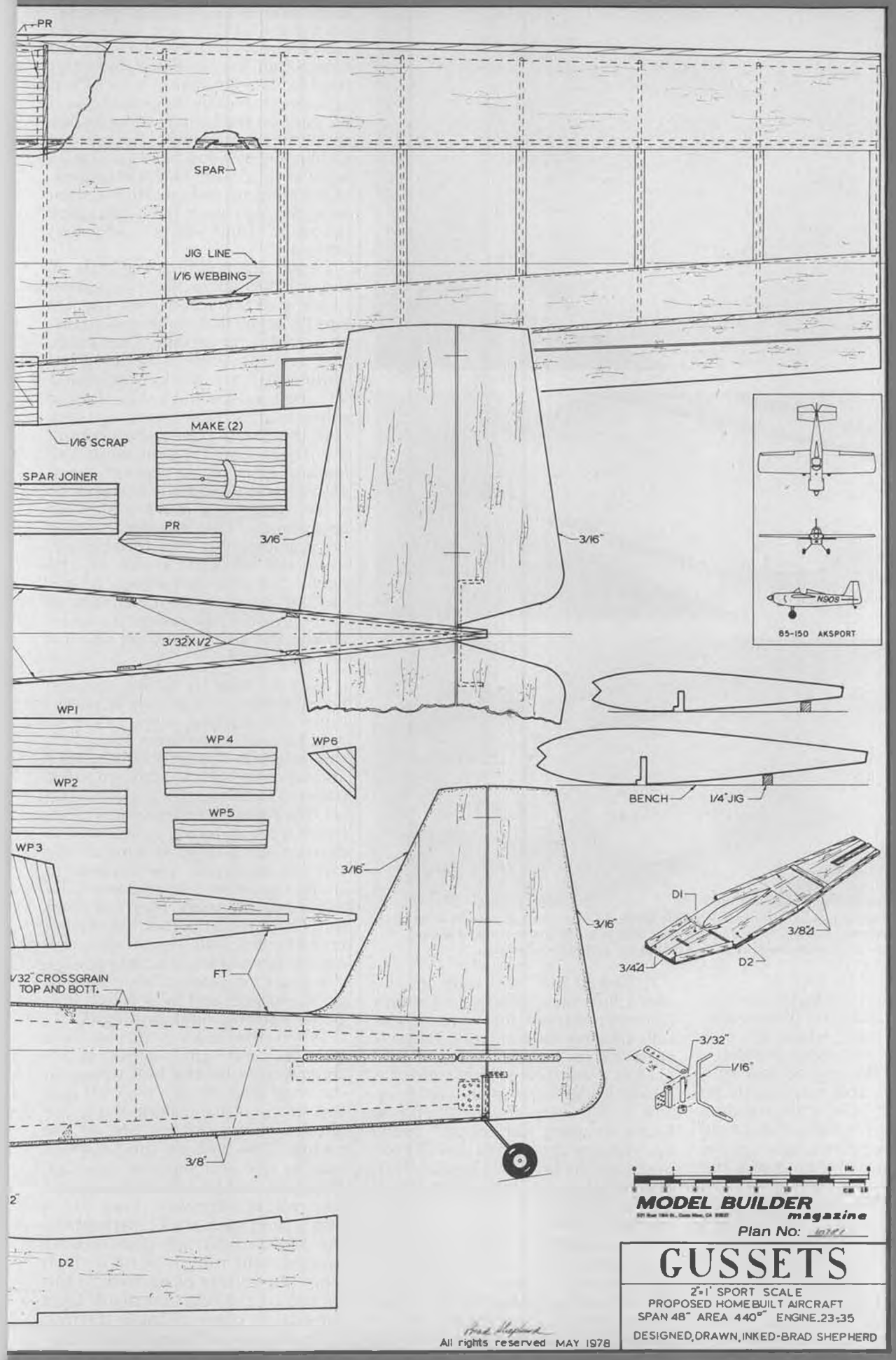
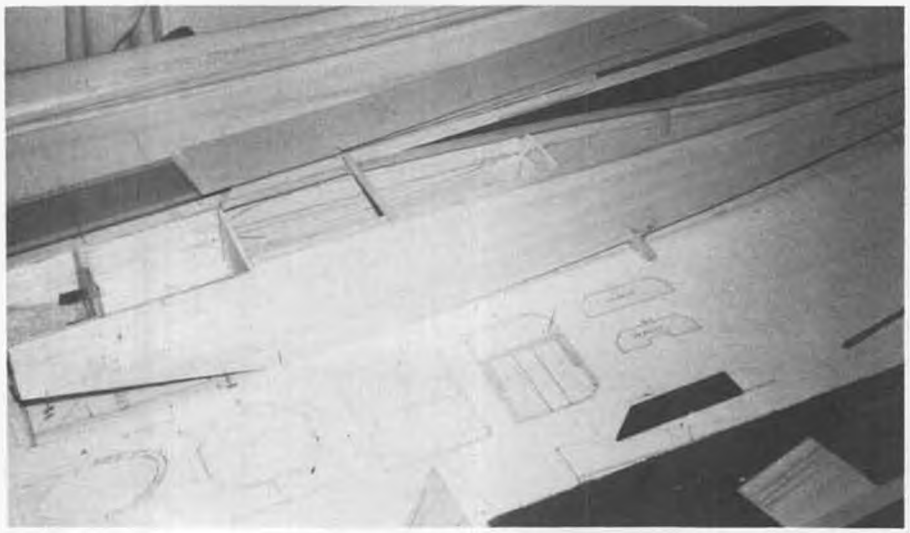
1 3/4"
SERVOS
RCVR
TUBE
LP
1/8" 5PLY
SIG 3/32"X1 1/2"X12"



FULL SIZE PLANS AVAILABLE — SEE PAGE 144



Fuselage construction sequence. Top: basic fuselage frame. Middle: top and bottom sheeting in place. Bottom: ready for shaping. Note that the balsa nose ring and cheek cowls have been added. Generous use of triangle stock in corners makes for well-rounded edges.

fabric covered.

The optional bubble canopy would be removable for those warm, lazy summer days, when you just want to go up and enjoy the sky.

A good 85 hp engine out of a wreck (cheaper that way) would be enough, or, if you're so inclined, stuff some more horses (150 should do it) under the cowl, beef up the tail feathers, and mix it up with the big boys.

The ST .23 in the prototype gives pretty good scale-like flying, but a .35 would give more vertical capability and be about what a 150 would be like in the big one. I had a few ideas I wanted to try on this model and they worked out okay. If you make any changes, let me know how it turned out for you.

I "lucked out" this time . . . the only adjustment I made was to add a tad more aileron throw for better roll rate after the test flight. Takeoffs are a real joy for a taildragger "nut" . . . just a smidgen of right rudder as power is applied, the tail comes up and it rolls right along. When you figure it's going fast enough, touch up elevator and jam right aileron (just like Art Scholl). I get my "jollies" this way, as long as my Kraft keeps working. Almost everything has been done with it . . . inverted spins have to be worked at, snaps are good, spins to the right are positive and recovery is good (tried one to the left and almost swept up the little pieces!), inverted flight is positive and solid, four-point rolls are easy, Cuban Eights and square loops are no sweat if the "muscle" up front is putting out, knife-edge with the .23 is possible if it is started from a split-S upwind and really gets honkin. The airplane is a lot of fun and gives lots of flying pleasure, and it's easy on the budget. It looks like something that might be seen at Oshkosh. So, if you have a .23 or .35 lying around idle, like taildraggers, enjoy building and sport flying, then look through your balsa pile, pick up your "Uber Skiver", and start cutting.

I used Sig building materials all the way through, with the exception of some of the accessories. The 1/8 Lite-Ply is just that; light, easy to cut, and quite a bit stronger than balsa. The trailing edge was designed around Sig's t.e. stock, which has a 90° angle on the thick side. If some other trailing edge stock is used, take this into account when cutting the ribs and building the wing. The landing gear blank was cut down with a hacksaw and finished up with a file, to give a more scale-like appearance. The tailwheel rudder drive assembly is easy to fabricate, using the isometric sketch on the plans. The 1/16-inch wheel collar is used as a spacer. Epoxy a piece of inner Nyrod in the rudder for wearability. The arm is cut from K&S 1/4 inch brass strip.

Start the wing by cutting root and tip rib templates from ply or aluminum, and stacking eight pieces of 3/32 balsa between them. Pin or bolt this assembly together, then carve and sand the balsa to conform to the patterns. Make a right and left hand set. The ribs won't come out perfect, but it is the quickest, easiest way to cut ribs for a tapered wing, if the taper is moderate. Use a piece of straight-grained 1/8 medium balsa to lay out the spars, then cut them out. I have used this method of wing construction (full depth spar, 1/8 cap, 1/16 webbing on trailing edge sheeting) for tapered wing models up to .40 size, and have found it to be very strong, light, and rigid.

When the spars and ribs have been cut out, pin a piece of 1/4 square balsa on the line shown in the wing plan. Pin the 1/8 x 1/4 spar cap to the plans, making the splice about halfway out on one of the panels. Glue and pin the 1/8 sheet spar to the rear edge of this cap. Check-fit each rib before gluing, and trim where necessary. Take ribs 4 and 5 from each stack, mark where the aileron bellcrank plate will be located, and trim 1/16 of an inch from the bottom of each rib at this location to accept the plate. Glue the ribs in place, pinning them to the spar and the 1/4 sq. "jig". While they are drying, cut two pieces of

This is how the nose looks after shaping. Air outlet through the left cheek cowl is barely visible.

Cowling removed. Note the plywood tabs that hold the cowl in place.

"Gussets" ready for finishing. The 1/64 ply exhaust extension in the removable cowl is plainly visible. Brad used Monokote on the wing, Sig Supercoat dope on everything else.

1/16 sheet 24 inches long by 1-5/8 inches wide, and glue the 1/8 x 3/8 trailing edge spars to the edge of each sheet. When dry, glue the sheet to the ribs, butting the spar against the rear edge of the ribs, and pin in place to dry. Glue reinforcement scrap in place inside the sheet joint at the center section.

Glue the leading edge to the front of the ribs. While this is drying, take some 1/8 Lite-Ply and cut out (2) of PR, (2) of aileron bellcrank plate, one each of WPL, WPT, and spar joiner. Glue the PR pieces to the inside of the root ribs. Use firm, medium A-grain balsa to sheet the leading edge . . . this type of grain curls easily across the width. Use a straightedge and trim one edge square. Do *not* sheet the center area between the root ribs yet. Pin the sheet against the l.e., between the tip and root ribs, and mark the sheet where it lays against the rear edge of the 1/8 spar. Use a straightedge to trim the sheet, and glue it in place.

Repeat the procedure for the other panel.

The center section sheet behind the spar can be done in one-piece sheets. Glue the 1/8 ply spar joiner in place, along with the aileron bellcrank plates. Remember, the aileron plates are flush with the leading edge sheet, and project 1/16 of an inch above the ribs at the rear to allow a 1/16 balsa cap strip to fit. Cap strip the ribs and allow the wing to dry.

Now is a good time to cut out the tail surfaces; use light to medium quarter-grain wood. Make the elevator joiner from coat hanger wire; it's about 3/32 of an inch in dia., bends easier than music wire, and is strong enough for this application. Lay the two elevator halves against the rear edge of the stabilizer and pin them to the workbench. Lay the joiner on the elevators and mark where the holes are to be drilled, then drill the holes and rout out a groove for the joiner. Lay Saran Wrap or poly sheet on the bench, position the elevator halves against the stabilizer, and pin them down firmly. Mix up some Kwik-Set epoxy and smear it on the wire, inserting it into the holes and groove on the elevator halves.

Remove the wing from the plans, turn it over, and pin it down at the root ribs and 1/4 sq. jig. Shim each tip 7/16 of an inch at the spar and 13/16 of an inch at the trailing edge. Pin this down firmly so the leading edge sheet will not twist the wing when it is glued on. Trim one edge of each trailing edge sheet with a straightedge so that they butt against the 1/8 x 3/8 trailing edge spar squarely, then glue in place. Glue 1/16 sheet reinforcements inside these sheets at the center section. Glue 1/16 balsa webbing between the trailing edge sheets, making sure the wing is pinned down solidly and the trailing edge is straight, or a warp will be glued into the wing. Epoxy the WPL ply plate to

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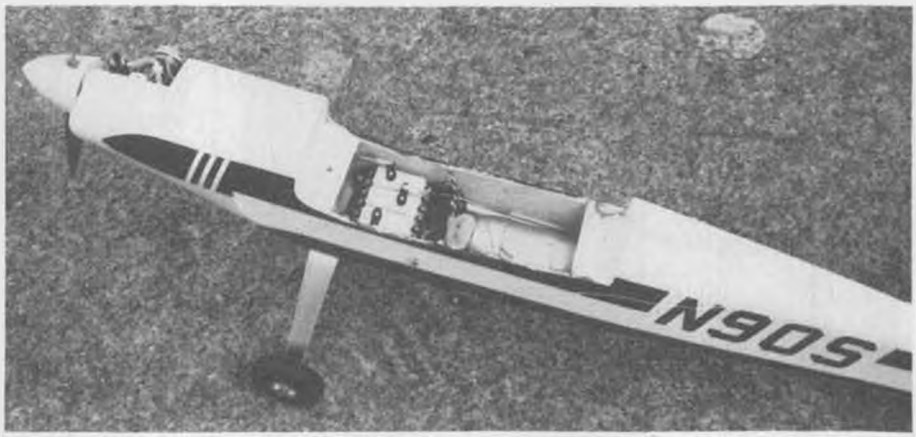


Spacious fuselage makes for easy radio installation. Receiver antenna exits through a brass grommet in fuselage side and connects to fin. Neat, clean arrangement.

What a work of art! This *all fiberglass* DH Beaver was built by Bill Jainicke, of Edson, Alberta, Canada, and flies with floats, wheels, or skis. The model is exact scale and is soon to be released as a kit. Fiberglass floats and cowl will also be available separately. Stay tuned to MB for more info.

MAMMOTH SCALE

By RON SHETTLER

• This month, we have some feedback from you modelers, which we can pass on as helpful tips to others. We have received some pleas for help, which we can collectively solve; improvements to what we have been doing; and some activities you can participate in at your local fly-ins, which could involve everyone.

I spent some time considering, in the case of suggestions, which is the most important or stickiest recurring problem, etc., and have come to the conclusion that, as in full-size aircraft, they are all equal, so let's start by item, rather than by some supposed order of importance. Often, the problem is not recognized. So, first the problems, then the solutions. If you have a better solution, let's hear from you. It will be much appreciated.

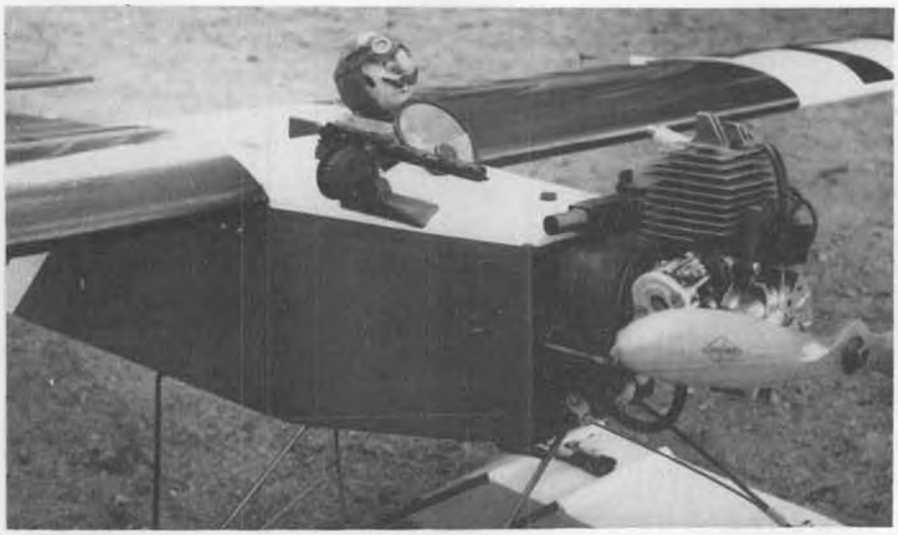
RADIO INSTALLATIONS

After years of trying to figure out how to cram the radio equipment into a small model when radios were larger (much larger!), we now have the unique problem of insuring that the new small equipment stays put in the enormous area in which we have to install it. The old method of stuffing enough foam into what little space was remaining in our radio area, to eliminate equipment shift, is no longer practical. If you really think about it, it never was. Often, this packing got jammed in the works, or allowed battery packs to rotate and either unplug in the air or fatigue the switch harness, etc., until they failed. Often, plugs were disconnected, or worse still, partially disconnected, only to complete the job in the air . . . all as a result of the stuffing of "protection" in the open areas.

Radio manufacturers who recognized this problem in the past (EK, for example) provided trays which held the receiver and battery to the

Jack Whitehouse, of Whitehorse, Yukon Territories, Canada, with his original design "Gute Fahrt" (German for "good trip").

Jack can drop up to two rolls of toilet paper from his Gute Fahrt. Each unrolls to some 450 feet! Makes good target practice.



Front end details of Jack's Gute Fahrt. Exhaust manifold on Quadra engine is part of smoke system. Model uses very little balsa. Plans will be available from Jack in the near future.

servo tray; a good idea for normal-sized models, because the radio was mounted near the balance point, which was relatively close to everything. Unfortunately, this is no longer the case, with servos as far as 5 feet from the receiver. Moving 16 oz. of radio equipment in a 7 lb. airplane an inch or so could help correct a CG problem. With a 15 to 35 lb. aircraft, it hardly makes a dent. For this reason, your aircraft should come close to balancing without the radio.

Another problem is routing the antenna in the normal manner; on Mammoth Scale models, attaching it to the vertical fin is out, unless you have a 5-foot antenna! If you do elect to add some form of extension to your antenna in order to reach that traditional securing point, make sure that it is a non-conductor, such as elastic thread, nylon fish line, etc.

I have actually seen a modeler connect a length of hook-up wire by tying it to the antenna (neat knots!) assuming that the insulation was protecting it from connecting together, and therefore wouldn't affect the radio. It can and does affect it electronically. The coupling is by induction and/or capacitance. It won't be the same as if you hooked it directly together, but it will still affect your radio drastically. His logic was understandable, as he had experienced a radio failure due to an antenna wire breaking inside the insulation, and had concluded that "no touchy, no worky". It's not that simple.

In my opinion, the antenna on our receivers have not been improved on since the start of radio control; in fact, if anything, it's even gone back a step. In defense of the R/C industry, we must say that we abuse that portion of our equipment so badly that it might as well be inexpensive and simple to replace. A lot of manufacturers have gone to the step of color coding the Rx antennas to the frequency on which they operate. It doesn't work, George, because it's one item that often gets replaced by the modeler who may not have a purple wire, for example, but a nice brown or red one, or it might detract from the appearance of the aircraft, so they (heaven forbid) paint it! If you can't depend on a frequency indicator, then why use it? I would rather see a clear insulation on this all-important wire so I can see the condition of the conductor. It just might help prevent an accident. Because we can fly these larger aircraft at distances at which we would be virtually out of visual contact with smaller models, we need all the help we can get. You will find that there might be enough fuselage depth, and if you add a dummy radio mast to thread your antenna through, it will be close to perfect for the best propogation angle.

SERVO LOCATION: TYPE AND MOUNTING

In one of my first articles, I mentioned the importance of locating the servos as close as possible to the surface or control which they are to move. I also stated that I used the Royal mini RS-4 servos (D & R mechanics) and RS-5, both single and dual brick (Dunham mechanics), with no problem in my Quadra-powered Thunderbird. I have also heard of people who have to use dual servos to activate the elevators of their bird, due to insufficient servo power.

Let's correct that last statement to read "servo power reaching the control surface". With the smaller servos, you can't afford power waste. Let me give you an example. I recently rebuilt a model which a friend had designed and constructed. It was Quadra powered, had about the same size control surfaces, weight, movements, airfoil, and flying speeds as the Thunderbird. In short, it should have required about the same muscle to perform the same function and control response with the same servos. It didn't. On the test flights, up elevator control was sluggish, although on the ground it had even more movement than my Thunderbird. A loop took a lot more airspace than I was prepared for (pretty scarey!).

OK, what's the difference? On the Thunderbird the elevator pushrod is a solid 3/32-inch welding rod, 6 inches long. Servos are right in the tail. Controls were hinged with 4 thicknesses of Econokote and were totally free, with no air gap. The servo arm height was identical to the half-travel height of the elevator horn. Vertically, the pushrod was dead in line with the elevator horn at half servo travel. The horn was

Continued on page 104

Ron Shettler's Arctic Drone making a low pass. Quadra-powered aircraft is made from arborite and foam, is capable of flying long distances over water at low altitudes.

Going . . .

Going . . .

CHOPPER CHATTER

By JOHN TUCKER

PHOTOS BY AUTHOR UNLESS NOTED

TRI-VALLEY R/C CLUB HELICOPTER COMPETITION

The following data was submitted by John Gorham, West Coast distributor of the Schluter Heli-Boy, mainly for the purpose of giving tribute to a gentleman who has contributed much to the success of the R/C helicopter hobby. The man, Cliff Bennett, age 59, flew R/C at the 1940 Nationals. He has a machine shop business right on his property, in which he does sub-contract work for the full-size aircraft industry and also makes model helicopter parts and items.

Cliff, a long-time modeler, sponsors an annual R/C Model Helicopter National Competition in conjunction with the Tri-Valley R/C Club. The club flying field, site of the July 1st and 2nd competition, is part of Cliff's real estate (really a part of his back yard), and covers three to four acres of closely-mown grass . . . a perfect helicopter flying site. In addition to providing the field, Cliff also sets up the headquarters tent (complete with public address system), furnishes his repair facilities, refreshments, and most important of all, a hospitality second to none! He really does a great job for our hobby, and it costs him a lot of bucks. Our hats are off to Cliff and others like him, with much gratitude for their tremendous support.

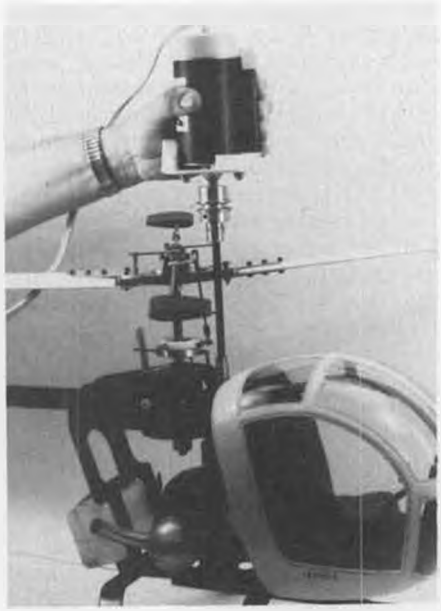
Now to the contest itself. It was held at 14154 Cleveland Rd., Granger, Indiana (Granger is near South Bend). The meet lasted two days, and was run in accordance with AMA helicopter rules. The weather was raining, with high winds most of the first day, and the second day was a complete washout. There were 14 entries from various parts of the country. John Gorham attended from California . . . didn't enter the competition, but gave demonstrations during the contest breaks.

At the end of the first day, two rounds were completed, with the following results.

EXPERT

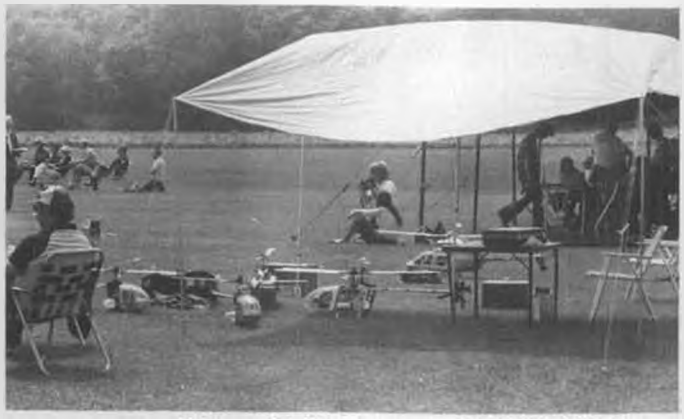
1. Bill Youmans (Fla), Heli-Boy
2. Bob Pinto (Ind.), Heli-Boy
3. Fay Peoples (Penn.), Homebuilt

Charlie Gilbert's "Twister" will soon be in production. Model is designed for .40 to .45 size engines. This has to be one of the simplest and most uncluttered choppers ever.



Unique "socket" starter drives the engine directly. Fully described in text.

Gone! Dr. Richard Smith took these photos of the gear retracting on his Bell 222. Sure looks sharp with the gear up!



Scene at the Tri-Valley R/C Club helicopter meet, held at Granger, Indiana. Poor weather hampered flying.

INTERMEDIATE
1. John Clark (Fla.), Heli-Boy
2. Wendell Hostetler (OH), Kavan Jet Ranger
3. Tom Knerr (Penn.), Revolution

NOVICE
1. Dan Chapman (OH), Heli-Boy
2. Stewart Kay (?), Heli-Boy
3. Dwaine Stevenson (OH), Heli-Boy

Cliff Bennett, host of the Tri-Valley R/C helicopter meet.

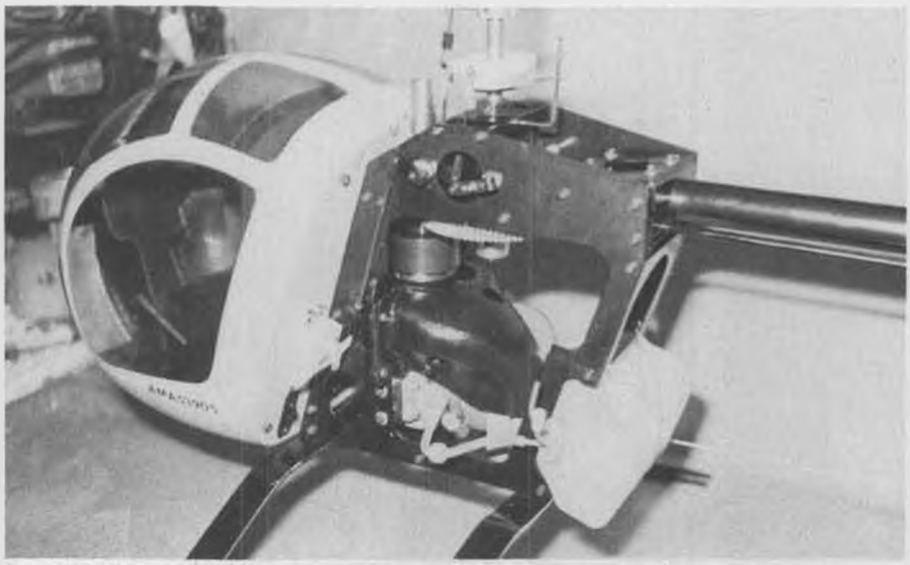
The flying was great, with no crashes. It was very commonplace to see loops and rolls, whereas last year it was a rare site. The contest closed at 5 p.m., but informal flying continued for another two hours. At one time, Fay Peoples was towing a Tri-Valley R/C Club banner, and Lloyd Wheeler dropped a GI Joe parachutist from his Schluter Bell 222. Dan Chapman, John Gorham, and Walt Schoonard had loads of fun hot-dogging their Heli-Boys.

Excellent cooperation and friendliness prevailed throughout the entire affair. During one round, Bob Pinto threw his fuel tank out in a violent maneuver at about 70 feet, and autorotated to a successful landing with his Heli-Boy.

As mentioned earlier, the second day was a washout, however, Bob Pinto put on a spectacular display in the rain, flying from under the cover of a barn roof! He did outside loops from roof height, and vertical figure eights consisting of half inside, full outside, and half inside loops consecutively! Wow, what a sight that must have been!

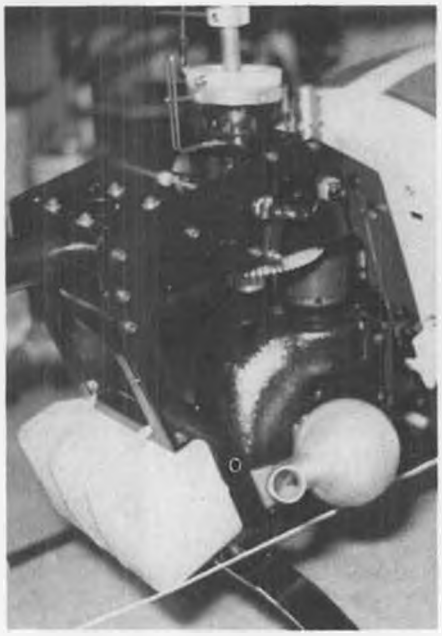
As a footnote, a short time ago, at

Standard 2-bladed main rotor head on Gilbert "Twister". Ball bearings throughout.

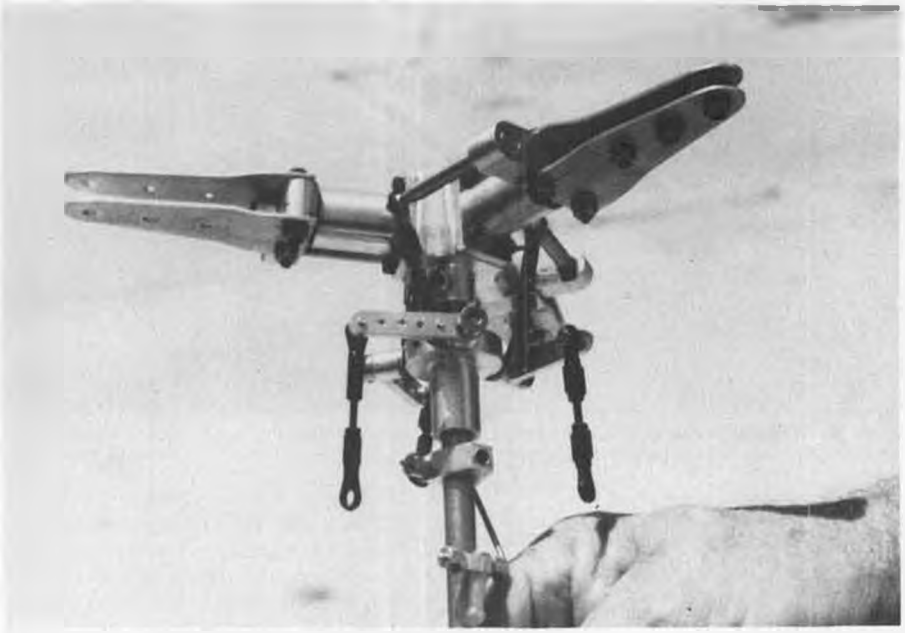


Wide spacing of fuselage sides permits engine removal through the bottom. Great access to all components. How much simpler can you get?

Radio installation. Note aluminum discs under servo wheels, probably for extra stiffness.



View of the pretextured engine cooling shroud and Heli-Ball muffler.



Optional 3-bladed main rotor head for the Gilbert "Twister". Turns a pussycat into a tiger! Simple and rugged construction is typical of this model.

Toledo, Walt Schoonard was ripped off when his car was broken into and his Heli-Boy and radio equipment stolen. Just the other day, John Crosby, Jr., of Crow's Nest Hobby Shop, at Macon, Georgia, recognized it and arranged for its return to Walt! Good for you, John!

THE GILBERT "TWISTER"

A new entry in the R/C helicopter kit business is the new Gilbert "Twister", from the workshop of the well-known scratch-built enthusiast and design engineer, Charlie Gilbert. In a taped interview last week, Charlie revealed the details of his proposal to produce one of the finest kits on the market, for a reasonable price. The kit builds into a helicopter designed especially for the beginner, but has performance suitable for the advanced pilot as well. Many areas were covered, so we'll try to outline the salient points as we discuss them.

The basic idea was to provide a T-tail configuration, superior reliability and performance, and easily accessible components, making the chopper easy to work on. You will note the resemblance to today's design trends, with the aluminum tail boom and bubble canopy up front to house the radio. The new model would be produced with a tetering main rotor system for the beginner, or with a 3-bladed collective pitch option for the expert. All-up weight is 6 pounds, and the .40 to .45 engine swings a 41-inch diameter main rotor. The main frame is made from 7075-T6 aluminum (as well as all other machined parts), and features wide spacing to permit dropping the engine unit out the bottom for easy maintenance. A .017-inch woven belt, made for high speed industrial routers, is used to drive the tail rotor at engine RPM. Pulleys for this belt are hard-anodized aluminum for no-wear, no-slip, no-tension loads. The tail rotor shaft is ball bearing supported.

Working upwards from the engine, we find a precision-machined centrifugal blower (ala Heli-Baby) mounted on the crankshaft with a taper bushing. The cooling shroud around the fan and cylinder head is molded from pre-textured .060 ABS plastic material. Next comes a special Z-shoe clutch with a novel circular spring clamp for proper RPM engage features. At the top side of the clutch bell housing, we find the steel spur gear which drives a custom-made "hobbed" delrin gear. The clutch shaft is capped with a hex-type socket, into which the electric starter may be inserted for "on the ground" starts. Of course, the starter must be equipped with a hex bolt, but the clearance is very loose and permits insertion of the starter, even at an angle. We tried this system several times and found it to be the best yet! No pressure required, no slippage possible, and easy flexibility when inserting and removing.

As mentioned earlier, the tail rotor is driven at engine RPM, while the main rotor is reduced 6:1. The swashplate is a 2-piece delrin design, very tight and almost frictionless. The main rotor shaft is 5/16-inch chrome-moly steel. All moving parts are mounted in ball bearings,

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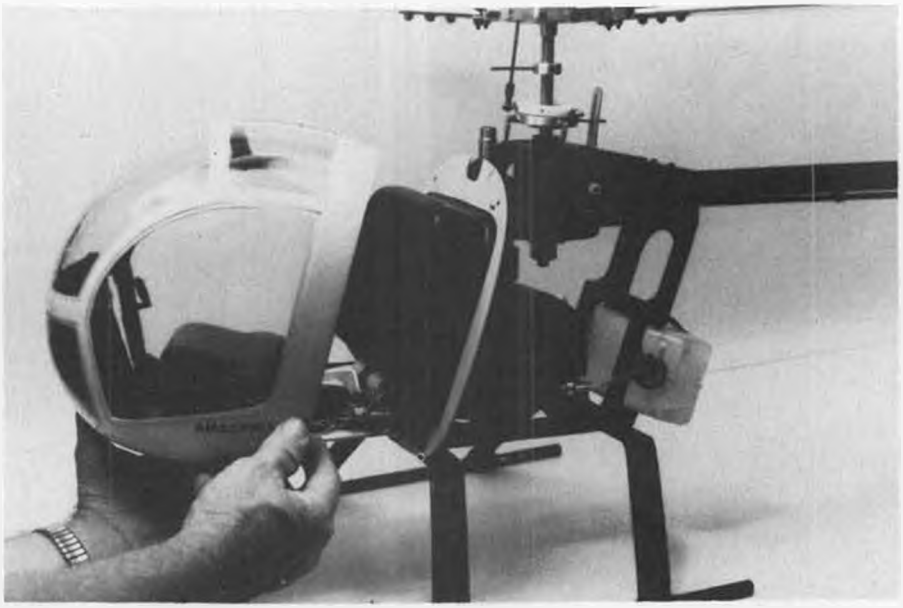

One-piece molded canopy attaches quickly. Radio is completely hidden by seat back and cushion.

Flight INSTRUCTOR

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

• This month's column is being written while I'm on vacation in the northeast, and fortunately, I've had many questions asked of me while flying in contests in Fitchburg, Mass., and Allentown, Pa. The most often-asked question at Fitchburg was "how do I handle a crosswind?". I'll bet most everyone reading this can guess what the conditions were at that meet. Crosswind conditions present some problems to a flier, and require a considerable amount of effort and technique to overcome. Many people say that, once airborne, an airplane has no knowledge of the wind and is unaffected by it, except for drift. Those who are pushing this theory should perhaps read Newton's first law of physics and apply it to model aircraft. This law reads that a body in motion tends to remain in motion, and a body at rest tends to remain at rest. This law of physics can be used to explain the downwind turn problem, which has been much argued, but I doubt if the controversy will ever end.

The main thing this law does is to point out inertia which affects all our model airplanes. It follows that the faster an airplane is, the more inertia it builds up, and therefore, the less it is affected by outside forces, such as wind. There are two ways to combat a crosswind from the pilot's standpoint. One is to yaw the airplane into the wind, and the other is to roll the airplane into the wind. Which is best to use is largely a matter of pilot's preference and amount of wind. The best approach is to use a little of both, which makes the correction less noticeable.

Most airplanes will yaw into the wind automatically, due to what is called weathervaning. In some airplanes, the amount of yaw is just about right to compensate for the crosswind automatically. The Phoenix 5, for instance, has exactly the right amount of vertical fin area to accomplish this, but the Phoenix 6 will over-yaw and actually turn into the wind. If the Phoenix 6 were flown faster (more inertia), it would yaw less and perhaps act the same as the Phoenix 5.

The amount of yaw required to compensate for a light crosswind is not very noticeable. When the wind gets stonger, however, the amount of yaw required to compensate becomes excessive, and other methods must be found. The best method I've found is to slip the airplane into the wind, thereby achieving straight flight in spite of the wind. A slip is a cross-controlled maneuver used by full-scale aircraft to lose altitude in a hurry, but without increasing the airspeed. It is basically a way of making the airplane skid sideways, using the fuselage side as an airbrake. A normal slip would be done by applying left aileron to lower the left wing, and applying right rudder to keep the nose up and avoid turning left. Now, if we can apply this skidding or slipping technique to crosswind control, we can compensate for drift without getting the airplane too badly out of shape.

Let's assume we are trying to do three loops, for instance, from right to left, with the wind blowing in our face. We would apply some left rudder to keep it from weathervaning too much into the wind, and some right aileron to keep it out, and voila! It loops reasonably without drifting or looking ridiculous. The basic rule to remember when using this technique is "downwind rudder, upwind ailerons" for inside loops, and "downwind downwind" for outside loops, when starting at the top. A little experimentation and a lot of practice will probably reap many rewards when flying in a crosswind.

Another place I've seen newcomers get thrown off is in the stall turn. The trick here is to always stall into the wind and let the wind help to blow the tail out from under the airplane. Also, this maintains more airflow over the wings, which lessens the potential of it "flopping". The slipping technique also works well to help straighten out the landing approach and takeoff climb on crosswindy days. When doing rolls in a crosswind, the best technique is

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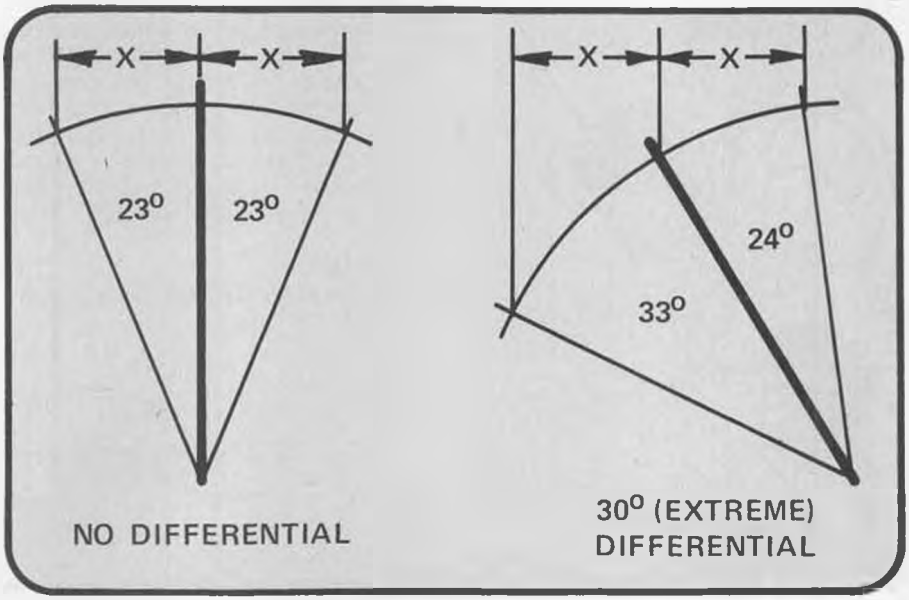


Q-M winners at Pontiac Chiefs race were (l to r) Dan Kane, 1st; Floyd Fitzgerald, 3rd; Jim Gager, 4th; Bob Nelson, 5th. Bill Roland, 2nd, not in photo.

Form I winners at Pontiac Chiefs race were (l to r) Bill Preis, 1st; Bob Onori, 2nd; Steve Metzger, 3rd; Roger Schlenker, 4th; Jack Clark, 5th.

PYLON "GO FAST AND *Turn Left!*"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

We're going deviant this month. . .

No, you didn't pick up a copy of S&M Monthly by mistake, and you didn't turn to Dirty Dan's column(?), either. That's just our way of letting you know this column is going to be a little different than normal, if it could ever be described as normal. But, since we've already mentioned "D.D.", let's continue with that for a bit.

If you've been following our columns, you've realized that there is some rivalry building as to whether U/C Combat or R/C Pylon is the better of the two events. A quasi-challenge was issued to "D.D.", to meet at this year's Nats and see who's best by competing in each other's event. Well, that's not going to happen at this late date, so I've been giving considerable thought to setting up the Match of the Year. Here's the proposal:

Sometime late this fall, to allow for preparation time, "D.D." and I get together at a neutral meeting ground . . . like Harrah's at Lake Tahoe . . . and fly in a newly-designed event to determine the Champion of U/C Combat/QM Pylon Racing. Since it wouldn't be fair to expect Dirty to fly my event competently, and since my having to resurrect my old U/C stuff and slow my reflexes down to that level again after working so hard to hone them to their current peak of perfection would consume too much of my already-not-enough time (WCN can attest to this by my late copy), I propose that we combine the two events. After it comes off, we'll turn it over the AMA to let them expand and improve the rules, before making it a regular and popular Nats event.

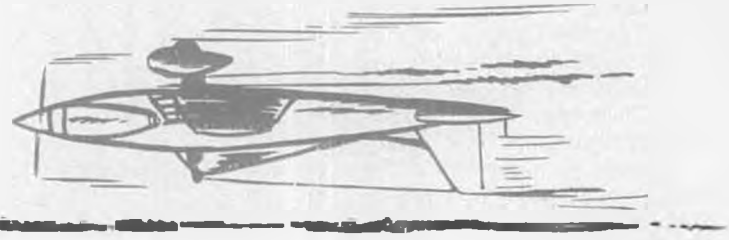
THE EVENT

The course will be laid out in circular form around pylons based on a one-hundred-fifty-foot radius. The event will consist of a ten-lap race; the objective being that I complete the ten laps before "D.D." does, or before he can chop my tail off. Naturally, this is a big undertaking, and we'd want it to come off well. So, since we both write for the same magazine, and since it would also involve **MB**'s pride as well as our own, it seems only fitting that **Model Builder**, that great leader among magazines, should pick up the tab for the works. Hey, Dirty, what do you say we set it up so we'll have a week to practice and see the sights in October. Thanks, Bill. *(This kid's not only deviant . . . he's delirious! wcn)*

Oh, I almost forgot . . . "D.D." has to fly a .15-powered standard FAI combat ship on 150 ft. lines, while I fly my standard .15-powered pylon racer. Sounds great, huh?

FORT WAYNE AIR RACES, 1978

This year's contest is over (this is being written the day after), and I must immodestly say, based on the contestant turnout, it was a success. True, when money ($1,000 in cash prizes) is involved, every problem or error that crops up is magnified at



Dan Kane with model and loot won at Pontiac Chiefs R/C Pylon Races.

least fourfold. But, with 45 Q-M contestants and 27 Formula I pilots showing up to fight it out for the prize money and overall neat feeling one gets from good, fast competition, it seems obvious that there is still a lot of interest in racing, and that our sport isn't suffering the decline some reports would indicate. We'll come up with a report in a future issue, along with photos and a critique on problem areas when running a money race. For now, the winners were: Q-M . . . Rex Knepper, 1st place ($250); Doug Bebensee, 2nd ($150); and Dennis Summer, 3rd ($100). Formula I . . . Bill Preis, 1st place ($250); Dave Keats, 2nd ($150); and Bill Hager, 3rd ($100).

From the *PRATHER PRODUCTS NEWSLETTER* comes word from a Richard Brunken that the Fox Prop Shaft Extension (#90410) 10-32 x 1/2-inch long can be used with the Cox engine, and permits fully cowling — in the head and carburetor, since it allows the engine to be moved back 1/2 inch.

PYLON RACING'S DECLINE

If racing is truly in a downswing, as many newsletters would indicate, perhaps the following letter will shed some light on the possible reasons of said decline. I must say that I'd read and reread the letter, and really didn't know whether to print it or not. I found it hard to believe that grown people would act in the manner the letter describes. Sure, I've seen displays of temper and pressure-fever at almost every race I've attended, but never to the extent outlined in Gary Korpi's letter. Until this past weekend, that is, at *my* club's pylon contest, where I experienced almost exactly the same problems as Gary. In fact, if I was to write a letter, all I'd have to do is copy the following one and change the date and place and involved parties, and sign my name.

If you haven't been around pylon racing but for a short time, you might not recognize Gary Korpi's name being involved with pylon racing, as it has been some time since he's been actively involved. We met Gary at the '77 California Nats, where he acted as starter, and we found him to be a knowledgeable and fair official. Reading about his past accomplishments over the years only served to introduce us to him through the written word, and even at that time, we recognized him to be a good man. Here's Gary's letter:

"Dear Sir:

"With regard to the Pylon races sponsored by the Pioneer R/C Club at PAL Field, June 24th and 25th, the behavior of the contestants and the derogatory comments directed toward the officials were childish and immature.

"As a former Pylon racer, I am more than familiar with the pressure associated with this type of intense competition, but do not feel that gives license to behave in a manner befitting a two-year-old.

"I agreed to act as Contest Director and head starter as a personal favor to Ron Sheldon and John Rouse, contest managers. They are aware of my reputation as a 'by the book' director who has the integrity to withstand the verbal abuse and attempted intimidation inherent to pylon racing.

"Contrary to the opinion of any contestant, it is not the responsibility of the contest director or the head starter to insure that the receiver or transmitter switch is in the 'on' position prior to flight.

"After receiving confirmation from all four pilots that they were ready for takeoff, I proceeded to flag them off at one-second intervals. The pilot in question was in third takeoff position and noticed his switch was 'off' just after the first airplane was released.

"The resulting midair collision not only destroyed two airplanes, but nearly caused serious injury to all personnel on the flight line. Rather than assume responsibility for his actions, the pilot launched a tirade against me, blaming the entire incident on faulty officiating.

"Due to the precarious relationship we have with the surrounding homeowners, we have had a muffler

Continued on page 121

This photo (and the one below) were taken by John Kilsdonk at the 2nd Annual Quickee 500 Warm-Up Race, hosted by the Can-Am Pylon Society. Mike Lasker was the winner.

At the Quickee 500 Race, Dave Keats won the Fast Time award, and Jack Busch won the Best Novice award. No info was supplied with these photos, so we don't know who the fliers are.

Mark Smith and his R/C seagull, built for the movie "Jonathan Livingston Seagull". Gary Goro and unnamed gull on right.

Mark Smith gives his Jonathan the heave-ho. Model is said to be very difficult to fly.

R/C SOARING

by Dr. LARRY FOGEL.

• No! Jonathan Livingston Seagull is not dead! He's alive and well at Torrey Pines, flying under the apt control of Mark Smith, designer of the famous triad . . . Windward, Windfree, and Wanderer.

You may recall that Mark designed this 1:1 scale sailplane for the motion picture which brought Richard Bach's book to the silver screen. The story was about a bright-eyed, bushy-tailed seagull who practiced aerobatics, striving for perfection in his flying. The model played the role of Jonathan through those sequences in which the bird flew aerobatics. According to the plot, a couple of other seagulls tried the fad. These birds were also Mark's creations, flown by Mark and his father, Rod Smith. A new film is now being produced by Jack Kauffer, the freelance producer of "Jonathan Livingston Seagull". This time the film is a documentary, called "Hollywood Animal Trainer", starring Gary Goro and a number of his "pets". In the film, Jonathan is contrasted with a real seagull, who is smart enough not to be trained to crash-dive into the cliff or perform other dangerous maneuvers. I look forward to seeing the film.

In the meantime, Mark is thinking about kitting his Jonathan . . . perhaps in an easy-to-fly version. At present, the bird's tail provides pitch control, ailerons produce roll, and transparent fences on the ailerons provide drag to increase the stability of this bird, which has very little lateral surface. Imagine the kick of soaring with a flock of gulls . . . circling over some garbage dump. What will they say? How will they behave? Will they adopt you as one of their own? Maybe Jonathan can win some new friends. Who knows?

R/C gliders come in all shapes and sizes. The most recent extremes include the 16-foot span Yankee Soar, a 1971 design by Niel Liptak that's still beautiful to see. Richard Eagle, of Chula Vista, California, constructed this 28:1 aspect ratio, six-pound bird, which flies slow and steady, even through turbulence. In the sky, it's every bit a thermal queen.

At the other extreme is the Seaglet, designed and constructed by Mark Loveland, of La Mesa, California. You have to look closely to see the tiny seagull in the cockpit. Believe me, he just goes along for the ride. The fuselage is 25 inches long, wingspan is 33 inches, and the wing area is 206.25 square inches, which lifts the 18 oz. total weight (2-channel radio included). Here is a spirited mini-beauty which performs notably in roll and snap-roll in close quarters.

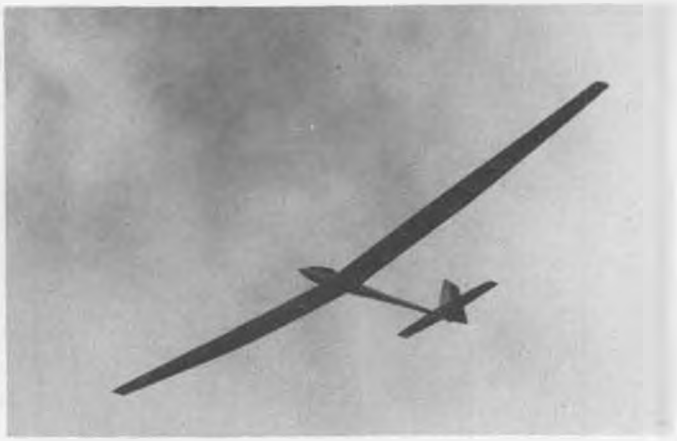
Another unusual aircraft belongs to Harris Nelson, of Encinitas, California. This canard craft weighs four pounds, and has an eight-foot span with mean chord of 5.8 inches (modified Eppler 387 airfoil). It operates at a wing loading of 17 oz. The canard is of 30 inch span, and the chord is 3.5 inches. Angular difference is four degrees, and the canard can rotate from 30° down to 20° up. The rudder is 45° each side of neutral. This experimental craft is exciting to watch. Harris is only satisfied with new and different designs that really perform.

Hi Johnson entered his new plane in a recent contest. I asked for

Harris Nelson and his very fast-looking canard slope glider. Model spans eight feet, wing loading is 17 oz./sq. ft.

Even Old Timers are getting into the act! Phil Merrick's Zipper at Torrey Pines.

The Goodyear Blimp was recently seen off Torrey Pines. Lloyd Standley's Beaver goes out to shoot it down.



Richard Eagle built this 16-foot Yankee Soar, a Niel Liptak design. About as graceful as you can get.

details, and he referred me to his catalog, which offers many interchangeable components, so that you can piece together your own design in modular fashion. It looks good. Read his catalog in depth, then head for the drawing board with components in hand. Here's a convenient way to get your own "original design". Write for his $1.50 catalog, entitled, "Superwings", 11015 Glenoaks Blvd., Pacoima, CA 91331, or call Hi at (213) 899-4312.

There are so many classes of sailplanes: scale, not-so-scale, thermal, aerobatic, and so forth. Phil Merrick endorses a new class, called "soaring old-timers." He's now operating the Carl Goldberg "Zipper" in truly aerobatic fashion. The only modification is the removal of the original engine block, which is replaced by the proper lead weight. Can we get sufficient interest to start old-timer soaring contests?

Bob Lear, of Arcadia, California, scaled down the Paragon for competition in the two-meter events. This 5/8 version of Ed Slobod's original design weighs 22-1/2 ozs., looks good, and flies well. Who needs spoilers on a craft this size?

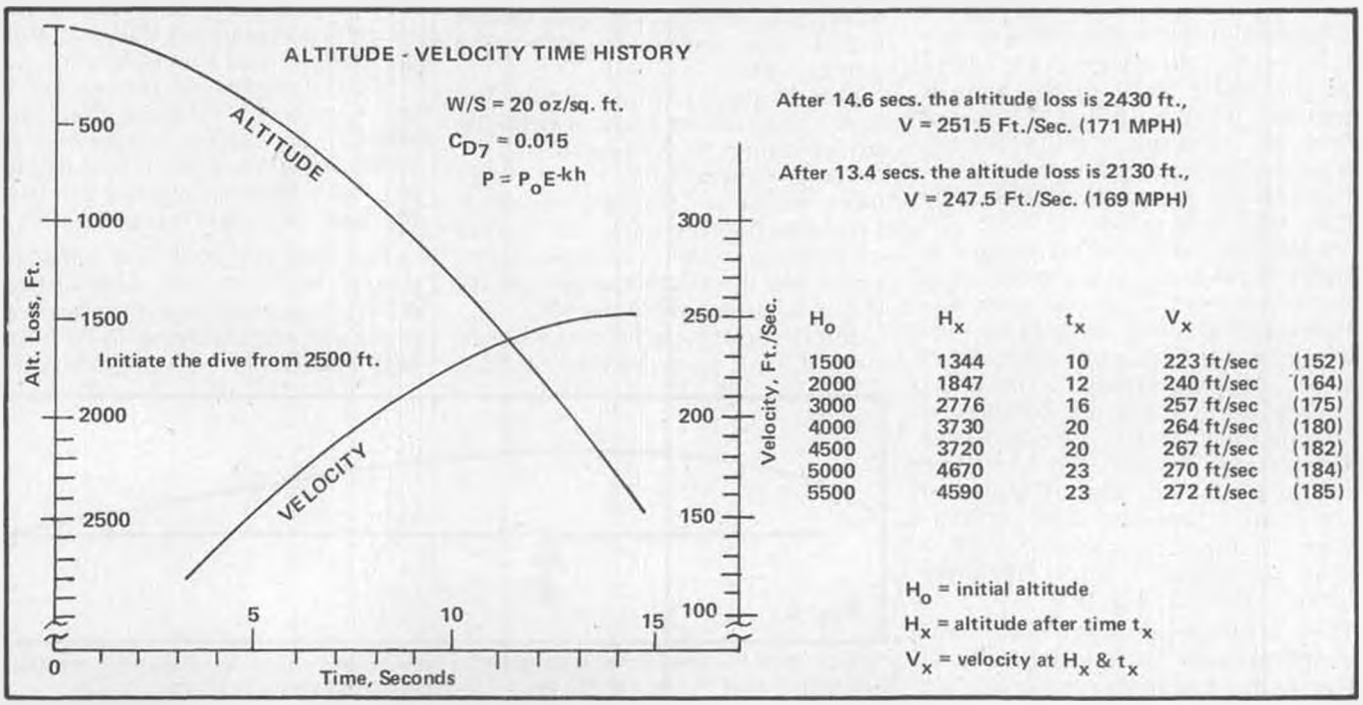
Jim Hicke has been flying the Sterling Cirrus, which was originally designed for single-channel R/C or free flight. He operates it on ailerons and elevator. It's tricky, but where can you put the additional servo and coupling to the rudder?

Recently, the Goodyear Blimp has been in our area. Cruising by Torrey Pines, it provides an opportunity for comparing size. Lloyd Standley's Beaver appears a fair challenge. The 205 millimeter telephoto lens foreshortens the distance between the two craft. Other planes could be seen in silhouette against the silver side of the blimp. Actually, I expect that the passengers in the gondola were far more interested in watching the surfers on Black's Beach, than the models that use this airspace.

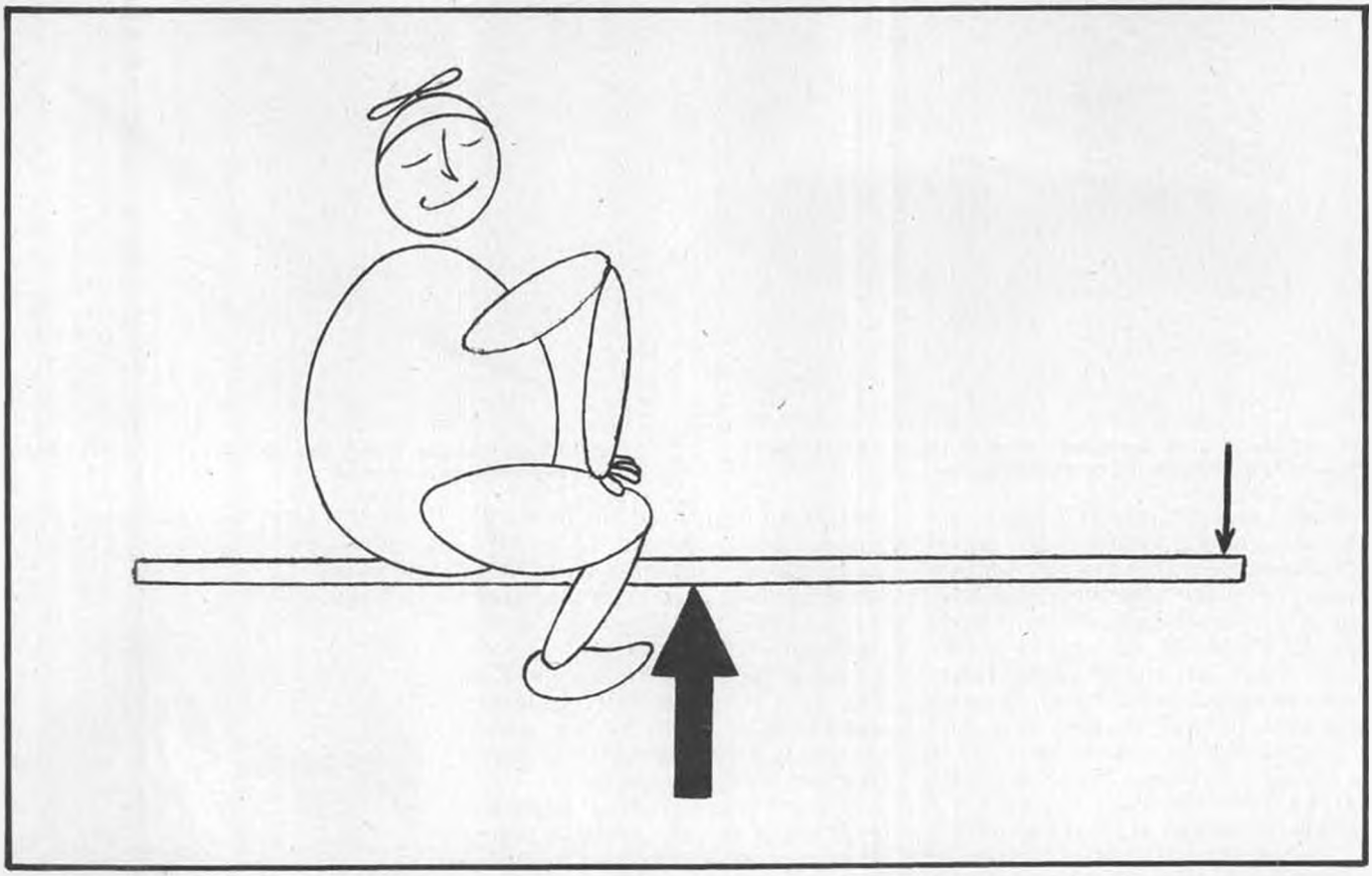
There's still a lot of talk about the recent FAI R/C glider speed record.

Continued on page 128

Bob Lear and his 5/8-scale Paragon, designed for two-meter contests.



H_o	H_x	t_x	V_x	
1500	1344	10	223 ft/sec	(152)
2000	1847	12	240 ft/sec	(164)
3000	2776	16	257 ft/sec	(175)
4000	3730	20	264 ft/sec	(180)
4500	3720	20	267 ft/sec	(182)
5000	4670	23	270 ft/sec	(184)
5500	4590	23	272 ft/sec	(185)



CENTER OF PRESSURE

By DAVE THORNBURG . . . Nobody hates theory more than the author . . . but here's a simple, well-written aerodynamic discussion that just might keep your sailplane wings from exploding on that next speed run!

• I prefer not think about Center of Pressure at all, but when I do, I like to think of it as a kind of invisible black arrow, poking around underneath my airfoil, looking for weak spots in my Monokote. Just like the drawings in the textbooks: **Fig. A**

It represents the magic point where all the lifting force of the wing is focused. (Why it's called "Center of Pressure", and not "Center of Lift", is a question that always embarrasses the serious aerodynamicists. For their sake, let's skip it.)

I also like to think of an airplane in stable flight as being balanced upon this magic point . . . in the same way that a seesaw can be made to balance across its axle (if you can get two kids to sit still long enough). Designers usually bring about this balance by placing their "fat kid" (the Center of Gravity, or weight-focus of the whole plane) just slightly ahead of the black arrow, and then countering this huge down-force with a long tail moment and a negative-lifting stabilizer: **Fig. B**

The plane's nose begins to want desperately to "tuck under", and all that keeps this from happening is a tremendous increase in negative lift from the stabilizer: **Fig. C**

This works. You really *can* balance Fat Albert, if you can get him to sit up near the seesaw's axle, while you scoot out to the very end of the board. The seesaw balances; the airplane flies.

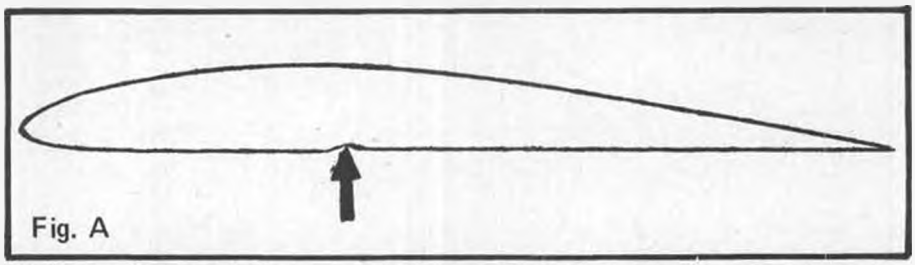
Good, you say; this is simple. But how can knowing about it keep me from ripping my wings off?

Well, Gentlemen, there's one more factor . . . the bad news that I've been holding back. The Center of Pressure isn't a simple, fixed point, like the axle of our seesaw. It's shifty. It moves around a lot.

But its movement follows a simple rule, at least: raise the leading edge (as in a climb) and the arrow moves forward; lower the leading edge (as in a dive) and the arrow moves back. We can forget about the forward movement . . . if the stabilizer doesn't catch it in time, it will only cause the airplane to stall, and stalls are seldom fatal to a sailplane.

It's the backward movement of the Center of Pressure that's the killer. If our arrow moves too far behind the Center of Gravity, it's like Fat Albert sitting too far from the axle. A dangerous situation . . .

This may not look too lethal on paper, but you can demonstrate what's happening with whatever plane you're now flying. Put it into a high-speed (30° or steeper) dive,



The Center of Pressure (arrow) is the point on the wing where all of the wing's lift is focused. The amount of lift forward of this point is the same as the amount of lift aft.

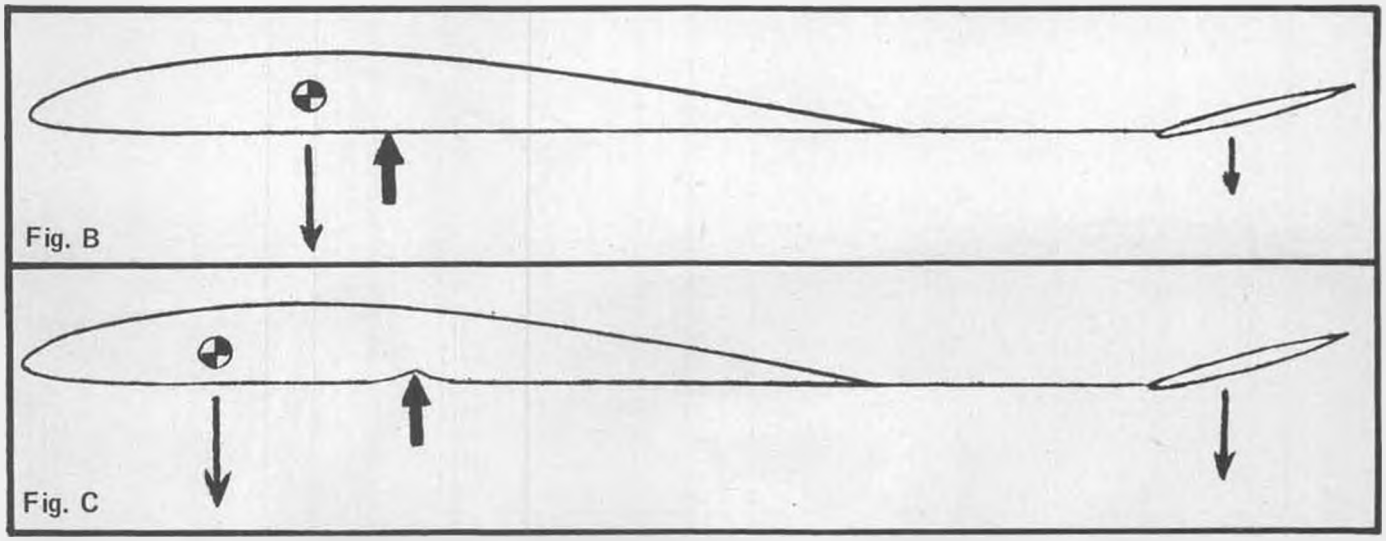


Fig. B: If the CG is forward of the Center of Pressure, a down-force from the stabilizer is required to keep the model from pitching down.
Fig. C: The farther forward the CG is from the Center of Pressure, the more down-force is required to maintain level flight.

straight towards you. Watch the stabilizer. Unless your stab is incredibly stiff, you'll probably see some anhedral . . . both tips will begin to sag down.

What's going on? You're applying down elevator, right? Down elevator is supposed to increase the stab's lift, right? And a surface that's lifting ought to bend *up*, not down, right? Then why is it going anhedral?

The answer is that the good ol' Center of Pressure has slid backward until it's dangerously far behind the Center of Gravity . . . so it's now pulling up on the tail of the airplane. And pulling up hard.

If you continue to dive at this angle, one of two things must happen. Let's begin with the worst. The stabilizer will quite suddenly give up the ghost, folding downward and allowing the nose of the plane to tuck under, which is what it wanted to do all along. The instant this happens, your wing is going to explode. I guarantee it. Nobody builds wings tough enough to withstand this particular maneuver.

It will explode, and it will all happen so quickly that you'll probably blame the whole thing on "wing failure". This happened to a plane I had built, during the speed run at the 1976 Southwestern Regionals. When I did the autopsy, I found that the wing panel that failed had folded *downward*, and at first I couldn't believe it!

It took me a week to reconstruct the actual event. To my sluggish eyeballs, the ship had simply exploded all at once, like a firecracker. When I finally got my hypothesis straight, I called the Air Force F-111 pilot who had timed the flight, and asked him what he saw. "The plane tumbled forward and the right wing blew off," he told me. Voila!

But that's the very worst thing that can happen, and it doesn't happen often (only once per airplane, at the most). What is more likely is that the stabilizer will hold (hurrah!) and the plane will settle into a terminal velocity for that particular wing loading and dive angle.

If you happen to be flying a speed course, or even just a distance course, you should be very interested in this terminal velocity. Is it the *maximum* velocity your plane is capable of, under those conditions? Not if your stabs are bending down, it ain't. Not by a long shot.

Why? Because the bending indicates that your stabilizer is carrying a heavy load, and *that's not what stabilizers are for*. Any time you load them, their drag goes up astronomically; they make lousy wings. Stabilizers are designed for stabilizing, for carrying the minimum possible load to keep the wing in aerodynamic balance.

So you ought to be wary of people who tell you to move your Center of Gravity *forward* to fly a speed course. They're asking you to do one of two things: 1) fold your stabilizer, followed instantly by at least one of your wing panels; or 2) fly the course with so much negative load on your stabs that you might as well be dragging a small parachute along behind you.

So what am I suggesting . . . that you move the Center of Gravity *back* to fly speed? That you go into that feared and dreaded and seldom-practiced speed run with a *tailheavy* airplane?

Yup.

And the reason is simple: when you line her up with the speed course and push in that down-stick, your little black arrow is going to start sliding towards the trailing edge of the wing. You want your Center of Gravity to be right back there, waiting for it to arrive.

If the black arrow arrives, and stops directly under your Center of Gravity, you have the ideal aerodynamic balance for your dive: Fat Albert sitting directly over the axle, and you balancing the board with the merest finger pressure on your end. Almost all of the force is off your stabilizer now, and your plane will go faster without ballast than your buddy's plane will go ballasted.

Try it.

Start moving your CG back, 1/8 of an inch or so at a time. Almost all kit designers deliberately show it too far forward, because this loads the stab and makes the elevator relatively insensitive, which is good for beginners. I can't give you any figures, because it's going to vary from airfoil to airfoil. And it will vary with your dive angle, of course, so you need to practice a specific course to really fine-tune. I'd be a little nervous if my balance point strayed much more than 1/2 inch from that shown on the plans.

Remember: the aerodynamic efficiency of your model is roughly proportional to the sensitivity of its elevator. When you get that CG back to the point that your elevator stick is touchy as a boiled owl, you'll have a faster, cleaner, more efficient model. Cut your throws down and learn to fly it that way, and you'll have a definite competitive edge.

Still not convinced? Go back and reread World Champion Skip Miller's article in the December 1977 *Model Aviation*. Buried inconspicuously in one of his final paragraphs is the note that he sometimes flies his Aquila with the CG so far back that the fuselage angles up at 45° or more, when the model is suspended at the back edge of the wing spar.●

The first of six production F9C-2 Sparrowhawks was S/N 9056, shown above. The landing gear has been changed back to the sturdier tripod arrangement used on the XF9C-1. Oil oozing out of crankcase shutter indicates leaky seal in crankcase. Photo furnished by Walt Stampfli.

CURTISS F9C-2 "SPARROWHAWK"

PART ONE

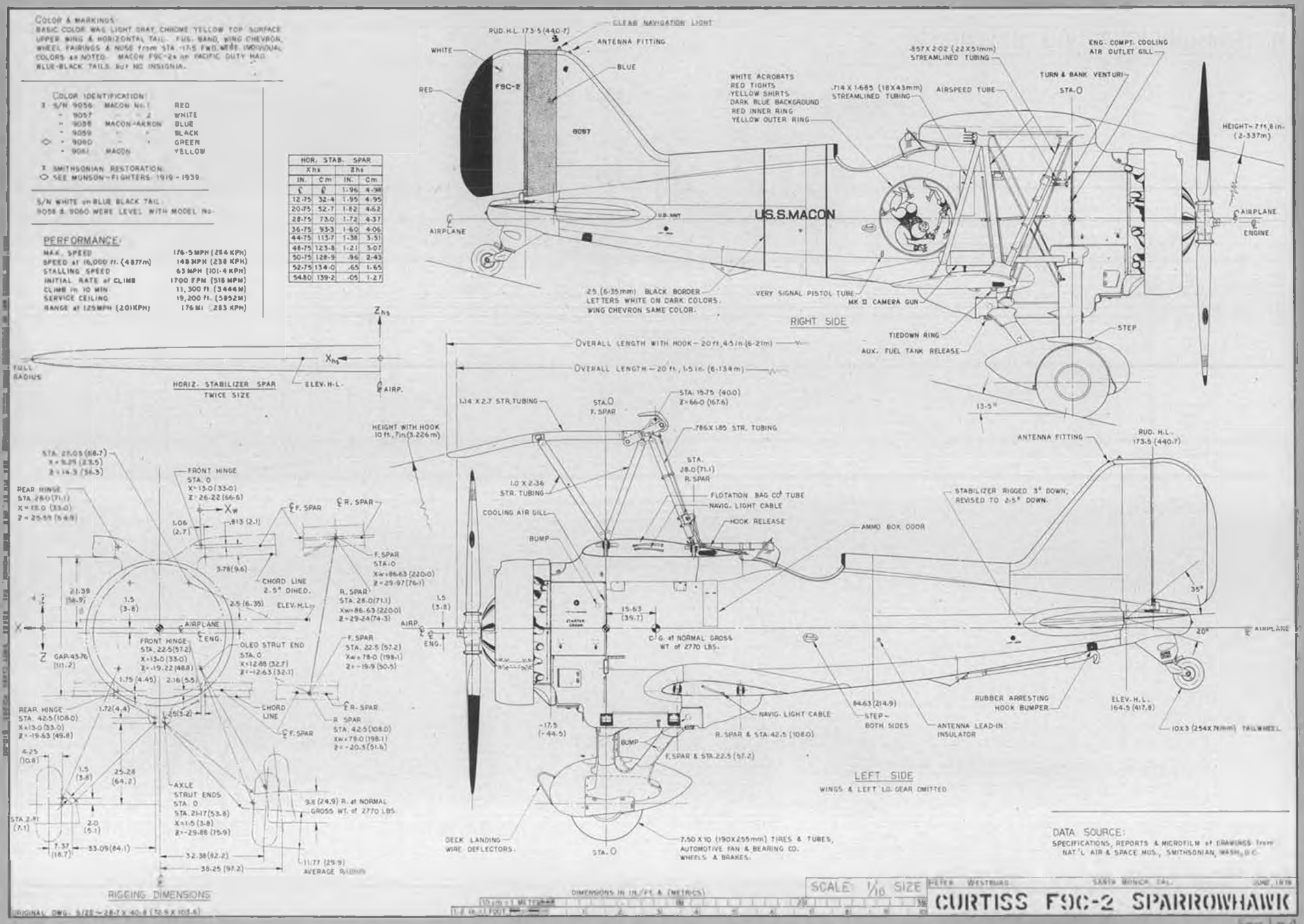
by PETER WESTBURG

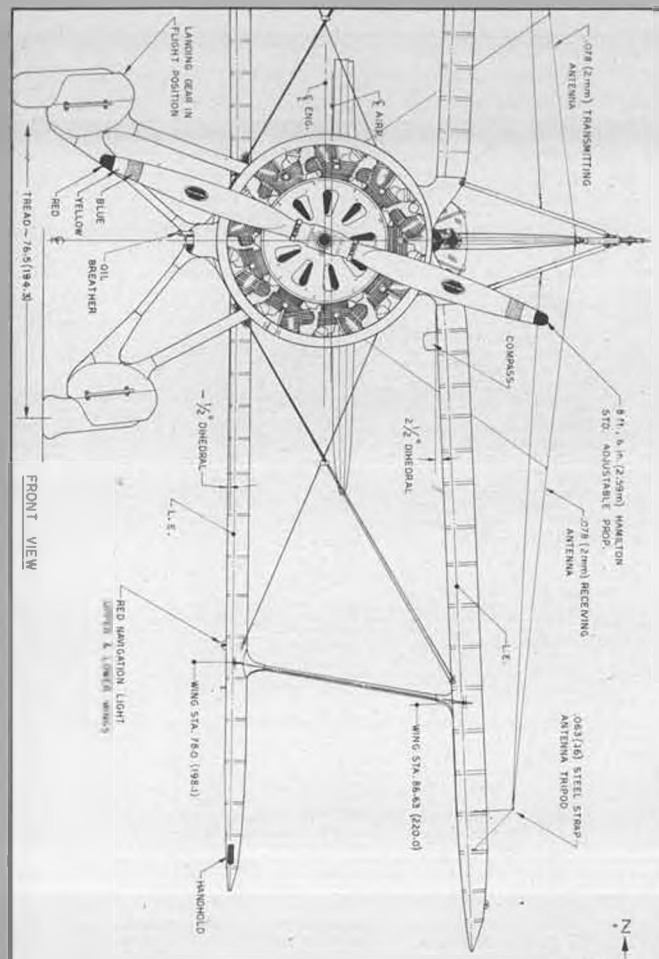
• No clear-cut evidence exists that the Curtiss Sparrowhawk was originally intended for the role of an airship fighter. The Navy Bureau of Aeronautics issued a spec for a small shipboard fighter, to which three companies responded; Fokker, with its XFA-1; Berliner/Joyce, with its XFJ-1; and Curtiss, with the XF9C-1. All were small airplanes, weighing less than 2900 pounds, loaded, and with wing spans of 28 feet or less. None of the aircraft were fitted with airship hooks, though the feasibililty of hooking onto a lighter-than-air craft had already been demonstrated several times, first by the U.S. Army, in December of 1924, when Lt. Clyde Finter jockeyed his hook-equipped Sperry Messenger to a precarious "landing" on a TC-3 blimp. A Vought UO-1 had hooked on and off the USS Los Angeles, and Consolidated Fleet N2Y's repeated the feat many times.

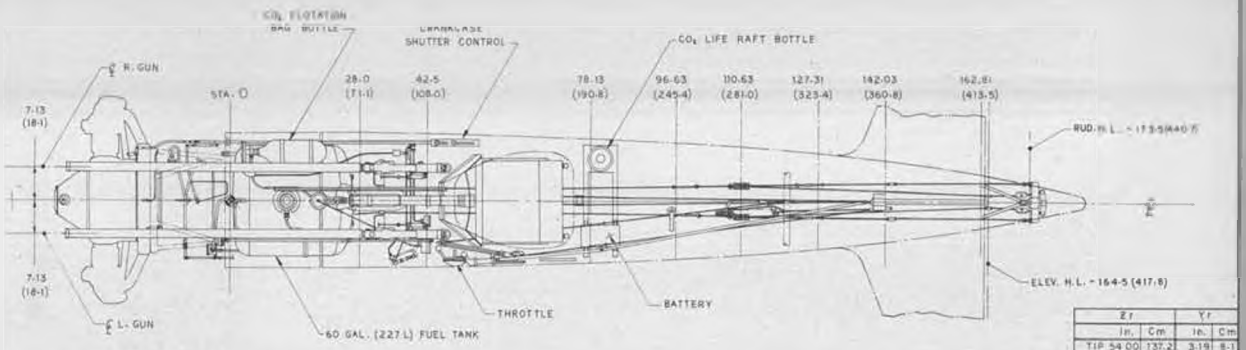
On the other hand, the dirigibles Akron and Macon were each expressly designed with a hangar to handle five aircraft, the first airships in history to be so equipped. A dirigible is not a fighting ship, although Zeppelins did drop bombs on London in WWI; but unless it carries fighters, it is useless as an offensive weapon. Without provision for carrying fighters, the Akron and the Macon had no reason for being. The airships were definitely intended to carry aircraft, but make and model were not specified.

The Curtiss XF9C-1 won the competition for shipboard fighters. At first, the program was hush-hush, and the airplane was flown secretly at Mitchel Field, Long Island. It was then tested at the Naval Air Station at Anacostia, and carrier landing tests were conducted at Hampton Roads, where the Navy had a carrier deck landing test facility. On its first

The prototype XF9C-1 at Anacostia NAS. Top of upper wing and horizontal stabilizer are yellow; orthochromatic film makes them appear dark. Dan Rush photo.


COLOR & MARKINGS:
BASIC COLOR WAS LIGHT GRAY, CHROME YELLOW TOP SURFACE UPPER WING & HORIZONTAL TAIL. FUS. BAND, WING CHEVRON, WHEEL FAIRINGS & NOSE from STA. 17.5 FWD. WERE INDIVIDUAL COLORS as NOTED. MACON FSC-2s on PACIFIC DUTY HAD BLUE-BLACK TAILS, BUT NO INSIGNIA.
COLOR IDENTIFICATION:
‡ S/N 9056 MACON No. 1 RED
" 9057 " " 2 WHITE
" 9058 MACON-AKRON BLUE
" 9059 " " BLACK
◇ " 9060 " " GREEN
" 9061 MACON YELLOW
‡ SMITHSONIAN RESTORATION.
◇ SEE MUNSON-FIGHTERS 1919-1939
S/N WHITE on BLUE BLACK TAIL 9058 & 9060 WERE LEVEL WITH MODEL No.
PERFORMANCE:
MAX. SPEED 176.5 MPH (284 KPH)
SPEED at 16,000 ft. (4877m) 148 MPH (238 KPH)
STALLING SPEED 63 MPH (101.4 KPH)
INITIAL RATE of CLIMB 1700 FPM (518 MPM)
CLIMB in 10 MIN 11,300 ft. (3446M)
SERVICE CEILING 19,200 ft. (5852M)
RANGE at 125MPH (201KPH) 176 M (283 KPH)
HOR. STAB. SPAR
Xhs Zhs
IN. Cm IN. Cm
℄ ℄ 1.96 4.98
12.75 32.4 1.95 4.95
20.75 52.7 1.82 4.62
28.75 73.0 1.72 4.37
36.75 93.3 1.60 4.06
44.75 113.7 1.38 3.51
48.75 123.8 1.21 3.07
50.75 128.9 .96 2.43
52.75 134.0 .65 1.65
54.80 139.2 .05 1.27
RUD. H.L. 173.5 (440.7)
CLEAR NAVIGATION LIGHT
ANTENNA FITTING
WHITE
BLUE
RED
FSC-2
9057
WHITE ACROBATS
RED TIGHTS
YELLOW SHIRTS
DARK BLUE BACKGROUND
RED INNER RING
YELLOW OUTER RING
.714 X 1.685 (18X43mm) STREAMLINED TUBING
.857 X 2.02 (22X51mm) STREAMLINED TUBING
ENG. COMPT. COOLING AIR OUTLET GILL
TURN & BANK VENTURI
AIRSPEED TUBE
STA. 0
HEIGHT-7 ft. 8 in. (2.337m)
AIRPLANE
ENGINE
U.S.S.MACON
.25 (6.35mm) BLACK BORDER LETTERS WHITE ON DARK COLORS. WING CHEVRON SAME COLOR.
VERY SIGNAL PISTOL TUBE
MK II CAMERA GUN
RIGHT SIDE
TIEDOWN RING
AUX. FUEL TANK RELEASE
STEP
13.5°
OVERALL LENGTH WITH HOOK - 20 ft. 4.5 in. (6.21m)
OVERALL LENGTH - 20 ft. 1.5 in. (6.134m)
FULL RADIUS
HORIZ. STABILIZER SPAR TWICE SIZE
ELEV. H.L.
AIRP.
1.14 X 2.7 STR. TUBING
STA. 0 F. SPAR
STA. 15.75 (40.0) Z=66.0 (167.6)
.786 X 1.85 STR. TUBING
HEIGHT WITH HOOK 10 ft. 7in. (3.226m)
STA. 28.0 (71.1) R. SPAR
1.0 X 2.36 STR. TUBING
FLOTATION BAG CO2 TUBE
NAVIG. LIGHT CABLE
COOLING AIR GILL
HOOK RELEASE
BUMP
AMMO BOX DOOR
ANTENNA FITTING
RUD. H.L. 173.5 (440.7)
STABILIZER RIGGED 3° DOWN, REVISED TO 2.5° DOWN.
STA. 27.05 (68.7) X=9.25 (23.5) Z=14.3 (36.3)
REAR HINGE STA. 28.0 (71.1) X=13.0 (33.0) Z=25.59 (64.9)
FRONT HINGE STA. 0 X=13.0 (33.0) Z=26.22 (66.6)
F. SPAR
R. SPAR
1.06 (2.7)
.813 (2.1)
3.78 (9.6)
CHORD LINE 2.5° DIHED.
F. SPAR STA. 0 X=86.63 (220.0) Z=29.97 (76.1)
R. SPAR STA. 28.0 (71.1) X=86.63 (220.0) Z=29.24 (74.3)
2.1.39 (54.9)
1.5 (3.8)
2.5 (6.35)
ELEV. H.L.
AIRPLANE
ENG.
FRONT HINGE STA. 22.5 (57.2) X=13.0 (33.0) Z=-19.22 (48.8)
OLEO STRUT END STA. 0 X=12.88 (32.7) Z=-12.63 (32.1)
F. SPAR STA. 22.5 (57.2) X=78.0 (198.1) Z=-19.9 (50.5)
GAP-43.76 (111.2)
1.75 (4.45)
2.16 (5.5)
REAR HINGE STA. 42.5 (108.0) X=13.0 (33.0) Z=-19.63 (49.8)
1.72 (4.4)
2.5 (5.2)
CHORD LINE
R. SPAR STA. 42.5 (108.0) X=78.0 (198.1) Z=-20.3 (51.6)
4.25 (10.8)
25.28 (64.2)
AXLE STRUT ENDS STA. 0 STA. 21.17 (53.8) X=1.5 (3.8) Z=-29.88 (75.9)
9.8 (24.9) R. at NORMAL GROSS WT. of 2770 LBS.
STA. 2.41 (7.1)
2.0 (5.1)
7.37 (18.7)
33.09 (84.1)
32.38 (82.2)
38.25 (97.2)
11.77 (29.9) AVERAGE RADIUS
RIGGING DIMENSIONS
15.63 (39.7)
C.G. at NORMAL GROSS WT. of 2770 LBS.
STARTER CRANK
-17.5 (-44.5)
NAVIG. LIGHT CABLE
R. SPAR & STA. 42.5 (108.0)
F. SPAR & STA. 22.5 (57.2)
84.63 (214.9)
STEP - BOTH SIDES
ANTENNA LEAD-IN INSULATOR
RUBBER ARRESTING HOOK BUMPER
ELEV. H.L. 164.5 (417.8)
10X3 (254X76mm) TAILWHEEL
35°
20°
DECK LANDING WIRE DEFLECTORS.
7.50 X 10 (190X255mm) TIRES & TUBES, AUTOMOTIVE FAN & BEARING CO. WHEELS & BRAKES.
LEFT SIDE
WINGS & LEFT LD. GEAR OMITTED
DATA SOURCE:
SPECIFICATIONS, REPORTS & MICROFILM of DRAWINGS from NAT'L AIR & SPACE MUS., SMITHSONIAN, WASH. D.C.
DIMENSIONS IN IN./FT. & (METRICS)
SCALE 1/10 SIZE
PETER WESTBURG SANTA MONICA, CAL. JUNE 1978
CURTISS FSC-2 SPARROWHAWK
SHEET 1 OF 4
ORIGINAL DWG. 3/28 - 28.7 X 40.8 (72.9 X 103.6)





INBOARD PLAN

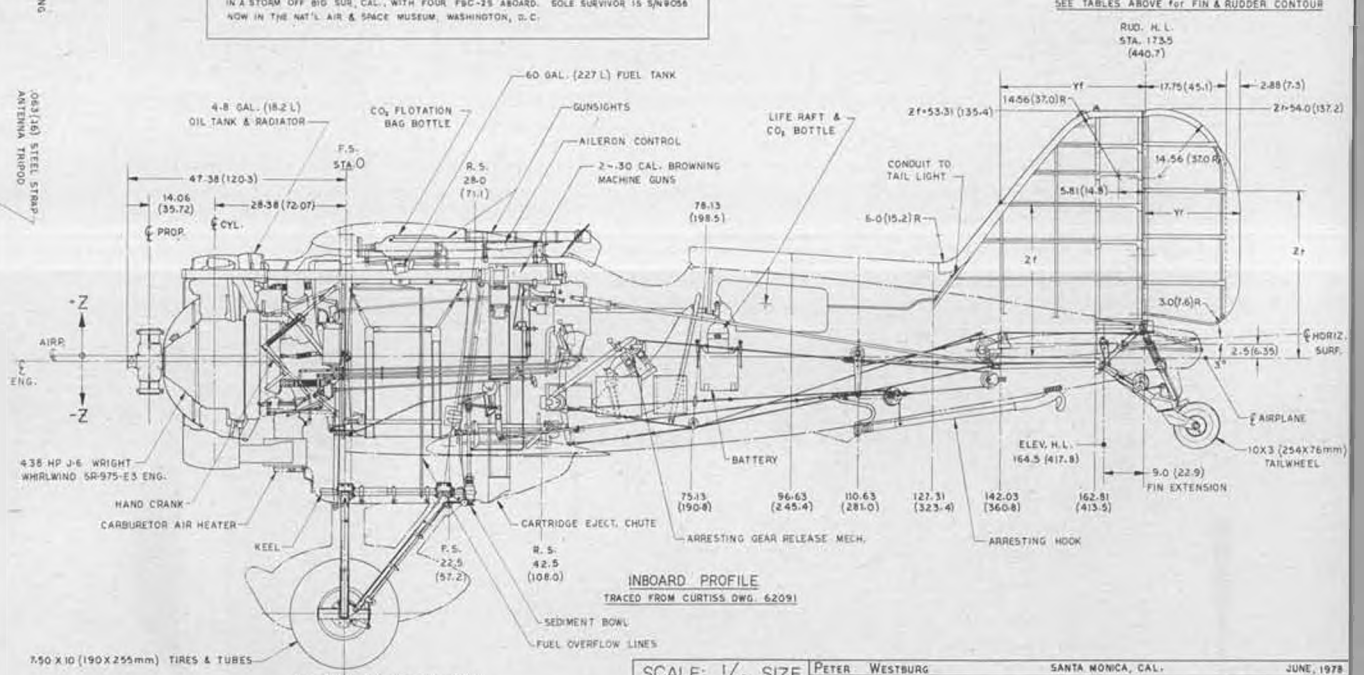
TRACED FROM CURTISS DWG. 6209)

	Zf		Yf	
	In.	Cm	In.	Cm
TIP	53-31	135-4	10-23	26-0
RIB	45-97	116-8	20-63	52-4
"	39-97	101-5	26-00	66-0
"	33-22	84-40	31-50	80-0
RIB	25-22	64-10	38-06	96-7
HINGE	39-15	99-45	0	0
"	22-28	56-59	0	0
HINGE	9-5	24-13	0	0

	Zf		Yf	
	In.	Cm	In.	Cm
TIP	54-00	137-2	3-19	8-1
RIB	46-38	117-8	12-80	32-5
	45-81	116-4	16-00	40-6
	43-44	110-3	17-44	44-3
	41-44	105-2	18-47	46-9
	39-44	100-2	19-41	49-3
	37-44	95-1	19-94	50-6
RIB	36-38	92-4	20-18	51-3
	35-44	90-0	20-31	51-6
	33-44	84-9	20-53	52-1
	31-44	79-9	20-63	52-4
RIB	26-68	67-0	"	"
RIB	16-38	41-6	20-63	52-4
	14-25	36-2	20-38	51-8
	12-25	31-1	19-75	50-2
ctr. 3 R	-10-25	26-0	18-59	47-2
	8-3-1	21-1	17-06	43-3

SEE TABLES ABOVE for FIN & RUDDER CONTOUR

ONE XF9C-1, ONE XF9C-2 & SIX PRODUCTION F9C-2 AIRPLANES WERE DELIVERED TO THE U.S. NAVY IN 1931-32 FOR USE ABOARD THE DIRIGIBLE U.S.S. AKRON. WHEN THE AKRON WAS LOST APRIL 4, 1933, IN A STORM OFF LAKEHURST, N.J., THE F9C-2 SPARROWHAWKS WERE TRANSFERRED TO THE U.S.S. MACON. ON FEB. 12, 1935, THE MACON CRASHED IN A STORM OFF BIG SUR, CAL., WITH FOUR F9C-2S ABOARD. SOLE SURVIVOR IS S/N #056 NOW IN THE NAT'L AIR & SPACE MUSEUM, WASHINGTON, D.C.



INBOARD PROFILE

TRACED FROM CURTISS DWG. 6209)

CHARACTERISTICS

SPAN, UPPER WING	25 ft., 6 in. (7.77 M)	TOTAL WING AREA	172-8 SQ. FT. (16 SQ. M)
SPAN, LOWER WING	23 ft., 4 in. (7.11 M)	UPPER WING AREA	104-5 SQ. FT. (9.71 SQ. M)
OAL WITH HOOK	20 ft., 4-5 in. (6-21 M)	LOWER WING AREA	68-3 SQ. FT. (6-35 SQ. M)
HEIGHT WITH HOOK	10 ft., 7 in. (3-226 M)	TOTAL AIL. AREA	18-9 SQ. FT. (1-76 SQ. M)
GAP	46-76 (118-8)	STABILIZER AREA	12-45 SQ. FT. (1-16 SQ. M)
DIHEDRAL, UPPER WING	+2-5°	ELEV. AREA	10-85 SQ. FT. (1-01 SQ. M)
DIHEDRAL, LOWER WING	-0-5°	FIN AREA	9-1 SQ. FT. (.85 SQ. M)
INCIDENCE, EACH WING	0°	RUDDER AREA	6-0 SQ. FT. (.56 SQ. M)
STAGGER	25-0 (63-5)	WT. EMPTY	2089 LBS (947 KG)
		USEFUL LOAD	681 LBS (309 KG)
		NORMAL GROSS WT.	2770 LBS (1256-5 KG)

DIMENSIONS IN IN./FT. & (METRICS)

10 cm = 1 METER

1.2 in. = 1 FOOT

SCALE: 1/10 SIZE

PETER WESTBURG — SANTA MONICA, CAL. — JUNE, 1978

CURTISS F9C-2 SPARROWHAWK

SHEET 2 OF 4

ORIGINAL DWG. SIZE — 26-7 X 20-6 (72-5 X 193-9)

This is the earliest photo of the XF9C-1 Sparrowhawk, taken at the Curtiss plant at Garden City, Long Island, six weeks before delivery on March 27, 1931. The airplane was assembled, but not complete. Dan Rush photo.

landing, the XF9C-1 wound up on its nose, partly due to improper braking and partly due to the tail hook being too far forward, permitting the tail to rise when the arresting wire was engaged.

The tiny fighter struggled through 11 more landings and barely passed, but the test pilots would not recommend it for carrier service without major changes. The low placement of the upper gull wing interfered with vision during landing, as did the placement of the engine. The landing angle did not match the high angle of attack that the Clark CYH airfoil needed to develop maximum lift. At low speed, aileron control was lost, and the airplane dropped in with excessively hard loads on the landing gear.

However, in the summer of 1931, the XF9C-1 was equipped with an airship hook, making its first hook-on and release from the Los Angeles in October. A spec for an airship fighter had been released in July of 1931. Written around the XF9C-1, it prompted Curtiss to incorporate all the desired changes. The work was shifted to the Buffalo plant where, in 90 days, the new prototype XF9C-2 was manufactured at company expense.

The XF9C-2 differed from the XF9C-1, in that the upper wing was raised 4 inches, the engine lowered 1-1/2 inches, and the landing gear was of the cantilever type used on the P-6E Hawk. Dark blue with gray wings, except for chrome yellow on top of upper wing and horizontal tail.

FUEL LINES

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

JOE KLAUSE
P.O. Box 2699
Laguna Hills, CA 92653

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.

ALDRICH

• It seems as though modelers are always concerned with the weather. The wind is our particular nemesis, whatever we fly. C/L speed and other racing nuts pray for low humidity and a high barometer.

Other than the wind affecting our flying, humidity probably causes more problems than any other weather element. If it is more humid, there is more water in the air, which in turn, will go into our engines. A certain amount of fuel/air is required for a given needle valve setting. If there is more water in the air, it will displace some of the fuel going down the venturi, requiring the needle valve to be opened more. On top of this, the added moisture makes the atmosphere in the cylinder heavier, and here comes over-compression, pre-ignition, crackling, and all those other neat things that can make life miserable. This is the time that a head shim (.005-.010) added under the head can really pay off.

Sport and Pattern fliers will selsom suffer from pre-ignition problems, unless they are using a fuel with too much nitro (15% and up) on a humid day; or their engine has unusually close head clearance (high compression); or they have induced high compression by using a tuned pipe; or a combination of any or all of these.

A recent incident at our local flying field reminded me of what humidity can do to an engine, whether it be C/L or R/C.

Living quite near to the Gulf of Mexico, we had been plagued by unusually high winds for several weeks. In order to get a little reasonably calm flying time, a few of us got out early, fired up and flew awhile. The great God who looks after modelers smiled on us that day and the wind stayed down. By noon it was in the 90's, but after a cool one . . . back to the strip. Every one of us who had flown early had to reset both the high and low speed settings on our engines. They were all way too rich.

Now, I'm no weatherman, and if there is one of you out there who can explain these conditions, please lay it on us. Anyhow, we'll try. When we flew early it was cool, dew on the grass, etc.; in short, more humid. Being more humid, fuel was displaced by water. In order to get the desired setting, the needle valve had to be opened more. Then, as the temperature went up, the relative humidity dropped, and there we were with our needle valves open . . . er, ah, that is, our engines were too rich.

We have all seen the guy who is a needle valve "tweaker". He's always messing with the setting and never seems to know when it's right. When flying at various times during the day, or when your flights are fairly far apart at a contest, *expect* the engine to be out of adjustment. A few minutes spent in the pits can save lost points, tempers, or even a model. •

BERNHARDT

• "What sort of fuel do you guys use?" If you fly with ignition engines, you've probably heard that question countless times, and if you're thinking about using an ignition engine, you will probably ask it yourself. So, let's discuss fuels, oils, and fuel/oil mixtures.

Fuels have changed little since gasoline engines became popular for model aircraft use in the mid-thirties, but great advances have been made in the field of lubricants. Almost all of the early engine manufacturers recommended a mixture of three parts gasoline to one part of 70-weight motor oil. The oil was easy to obtain from motorcycle shops, and the gas used was the white gas used in lanterns and single cylinder commercial engines. Most gasoline stations carried white gasoline in 55-gallon drums. Although this combination of gasoline and oil was used by almost everyone in the "old days", it was a dirty mixture. The oil had a tendency to burn in some engines, causing the spark plug to foul up, and the outside of the model had to be wiped down after each flight. Almost all of the early engines had lapped pistons and bronze bearings, so a heavy concentration of oil was necessary to keep the little jewel from freezing up.

With the introduction of ringed pistons and ball bearing crankshafts, the high oil content was reduced to as little as 15 to 1, according to some manufacturer's instruction sheets. It was well-known among motorcycle racers that a mixture of alcohol and castor oil produced more horsepower than gasoline, and some modelers tried this in their miniature engines.

For models such as U-control speed ships, there was a noticeable increase in performance using alcohol as a fuel; however, the rate of consumption was two to three times greater than using gasoline. Also, alcohol has a nasty habit of messing up the finish on a nitrate-doped model. Castor oil had long been known for its excellent performance as an engine lubricant, dating back to the World War I era. In those days, there were some full-size aircraft engines that absolutely would not operate with any lubricant except castor oil. In a two-cycle engine, this lubricant mixes nicely with alcohol, but some brands of castor oil will not go into solution with gasoline. Try it, if you will, and you will notice that the castor oil will settle to the bottom of the container. Now, if you add a very small amount of ether to this mixture, you will find that the gasoline and castor oil will now mix with each other and become an acceptable model engine fuel for ignition engines. The fuel container must be kept tightly closed to keep the ether from evaporating. Should it evaporate, the gasoline and castor oil will again separate. The small addition of ether will also give the mixed fuel a slight power boost.

Specifically, lubricants used in two-cycle fuel mixtures are there for the purpose of creating a film between all moving parts, thereby minimizing wear by reducing the amount of metal-to-metal contact. The ability of the lubricant to maintain this film is the key to the quality of the lubricant. Some oils break down faster than others under pressure and heat. Some will burn in the combustion chamber, causing carbon deposits and plug fouling.

Engines for model use vary considerably in their design, and their requirements for lubrication will vary accordingly. Engines with lapped pistons and sleeved main bearings will require a heavier concentration of oil in the fuel mixture

than an engine equipped with piston rings and a ball bearing crankshaft. Generally speaking, if you are going to use 70-weight motor oil mixed with gasoline, I would recommend a gasoline-to-oil mixture of 3 to 1 for lapped piston engines; and for engines with ringed pistons and ball bearing crankshafts, this could be reduced to 5 to 1. With a castor oil-based lubricant, the oil mixture requirement could be cut in half for both types of engines.

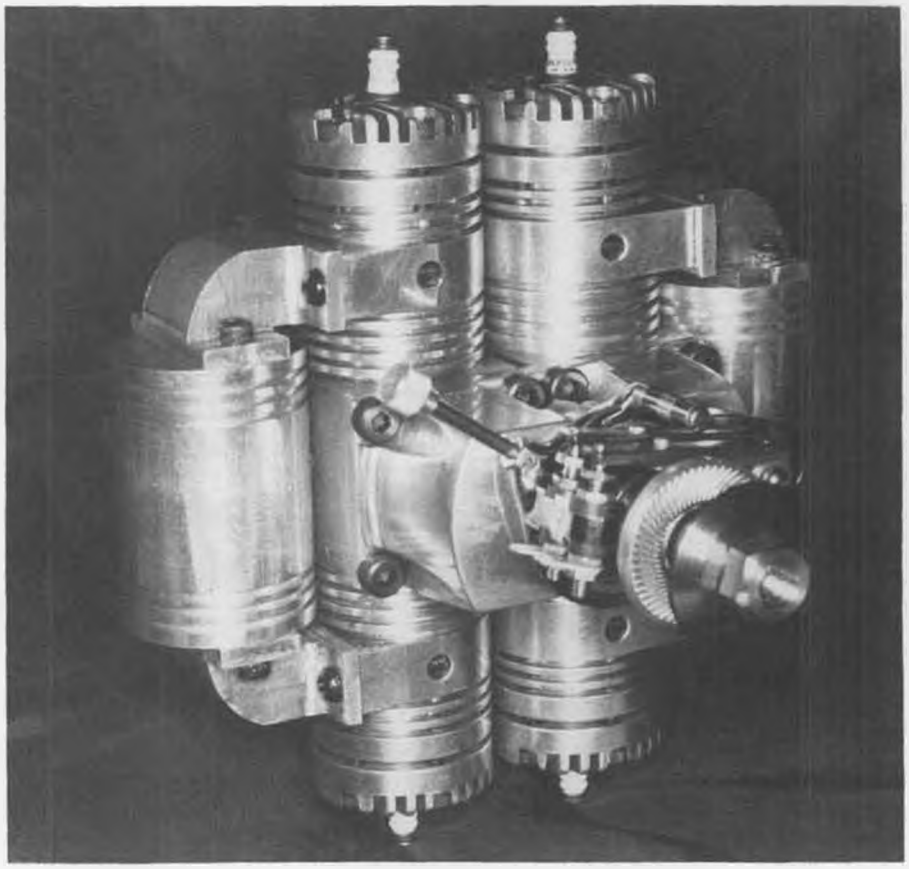
Now, what kind of fuel (gasoline) is recommended for use in model engines? Today, the modeler may go to the local service station to have his one-gallon gas can filled, only to be confronted with a variety of choices such as regular, unleaded, premium, etc. He may also have heard that some modelers have used commercially available lantern fuel (white gas), and 100 octane aviation fuel. Any of these fuels will operate a model two-cycle engine, but some fuels will give better results than others.

Fuels with high octane numbers sound like they will develop more power than those with lower octane ratings, but this is not necessarily so. Octane is a rating scale used to determine the ability of a gasoline to prevent detonation. Detonation is when a fuel explodes, instead of burning smoothly in the combustion chamber. This results in a loss of power and possible engine damage. Detonation is caused by one or a combination of the following: 1) High compression, 2) Advanced spark lead, 3) Molecular structure of the fuel. With the exception of a very few, model ignition engines gain nothing by using high octane fuel, because they don't have a high enough compression ratio.

Generally speaking, an acceptable fuel will have an octane rating of not over 90. It should be a good grade of unleaded gas, free of impurities such as dirt and water. Keep it sealed in an approved container. Also, don't mix more than a gallon at a time. You will be surprised how long it will last you. •

Klause

• During the past several years, we've always felt that we could drop by **Model Builder** headquarters at most any time and be welcome. We don't like to jeopardize friendships like that, but how can we pass up an opportunity like this to open our mouth to change feet? Seriously, though, our goal is to provide you with accurate, detailed, and thorough information on small-bore glow engines and their operation. Where to begin? Well, since the first word of the title of this column is "fuel", that seems like a reasonable place to start.



Otto Bernhardt did an ignition conversion on Alberto Ulrich's 4-cylinder Hiness engine, which is really two separate twins geared together. Dual ignition points. Jim Woods photo.

Fuel is essential to the operation of glow engines, and it is well-known that, in general, it consists of various percentages of lubricants, methanol, nitromethane, and maybe some other secret stuff. Beyond that, there are a lot of different ideas and misconceptions, prevalent among modelers . . . experts as well as beginners. Want to start a good discussion (argument)? Just mention nitro! The extremes of opinions will vary from, "Bad stuff!" to, "If some's good, more's better, and too much is just right!" Actually, nitro is a mighty fine fuel ingredient, *provided that it is used in the right percentage range for the particular engine and atmospheric conditions.*

More about that later. For now, since the labels on most commercial fuels do not provide detailed information, perhaps it will help to provide a list of some popular brands of fuels, together with their nitro content. We'll also add some information on the second most discussed (or cussed) fuel ingredient: lubricants.

FUEL	NITRO	LUBRICANT
Cox Glow Power	10%	Approx. 20%
Cox Flight Power	15%	Approx. 20%
Cox Racing*	30%	Approx. 20%

Note: Cox uses pure Baker AA castor oil as a lubricant. Cox also recommends that Cox Glow Power be used in their cars.

Fox Superfuel	5%	28%
Fox Duke's Fuel	10%	22%
Fox Missile Mist*	25%	22%
Fox 40-40	40%	20%

Note: Fox lubricant consists of 90% castor oil and 10% synthetic. Missile Mist uses a combination of nitromethane and nitroethane. All Fox fuels also have 1-2% propylene oxide as an igniter.

K&B 100	5%	Castor
K&B 100+	5%	X2C synthetic
K&B 500	15%	X2C synthetic
K&B 1000*	25%	Castor
K&B 1000+	25%	X2C synthetic
K&B Super Speed	50%	X2C synthetic
K&B FAI	0%	20% castor

Note: K&B nitro percentages are close approximations.

Magnum 5	5%	Synthetic
Magnum 10	10%	Synthetic
Magnum 15	15%	Synthetic
Magnum 25*	25%	Synthetic
Magnum 50	50%	Synthetic

Note: The lubricant in Magnum fuels is mainly synthetic; however, 3% is castor oil. All Magnum fuels contain a detergent, plus approximately 1% propylene oxide as an igniter.

NITROTANE

These fuels are labeled as Nitrotane, plus a number. The number indicates the nitro percentage. They are available as 5, 10, 15, 20, 25, 30, 40, 50, 60, and 70. Special Nitrotane 1/2A fuels are also available. They

Continued on page 133

IMPBA president Len Skweira won the 1978 Indy Unlimited with his "Crapshooter".

The driver's platform and pit area at the Indy Unlimited. Looks crowded, but is actually set up quite well.

R/C POWER BOATS

By BOB PREUSSE

• This month, let's take a look at some of the major race events that took place in June across the country. We have material on events from the West Coast and Midwest this month. Come on, East Coast boaters, drop us a line and let us know what's happening in your area.

INDY UNLIMITED

On June 3rd and 4th, the Indy Model Power Boat Club hosted the 6th Annual "Indy Unlimited" at the Dandy Trail Lake, on the west side of Indianapolis. This is a pre-registration event, in which the boater registers a frequency and races any class hull. Due to the eight-boat heats, usually the .40's and .60's stand a better chance in the fierce competition.

This year's Indy Unlimited brought the normal quota of 120 entries, with each competitor racing 5 times. There were a total of 75 heats. I think this year's event was one of the smoothest and well run, due to the fact that 3-1/2 rounds were completed on Saturday. The other 1-1/2 rounds were completed early Sunday, and all runoffs, which went through 30th place, were completed by 2:00. Prizes were awarded and all the out-of-towners got a head start home.

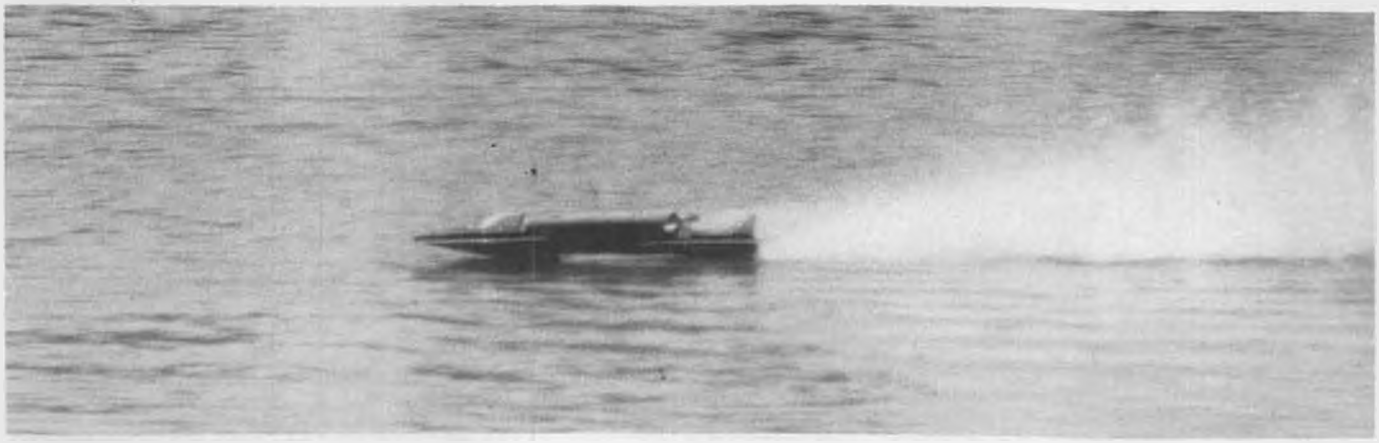
Each contestant was given a racing program listing all heats. Included was the boater's frequency and space to record buoy counts and net score for each heat. This is really a professional program! I talked to several boaters, and they all thought it was great.

Len Skweira, President of IMPBA, turned in a perfect score (2000 pts.) with his .60 Crapshooter, named "Harpoon". Len has won numerous events and championships, but this is one he'll probably remember, as he competed in all types of water conditions. I think it was his fourth heat, maybe the fifth, where the rollers were out in force. Looked even too rough for the deep-vees, but Len hung in there until the finish. Congratulations Len, you deserve it!

The "Indy Unlimited" does not require the constant "pedal to the metal" strategy. That will get you 3 or 4 good finishes, but that DNF will take you right out of the big marbles. It takes a consistent, reliable-running boat. Take any reliable 50-60 mph hull, and you will probably finish very high. You must collect points every heat. This is a perfect event for a fast deep-vee. Rip Holdridge and the boys from Dallas were really storming the course with their Wardcraft boats. My Dumas twin-.60 vee finished 17th, which isn't too

Ben Beaird has twin scratch-built .88's in his Super Gator. Looks mean!

Chuck Morris, of Ft. Wayne, Ind., showed up at Indy with his stand-off scale "Wolverine". It's a .60-powered Dumas deep-vee.



Ben Beaird's Super Gator goes howling across the water. Ben's son, Bud, designed a special cowling for the model. These boats are really something to see (and hear).

bad, because I lost one engine and got zero points in the 2nd heat. What a disappointment, but that's racing.

Two special thank you's are in order. One for the Indy wives who handled food concessions, the Saturday night picnic, etc. Also, thanks to all the manufacturers who helped make this race successful again.

SAYRES MEMORIAL RACE

Now let's move across the country to the West Coast for the 4th Annual Stan Sayres Memorial Regatta, also held the same weekend as the "Indy Unlimited". This event is NAMBA sanctioned, and the participants compete with 1/8th scale unlimiteds. These boats are true to the prototypes in every possible detail. Even though they are classed as stand-off scale, the guys really outdo themselves with the detail.

Once again, the oldie-but-goodie hulls proved that they are quick, like their modern pickle-fork brothers. Bill Osborne, driving the Slo-Motion V, clocked a super-fast 51.13 seconds for three laps around the 950-foot Brown Bowl course. In all, 27 scale boats competed. Ron Erickson dominated the competition with his "Spirit of Dayton-Walther", scoring a perfect 1600 pts. Roger Newton (czar of the scale boaters) pushed his new Miss Budweiser to a very impressive 2nd place. The Slo-Mo took third place, and Gale Whitestine powered the U-55 Lincoln Thrift to a fourth-place finish. The Hamm's Bear and rookie Dennis Caines won the first consolation race, while rookie Gary Duback and his Thriftway Too won the 2nd consolation race. Congratulations to all!

Those of you who would like to see more articles on the scale unlimiteds, please let me know. Those of you who have a scale you would like everyone to see in **Model Builder**, please send me some 3 x 5 B/W photos.

MINI-GOLD CUP

On June 24th, the Wolverine Model Power Boat Club hosted the Mini-Gold Cup for hydros only, on Belle Isle, in Detroit. This year's Mini-Gold Cup was the best attended ever, with 125 entries, including 22 scale boats. A total of 85 heats were run that Saturday, from 8:30 a.m. to about 8:30 p.m. Boy, that is a full day of racing! We had the weatherman on our side all day . . .in fact, for the entire weekend.

The big boats ran on Sunday, and except for the strong wind, everything was perfect.

The Detroit club always puts on one of the best races of the year, and this year was no exception. The only problem was poor frequency spread in each class. Ideally, you want 5 and 6-boat heats, instead of 3-boat heats. A suggestion would be to allow only "x" number of entries on a frequency per class. I think if you encourage boaters to come into a race on some of the lesser-used 27 band frequencies, they will change from 72.

It was great to see and hear the F-hydros compete. Ron Walker really had his twin smoking around the oval. Ron has worked hard on this boat, and it pays to stick with it . . .

Continued on page 138

Louis Durand, of New Orleans, came to Indy with this outrigger boat powered by the brand new OPS .65.

At the Mini-Gold Cup race, Doug Riha's "Miss U.S." got a lot of attention with its Eastcraft Specialty's on-board electric starter system. This is the same boat described last month.

Dick McCoy, left, sponsor of the 6th Annual McCoy Race, and Jeff Rold, Expert 'A' main winner.

The officials area and driver's stand at Thorp Raceway. Photo taken at the McCoy race.

R/C AUTO NEWS

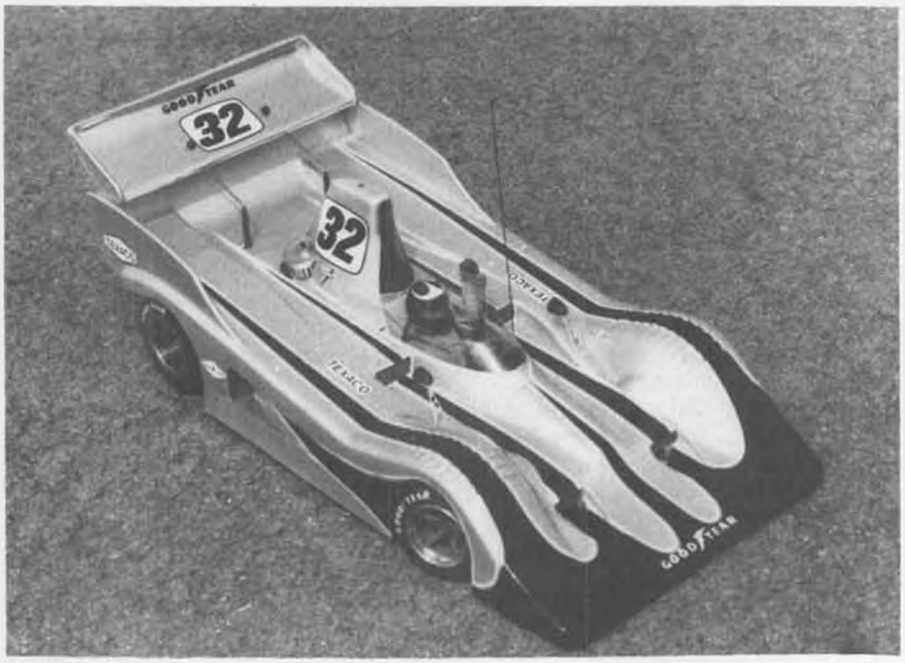
By CHUCK HALLUM

PHOTOS BY AUTHOR

• The 6th Annual McCoy Race was held at Thorp Raceway, in Pomona, CA, on June 10 and 11, 1978. The race had a two day format for the first time . . . and with 110 entries, it was a good thing. Entrants came from the San Francisco Bay area, Arizona, Nevada, and Washington state. Racers started arriving Tuesday and Wednesday, and most were there practicing Friday. There were two practice sessions and one qualifying heat on Saturday, and one practice round, the second qualifying heat, and A and B mains in four driver classes on Sunday.

Jeff Rold went home the big winner (by 2 laps) in the Expert A main, but Curtis Husting, Bob Welch, Bill Jianas (T.Q.), and Gary Kyes (possibly myself, too) turned in good performances. In the Amateur A Main, Mike Kimrey and Dana Smeltzer (T.Q.) put on quite a race, with Kimrey winning, and both had four laps over the rest of the field. Bill Watson looked good until he went out with a steering servo problem. There was also quite a race in the novice class between Randy Smeltzer and Dick Rold, with Randy winning, but Mike Reedy (Novice T.Q.) looked like he might be a winner, until he went out. Little Barry Grossenbacker was really driving well, and will be a driver to contend with in the future.

The competition concourse winner, Chuck August, from Phoenix, I believe, also won the Beginner A main. August ran a smooth race and stayed out of trouble with a consistent running car to hold off Joe Sortillion Jr. and Willie Green for the win. Chuck did some interesting things to his car to make it quite scale-appearing, such as making the side scoops functional, a scale-appearing driver with removable helmet and a very scale-like paint and number job.



Chuck August, of Phoenix, won concourse at McCoy race with his Lola. Nice detail and driver.

Watching these races is as much of an experience as running in one. It's great to see racers like Dick Rold and Mike Reedy becoming really good drivers, and the Smeltzers (Dana and Randy) improving rapidly. Then racing against the youngsters (they are when you're as old as I am), Jeff Rold and Curtis Husting, and feeling the pressure and watching them get better and better and super-consistent. Watch these two, on any corner . . . or the whole track . . . and you'll see what I mean.

Bill Jianas "The Greek" is still super fast; he was top qualifier and set a track record. But the competition was stiff in the expert class, and lots of racers were up and ready, as evidenced by the drivers who only made the B main . . . Bob Titterington, Gene Husting, and Ken Kimbrow (the first three finishers), and a bunch of big names who didn't make the program.

The Expert A main may have looked like a walkaway for Jeff Rold. Soon after the first pit stop, he had a one-lap lead over the field! Near the start, I was knocked upside down on the inside left of the track and lost a lap waiting for the turn marshal from the back straight to right me. During the race, Jeff got behind me once, hung there for about a lap until I hit a corner marker and bobbled . . . then he went by and just disappeared. Curtis Husting, Bob Welch, and Bill Jianas all passed me, but each encounter was a race in itself for several laps, before and after the pass. So, the finishing order seems to represent quite well how fast the

cars really were in the race that day. Once, Jianas tried to make a pass by ricocheting off me to make a turn, but went into the infield, hitting Bill Steele's car which was pitting for fuel.

To me, some new ideas were as interesting as the racing that was going on. One of the most interesting items was the pipe/muffler that Rich Lee has been working on. We saw it at the first '78 So. Cal series race, but Rich has already gone through a couple of variations. Butch Kroells has been running another of Rich's pipes. The latest variations have the stingers coming out the side of the large part of the pipe. Subtle changes to the expansion, straight, and contraction sections supposedly alter the torque/rpm curve. Rich Lee's pipe (pictured) is set up to give good mid-range power, as well as reasonable top end. The pipe on Butch's car is tuned for the top end . . . and has a slight power loss in the mid-range.

OK. Now, how do the pipes perform on R/C cars? All I can say is that the pipes perform almost as well as stock McCoy and Thorp mufflers. It's difficult to say if they are really better or worse than our current mufflers. They are certainly a lot quieter. Once I went over to Rich to talk to him about the muffler . . . he was setting the idle, and I didn't notice that the engine was running. That's quiet! Some of Rich's other mufflers have larger diameter side stingers, and they are noisier, but still probably less than 80 db at 10 meters. (At the next So. Cal. series race, several cars showed up with Lee pipes. But again, direct performance comparison is difficult. Old mufflers had positions 1, 3 and 5 with pipes 2, 4, 6, and 7. But 5 also only ran a 40 carb vs. 60 or 61 pumpers on all the rest.)

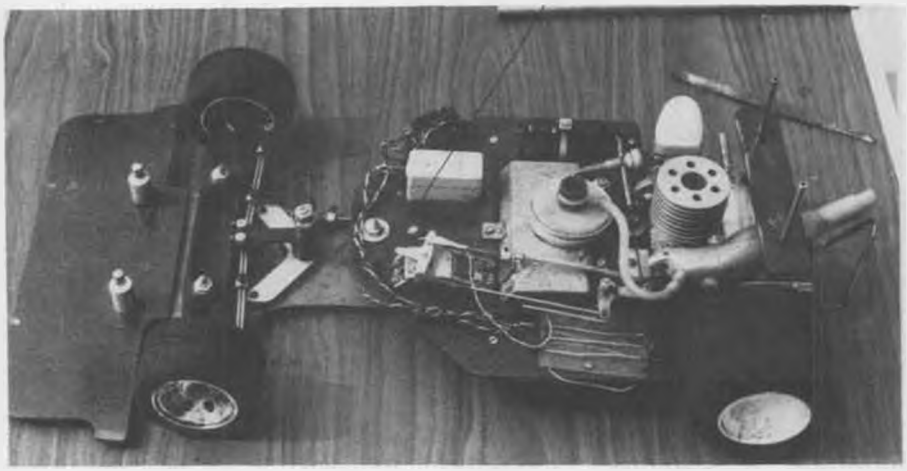
Also, one car that I was aware of was running a prototype McCoy muffler at the McCoy race. And it certainly did not appear to be lacking in the horsepower department. Dick is playing around with a dual-chamber type of arrangement and is getting good results. The McCoy muffler has the external appearance of the European type mufflers and uses the elbow section of his old muffler.

A new MRP 1/8 scale chassis was used at the McCoy race and did very well. Gary Kyes, with his aggressive throw-it-around-the-track style, was second top qualifier, and Bob Welch also qualified for the A expert main. A fiberglass chassis plate is used in conjunction with the existing power pod and plastic front beam axle. The radio layout on Kyes' car (pictured) was neat and low, but some kind of a rear bumper is definitely needed for protection.

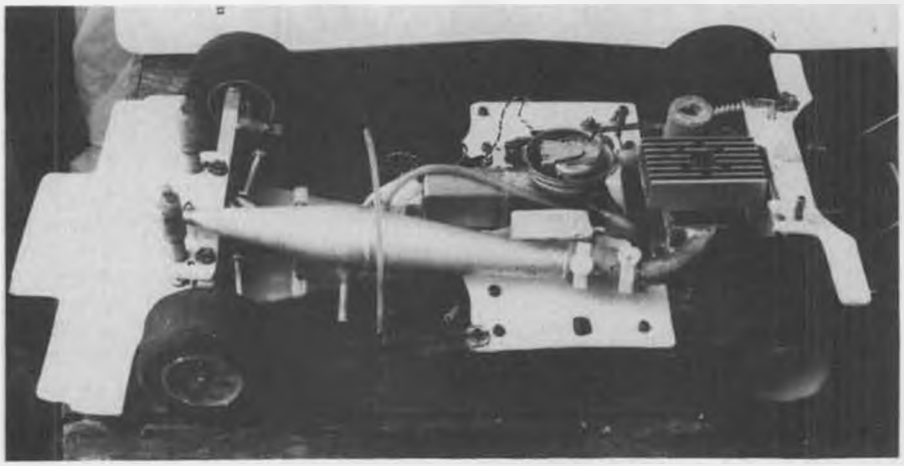
Another thing that a few racers are playing with is the clutch arrangement. Bob Titterington has been running four quarter-circle shoes (and four pivot pins) with no springs. Two shoes give quite a bit of slip and lots of low-speed controllability. Unlocking the other two shoes gives much earlier clutch engagement and lock-up. This clutch arrangement seems to be working well for Bob. Sorry I didn't get any pics.

A prototype Kraft transmitter, designed for 1/12 scale cars, was shown at the McCoy race. It was a simple, neat package. The transmitter size was about 7 x 7 x 1-1/2 inches and it was light. There was standard (Futaba, Deans) placement of controls

Continued on page 110

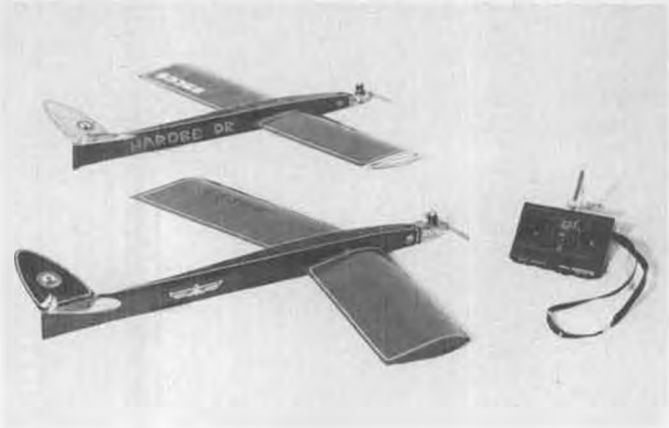


Gary Kyes' car uses the new MRP fiberglass chassis. Rest of car is conventional.



Rich Lee has been experimenting with tuned pipes, latest version is shown above. Many are now being used in So Cal.

Jeff Rold drove this Elfin to victory at the McCoy race. It was the fastest car in the mains, too.



Stan Jonutis designed these wild-looking 1/2A pylon racers, which he calls the "Harobe". Model uses only one aileron.

Midwest has just released a kit for Russ Sandusky's "Super Mouse", designed for AMA Class II Mouse Racing.

The 1/2-A SCENE

By LARRY RENGER

• A couple of neat people have combined their talents to bring you a super product for small model flying. Bob Novak, previous owner and designer of the RS radio, and Dick Rehling, owner of D & R Products, have together worked up the design for a new servo, the "Bantam Midget". Compared to other midgets, such as the Dunham or Kraft, I feel it has some outstanding advantages. Dimensionally, the Bantam is smaller than the Dunham with its required mounting tray. Although larger than the Kraft KPS 18, since the Kraft only works with its own receiver, you can end up with a lighter system with the Bantam Midget. For example, Kraft's smallest, lightest 4-channel airborne system comes to 6 ounces; 4 Bantam servos, Mike Dorffler's receiver, built as a 4-channel (Royal Electronics kit), and 100 mah batteries come in at 1/4 ounce less!

The Bantam turns out to be one of the smoothest, fastest, and most powerful servos available, independent of size. It has 21 in./oz. of torque, while still traversing 100° in .3 sec. That's both over twice as powerful and twice as fast as other mini-servos! Mounting is a solid, four-grommet system integral to the case. You can select any case color to match your system, from orange, white, black, red, blue, yellow, or ivory. In addition, the servos are supplied with your choice of connectors to match whatever system you use. Bob sells the servos direct or through dealers, at $29.95 built, or $26.95 as a kit. Order from Novak Electronics, 1915-A S. Evergreen St., Santa Ana, CA 92707. Oh yes, one final item; Bob also sells battery packs in sizes from 100 mah up to 450 mah. Check with him for prices.

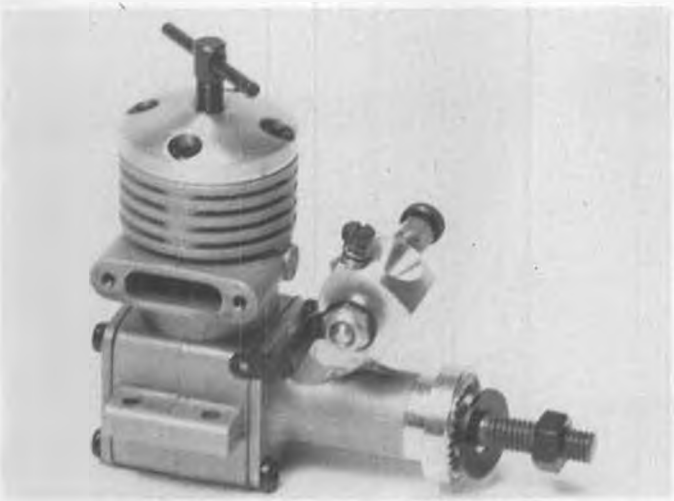
My QB-10L is being built as a 4-channel, and I found that these new servos fit exactly across the fuselage. Installation was really simple, as I just epoxied one rail to each fuselage side. The servos are small enough, also, that the aileron servo does not need to extend below the wing's lower surface at all. That eliminates the ugly bump that the design usually features. I have to finish that airplane soon, as I have six engines to test in it!

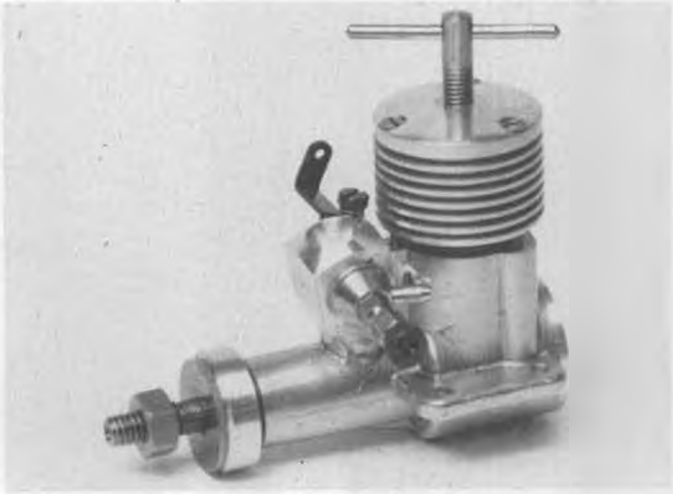
If you are wondering what to put four of Bob's new servos in, how about an AT-6 Texan? Flight Dynamics, Inc. has added another kit to its line of WW II models. This .10-size model has interesting possibilities. What if a bunch of guys built them in scale racing colors and held Texan races, just like the real ones! Another thought is to modify the kit to duplicate the modified Texans used to simulate Zeros in the movies "Tora Tora Tora" and "Black Sheep Squadron". That would be an unusual scale model indeed!

You just know there isn't going to be any problem with mounting the engine and radio gear in this model. That fuselage is rather big, and the front end is as wide open as the state it was named after. It's sure nice to see pilots in a scale model! An

Novak Electronics has just come out with a new mini-servo, the Bantam Midget. Very impressive performance. See text.

Also new from Midwest is the AXIFLO 1/2A ducted fan kit. No difference in thrust between fan and regular prop!





A throttlable diesel? Why not? Dave Shipton, of Hobby Hideaway, has been adding Tarno carburetors to some of the .09 diesels that he sells. On the left is the Kingcat, and on the right is a P.A.W. 1.49 cc engine. Other brands, both larger and smaller, are also available.

empty cockpit looks empty in the air for a remarkable distance.

Now that you have the radio and plane, how about an engine? Dave Shipton, of Hobby Hideaway, has recently been adding Tarno Carburetors to the .09 diesels he sells, as a special service. The two engines shown are the classic P.A.W. 1.49cc (.09) diesel ($35.50 w/throttle, $22.50 without), and Kingcat diesel ($41.00 with throttle, $28.00 without). There are lots of other diesels of both larger and smaller sizes to select from, too. I would expect that an .09 diesel with, say, an 8 x 4 prop, would haul that Texan around "jes fine".

The next model is one which serves a rather specialized function. Russ Sandusky is a successful competitor in a broad variety of U/C events, but he has done some special development in 1/2A racing categories. Midwest has just released Russ' "Super Mouse", a highly competitive model for AMA class II Mouse Racing. The kit features both balsa and hardwood parts . . . some die-cut, some machined. Landing gear is pre-formed, and even a wheel is included. As we have come to expect from Midwest, the bellcrank, pushrod wire, leadout wire, engine bolts, and decals are also included.

So, unlimber your best Tee Dee .049, add some high-nitro go-juice, and put one of these racers in the air, if you dare. I've found that I get dizzy flying U/C the first few times after a few month's layoff. Maybe you better start with low-nitro fuel and a low pitch prop for the first few flights, if you aren't used to go-fast machines. A fast 1/2A racer can get you going around awfully fast for a distressing length of time.

As long as Midwest Products is the topic, here is a look at the parts in their new AXIFLO RK .049 ducted fan unit. This is the power unit which goes in the Douglas A4D Skyhawk model mentioned last month. You can, of course, design your own models around this compact unit (and I hope lots of you do and send me pictures!). The engine of choice is, of course, a Tee Dee .049/.051. This kit is designed to require only assembly, as all parts are either molded or machine cut to give a good fit. Since small clearances are critical for high efficiency in ducted fans, this puts a good power source within the reach of the average builder.

Midwest quotes very impressive performance figures, with a static thrust of 16 ounces, on a Tee Dee .049 running at 20,000 rpm on 25% nitro. Just for reference, that is the same thrust that I would expect from the engine on that fuel with a 6 x 3 prop! I don't know how they do it, but then, who cares, as long as it works.

Special features of the AXIFLO kit are a jig for proper stator alignment, a glass-filled nylon motor mount, and a tail cone designed to also serve as a 1-1/2-ounce fuel tank. With that much fuel capacity, you could increase the nitro to 50%, and *really* get some rpm without too short a flight. Hmmm, I wonder to what rpm limit the fan is stress designed?

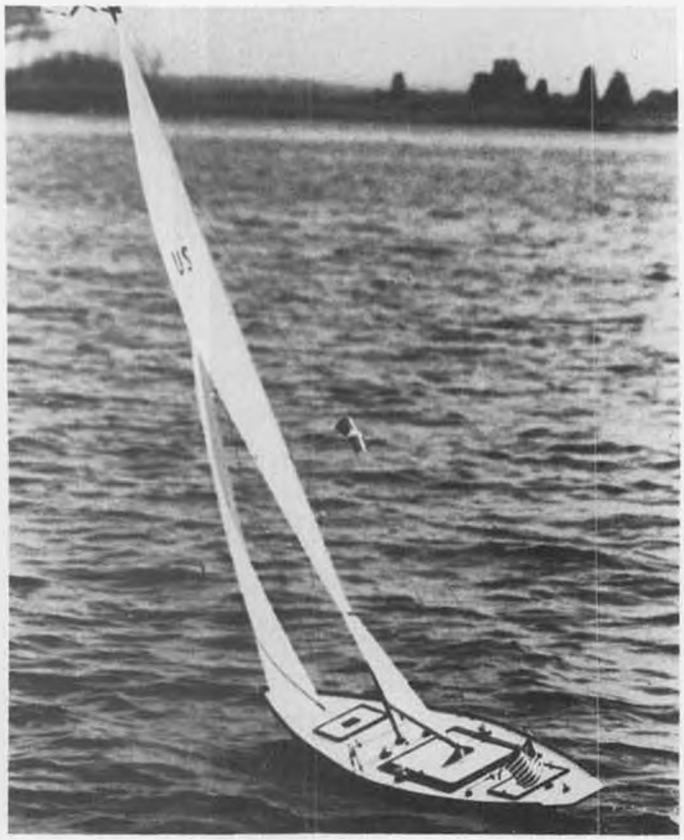
Final airplanes for the month are a couple of 1/2A R/C racers, submitted by 1st Lt. Stan Jonutis (PSC Box 2852, MAFB, MT 59402). Stan shows us his two latest versions of a model he calls the "Harobe D". Features he has incorporated in these models are the absolute minimum cross-section fuselage which will still hold a radio, unusually long tail moment arm for smooth flying, and a 140° V-tail with elevator action only. Stan uses only one aileron, that one being on the right wing. His power preference is a Robart Pumper-boosted Tee Dee .051, with a 5 x 4 or 5-1/2 x 4 prop and 30% nitro Cox or 40% nitro Fox fuel. The engine mount is built up from 3/16 ply, to allow streamlining while accommodating the pump behind the engine. By the way, that blank background in the photo is not achieved by fancy lighting and careful retouching; those models are sitting on snow! I told you Stan lives in Montana; they grow a lot of that white stuff there.

BEGINNER'S WORKBENCH

This month, I'll continue talking

Continued on page 119

A new kit from Flight Dynamics is this AT-6 Texan, designed for .10-size engines (how about one of the diesels shown above?).



All of the photos on these two pages, of magnificent J-Class boats, were furnished by Class Secretary, John Garbarino, Mystic, Connecticut.

STRICTLY SAIL

By ROD CARR

• A lot of the skippers on the rolls of AMYA were first attracted to model yachting by the "modeling", rather than by the yachting. Though AMYA has had a very strong affinity toward racing, it has nevertheless maintained a consistent posture of encouraging any and all varieties of model yachtsmen. Notable in this regard is Wally Gitchell, who has served as OPEN Class secretary for years, and who has pioneered the events of that class' annual championship event. Wally is always proud to report that, when the OPEN Fleet takes to the water, no boat looks like any other!

Now the J-Class has taken on that flavor of adherence to scale. There is more emphasis on the building of the vessel, but with the promise that they will be raced head-to-head after launching. The class has languished during the past year without a Class Secretary at the helm. Now, John Garbarino, of Skiff Lane, Mason's Island, Mystic, CT 06355, has taken the helm. He has proposed a revolutionary set of new rules, and has asked each J-boat owner to comment on them in a straw ballot. The following are the materials as sent to each owner, and finally, excerpts from a letter from John to me, after I had commented favorably upon the delightful breath of fresh air he was bringing to the class. The photos accompanying this article are all from John's camera.

"Dear 'J' Boat Class Member:

"I have been appointed by Dick Hein, AMYA President, to be the Acting Class Secretary of the 'J' Class to try to revive it again. In 1977 the number of registered members fell, no ACCR was held, and there was no Class Secretary. For these reasons the 'J' Class is no longer considered an active class by the AMYA.

"It is my intention to reactivate the class and I need your help. First, I wish to define the class and have a set of specifications adopted by the class members. Second, I plan to hold an ACCR through the Mystic Model Yacht Club in 1978 to bring it to an active class again.

"Please note that all applications for registration in a class of the AMYA are now handled by the Class Secretary instead of the AMYA Secretary. If any of you have not received 'Hull Stickers' yet please let me know and I will provide them. These hull stickers are to be attached to the inside of the hull in plain view through the hatch opening. Once the sticker is attached that number will stay with that boat forever.

"Attached is a sheet describing what I think the 'J' Class should be defined as. The other sheet is the specification sheet which I am proposing to you for adoption. Please return the bottom part of the Specification Sheet with your vote so that I may send them to Bob Crysler for tabulation.

"I am open to ANY and ALL comments concerning the 'J' Class. Thank you for your help."

"J" CLASS DEFINITION

"Basically, I believe that the 'J' Class should be free of as many restrictions as possible.

"I believe that the person that becomes involved with the 'J' Class is not the ordinary modeler. The boat is large and expensive. Therefore I believe that there should be room for innovation within a general framework.

"First the class must be consistent with the existing models and allow room for future models. At this time there are basically two models in existence and they are the 'Whirlwind', by Chuck Millican and the 'Enterprise', by Ken Comeau. Both

of these boats are of the same scale which is 3/4 inch = 1 foot. Both boats have been raced in informal competition and they are equal. The proposed specifications are consistent with both models.

"During the 'J Boat Era' there were a total of 10 boats built in this class. They were: Enterprise, Weetamoe, Whirlwind, Yankee, Rainbow, and Ranger for the U.S. and Shamrock V, Velsheda, Endeavour, and Endeavour II for the British. I feel that this should be the general framework for the model 'J' Class. Basically any model scaled after one of the original 'J's with a scale of 3/4 inch = 1 foot should be allowed to participate.

"The attached Specification Sheet is based on the above with a few exceptions which I feel are necessary to make the transition from a standing scale model to an operating scale model.

"Please vote on these specifications as it is necessary to define the class for the AMYA. Thank you."

SPECIFICATIONS FOR THE AMYA "J" CLASS, as proposed by John Garbarino, Acting Class Secretary

HULL

a. Must be a scale model of one of the original "J" boats.

b. Scale must be 3/4 inch = 1 foot.

c. EXCEPTION: The keel draft can be 2 inches deeper than scale to help the stiffness of the model.

MAST

a. Height: 8 feet (+ or – 2 inches) from the deck.

b. Material: Wood or aluminum.

SAILS

a. No restriction on sail area.

b. Any sail plan that was used by the original boat for which the model is scaled after (i.e. double headsails, genoas, spinnakers, etc.).

RUDDER

a. Must conform to the original boat from which it is scaled after.

b. EXCEPTION: The rudder may be 2 inches deeper to follow the extended keel and 2 inches wider to provide extra maneuvering control.

The following is most of the letter I received from John Garbarino.

"Here is the information you requested on the 'J' Class as it stands now. I was appointed acting class secretary this year and the first thing I wanted to do is set up some specifications for the class. Chuck Millican, when he started the class with his Whirlwinds, wanted a one design class but nothing was ever formally done about that. I gather that he is not happy with the AMYA and has not been a member for a couple of years. The class was established because the required number of boats were sold and registered with the AMYA. Since then very few of the members ever renewed their memberships so now there are only 16 people who are still current AMYA members and I know some of them no longer have their 'J' boats. Because the class seemed to fizzle, the owners lost interest.

"Here in Mystic we were building a model of the Enterprise 'J' boat about the time Chuck was selling his. Of course we were not allowed to register ours as a 'J' at that time even though they were compatible boats. Our initial reason for building the Enterprise was for our own private use but as time went on people kept asking us to build them a hull. We now have 14 or so Enterprise hulls out.

"The specifications that I wrote for the 'J' class were designed to incorporate the few remaining Whirlwind owners and the Enterprise owners into a class so we would have some numbers. To fur-

Continued on page 135

R/C FORUM

With

Hal deBolt

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

Mail in your questions or concerns.

• This column seems to be off and running quite well now. It always takes a few tries to get organized and find out just what you people wish to discuss. We have had quite a few "appreciation" letters from R/C'ers who had problems and who found some clue to the solution to their troubles in this column. It was a pleasure to be able to answer their letters.

A couple of the letters contained questions that we hear quite often . . . obviously, these questions concern many people, so we will try to shed a little light on these subjects this month.

We received a very nice letter from Carl Bock, of Bloomington, California, who found some good in the "servo pot story". His R/C system did not have the "best" pots, but it did have one of the substitutes that have been used for the "faulty" types. It was surprising to hear from a number of other fliers who actually found faulty pots in their systems. It pays to take a look-see.

Carl's further questions bring up an interesting point that bears discussion. In all of the advice that an R/C'er gets, he is told over and over to be aware of vibration, the number one enemy of his radio. The advice goes to great lengths to describe how to install the R/C equipment to isolate it from vibration: however, there is obviously a limit to how much isolation you can attain. In many of the smaller models, it becomes extremely difficult to have even the minimum amount called for, and problems can occur as a result.

The real answer to vibration would be, of course, to eliminate the vibration. However, if we are going to use a model engine to fly with, we are going to have vibration, and the question becomes, how much is tolerable. Our engines vary greatly in size and operation, so the *amount* of vibration and the *type* of vibration can be different. Vibration varies between different makes and designs of engines, even though they may be the same size. Some engines simply are designed and built to run smoother than others, and we should be aware of this.

One question has been, can any mechanical problem turn up in an engine to create unusual vibration. Normally this would not happen, if the engine is in good condition and has not been broken and worn excessively. Of course, should you bend the prop shaft, or if wear has occured in the shaft bearings, vibrations will show up. Sometimes it can be caused by a less obvious source. After much usage or a few lean runs, the piston and cylinder liner can pick up some so-called "varnish", which can cause the piston to be "sticky" while running, which, in turn, can upset the balance of the engine. These are not always obvious causes, and should you suspect some engine problem is creating abnormal vibration, you would do well to have the engine serviced and the problem cured.

How can we observe vibration in the model and determine what level it is at? The amplitude of engine vibration varies with engine size, of course. Obviously, the amount of vibration created by an .049 engine will not be as great as that of a .60. As a result, we would expect the problem to be less with the smaller engines. Probably more important than engine size is the rpm, or operating speed of the engine. The best example is any size engine, at its idling speed and when wide open. Most any engine creates practically no vibration at idle, yet has some amount at full throttle. RPM creates vibration.

Engine vibration should be checked at the maximum rpm expected from the engine. It should also be checked in *flight*, which is almost impossible for us modelers to do. However, we can simulate flight conditions by running the engine on the ground with a smaller prop than what will be used for flight. Any vibration check that is made should be done with a smaller-than-normal prop. Any vibration has a frequency, caused by the number of times that the piston moves up and down. The higher the rpm, the higher the frequency. Our sense of feel can be used to determine the frequency and judge the amount of vibration.

The smaller engines, and the racing types, turn at much higher rpm's than do the average sport and pattern engines. When the rpm gets to the 18 to 25 thousand range, our sense of feel responds exceptionally well to vibration. At these rpm's, an engine creating excessive vibration will actually sting your fingers. The procedure for a vibration check would be to hold the model near the engine mount, or the nose of the airplane, or grasp the engine's needle valve. With the engine at full throttle, if your fingers feel a sharp sting, vibration is probably excessive. You should feel some vibration, of course, but the main thing is whether it feels uncomfortable. A Formula I aircraft is rather small, yet uses a very powerful, high speed engine, and you would expect it to vibrate. Even so, a Formula I aircraft, when operating properly, will *not* be uncomfortable to hold. With this as an example, you can see that any other sort of aircraft should not be uncomfortable to hold, either.

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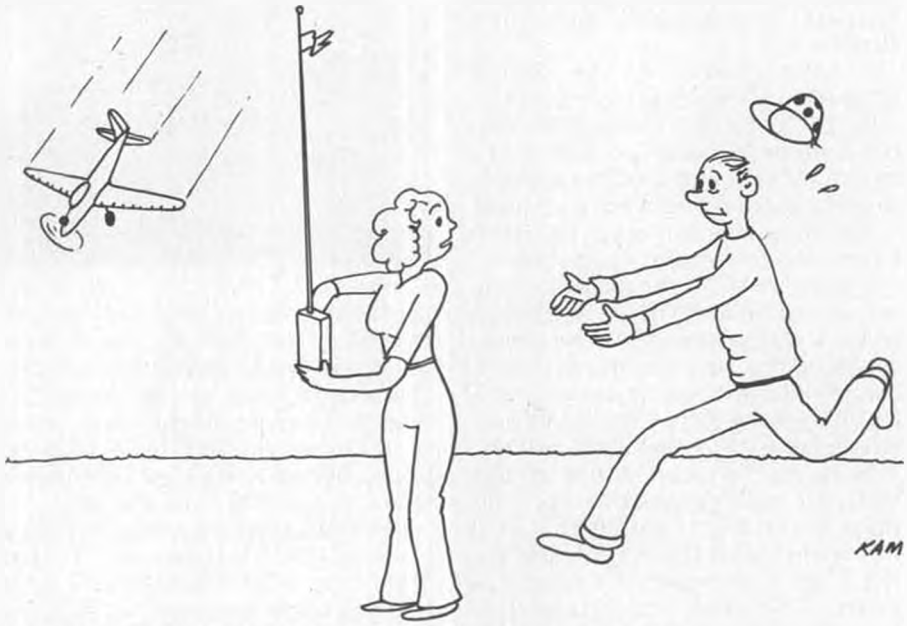


"But if I push the little lever up, the plane should go up, shouldn't it?"

The Afternoon Delite is a fast, maneuverable slope soarer that just might make a good slope racer, with some extra ballast. The model will fly in very light wind, due to its light (25 oz.) weight. Nicely-rounded fuselage is not hard to make, and is well worth the little extra work involved.

"Afternoon Delite"

By RANDY WRISLEY . . . This small, highly maneuverable slope soarer is light enough to stay up when the others won't. When the wind gets to blowing real good, put in lots of ballast and hold on tight!

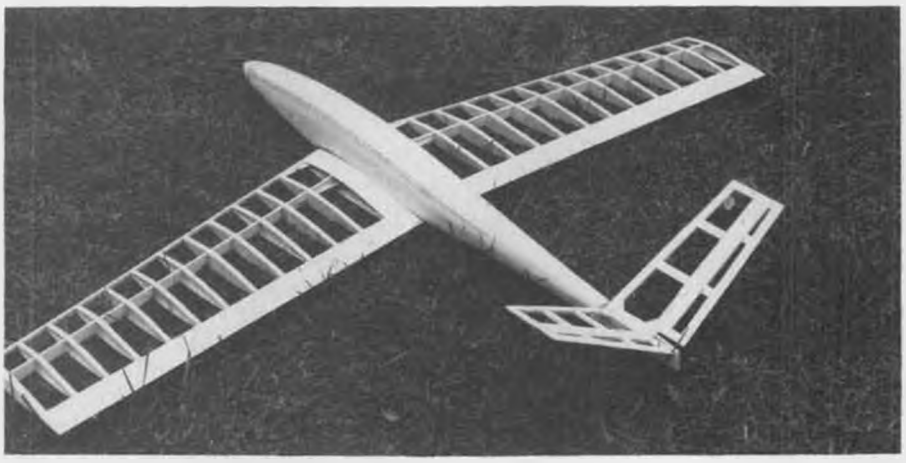
• You say you like the looks of those sleek, jet-like, fully aerobatic slope soaring gliders you see on the hill on windy days? And you'd like to build one, but the wind never blows more than 10 mph, and your pocketbook squeeks when you open it? Is that what's bothering you today, Bunky? Well, lift your head up high and read on! *Afternoon Delite* flies well on light-wind days. Mine cost under 25 bucks, including the covering material. The prototype weighs 25.5 oz. ready to fly. On windy days, you can add lots of ballast without fear of overstressing the airframe. It's even small enough to carry assembled in your car. Construction is simple, so let's get started. About the only way you'll get to fly one is to build one! Ready, here goes. . .

WING

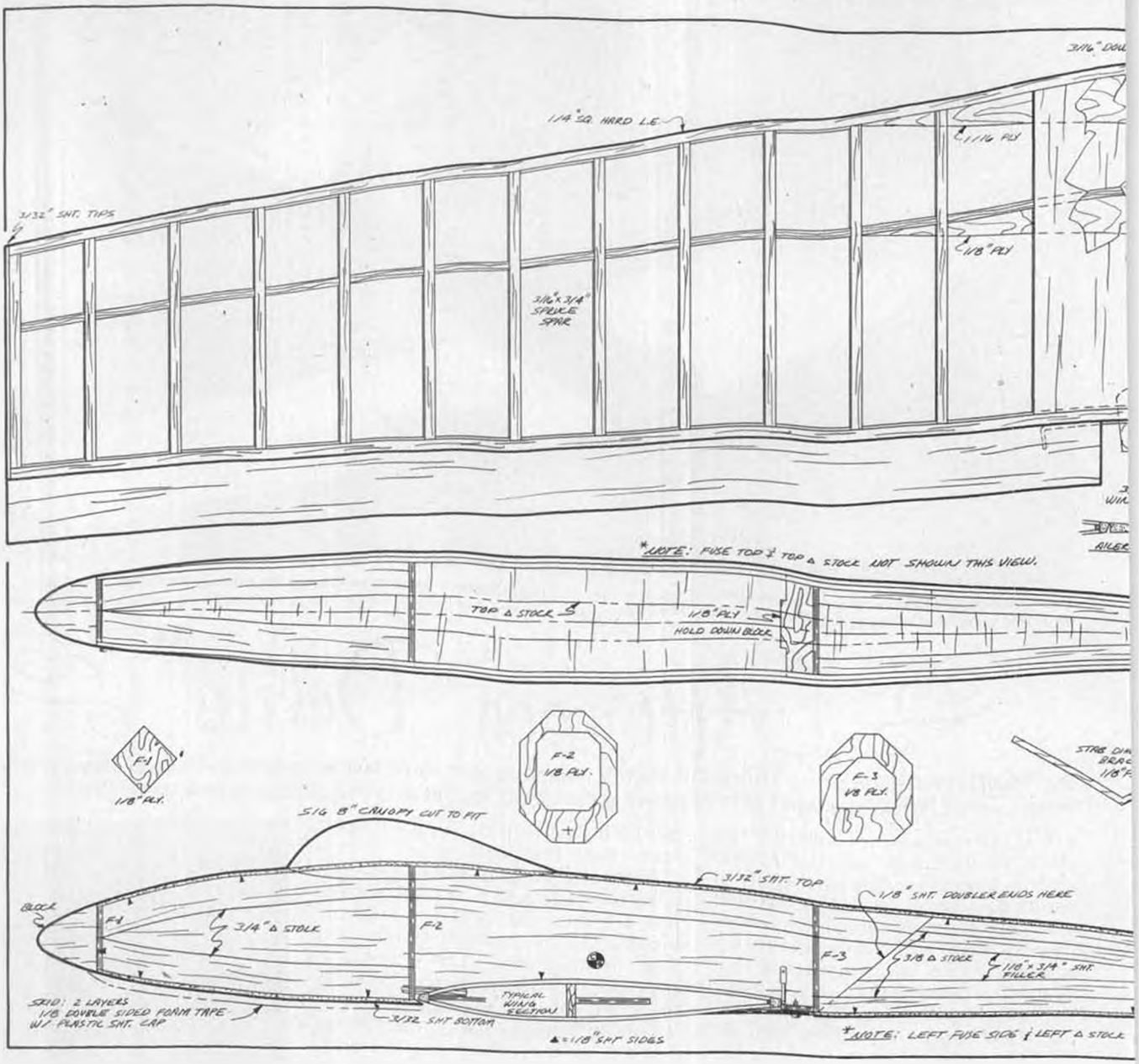
To begin construction, collect the necessary bits and pieces. Cut the l.e. and t.e. to the proper angle. Follow with the 3/16 x 3/4 spruce spar. Hot Stuff the 1/16-inch centering strips to the l.e. and t.e., as shown. Pin the spar down on the plan. Follow with the l.e. and t.e., which are pinned a 1/4 inch off the board on small blocks. Cut the sweepback braces from the correct size plywood, and install them on the l.e. and spar. The ribs are nothing more than 3/32 x 1/4 balsa capstrips. Cut these to size, roll over the backside to impart a curve, and install with Hot Stuff.

Once the top is done, flip the wing over and add 3/32 of an inch to the 1/4-inch l.e. and t.e. support blocks. Do the bottom just as you did the top. The center section sheeting is 3/32 sheet, applied with the grain running chordwise. Note: If you fly from a rocky area, do the bottom of the center section with 1/16 sheet, and face that with 1/32 plywood. Remove the wing from the board and Hot Stuff the 1/32 vertical grain webbing to each rib. Cement the 3/32 tips on and sand the structure to shape. Cut a slot in

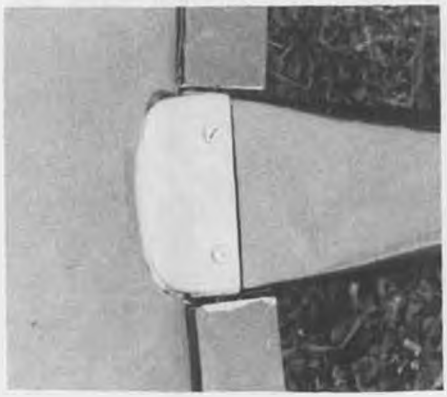
The Afternoon Delite doing what it does best . . . flying up a storm.



Ready for covering. Note the unusual rib construction. For racing, beef up the wing (to withstand mid-air collisions), and go pick up your trophy!



the top center section sheeting and epoxy the 3/16 hold-down dowel in place. The ailerons are cut from 3/16 balsa. Sand to a taper and angle the bottom of the t.e. for clearance. Horns can be installed now, and the ailerons fitted to the wing.



Wing hold-down detail. Uses dowel at l.e., two screws at t.e.

STABILIZER

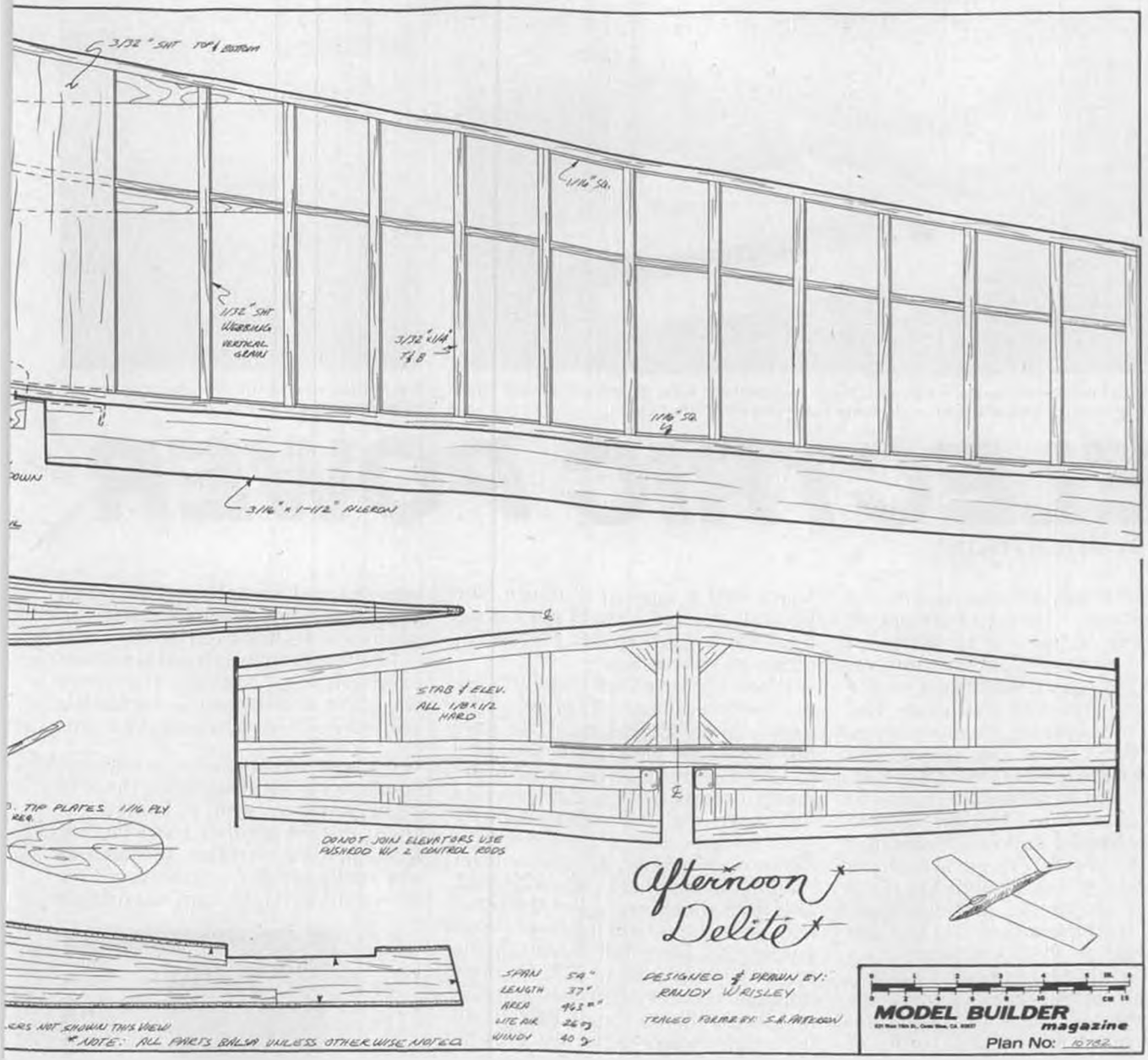
Nothing much to say here. Build the tail as a complete unit. Cut in two, raise one side, and install the 1/8 ply dihedral brace. Some Hot Stuff, dropped onto the brace, will stiffen the assembly. The tip plates are cut from 1/16 ply and are installed after covering.

FUSELAGE

Cut two sides from 1/8 med. balsa. Doublers of 1/8 balsa are cemented to the sides, followed by the 1/8 x 3/4 balsa filler pieces. Remember that the filler pieces taper to nothing at the tail. Now comes the triangle stock around the edges. Use 3/4 and 3/8 stock, as called for on the plan. Should you have trouble bending the pieces, make relief cuts on the inside edges. With the sides over the top view, install F-3. Follow with F-2, and finally F-1. Sheet the top of the fuselage with 3/32 balsa, from F-3 to F-1. Once dry, remove from the board and sheet the bottom. Install the 1/8 ply hold-down block.

Fit the wing to the fuselage and install the 3/32 ply hold-down on the bottom of the wing. Don't forget to leave room for the aileron horns.

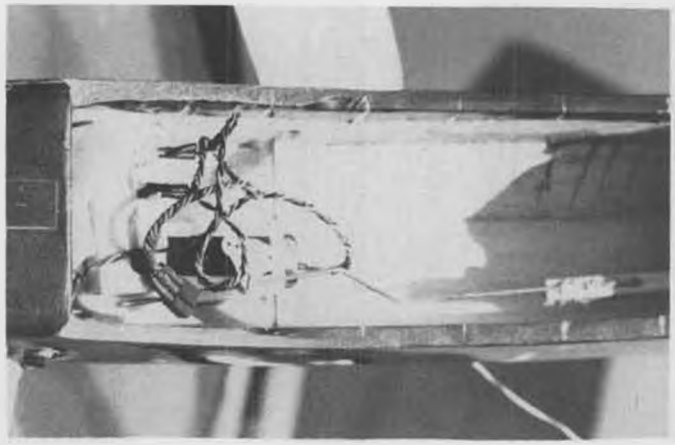
Separate elevator pushrods tie in to a common pushrod going to the servo.



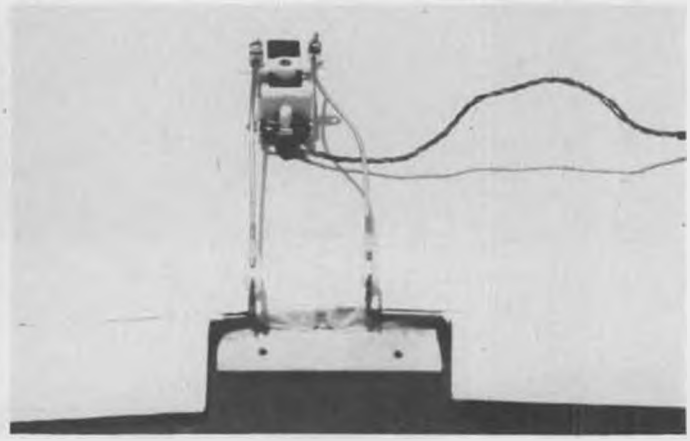
FULL SIZE PLANS AVAILABLE – SEE PAGE 144

Temporarily fit the stab to the fuse. and make up the elevator pushrod. Use two Kwik-Links and route one out each side. When the action of the elevators suits you, remove the stab and sheet the top of the fuselage. Add the noseblock and start shaping the fuselage. Use a razor plane, and carefully round the nose. The part over the wing has rounded corners and all points aft are round, or nearly so. Sand with 220 grit paper, and use a tack-rag to remove dust before covering.

Continued on page 113



Radio compartment. Elevator pushrod wire is bent in order to clear the aileron servo.



Aileron servo mounting. Servo is offset to one side to clear elevator pushrod. Wide, full-span ailerons are powerful!

Mitch Poling has been successfully flying his Astro 15-powered "Astro Sport" off of Lake Washington, in Seattle. He uses the lightweight foam floats made by Sure Flite.

Start of the takeoff run. The model is not quite up on the step yet.

ELECTRIC POWER

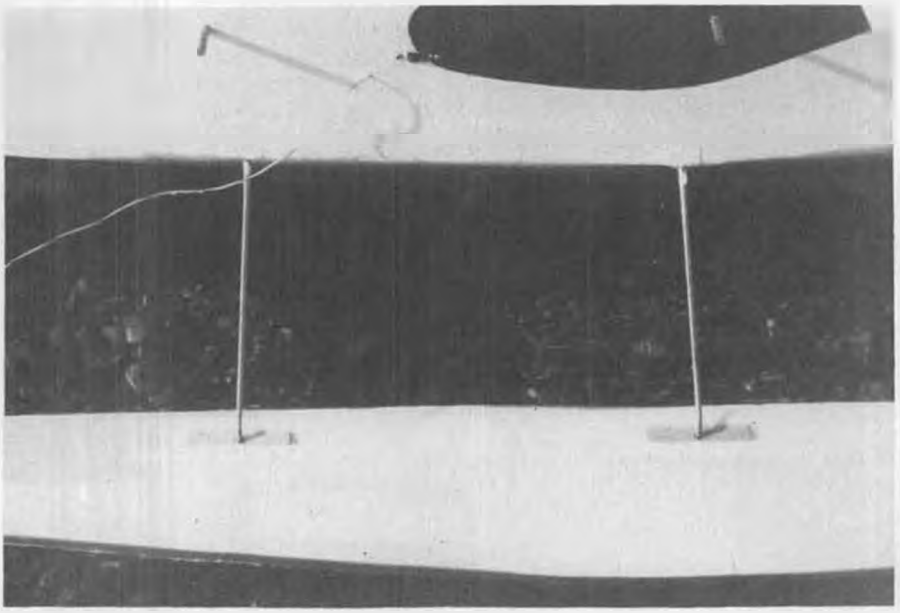
By MITCH POLING

• June and July are bad months for me, because I have to cut back to practically no flying at all. Instead, I do a lot of sailing and boating on Lake Washington. Why? I get severe hay fever, and both the power and glider fields are nice, beautiful grass, doing their thing. So, out to the water, where the pollen isn't so bad. But this year is different! Thanks to the excellent article by Don Foster in the July **Model Builder**, "Seaplanes Aren't All Wet", I can get away from it all and still enjoy my hobby. Don made it all simple, and that's my level! I read the article and realized that I had an ideal candidate for a seaplane, the Astro Sport, which I designed for the Astro 15. It is lively and maneuverable, ROG's well, and can carry up to an extra 3/4 lb. of weight with no problem. Hobby Shack had a sale on the Sure Flite foam floats, and I could get a good deal on a Sinterplast canoe for retrieval, so why not?

When the Sure Flite floats arrived, they were a pleasant surprise . . . the pair only weighed 5 oz.! This gave me plenty of weight margin, so I installed a third servo to turn the motor on and off. I had been using full down elevator to trip a push-push switch, but a third servo is more dependable. I used a lever switch, Radio Shack No. 275-1102. This goes nicely on top of the servo with servo tape, and the lever flexes enough to allow full travel on the servo without stalling it. It requires only two ounces of force to actuate, much less than a toggle switch. All up weight, ready to fly, was 3 lbs. 10 oz., only six ounces more than as a two-channel landplane. I've flown the Astro Sport at four lbs. with no problems, so it looked good.

The first flight was hand launched to check the handling. The climb was good, and the rudder had all the control needed to handle the floats.

The speed was the same as without floats, to my surprise. Since the first flight went so well (I landed on grass), I tried another hand launch with a landing on water. The landing was really pretty . . . one skip and then a smooth taxi. I am not using a



Close-up of float mounting. Landing gear legs plug into tubes mounted vertically in the floats. Makes for easy removal or adjustment.

Landing gear legs plug into fuselage; slots are then covered with vinyl tape.

water rudder, but the air rudder is good enough to steer the plane back to shore, using short motor blasts.

I chose a day with a 5-6 mph onshore wind for the first water takeoffs. The Sport took off nicely in 80-100 ft., very realistically. I got another ROW in that day, then two dunkings, which got water inside and soaked the motor and batteries. I took it home and let it dry off in the basement overnight. The dunkings were on crosswind takeoff attempts; just as the plane would lift off, the downwind float would dig in and over it would go.

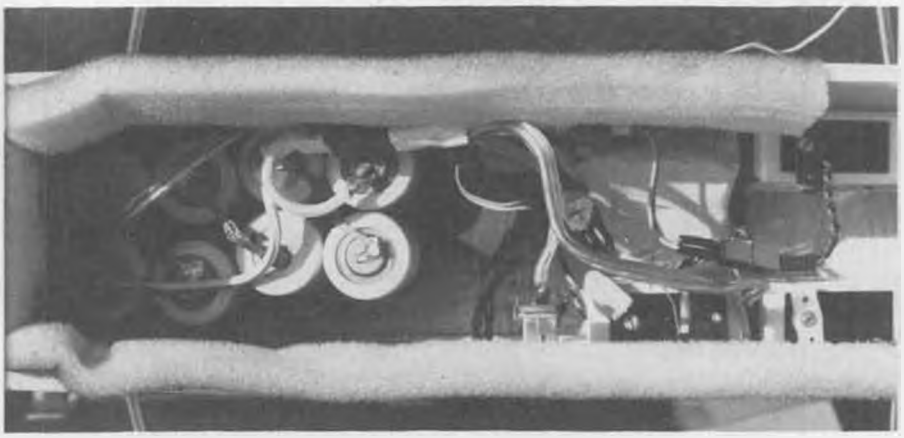
The next day, the wind was blowing away from shore, and I dunked it twice trying to take off crosswind. This time the cabin stayed dry, due to a foam coaming I put in. I finally put all the flying gear into the canoe, paddled out a couple hundred yards, and took off towards shore, into the wind. This worked out very well, and it was really dramatic to fly the plane in steep banks around the canoe. I got a lot of people on shore as an audience, pointing out to their incredulous friends the "miniature seaplane that doesn't make any noise". Some just wouldn't believe it!

A few days later, I tried ROW's in flat calm, but the Sport would not break free of the water. I had an electric speedboat, not a seaplane. I still don't know why this is so, but for ROW, some wind seems to be necessary, at least for this particular plane.

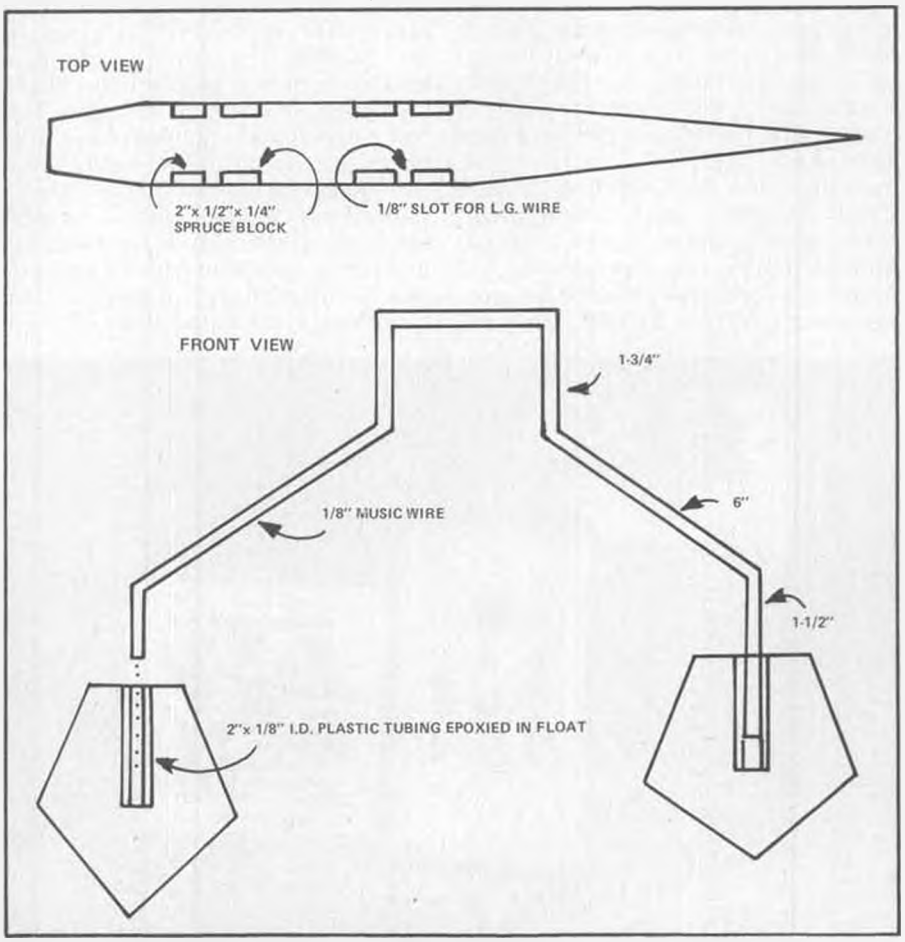
For those who would like to try electric seaplanes, I think the Electra Fli with an Astro 10 or 15 would ROW nicely, and so would the Bushmaster with the Astro 25. The sketch shows how I mount the floats. It is quick and easy, and allows simple adjustment of the float angle and interchangeability with wheel gear. The floats are parallel with the midline of the fuselage and are spaced 15 inches apart, with the step directly below the balance point. I used an old 9 x 4 Cox nylon prop to get extra power for ROW (this reduces the flight time slightly). This prop has a narrower blade than most. If you try a 9 x 4 Top Flight prop, you might cut it to 8-1/2 inches to keep from loading the Astro 15 too much.

On the takeoff run, I let the plane get up on the step until it starts skipping a little, then pull up to get it loose. Without the up command, it does not get off the water. Once it is off, I immediately give some down to prevent a zoom and stall, and hold it in level flight until the speed has built up. Once the speed is up, I let it climb out. The critical part is just when the plane is on step and starts skipping a little. If you are not firm about the up command, a float will drop and catch, and over it goes! I have dunked the plane at least half a dozen times with absolutely no damage, and no problems have shown up with the radio, motor, or motor batteries. I did have a problem with the receiver batteries. I had left the plastic case on it, and water got inside and shorted two cells. I took the case off and dried it out, and it works fine now. Do not leave the case on the motor batteries for the same reason. I had taken the case off the motor pack, and so there were no problems with water there. I recommend the foam coaming around the cabin top, as it keeps most of the water outside, even when the plane flips.

So, thanks, Don, for a fine article. It opened up a whole new field (lake, pond?) of modeling for me. And, best of all, electricity and water mix, so come on in, the water's fine! ●



Interior layout. Foam coaming on fuselage sides serves to semi-waterproof the inside. Battery case was removed to prevent water from collecting inside and shorting out the batteries.



Mitch Poling's method for mounting the floats on his Astro Sport is shown above. Landing gear legs are a tight fit in the fuselage, then sealed with vinyl tape.

Equipment used to measure charger operation. Heath Voltmeter measures voltage, Simpson 260 multimeter monitors charge current.

PRODUCT$ IN U$E

M.E.N.'s C-25 AUTOMATIC CHARGER, by Eloy Marez.

• "The life and performance of the Solid-Gel batteries are very much a function of the charger used, and it is important that the two systems, battery and charger, be compatible."

The above is a direct quote from the charging manual furnished by Elpower Corporation, one of the manufacturers of one of the gelled electrolyte batteries currently being sold through hobby suppliers. For "Solid-Gel", which is Elpower's trade name for its batteries, you can also read "Gelyte" for the ones manufactured by Gould, or "Gel/Cell" for those of Globe-Union manufacture. These, as well as some imported batteries, are also to be seen with various distributor/manufacturer's house names, such as Astro Flight's "Gel Type" battery, M.E.N.'s 6V-6AH pair, and Orange Coast Hobbies' 12 volt, 4.5 and 5.0 amp'ers.

There is yet another brand of sealed battery in model use, manufactured by Gates Energy Products, but so far, it has only appeared in two-volt versions for glow plug power. This is the cell that is used in the GloBee "Fire Plug", and in a similar device available from Flight Dynamics, of Portland, Oregon. This cell is worthy of mention here only because it is different, being what the manufacturer calls a "semi-starved electrolyte" cell. Chargers for both of the above are available from their respective manufacturers.

A similar charging precaution statement is included in all of these various company's literature, so it is fairly evident that the dependability, capacity, and life that you get out of your battery will depend to a larger degree on how you charge it. The biggest sin seems to be overcharging, which can occur if a too-high charging current is used, or if it is left connected to a charger after it has reached saturation. Either will cause premature aging and loss of water in the electrolyte. All of the maker's literature mentioned also give recommended charging rates, both initial and final, which must not be exceeded in order to achieve 100% charge, without the dangers of overcharging.

Undercharging, the result of too-low charging currents and/or not enough time, is not as serious a problem, at least as far as the life span of the battery is concerned. But it definitely bears on dependability; your flying day starts with equipment that will simply not deliver all that it is capable of.

Since most of us are using a 4.5-amp capacity battery, we will continue our discussion based on this size. First, to clarify the above figure,

M.E.N. C-25 Automatic Charger with PB 660 gelled electrolyte batteries. Two 6-volt batteries are connected in series to provide the required 12 volts.

Battery made by Elpower, sold by Orange Coast Hobbies.

remember that gelled electrolyte batteries are rated at a 20 hour rate, unlike nickel cadmiums, which are rated at a 10 hour rate. Thus, the above battery can be depended on to provide 225 milliamps for 20 hours. It is not, however, a direct trade-off in current for time, in that if you double the current consumed, it would provide it for half the time. At the higher loads that we subject our batteries to, the available time can be surprisingly low. Thus it is extremely important that, in order to provide ourselves with the greatest possible amount of power when we need it, we start off with a battery that is as close to 100% charged as possible.

The starting point is, of course, a discharged battery, which is considered being in that state when a voltage of 1.6 volts per cell has been reached. For the 12-volt types that we use, being a 6-cell battery, this voltage is 9.96, and should be measured without any external load being applied.

For our 4.5-amp battery, the maximum allowable initial charge current must not exceed 675 milliamps; the highest recommended for any extended period is 450. With the common non-automatic charger, being of the constant voltage variety, the current can be expected to decrease during charging, as it is a product of the battery resistance, which will increase with charge.

The battery is considered to be fully charged when a cell voltage of 2.33 each AND a charging current of 90 milliamps has been reached. Note that this voltage, a total of 13.98 for our six-cell 12-volt (rated) battery is reached while a higher current is still flowing, though full charge has not yet been achieved.

The preceding is just basic information, intended as a refresher before we tell you about M.E.N.'s charger. For a more in-depth study of gelled electrolyte batteries, the reader is referred to our article on that subject in **MB** July 1976. At that time, the M.E.N. C-25 Automatic Charger was not yet available, nor was any other type of automatic charger readily available to the modeler.

At this late date, M.E.N.'s is still the only charger marketed for our use that safely meets the battery manufacturer's charging recommendations, and we would like to acquaint you with it and its use.

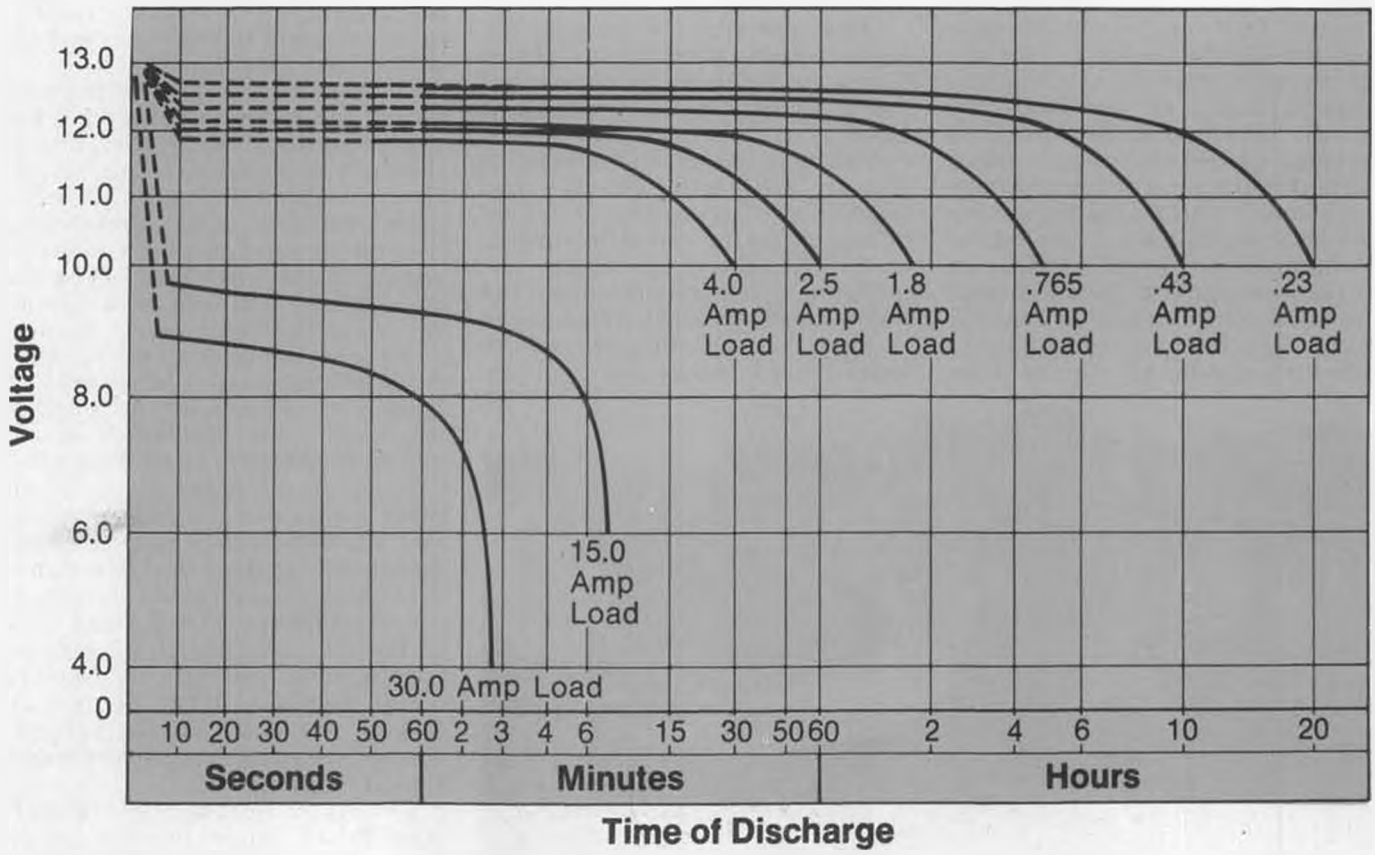
The C-25 is self-contained in a 1.5 x 2.125 x 3.375-inch wall socket plug-in case. It consists of the necessary voltage reducing and rectifying transformer and diodes, plus sensing circuitry that permits charging current to flow only until the proper values are reached, at which time it will cut off the charge. At the same time, an L.E.D. (Light Emitting Diode) located on the cover will come on, to indicate completion of charge.

When connected to a battery reading 10 volts (with no load), the C-25 Charger started doing its thing at 260 milliamps, at a voltage of 12.90. Within ten minutes, it had stabilized to 250 mils, at 12.48 volts. From then on, there were minor variations in the current; about 1%, plus or minus. The voltage very slowly and gradually started building up, until some eighteen hours later, it was at 13.58, still at 250 milliamps.

A short time later, the voltage had gone to 13.82, at a new current low of 235 mils. The next ten minutes saw the same drastic and rapid change of both values, in the same direction, until the voltage was 14.05, current 230, at which point the LED indicator came on and the current went to zero, indicating that the automatic cut-off had taken over.

The .07 volt, the difference between the recommended fully charged voltage of 13.98 and the 14.05 as read, is insignificant, being on the order of .006%, which can easily be equipment error. What is more significant is that a downward trend of the current had started as the battery reached the critical voltage, and would probably have continued downward, had the auto-

Continued on page 130



Discharge characteristics of an average 12-volt, 4.5-amp gelled electrolyte battery.

Kieth Hearn's "Southern Cross" at 2000 feet above Port Phillip Bay, Australia. Trans-bay flight was made to commemorate the 50th anniversary of Charles Kingsford-Smith's 1928 flight from the U.S. to Australia. Model was flown by Kieth from the Enstrom helicopter.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• Perhaps this writeup on the flight of the model Southern Cross isn't exactly Old-Timer activity, but the flight was so reminiscent of Maxwell Bassett's four-hour flight in 1934, that the author couldn't resist the voluminous amount of clippings, reports, photos, etc. received from Monty Tyrrell, one of Australia's foremost model aviation promoters.

The fiftieth anniversary of Kingsford-Smith's historic flight from the United States to Australia stirred the Melbourne Sun (local newspaper) to do something to commemorate the occasion. No question about it, Monty Tyrrell had quite a bit to do with the promotional aspects of the idea of a model Fokker Trimotor, painted in the original Kingsford-Smith "Southern Cross" colors, to fly across Port Phillip Bay.

Once committed to the idea, the flight pattern called for a flight to Casey Airfield, Berwick. Actual flying was to take off from Point Cook, cross Port Phillip Bay to Frankston, and then to the Berwick Airport, where the officials and relatives of Kingsford-Smith would be waiting for the end of this historic commemorative model flight.

The natural person to make the flight was Keith Hearn, who had just restored his O.S.-80-powered, 9-foot Fokker Trimotor. Although this model is an excellent flier, Keith decided to build a larger Fokker F7B-3M especially for the Melbourne Sun. This model would be Quadra powered and have a wingspan of 12 feet, giving an area of 22 sq. ft.

As it turned out, the model was "dead on" (as they say in Australia) for scale, with only a slight bit of dihedral being added to get away from the drooped wing illusion that straight wings give. In every case, scale construction was followed throughout, with the natural substitution of balsa stringers instead of steel tubing longerons.

Of course, some problems arose during the 350 hours expended by Keith Hearn and his brother, Bruce (both, incidentally, founders of Hearns Hobbies Pty., Ltd.). Wheels were a problem, as no commercially-made model airplane wheels were available. This was solved by using aluminum rods and tubes, with tires (spelled tyres in Aussieland) being 8-inch inner tubes taken from full-size aircraft tailwheels! A tailskid was used (as on the full-size Southern Cross) instead of a tail wheel, to shorten the landing roll.

Although the flight was to be 40 miles across the bay, the gasoline tank was made well oversize to allow for headwinds, flight deviations, and problems in landing. As it turned out, the flight only used about 55% of the tank capacity of 1.2 gallons (one imperial gallon). This gave an all-up weight of thirty pounds at takeoff. A 12-knot wind on takeoff showed the model could carry more fuel, if required.

The week before the "model trans-Pacific" flight, the Sun newspaper devoted a considerable amount of publicity to the upcoming flight. The blue and silver Econo-

Kieth Hearn is congratulated after completing his history-making flight. Twelve-foot model is covered with Econokote, powered by Quadra.

cote-covered model was flown at the Berwick Airport to see what problems were involved in circling and landing on the field, with the ever-present danger of a large number of spectators adding to the possible hazards. At the same time, the Sun arranged to have Kingsford-Smith, Jr. and John Ulm on hand at the completion of the flight. Both are sons of the pilot and copilot of the full-size Fokker that made the historic flight in 1928.

The standby Fokker (the nine-footer) was brought out and flown along the beach in contrast with a girl running on the beach, for pre-flight publicity. At this time, arrangements were made for the large Fokker model to carry eight airmail letters, two for Kingsford-Smith, Jr. and John Ulm, two for Monty Tyrrell and Noel Harding, of C.F. Barners (Hobby Distributors), and the balance for the officials, including the Berwick Mayor, Hugh Dodson.

The model was not flown on the same date that Sir Charles Kingsford-Smith and Charles Ulm touched down in Brisbane (10:15 a.m., June 9, 1928), as the time had to be coincided with the weekend. The model, after having been flown at Berwick, was placed on display for one week before the actual attempt.

June 18 dawned with a brisk 12-knot headwind, so care had to be taken not to overload the model with too much fuel. As reported earlier, this premise proved to be false, as only 1/2 of the fuel was consumed during the 64 kilometer flight.

The big bird took off perfectly from the Point Cook RAAF base, with Keith Hearn controlling it from the newspaper helicopter. The model was climbed to 2,000 feet to allow for enough gliding altitude, as experience had shown that the Quadra (having one of the old propeller shaft assemblies) had a bad habit of loosening its prop.

What a crowd! Sort of reminds you of Lindberg's arrival in Paris, doesn't it? Photo taken just after landing at Casey Airfield, Berwick, Australia.

The flight was actually quite uneventful, except for having to detour eight miles to avoid a rain squall. One item that did bother Keith Hearn and the chopper pilot no end was the intrusion of a rival newspaper's chopper, which flew between Hearn and the model, to get some real close shots.

Keith actually lost sight of the model for awhile, as the rival chopper people had no idea of the hazard they were causing to the model. After considerable profanity over the radio, the rival paper's chopper dropped back and stayed a reasonable distance behind. As Monty Tyrrell pointed out, the ironic part of the whole episode was that the rival news media gave the model flight much better coverage in the newspaper and on television than the official sponsor (the Sun).

After crossing the bay, the model descended to 1,000 feet, where they cruised over the southern suburbs (under Air Traffic Control!!). With a 120° turn to starboard, the model homed in on Casey Airfield, Berwick, where it made a successful landing in front of a huge crowd.

The chopper pilot let Hearn out, and he promptly took off, flew the model around in a few low circuits, landed, taxied up, and the motor quit! Don't ask why, as there was plenty of gas. The important thing was that, despite the blustery wind conditions of 25 to 30-knot winds, the model handled and flew beautifully.

Total flight time was 70 minutes, giving about a 30 mph rate; not bad, considering the headwind. The greatest thing about this nostalgic flight was the immense favorable publicity that R/C modeling received in the Victoria State's leading newspaper. On the face of things, everything went off like clockwork, but Monty sez you should have been there to experience the frustrations behind the scenes. All in all, Monty comments, "It takes true professionals to do something like this and do it right."

When asked about the model, Keith replied it was strictly a labor of love, with Kingsford-Smith being his boyhood idol. Hearn regards K-S as the greatest in his day. The model, fitted with a six-channel radio, featured only one active motor, with dummy engines on the wings.

Concluding his interview with the press, Keith Hearn stated it was one of the best models he has ever built, and it flew just like a real aircraft. The wind was quite gusty, and Hearn was quite concerned about the landing approach.

Keith is now looking forward to another flying project, which would involve delivering a copy of the Sun, by the model, to a country town. The Sun is going to get some mileage out of that $3,000 model!

In retrospect, this flying scale model brings to the fore the writer's contention that many of the Old-Timer flying scale models make

C.D. John Pond congratulates Ross Thomas on his Texaco win at the West Coast R/C SAM Champs, held at Fresno, Ca., on Memorial Day. Ross flew a Lanzo to victory.

Roy Turner flew his beautiful silk-covered Comet Clipper at the R/C Champs in Fresno. Intricate trim on wing doesn't show in this photo.

excellent competition models. The problem with models like Lanzo's is that there is always an implied guarantee of contest success if you use them. The foregoing was intended to show the definite possibilities of flying more of the realistic scale models in competition. After all, this is what the public looks for . . . realistic looking models that fly realistically . . . like Old-Timer models!

MOTOR OF THE MONTH

The engine featured this month is one of the many designs produced by Bill Atwood during the 1938-1941 era. Bill can be likened to the "Joe Ott" of engines. Ott was a prolific producer of kits. It has been known that, when selling a line of 25¢ kits to a department chain, if they preferred a line of 15% kits, Ott would produce them in less than two days!

So it was with Atwood and his motors at that time. Starting with the Bullet, Phantom, and Torpedo, it was indeed hard to tell which part belonged to which, and why. All his engines had their individual idiosyncrasies, but all ran quite well. And the prices! Were they ever attractive! Most engines ranged from 10 to 13 dollars, which was considerably less than most competitive engines.

The particular model Bullet we are showing was the so-called 1946 version. By this time, the manufacturing rights had been taken over by Miniature Motors, of Culver City, California. In 1946, there was plenty of money that had been dammed up by wartime restrictions. Now, anyone who had an engine that would perform halfway decently, could make sales and prosper. Hence, the reason for so many of Bill Atwood's designs on the market at that time.

The original engine (1939 version) was called the Phantom Bullet, actually being manufactured by the Phantom Motor Co. When the motor was again produced in 1946, the revised version was known as the Bullet 100. Sold for the attractive price of $12.75, the motor came without coil or condenser.

For the technically minded, the Bullet was a .275 cubic inch displacement motor, with 3/4-inch bore and 5/8-inch stroke. Weight was 4-3/4 ounces. The motor castings were all die-cast of Dow metal (magnesium alloy), with mehanite piston and honed steel cylinder.

All Dow metal crankcases of the early days were extremely susceptible to crashes. Although die-casting did lend itself to extremely fast production, the crankcase lugs broke quite easily (same problem with Baby Cyclone cases). For this reason, these series of Atwood engines are difficult to find in original (undamaged) condition. Later models employed die-cast aluminum crankcases to improve strength.

Early Air Trails issues note, in a review of the engine, that strobotac tests show the following figures:

7,500 rpm with 9 x 9-1/2 Hi-Rev Prop

8,500 rpm with 10 x 4 Flo-Torque Prop

All tests were based on use of standard three-to-one gas and oil mixtures. No tests were run using methanol-based fuels.

30 YEARS AGO, I WAS. . .

George B. Darrah Jr., reports in a letter to the columnist, that 30 years ago to the month of June, he folded up his Comet Clipper and Zipper plans, shoved the balsa and Ambroid glue back on the shelf, and went out to blast the Hun from the sky. *(Hmmm, wanna make that about 38 years? wcn)*

Then it was American Airlines, starting with DC-3 Douglas airliners and working up to Boeing 747 giants. After what seemed an interminable amount of flying, retirement came, and with it, a chance to start modeling again.

But what's this? Everyone in the Fort Worth area (Euless), Texas, is building and flying Clippers and Zippers. Is this the twilight zone? No kidding; that's the way it seems, so George is ready to pick up where he left off. He has joined AMA and SAM, is buying a radio, and is steaming to go. George is finding out what this Old-Timer kick is all about . . . FUN!

U.S. FREE FLIGHT CHAMPS

As we promised last month, the Old-Timer events at the U.S. Free Flight Champs enjoyed excellent competition. Conflicting reports indicate good attendance and a good contest, while others indicate the Old-Timers dropped in attendance. Regardless, the flight times were simply great, as the weather featured the usual Taft heat and wild thermals. Three of the six events on Saturday required fly-offs. How about Earl Thompson's ten perfect flights in a row to win .020 Replica?

Sunday featured sky divers who evidently missed the wind direction; most of them landed west of their field, right among the models! Talk about excitement! One thing for sure, those chutes are beautifully colored and make excellent viewing. Fortunately, no models got stomped on.

Taft is back to its usual dryness, as attested to by the brush fire that developed from careless fuse handling. Again, luck was with the free flighters, as the east road made a

Jerry Persh likes Valkyries in all sizes, holds 1/3 size on left, 1/2 size on right.

The second (and unfortunately, the last) design to be kitted by Cal Aero Models was the Air Trails Sportster. The prototype shown above was built by Bob Oslan. Model has a 50-inch span, O.S. .15 engine, and is very aerobatic. High-quality kit was discontinued because of poor sales.

good firebreak and the boys were able to get the fire under control (this is one reason the Northern California Free Flight Council has a ban on fuses). Might also mention that the fire was put out before it reached the row of parked vehicles. Whew!

Noted among the modelers present was Sal Taibi, with a "new" design known as the Anderson Pylon, a design built in 1937 and dug up by Lou Levine. Upon seeing the model, Goldberg said that pylon models were fairly common in the Chicago area before he came out with his successful Zipper that revolutionized competition flying.

Quite a few models were lost, but by and large, most were returned. Leslie Norman, of Fort Worth, Texas, did it to the boys again by winning Old-Timer Sweepstakes. Interestingly enough, only eight fliers won more than one trophy. Looks like the competition is catching up! Results looked something like this:

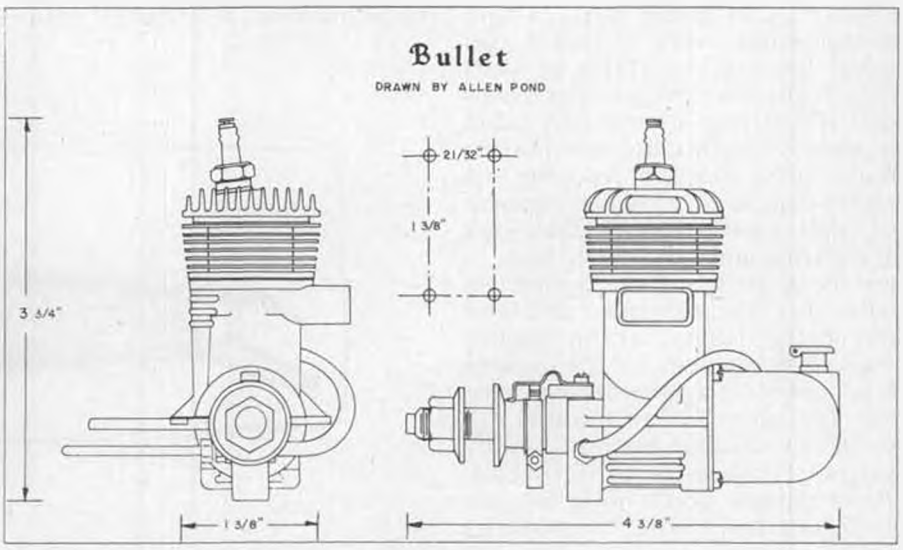
SATURDAY, MAY 27

CLASS A CABIN	
1. Larry Boyer	15:00
2. Tom Heiser	13:42
3. Bruce Norman	12:05
4. Bruce Chandler	11:36
5. Bob Chambers	8:46
CLASS B CABIN	
1. Al Heinrich	18:49
2. Leslie Norman	11:10
3. Andy Faykun	8:29
4. Bob Dittmer	7:43
5. Bud Cohen	5:00
CLASS B PYLON	
1. Jerry Otis	20:00
2. D. Weitz	15:00
3. Bruce Norman	14:47
4. Leslie Norman	13:42
5. Sal Taibi	13:40
CLASS C CABIN	
1. Fred Emmert	13:31
2. Phil McCary	13:09
3. Bob Oslan	11:59
4. Bruce Norman	11:52
5. Leslie Norman	11:26
CLASS A PYLON	
1. Wade Wiley	22:20
2. Bruce Norman	21:16
3. Marty Thompson	16:41
4. Bruce Chandler	12:54
5. Rudy Calvo	12:26

SUNDAY, MAY 28

CLASS C PYLON	
1. D. Weitz	33:18
2. Bob McBride	28:03
3. Al Heinrich	19:17
4. Cliff Silva	17:54
5. Ken McBride	17:13
O/T RUBBER COMBINED	
1. Ray Berens	15:00
2. Charles Werle	12:27
3. A. Richardson	11:56
4. Wade Wiley	10:46
5. George Perryman	9:35
JUNIOR .020 REPLICA	
1. J. Campbell	7:37
JUNIOR O.T. RUBBER	
1. Stephanie Perryman	12:32
2. S. Cover	3:55
30 SECOND ANTIQUE	
1. Jim Adams	20:00
2. Sal Taibi	14:46
3. Leslie Norman	14:28
4. Larry Boyer	12:25
5. Fred Emmert	12:17
.020 REPLICA	
1. Earl Thompson	30:00
2. Sal Taibi	20:36
3. Bob Oslan	14:36
4. Abe Gallas	13:44
5. C. Archer	10:35

Goldberg Sailplane, by Mervin Buckmaster, editor of "Airborne", Australia's model mag.



Radio problems did a job on Ron Keil's Comet Clipper at Fresno R/C SAM Champs.

Dick Gleason's Ohlsson-powered Comet Golden Eagle is ready for covering. Unidentified wing center section in foreground.

THE NATIONAL MODEL AIRCRAFT MUSEUM

Yes, that's what Russ Barrera is going to call his long cherished dream, as suggested by Carl Goldberg. This honest-to-goodness model museum is nearing reality with every day that passes.

The columnist had intended to give the ground-breaking ceremonies (complete with pink champagne trimmings) a big spread in this column. However, when the first Japanese copy of the Kodak Instamatic popped open with no apparent excuse, and one of the family "helped" to reel up the film in his Topcon, there was not an unexposed frame left. Rats!

However, this is not to say we won't cover this museum later, as things are progressing at a great rate. Located on the south corner of "Hill Country", in Morgan Hill, California, the foundations have been poured, flooring laid, and now the steel framing is being erected. Russ confidently feels the museum building will be a reality in early August. Then comes the job of transporting and unloading all that tremendous material he accumulated while in San Marcos. Whew!

The museum, when completed, will have no admission charge; however, Russ will have to ask those desirous of seeing the museum to make sure he is there the day they show up.

We'll have more on this extraordinary museum in the upcoming issues. We will clue you in completely as to location, visiting dates and

Continued on page 135

OLD TIMER Model of the Month

Designed by: Francis Tlush

Drawn by: Al Patterson

Text by: Phil Bernhardt

INSPIRER

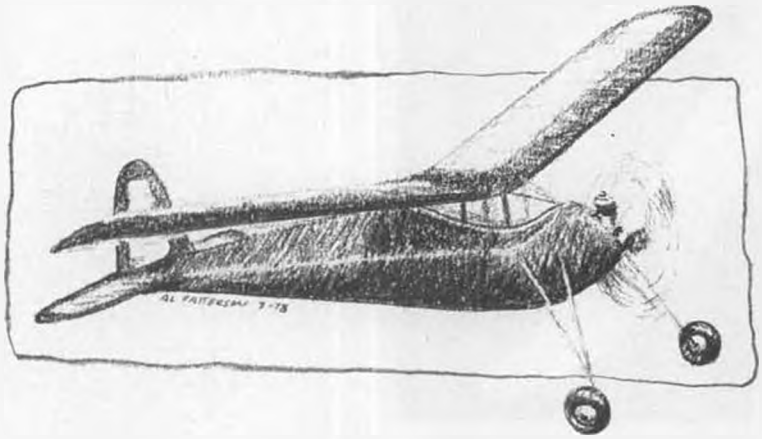
• Mention the name "Francis Tlush" to any Old-Timer enthusiast, and nine times out of ten you will get a reply like, "Oh, yeah, he made some great little motors. . ." and on and on. Fact is, Tlush designed some great little airplanes, too. One of his models was the "Inspirer", which appeared in the October and November 1937 issues of Air Trails.

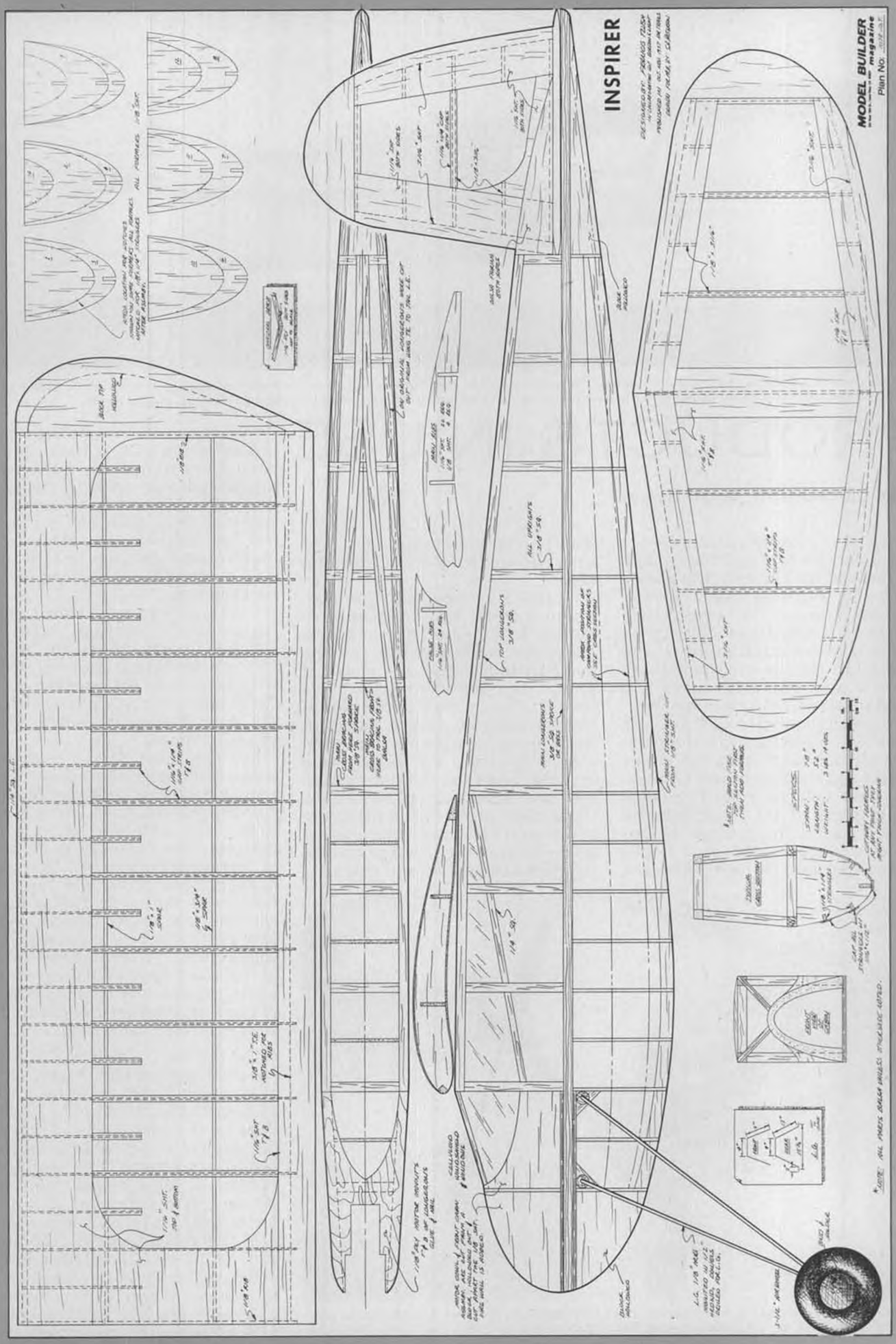
Aside from being one of the "unknown" Old-Timer designs, the model is interesting in that it uses some unusual (for 1937, at least) construction techniques. For example, it was one of the first cabin models to use the crutch method for building the fuselage, resulting in a nicely-contoured structure, instead of a slab-sided box. Also, take a look at the wing and tail construction . . . not many designs of this period use balsa sheeting, capstrips, and false ribs to the extent that the Inspirer does. Performancewise, the Inspirer is probably on a par with the Trenton Terror or Flying Quaker . . . stable and reliable, but not a trophy magnet. However, as with most Old-Timer designs, you'll never be sure until you build one. These things can fool ya!

The Inspirer is a natural for R/C, and would probably rank with the best of the 3-channel trainers. If you go this route, we would recommend using spruce for the wing spars, so that you can at least loop the model without worrying about folding the wing. Also, the dihedral should be reduced from the present 8-1/4 inches to about 4-1/2 inches, to eliminate any dutch-rolling tendency.

By the way, the text does mention that the balance point should be at about 1/3 of the wing chord back from the leading edge . . . a rule of thumb that seldom misses on this type of design.

Also not shown on the drawing, but to be included with the full size plans . . . a wire tailskid is mounted at station 14.





FULL SIZE PLANS AVAILABLE – SEE PAGE 144

The whole works, ready to go. This is Jef's second Centurion, which he modified slightly. Note the overflow tube just forward of the nose gear strut, and the tail skid. Biggest change is in the wing mounting; Jef uses hooks and a nylon bolt, instead of unsightly rubber bands.

PRODUCT$ IN U$E

COX CENTURION, by Jef Raskin.

• Last year, mostly unemployed, I had a lot of time for building models. I practiced for contests, was always prepared, and won a lot. This year, my new business in full swing, I have no time for building models. I go to contests with untried airplanes, and lose a lot. There's a moral in there somewhere. Anyway, there is a medium-sized field near my business, and it seemed to me I needed a small R/C plane that I could run out and fly now and then, on coffee breaks and the like (I hate coffee).

I tried building one, but never could seem to get it finished. So, when I was on a trip and saw the Cox Cessna Centurion kit at a hobby store, I decided I'd try it. The plane looked to be small and pretty . . . just what I needed for that field near the office.

I carried it home with me and, within a week, found a chance to put the kit together. It is a beauty. The plastic molding is clean, and the parts fit like those of a watch. I should have expected this when I saw that it was molded by the famous Kyosho company, which makes so many operating scale models. When you rubber-band the 36-inch wing on, and fasten the stab into its slot with the breakaway plastic screw, the surfaces fit tightly and are square and true. The stick-on decorations go on easily, fit well, look good (like standoff scale should) and aren't too heavy. The main fuselage stick-on is applied at the factory. The ones I've seen have numerous bubbles. I discovered that pricking the bubbles with a pin, and then ironing the stick-ons down with my iron, with the heat set very low, made for a much neater airplane. Test the iron on a scrap of foam to make sure it isn't too hot.

I was surprised at the light weight. Ready to fly, without radio, it weighed exactly the same as my Monokote (wing) and Solarfilm (fuselage and tail) covered balsa Goldberg Jr. Falcon. Both planes are the same size, same weight, same engine. Hmmm.

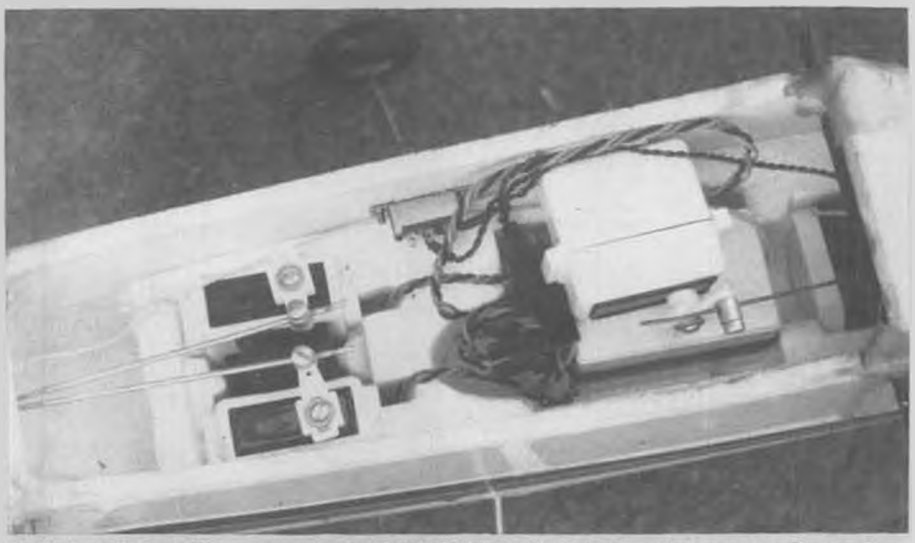
For the most part, I built the Centurion according to the instructions. I made one important modification; the wing, which is quite strong and well-finished, is a bit flexible. Since I planned to do a lot of aerobatics, I stretched fiberglass filament tape across the top and bottom of the wing. This is done with the tape under tension, and a very rigid and nearly unbreakable wing results. I have done this in lieu of spars on a number of foam wings, having learned the technique from the instructions that come with the wonderful Ace foam wings.

On the stab, which is also a bit floppy, I used Scotch Magic tape, again applied under tension. I also applied filament tape on the leading edge of the wing, to help prevent the otherwise inevitable dings that accumulate there. The tape isn't fuelproof, and it will come off sooner or later unless you paint over the edges, or epoxy them down. Sealing the edges of the decorative stick-ons is also a good idea. While you have the epoxy out, add a bit to the bottom of each of the Hoerner-style wing tips. This will keep them from shredding on those inevitable,

Centurion No. 1 (left) has over 150 flights, uses a Cox Medallion .049 and Hiscott throttle and muffler. Centurion No. 2 (right) uses stock QZ .049.

not-exactly-perfect landings. After some 30 flights, there has been no damage to any part of the plane with this protection. It might stand up as well, just as it comes out of the box . . . I don't know, but I don't aim to find out.

When I got my second Centurion, I made one other change. The plane is so good-looking (unlike some other ARFs I've seen) that the rubber bands are an eyesore. I put hooks on the trailing edge of the wing to engage the rear wing dowel, which I cut off flush with the fuselage. Then I added a mounting block with a blind nut, near the front of the wing saddle, and added a plywood plate in the wing, with a hole that allows me to tie the wing down with a nylon bolt. It makes the sleek craft sleeker still.



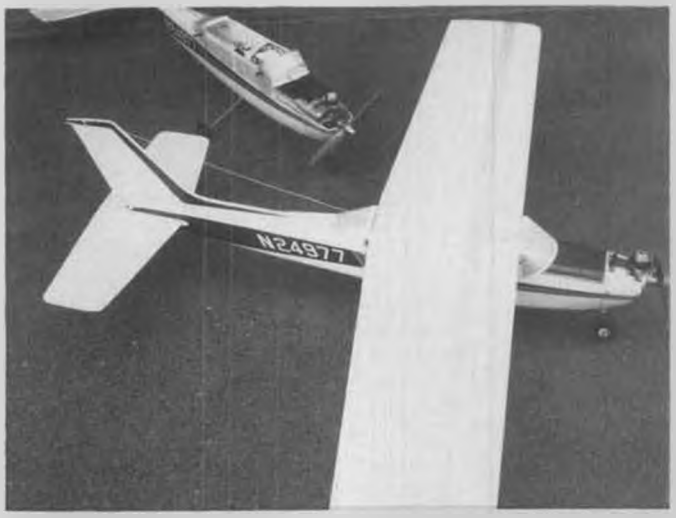
Radio installation. Litco system has over 150 flights, and has survived two crashes. Plenty of room for bigger radios.

I am not very used to thinking about a model plane in terms of cleaning, since I usually fly rubber-powered free flight or R/C sailplanes. But a gas engine certainly generates a lot of mess. After one session, when I forgot to bring rags, I took the plane back to the shop, unscrewed the very neat plastic cowl, took off the engine, landing gear, wings and stab, and washed and cleaned each part. There aren't many planes that I could clean that way! The foam has a coating on it that allows you to clean it very easily with a detergent. I use Lysol Basin/Tub/Tile cleaner. After a lot of flying, the plane is still clean and new-looking. This is a unique experience for me, as my few gas models have gotten pretty sorry-looking in a hurry. Score another point or two for Cox. To keep the plane from getting too ooky, I drilled a hole in the bottom of the cowling and ran a short piece of fuel tubing from the overflow tube on the bottom of the .049's tank out through this hole. Keeps the plane much cleaner.

Jef Raskin himself, getting ready to pitch his Centurion into the blue. With a field like that, who needs wheels?

So now you know that it is good looking, well-built and tough. The radio installation, a task I usually dread, was easy. I used a Litco system. The Cox Sanwa system drops right in, but I don't have one. Since the Litco servos are smaller than Sanwa's, a few pieces of thin servo mounting tape were required to make them rigid. The battery and receiver were mounted with thick servo mounting tape for better

Continued on page 111



Model No. 2 sure looks clean without the rubber bands. Note the strip of fiberglass filament tape on the wing.

Jef's neighbor, Diane, holds Centurion No. 2, while No. 1 acts as a wheel chock for a PT-22. Photo taken at Half-Moon Bay Airport.

what are Anaerobics?

By ELOY MAREZ . . . Little used by modelers, anaerobic thread-locking compounds can be very useful in almost any type of model.

• If you are bothered by the "toy airplane" image that we are constantly faced with (and who isn't?), it'll help change it, if, the next time you are in a non-modeling group, you start dropping such words as "anaerobic", "thixotropic", or "dimethacrylate". Or maybe it will take "controlled lubricity" to get their attention, after which it will be up to you to convince your audience that it is model airplanes, cars, or boats that you are referring to.

More correctly, you are speaking of compounds that are used by some of us to keep things from falling apart during operation. Here we present, for your familiarization, some information about these locking and sealing compounds, of which there are quite a few, each recommended for a specific use and application.

Anaerobic thread-locking sealants are single-compound, polyester-type liquid resins which self-harden into tough structural solids when confined between close-fitting metal parts, as between the threads of a nut and bolt. These resins are formulated to give a wide range of strengths and viscosities for various applications.

The hardening action of these resins does not depend on the evaporation of solvents or the action of a catalyst, as do all other adhesives that we are familiar with. When placed between two close-fitting metal surfaces, hardening automatically takes place from the inside out, by a chemical reaction known as "anaerobic" cure. The term means "without air"; the air dissolved in the liquid inhibits the chemical reaction from proceeding. When confined between metal, in the absence of air, and aided by a catalytic action with the metal, the liquid hardens to form a tough solid. Any excess around the parts, exposed to air, will not harden and can be wiped off later.

The benefits to be derived from the application of any of these compounds are:

1) Prevents loosening as a result of vibration.
2) Controlled locking strength; various grades available.
3) Completely seals over the entire engaged area, preventing corrosion and leakage.
4) Fast cure on most surfaces.
5) Easy application; one part, self-hardening.
6) Thixotropic (Non-migratory) types available; will not wick into adjoining parts.

There are many types of anaerobics. One manufacturer's literature lists fifteen varieties. But out of the many available, we can narrow the choices down very rapidly, since modelers are usually not interested in sealing pipe threads or hydraulic fittings, or really large coarse threads. Nor will we cover the brands and types that are not sold through normal model outlets. Not that they are lacking in quality, but simply that most of them will probably be impossible for our modeling friends to obtain through normal outlets.

Thus, we are down to two brands; "Loctite", as produced by the Loctite Corporation of Newington, CT, and "Super Lock", by the Devcon Corporation, of Danvers, MA, already well-known in our hobby for its other excellent adhesive products.

No doubt, they are both available from many distributors around the country whom I don't know about. In fact, if I have any gripe at all with our model manufacturers and suppliers, it is that I don't always get answers to my requests for information. They are right if they are thinking that I'm probably not going to order anything, but I can spread the word to many of you who will.

Anyway, the suppliers who I know of for "Loctite" are Ace R/C and Orange Coast Hobbies. Devcon Products are distributed within the hobby industry by Du-Bro Products, Inc., and further by Midwest Model Supply. All are listed in our advertiser's section.

These thread-sealing compounds are type-classified as to strength, which has some bearing as to the permanency or semi-permanency of the assembled parts. The highest-strength compounds are recommended for use only on parts that are not normally disassembled or removed. The use of compounds of this strength on a No. 4 machine screw and nut would probably result

Continued on page 109

FREE FLIGHT AND CONTROL LINE

"Son of Hawk Moth", built by "Designer of Hawk Moth" . . . at least, designer of the 1-inch scale Moth also shown in the photo. Bill Noonan built the 1/2-inch version for the Flying Aces Nationals Scale Meet, after finding that the big one would cost $40 to ship by air. The little one fits in a box that would be allowed under the airliner seat. "Built to Accommodate!"

Grand Peanut winner's reward! A Kraft KP-2AS radio control system.

Seven-eights of a Grand Peanut is better than none! By a strange quirk, this is one of only two photos of the big winner, Bill Hannan's Farman Moustique. See "Workbench".

1978

Parcel Post Proxy Peanut CONTEST!

PEANUT SCALE

PEANUT SCALE

By CHUCK CONOVER and BILL HANNAN

• The 1978 Parcel Post Proxy Peanut Contest was smaller in total number of entries than last year's contest (46 this year, as compared to 59 last year). However, the quality of the models had not diminished in any way, as any of the participant judges or fliers could testify.

This year's event saw four foreign entries, from England, W. Germany, Italy, and Canada.

Jack McGillivray, of Toronto, Canada, won the Modern Class with his Issacs Fury biplane. Daniele Vescovi, of Ferrara, Italy, won the WW I Class with his Ansalda SVA-4 biplane, and Benno Sabel, of Frankfurt, W. Germany, took second spot in Pioneer with his Drzeweicki Flyer Canard. Butch Hadland, of Berkshire, England, entered a beautiful Monocoupe 110 special. This model (along with George James' Fairey Barracuda) was stolen from a *locked* classroom the night before the contest. Butch's entry would have placed high in scale and workmanship, and because of its light weight, should have flown well. I really felt badly about the loss of the two models. The appropriate authorities were contacted, and hopefully we will somehow be able to locate the two models. Up till now we have had no security problems. Next year, we will take extra steps to assure that the models will be safe.

Bill Hannan won the Golden Age Class, as well as the "Grand Peanut" award, with his Farman Mosquito.

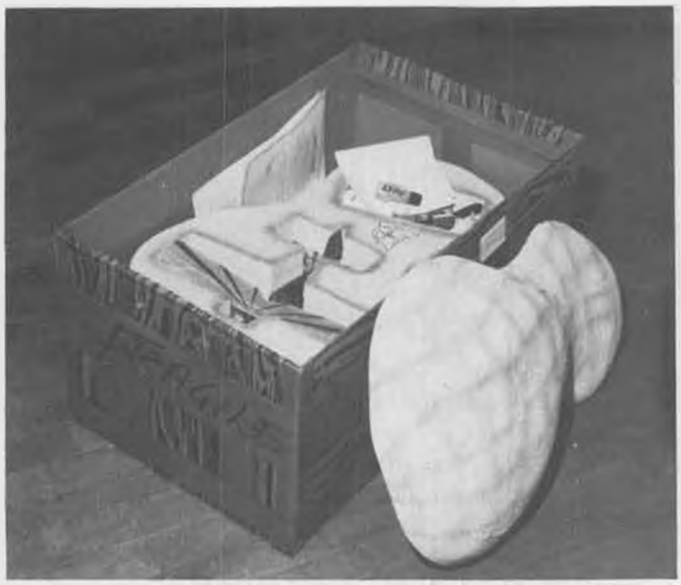
Highest in scale points, this Fairey Barracuda, by Jack Little, Menlo Park, Ca. Prop just a little oversize!

Best Biplane, this Issacs Fury, by Jack McGillivray, Toronto, Canada.

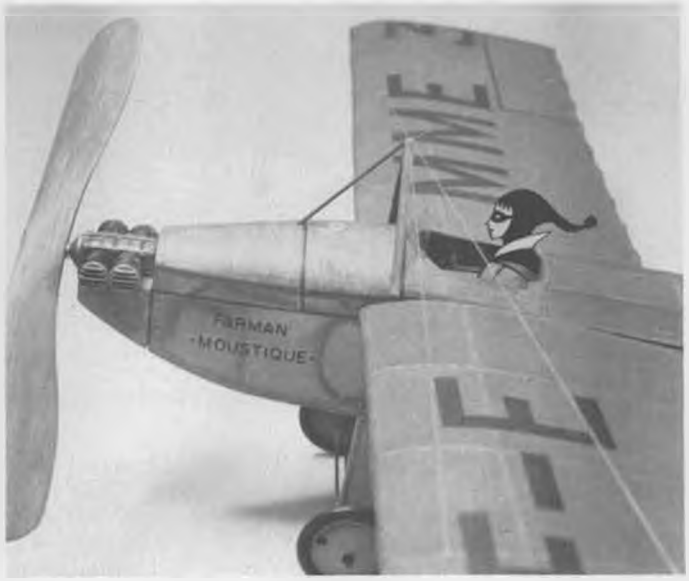
Ansaldo SVA-4, by Daniele Vescovi, Ferrara, Italy, 1st in WW-I and best workmanship of foreign entries.

Tied for second highest points, Wildcat by Phil Cox, Highland, Ind. Tops in WW-II.

Butch Hadland's beautiful Monocoupe 110, which was stolen. Plans to come.



Best Shipping Container winner, by Tom Wood, Bainbridge, New York.



Close-up of Bill Hannan's Grand Peanut Farman . . . before paper attack!

Bill's entry was damaged during its photographic session. After a quick repair job to its wing spars, it still had a best flight of 40 seconds, which was highest in its class. Bill donated his "Grand Peanut" award to Butch Hadland. A real fine gesture . . . thanks, Bill!!

The WW II Class was won by Phil Cox, with his F4-F Grumman Wildcat. Phil's model was real gem . . . the workmanship and detail were really outstanding, and won him Best Workmanship (U.S.A.) Award.

As usual, the Modern Class had the most entries (14). Jack McGillivray won with his fine Issacs Fury biplane. Jack also captured the High Point Biplane award for his efforts.

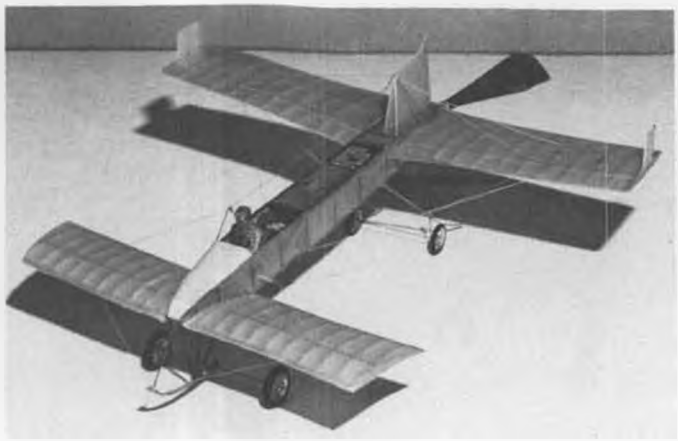
Daniele Vescovi won the WW I Class and the Best Workmanship (Foreign) Award, with his beautiful Ansalda SVA-4 biplane. It was really a pleasure to observe Daniele's scale documentation presentation, which included a magazine article, a Profile Publication, a photograph, an actual construction plan for the model, and several decals from his own model club. I hope there will be more foreign entries next year . . . we enjoy their participation, and they do well in the competition.

Pioneer was won by Ken Johnson's 1911 Cessna, which had a best flight of 53 seconds. Ken does a real fine

Buhl "Bull Pup" entered by Capt. C.G. Strange, Carlsbad, Ca., a dentist.

Second in Golden Age, this Ford 2-AT by Jack Little, Menlo Park, Calif.

Rubber band suspension allowed Clark Wade's Davis to damage itself. Box was O.K.



Drzweicki Canard, by Benno Sabel, Frankfort Germany. Most distant and oldest qualified contestant.

Polish Fighter built from Cleveland "Dwarf" plans, by Bill O'Conner, Jr., Scottsdale, Arizona.

Walt Mooney's Upton Baby Ace, featured in May '78 MB, construction article.

job of building light models which fly quite well.

Twelve of the entries did not qualify (flights under 10 seconds). Every effort was made t qualify these twelve. After taking part in the past four Proxy Peanut contests, I can give the following advice:

1) Build your peanut as light as possible, and with as much scale detail as you can get away with. *Be sure you install a pilot!*

2) Submit the proper scale documentation . . . at least a 3-view.

3) Test fly your peanut. You know it has to fly at least 10 seconds inside a gymnasium.

4) Package your model so it won't be damaged; don't hope for a miracle!! This is no time to take a chance. All your efforts may be wasted.

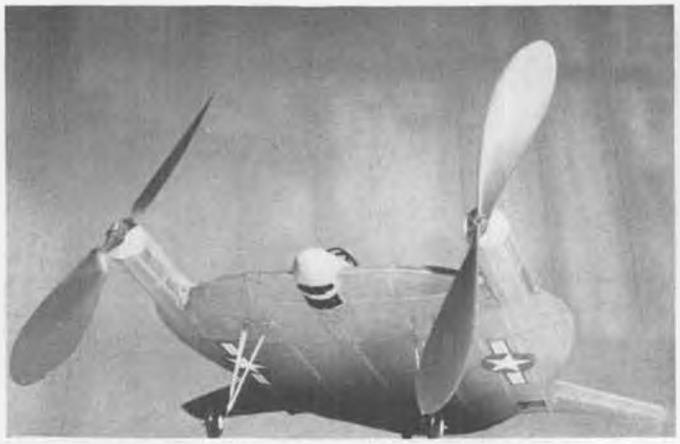
5) Don't be discouraged by previous failures in the contest.

I would like to thank all of the people who helped in this year's event. Without their participation, there would be no Peanut Proxy Contest. Special thanks to Bill Bovee, of Cal State, Long Beach. Bill has been the one responsible for our using the gym. Also, one of Bill's employees, Mike (I didn't get his last name), who was helpful in rescuing George James' "Goon" from behind the folded bleacher seats with a swimming pool rescue hook. How Mike ever pulled the light, condensor paper-covered peanut free from its internment, I will never know! •

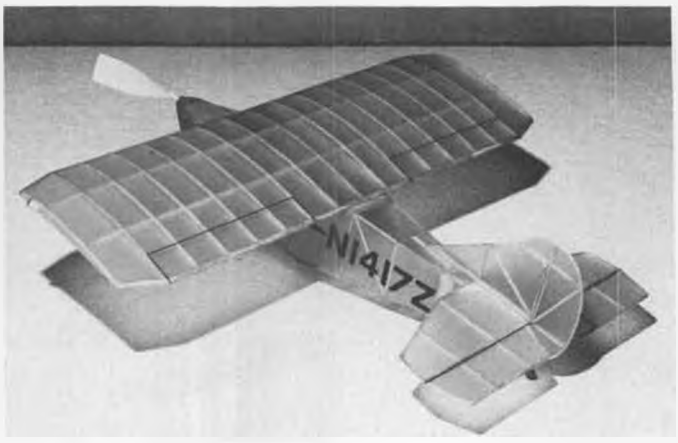
by BILL HANNAN

• Having spent the previous three **Model Builder** Postal Peanut Contests in the static judging and proxy flier role, it seemed time to sample the action as a contestant, for a change. Certainly, one gets an entirely different perspective on the proceedings in this manner!

Chuck Conover handled the communication and logistics this year, and in my opinion, did an outstanding job. The myriad of details in-

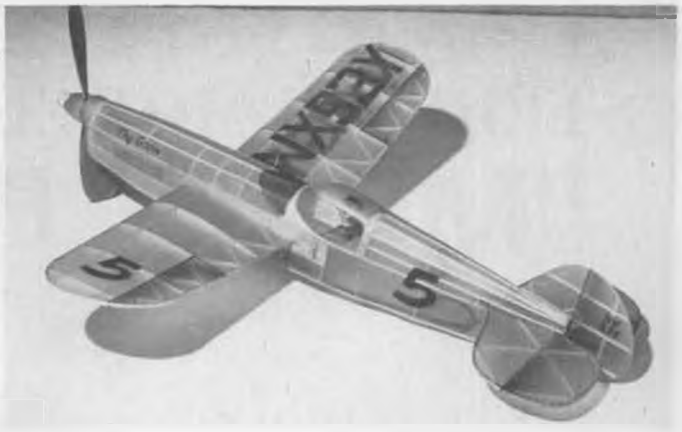


Bill O'Conner's Chance Vought "Pancake". As with a previous pancake entry, it DNQ.



Chuck Conover's Fike E. Lookit all that area! Averaged 42 seconds.

Pert Little Smith Miniplane, by Doug Hinkel, Salem, Wisconsin. Averaged 17 seconds.



George James' Chester Goon. Super light, it averaged 41 seconds.

volved in such an undertaking demand the utmost in patience and understanding, and few would be willing to trade places with Chuck, who manages to remain calm and cheerful, even under pressured conditions.

Aero photographer Warren Shipp agreed to document the meet on film this year, and it was a pleasure to accompany him during the hour-and-a-half drive from Escondido to the Cal State University, Long Beach contest site. At least, it *was* a pleasure, until he started unloading his enormous collection of photographic equipment! But, after several trips carrying (he says "schlepping") cameras, backdrops, lighting fixtures, etc., to the judging room, I began to wonder. All this to shoot Peanuts? Warren doesn't do things halfway.

Model processing went smoothly, in spite of a smaller-than-usual turnout of volunteers. Several "regulars" found it impossible to attend, owing to job conflicts or having moved away, and they were sorely missed. One disgusting note which cast a pall over the early proceedings was the discovery that two of the models had been stolen during the night. It is difficult to fathom the mentality of anyone who would stoop to such an act. One of the models had traveled all the way from England, and according to those who had seen it, was the best-finished of all the entries. Belonging to Butch Hadland, the model Monocoupe was removed along with another new Peanut, belonging to Flightmaster President, George James. Apparently, the thief or thieves did not know much about aircraft, as the propeller of one model was left behind. George was able to rush home for a replacement model, but must certainly have been demoralized by the incident. Hadland's shipping box, also left behind, was in a class by itself, and probably represented more man-hours of effort than many of the models. It is hoped that the stolen models may be returned to their rightful owners.

Ken Johnson's 1911 Cessna tied for 2nd highest points. Average 53 seconds, flew in 10 foot circles.

In spite of this unfortunate start, it was felt the contest must proceed, perhaps with a slight additional amount of determination. Many beautiful aircraft were on hand this year, and as is usual in Peanut events, the variety was the spice of the affair. Designs which might not even be considered seriously for larger model projects, seem quite logical to explore in Peanut size. As an example, Benno Sabel's Polish Drzewiecki Canard not only looked intriguing, but proved eminently airworthy, as well. Other sure-fire attention grabbers were the Whitehead pre-Wright Brothers aircraft,

Continued on page 126

XP-55 Ascender by Bill Wheeler, Portland, Oregon, just made the 10 second minimum, 3rd in WW-II.

Pemberton Billing, PB-9 flew no better than original, for Bill Sherman, Highland Park, Ill.

Presenting . . .

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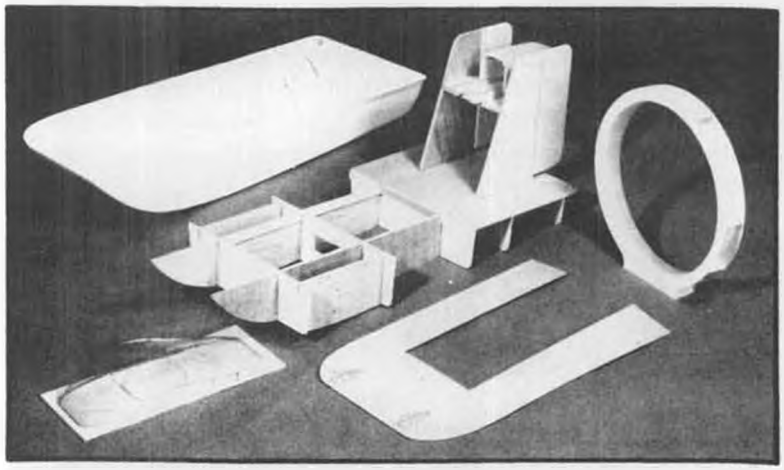

Frame Photo Reveals Simple-Rugged Construction

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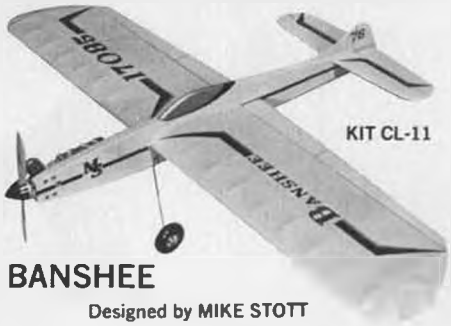

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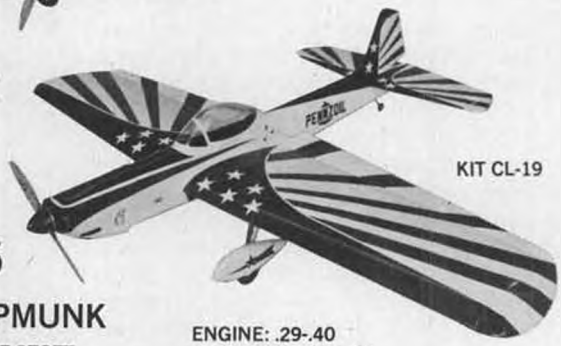

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From nose to tail, the "Atavist" is simplicity in itself. It might not be as pretty as some other free flight ships, but it's a winner.

Popped-up tail is common sight on this model. Hand "coming up out of the washing machine" has a real good grip!

THE "ATAVIST"

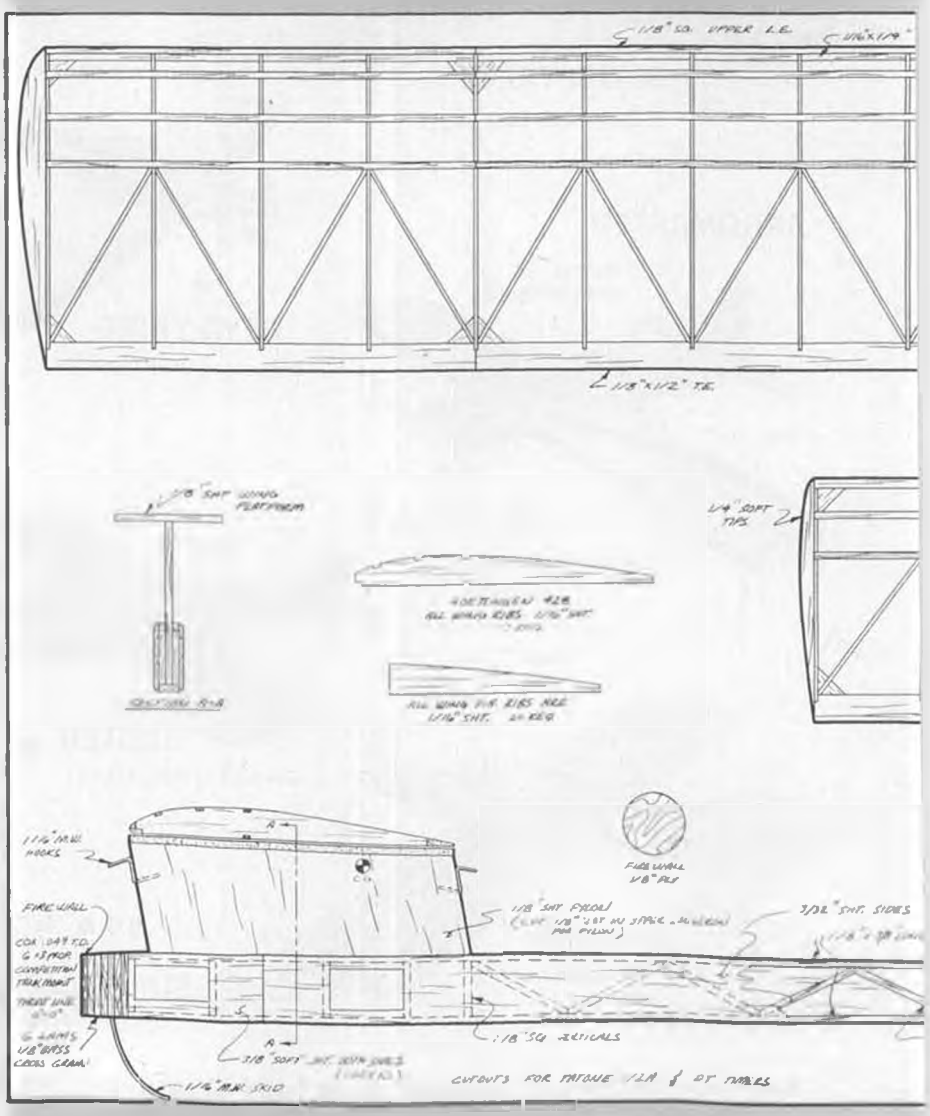
By BILL LANGENBERG . . . Quick to build and highly competitive, the "Atavist" is one of the new, smaller-than-usual 1/2A models.

• The Atavist is aptly named (A person or thing characterized by reversion to an earlier type; a throwback). After designing, building and flying streamlined, complex gas models such as the "Shrike" (**MB**, June 1975), I came to the gradual conclusion that esthetically pleasing ships are not necessarily vital to success on the contest circuit.

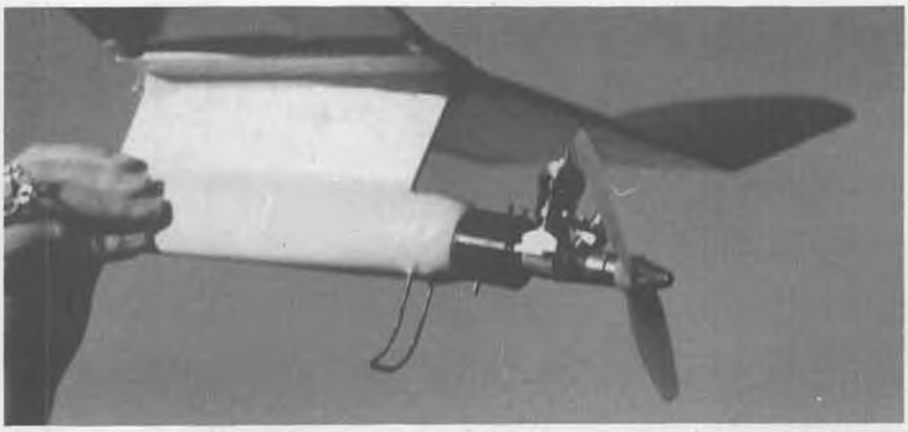
Several changing conditions led to that judgement. First, reduced engine runs in the AMA gas events (9 to 12 seconds) put more emphasis on the climb, and in particular, a consistent, stable power pattern. Second, a sharp reduction in my desire to build, and time available for that purpose, put a premium on simple, straightforward construction. Finally, the occasional loss of a model through wear and tear, accident, crash, OOS, or sundry other causes, fostered the need for a simpler replacement design.

As a result of these influences, the Atavist was conceived. It was designed to be smaller (252 sq. in. wing) than my previous 1/2A-A models, in order to increase altitude achieved during the power run. A flat-bottom, 8% wing and stab airfoil was selected to facilitate construction and minimize drag during the climb. Diagonal ribs in the wing and stab were included to enhance torsional rigidity in those surfaces. The fuselage was designed as a straightforward box, with no compound curves other than the simple fairing of the nose into the firewall and engine mount.

To date, the Atavist has performed up to all my expectations. The model has a consistent, grooved power pattern which seems relatively impervious to normal wind or gusts. Altitude gained during the climb appears higher than my larger, more streamlined models. While the Atavist has a glide somewhat inferior to its larger predecessors (as expected), it thermals easily and tenaciously. Since most contests are flown dur-



Clean, simple lines of the model are evident in this photo.



The Cox Tee Dee .049 is mounted on a Competition Models tank mount. Thin airfoils and small overall size make for a skyrocket climb.

ing the presence of thermals, I frankly believe the Atavist can compete equally with the more streamlined, complex models under typical contest conditions.

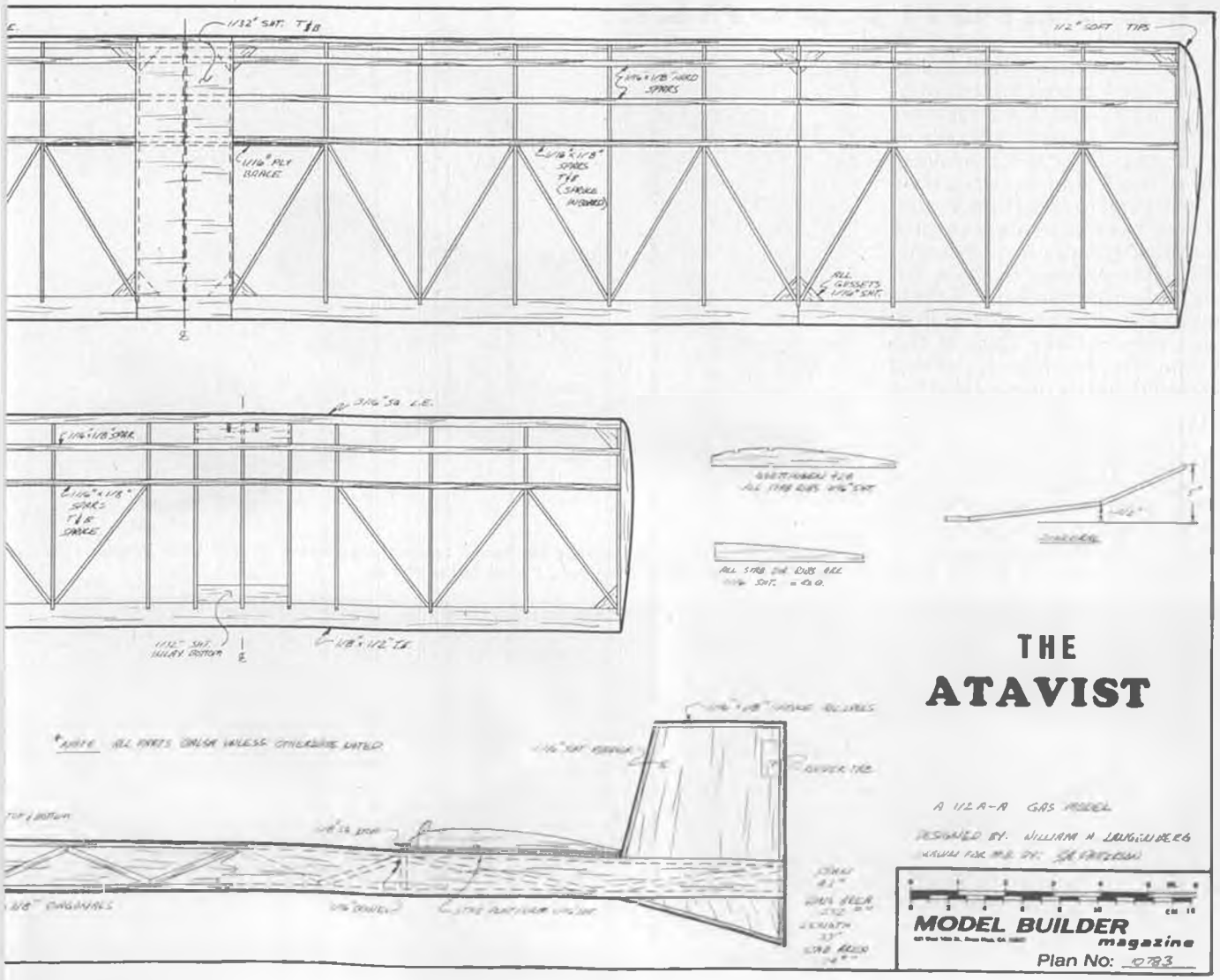
But that is enough of a prelude. If the design appeals to your tastes, and you seek a consistent, durable 1/2A or A model which will permit you to compete rather than build, the Atavist may be for you.

STABILIZER

Begin construction with the stabilizer so that it can be covered, doped, and cured before any test flights are attempted. To withstand the rigors of D-T landings and enhance durability, spruce spars, as shown on the plan, are utilized. Balsa can be substituted if weight is the ultimate criterion to the builder, although this is not recommended.

The stabilizer should be covered with tissue and given at least three coats of thinned dope. I normally prefer nitrate to butyrate dope, because it appears less susceptible to

Continued on page 112



FULL SIZE PLANS AVAILABLE — SEE PAGE 144

Daniele Vescovi, Ferrara, Italy, won first place in the World War I category of the 1978 MB Peanut Contest, with a beautiful Ansaldo SVA-14. He sent us this photo of himself, launching his 1909 Paulhan-Tatin. He also won Best Workmanship for a foreign entry.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• This month's article is being written while flying across the countryside. My family and I are taking a vacation which, in part, will take us to Washington D.C. and Johnsville, the site of the Flying Aces big scale bash. In trying to keep pace with time, I have been working feverishly on my full-size bipe, in hopes that this will be the summer that was. It is unbelievable how much detail there is to take care of before going on to the next step. At any rate, at this exact time, the fuselage is painted and trimmed, and is presently at the airport. The tail group and two lower wing panels are painted, while the two upper wing panels are covered and ready for painting. When we arrive back home, I hope to start assembling the whole works and completing the final details, in preparation for the big flight. Walt

Most static points overall at the 1978 MB Peanut Contest, were earned by Jack Little, Menlo Park, Calif., for this Fairey Barracuda. Placed 2nd in WW-II.

Dick Baxter's Lemberger LD20 averaged flights of 40 seconds duration. Note corner gussets.

Cute and flyable as it seems, Ced Galloway's Thorp T-18 could not average 10 secs. minimum.

This Macchi by George James, refused to make 10 seconds, broke wing in process.

Curtiss P-1 was entered by Bill O'Conner, Sr., Scottsdale, Arizona. Placed 10th in Golden Age.

Mooney is ready to do the test hop.

With all this going on, I have been busy trying to ready four models to send back to the F.A.C. bash, while preparing yet another model to send to England. Everything seems to be a bit hectic, but I love being so involved in aircraft, whether small or big. Next month, I hope to have coverage of the F.A.C. meet. I just hope it doesn't rain for this occasion.

Another **Model Builder** Parcel Post Proxy Peanut Contest has been recorded for posterity. How the time flies! I don't want to delve into a lot of detail covering the contest (I hope the photos take care of that), but I do want to cover a few problem areas that seem to persist. There are still far too many models which have never flown prior to this contest. I still feel it quite unfair for our modelers to have to do all the trimming prior to taking an official flight. I know that having access to an indoor site is quite an impossibility for many, but at least the models should be flown outdoors to see whether or not there is any prospect of flight. If your model has been tested outdoors only, then you should provide a smaller motor, since it will require less power to fly the model indoors. If the outdoor motor is left in the model with no other instructions, the model is wound and released, usually flying at high speed into the rafters or the walls. This can eliminate an entry very fast!

Another problem area that I encountered was the size of material used to secure the motor peg; that is, the balsa material that the motor peg runs through. On one model, I pulled on the motor to prepare for winding, when all of a sudden I had both the motor peg and rubber in my hand! The material size was not much bigger than the diameter of the peg. It looks much neater this way, but there is no chance for it to hold under winding. Many models that I saw had very small openings behind the removable nose block, which makes it very tough for a

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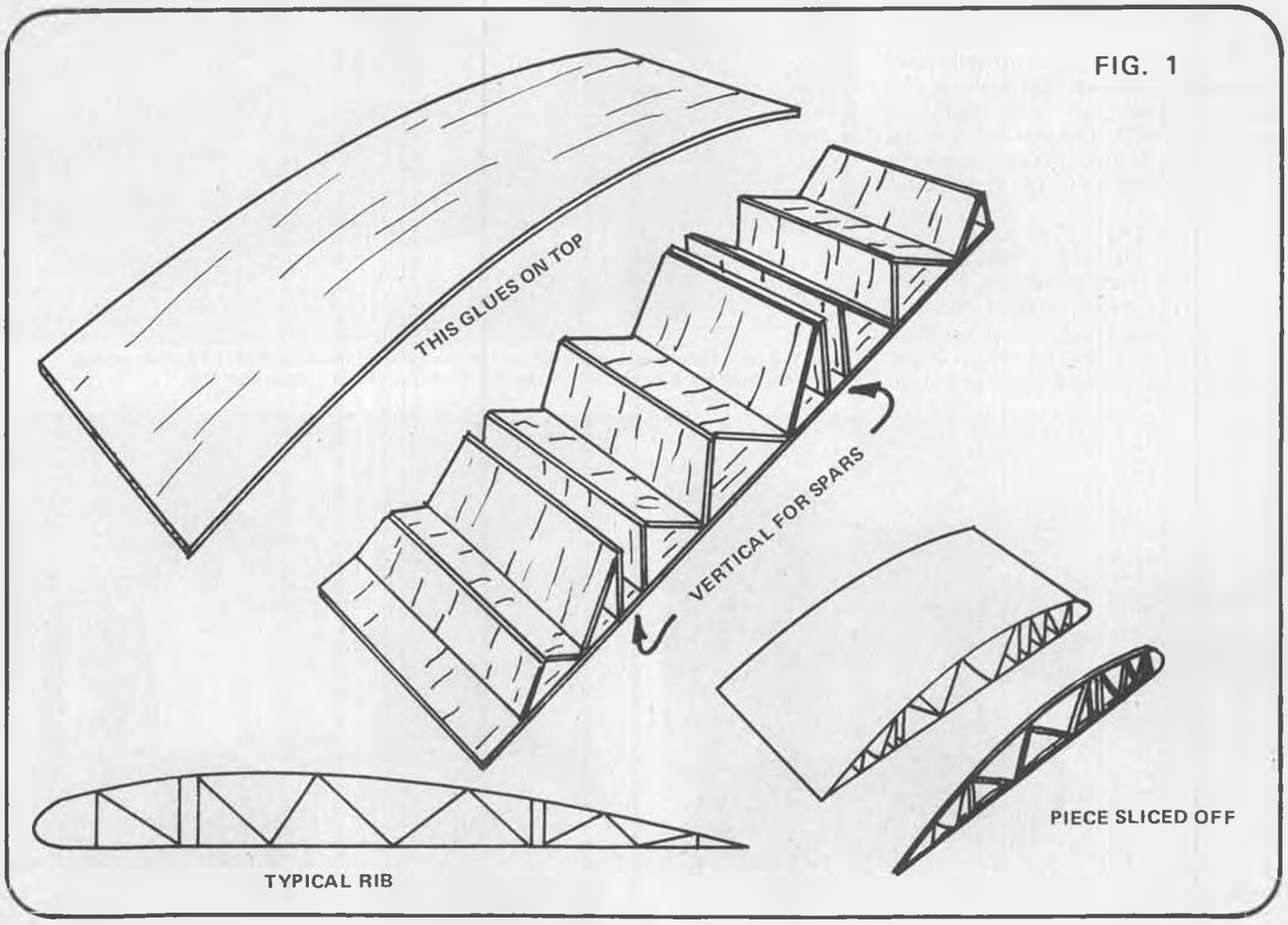
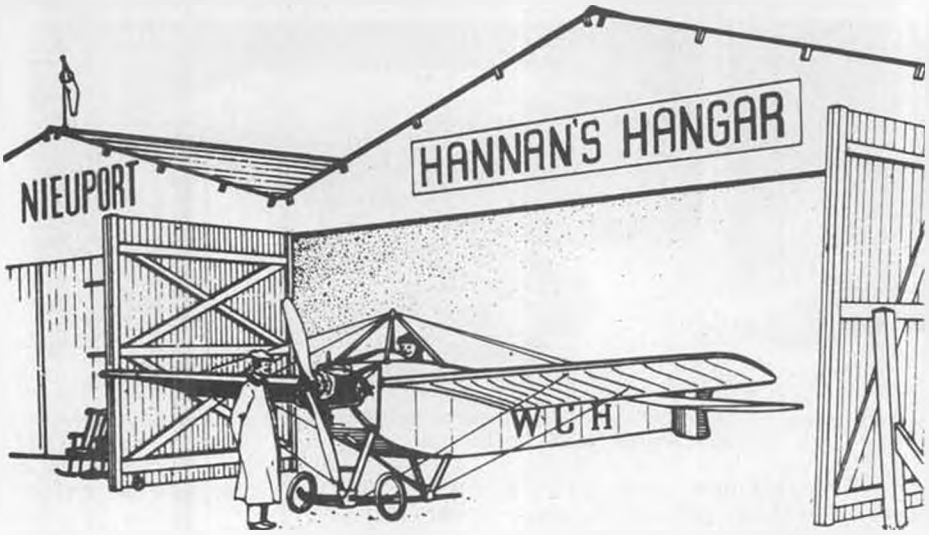
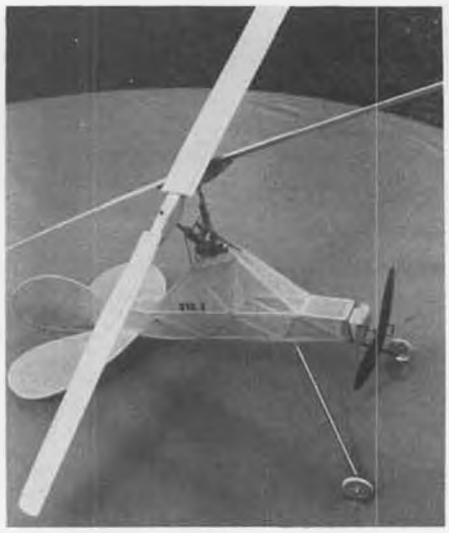






George Chaulet's rubber-powered synchro-gyro. Rotors are geared to keep them from beating each other to pieces.

"To invent a flying machine is nothing; to build it is little; to make it fly is everything."

• Our quote this month is from the pen of Captain Ferber, pioneer French aircraft designer, circa 1909.

THE FORWARD LOOK

Speaking of pioneers, the Southeastern Oklahoma State University TECHNOLOGY USE STUDIES CENTER newsletter, yielded this tidbit: "Rudolf Nebel asked the German army for assistance in building an airplane in 1912. The army replied, ". . . an aircraft can never have military significance because flying an airplane requires acrobatic agility."

And from the same newsletter: "The first American flight of a rocket-powered aircraft was made on August 23, 1941. The aircraft was an Ercoupe with the prop removed, and was piloted by Captain A. Bousney, Jr."

NEW CATALOG

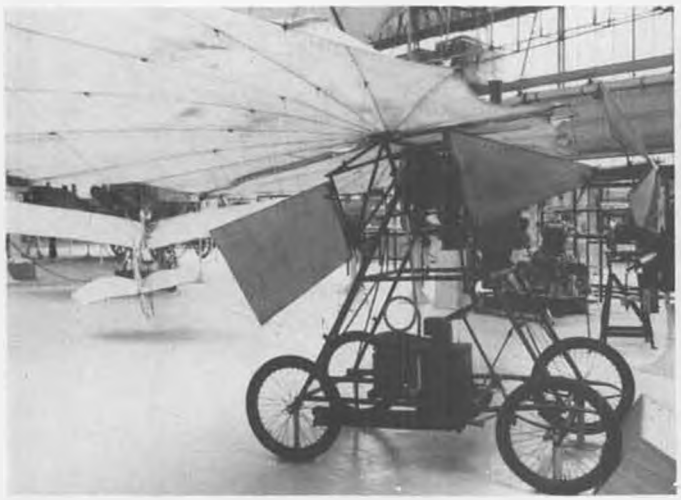
Oldtimer Models offers a compendium of their products, including model plans, wood, tissue, condenser paper, wheels, propellers and many more items. Certain of the offerings are not likely to be found elsewhere. For example, how about a pair of wheels for a Jimmie Allen Bluebird? Or, goldbeater's skin for covering ancient model aeroplanes. A stamped, self-addressed envelope will bring you a copy of this intriguing offering. Box 18002, Milwaukee, WI 53218.

WORLD TRAVELERS

One of the great "fringe benefits" of being a model builder is the opportunity to develop wonderful friendships with people of like

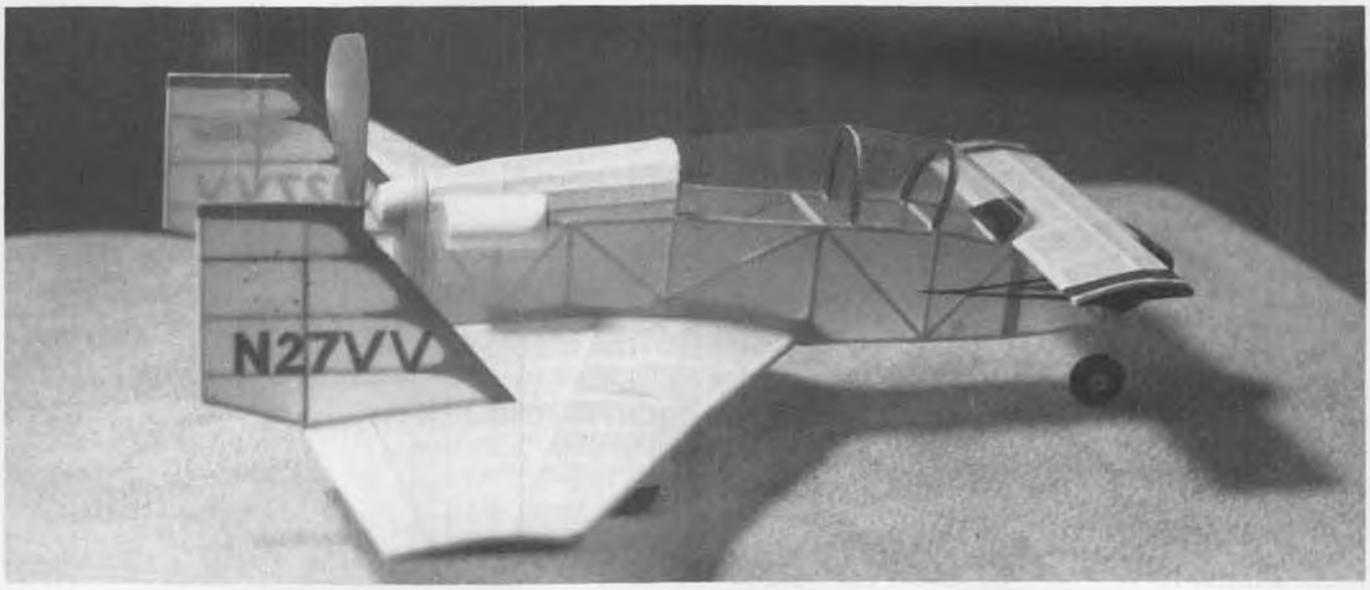
Continued on page 131

Karel Ludvik, of Czechoslovakia, did an excellent job on this Avia B.H. 21 rubber model. Didn't say how big it is. Photo by Lubomir Koutny, also of Czechoslovakia.



George Chaulet sent in this photo of the 1906 CO_2 powered Vuia monoplane, now in French Air Museum.

Last month's mystery modeler photo from 1942 was this well known rubber scale and indoor flyer, Clarenc Mather, San Diego.



PEANUT SCALE

VARI VIGGEN

By STEVE GARDNER . . . One of the most unusual Peanuts to come along, Steve's Vari Viggen is an excellent flier. Guaranteed to cause heads to turn!

• If you like to build unusual models, this one will fill the bill. It is a twin-tailed, canard pusher homebuilt, designed by Burt Rutan, of the RAF (Rutan Aircraft Factory). Rutan has also designed an all-fiberglass canard pusher called the VariEze, but this aircraft wouldn't make a very good peanut, so I built the Vari Viggen, an all-wood, two-place, semi-aerobatic homebuilt.

As a peanut, the Viggen is a real winner. It has lots of wing to carry its greater-than-average weight. It is very stable with its small amount of dihedral, probably because of the keel effect of the fins and rear fuselage. The canard (stabilizer) is scale size and shape, and is more than adequate with a forward CG and lots of incidence.

The full-size aircraft is very stall-resistant; since the first thing to stall is the elevators, the wing never gets a chance to stall. This characteristic is in the model, too, so you don't have to worry about stalls.

The model's construction is conventional, even if the shapes of the parts aren't, so you should have no trouble with it. The fuselage consists of two sides joined by formers and cross braces. Formers No. 2 and 3 are laminated from several thin strips of balsa. This is unusual for formers, but it looks better and is closer to scale than sheet balsa. The nose and motor plug are made of balsa blocks, and the engine cowls are made from Dristan bottle corners. A 5-inch Peck Polymers prop, trimmed to 4-1/2 inches, will do fine with a 12-inch loop of 1/8-inch rubber.

Only half of the wing is shown on the plan, but it is very easy to build. The tip rib is 1/8 sheet balsa, the dihedral break rib is 1/16 sheet, and all others are 1/32 sheet balsa.

The canard is also built with 1/16 and 1/32 sheet ribs. When mounting the canard, glue only the leading edge, so that it will break free, instead of destroying the nose.

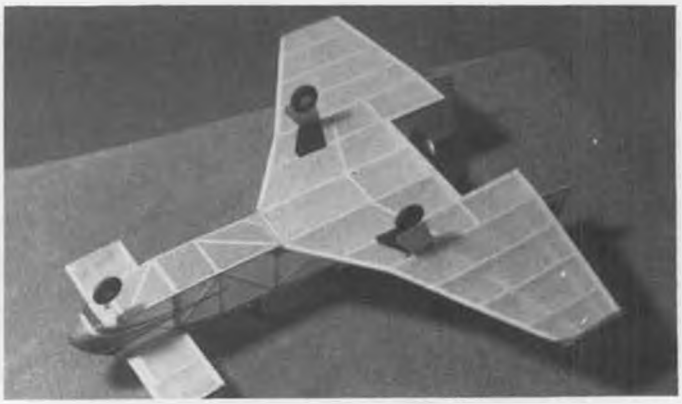
Build the fins straight, and don't shrink the covering or you will get real warps. The fins are big and thin, so they can warp badly. Glue them to the wing at the dihedral ribs, and at a right angle to the outer wing panels.

One coat of Sig Lite Coat dope finishes the model. The red and blue trim can be added now.

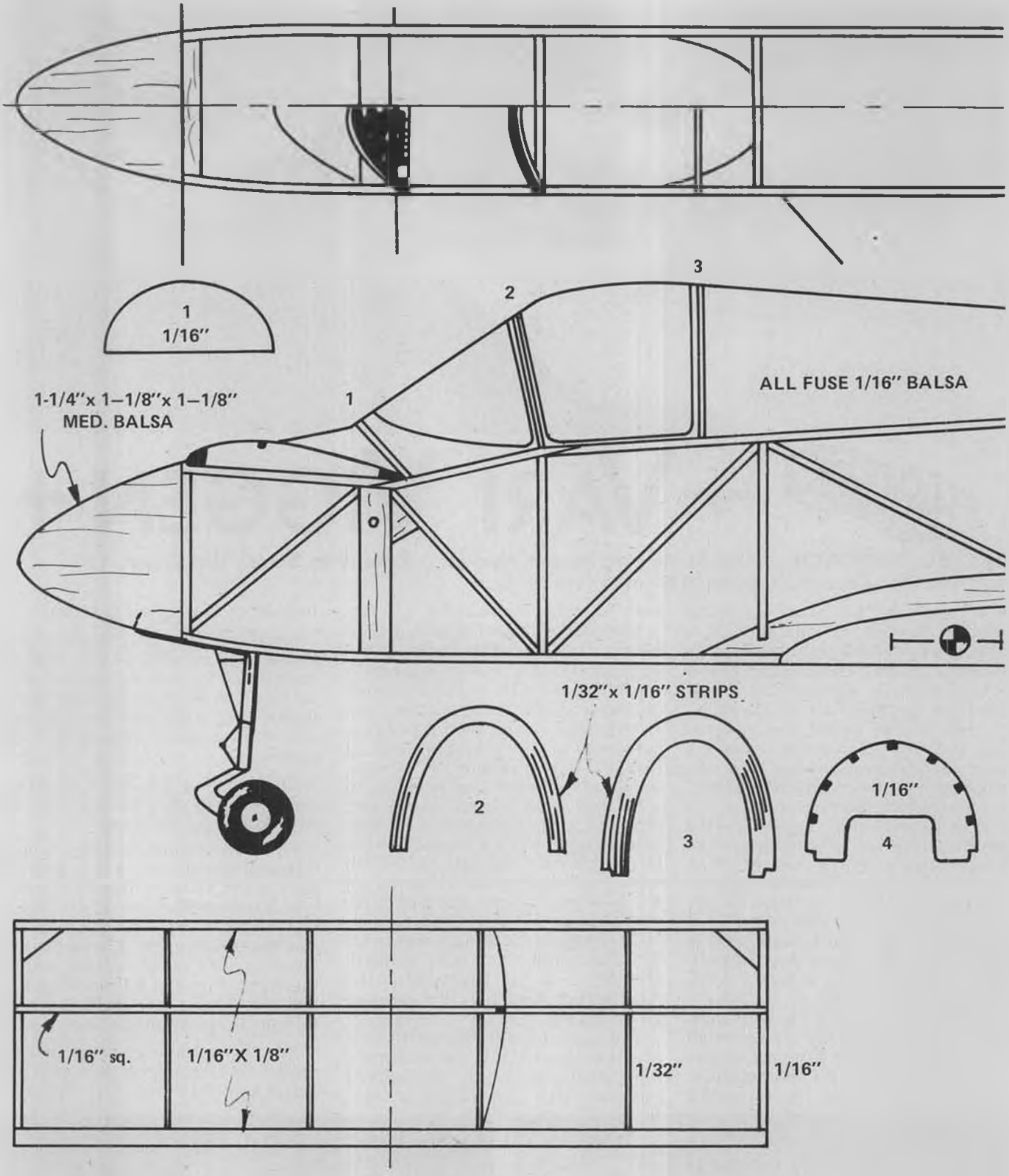
To fly the model, balance it well forward, and use lots of incidence in the canard. With its high thrust line, it will not need much down thrust, but some right thrust may be needed, although this isn't very effective. The model will fly best to the right, but it will fly well to the left, too. Also, a little wash-in seems to help keep the inside wing up.

You now have an interesting model to take to the next contest. Good luck with your Vari Viggen!•

Like all properly-designed canards, the model is very stall-resistant. Lots of wing area.

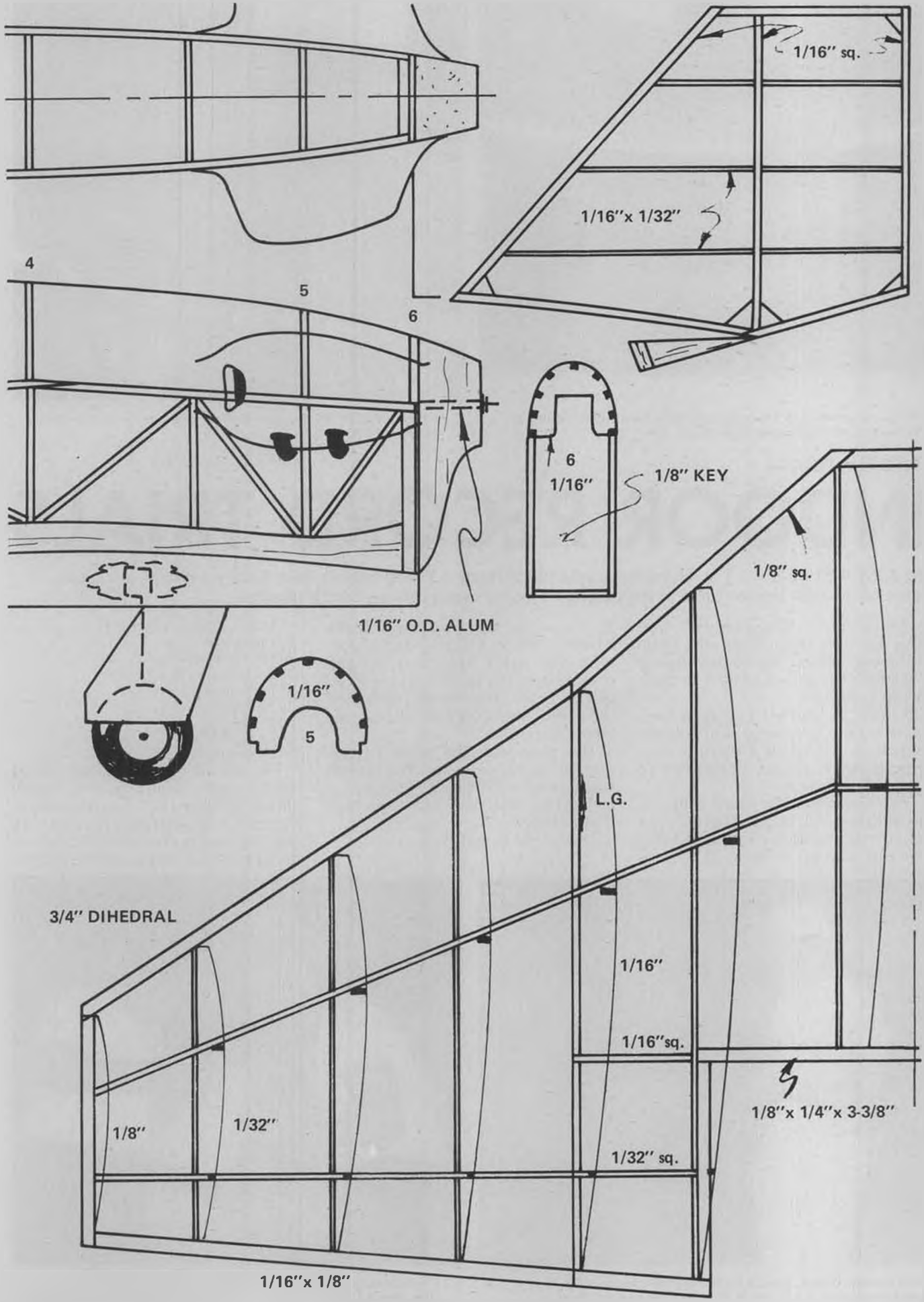


Bottom view gives a good idea of the amount of wing area. Stabilizer is vulnerable, is glued lightly so it can break free.



VARI VIGGEN

DESIGNED BY: STEVE GARDNER


1/16" sq.
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4
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1/8" KEY
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1/16" O.D. ALUM
1/16"
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L.G.
3/4" DIHEDRAL
1/16"
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1/32"
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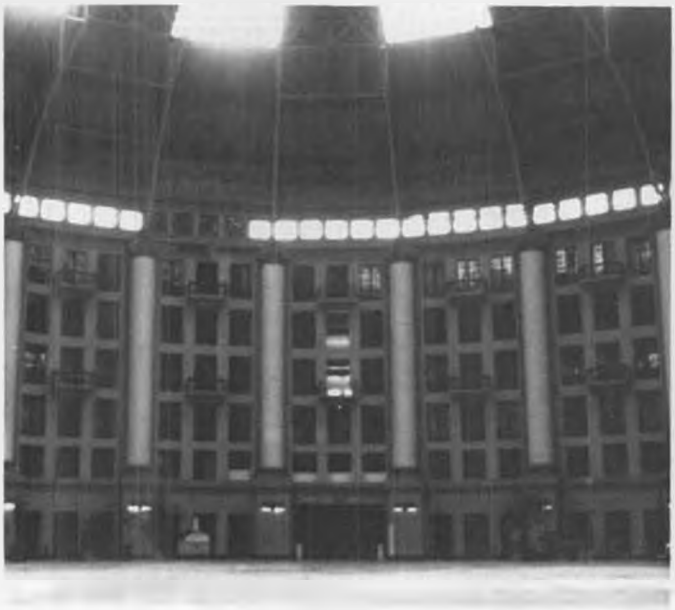
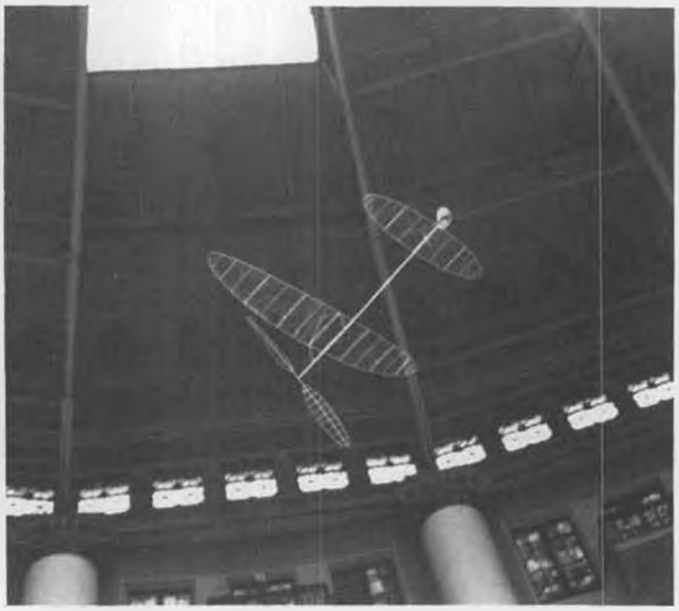
1/16"x 1/8"



The site of the Record Trials was this 150-foot diameter atrium at the Northwood Institute of West Baden, Ind.



A classic shot of Bill Shailor's Kowalski-designed microfilm stick model. On the way up.

INTERNATIONAL

INDOOR RECORD TRIALS

By JOSE TELLEZ . . . The Third National Indoor Record Trials, held at West Baden, Indiana, attracted some of the best indoor fliers in the country. Records were broken by the handful.

• They came to break records, and they set new records in wholesale numbers, taking home handsome "THNIRT" awards to attest to their flying expertise.

"They" are the better indoor fliers in the country, who were more intent on setting new records than engaging in direct competition against each other.

The event was the Third National Indoor Record Trials (THNIRT, get it?) of the National Indoor Model Aircraft Society, on June 23, 24, and 25. The event was organized by the Miami Indoor Model Association, with Dr. John Martin of Miami presiding as the hard-working Contest Director. The THNIRT followed the FNIRT and SNIRT of the past two years, of course.

The place was the superb Category II facilities of the Northwood Institute of West Baden, Indiana . . . a 150-foot diameter, 85-foot high flight atrium.

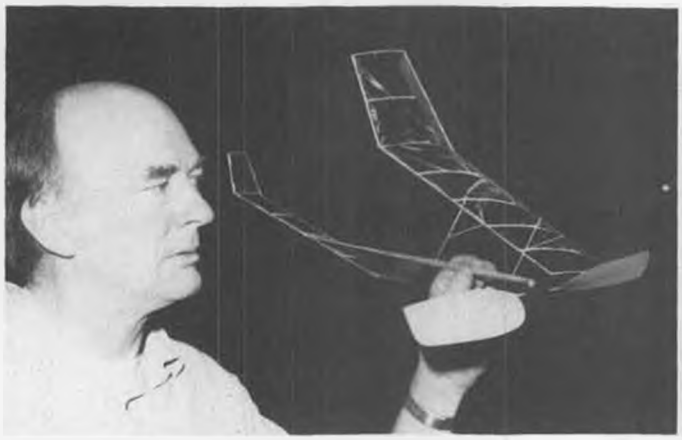
The winners were:

1. Dave Lindley
2. Dave Lindley
3. Dick Obarski
4. Jim Richmond
5. Bucky Servaites
6. Jim Richmond
7. Al Rorbaugh
8. Ron Ganser
9. Cezar Banks
10. Dennis Jaecks

The award rankings were based on an index point system, which allows all ages and all categories to compete against each other by comparing the contestant's flight in his age group and category against

Dave Lindley (right), assisted by father, Don, prepares for an attempt to break the Jr. Cat II Baby ROG record. He made it.

C'mon, you guys, pick on someone your own size! Larry Loucka, Dick Obarski, and Ron Ganser prep Ron's Baby ROG for a flight.



Cezar Banks and his newest Pennyplane, covered with silver Microlite. Note huge prop blades and stab tips. Did 10:53.

Ron Ganser, an outstanding craftsman from Pittsburgh, and his twin-rotor autogyro. Ornithopter on stand in background.

the existing national record. If he beats the record, he gets a point index greater than 1.00; if he falls short of the record, he gets a fraction less than 1.00.

In addition to the above winners, who received THNIRT trophy mugs, two fliers received special trophies for the following placings, not currently recognized for official record purposes:

Al Rorbaugh	
For Ornithopter	2:47.7
For EZB	16:30.2
Walt Van Gorder	
For Manhattan Cabin (new unofficial record)	9:15
For Novice Pennyplane (new unofficial record)	11:09

Now that you have the formal statistics, let's get down to the interesting details of the event. Last year, we reported on the devastation caused by strings dangling from the dome of the rotunda. This year, either most of the strings were gone or the fliers were more aware of them and controlled their craft to avoid them. The platform trapped some models, but their owners retrieved them by stepping gingerly (and frighteningly) along the small struts 100 feet above the floor.

Al Rorbaugh holding his record-setting ornithopter. Climbs to about 50 feet.

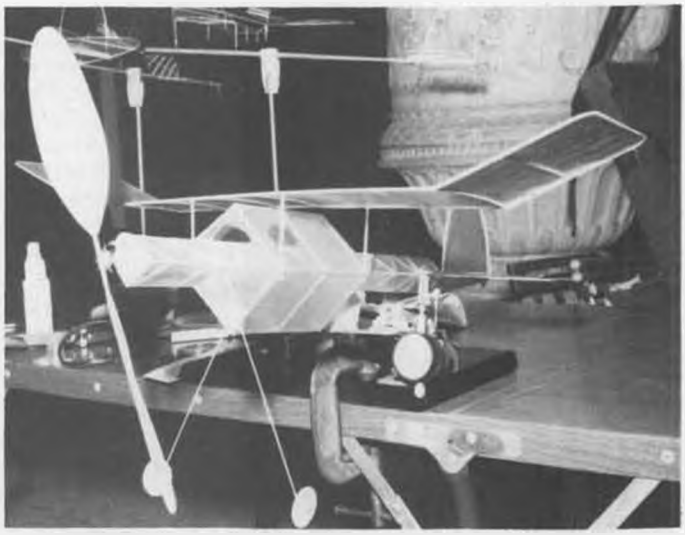
However, if you were to become interested in the fragile and slow world of indoor, I cannot think of any place or any time that you could receive a more concentrated and expert introduction to the hobby, than the annual NIMAS record trials. You have the opportunity to meet and learn from the elite indoorsmen the fine points and strategies that make them winners.

The first official flight was launched by 12-year-old Dave Lindley, of Naperville, Illinois, who soon set a new national record of 9:12 for Baby ROG in junior Category II (ceiling height between 35 and 100 feet). Not satisfied, he launched his autogyro, which topped an earlier junior national record in Cat II flying with 1:25. To prove this flight was no fluke, Dave topped it later to set the record at 3:53.6, and he wasn't through yet! Dave summoned timers into Northwood Institute's dining room, where he set a Category I (ceiling height under 35 feet) junior record of 1:06. With this performance, young Dave took overall high points, winning first and second places for the meet; a remarkable feat, considering the big-name competition he faced.

Another junior who was a record setter at West Baden last year, Mike Van Gorder, was practice-flying FAI under the coaching of Bucky Servaites. It is a pleasure to see the seriousness and dedication of this new generation of indoor fliers.

Several more records were shattered on the opening day by the select group in attendance. Al Ror-

A smiling Jim Richmond, just after setting a new open Baby ROG record. High aspect ratio wing and long motor paid off.



Ron Ganser's Manhattan Cabin on its winding stooge, which registers the motor's torque as it is being wound.

Dick Obarski and his helicopter, just before setting a new open record at 8:47.6.

Doc Martin, Trials C.D., flew this 24-inch Weyman Lepere in Indoor Scale.

Charlie Sotich's seven-year-old Volksplane consistently gets over-two-minute flights.

baugh, of Fort Wayne, established his open class indoor ornithopter mark with a strange, intricate, and delicate contraption which defies analysis and description. See for yourself in the photo!

Dick Obarski, of Pittsburgh, put his helicopter up for an open indoor record-breaking flight of 8:47.6. If you have ever flown this event, you must realize that this record will be with us for quite a while.

Throughout the day, a "private" contest was taking place between three of the very best indoor men you can find anywhere. Flying A ROG's (Baby ROG's), Jim Richmond, Ron Ganser, and Al Rorbaugh were trying to determine whether a high or a low aspect ratio is superior for this class. Richmond's ship, which is shown in the photo, has a slender 18-inch wing and a correspondingly long fuselage. This combination makes for a flimsy structure, which had a hard time taking the initial power burst and getting off the ground. (Jim claims this model is 11 years old, in spite of its flimsiness.) Ganser's ship, on the other hand, had a short 12-inch span, and was stubby and relatively rigid. Al Rorbaugh's ship was also in the low aspect ratio class.

Well, folks, in the end, long wings, a long motor, patience, and scientific fine tuning paid off for Richmond, who broke the record with a flight of 16:05, just as the motor dropped out of his airplane! Now, the big question: was the flight legal, illegal, stopped when the motor hit the ground, or stopped when the remainder of the model hit the ground? Wouldn't you think that something like this would be covered by the AMA rule book? Well, it is not. The situation is spelled out clearly for Hand Launched Gliders and for a couple of other categories, but it is definitely not specified for FF indoor rubber (tsk, tsk, tsk).

Mike Van Gorder practice-flew this FAI job under the tutelage of Bucky Servaites.

The great debate was ended when Jim improved on the questionable flight by staying up for 16:50 on the next flight. To top it off, the next day he set a record of 17:33. You had to be there to appreciate the limits of perfection that Jim achieved on this historic flight. I predict the record will stand for a long time.

Jim didn't quit there. He closed off his first day of flying with one more national record to his credit. Jim flew a 270-square-inch Class B Stick for 36:21.4, using a rubber from what was described as a batch of "new' Pirelli, supplied by Ray Harland. (Rubber was argued more than any other subject at the meet, but super rubbers flopped or broke records just as much as the old doggy rubbers.) Jim's 270-square-inch ship is a beauty to watch. Even with the initial power burst on takeoff, the enormous prop is turning no more than 40 rpm, then settles down to a steady 36 rpm. Toward the end of the flight, it starts coming down as the prop slows to about 33 rpm. Jim says he'll be applying for a world record, based on this flight in the open Hand Launch Stick category.

I am happy to say that Southern California was well represented by Cezar Banks, of San Diego, who upheld the reputation of the Land of **MB** in open Novice Pennyplane with a flight of 10:53. Unfortunately for Cezar, just a little later Walt Van Gorder of Cincinnati, topped Cezar's flight, posting 11:09.9 for a new record. Ironically, Walt used Cezar's design to beat him out of the record.

A very famous reporter from Miami and Riyadh, Saudi Arabia, who caters to an unmentionable publication under the pseudonym of VTO, was seen to furiously build an indoor HLG between photographic missions. When the glider crashed, damaging the beautiful mosaic floor of the atrium, he quickly converted the remains into an indoor helicopter. Sadly, this too was a failure, and he was last seen converting the remaining remains into a Desperado Canard biplane LX-4, to enter the scale event on Sunday. (The original LX-4 is known to have crashed on its initial test flight.) Although we left before the conclusion of the scale event, we are certain that Dave Linstrum must

Bob Larsh was the only flier who came close to the existing indoor HLG record.

Mr. Micro-X, Gerald Skrjanc, flew this well-detailed Pilatus Porter in Scale. Now being kitted by Micro-X.

Cezar Banks holds his record-breaking Pennyplane while Dave Linstrum takes measurements. Flight was later beat by Walt Van Gorder.

have taken honors by reproducing the flight qualities of the original.

The last morning of the contest was devoted to Indoor Scale. Although there were a few more entries this year than last, it is a shame that more fliers don't take advantage of this incomparable flying site.

Some very noteworthy efforts were observed. Charlie Sotich, of Chicago, had a true indoor Volksplane, which weighed in at only 0.09 ounce! It is covered with Microlite, and is a smooth flier, from takeoff roll to no-bounce landing. CD Doc Martin unveiled a 24-inch Weyman Lepere, done up in silver Microlite. Doc's model is very light, and should be a good flyer when he gets it tamed down. On its initial test flights, the zero-dihedral ship was performing some wild skidding turns.

Gregg Thomas, of Minneapolis, had a beautifully detailed peanut-sized Tailwind. Gregg, a designer for a well-known computer firm, used his drafting talents to advantage. After clear doping, his model was detailed using a 000 technical drafting pen, loaded with ink for drawing on acetate. For accuracy, Gregg cuts a pattern of the object (such as a door or aileron) from acetate, sticks on some spacers to raise it above the model's surface, carefully positions the pattern, and outlines it on the model. Very simple, if you are patient and have been doing it for a few years. To give you an idea of Gregg's patience, the instrument panel on his 12-inch Tailwind has a navcom radio that can't be over 1/2 inch on each side. The radio has cooling holes painted on the case . . . not randomly spotted, but in neat, staggered rows, precisely spaced! The cable from the rear of the radio is shielded with metal braid, of course!

Gregg also flew a peanut Lacey. I watched him prep a new motor for this bird, using a loop about three to four times the length of the fuselage. After making the knot in the rubber loop, Gregg seals the knot with a drop of cyanoacrylate. This surprised me, but Gregg claims he has never yet had a break at the knot.

Bob Clemens had a small fleet of well-behaved peanuts, including a BD-4, a Farman Moustique, and a Wright WP-1.

Gerald Skrjanc, of Micro-X Indoor Supplies, had a beautifully detailed Pilatus Porter, which had been tissue covered, lightly doped, then sprayed with thinned-down Floquil paint, and finally detailed with India ink. Gerry is now kitting this very good-looking model. I did not see it fly, but judging from its good proportions, it should be a winner. Most scale aircraft have such short nose moments that they usually require nose weight, but with its long nose, this Pilatus should require no extra ballast to balance out.

One last model which deserves special mention is an SE-5, built and flown by Dennis Jaecks, of Gainsville, Wisconsin. This all-sheet model is not too unusual, until you find out that Dennis sawed his own sheets from choice indoor wood. (As an **MB** exclusive, we bring you Dennis' secret: he uses a Sears plywood

Continued on page 116

This beautifully-built Farman Moustique belongs to Bob Clemens, of Rochester, N.Y. Flew as well as it looks.

Another view of Ron Ganser's twin-rotor autogyro. Model gets its lift partly from the rotors, partly from the short wing.

Ted Stalick preparing his "Skyscraper" Wakefield.

Ted Stalick flew his "Skyscraper" at recent Dick Stark Memorial Meet. C.D. Guntis Sielens in background.

FREE FLIGHT

By BOB STALICK

• The Nats are over for another year, as you read this, and you are now on your way across the country to get to Taft, California, just in time to get in a couple of practice days prior to the upcoming FAI Team Selection finals. One thing about free flighting, you do get to see a big bunch of countryside. All along the way there are friends to stop in to see, throw the sleeping bag on their floor, and mooch breakfast from, before heading on down the road again. In deference to the FAI mood of the Labor Day weekend, how about some thoughts and features about this phase of modeling in this issue of **Model Builder** Free Flight? Sound okay? Here goes . . .

THREE VIEW OF THE MONTH:

Re-Tern V

Back in 1961, Gerry Ritz became the first (and so far, the only) American to win first place in the newly-developed Nordic event. Gerry won the event by flying his now famous "Continental" design, but in the September issue of American Modeler, he recounts how he won his place on the U.S. team by flying a straightforward V-winged model which he called the Tern V.

About 7 or 8 years later, your columnist was beginning to try out A/2 gliders, and decided to build the Tern. Some minor (fiberglass tailboom, wing tires, and a slightly changed airfoil) later, my Tern took to the air. The model was noteworthy for its ease of towing and its ability to handle gusty winds without wing breakage. However, in non-thermal air, it was also notable for its ability to pig itself down in 70 to 80 seconds. Then came circle towing, and the Tern was outclassed. Into the attic it went . . . where the stab was subjected to terminal hangar rash. The wings, however, were taken down and looked at several times . . . I was impressed by their shape and construction. But, they were always replaced for a future time.

During our preparations for the upcoming Taft bash, the wings were taken down again, and after some plotting, a new fuselage began to take shape in my mind. The result is the Re-Tern V. The wing is pure Ritz, with the wire wing mounts instead of the aluminum as per the original. The stab has been changed to the more conventional thin, flat-bottomed style prevalent today. In order to make room for the Swedish towhook, featured in last month's free flight column, the fuselage was redesigned.

A tapered balsa boom was constructed on a pool cue by taking a sheet of 4-inch wide medium 1/32 balsa sheet and doping tissue onto one side. After a couple coats of dope, the sheet was cut to the taper of the pool cue and allowed to soak in the bathtub for about an hour. After it was soaked, it was wrapped around the pool cue and held in place by an old rubber motor. When it had dried (about 24 hours), it was removed from the form and the seam was Hot Stuffed, resulting in a long cone. The boom was then spiral wrapped with lightweight silkspan (applied wet) and doped several times.

The boom was set aside while the pod was being built. I began by designing the pod around the nose

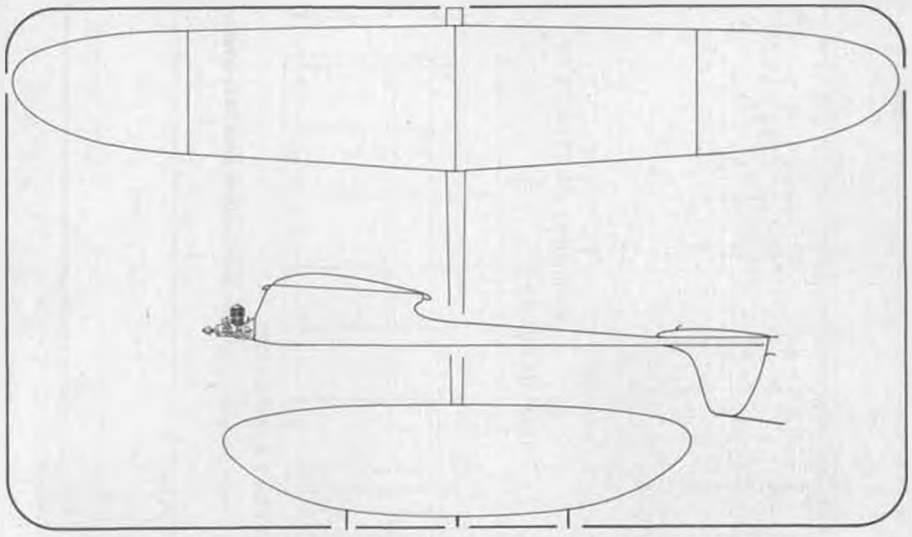
John Kamla flew his Korda Wakefield at Dick Stark contest. Korda design is popular in O.T. Rubber events.

cone that was left over from my original Tern. This piece of brass originally weighed 140 grams and had a back diameter of 1 inch. Since I knew that the tailboom would be much lighter than the original fiberglass tailboom (and about 2-1/2 inches shorter), I made the nose much shorter than on the original. The plywood core was cut to shape for the timer, wing mount, and nose cone. Pieces of 3/16 balsa were cut to the same shape and glued onto either side of the ply core. Lightening holes were drilled into this "sandwich", in order to reduce some weight, especially behind the CG. A 1/4-inch bolt was epoxied into the front, to which the nose cone is screwed, and a piece of 1/16 plywood without the towhook cutout was glued to either side of the sandwich. Pieces of 3/16 basswood, 1 inch high, were glued into place along the bottom of the fuselage, and the wing mount area had similar pieces beveled to the dihedral angle and glued into place. A piece of large Nyrod was inset into place behind the towhook on the bottom of the fuselage and exits at the back of the pod.

The entire mess was shaped using a knife, razor plane, and sandpaper. A timer hole was cut and a plywood facing plate installed around this opening. After shaping, the entire pod was filleted and filled using Pettit's new "P.F.C." filler. Two layers of this stuff and the fuselage pod was ready for attaching the boom. The boom was fastened to the pod, and then given a layer of fine figerglass cloth and two coats of K&B clear epoxy. The pod was painted with Aerogloss urethane paint (white), and in two coats it was completely covered.

Except for the fact that the model came out very nose-heavy and overweight, the plan worked to perfection. The brass nose cone was drilled and reamed out until it was down to 94 grams, and the balance was established.

The first tows with the ship were very gratifying. It towed as straight as the original, and, with the Swedish hook, it would circle upon command. The glide was a bit better, due to the fact that this ship was about 60 grams lighter than the original.



OCTOBER'S MYSTERY MODEL

If I were doing the whole thing again, I would build the boom out of either two layers of 1/32 balsa or one layer of 1/16 balsa, as the boom seems too flimsy to withstand ground shocks; however, that will be for the next one.

So far, the model has been very enjoyable to build and fly, and with V dihedral, it's different enough to cause heads to turn (or is it tern?).

MYSTERY MODEL FOR OCTOBER

In the nearly 5 years I've been doing this column, I've sometimes asked for some suggestions about things to feature . . . Mystery Models, 3-views, etc. I have received my first bona fide suggestion on this month's Mystery Model, and it came from none other than Vince Ferrarese, who was "featured" in the June issue of this column (as reported by the CIA Informer).

Vince sends along this little 1/2A, which used styrofoam in the fuselage construction. Since the ship first appeared in the late 1950's, it has undergone many changes, and its current appearance belies this humble beginning. I had better stop, or I'll give away too many clues. If you know what it is, drop Bill N. (our esteemed Editor) a note and he will reward you well. (Gotta be first, though!) By the way, thanks to Vince and his good sense of humor for this suggestion.

DARNED GOOD AIRFOIL
S.I. 33006

Another stabilizer airfoil graces the column this month. This section is very much like those I have been using on my A-2 gliders and FAI power models lately, except it's only 6% thick. Trailing edge warping could be controlled by using 1/32 sheet at the back, laid onto the top and bottom camber. Spars would be best laid flat at the high point, and then webbed for strength. There is no doubt that a thin, flat-bottomed stabilizer section is the current vogue in most free flight applications. This one is as good as any. Try it.

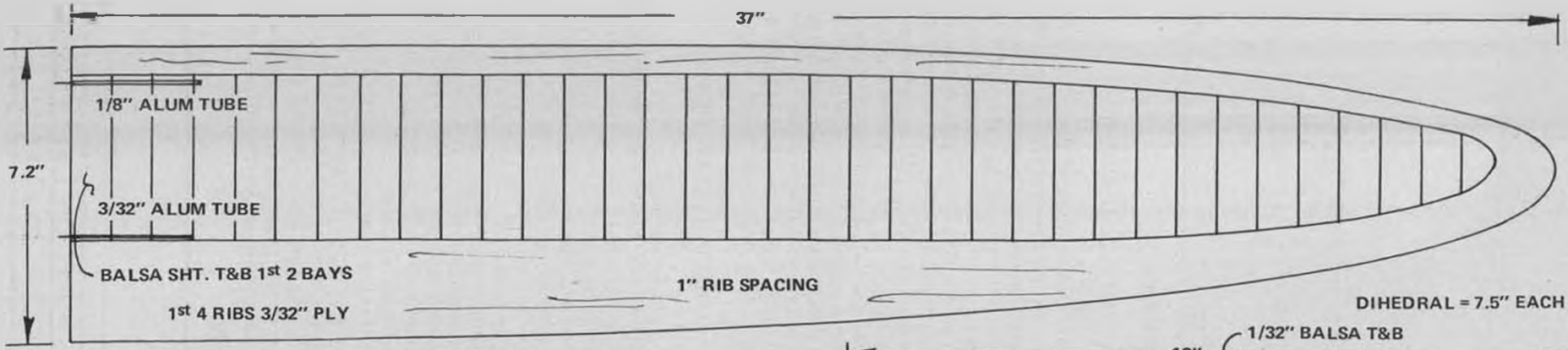
WAKEFIELD: ITS DIRECTIONS AND FUTURE
by John Lenderman

From the Bat Sheet, which is a D.G.N. (Darned Good Newsletter) edited by Tom Cashman, 2521 S.W. 323rd St., Federal Way, WA 98003, comes this article by ex-Wakefield team member and the Team Manager of the 1977 U.S. FAI Team, John Lenderman. John's comments are pungent and topical. Future and/or aspiring rubber model fliers and Wakefielders in particular should find it informative.

"This premier event has had many changes since it began years ago, and there is no reason to believe it will change again in the future. There are many who still wish to build and fly under the original set

DARNED GOOD AIRFOIL — S. I. 33006

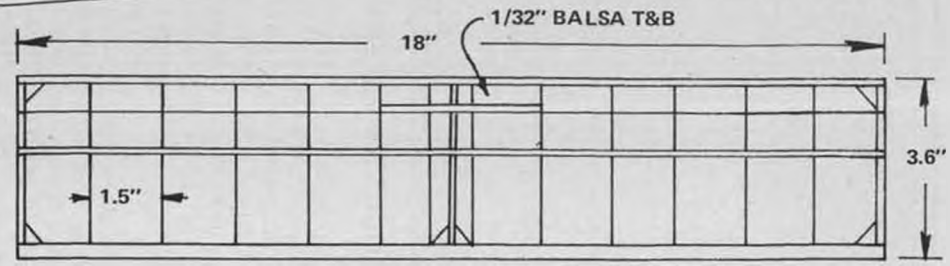
STATION	0	2.5	5	10	20	30	40	50	60	70	80	90	100
UPPER	0	2.3	3.5	4.9	5.8	6	5.7	5.3	4.7	3.8	2.9	1	0
LOWER	0	0	0	0	0	0	0	0	0	0	0	0	0



WING DETAILS = SEE AMERICAN MODELER – SEPT 1961

RE–TERN V A–2

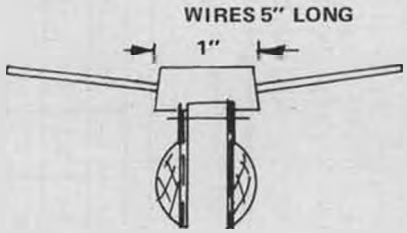
BY: BOB STALICK WITH APOLOGIES TO GERRY RITZ



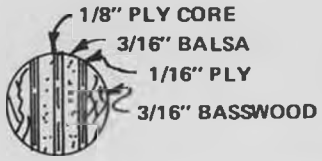
1/32" GUSSETS

WASHOUT BOTH T.E. TIPS 1/32"

3/32" TIP & CENTER RIBS

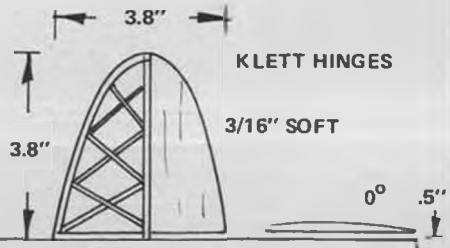


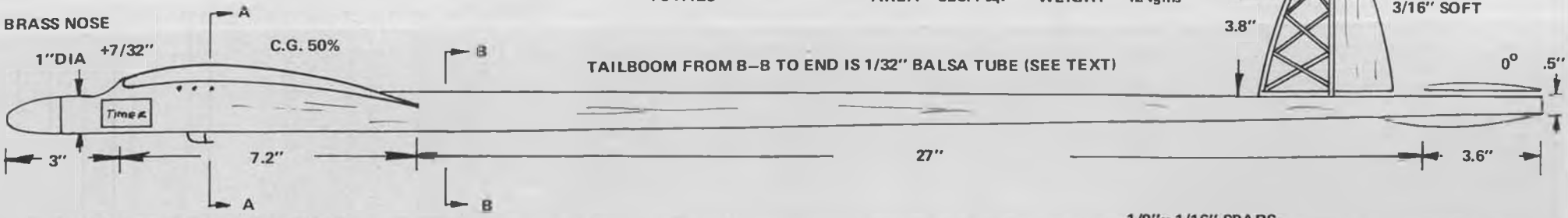
A–A



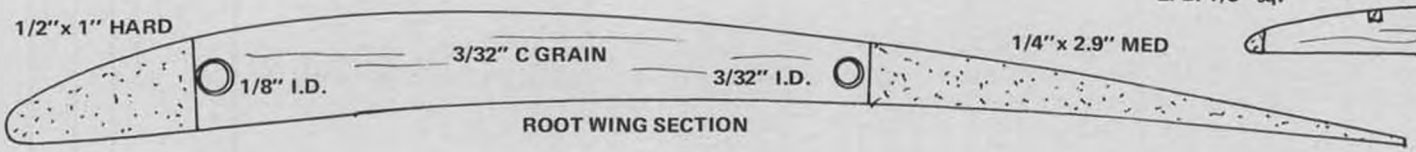
B–B

WINGS: PROJ. SPAN = 73"	AREA = 458.6 sq. "	WEIGHT = 171gm
STAB: PROJ. SPAN = 18"	AREA = 64.8 sq."	WEIGHT = 7gm
FUSELAGE –	—	WEIGHT = 153gm
BRASS NOSE –	—	WEIGHT = 93gm
TOTALS	AREA = 523.4 sq."	WEIGHT = 424gms

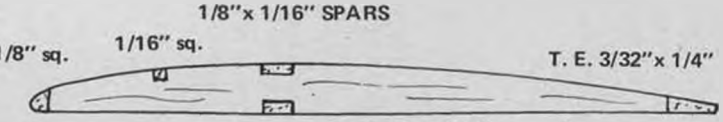




WAYNE DRAKE STYLE TOWHOOK



ROOT WING SECTION



STAB RIBS 1/32"

Clarence Haught, O.T. F/F columnist for Model Aviation, attempting to bite the engine off his 'B' ship. The engine won.

of rules, but with the advancement of the art, this is just wishful thinking. The present status, with the weight requirement and just 40 grams of rubber, appears to be an ideal position, and most fliers seem to feel it is enough of a challenge to prevent any further changes in the rules. Let's examine some of the trends we may expect, in light of the designs we have at present. Keep in mind that these trends will be determined by the following criteria:

1) Quality of rubber, and availability to all contestants.

2) Development done by groups of individuals or nations.

3) More intensive use of the "black box".

"Examining first the rubber situation, we find that this is the critical facet of this fine sport. Most of us recall when quality Pirelli was available, and even the newest devotee of the sport could build an average model with no special features, and with good Pirelli, keep up with the best of the fliers. Many times this average modeler didn't know he had better-than-average rubber, and attributed his success to his expertise. Only when that quality rubber ran out did he know how important it was to have the good stuff. This is even more true today, since good rubber is almost gone, and every flier is on a more even footing in that respect.

"Only when a modeling group or a national group can influence the rubber makers will we get the superior rubber, and then only by extensive testing of the various qualities that tend to make it better. I'm certain we could obtain 100 skeins of current rubber, and through lengthy testing and evaluating, come up with skeins that are a significant percentage better than the lot average.

"I believe that any further significant developments in the models themselves will come through the hard work of a club, association, or national group. This can only be done through a succession of discussions, and then the results developed through production of these innovations in a workshop atmosphere, financed either by industry or national organization. Of course, this is done in other countries, and there is no reason why it could not be done here also, in various regions throughout the country. The development of the 'black box' could be done more scientifically, and by thorough field testing, become a reliable means of indicating when the air is right for the model to be released.

"The biggest changes in the near future, I believe, will be in the prop and the mechanism connected with it. We will be seeing more precise prop blade forms, molds, and shaping devices. How many modelers are capable of carving two identical props? Each prop still has its own personality, and one is always better than another, no matter how carefully prepared. The trend will be towards laminated prop blades, either of balsa or softwoods such as pine.

"At the next World Championships, we will see greater use of the delayed prop start, actuated by a thumb or finger release on the side of the fuselage as the model is launched. This will activate a multi-function timer, which will deploy the prop blades at the right instant and begin the power run. Just for fun, time your best Wakefield as it glides down from twenty feet to the ground . . . this is potentially how much time you can add to your score from this development.

"The results of the last World Champs in Roskilde are not really indicative of the present state of this grand event. The weather was the real culprit of that W.C., but there were models there which were capable of four minutes and better, under average conditions. With the prospect of better weather conditions in Yugoslavia for 1979, we may see a further reduction in rubber weight to 35 grams. I feel there will

Continued on page 108

A satisfied Bob Stalick and his "Re-Tern V", after testing it in a hayfield. Model has mucho dihedral.

W.R. "Bill" Lee looks pleased after finish of Goodyear final.

Chuck Rudner, '78 FAI Combat Team member and past MACA No. 1 combat flier.

Les Pardue putting the head back on his Rossi, after having it checked.

Control line

By "DIRTY DAN" RUTHERFORD

SMALL IN BORE AND FUNNY IN SMELL

The Cox .049 engines have proven to be almost unbelievable, as far as performance and versatility are concerned. Though he is gone now, Bill Atwood left us with engines that will do an amazing number of different jobs in many different models. The TD .049's dominate in high-performance small-bore competition, from F/F to C/L Racing, C/L Speed, 1/2A Pylon, 1/2A Pattern, and on and on. By using off-the-shelf Cox parts, you can assemble anything from a "torquer" TD .049 to a really fast reed-valve engine, and not need to be an expert engine builder.

Although standard O.E.M. parts give the modelers left among us a chance to tailor an .049 engine to our own requirements, there are people like Bob Davis, of Davis Diesel Development, who will go one step further. Actually, Bob went several steps further with his diesel conversion unit that all of you should be familiar with by now. I don't feel like digging into the diesel conversion right now, but Bob has got some other new products that we'll look at in a minute. I would like to say, though, that the diesel conversion does work . . . works very well, in fact, and continues to be developed with better fuel and slight production changes. The reason for not having any coverage of dieselized .049's in the C/L column is simply that I don't compete in any events where diesels would be an advantage, so only occasionally even run my converted TD .049, and then it is in an R/C plane. (If you think the C/L column is wacko sometimes, you ought to see me fly R/C . . . Wacko City.)

Believe it or not, Bill Hannan used to be a handle waver! Roy Scott took this photo of Bill's "Knightmare" (check helmet on pilot). Used a Cox engine, but didn't say what size.

Since coming out with the diesel conversions, Bob has been working on more stuff for the small-bore fliers. One of the handiest things is the "D" Varnishing Brush. This is a stainless steel, bottle brush looking thing that you just stick inside the cylinder of a Cox .049 (or .051); twirling it removes any varnish build-up very quickly. As the varnish caused by castor-based fuels can really take the power out of an .049 engine, plus make it run a bit hotter, this is a good item.

With small-bore C/L racing picking up in popularity, many are finding that the crankshafts in the reed-valve engines are not too strong, and prone to failure at high RPM. The answer here is to try the Davis H.D. shaft, which features a full disc design. It looks as if this shaft would promote an out-of-balance condition, but Bob says it doesn't, and the full-circle design seems to give better packing of the crankcase, which gives more power at the top end. So, not only is this shaft stronger, it puts out more power. An interesting take off on the H.D. shaft is a similar version that fits the new Testor's .049 reed engine. Standard Cox prop screws are used here, but the interesting point is that the Davis shaft ups the displacement to .055. Ah, yes, a cheater motor for your favorite event.

Again with reed-valve engines, the Davis Tef-Reeds would seem to be a super solution to the old weak-

ness of reed-valve engines; the reeds themselves. And I don't doubt that they work okay, but every time I have tried them (3 times), either the engine was hard to start or lost power. The instructions say that the Tef-Reed gets better the more runs you put on the engine, but mine didn't work out that way. So, I'm back to running a single Cox reed and changing them frequently. *(Bob . . . send him some special "Dirty-Reeds". wcn)*

A new version of an old line is the Davis reset tool. Right, you've seen them before; in fact, you probably already have one. The Davis unit is different in that it comes complete with a small square aluminum block that is drilled to accept the piston, giving a solid base when resetting the rod.

For many, one of the handiest things about Cox reed engines is the spring starter, which, of course, won't fit the TD series of engines. If you think a spring starter might help light the fire in your TD (and it probably will), Davis offers you one, and it will fit both the TD and Medallion engines.

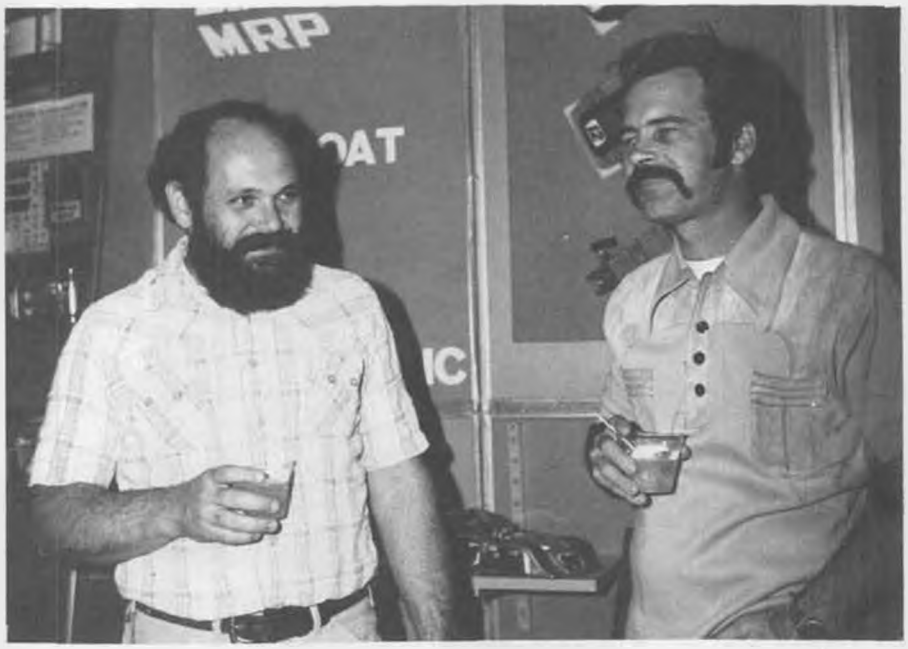
Last thing we'll look at is something that I have not tried, but looks like the hot tip. This is Tef-Lock, a non-liquid strip of teflon that is applied to the needle valve before installing it. When screwed in, the needle valve has this strip mashed into its threads, keeping it from changing adjustment in flight. Yes, I know about the fuel-tubing-on-the-needle trick, but this one looks even better.

One thing that a few of you might be interested in is a new diesel conversion unit that has a de-clutching thingie on it, making speed adjustment (throttling) possible. Small-bore Carrier? Hmmmm...

GLO-BUTTONS

You've probably already heard about the latest in glow plugs from Fusite, but just in case you haven't tried them yet, here is the word that they can be the hot tip for more power, either from reed-valve engines or the TD's. The reason I say that they *can* be the hot tip is that, to get the max from them, it may take a bit of juggling with nitro content of the fuel, and deck clearance. Playing with deck clearance is easy . . . just add a gasket, maybe two. I tried a Sport Glo-Button in a reed engine that really honked with a Cox high-compression head, but that required three (total) head gaskets, where I had been using one before.

Until adding the two extra gaskets, the engine would run okay for a bit, then go lean, plus the needle was pretty touchy. Others have had the same experience . . . don't be afraid to try the extra gaskets.



Once and for all, we end Dirty's purposeful identity confusion with Rich "von" Lopez. Seen here with Stunt flier Bob Whitely (right), is none other than Brmskv Stznildt.

Playing with nitro content is a little different. You may be able to go up some, but then again, other engines will like less nitro and still put out the power.

About the time the engine is really working, don't be real surprised if the crank in a reed engine breaks . . . they just aren't very strong to begin with. Investing in a Davis H.D. shaft would be a good move.

With the TD's, it isn't very hard to break something using Cox plugs and lots of nitro. I consider 70% and above to be a lot of nitro for a TD. If you are into small-bore stuff, you know that cranks and rods fail frequently enough to be a worry. With a Racing Glo-Button on the engine, power is easier to get, and breakage can be a problem if you don't keep real close track of the amount of slop in the rod/piston ball-and-socket joint. Resetting this joint with a good reset tool is an absolute necessity, especially with the extra power and RPM given by the Glo-Buttons.

Incidentally, word from Fusite is that the Racing plug doesn't work (or isn't supposed to work) very well on fuel with less than 50% nitro

Continued on page 101

Charlie Johnson took this photo of his Combat shirt and FAI Combat helmet. What more is there to say?

Winners in Expert Precision Aerobatics were (standing, l to r): N. Whittle, 2nd; L. McDonald, 1st; R. Galle, 3rd. Kneeling, l to r: D. Hemstrought, 5th; C. Maikis, 7th; K. Trostle, 4th.

Gene Hempel's Form 40 held record for a few hours, until beat by Tom Bankman.

1978 U.S. Control line CHAMPIONSHIPS

By B. B. BROWN and DICK TYNDALL . . . A report on the United States Control Line Model Airplane Championships, which attracted a total of 158 contestants. This year's meet was better than ever.

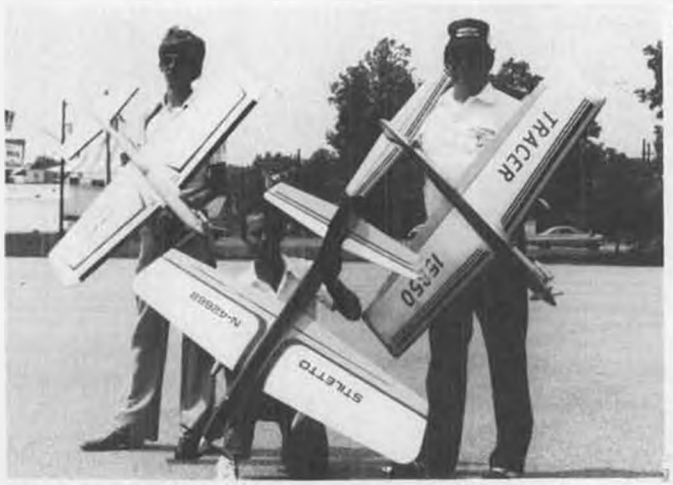
• Friday night, June 16, in Winston-Salem, North Carolina, the parking lot of the Coliseum was segmented, circled, roped off, swept, and otherwise transformed into the stage for the 1978 United States Control Line Model Airplane Championships. Twelve circles, ten on smooth asphalt and two on three to four-inch grass, were ready for thirty-seven Speed events and fifty-four of Racing, Carrier, Combat, and Precision Aerobatics.

Bill Pardue, the Contest Director and master organizer, was discussing with Doc Jackson, the U.S. FAI C/L team manager, the engine modification methods developed in his early years, as compared with contemporary techniques. Walt Perkins was sitting on a picnic table, while Russ Sandusky admired Walt's latest epoxy-fiber team race propellers. The relaxed atmosphere carried a current of excitement. Glenn Lee was at the pylon in the Speed circle.

Henry Nelson, builder of superb team racing engines, had Tim Gillott in tow. Keith Trostle, PAMPA President, was with Claus Maikis, the 1978 West German Precision Aerobatics Champion. Bill Lee, Racing columnist for *Model Aviation*, entered Rat, Goodyear (O.K., Badyear, Dirty Dan), and Slow Rat.

Saturday, the first day of competition, started with FAI Team Race in circle 4. Slow Combat was flown on the grass. Speed was to run all day Saturday and Sunday in circles 1 and 2. Peculiar was the silence at the Speed circle at 8 am. . . Dubby Jett usually has a record by the time most people find a parking space. No one was flying in the Speed circle practice area.

Team racing has a different sound. The engines go pop pop pop hum hm hmmmmmmmmm, until they warm up. When properly set . . . compression just right with the needle valve setting . . . they go "on song". That's the sound that delights any Team Racing fan. A pure tone that says everything is ON. Twelve teams were entered. The predominant engines were the Nelsons. Californians Tim Gillott and Jed Kusik had the only Rossi Diesel entry. Canadian Team Champions



Advanced Stunt winners were, l to r, Dean Brock, 2nd; Vince Schnetzer, 1st; Bob Harpe, 3rd. Beautiful models!

Claus Maikis, right, from W. Germany, won the "First International Contestant" award. Bill Pardue, C/L Champs C.D., on left.

Harold Lambert flew this screamer to first place in Rat Racing, with 4:53.68.

Team Racing finals. Carl Dodge, left, and Jed Kusik battle it out, while J.E. Albritton sits and waits. His plane (foreground) ran into the circle. Dodge won the finals.

Kelly/Parent and Kerr/Baker, with team artist and speed flier Sam Burke, used the very fast homebuilt RAM engines. The Kelly/Parent team blew their best engine during early morning practice. Their retracting gear racer was doing about 17 seconds for the half-mile (105 mph). Nelson/Dodge, the top U.S. qualifiers for this year's World Championships, in Woodvale, England, were practicing in the Mouse Racing circles, turning about the same speed. The Bill Lee entry had withdrawn, to make it twelve teams, instead of thirteen. Nice of you, Bill.

Team Racing is run by international rules (pages 74-77 AMA Regulations). The prescribed total lifting surface planform area (186 sq. in.), fuel capacity limitations (seven cubic centimeters . . . about 1/4 ounce) that dictate the use of racing diesels, instead of the more powerful but fuel-gulping glows, minimum cross sectional area (6.045 sq. in.), etc., plus strict flying regulations, make this a premier event in model racing.

David Owen, of the Nashville Rats, won Slow Combat and Slow Rat, 6th in AMA Rat.

Jay Marsh called the pilots and mechanics together and explained the starting procedures and the heat draws. All the heats were run three teams at a time; racing 100 laps preliminary and semi-finals, 200 laps for the glory. The draws went Perkins/Fambrough, Gillott/Kusik, Swindell/Tate. The times went 4:21.38, 4:58.4, and 4:49.87, respectively. Next up, Kelly/Parent put in a very smooth 4:16.65. The Vansant/Vasant team was steady but slow at 5:16, and Dr. Laird Jackson, the editor of the (as Dave Clarkson, of the eminent *Aeromodeller*, puts it) totally irresponsible FAI Gazette, finished a sporadic 7:32.6 with a fill-in pilot. The third heat saw the Findley team run 25 laps. Goodyear veterans Trent/Duncan ran 31 laps with an (until then) untried plane, and the second place World Championship U.S. qualifiers, Jim Joy and J.E. Albritton, sailed home strongly with a 4:07.2. The fourth heat saw Baker/Kerr of Canada disqualified, as the plane ran into the circle on a pit stop. John Ballard couldn't get it up (sorry, John), and the First Place U.S. qualifiers, Nelson/Dodge, came in with a nice two-stop 4:16.89. Allen Baker, of Aurora, Ontario, is one fine pit man. He and Walt Perkins are as fast as Jehlik in his prime.

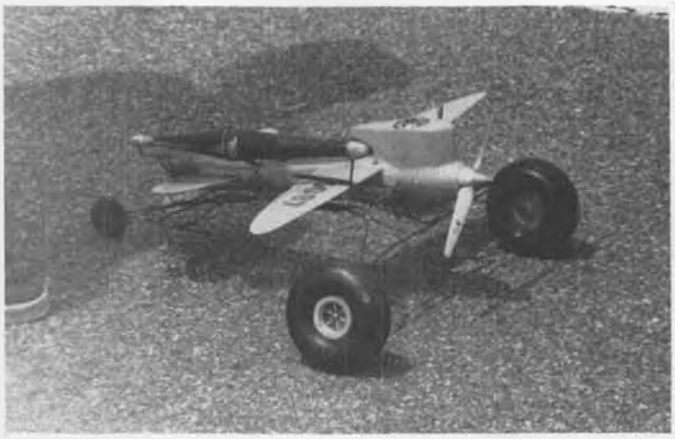
Incidentally, Herb Stockton and

Melissa Hartman, of Burlington, N.C., beat all but two of the fliers in Fast Combat! The guys will never live it down!

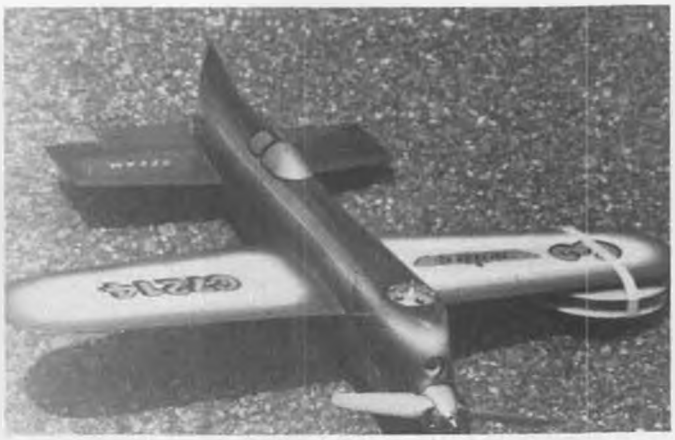
Half-A Mouse Racing winners, l to r: Jerry Kasmer, 3rd; Robert Oge, 1st; Russ Sandusky, 2nd. Oge's pilot, Tim Stone, in back.

Tim Gillott pitting his team racer. Tim could pass for a walking hobby shop, with all the equipment he carries on his belt!

Tim Gillott's well-engineered and highly-decorated "Shark" rat racer. Placed 8th at C/L Champs.



Glenn Lee's Class D Speed ship ready to go. Fastest flight was 190.20 mph, placed second.



Second place in FAI Speed was won by Sam Burke, flying this unusual model. Did 126.38 mph. Only 5 fliers in FAI.

Don Jehlik, former World Champions, were not on hand as they were the year before last. Their expertise was missed.

The second round improved a few standings: Perkins/Fambrough, with 4:13.6, and Gillott/Kusik, with 4:22. The Kelly/Parent entry ran into the circle, and Parent inadvertently stepped into the circle with both feet, reaching for the model, disqualifying his team for the heat. Ballard got it up this heat (way to go, John) for a 4:31.38. So, qualifiers for the semi-final heats were Joy/Albritton (4:07.2), Perkins/Fambrough (4:13.6), Kelly/Parent (4:16.7), Nelson/Dodge (4:16.9), Ballard (4:31.4), and Gillott/Kusik (4:22.4).

The first round of the semi-finals did not show any change of tactics or strategy. Nelson/Dodge led the round with 4:13.9. Kelly/Parent were on their way to a fast round, but lost a wheel on their second pit stop. Gillott's fuel tank decided to disgorge a minute bit of solder into the tank, which stopped the flow. Perkins/Fambrough went 36 seconds off their pace, due to a sour engine.

In the second round of the semi-finals, Joy/Albritton showed the way with a 4:09.0. Nelson/Dodge felt comfortable and gave a bye. Kelly/Parent came back with a 4:23.9. The Shadow Team (Perkins/Fambrough) improved, but not enough, with a 4:26.4. Gillott/Kusik came back

Russ Sandusky, left, won 2nd in 1/2A Scale Racing with his Stinger. George Caldwell, right, flew a Falcon Special to 1st place.

Patrick Hempel with his Form 40 and C Speed entries. Pat won C Speed, set new record at 177.97 mph.

Expert Combat designers and fliers Atkins, Tyndall, and Cartier show off their latest "weapons". Note the multitude of ribs in Atkins' machine.

You'll have to supply your own caption for this photo . . . none of mine are printable!

Ed Simmons, right, of Baltimore, Md., and pit man getting ready for a heat. Ed placed 14th.

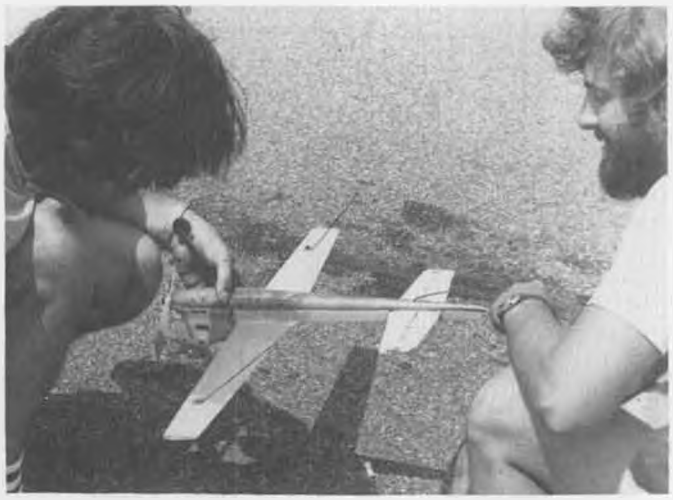
Eric and Al Stegens prep Al's 120.76 mph 1/2A Speed ship. Al doesn't use a tuned pipe, but got within 2 mph of record!

strong with a fully-flowing fuel system, and posted 4:13.9 to make the finals with Nelson/Dodge and Joy/Albritton.

The solid World Class Team of Nelson/Dodge motored without fuss, and posted an 8:26.77 for the 20 kilometers (6.214 miles). It would have been closer all around if J.E. Albritton hadn't fumbled on the pit, causing the plane to run into the circle and nose over. The Joy/Albritton entry had shown its speed and good form, and the reliability and championship quality of the Nelson engine. But that's racing.

So, Dodge and Kusik went at it two-up for the rest of the race. And the best Team Racing competition ever in the United States came to an end, with Nelson/Dodge first, Gillott/Kusik second, and Joy/Albritton third.

The excellent turnout was due to the availability of competitive equipment, and that means the Nelson engine, in our opinion. One cannot expect to win a race without first-class equipment as a base. The highly prized European Bugl engine



Larry Hill, left, with rat racer that he flew to second place. On right is Len Cleveland, last year's Goodyear winner.

Hot Stuff to the rescue! Tim Gillott removes his handprint from the wing of his FAI team racer.

has been impossible to get. Now produced on our own ground, the Nelson is, out of the box, competitive with the best. You, the reader, can get an excellent magnesium crutch and engine from Henry. Have him put your name on his list. It takes him a few months to make a batch of a hundred, and there is not a bad one in the lot. Incidentally, the Europeans and Australians are buying more of them than the Americans are.

Dick Tyndall went off to help in Slow Combat, and made the following observations:

Slow Combat started early Saturday morning, with the Juniors and Seniors mixing it up for the top spot, which was captured by David Owen, from Nashville, Tenn. (David also took the outstanding Jr./Sr. award in Fast Combat on Sunday.) Open Slow caught the attention of the spectators with some really good matches. Mack Henry seemed to be the busiest man on the field during the entire event, and certainly deserved the win after some fine flying. Mack and Warren Sanders, from College Park, Md., fought a long match in the final, with the man from Franklin, Tenn., finally getting the kill. Mack must have pitted at least half of the entries in Slow. I remember asking him about his "bionic" finger that he starts with. I hope it feels better now, Mack.

Fast Combat got off to a late start Saturday afternoon, and after about six or seven matches, had to be stopped at 4:30, because of a tractor-pull event at the fairgrounds. It seemed that the people at the tractor-pull didn't want spectators coming in the gate at the Combat circles and walking over to get a freebie at their show, so we packed up and left.

Sunday was as nice as Saturday, and at 10:30, flying resumed. Most of the matches in Fast were not as competitive as in the Slow event, and a lot of them were decided by air time. First place was won by Paul Curtis, of Jeffersonville, Ind., over flying partner Eric Taylor (of Jeffersonville, also). Both were flying Nemesis II's with ST. 35's and Y & O props. Paul got the kill with less than 30 seconds gone in the match.

Third place was won by 22-year-old Melissa (yes, fellas, a girl!) Hartman, of Burlington, N.C., by outlasting Dick Tyndall, when his wounded "Toothpick" came apart in mid-air. Well, we can't win them all, can we, Dick?

FAI Combat finished things up on Sunday, with Phil Carter taking all the marbles over Max Mearns, and Keith Marks finishing third. I didn't get the name of Phil's foam-wing ship, but it looked good and flew even better! *(Phil is proprietor of the Core House. Has appeared in classified ads. wcn)*

This year's Combat events were run by Jim Haynes, from Winston-Salem, N.C., and Howard Shenton, of Mauldin, S.C., with a lot of help from Max Mearns, Paul Curtis, Mack Henry, Phil Cartier, Keith Marks, myself, and a few other people whose names I didn't get. To these people, I would like to say "Thank You", and I hope to see you all next year.

Scale Racing again drew the most entries, with 41 contestants (31 Open and 10 jr./Sr.). Once upon a time, almost all of the entries were Busters and Falcons. Now we see Ginnys, Midget Mustangs, Cosmic Winds, El Banditos, Shoestrings, Stingers, Owls (Fangs, Lil Quickies, and Pogos), Busters, Zippers, and Miss Daras, just to name some of the designs. The powerplant that emerged in the early '70's is still to be dethroned . . . the mighty Rossi .15. We are all anxiously awaiting the new generation of Super Tigres with 11.5 mm cranks, and but then again, rumors are the new 12 mm shaft Rossi is due any minute.

John Lancaster called the pilots and crews to the Starter's table. How to run the race with the fastest Scale racers in the U.S. assembled? When put to a vote, 16 voted to go two-up, as it is a much safer way than the conventional 3-up. A longer, but safer, day of racing. In the line-up were eight entries who had finished in the top three places at the Nationals in the past 3 years. This year, with the megaphone banned, the times continue to FALL.

John Wolfe, of Macon, GA, and Ricky Hummer qualified at 3:13.24 and 3:19.2, respectively, to lead the Jr./Sr. heats. Joe Kall, Jr., the 4th fastest qualifier, came away winning the 160-lapper at 7:05.0, edging out John Wolfe by four one-hundredths of a second! Joe traveled from Lakewood, Ca, and has also been competing in Team Racing on the West Coast. He didn't enter at W-S; maybe he didn't want to be Number 13. Ricky Hummer placed 3rd, at 7:58.19. Dave Katzmeyer was 4th; he had trouble, and did not finish the 160 laps.

In Open Scale Racing, John Ballard, pitted by the able Gary Fentress, flew against your photo journalists. This is only significant because it was a sign of things to come. John walked away with a heat time of 2:51.1; 3 seconds faster than the fastest at last year's Nationals! John finished so quickly that he asked us if we were flying another heat! Talk about insults to injury! Furthermore, he said that we had the best engine he had ever heard "in the air". (We were only turning 15.2-15.4, John.) Oh, well, next year! (We said that three years ago.) The 2:51 didn't last long. Bill Lee dropped the full load on everybody with 2:48.57.

Here's the 12 sifted out of the 31. Lee (2:48.57), Ballard (2:51.1), Harold Lambert (3:02.95), Gillott (3:05.2), Caldwell (3:07.88), Shaefer (3:11.2), Fentress (3:11.5), Dick Lambert (3:14.5), Duncan (3:20.6), Tim Stone (3:20.14), "Bulldog" Martin (3:24.7), and Trent (3:25.5).

The finals were run with the competitors matched as they qualified: Lee and Ballard, Lambert and

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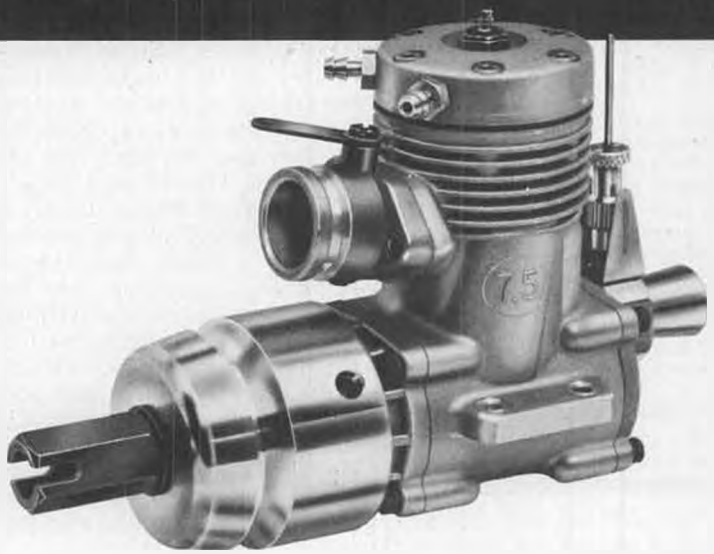

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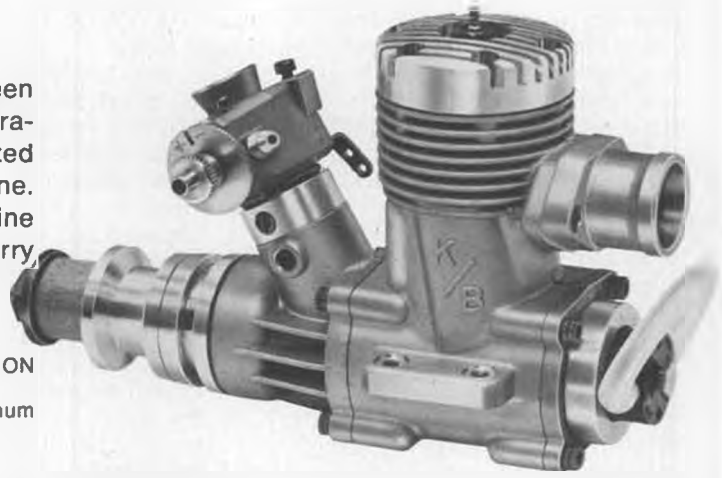

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Gillott, Caldwell and Shaefer, etc. So, it turned out that the fastest qualifiers flew head-to-head. The match between Fentress and Lee in the pits was as exciting as the ballet performed in the center circle by Ballard and Larry Hoffman. A lot of seasoned control liners stopped what they were doing to watch. As the race ended, Hoffman shut off the engine, came in on final, the Scoville Stardust rolled up to Bill Lee, who caught it, dropped on his knees, and raised his arms in exultation. Ballard went around again and shut off. There was a difference of six and sixty-five hundredths seconds in 10 miles of racing, with 3 mandatory pit stops each. The crowd all around the vast parking lot started applauding.

Consistent is the word for Harold and Dick Lambert, who came in 3rd and 4th with 6:19.56 and 6:19.97, respectively.

Carrier and Sport Scale were scheduled for Saturday. We never did see much going on in the circles, and when we did see something flying, the competition was hot in Combat or Racing. I found out from Pardue that there were 4 contestants in Class I and II Carrier, and 6 entries in Profile Carrier, with 5 contestants flying in both events. If you want to support these events at contests, just show up with an entry. Ron Haase, of Tampa, Fla., won 1st and 2nd in Carrier, which was run as a record/ratio event, with 81% in Class II and 78% in Class I. Richard Perry was 3rd in Class I, with 53.9%. We watched a couple flights through a 165 mm lens . . . never saw anyone hook anything. Maybe the "deck" was too flat.

Keith Trostle won Sport Scale with his stunt FW 109-09. Efficient use of materials, Keith.

Novice and Intermediate Stunt (Precision Aerobatics) drew 4 entries. Seems like no one wants to be a beginner at a big meet. I know the feeling. First place winner put in apparently two very consistent flights, because he scored an attempt, then 386.5 and 386.5.. Congrats Lloyd Gregory, of Salisbury, Md. Mathew Dube, a Junior, was second. Mathew put in a good flight, lost his composure on the second, and came back with true grit on the third, to equal his first flight. George Nash, Vinton, Va., was third. Glad to hear people are flying control line in the hills again, George.

The Rats came out about 8 a.m. Sunday morning. We were in the Combat circle flying (?) Dick's two newly-built "Toothpicks" and watching the Rats tune-up through the fence. Trusty Cronus came out and checked to see if there were any 150 mph Rats in the area. Didn't find any, although one was reported. Dave Lancaster was in the middle 11's, but blew the engine in his really nice-looking Shark, designed by Gillott. Bill Garner called the pilots and mechanics (that's what the AMA rule book calls them) to start the heats. We watched most of the first two hours from about a hundred yards. We were busy all day long . . . run up to the Rat area, shoot a few pictures, check the time board, see what was happening in Stunt and Mouse, back through the Speed area, ad nauseum. W.R. "Bill" Lee was losing crankcase compression through his rotor seal . . . things wear and work loose at 22 thousand plus . . . so Bill decided to take everything apart. He pulled the sleeve, piston, and rod off the crankpin, and the crankpin fell off the crankshaft! Harold and Dick Lambert flew their Snake design to 1st and 4th. Larry Hill was second . . . had only a minor problem with a wing tip skid breaking. John Wolfe, a Senior and good in everything, was 5th and dead consistent, with back-to-back 2:27.2's in the heats. David Owen, also a Senior and good in everything, was 6th and dead consistent with 2:27.16's. It MUST be the new Unified Racing Rules, which state that consistency, not getting there first, is the objective of Racing. (Page 23, section 25, 2.)

Tim Gillott flew the second fastest heat (2:22.1). Tim had the East Coast Blues. The harder he worked, the more things went wrong. He had a problem with the tail of the Shark going sideways. Seems it had cracked (on a hard stop), and in the finals it was skewing out noticeably. Instant right rudder. Tim finished 8th.

Marshall Busby finished 7th. This crew is hard to believe. Paul Tune and Busby work the pits like the Woods Brothers at Charlotte or Indy. See the Slow Rat commentary.

Eight pilots flew in the finals. Big John Ballard, who finished 3rd, was consistent with 2:27.38 and 2:27.04. He seemed to have tuning problems the night before, but must have solved them somewhat.

Rat equipment is about the same. The new K&B front rotors were out in force . . . Tim Gillott still uses a 4-year-old K&B rear rotor . . . lots of O.S.'s and HP's were there . . . Harold Lambert used a Bartel 8 x 8 prop at about 7-1/2-inch pitch (very strong HP) . . . many Kelly 8 x 7's and 8 x 8's cut and pitched to this and that . . . Glo Bee plugs, the newer R2, seem to abound and work very well . . . the Glo Bee Fireplug has been the single major development

in reliability in pit stops.

Half-A Scale Racing (Class I — reed valve) is a ball. Tommy Carr directed Scale and Mouse Racing. The Roanoke C/L Club staffed both events, which had a total of 34 entries. Next year, we hope more trophies go to this event so the Junior-Senior contingent will have a shot at the hardware. We like the idea of a 4-1/2-footer flying against a 6-footer and flying on equal terms at the end of the lines (hopefully). Good experience for *both* sizes.

Junior Chris Scott flew the best preliminary heat, covering 50 laps in 2:44.1. You can see Chris, from Dayton, Ohio, in the August issue of *Model Aviation*, in the *Little White Mouse* article. Next was Jerry Kasmer, Open Class, with 2:44.6, flying with a Mickey Mouse shirt. Third best qualifier was George Caldwell, with 2:39.5. The Big People took the finals: George Caldwell, flying a copy of his Goodyear "Falcon Special" (powered by a Cox QR2, with a TD piston and cylinder, Top Flite nylon 5-1/4 x 4 prop), came in first at 5:29.0. George won this event last year, too. Russ Sandusky, flying a Stinger (my favorite Goodyear model), powered by a Cox Black Widow with Glo Bee head, KK piston and sleeve, 4-3/4 x 4 Kelly fiberglass prop, and pitting with a Glo Bee Fireplug, was second. Tom Friday was third with a Lil Mike, modified Cox Black Widow, Kustom Kraft 5 x 4 prop. Comment from Harry Myers, AMA 634: "My stuff doesn't run quick enough."

Slow Rat is *not* slow. Slow Rat is becoming the opposite of what it was intended to be. But it's popular . . . 28 entries. Slow rat is sophisticated. Sprung venting systems . . . priming systems . . . centrifugally operated carburetors . . . carbon fiber propellers . . . debored racing 40's . . . polished technique in the pits.

In Jr./Sr., David Owen, of the Nashville Rats, beat Larry Hoffman, of Corpus Christi, by 7.49 seconds (6:25.3 to 6:32.72). This was good Rat time not long ago! And the Open winners were almost a minute better! Glenn Fultz, Jr. and Ricky Hummer were 3rd and 4th, at 8:06 and 8:21.

Lee Cleveland ran the Slow Rat events. Incidentally, Ms. Cleveland (Lee's better half) and Ms. Martin kept the entry cards, posted times, made the heat lists, and generally glued the racing events together. Many thanks to those fine ladies from all of us.

Open Slow Rat is something other than McCoy 35's on Ringmasters. There are 120 mph Slow Rats! Lots of 'em. Most of them are blue and white, come from Tennessee, and belong to Marshall Busby, Paul Tune, Mack Henry, David Owen, and transplant Larry Hill. Slow Rat Story: David Owen flying, Marshall Busby on the battery, Paul Tune on the prop. Pit stop time. Tune catches, refuels with right hand, right hand goes back to left field . . . far left field, hits the prop once. No go. Marshall disconnects battery, puts wrench on plug, turns 1/2 turn, uses index finger as pivot, while Paul flicks the wrench, spinning out the plug. Paul puts in new plug, turns once, Marshall puts on wrench, Paul flicks wrench, Marshall tightens and puts on battery just as prop is hit from far left field by Paul . . . and the plane is gone. I just happened to have my thumb on an electronic marvel, because we had been watching this crew for several races. The above scene took 12 seconds. It seems only right that they took 1st, 2nd, 3rd, and 5th; Busby (5:39.16), Henry (5:54.93), Hill (6:01.51), and tune (6:20.36). Somehow, Harold Lambert snuck in with a 6:13.08, for 4th.

Marshall Busby repeated his '77 Slow Rat win.

The mighty mouse racers, Class II (T.D. 049's) raced and raced and raced. 200 lap finals. Russ Sandusky and Robert Oge were best in the preliminary heats, with 4:25.2 and 4:25.9. They traded places in the finals, Oge going 10:04.1 and Sandusky 10:41.7, for 1st and 2nd. Jerry Kasmer was 3rd, at 11:05. Frank Scott was 4th and Jerry Scott, 5th (Jr.), flying their Lil White Mouses (Lil White Mice?). Ben Berry was 6th with 160 laps. Wendy Sanders (Jr.) was 7th. The winning models were powered by Tee Dees in various stages of modification. Oge used a KK left-hand crank and Kelly prop. Sandusky used a 4-3/4 x 3-1/2 Kelly prop and Glo Bee head. Sandusky's design (the "Super Mouse") is kitted now by Midwest. Some fliers used suction fuel systems, others used pressure, with Don's Quickfill. Oge used suction with a torn Quickfill for venting and fast filling. Oge also used a 6-1/2-foot pilot, Tim Stone.

Now to the really fast and slow stuff . . . Speed and Aerobatics.

There *seemed* to be less speed flying, and checking the '77 tally sheets, there were 137 Speed entries in 1977, and 86 this year. Not our imagination after all. 'A' Speed was obviously off, because, as we noted in the beginning, Dub Jett wasn't out booming them off in the early hours, and more significantly, Langlois-Hurlocker-Huff had one official (for a winning 177.79) and didn't bother after one more attempt. We

saw Dubby and asked if he planned to put in some 'A' flights. Speed Story: Dubby relates that someone kicked in his garage door and took his 'A' ship off the wall shortly before the AAAA.

Glenn Lee is usually active in 'A'. The Grays didn't show up from Delaware, or the Bussells from Texas. Everyone has heard that the new 15's (the Super Tigre FI and Rossi big shaft) are lurking, ready to jump out and smash the records. Was everyone sandbagging at W-S, with the Nationals 6 weeks away? Interesting thought, but the possibility of apathy is worse. Anyway, Les Baer, Pa., took second with 168.47. Carl Layman, Tx., was 3rd at 166.14. Only Glenn Vansant put in an official in 'A' Jr./Sr. . . . 124.78 mph. The 9 Jr./Sr. and Open entries in 'A' were down from 20 in '77. FAI was down from 10 in '77 to 5 this year, with Charlie Lieber, from Moorestown, NJ, showing FAI U.S. Team and World Championship Class form at 144.33 mph (new record). Charles is our 3rd qualifier on the U.S. Speed Team, which will compete at the World Championships in Woodvale, England, later this summer.

Forty-five contestants flying in twelve different events is too much for us to cover. The highlights: Charles Davis is reported to have flown a "stock" Dynajet head and turned 196:00 for 3rd in Jet. As a hobby shop person once said to me, "You've worked on that engine all winter, is it stock yet?" Langlois, Hurlocker, and Huff boomed a 207:53 for first. They added benzene to the 50-50 mix to get enough laps for clocking an official with their Super Burp MK II. Frank Marcenaro, formerly Italian Jet Champ and World Record Holder, now from Fort Worth, boomed 197.29 for 2nd.

Glenn Vansant, from Penndel, Pa., flew record times in 1/2A speed (85.23 mph) and Formula 40 (157.01 mph), but did not get the back-up flights for National Records. However, you can't keep a good man down . . . Glenn set a new Sr. 'A' record at 124.78 mph. Carl Layman, Houston, Tx., posted a new Open record in 'B' Proto, with 143.94. patrick Hemple set the 'B' Speed Senior record at 176.92. Pat flew for his father, Gene, and Tom Upton, and later turned 177.97 with a back-up of 177.44, for a Sr. 'C' record.

Dennis Ytuarte recorded 88.5 for a new National Standard in 1/2A Profile Proto.

Always worthy of note are Al Stegens and son Eric, who flies the things. Al runs an open face (no tuned or mini pipe) T.D. .049, and is always climbing the back of the record holders. He turned 120.76, outrun only by Dub Jett's full pipe ship turning a shade faster (121.08).

First and second in 'B' Speed was close, with a rockin' 193.47 for Carly Layman and 193.06 for Jett and John Shannon. We predict that, this year, Layman, Jett and Shannon, Lee Hemple and Upton, and the LHH team will all go over the 200 mph mark with reciprocating equipment.

Expert Precision Aerobatics and Advanced Precision Aerobatics. This takes nerve. Different than the explosive combat flier's reflexes. Pull out of a loop over the same spot, 5 feet above the ground going 60 mph, three consecutive times, trying to hit it dead right each time, and then fly progressively difficult maneuvers for 5 minutes. Just being able to do it is enough for some.

Being able to do it well, like the talent at the top of the heap, is an art form. There was a good entry list in Advanced. Vince Schnetzer, Miami, Fla., with the Best Appearance Award "Stilleto", coupled a fine airplane and consistent flying for 1st Place in Advanced. Dean Brock, Callahan, Fla., a senior, placed second . . . nice flying, Dean. Bob Harpe, Savannah, Ga., won third. Ron Burn, Richmond, Va., had a particularly outstanding paint scheme and finish on his new

stunters.

The experts had to go against reigning World Champion, Les McDonald, from Miami, Fla., and the West German Champion, Claus Maikis from Neu Ulm, W. Germany. Claus had trimming problems . . . maybe a warp that occurred during transit. The engine is the beautifully proportioned Elf, but it ran too fast, apparently not responding to tuning. Claus finished 7th overall. Bill Pardue, who has more expertise in judging than most of us, noted that Les McDonald was off form. Still Les was up there high enough to outscore the closest competitor, Norm Whittle, from Scott A.F.B., Ill., by 20 to 30 points on each flight. Bob Galle, of Clinton, NJ, was third. Last year's winner and host to Claus Maikis, Keith Trostle, has a new airplane that he flew to fourth place.

A fine meet, worthy of being the 1978 U.S. Control Line Championships. Next year, all you builders and fliers out there, Pardue needs the manpower to run the meets, so volunteer for duty as you register your entries. If you don't enter, volunteer to help with the concessions, lap counting, timing, or sweeping up. He needs 50 people to help run the meet, and his club has seven active members. Hats off to the Golden Triad Model Masters of Winston-Salem! •

C/L . . . . . *Continued from page 91*

content, due to the element being cold. Yet, some of my R/C Pylon Racing friends in this area require only 30% nitro fuel for their club races, and the Racing plug works fine. Of course, they are into using itty-bitty props, ever since Jive Combat Team member Gary Stevens blew them off with quite small diameter props, screeching RPM and superior speed. Maybe the little props help here; just don't stay away from the Racing plugs because 50% fuel may be required.

SMALL-BORE TIPS FROM AN R/C CAR RACER

Since racing the R/C cars, I have come to know Gary Kyes, probably the most thorough of individuals when it comes to building racing equipment, in addition to being an extremely smooth and fast driver.

Gary passed on a few tips concerning building TD .049's that you may not have thought of, or possibly forgotten. The first is one that is actually ancient history, I heard about it years ago, yet don't recall seeing anything written about it, except in Gary's R/C Car column in R/C Sportsman. This tip is that, to really rip, many TD's are helped a lot by having the bore of the cylinder square to the shaft. In stock condition, a TD may or may not be square. The only way to find out is to get your machinist buddy to chuck the crankcase in a milling machine and put the indicators on it.

As long as he has it set up to do the checking, have him mill the top flange of the crankcase (where the cylinder seats), getting it perfectly square to the crankshaft. Only take off as much material as necessary to get things right, and be prepared to scrap the case if it is really a long way out, which is doubtful. Gary also mills the seat for the back door (rear cover . . . that threaded thing that plugs up the back of the engine), again getting it square to the bore of the cylinder, which is already square with the shaft. I have my doubts about this helping much, but Gary's engines *do* go fast, so maybe there is something to it. At any rate, moving the back door in as far as possible, still having clearance for the crankpin, is a good trick worth a bit of power on most engines.

Although it is not a real critical thing in airplanes, the .049 engines used in cars have a bad tendency to loosen the glow plug. It is common for car racers to tighten the glow head after each run of the engine. If

you have this problem, Gary's solution is to lightly face off the seat of the Cox plugs. There is a bit of flash or something on them, and Gary maintains that this can set up a "wavering" sort of action that loosens the head. Add the very high temperatures encountered in R/C cars, and your head comes loose. That last sentence didn't come out exactly right, but you get the point.

The easiest way to face off the plugs is to lay a piece of 400 or 600 grit wet-or-dry sandpaper on something perfectly flat; a piece of good glass will be okay. Squirt some light oil on the paper, and rub the seat of the plug on what is usually referred to as a poor man's milling machine. Crude, but effective. Don't overdo this; a few circular (better yet, figure eight) passes is enough.

Next is a really great trick Gary told me about, and which is, as far as I know, a new one. With your newly-assembled engine on a test stand, be sure the glow head is tight, but leave the cylinder just finger-tight in the case. Fire that beauty up, and give it a little break-in if it seems to need it. When ready to go for max RPM, have somebody hold the tach where you can read it, and rotate the cylinder a bit at a time. By doing this and playing with needle valve settings, you can determine exactly where the cylinder should be for max power. Note that the engine is running while you do this, the cylinder being easy to turn, as it isn't tight. Use a standard Cox wrench for turning the cylinder, unless you have asbestos hands. When you have the cylinder turned so that the engine makes real power, shut it down and mark the position of the cylinder. By shimming the base of the cylinder, you can get things exactly right when the cylinder is tightened down again. I think that Cox .09 head gaskets work okay for shimming, if you don't have a lathe for making your own. Pretty neat trick, very effective, and relatively easy. Also, not cheap if you have to buy very many Cox .09 glow heads, just to get the gaskets out of them. . .

PA (PRECISION AEROBATICS)

The first couple of years I was involved in C/L competition flying, I always looked at the Stunt fliers as super neat builders, but so-so fliers who were more into a knitting bee-type of thing than they were into heads-up competitive flying. The white pants, the jumpsuits, the perfect airplanes and so on gave the event an artificial type of atmosphere. Or so I thought back then.

Today, the Stunt event is basically the same as it was back then, but through PAMPA, Stunt has been presented (to me, at least) as the very competitive event it really is. Also, I have made an effort at being a somewhat decent Stunt flier, and can now appreciate just how good people like Hunt, Gieske, Rabe, and McDonald really are.

With this in mind, I have been watching the advancement of Stunt flying and the promotion of same by the Precision Aerobatics Model Pilots Association (PAMPA). Keith Trostle leads PAMPA as Prez., and Wynn Paul is the editor of the monthly newsletter. I know there are a number of other good people in there working, but these two seem to have been the ones to give PAMPA common direction and unity.

I feel that what they have accomplished so far is amazing. Take rule changes, as an example. We all know how big a hassle it is to get the rules changed, especially if there are a lot of people involved, as there are in the PAMPA group (or any other special interest group). But with PAMPA, there is very little hassle. Their advisory board submits a few proposals, and it is obvious that the proposals have been well thought-out in advance. As these proposals wend their way through the CLCB procedures, they are guided along by the advisory group. When it comes time to cast votes for the final time, each member of the CLCB has got in his little hands a letter from the PA advisory group that states exactly what the Stunt community wants done. And it is done. I can't recall any of their proposals being voted down, unless they so specified. PAMPA's record on getting the rules to match what the Stunt fliers want is the best.

Rules are very important to the AMA events, but what really counts is promotion. PAMPA is involved with publicizing local contests, pushing their class system for local contests and so on, but where they have really done the job is at the Nats. For the last few years, C/L Stunt has been the most organized of all the events, and not just C/L events, but R/C and F/F as well.

Stunt at the Nats is also the best event to be involved in, if you like to concentrate on one event and do it right by getting in and socializing with everybody.

Take the '77 Riverside Nats, as an example. While C/L's other large special interest group, MACA, watched its "leaders" knuckle under to pressure from the AMA, leaving the Combat fliers to fly in a dirt field cluttered with rocks, dirt, ant hills, and more dirt, the Stunt fliers were participating in their best Nats, under the directorship of Arlie Preszler. The contrast between the two groups, MACA and PAMPA, has

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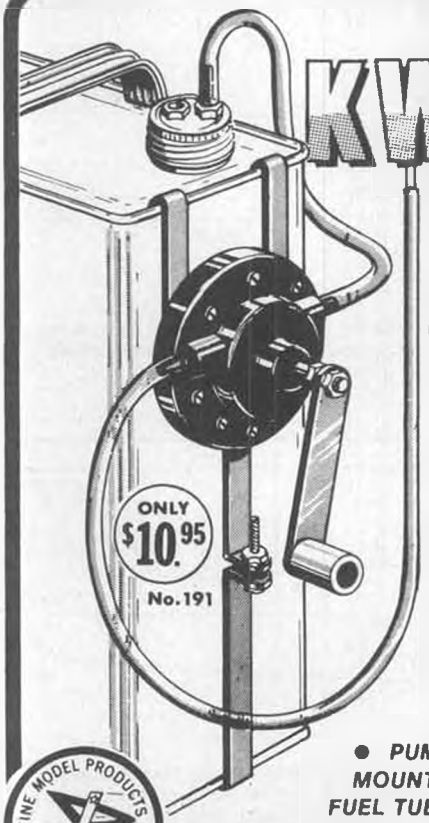

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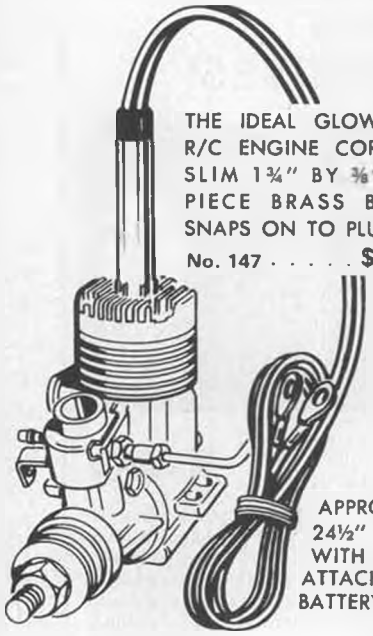

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always been evident . . . at the '77 Nats more than ever before. Having belonged to a couple of special interest groups, I can really appreciate what PAMPA has been doing. The future of C/L Stunt looks better than ever.

If you would like to join PAMPA, send $6.00 to: Wynn Paul, 1640 Maywick Dr., Lexington, KY 40504. Tell Wynn that Dirty sent ya!
YOU *DID* READ IT,
DIDN'T YOU??!!

In the August '78 issue of Flying Models, Al Rabe published his story of the evolution of the Mustang he flew to a 1st at the '77 Nats and a spot on the '78 FAI Stunt Team.

The reason I bring this up is that there seem to be an awful lot of R/C and F/F fliers who read this column. And, as all of us have a tendency to get totally involved in our favorite event, we also have the tendency to feel that we are the only ones doing anything demanding a degree of sophistication. Generally speaking, the R/C guys are the worst in this respect, for one reason or another.

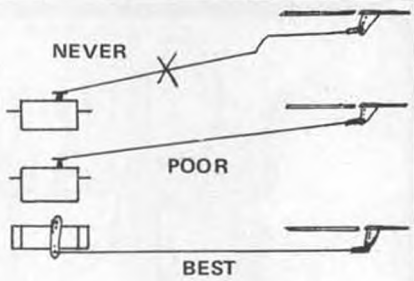
You can forgive me or hate me for that statement, I don't particularly care one way or the other. Just go back and read Rabe's article. You won't believe how much effort has gone into making the Rabe Mustang a Nats-level winner in Stunt. I'm sure you'll agree that what Al has done makes most other modeling achievements of recent years fall into the ho-hum category. ●

Mammoth . . . . *Continued from page 25*

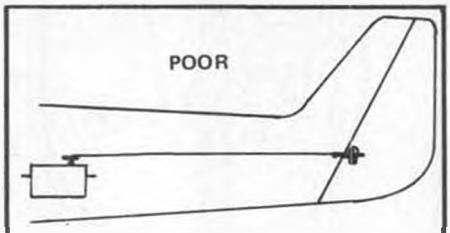
mounted at right angles to the hinge line. In short, you were getting most of the servo's power where it was doing some good, fighting the slipstream and controlling it as required. What was on the other machine? Thirty-six inches of Nyrod with solid wire on each end. The elevator horn was angled to suit the pushrod angle, but not correct with the elevator hinge line. The pushrod exit height was level with the horn at neutral elevator, but angled more and more as control was applied in either direction. In the vertical plane (looking down at the top of the fuselage), the pushrod was at a fair angle to the servo/elevator plane of movement. A name-brand, standard hinge was used. Because the hinge line on larger models is a lot longer, you use a lot more hinges, and the more you use, the greater the chance of misalignment and more friction points.

Lastly, because the horn was not located in the center of the surface, a load imbalance occurred, adding many times the power required to move the surface. It's the old story, "Oh, that's such a little bit", but unfortunately for us, it can amount to over 50% of the usable servo power, *collectively*. Even if you have some super servos, don't have their power make up for your bad design. There is no point in having 1% servo resolution if you have 5% error in your control linkages. If you use pushrods, keep them short, or use twin cables, as in full-size practice. Some examples are shown in the diagrams. Eliminate the don'ts wherever possible.

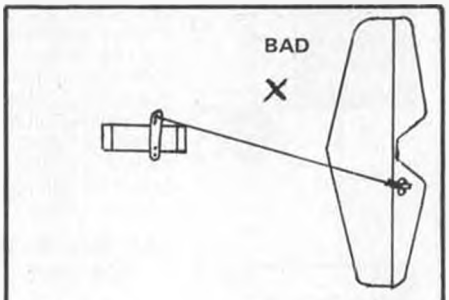
Another problem we have is that, in the quest for smaller servos, the cost has been the loss of a good servo base or mount. If a servo is



Note: Avoid bends, angled rods, servo pivot and surface hinges not working on same plane.



Note: Use ball linkage. Standard clevis will tend to bind and be forced open. Pushrod exit hole difficult to shape. Avoid design if possible. Robs servo power. Also note that pushrod hole should be in line with hinge line.



Note: Pushrod angled. Load not centered. Will not move surface linear to stick movement. Less servo power available at extreme travel, where needed most.

going to be put to work in a large aircraft, never mount the servo in a position so that the force is sideways to the servo (this is usually the smallest base). In the case of the Dunham and D & R mechanics, this sideways base is less than 3/4 of an inch. Endwise, it is nearly 2 inches. On Jo-Mac and Kraft KPS-15 servos, the side rock base (remember, you must consider the grommets as the base) is also about 3/4 of an inch, but the end base is nearly 2-1/2 inches. A servo that rocks in its mount is one that will give you erratic control, control surface flutter, and a very

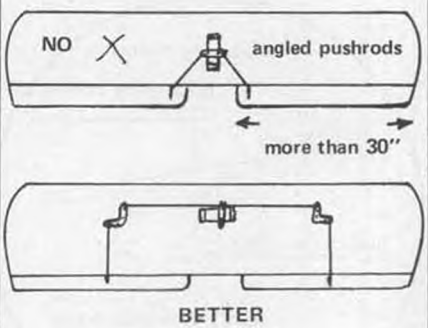
mushy, unpredictable response. There are some servo mounts (particularly single-servo mounts) that are so flimsy they aren't even practical for 1/2A loads. I am unaware of any single-servo side mount that actually improves servo mounting, other than the one put out by D & R. Unfortunately, it only fits the Bantam servo.

CONTROL LINKAGES

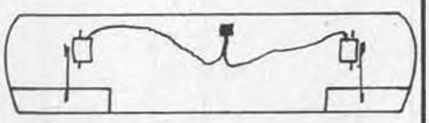
If someone asked me what I thought was the most important accessory that could be improved in our industry, it would have to be the adjustable quick link, or the adjustable means of connecting a pushrod to a control horn or servo arm. You can't expect the air loads and bumps the big surfaces get in transporting, etc., to be held by a 2-56 thread on a nylon or plastic clevis, especially if that thread is not too clearly defined on the rod itself. If you're using the nylon type clevis of the heavier type, buy a few lengths of 3/32 mild steel gas welding rod and a 4-40 threading die. You will find that the 4-40 die will cut excellent threads on the 3/32 welding rod, and in most cases this new threaded rod will force thread into the nylon, giving you a tight connection that will not pull out, and will also give a positive adjustment and a far sturdier pushrod.

As for keepers, I have found that 3 small servo grommets make a better keeper than the plastic sleeves supplied with most of these units. The keeping force is needed as close to the pin as possible, while still allowing full movement of the control horn. Three are used so that you still have two others to help hold the first one in position, and provide a safety back-up, should the first one fail. Try them. I think you will find it a big improvement. I have sent a clevis design in to two major accessory manufacturers at their invitation, and these should eliminate the weak link.

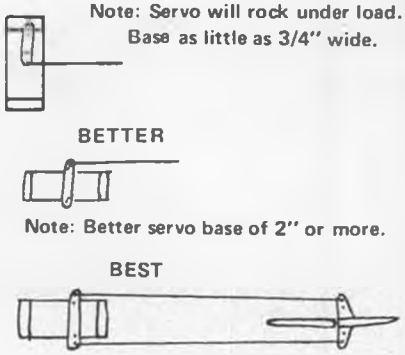
Steel clevises are good when



Note: Load centered. Good control rod travel.



Twin servo ("Y" connector) for barn door ailerons. Servo mounted with arm travel in same direction as aileron horn. LEAST POWER LOSS. Surface travel (Differential) adjustable through servo centering.



manufactured correctly, but it is so easy to get the temper wrong (too soft or hard). If sprung even normally, they have been known to snap, both on an attempted adjustment and in the air. The second problem with this type is that the threaded portion is usually folded over to form a tube in which the thread lies. Often, these are too tight (which can result in damage to the connector during adjustment) or too loose, which can allow a pushrod to slip. Keepers are also difficult to maintain on this spring type. So, I'll go out on a limb and state if anything has ever two-bitted a model to death, it has to be the adjustable pushrod connector.

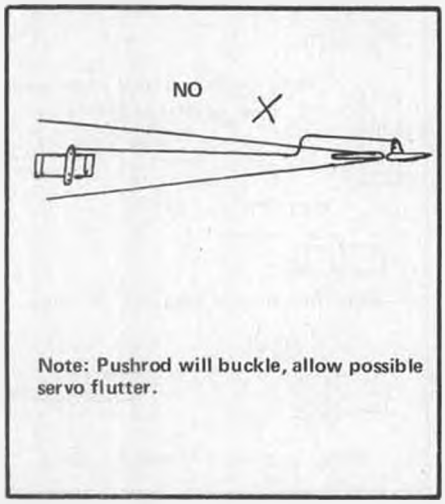
SERVO ARMS

This is certainly an area which needs improvement. We are finally getting servos with decent output shafts (even ball bearings yet), but we still have far too many flimsy servo output arms on the market. On some, there is a lack of adjustment holes, and on others, there are so many holes so close together that they actually weaken the arm. If you wish to use a clevis on the inner holes of some of these arms, the arm will jam in the throat of the clevis. On most, if you use a ball link to prevent this, it can put the load high up on the servo arm and shaft, which can allow the more flimsy arms to twist. On servos without a decent output shaft support bearing, it puts a side load on the shaft, which sure doesn't help operation.

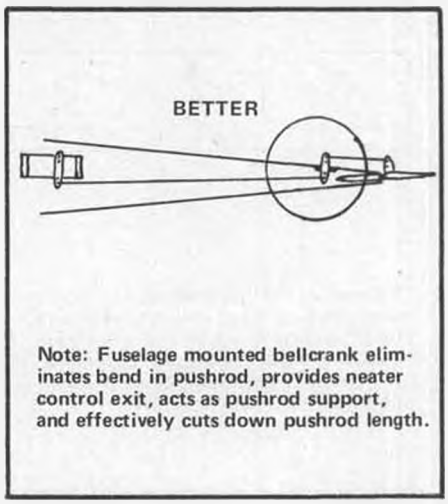
If you feel you might have a problem in using a ball link, see if your servo will allow the ball to be mounted below the arm. In this way, the push/pull is closer to the output shaft bearing and also to the servo mounts, applying less leverage to rock the servo. Remember, the closer the load is to the mounting grommets, the better.Less wear and tear on the servo is the result. If you use a Z-bent wire to connect to the servo arm, make sure there is enough meat in the arm to allow the size wire you use, and still have some arm left. This doesn't apply only to large models, but also to standard-size models, especially those using the new powerful super engines which are capable of high flight speeds.

Tail wheels and nose wheels of the steerable type are also part of your linkage. On tail wheels, if you're steering via a tiller arm hooked to your rudder, try and keep that attachment point as close to the rudder horn as possible. The longer this distance is, the more unnecessary twist is applied to your rudder and rudder hinges. The other consideration is to mount your rudder horn so that it's the best compromise between obtaining this ideal tail wheel pick-up point and a point which is as close as possible to the aerodynamic load center of your rudder. You can lose a lot of effective servo power by not doing so.

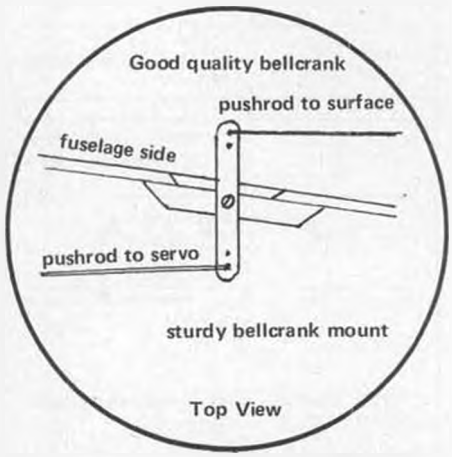
On tail wheel struts, I have found that the better grades of nose gears can be adapted for tail wheel use. This would also give you the advantage of moving the tail wheel assembly forward, shortening your wheel base, and giving you a further advantage of separate steering ratios



Note: Pushrod will buckle, allow possible servo flutter.



Note: Fuselage mounted bellcrank eliminates bend in pushrod, provides neater control exit, acts as pushrod support, and effectively cuts down pushrod length.



for rudder and ground steering. When taxiing your aircraft on standard model fields, you might find your steering limited to the point that you can't negotiate the taxiways, turn around on the runway after landing, turn into the wind for takeoff, etc., or stay on the strip, with a normal set-up. If you adjust your rudder throw to compensate, you could, with a direct-drive installation, find that you don't have the correct rudder throw in the air, possibly more movement than you need. This is also making the servo work harder than necessary, so consider the separate drive to the tailwheel. On any steering gear, make sure your wheel center (vertically) is in a direct line with the pivot point. This applies to all models, and for this reason, dual-strut gears are far superior. If your axle is bent either way (not at right angles with the pivot point), it can apply a side load which will result in unnecessary shocks and jolts to the servo. Some of the servo savers on the market, while cutting down on some of the direct shocks to the servo, can start an oscillation which keeps going long after the original shock.

While strip ailerons seem to work on smaller aircraft with the drive attachment or arms on the fuselage end, I wouldn't recommend that type of connection on any strip aileron over 24 inches in length and 1 inch wide, and certainly not on any man-sized model. If you do use a strip aileron on a larger model, try to make sure that your aileron horn is as close as possible to the aerodynamic center of the control surface. Also, make sure that your linkage is as tight as possible, and consider using a separate servo for each one, connected via a Y-connector to the same aileron channel.

Our last primary control is the throttle, probably the most abused control hook-up that we have. At this point, I would like to make a comment on the Quadra. The original instructions supplied could have caused modelers reading them to remove the throttle return spring entirely, rather than unhooking it. The new instructions now leave no doubt as to what is intended. They read "unhook". This spring also serves to take up shaft end play. If you have a Quadra, or know someone who has one with this spring removed, suggest he read this. Remove the carb so that the throttle butterfly screw can be reached, and remove this screw carefully, along with the butterfly. Remove the circlip on the end of the shaft and withdraw the shaft.

Install a short length of *neoprene* fuel tubing (of the type supplied with the engine) next to the arm as a spacer to replace the missing spring. The length should be just long enough to provide a slight tension against the circlip when it is reinstalled. Replace the butterfly valve with the two indentations facing up (same side as the screw head). Thoroughly clean any traces of oil from both the throttle shaft and the screw. Put on a drop of permanent Loctite and tighten the screw firmly. Check throttle operation for binding. Without the spring, the throttle disc takes all the centering loads and eventually wears, and this could result in an erratic idle. Occasionally check this screw to see if it is tight. This screw, ingested into the engine, can ruin it.

Earlier on, I mentioned the problem of how to store small radio components in a large fuselage (a one amp battery pack, if it comes adrift, won't hesitate to rip all of its wiring harness to shreds, while destroying everything in its path). A neat method of securing everything in a small space is to use small refrigerator food keepers, of the polyethylene type, with air-tight lids. While you can't glue to these, you can bolt or screw them to something which can be glued. On radios such as the Royal Super Sport, which has the switch harness integral with the battery, you can, if you wish, mount the switch in the lid and simply take the lid along if you need to remove the battery from your aircraft for charging. If you can charge the battery while it is in the aircraft, simply route the charge lead through the side of the container. On some of the better brands, the lid fits so well that you shouldn't have to secure it other than to snap it on.

If you pick the right size container to fit the equipment you wish to install, along with the perfect amount of padding, your radio will never have had it so good. I haven't tried it, but what would you modelers think of using Idea Development Inc.'s "Stick-it" for holding those long wire leads in place?

I have received Andy Sheber's prop drive unit for the Quadra engine. His instructions were to run it until it falls apart. Preliminary tests so far indicate very minor changes, amounting to incorrect instructions on how to install it. When you read this, those changes will have been made. We're running a 24 x 10 prop on this unit, and it certainly doesn't load the engine down.

GROUP ACTIVITIES

Have you thought of allotting time slots, say 15 min.each, to be drawn out of a hat? Say you have drawn 10:00 to 10:15; you would have 15 minutes to start and put on a display,

act, or private air show to demonstrate your aircraft, land, shut down your engine, and return your Tx to the impound. You do what you want in that time. The last thing you want to do is copy what has been done before, just as they do in a full-sized air show. In this way it is hoped that you are going to be comfortable and enjoy yourself, and because it isn't repetitious, your buddies might even enjoy it, too.

Another event, also involving a time slot, is a team event where two or more participate, either all in the air or with ground crew support (modelers temporarily grounded will appreciate this). The only person who should know what you are going to present is the CD or field safety man, to ensure that what you are going to do is safe. In any case, no individual or team should attempt something they have not done before. Do it as they do with full-sized aircraft; practice away from the crowds and get everything down pat in advance.

With Mammoth Scale, you have a cargo capability, and a whole bag of tricks available to your imagination. As a team event, the "bomber" can get high upwind and drop his toilet paper streamer, while his buddy on the ground scrambles his aircraft and attempts to make as many cuts (or hits) as possible. Remember, you have a 15 minute time slot (this could be extended or cut as required). These are also good events for glider tow, flour bombing, challenging a second club, etc. In these types of events, you fly what you have within both its capability and yours. No ulcers, no unnecessary crashes, and no hassles with judges. Your prize? The knowledge that you have had a good day providing entertainment for someone else who has done the same for you. You don't have to have a bunch of hardworking officials. They can all participate. Don't be surprised if the novice in your club gets the standing ovation. He will be judged against his own ability and imagination, not a sheet of paper.

We will be coming out with an inexpensive throttle linkage for the Quadra engine. The parts are on the way, and the finished product will be in stock as you read this. See your local dealer.

The next issue will delve into other weak areas and solutions concerning such items as wheels, landing gears, struts, skis, floats, their attachment and set-up, glider tow and bomb drop attachments, etc. It's also time for a complete article on the care and feeding of ignition engines, using standard items available anywhere, not tool No. so and so, etc. Because we can't speak for other manufacturers, it will be a complete manual for the Quadra engine, but it should be of tremendous help to all owners of small ignition engines, regardless of make. Any info submitted by other manufacturers will be passed on where applicable.

FLASH!!! We have just received several good pictures and center spreads from the Sun newspaper, of Australia, in which a Quadra-powered replica of the "Southern Cross" made the 50-year commemorative flight from Pt. Cook to Berwick, accompanied by a helicopter. The flight was entirely successful, despite gale-force winds over the open sea and having to fly at 1800 feet and higher to remain within air traffic control. This flight, which was picked up on TV and other news media, has given modeling a big push forward, not only in Australia, but worldwide. It seems that Mammoth Scale models attract responsible people whom we at **Model Builder** are proud to be associated with. •

F/F ..... *Continued from page 89*

be a good number in the flyoffs at that W.C.

"Finally, I predict there will be a general decline in the number of Wakefield participants, but more intensity in those individuals or teams that remain. It is still a tough event, but one that brings a great deal of satisfaction for the dedicated."

GETTING A START IN WAKEFIELD

Sorry, there aren't any kits on the market for this kind of model. The first and most important step of all is to get next to the expert Wakefield flier in your club or area. Providing you've built and successfully flown some smaller unlimited rubber models, you can make the transition to Wakefield easily, especially with some key guidance from your resident expert.

Lots of plans are available. John Clear's Straight Shooter (Bat Sheet, June 1974) and its Montreal stop front end are good beginner designs. Plans and construction articles are available for several Bob White models: Vol Libre (Model Aviation) and 71-7 (**Model Builder** Plan No. 6721), although these are not simple to build. Jon Davis' Maxine is recommended as a first Wakefield, and plans are available from Carstens Plans Service. Several plans, including Bob Duffield's NorWester, are available from NFFS.

PETTIT P.F.C.

As mentioned earlier in this column, I have tried some new and super filler from Pettit Paints, and it is tough to beat. It cures rapidly (in fact, a bit too rapidly for me), and fills everything. It can be carved, sanded, drilled, and tapped. Dope and urethane paints go right over it, as does epoxy paint. If you've got a bunch of gaps, and you want to hide them from the eyes of the public, P.F.C. is for you. Pure white when it cures, it is a bit on the heavy side, so use it sparingly at the extremities. I couldn't have built the Re-Tern V nearly as easily and as neatly (if I do say so myself) without it.

AND SO, ANOTHER MONTH GOES BY

Hang loose, write if you get work,

keep those cards and letters coming, thermals, and all of those other closing-type comments. See you all next month with more from the Model Builder world of Free Flight.●

Anaerobics . . . *Continued from page 66*

in the screw being twisted in half before the parts loosened.

More fitting for our purposes are the mild and medium-strength compounds. Mild strength is best for small-diameter screws, for which both the application and removal torque is low, due to the small tools used to assemble or remove them. Medium strength is probably the best for most modeling uses, and is recommended for everything on which wrenches or reasonably-sized screwdrivers can be used. It should not be used on any screw so small that a jeweler's screwdriver has to be used on it.

Further type classification is done according to whether the compound will penetrate between already-assembled parts, or whether it has to be applied to one or both of the parts before assembly . . . which is where that "controlled lubricity" business comes in . . . back in the grading of the materials.

The curing time depends on a number of things; starting with the type of compound being used, and further influenced by the types of metals. Fastest curing times occur with copper and brass; iron and steel are rated as fast, aluminum as slow, and cadmium and zinc are very slow.

The space between the surfaces also affects curing time; the tighter the fit, the faster the cure. Higher temperatures also make for faster curing, as do clean surfaces. Oil and dirt slow the cure considerably. Since most of our hardware is tin or camium plated, it can be considered as being clean. However, some of our socket head engine mounting screws are unplated, and appear to have an oil-based protective coating. Most anaerobics will cure through this coating, but for best results, a quick rinse in alcohol or trichlorethylene would not hurt.

Of the two brands previously mentioned, Loctite comes in two types: a medium grade called "LOCK 'N SEAL", which is blue in color and described as best for use on parts that you will later want to disassemble; and a high-strength grade, call "STUD N' BEARING MOUNT", red in color and recommended for studs, bearings, or for general use where you won't ever want to disassemble the parts. It is plainly described as requiring pullers, a press, extra effort, or heat, for disassembly.

Both of these Loctite products are of the types recommended to be applied prior to assembly of the parts. They come in plastic applicator tubes of 6 cc (.2 fl. oz.), at $2.35 each.

Devcon, through Du-Bro Products, markets its modeler's thread sealant as "Super-Lock A", also in a 6 cc container, at $2.25. Like Loctite, it comes in a drop-at-a-time container, in this case, cleverly shaped like a large hex bolt and nut of about the size needed to hold down a Webra .91.

This one is not graded by the manufacturer on the card as to strength, but from the instructions provided, it falls into the medium strength class and is to be applied before assembly.

So far, all the above sealants have turned out to be of the thixotropic (non-migrating) types. If your particular needs call for one of the penetrating types, look for Loctite 220 (mild) and Loctite 290 (medium). Your nearest hardware or automotive supply store is probably your best bet.

Our uses are many, but more will

no doubt occur to you after you have brought home a container and proved to yourself that it really works. The only basic rule, if any, is that the higher the vibration level, the more you need an anaerobic thread sealant. Helicopters and R/C cars will probably profit more from its use, though airplanes have been known to shake themselves to pieces when an engine has come loose. The less material area in contact, the more it needs a sealant. For example, the blind nuts we use, many of which have minimal thread area, will certainly hold much better with a drop of sealant to help. And certainly, that muffler that ISN'T going to fall off and be lost, will more than pay for a tube of either type.

But watch out for that dimethacrylate mentioned earlier. It is one of the ingredients in these thread-sealing compounds, and might not be responsible, but something in their makeup makes these compounds irritating to sensitive skin. In case of contact, wash off promptly, and in case of skin reaction, discontinue use and see a doctor. Keep it in that kid-proof place you have for all such items.

Even if you aren't too sure how to pronounce "anaerobic" (don't ask me!), try one . . . you'll never be without it again. •

R/C Auto . . . . *Continued from page 45*

and trim adjustments. Price of the complete radio is to be in the $120 to $140 range. A 1/8 scale radio will be out later and will probably have adjustable (or selectable) servo throw, and be more expensive, too.

In any case, the 6th Annual McCoy Race of 1978 is now history, and the Pomona PROCAR club ran a good race. I would like to thank Helen Thorp for providing the tabulated finish order.

Results: 1978 McCoy Championship Race
EXPERT CLASS
T.Q. Bill Jianas
'A' MAIN
1. Jeff Rold
2. Curtis Husting
3. Bob Welch
4. Bill Jianas
5. Chuck Hallum
6. Earl Campbell
7. Bill Steele
8. Jack Barton
9. Jim Aguirre
10. Gary Kyes
'B' MAIN
1. Bob Titterington
2. Gene Husting
3. Ken Kimbrow
AMATEUR CLASS
T.Q. Dana Smeltzer
'A' MAIN
1. Mike Kimrey
2. Dana Smeltzer
3. Jay Spere
4. Jerry Thompson
5. Larry Ferriss
6. Paul Kawaguchi
7. Bill Watson
8. Paul Vega
'B' MAIN
1. Rich Perry
2. George Hague
3. John Keltz
NOVICE CLASS
T.Q. Mike Reedy
'A' MAIN
1. Randy Smeltzer
2. Dick Rold
3. Glenn Williams
4. Don Baiss
5. Dave Shuck
6. Jeff Warner
7. Barry Grossenbacker
8. Mike Reedy
'B' MAIN
1. Thomas Hickenthier
2. Joe Tentschert
3. Lance Love
BEGINNER CLASS
T.Q. George Anderson
'A' MAIN
1. Chuck August
2. Joe Sortillion, Jr.
3. Willie Green
4. Ira Kimble
5. Donald Gaither
6. George Anderson
7. Robert Roben
8. Reba Steele
'B' MAIN
1. Joe Sortillion, Sr.
2. Ray Shum
3. Tim Bell

Next month we'll be getting back to some technique topics . . . more about weight distribution effects and possibly some aerodynamics. Then it will be ROAR Nationals time.

Before signing off, here is an experiment that was performed at the Orange County (CA) R/C Auto Racers track, at the Briggs Cunningham Auto Museum site. The parking lot surface was "sealed" about 4 years ago. For the first six months, traction was super, then over the next six months, traction got noticeably worse. By 3 years, the sealer was very hard and dust and dirt would just sit on top of the surface, and traction was very bad through Saturday practice and most of racing Sunday. In the 4th year, traction never seemed to develop, and racers really disliked running at the track. So, for Orange County's first So. Cal series race, I went down to the local drag strap . . . Orange County International Raceway (OCIR) . . . and talked with the owner, Bill Doner, and the track steward, Kenny Green. They recommended that we try "Moose Juice" traction compound (not VHT, Very High Traction). OCIR lent me a small 2 gal. metal garden sprayer with some "Moose Juice". On Saturday afternoon, I sprayed some on the

track . . . everywhere but the back straight. I would guess that I only applied about one pint, maybe a quart, to the whole surface between the white lines. Traction was instantaneously better, but not super good. Traction seemed to improve slightly during the remainder of Saturday, and was even a little better Sunday morning. There was little change in traction throughout the race program Sunday. Nothing came off the track and got on the cars, and if you got outside the white lines, the surface was really slippery, making you drive a good line. A lot of racers and spectators really thought it helped our racing program, and we even had a new qualifying record set.

So, for old, hardened, sealed asphalt surfaces, a little "Moose Juice" can really improve the fun of racing. A lot of juice may be worse . . . I don't know. If you want to try "Moose Juice" (a trade name), write to Norman Pearah, 675 Wooddale, No. 165, Baton Rouge, LA 70806 (this is a drag strip). "Moose Juice" costs about $10 per gal. and all you need to get is a 2 gal. garden sprayer. If you have any difficulty getting the juice (or have questions or comments), write to me, Chuck Hallum, P.O. Box 4658, Irvine, CA 92716. •

Centurion . . . . . *Continued from page 65*

vibration and crash protection. I had to add 3/4 oz. of lead way up in a compartment that seemed made for the task. This balanced the ship at the point called for in the plans.

Weight was necessary, since the Litco system is lighter than the Cox system. By the way, the Litco R/C gear has been very good. They're not well-known, but the price is right and I have no complaints after flying one of their set-ups in two sailplanes and the Centurion. Cox supplies the pushrods ready-made, and after straightening out the ends so that I could use those clever Goldberg fixtures on the servos, they fit right in. I had to enlarge the pushrod holes in the fuselage a bit, otherwise the rods would rub against the fuselage. I have a prejudice (probably learned in my single-channel days) against any friction in my control systems.

The engine is a standard Cox Quiet Zone .049 with muffler. I have never been *muy simpatico* with engines, but I decided that I would follow the instructions to the letter. I ran it five times on the bench, leaving the three head gaskets in place as I was told. After breaking it in running a bit rich, I found that it would start at the first flip . . . at most two. For quite a few minutes after a flight, the engine would start immediately by just filling the tank, attaching the battery, turning over the prop three times, and giving it a good flip, with or without the spring starter. Much to my surprise, it also did this out at the field, every time, even with spectators standing around. Never has an engine been so good to me. And the muffler (which I never have to open, except for the first prime of the day) keeps the sharp bark of the engine down to a pleasant purr that doesn't even scare horses.

My last pleasant surprise with the Centurion was seeing how well it flies. I followed the instructions, and it was trimmed perfectly from the first launch. Loops, rolls, snap rolls, outside loops, inverted flight, tight turns without losing altitude, and greased landings are all possible. One regret I have is that the engine isn't provided with a clunk tank. This means that inverted and outside maneuvers must be kept brief. With the engine running, it is nearly impossible to stall the Centurion; it will just keep climbing. The climb surprised some R/C flyers who saw me do an ROG takeoff from a small parking lot surrounded by tall redwoods. With the stock engine and prop, it is a perky little beast. When it does stall, power on or off, the stall is clean and straight ahead. The aerodynamics of this bird are *good*.

So far all of my landings, on dirt and grass, have been on the wheels. I have bent the front gear a few times and I'll say a word about this later on. If it did break, it should be easy to bend up another one. In one crosswind landing, the front wheel popped off. I popped it back on, and it hasn't come off again. I know it won't, because I added a keeper. One of my favorite stunts (with a new bunch of spectators) is to let the plane climb high, toward the end of its engine run. When the engine quits, I say "Oh, no!", roll the plane inverted, and fly it down to 30 feet or so that way, then do an inside half loop and land it right in front of myself. Never fails to bring out a "By gosh" from the natives.

The firewall is not quite fuelproof, and after a number of flights began to develop surface cracks. A coating of epoxy stopped the deterioration.

Another complaint is that the landing gear is made from steel wire that is just too soft. The nose gear deforms even on quite gentle landings. Real music wire would do the trick, and I hope they improve in this department. Another problem with the landing gear showed up after

many landings . . . the main gear's mounts were only glued to the fuselage shell. A bit more glue at the factory and they would also have been attached to the foam block that holds the radio. After they cracked the fuselage and came out, I glued them in more securely. It helps.

All in all, an easy-to-build, not-too-expensive ($35 to $55, depending on where you look), handsome, good-flying airplane/engine combination. I'm impressed, and am having a lot of fun with it. •

Atavist . . . . . *Continued from page 75*

moisture changes in the air. If nitrate dope is used, a coat of fuel proofer must be applied as the final step. The stabilizer should be absolutely free of warps.

WING

The wing is straightforward and should present few building problems. Here again, balsa can be substituted for the spruce spars shown on the plans, although I do not recommend it.

Select the wood for the wing tips with care, as they should be kept as light as possible. For the two inboard wing panels, ribs should be cut from medium 1/16 quarter-grain stock. The trailing edges are carved from similar 1/8 sheet balsa. The diagonal ribs are inserted last, after the spars have been glued in place.

Assemble the wing panels to the polyhedral dimensions indicated, using liberal amounts of glue on all joints. Install the plywood gusset and triangular reinforcements as shown. Sand the entire completed structure carefully to ensure an attractive covering job.

I recommend covering the inboard wing panels with GM silkspan, to enhance torsional rigidity and facilitate field repairs and patches. If tissue is used, cross-grained double covering of the inboard panels is desirable. As on the stabilizer, apply at least 3 coats of nitrate dope, plus fuel proofer on the inboard panels. Set the wing aside and allow it to cure thoroughly. The right inboard wing panel should have 1/8 inch of wash-in.

FIN

The fin is cut from medium 1/16 sheet, to the outline shown on the plan. To preclude warps and enhance durability, 1/16 x 1/8 spruce strips should be glued to all the edges, as shown on the plan.

FUSELAGE

Select two 1/8 x 3/8 straight-grained balsa strips for the longerons. Cut the two fuselage sides from 3/32 medium-quarter-grained sheet balsa. Cut the 1/8 x 3/8 diagonal and vertical members to length. Do the same for the 1/8 sq. members in the pylon area.

Now pin one fuselage side to the plan and glue the 1/8 x 3/8 longerons to it. The top longerons must be cut to 1/8 sq. from the rear of the pylon forward. Glue the 1/8 x 3/8 diagonal and vertical members in place. Then glue the 1/8 sq. verticals in position forward and aft of the engine and D-T timers.

Cut out the pylon, very accurately, from hard 1/8 quarter-grained sheet balsa. Glue it firmly in place, ensuring that it is perfectly vertical. Then add the 1/8 sq. vertical members and top longerons section along the pylon. Sand the entire assembly smooth and glue the second fuselage side in place. Prepare the wing and stab platforms as shown on the plan.

After the fuselage assembly has dried, remove it from the plan. Cut and drill the 1/8 plywood firewall to fit a Competition Models CM-1 tank mount. Install blind mounting nuts, then glue the firewall to six cross-grained sheets of 1/8 bass wood, and cement this assembly to the fuselage forward bulkhead, as shown on the plan. Epoxy is recommended for this step. Add the soft 3/8 sheet balsa cheeks. Now file, carve, and sand the forward fuselage into a smooth, round shape to ensure a clean junction with the tank mount. Use fiberglass and epoxy resin over this entire region.

Sand the balance of the fuselage smooth, then add the wing and stabilizer platforms. Glue the fin in place, ensuring that it is properly aligned. Add the 1/16 spruce dowel for the D-T bands, then the tubing for the external D-T string. Bend the wing hooks from 1/16 music wire and epoxy them firmly in place. Drill two 3/32 holes in the bottom of the nose and epoxy short lengths of 1/16 I.D. tubing in place to hold the landing skid, which is formed from 1/16 music wire. Sand the entire fuselage smooth and apply two coats of clear dope. Install the engine and D-T timers. I normally apply two coats of epoxy paint as a fuselage finish, primarily because it is durable and absolutely fuel proof.' If desired, however, the fuselage can be tissue covered and doped. Ensure that adequate fuel proofing is applied if the latter procedure is used.

FLIGHT TESTING

The "moment of truth" of a hot 1/2A or A model usually occurs during initial testing. Normally, the first few flights are the most critical. Once these have been completed

(hopefully without mishap), the rest becomes easier. The Atavist is no exception to these statements. Before attempting the first test flight, assemble the model and check it carefully for proper alignment, CG location, and absence of warps. Test glide it and adjust as necessary by using small increments of packing under the leading or trailing edge of the stabilizer. Hand glides should reveal a slight right turn. This should be generated by stab tilt.

After the glide is satisfactory, the ship is ready for its first power flight. Set the engine timer for not more than a three-second run, start the motor, and hand launch the model gently into the wind at about a 45 degree angle. The climb should be straight out at the angle of launch, into a slight right spiral. Any tendency to go left in the climb should be corrected immediately, as this is normally fatal. On subsequent test flights, increase length of motor run as flight pattern, safety, and intestinal fortitude permit. All of my models of this general design have required about 1/16 inch left rudder tab to keep the tail down during climb. The 1/8-inch wash-in in the right inboard wing panel helps keep the right wing up during ascent.

One word of caution on this subject seems appropriate. If this model is to be used interchangeably in classes 1/2A and A, this test procedure should be repeated upon switching engines. Nothing affects the Atavist's climb pattern more drastically than major changes in power, hence speed. So, unless you are absolutely certain your 1/2A and A engines are equal in power output, a few short test flights upon engine changes are normally prudent.

With a full hand-launched 12-second engine run, this model should make about 2 full turns to the right during climb, and enter its glide pattern with no stall or loss in altitude. Flight patterns should be right-right, and this will automatically result if the model is built according to plan.

The model should weigh about 7 to 8 ounces ready to fly, if built as shown. In my opinion, this extra weight will not noticeably reduce performance, presuming a hot engine is used. The rugged construction which creates this weight, however, will allow this ship to compete actively for several contest seasons. For those modelers with limited building time, or with a preference for competing, rather than building, this can be a great advantage. •

Delight . . . . . *Continued from page 53*

COVERING

Use a low temperature film on the fuselage. With care, you should be able to cover it with 4 pieces. Take your time and work the material around the curves. I used covering material for the hinges, as well, but the choice is up to you. The wing and stab are covered in a normal manner.

ASSEMBLY

Epoxy the tip plates on the stab; when dry, epoxy the stab to the fuselage. Mount the elevator servo in the middle of the fuse with 1/4-inch spruce rails. Cut a hole in the wing's top sheeting and install the aileron servo with foam tape. Hook up the pushrods, bolt the wing on and try the controls. They should work without binding. A 500 or 550 mah battery pack fits in the nose, followed by the receiver. Don't forget to balance the model as per the plan. Do this by supporting the model by the wingtips, upside down. Install the canopy, if desired, and *Afternoon Delite* is ready to fly.

FLYING

Pick a day when the wind is blowing at least 10 mph. With the correct balance point and a working radio, give the model a hearty toss off the cliff. Remember to keep the speed

up. The sharp leading edge makes the model go fast and penetrate well. However, it also stalls rather abruptly. Simply stated, keep the airspeed up until you feel out its characteristics. Once you're used to the way she flies, try some aerobatics. The heavier it is, the more you can do. I think you'll soon find that flying *Afternoon Delite* is the second most exciting thing you can do on a Saturday afternoon! •

F/F Scale . . . . *Continued from page 77*

wound motor to slip into the fuselage. This appears to be a continual problem which is easily corrected. A related problem is that the nose cowl fits so loosely that it will fall off during the last part of the flight and act as a DT, bringing the model down much sooner than it should. These few problems are the ones which keep cropping up year after year, ever since **MB** has been doing this contest.

The overall quality of the models is not nearly as high as it once use to be. I think that the active modelers who have entered before, no longer do, for whatever reason, leaving the door open for the neophyte modeler. Apparently, those with experience no longer want the challenge. For one thing, the cost to mail anything larger than a postcard is getting out of sight, and certainly, modelers have to take this into account. Still, there are those models that, as soon as you walk into the room where they are being judged, catch your eye. One such model was a Wildcat built by Phil Cox. This work of art has to be seen to be appreciated. Not only was it built lightly, it had a very nice finish, representative of the aircraft of that period. It was truly flawless. In addition, this model flew every bit as good as it looked! Another model that caught my eye was an Ansaldo built by Daniele Vescovi, from Italy. This model was particularly well detailed, and it flew reasonably well.

I find it quite surprising that many of the models entered were either Mooney-designed or built from a Peck kit, and as to be expected, they all flew very well. I knew this has to please both Walt Mooney and Bob Peck, since they knew that their efforts go for naught. I would suggest that those of you who feel that your models do not measure up to the proper expectations (whatever those might be), take another look, because your chances of winning are just as good as the next guy's. Try your hand for next year by starting now, and be fully tested before putting your effort into the mail. Who knows, you might be the next Grand Peanut Champion of the World!

Some time back, I mentioned a simple method for installing engine mounts so that the motor shaft would come out exactly in the middle, regardless of the amount of down and side-thrust necessary. While finally finishing my Thomas-designed Heath Baby Bullet for gas, I came to the realization that, if the amount of down and side-thrust was not as estimated, what would this do to the front end of the model? The Heath has a very tight front end, with the prop spinner nearly tangent to the nose cowl. If my calculations on the thrust were incorrect, then the spinner would be eccentric to the nose cowl. Another factor is that the nose cowl carries a great deal of dummy engine detail, including the "burnishing", which is not easy to duplicate. The idea of having to do this part over because I goofed on thrust settings . . . no way! So what I did instead, and what I highly recommend, is that I went out and test flew the Heath without the cowl, until I was satisfied that the thrust settings were correct. I might add that my calculations were not too far off, but enough that I had to change both side and down-thrust. Now I can go back and make the cowl fit the spinner exactly. Believe me, this is a much easier approach. If you are worried that the absence of the cowl will affect the balance point, estimate what you think the finished cowl will weigh, and substitute a hunk of clay or a piece of lead. In the case of the Baby Bullet, it will take some additional weight in the tail to compensate for all of the weight of the engine detail.

The Bullet was one of the models I was expecting to take with me to the F.A.C meet, but I ran out of time. There are some other changes that need to be done, which I will mention when I get everything ironed out. Let me just say that the Bullet flies very fast and is quite stable, and is very impressive in flight.

As previously promised, I have some more interesting news from the files of Fulton Hungerford. This time, it's how to build trussed ribs. Fulton stirred the modeling world, particularly those in F/F scale, when he entered his most exquisite Ford Trimotor in indoor scale at the '70 Nats. It would take several issues to describe all the innovations that this model had incorporated. Slowly but surely, I will get around to covering most of those, since I feel that we can all profit by Fulton's ingenuity.

Most die-cut ribs do not have smooth edges and must be sanded, resulting in smaller dimensions than originally intended, and it takes time. Most sheet ribs have spars notched in the edges of the rib, and a spar flush with the top of the rib does not give a pleasing covering appearance. If the spars are all on the bottom of the airfoil, then the wing warps up when the covering is doped or otherwise shrunk tight. Some kit makers stamp out a hole in the center of the rib for the spar, which alleviates the warping tendency but weakens the rib, because it usually cuts the straight grain strength of the rib between the leading and trailing edges.

The method of construction that Fulton uses for built-up ribs requires

time for the glue to harden before individual ribs can be cut, but otherwise takes no longer than sanding and trimming sheet ribs, and look at the advantages: 1) The top and bottom contours of all ribs are identical . . . no need for sanding. 2) Full-depth spars keep the wing from warping when covered. 3) The strength of the built-up rib is actually better than sheet ribs because, even at its best, the sheet rib has a weak spot where it attaches to the trailing edge. 4) The weight of a built-up rib is usually less than a sheet rib. 5) Since each rib is sliced off the "sandwich" in his method, variation in rib strength is easy to accomplish; for wing root ribs, landing gear or strut attach points, simply slice a thicker rib.

To get started for this whole procedure, you must first select good sheet balsa . . . straight grain, C-grain, and reasonably soft. Cut the first length to fit between the leading and trailing edge, grain running chordwise. This piece is the bottom rib surface, and it will become the bottom of the sandwich we are about to construct. Put this piece directly on the plans and mark with pencil or ballpoint pen where the front and rear spars go, then mark where the trusses attach to the bottom of the rib.

Now cut two short, vertical grain sections, the depth of the rib thickness where the main spar is located. Glue these onto the bottom of the sandwich on each side of the main spar location. If these sections refuse to stand on end long enough for the glue to set, get a section of the spar material, and pin or clamp it between the two uprights so they form a neat fit for the main spar. I would suggest waxing these spar materials first, so that the glue will not attach them to the truss. Cut two short sections for the rear spar box and glue them to the bottom of the sandwich. If there are vertical members between the top and bottom of the ribs, cut and glue those in place before the diagonals are cut.

In all these vertical members, the grain must run at right angles to the bottom sheet. Fulton usually makes the rib sandwich as wide as the sheet balsa allows, so there is never any waste or scrap, and the next cut made from the sheet gets started with a nice square end, important for the next step.

The diagonal trusses should be cut so the end of the grain fits where it meets the bottom sheet or vertical truss. If you are really good with an X-acto knife, this treatment can be performed on the end of your sheet balsa before before cutting it to length. Fulton usually cuts the longest of these diagonal trusses first and check fits them; then, if subsequent chamfering or trimming makes them too short for the intended place, they usually fit perfectly in a thinner section of the rib sandwich.

When all trusses are in place, the sandwich should look like Fig. 1. Take a sanding block and sand the contour of the rib into the top (exposed end) of all the trusses. Check frequently against the typical rib section to be sure of correct airfoil shape, and remember that you have yet to add the thickness of the top of the ribs (the cover for the sandwich). That is the curved portion as seen in Fig. 1, which can be formed by using hot water.

Before gluing the top in place, check all glued joints on the trusses, for the sanding operation may have loosened some. There should be a good fillet of glue on each joint, the full width of the joint. Otherwise, when the individual ribs are sliced off, you get balsa confetti! Now, glue on the top sheet with the grain running chordwise. Clamp it in place, and forget it for at least overnight.

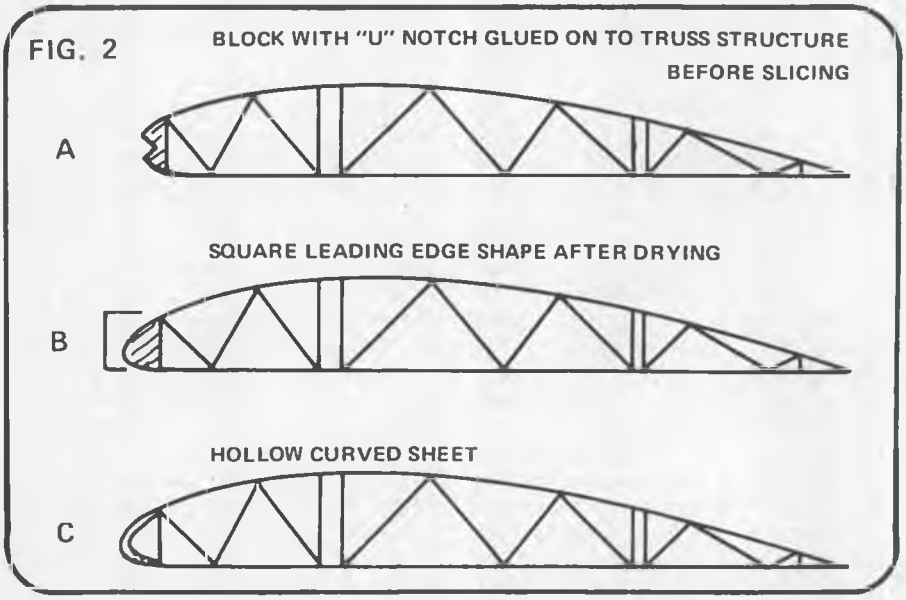
To slice ribs off this sandwich is easy. Using a straightedge and X-acto knife, cut through the top sheet and the glue fillets on that side, then flip the sandwich and score the bottom sheet in the same manner. The trusses tend to splinter if the knife is used to cut through the full rib depth. Use half of a double-edged razor blade to slice through the trusses, as it does a fairly good job. If the face of the sandwich is uneven after cutting a rib, simply use the sanding block and true up the sandwich, then cut another rib. It is good to plan for 1-1/2 to 2 times the number of ribs required; then, if a rib or two is broken or damaged in the slicing operation, you have plenty of spares.

Now you are ready to slip the ribs onto the spars and glue them in their proper place. This really gives the wing an entirely new look. One area that Fulton did not mention is what he does with the nose part of the rib. If you see Fig. 2, you will see three different ways that I would approach the problem. In Fig. 2a, the rib uses a small block of balsa with the grain running chordwise, and a V groove cut in it the size that the leading edge would be. When the ribs are all glued in place, the leading edge material can then be glued into the V notch or groove. In Fig. 2b and c, the truss would end with a blunt nose. A square stock of material could be glued onto this blunt part and then sanded to shape after the wing is removed from the building board. Or, you could form a sheet over a dowel of the appro-

priate size, by first soaking it in hot water, and then wrapping it onto the dowel to dry. This would be very stiff and quite scale-like. Regardless which method you choose, each should work out satisfactorily.

There you have it. A very easy way to make ribs which are very strong and light. The bonus, of course, is they also look like real ribs.

Last but not least . . . I have been getting mail regarding Flyline's very fine Heinkel. One such letter was received from John Bausane, of Seattle, Washington, who is getting one minute and five seconds on only 700 winds on a loop of Sig 3/16 inch rubber. I'd say that was pretty darn good! John's method for finishing his Heinkel will probably be of interest to you. After coating the model with two coats of clear nitrate, he paints the model with a paint called "Polly" polyurethane.



This paint is mixed with rubbing alcohol and rubbed on with a cotton ball. The overall finish gained the model a scant 2 grams! Incidently, the overall weight of his model was 1-1/4 oz. So , there you have yet another way to finish a rubber scale model.

Hungerford wheels have added more stainless wheels and sizes to their already fine line of spoke wheels. Not only can you buy a certain diameter, but you can also get different tire sizes. For more information, send a stamped, self-addressed envelope for Hungerford's latest catalog. Send to: Hungerford Wheels, 1770 Lilac Circle, Titusville, FL 32780.

Don't forget the Flightmasters' Annual. This biggest of all F/F scale contests will be held on September 30 and October 1st. Judging takes place Saturday evening at 7:30 p.m., at Trident Jr. High, 1800 West Ball Road, Anaheim, CA. Flying will start Sunday morning at 8:00 a.m. sharp, at Mile Square Park in Fountain Valley. There will be five separate events: Rubber, Peanut, Gas, CO_2, and Electric. AMA membership is required. There will be trophies through fifth place, and the cost per event is $2.00, with 50¢ for each additional entry in the same event.

There are plenty of motels less than five minutes from the school where the judging will be held, and also KOA Campgrounds. The flying site is about twenty minutes from the school. If you need further information, drop me a line. Sure hope to see you there! •

Indoor Trials . . *Continued from page 85*

blade which has been ground down to eliminate the set on the teeth!) His model is detailed in colored tissue, and has scale wheels turned down out of styrofoam from an egg carton. The pilot is sanded or carved from a styrofoam peanut used in packing glassware. The only non-scale detail I noticed was the pilot's scarf, which was red instead of the traditional white. The total weight of the SE-5 was 8 grams, a major portion (3 grams) of which was built into the nose block, a penalty paid by these very short-nosed WW I scales. The beautiful bird flew as smooth as anything I've ever seen, turning in a consistent 2 minutes.

In closing, we must mention that this was a great meet, where we had a chance to meet and talk at length with the best fliers in the country for three days in a row, 8 a.m. to 9 p.m. We exchanged expert ideas and watched the results in flight.

The setting is ideal. The flying hall is superb. Each contestant is provided with a desk, where he can

work on his models. Living quarters surround the flight atrium, and the meals provided are reasonable, healthy, tasty, and served by a pleasant staff.

As for the flying, the number of national records set attest to the quality. Rarely have so many records been shattered by so few in such a short time. Strangely, the Contest Director received only two application blanks for records in all the paperwork turned in prior to the contest. But, as the record-breaking flights continued, Doc Martin just about went broke copying applications on the Northwood Institute's Xerox machine, at 10 cents a copy.

It was a great meet. You can bet I'll try to be there next year. •

Gussets . . . . . . *Continued from page 23*

the PR pieces. Take two more 1/16 A-grain sheets of wood and check the fit against the leading edge; trim if necessary, mark the sheets as was done on the bottom sheeting, cut and glue into place. Glue a 1/16 sheet scrap under the center section joint.

Glue the cap strips in place and let the wing dry thoroughly. Using a long, straight block with 220 sandpaper, sand the wing smooth. Pin one panel down at the trailing edge over some poly sheet, fit the 3/8 x 1-1/2 trailing edge stock to the rear side of the 1/8 x 3/8 spar, sand where necessary for a good fit and glue in place. When this has dried, repeat the procedure on the other panel. When dry, remove the wing from the board and sand smooth. Glue WPT and hardwood block to trailing edges.

Lay the fuselage sides out on 3/32 sheet balsa using a ballpoint pen and straightedge, but do not cut them out. All the lines on the sides, except the root rib, are straight. Locate and draw the thrust-line. All other measurements and lines are made from this reference point. Locate formers C and D on the sides and, using a 90° triangle, mark their locations on the fuselage sides. Locate, but do not cut out the openings for the wing.

Locate and draw the cutouts for the stabilizer. Lay out and cut two each of the doublers D-1 and D-2, from 3/32 sheet. Glue D-1 into place on the sides. Use a scrap piece of 1/8 balsa between D-1 and D-2, when gluing D-2 in place; this is to allow for former C. Glue the 3/8 triangle stock to each side, as shown on the isometric view, and also the 3/32 x 1/2 under the stab and on the fuselage side between the wing and stab. Lay out all the ply parts, and cut them to shape. Note that the firewall and landing gear plate are hard 3-ply or 5-ply birch. The heavy lines on the section drawings are the outlines of the formers.

Cut the sides out around the outside edges of the triangles and doublers, cut the slot for the stabilizer, but do not cut out the wing opening yet. The fuselage section over the wing, between formers C and D, is removable, but it is not cut loose until the fuselage has been shaped.

Lay poly sheet over the fuselage top-view on the plan. Pin landing gear plate LP in place squarely over the plan. Pin a piece of 3/8 sq. scrap, about 4 inches long, over the top view, 3 inches behind former D location. Pin each side over the plans, butting them against the LP plate, and pinning them down to the 3/8 sq. scrap. Slip former C into the slot between D-1 and D-2, and pin it to the sides. Check the squareness of the fuselage by setting a 90° triangle against the sides and bench top. Shift the sides or former to get everything square, then use the Hot Stuff, Zap, etc. to glue LP and former C in place. Glue two B formers together with Kwik-Set epoxy, then lay out the thrustline and center line on the front of B. I used a Tatone long .19 mount in the prototype. Take whatever mount you are going to use, and center it over the center line and thrust-line, then mark the mounting bolt holes. Drill the mounting holes in the plywood, and use bolts and blind nuts to hold the engine mount. (I use bolts with a short piece of wire soldered to the head slot, to keep them from turning. The bolts are epoxied to the back of the firewall. The mount is held to the firewall by double nuts; this makes a fuel-proof arrangement and will not vibrate loose.) Slip the firewall into the slots, check for squareness, wrap the fuselage front sides with masking tape, and use a hot glue to fasten the firewall to the sides. Install former D and press it against the rear edges of doublers D-2, pull the sides together at the rear, and hold with two clothespins. Check to see that the joint is over the center line at the rear; if it is, glue the sides together. Check former D to see that it is against doublers D-2, then glue it in place. Go over each former and LP with epoxy glue. Pin and tack-glue a temporary brace across the top of the fuselage at the cockpit, to keep it square.

Using a Zona saw, make a cut on the sides down to the wing center line, directly in front of former D and directly behind former C. Slip some poly sheet into these slots, then glue formers C-1 and D-1 in place. Cut FT from 3/32 sheet, and glue it to the fuselage, lining the fin slot up with the centerline mark on the firewall. Glue the 3/32 top sheets in place. Cut the 3/8 sheet over the wing to length, butting it against the sides at the cockpit location, line it up with former C, and glue in place.

Glue the 1/8 tank floor sheet in place, fit the tank and tubing in place, then glue the 3/4-inch triangle pieces to the sides and firewall. Stuff some foam around the sides and top of the tank. Cut and fit the top 3/8 sheet, then glue it in place. When it is dry, unpin the assembly

from the plans and plug the fuel tank lines to keep sawdust out of the tank.

Cut the pushrod slots in the fuselage sides. If you use Golden-n-rods, as I did, epoxy the outer tubes in place now. Sheet the bottom from LP to the tail, glue the 3/4-inch triangles in place in the nose, and glue the bottom 3/8 sheet in place. Sand the front end square, using a large sanding block. Draw the center line and thrust-line on former A, and glue in place. Glue the cheek cowls to the sides, and also the 3/8 front cowl sheet.

When everything is dry, carefully rough-carve the fuselage to shape, according to the section drawings on the plans, then use rough sandpaper to finish shaping, and finish off with 220 grit. Using a sharp knife, cut along the line between C and D, at the center line of the root rib on each fuselage side, and remove the turtle deck. Trim the fuselage sides at the root rib until they are the same as doubler D-2. Epoxy the WP3 pieces to the sides, then epoxy WP2 and WP1 in place. Epoxy the hardwood block under the center of WP2. Glue WP4 into recesses and against former D. Glue WP6 pieces to each side and up against WP4, then glue WP5 under WP4.

Draw center line on formers C and D, and a center line on top of the wing. Place the wing in the fuselage, line up the center lines, and pin the wing firmly into the fuselage saddle. Measure from each tip to the tail post, and shift the wing until it is square. Drill holes down through all the ply plates and hardwood blocks at the leading and trailing edges, and tap the front and rear blocks with a 1/4-20 tap. Enlarge the holes in the wing leading edge plate and fuselage at former D to clear a nylon bolt, then bolt the wing in place.

Place some poly sheet at formers C and D and glue the fuselage turtle deck to the wing. Slip the stabilizer into its slot, measure back from the wing to get it square, and glue it to the fuselage. Glue the fin into the slot in FT, using 90° sheet balsa triangles to keep it square with the stabilizer. Cut the cockpit opening as shown on the side view. I used BT5 rocket body tubes for screw guides; sand holes in the rear bottom and front top of the fuselage to allow these to slide in, then glue in place. Cut through the headrest at former D with a Zona saw, and remove the wing.

Place the drilled landing gear in position over LP and drill the holes. I used 4-40 x 3/8 flat head screws and blind nuts to hold the gear in place. Bevel the holes in the gear to receive the flat head screw.

Cut a slot in the center of the rear fuselage, under the fin, to receive the aileron bearing that is used for the tail wheel bracket. If you have not fabricated the assembly, do it now. I used low temperature silver solder to make the joint between the arm and the 3/32 tubing, and also to sweat the tubing to the 1/16 music wire. Trim enough of the fuselage away so the 1/16 wire lines up with the hinge lines; otherwise, there will be binding when operating the rudder servo. Epoxy the assembly to the fuselage. Place the rudder in position and mark where the tail wheel drive wire goes, then drill a hole and epoxy a short piece of inside Golden-n-rod to the rudder.

Using a ballpoint pen , lay out and cut out the ailerons. Bevel the leading edge of the aileron, removing about 1/16 of an inch of material, so the aileron will fit properly and be free to move. Cut the wing tips out and glue them to the center of the tip ribs, using scrap triangle stock to keep them square and solid. Draw center lines on top and bottom of the fuselage ahead of the firewall, and draw a line around the right side, from the top center line to the bottom center line, about 1/8 of an inch ahead of the firewall. Use a Zona saw to cut the cowl off.

I made the 1/4-inch cowls functional by cutting a 3/8-inch wide by 1-inch high hole in the left fuselage side, just ahead of the firewall, and gouging the cowls out to about 3/32 of an inch thick. Paint the inside of the cowls and fuselage sides with epoxy, then glue the cowls in place. Cut the removable cowl to fit the engine by starting with a small hole where the glow plug is, and keep cutting until there is about 1/8 of an inch of clearance around the head.

A ply tab is glued on top and bottom of the cowl, inside the 3/8 sheet. Drill holes in the cowl in the center of these tabs, and glue short pieces of dowel into the holes. Drill holes for 4-40 screws down through the dowels and tabs. Put blind nuts inside the tabs, and screw the cowl on tight. When drilling these holes, it is a good idea to tape the cowl tightly in place before drilling. I used 1/64 ply, wrapped around a form the same shape as the exhaust cut-out, to make an exhaust extension. The carb air scoop is made from two pieces of 3/8 sheet; glue one on the fuselage and one on the cowl, and sand to shape. Coat the entire engine compartment with epoxy.

Everyone has his own favorite finishing method. Mine was to paint

the fuselage and tail feathers with clear dope, cover it all with light silkspan, and finish with Supercoat dope. The wing is Monokoted. The aileron link is bent as shown on the plans, and is installed after the wing is finished. Don't forget to install the 1/16 music wire aileron pushrod before covering wing. I used a Du-Bro aileron connector and ball link at the servo. When bolting the wheels to the landing gear, give them a little camber and make sure each wheel toes in a few degrees. Restrict elevator movement to 1/4 inch up and down for test flights.

Gussets doesn't take long to build, the cost is moderate, it's fun to fly, and sure looks good taxiing out, taking off and flying. I hope you enjoy yours as much as I have mine.●

Half-A ..... *Continued from page 47*

about aircraft trim problems. Specifically, how do you set up a model to give you the best performance in pitch (nose up/nose down)? You have several variables to play with: Center of Gravity location, elevator control sensitivity, thrust angle, and wing and tail incidence. With all those factors, how can you get the right combination?

First of all, there are several "right" combinations; the right one for you depends on what you are doing. The true novice pilot needs an airplane which keeps its nose up in rudder-only turns, flies slowly, recovers from dives quickly, has good transition from power to glide, and is very insensitive to overcontrolling. An experienced pilot will take the same model and want it to fly fast, groove through turns without ballooning into a climb, and have enough elevator power to kick the model into snap maneuvers.

In the case of the novice, the wing and tail should be set up with a degree or so of extra angular difference (difference in angle of attack between the wing and stab) and the model balanced well forward. Training models usually have these settings specified on the plans. Use the hole in the elevator horn farthest away from the hinge line. With the elevator set flat to the stabilizer (neutral control setting), adjust the balance so that the model glides smoothly. The final step in trim is to adjust the thrust angle of the engine downward, until only a very slight, steady climb occurs under full power.

This kind of trim makes the model speed-sensitive, so it tends to pull itself around turns without needing elevator control . . . you just steer it around the sky.

Now, if the same model were built for sport flying by an experienced pilot, here is what he should do. Set the angular difference at zero, move the balance point back until a fast glide is achieved. Again, play with engine thrust line for power trim, but go for level flight instead of a climb. Since the balance has been moved aft, approach control sensitivity changes with caution; a little extra elevator movement makes a lot of difference. Play around until the model responds the way you want it to for your own piloting skill level. You will find that this set-up requires elevator action to turn the model. Rudder-only will give you nice, straight rolls!

In general, if a model drops its nose sharply when the engine quits, you need more downthrust, and then correct with elevator position. If the model is "squirrely", you probably have too much elevator throw sensitivity. If your elevator is already as insensitive as you can get it, add some more nose weight, and compensate with up elevator, or add some incidence by shimming up the front of the wing.

The secret to getting the most out

of any model is to keep experimenting with the trim until it flies the way you want it to. Trimming the model just like "Joe the Pro" would doesn't do a thing for you, if you need a model which practically flies itself. Most models will fly very well indeed, once you find that magic trim combination.....●

Choppers .... *Continued on page 28*

not so much to reduce friction as to minimize wear. The main rotor head features a special bar/spring arrangement to control tetering action, and a micrometer-type adjustment for fine tuning of the blade pitch angle. An optional 3-bladed collective pitch rotor assembly will be available at a very modest retrofit price, for those who want a "hot" performer!

All nuts, with the exception of the engine mounts and blade mounts, are captive style . . . no more fishing around inside the fuselage with tweezers and pliers to get the nuts on the machine screws! U.S. standard nuts and screws are used throughout. The tail boom is easily adjusted for twist and/or length by means of a novel clamping arrangement. The T-tail configuration is extremely rigid, being constructed from 3/32 plycore core and soft ply sides. The tail rotor assembly (and the 3-blade collective pitch head) contain needle bearings for rotational torque, plus ball thrust bearings for centrifugal force effects!

The quick-attach fiberglass canopy assembly provides lots of room for receiver servos, and batteries, and includes a molded seat and control console. Main rotor blades will be very unusual and interesting, in that Charlie plans on supplying one-piece hollow epoxyglass blades, ballasted on the leading edge for proper chord-wise balance. These blades feature an extruded rubber leading edge with imbedded lead tape for balance, and a molded spar running the length of the blade. The blades also have a helical pitch from root to tip, for better efficiency and more positive control. Replacement costs will be the same as or cheaper than existing wood blades found in the present-day kits.

To finish off the report on the Gilbert "Twister", Charlie indicates that the company will be in limited production within 3 months (around October '78). Although not confirmed yet, he anticipates the price will be in the 300 to 350 dollar range, with the collective pitch modification to run about 30 to 50 dollars more when included in the initial purchase. His only sales pitch is, "I would rather produce the finest quality helicopter available . . . for a

price which justifies its existence . . . and sell fewer of them to modelers who appreciate the design details and flyability of my helicopter." I can attest to the flyability of the Gilbert "Twister" . . . even the initial test flights went without a hitch, and the hovering stability just can't be beat! It looks great for the discriminating modeler who wants the best. I didn't witness the 3-blade collective tests, but the pilot said, "Wow! What a bomb!" Lots of luck to you, Charlie.

FINAL APPROACH

And that's about it for this month . . . I'm going on another long vacation, so can't really say what's planned for the next issue, but we'll have something, I'm sure.

BCNU next time. •

Pylon . . . . . *Continued from page 31*

rule in effect for several years. In spite of repeated warnings to remain in the designated area, some pilots ignored the restrictions and flew over the residental neighborhood without benefit of any type of muffler.

"Even our own club members are limited to flying pylon from 2:00 p.m. to 4:00 p.m. weekends and holidays, and we discussed this and flying over the pits in detail at the pilot's meeting prior to the contest. All contestants were aware that they would receive a '0' if they violated either rule.

"The only infraction occurred when an NMPRA officer opted to crate his own rules, and flew over the pits and then over the condominiums at the far end of the field, which prompted an immediate visit by our club president, who is a resident of those condominiums. The pilot was given a generous warning instead of a '0', but construed this as a personal insult to his ability as a pilot, and retaliated with a full-fledged temper tantrum, making comments regarding the marital status of the director's parents and his possible affiliations with the Nazi party (In spite of what he may believe, my parents were married long before I was born and I have never even been to Germany).

"The depth perception of the pilots competing all weekend would astound medical science, as they professed perfect vision at 600 feet and engaged in heated debate over their position as they passed in the approximate vicinity of #1 pylon. We maintained constant radio contact with the flagmen at #1 pylon, but that did not deter a prominent national pylon-official from declaring his innocence of any cuts and insisting his eyesight at that distance was better than the flagmen situated directly underneath the #1 pylon.

"Scale judging, as we know, determines takeoff position, but one pilot felt compelled to jump the flag on two occasions and became indignant when he received a '0' for the second infraction.

"It is the nature of some pylon racers to intimidate officials, and when they are unsuccessful, they resort to infantile behavior and juvenile mannerisms.

"It is with regret that I acknowledge I will never again act as Contest Director for a pylon race, but when dealing with adults I expect them to act accordingly. I realize the adage, 'the difference between men and boys is the price of their toys', but I erroneously believed there was an element of maturity accompanying the price."

As mentioned before, we hesitated to publish the letter, and should the other parties involved like equal time to explain their actions, we'll be glad to furnish it. But a very important point has been made.

It is no secret that we (pylon racers) should be competing at Las Vegas for all that money the Pattern and Scale guys are tuning their engines for. Las Vegas originally started out to be a Pylon Contest, until some racers used language that was abusive and loud enough to convey attitudes that were totally unbefitting a sportsman. Obviously, they not only lost the chance to compete, but we, as a group, lost the respect and support of a lot of decent people. The Tucson Winternationals used to draw a large racing contingent until it was lost for the same reasons. Can we afford this? Ask the "fast" girls from your high school days how hard it is to gain respect once you get a reputation. Especially after the stories grow in the retelling.

I've given a lot of space to the above, but we racers really need to examine ourselves. When we attend a race, we are guests of the hosting club, and should be grateful that they are willing to go to the trouble and expense of hosting a race. It would behoove us to be at our best behavior, so as to encourage them to hold another. Yes, they owe us a well-organized and well-run race, but should a breakdown in their facilities or a problem with inexperienced workers cause a problem, we should bear in mind that they are only human, and mistakes will happen. They will definitely learn from their mistakes, if criticized *constructively*. They want to hold a good contest just as much as we would like to fly a good one. Quick tempers and destructive verbal abuse

will not get us more and better races. It *will* help free our weekends for working in the yard, for lack of contests to go to. Examine yourself and don't be a negative factor in pylon racing. If you feel the need to make enemies, please don't do it as a racer. The message is clear, so I'll get down off my soapbox now, before the bubbles ruin my typewriter. ●

R/C Forum . . . *Continued from page 50*

Vibration is often caused by a faulty engine installation. This can be checked by watching the tip of the glow plug, prop spinner, or shaft. When observing them, they should be clear to your eyesight, and not at all blurred.

We do not wish to get into a long discussion on engine installations and model construction, even though these things have a major bearing on the amount of vibration present in any model. However, we can give you some basic rules of thumb in this regard. Of the two methods of mounting engines (radial and beam mounting), radial mounting is the least used and involves fastening the engine to a bulkhead, by means of a bracket attached to the rear of the engine's crankcase. When properly done, this method transmits the least amount of vibration to the model. On the other hand, it does *not* absorb any of the engine's vibration, the reason being that the attachment is in the same plane with the cause of the vibration; the engine's piston, etc. To get the most from this mounting method, the bulkhead used should be very sturdy, and the attachment bracket securely fastened to the engine.

The more solidly the engine is mounted, the better, both from the vibration and performance standpoints. This is the main advantage of beam mounting. If a good solid mounting is used, 90 degrees to the plane of vibration, much of the vibration can be absorbed by the mounting, and this can improve the performance of the engine. With the vibration being transmitted to the model, it must be dissipated before it reaches our R/C equipment.

Experience has shown that the best way of dissipating vibration is to use large, hard maple engine bearers buried in solid balsa. The hardwood bearers will take the load, and the balsa acts as an excellent absorbtion agent. Obviously, the larger the bearers and the more balsa used, the better the mount.

Another popular method these days is the use of a metal or plastic bracket that attaches to the lugs of the engine. The bracket is then radially mounted to a bulkhead. While this method is very widely used, it is the *least* acceptable of the three methods, designwise. With this "radial-beam" mount, the vibration is absorbed by the bracket, which must transmit the vibration at a 90 degree angle into the model. This transmission does not happen very well, resulting in most of the vibration being absorbed by the bracket itself. Mounting an engine on such a bracket is similar to fastening it to the end of a lever, even though it would be a short lever. It should be remembered that levers are used to amplify forces; thus, their use to absorb vibration is not very good engineering. To sum up, when using the "radial-beam" type mount, choose the heaviest one available, if vibration is of concern. The greater the density of the mount, the more vibration it can absorb.

So, in conclusion, if your model stings your fingers when you hold it,

or you can see the engine or any part of the model oscillating, you probably have more vibration than any R/C installation will accept.

Switching to another letter and another subject, we have had some fine correspondence from Wendell Hostetter, of Orrviller, Ohio. Wendell is active in R/C helicopters and finds that, along with the "big plane" people, our normal servos give rise to questions about their usability for those applications. We covered most of his questions in a previous discussion rather thoroughly, so we will not get into them again here. However, Wendell does ask some very good questions about servo design. Most of these people would like more power than a normal servo supplies, and they wonder why it is not easy to obtain and make available for their use. To understand the "whys", you must know a bit about servo design as it applies to our R/C systems, so without getting too technical, let's get into the fundamentals of servo design.

First of all, we all want inexpensive R/C systems. We could easily have better and more exotic systems than we have now, *if* we would be willing to pay the price. The cost probably would jump to 3 to 5 times the current level. Fortunately, we do not need them for the average application . . . what we have does fine. It could very well be that, for some of the special applications that we are coming up with, we may very well have to pay a higher price for some items, such as servos.

The heart of a servo is the motor; it provides the power, speed, and does the work. The rest of the servo only tells the motor what to do. The motor is also the most expensive portion of the servo, and thus controls the servo's cost. Fortunately for R/C and its minor consumption of miniature electric motors, large-volume users of such small motors have developed during the same time period as our need was created.

These large-volume users made it possible for the motor manufacturers to develop a couple of sizes of really fine miniature motors at reasonable prices. Our R/C manufacturers were aware of this and quickly latched onto the coattail of the volume users. All of our R/C servos have been designed around these low-cost motors. It has proven to be an excellent answer to what could have been a costly problem. As an example: when investigating quality motors *before* the volume production, *one source* was found. The same type of motor that we now use, would have cost over *10 times* what you now pay for it!

The motor being the heart of the servo and controlling the servo's power and speed, the next obvious question is "what controls the power and speed of a motor?". Generally speaking, it can be said that the larger the diameter of the motor, the greater will be its power and the less will be its speed. Since motor power is usually expressed in torque, the output of miniature motors and servos is generally expressed in inch/ounces of torque, rather than horsepower. The opposite of torque is speed, or rpm in this case. Referring back to the original statement, it should be seen that the smaller the diameter of the motor, the greater will be its speed and the less will be its power.

Traditionally, a high-speed electric motor will be relatively small in diameter and long in length, as compared to the average motor. The longer length provides extra windings for the armature, resulting in more torque. There are now three basic motors used in servos. The 11mm motor is of different design than the others, and is the one used in the new micro-size servos. The 16mm motor is the most popular, and is used in most of the average servos. The largest motor is 20mm, and, having the most torque, will be found in the servos claiming to have

more power.

While the motor controls the power and speed of the servo, it also is the factor which determines the servo's size. Most of today's servos have nothing but the thinnest plastic case between the motor and the outside. To keep the size down, the servo is designed around the dimensions of the motor.

The design parameters for a servo are minimum size and weight, and maximum torque and speed. The designers are satisfied with any torque about 16 inch/ounces and a transit time of .5 seconds. Transit time is the time needed to travel from one extreme position to the other, so from neutral to an extreme would only be .25 sec. These are quite adequate design factors for average flying . . . in fact, they may be more than is necessary.

Going back to the beginning again, we know that it is the characteristics of the motor which control what the servo will put out. It is apparent that, unless you wish to spend a lot more money than a servo now costs, you can only change the servo's output by sacrificing some other part of the servo's performance. For example, Wendell asked for more power, as some of the "big plane" people would like to have. Okay, he can have more power by simply using one of the retract servos that are available. However, he will not like the servo because the transit time will be much greater. In this case, the designers have used the regular motor and increased the gear ratio between the motor and output shaft, usually by adding more gears. This provides the desired power, but at a sacrifice in operating speed; the servo becomes slower.

There is one servo available which probably provides the closest to the ultimate in speed and power. With this one, by using a motor with different characteristics, the power has been increased by about 1/3 while maintaining the same transit time. It does provide a bit more power, but probably not the amount that is being looked for. However, it should be noted that in doing this, a sacrifice has been made; the servo has a higher battery drain, thus you either need more battery capacity than normal, or else you must be satisfied with a reduced amount of flying time per charge.

To conclude the discussion on servo design, we should consider the gear train and what it accomplishes. If you were to take the motor alone and operate it, you would note that it requires very little finger pressure to slow it down, and as it is slowed down, the current drain rise drastically. You would also note that if you applied light pressure to the output shaft and then applied the electricity, the motor would not start. It has very little starting torque. As far as the entire R/C system is concerned, it is necessary to have servo motors that create as little current drain as possible. It must be remembered that the drain rises drastically as torque is taken from the motor. This means that when the servo moves a control, and as the control meets pressure from sources created by flight, the servo current is going to increase. With four servos constantly in use, it is most necessary to start with the very least current drain possible, because the average actually used will always be considered more.

The gear train accomplishes two purposes. First, the very best of gear trains will have some backlash (play). No matter how little the amount may be, it is enough to allow the motor to start without an excessive load on it. Thus, the gear train makes up for the low starting torque of this type of motor. Secondly, of course, the gear train multiplies the torque of the motor to a usable amount for our purposes. Years ago, servos were experimented with which used worm gear outputs and positively no backlash. Performance was

excellent, except that it was found that air loads on the controls could be heavy enough to lock the servo in a control position. Once the servo moved the control to a position, the servo would simply not move from that position until the air load was removed. Removing the air load usually necessitated a crash, of course! The solution was to provide some backlash in the gear train by switching to spur-type gears, and another lesson was learned along the rocky road to the R/C success that we have today!

It was not the original intention of this column to discuss the attributes of various R/C products that are being offered to modelers. However, second thought indicates that it could be a worthwhile service, when the product has merit. As a result, we will be telling you about new products which prove worthy to us and can be of benefit to you. We will be checking them out pretty carefully, and if we do not find them to be satisfactory, we will simply not mention them at all.

This month we had the pleasure of experimenting with two new products offered by the Pettit Paint Co. Both are to be used for similar purposes. A perenial chore for modelers seems to be the repair of "hanger rash" . . . those nasty dings and dents which come from not handling the model carefully enough in close quarters. Even when we are careful with our handling, we always seem to be able to find new ways of dinging a model for no real reason. The repair of such "accidents" has always been a problem of finding the proper material to use, and one which will not require a long, drawn-out process. One of the best remedies has proven to be the epoxy cements. They fill without shrinkage, and bind any loose ends together positively. About the only drawback has been the need to mask off the area carefully and build some sort of dam, so that the cement does not run away from the ding. During the construction, there is occasionally a place which does not fit tightly, usually because a good fit is difficult and not all that important at the particular point. It saves a lot of fooling around if such spots can be filled with cement. Most of the time, the very nature of the spot requires some sort of a "fix" so that the cement will not run out of the joint before it sets.

Pettit now offers Hobbypoxy Formula 3, a thixotropic (non-migrating) Epoxy glue. The main attribute of this new glue is that it can be laid thickly onto any surface, and it will stay where it is put. A few recent hanger dings on a couple of new planes (naturally they had to be the new ones!) gave me the opportunity to test Formula 3. The dents were on wing tips and thin rudder edges, where it is always tough to make an easy fix. The Formula 3 was laid into the dents so that they were filled neatly, and then purposely ignored.

Wunderbar! The stuff stayed just as applied, and when once cured, provided as neat a repair as I have ever accomplished. The only drawback might be the curing time . . . in this case, it took overnight before my finishing could be done.

The second new Pettit product is called P.F.C., the initials standing for polyester filler compound. Polyester resin does a wonderful job of laying up fiberglass. This resin is also the only really 100% fuel-proof finishing material that I have found. The only troublesome drawback of polyester is that epoxy does not adhere to it well. With most of our common cements and paint products being epoxy based these days, a polyester surface can be a bit of a pain when repair is needed. It seems that no matter how hard I try to make a neat repair, I always wind up needing some sort of filler to finish the repair off so that it is not so noticeable. The new Pettit P.F.C. should be just the filler needed when the repair is on a

polyester surface. The adhesion should be the best possible.

There never seems to be an end to the types of gadgets we are offered these days to make R/C easier. Thank God for inventive people with our needs in mind! I have been wondering how long it would take until someone filled a need that always has been bothersome to me. With racing engines and pressure fuel systems, it is almost mandatory to securely fasten the fuel lines in place. The same goes for "slippery" fuel lines that never seem to want to stay on, especially at a critical time, or when in a hurry. A number of times, in hopes of doing the job better, I have grabbed some piano wire and pliers, attempting to fabricate some usable hose clamps similar to the type used on autos.

Every time, I have wound up with a pile of wasted wire, a blemished vocabulary, and the promise that, someday, I would make a tool which would create those hose clamps in a usable configuration.

The other day a package came in the mail from Delp's Hobby Products, P.O. Box 82, Perkasie, PA 18944. If I had said a prayer instead of resorting to the language I used with my attempts, I would have found the answer to my prayer in the package. Delp's Hobby Products has obviously done what I threatened to; they have produced the tooling and are making the hose clamps that I only dreamed of. The clamps are offered in several sizes in order to be usable with most sizes of tubing and fittings. The clamps I have are their No. AP-738, which are labeled medium. They appear to work well with what would be considered average size tubing, when used on a fitting of about 1/8 inch. The clamps are of the wire spring type that we see on the auto hoses. Simply grasping the wire extensions with pliers and squeezing, opens them up enough so that they can be slipped onto the tubing and fitting. Very neat, obviously reliable, and well worth the few pennies asked.

This is the first month in which we could bring some of you into the discussion. In check-reading the writings, it appears to me that we brought out some interesting points as a result, and in so doing may have been of help to some of you. The point is that I was pleased to hear from these people. Hopefully, their needs and problems are not unusual, so that the discussion can be something more than just me sounding off some more. I will be happy to hear from you, too, and please believe that you will get an answer, just as Carl and Wendell did! •

Proxy Peanut . *Continued from page 71*

the "Flying Pancake," and the delightful Ansalda WW I model, the first entry ever received from Italy.

It would be impossible to single out any one "best" model from such an imposing array, but Phil Cox's Grumman Wildcat would have been in close contention, conforming to the original spirit of the Peanut rules, for its economy of means. That is to say, it was the epitome of a practical Peanut, being light in weight, yet well-detailed.

It was my pleasure this year to serve as an assistant to Dick Baxter, who ranks as a near-magician in the stubborn-model adjustment department. Although his specialty has long been Wakefields, he is equally adept with Peanuts, and has a special knack with unconventional designs.

Watching the various fliers in action can be a genuine learning experience, as each has an individual approach. Since model flying is part science, part luck, and part art (some say *"black"* art), there are many different paths to success, rather than just a single "best" system.

Managing the flight portion of the contest was Carl Hatrak, who deserves credit not only for his fairness and efficiency, but for coming up with the International Postal Peanut concept in the first place. His staff of volunteers, whose names appear elsewhere, really put themselves wholeheartedly into the task. Make no mistake, judging and proxy flying are quite demanding, and most of the crew probably invested at least a solid working-day in the project. A few even bypassed lunch in the process; enthusiasm can be a pretty fair substitute for nutriment, but eventually, one notes the onset of slightly fuzzy thinking!

Bill Northrop and five-year-old daugther, Belinda, were able to spectate this year, and doubtless enjoyed not being encumbered by camera gear and the need to function as reporters. You didn't know Bill had a co-editor person?

Although extreme concentration may be required during proxy flying, these meets are generally characterized by joviality and good fellowship. If someone needs help, it's there. Need a tool or a particular type of glue, and you've got it . . . as simple as that. It is a pity that tape recordings have not been made to capture some of the humor-shrapnel which constantly flies about between the aircraft. However, there are a few verbal comments, such as when a rubber motor ex-

PEANUT RESULTS

GRAND PEANUT — Bill Hannan, Farman Mosquito
MOST STATIC POINTS — Jack Little, Fairey Barracuda II
BEST WORKMANSHIP POINTS, FOREIGN — Daniele Vescovi, Italy, Ansaldo SVA-4 WWI
BEST WORKMANSHIP POINTS, USA — Phil Cox, Grumman Wildcat WWII
HIGH POINT BIPLANE — Jack McGillivray, Issacs Fury
HIGH POINT FEMALE ENTRY — Deborah Christen, P-51D
BEST SCORE BY 15 YEAR OLD OR YOUNGER — Ross Janke, J3 Cub (Clipped)
BEST PECK POLYMER KIT — Tom Telesca Jr., J3 Cub (Clipped)
BEST FROM MOONEY PLANS — Bob Stought, Centennial 100
YOUNGEST QUALIFYING CONTESTANT — Ross Janke, Nesmith Cougar, 14 yrs. (1 of 3 14 yr olds)
OLDEST QUALIFYING CONTESTANT — Benno G. Sabel, 53, West Germany
MOST DISTANT — Benno G. Sabel, West Germany
MOST DAMAGED IN SHIPMENT — Clark Wade
BEST SHIPPING CONTAINER — Tom Wood (Peanut Shell)

		FLIGHT	STATIC	TOTAL
PIONEER				
1. Ken Johnson	1911 Cessna	53	69	122
2. Benno Sabel	Drzweicki Canard	21	78	99
3. Joseph Holmes	1911 Cessna	12	75	87
WORLD WAR I				
1. Daniele Vescovi	Ansaldo SVA-4	16	80	96
2. Ken Johnson	Hergt Mono	21	67	88
3. Walt Mooney	Thulin 'K' Jagaren	14	72	86
GOLDEN AGE				
1. Bill Hannan	Farman Moustique	40	90	130
2. Jack Little	Ford 2-AT	20	90	110
3. Dennis Osborne	Bucker Jungman	19	80	99
4. George James	Chester Goon	41	50	91
5. T. Telesca	J3 Cub (Clipped)	31	59	90
6. Ross Janke	J3 Cub (Clipped)	29	58	87
7. Eric Holmes	J3 Cub (Clipped)	25	59	84
8. C.G. Strange	Buhl Pup	10	72	82
9. William O'Conner Jr.	Polish Fighter	12	68	80
10. William O'Conner Sr.	Curtiss P-1	10	68	78
11. Hugh Ross	Folkerts SK-3	21	48	69
WORLD WAR II				
1. Phil Cox	Grumman Wildcat	31	91	122
2. Jack Little	Fairey Barracuda	16	92	108
3. Bill Wheeler	XP-55 Ascender	10	85	94
4. Walt Mooney	Ikarus 122	16	77	93
5. Deborah Christen	P-51D Mustang	17	51	68
6. James Martin	Zero	11	50	61
MODERN				
1. Jack McGillivray	Issacs Fury	39	80	119
2. Chuck Drew	Nesmith Cougar	67	48	115
3. Jack Little	Wittman Tailwind	19	90	109
4. Ken Johnson	Fike E	54	50	104
5. Chuck Conover	Fike E	42	60	102
6. Walt Mooney	Baby Ace	20	78	98
7. Dick Baxter	Lemberger LD20	40	55	95
8. Doug Hinkel	Smith Miniplane	17	69	86
9. Thomas Wood	Andreason BA4-B	21	58	79
10. Ross Janke	Nesmith Cougar	20	45	65
11. Ray Stearns	Nesmith Cougar	16	46	62

plodes, that may best be left unrecorded! One gag being bandied about: "Have you heard about the new space-frog movie? It's called STAR WARTS". Answer: "Nope, but I've seen the Russian version . . . CZAR WARS". Ah, well.

During the heat of battle, while Dick and I were trying to unravel a knotty problem in one entry, Walt Mooney gave me the somewhat disquieting news that my own entry had been "rolled up in a tube", during a photo session. At first I thought he was kidding, but he wasn't. Seems that the model had been scrunched in a sheet of heavy photographic backdrop paper, which has rolled up like a window shade. However, Mooney and Ramos must have managed a repair miracle, in spite of both wing spars being broken, and the Peanut later appeared airborne on the other side of the gym, under the proxy guidance of Ken Johnson. Actually, we were too busy to pay much attention to other's flights, having to concentrate on the job(s) at hand. Our charges included high-wingers, gull-wingers, low-wing types, and bipes . . . each requiring a different approach. Some flew to the left, while others flew to the right. A few even persisted in trying to follow a straight course . . . bad news indoors.

Instructions supplied by the builders varied from a simple "GOOD LUCK", through lengthy discourses reminiscent of factory maintenance manuals. An inhibiting aspect of proxy flying is the limited time available to become familiar with each subject. It is just not possible to explore more than a small percentage of the power and adjustment combinations. Thus, a model which arrives in a brand new, barely-tested condition is at a distinct disadvantage, compared with one which has been thoroughly "tuned" beforehand.

Doubtless, in the hands of their owners, almost all of the entries could achieve at least enough duration to qualify. Note that I said almost. Ten seconds, the minimum, sounds like a cinch, until you try to manage it with a ship that snap-rolls to the inverted position upon launch. Or, how about one that spiral dives to the right and then, on the next flight, spiral dives to the left with NO change in adjustment? A puzzlement. Some examples fly with adequate stability, but resist efforts to extend their duration. This is particularly true of heavy models equipped with unusually small diameter props. Whirrrr! Instant rundown. Yet, even though seemingly hopeless cases may respond positively to a change in proxy flier.

Finally, the flying was brought to a close, the broken bits of rubber and clay ballast were picked up from the floor, the models and photo gear repacked, and a safari organized, heading for the Northrop abode.

These "de-briefing sessions" are an added fringe benefit for participating in the Postal meets, and everyone eagerly looked forward to again visiting Lido Isle. Upon arrival, we were immediately supplied with refreshing drinks to suit every taste . . . particularly welcome after a very warm day in the gymnasium. Anita and Bill began preparation of a spendid evening repast, and as if this wasn't enough, treated us to a most enjoyable motorboat tour of the harbor.

The after-dinner conversation concerned, in addition to the day's activities, a few anecdotes about the recent European trip by Bob and Sandy Peck, where fellow model builders in England, France, Switzerland, and Germany had rolled out the red carpet and truly made them feel welcome. According to the Pecks, Peanuts are the universal language!

Anita Northrop brought us up to date regarding her special interest in real estate, while Bill filled us in on recent developments in the magazine publishing business. It was with great reluctance that Warren and I finally tore ourselves away from this relaxing atmosphere, and headed the Shipp Plymouth down the long road toward San Diego, capping a full but memorable day, and all part of the **Model Builder** Postal Peanut experience. ●

Soaring . . . . . *Continued from page 33*

Let me share with you an authoritative view from Dominic Scrook, of Redondo Beach, California:

"Dear Dr. Fogel:

I read your article in the March/April 1978 issue of **Model Builder** and noted a comment relative to the recent rash of sailplane speed records and the expressed concern at to whether the claimed speeds can be achieved with R/C sailplanes.

"A comment made in your article that 'there seems to be a need for reconciling some recent claims with the physics of the situation' is interesting. A few years ago I had some doubt as to whether the speeds were realistic and achievable. As a result, I developed a program and performed some calculations using an HP programmable calculator. The program estimates the altitude loss and velocity as a function of time given initial altitude, wing loading, and total drag coefficients. It is noted that the program accounts for variable atmospheric density. I concluded that it *is* possible to achieve the claimed velocities, and that the laws of physics were not violated.

"Using the above mentioned program, I performed some calculations for the wing loading and drag coefficients given in your article. The results are in the attached altitude, velocity, time history profile. Although not plotted, additional data has been tabulated presenting the results for other initial altitudes. I hope this will shed a little light on a confusing and controversial issue in the R/C sailplane fraternity."

I expect the controversy to continue, at least until the record is broken once again.

For those interested in micrometeorology, dig out the article by Jerl Walker, entitled "What Plumes of Smoke tell About the Structure of the Atmosphere," pp. 162-171 in the May 1978 *Scientific American* (Vol. 238, No. 5). It's amazing what you can learn simply by watching the telltale signs. You also should read *The Miracle of Flight*, an excellent book by Stephen Dalton, McGraw-Hill Book Co., 1977. Here's the beauty of nature portrayed for all to observe and appreciate. And we shouldn't forget the book by R.S. Scorer, entitled *Natural Aerodynamics*, Pergamon Pres, 1958. It's a bit hard to find, but well worth your effort. ●

Instructor . . . . *Continued from page 29*

to simply angle them into the wind sufficiently to compensate for the drift. The crosswind spin entry is probably one of the most difficult things to handle, and results in many very low scores or zeros, even by the experts. The problem here is that you must hold downwind rudder as you slow down to stall, but must avoid snap-rolling on the entry. I've found that the trick is to always spin in the downwind direction, and to start the spin just before the airplane stalls, using *only* rudder and elevator. This causes the airplane to turn flat to the downwind side, where it will truly stall and spin; at this point, the ailerons can be added, if necessary, and the maneuver continued normally. Another advantage to spinning in the downwind direction is that the airplane will tend to stop more positively as the fin comes into the wind. The maneuver, though, that is the most difficult to perform in a crosswind is the Figure M, and if anyone has figured that one out, I'd sure be interested in knowing how it's done.

LETTERS

"Dear Dave:

I have a few questions for you. First off, what is the advantage, if any, of a nose gear retract door? If

it's preferable, what is your suggestion on hooking it up? With all the snap rolls in the pattern schedule this year, would it be advisable to use flaps? What do you find is the best speed to do a snap roll, at full or half power? I've been experimenting with propellers . . . different diameters, different pitches and found that a 12-7 cut down to 11-1/2-7 works well. Any suggestions on this? Yours very truly, Henry Piorun, Victoria, BC, Canada."

Dear Henry:

Your letter brings up some interesting questions, which I'll try to answer with my opinions. First, the main advantage to the nose gear door is to cut down the turbulence behind the prop, enabling the propeller to work more efficiently. I've found that, by making the smallest possible cutouts which will clear the gear and wheel, the effect is nearly the same as having the gear door, but without the complications. As to the use of flaps in snap rolls, the jury is still out on that one. I'm using flaps on my Curare for the snap rolls, but Tony Bonetti does the snaps without the flaps and says his airplane snaps better this way. I feel that the main advantage to flaps is in takeoff, landing, and spins. In all cases, I couple the flaps to the elevator, and have been impressed with the results. I agree with your conclusions on prop modifications, as I came to the same conclusions a few years back and used the 11-1/2-7 props exclusively until this year, when Top Flite came up with some special thick-hub 11-7 true pitch props with a lot of blade area, which work well. The main advantage to the 11-1/2-7 props, as well as the new wide-blade props, is that the airplane flies at a more constant speed than with the "toothpicks", making timing easier on vertical and looping maneuvers.

Dear Dave:

Just a note to say how much I enjoy your "Instructor" series in **Model Builder** *magazine, and to ask one question about your method of getting elevator differential, as shown in the July issue.*

The main question I have is this: do you consider the method of offsetting the servo neutral better than bending the elevator horn so that it is in front of the hinge line? I have used both methods (usually together) when the horns are fixed and can't be bent. The reason I am asking this, is that I wrote a section on differential for our club newsletter last December, and I am wondering if I have any misinformationon in it that I should correct. Sincerely yours, Charles Ambrose, 3318 Camarie, Midland, Texas 79701."

Dear Charlie:

In answer to your question, I usually offset the servo for differential throw and bend the horns only for aileron differential, as per my previous column. The only reason for this is that it is usually more convenient, and the results are identical. I read your articles on differential, pushrods, and CG, and ended up wondering why I'm writing this column, as your articles are superb. I've included your complete address in the article to enable our readers to get in touch with you about reprints, at whatever costs you deem necessary, as I think they are great, especially the one on determining Mean Aerodynamic Center and Center of Gravity.

Dear Dave:

Comment on your reply to VEV in the July **Model Builder**.

I've been flying models for more years than I care to remember, and I've used the same theory as other fliers. However, your system of control differential has me baffled. I got out a few sheets of paper, ruler, compass, and pencil and tried to put it down in black and white. Can't do it!

As long as the hinge line doesn't interfere with the pushrod, it doesn't seem to make any difference where you put the horn. I used a 1-inch horn and a 3-3/4-inch elevator (easier to measure). If the servo arm is at 90° and the elevator is neutral, let's assume you pull the horn forward (up) 1/4 inch. The elevator t.e. goes up 1 inch. Push it back (down) 1/4 inch, and the t.e. drops 1 inch.

Let's move the horn back, say, 1 inch from the hinge line. Pull up 1/4 inch, the t.e. goes up about 11/16 of an inch. Push it down 1/4 inch, and the t.e. goes down the same 11/16.

All we have done is make the effective length of the horn longer, and thus cut the elevator throw in both directions. I even bent the horn forward over the stab, and it works the same way.

I know what you suggested works, but now I don't know why! I just shot down all my reasons. Why does it work? Thanks, you've got a great column. Linus Boehle."

Dear Linus:

I received your postcard saying you'd figured it out, but I think many of our readers may have the same questions, so I'll try to show the answer with a drawing.

TIP OF THE MONTH

When flying in the sun, try a hat with a dark tinted transparent visor, so you can look up through it when flying near the sun to avoid the glare. •

Charger ..... *Continued from page 57*

matic feature of the charger not taken over.

In reviewing the time and values, this battery can thus be considered 100% charged, and it was done with absolutely no chance of overcharging.

We also checked one of the molded, plug-in, non-automatic chargers available down at the corner hobby shop. This is a common one, often seen and advertised, and all made by the same company, though marketed by different hobby suppliers. It is marked 12 VDC, .5 Amps (500 Milliamps). The M.E.N. C-25 is marked 12V-.3A. Remember, these markings on a charger indicate the maximum capabilities of that charger ... the values it can deliver without overheating and harming itself. The actual current delivered is, to some degree, controlled by what is connected to it as a load.

Anyway, our non-automatic charger started doing its job of putting life back into our dead soldier at a rate of 120 milliamps at 13.23 volts. One hour later, it was charging at 240 mils, 12.93 volts, which was the highest current reached. Within another hour it had settled to 200 mils. From then on, it maintained the current and voltage pretty closely, until a total time of 18 hours had elapsed. At this time, the voltage slowly started to rise, while the current lessened. At a total of 22 hours, with a current flow of 150 milliamps, the voltage stood at 14.09.

At this time, when connected to the M.E.N. Automatic Charger, the LED would light within seconds, indicating that this charger, too, sensed the battery as fully charged.

In conclusion, we have established that both chargers will work within the safety limitations recommended by the people who should know more about the subject; the battery manufacturers. The M.E.N. C-25, however, has the advantage that it will stop at the proper time, preventing damage to your expensive battery, while the non-automatic types will keep pumping in the juice forever, or until enough electrolyte has been vented that you no longer have a battery.

The solution is somewhat simpler, if you always start out with a completely dead battery; either have a timer, or remember to disconnect it in 20 hours or so. But we seldom run the battery down to nothing, so it becomes an impossible task to determine how much we took out and to put *only* that amount back in. It can be done with monitoring equipment, such as was used for these tests, but you have to be there to read it. Always charging on the extremely low side is not a good solution, as Murphy's Law will see to it that you run out of electrons during the most important start of the contest season.

The C-25 is inexpensive, only $16.95; a cheap price to pay for the reliability that you were after when you bought a gelled electrolyte battery in the first place. And isn't it nice to know that you are not boiling away that reliability and investment?

Using the C-25 Charger is simplicity in itself. It comes with a red positive output and a black negative output wire, to which a polarized connector should be attached, to eliminate any wrong connections later (though you may have to resort to alligator clips, if it is required for your equipment). In any case, make sure the red wire goes to the battery positive, black to the negative. Connect the charger to the battery *first*, then plug the charger into the wall socket. (If the charger is plugged in first, and then the battery is connected, the LED will light, possibly leading you to think that your battery is fully charged, which is not the case. The sensing circuitry depends on the battery connecting being made first, then the connection to the AC supply.)

The M.E.N. C-25 Charger is available from distributors and dealers all over the U.S., and in some foreign countries. It is manufactured by Model Engineering of Norwalk, 54 Chestnut Hill, Norwalk, CT 06851; distributed in Canada by Eagle Hobby Supplies, Box 6550 Station C, Edmonton, Alberta, Canada T5B 4M4.

As we modelers have been using this type of battery for some years now, a couple of interesting facts have surfaced. Though the manufacturers disclaim any memory problems, such as are claimed for nickle cadmium cells, it seems that during our short-period, high-current use, gelled electrolyte batteries will last longer if they are stored fully charged and are exercised periodically more than two or three start's worth every Sunday.

It is recommended that the charge be topped off after returning from each flying session, and certainly, you Northerners remember to keep them fully charged during those long winter months of no activity. It also seems to benefit these cells if, now and then (like every three or four months), they are pulled down more than is normal during your particular use. This can be done with your engine starter, with some kind of load applied to it, though I prefer to use a pilot light bulb. A No. 93, such as is used in high-intensity desk lamps, draws just over an amp at 12 volts, and if connected to our battery for a couple of hours, will provide good exercise. Other possibilities are Numbers 382, 386, or 2182, which draw 800 mils. Be sure and recharge immediately after pulling the battery down.

A rather strange phenomenon crops up now and then, which is not mentioned in any literature that we have received, but which has been observed by more than one modeler. If a battery is fully discharged, a high resistance apparently develops. In this case, neither the M.E.N. C-25 or the non-automatic chargers will charge the battery. The C-25 LED comes on immediately, erroneously indicating full charge. The other charger can't seem to put in but a few milliamps of current. In fact, the battery will appear to have suddenly done a Figure Nine.

Not so, in all cases. A high current, of no more than an amp or so, for five minutes, will get it on the other side of whatever curve it was on, and then both the C-25 and the non-automatic charger will charge it normally.

We don't know why . . . if you find out, let us know, so we can tell the battery engineers. In the meantime, all we can say is that truth is indeed stranger than fiction! But it is no fiction that your properly charged and cared-for gelled electrolyte battery will be with you longer than the one that is constantly abused. •

Hannan . . . . . *Continued from page 78*

interests, regardless of their geographical location. Truly, model aircraft represent a unique form of international language and a force for goodwill.

Frank Zaic, doubtless one of the most widely-known modelers of all time, traveled recently to New Zealand, with his charming wife, Carmen. While enroute, they stopped off at the island of Tahiti, the dream destination of many. On arrival in New Zealand, the Zaics were welcomed by friends, including model builder Vernon Grey, who had been corresponding with Frank since 1934. Later, a reception was held, hosted by the Auckland Model Aero Club, an institution nearly 50 years old. The banquet was covered by the AUCKLAND STAR newspaper, describing Frank as ". . . doyen of model designers of the 1930's, author of Model Aeronautics Year Books which fanned interest of youngsters in early aviation around the world." Added Bill Mackley: "The reasons why some model aircraft flew (better) than others was all black magic until Frank came along. His yearbook became the bible of modelers everywhere."

Zaic himself recalled those early days, when he lived on the princely sum of one dollar per day, split 50/50 between food and rent. As a single fellow, he put all of his energies into model flying.

Later, during the 1950's, Frank was

able to apply many of his model aviation-developed talents to design projects such as the *PIRATES OF THE CARIBBEAN* attraction at Disneyland, and inertial guidance systems for Litton. Appropriately enough, one of these units was operating aboard the big jetliner which brought the Zaics safely home after their spendid New Zealand holiday.

PEANUT PEOPLE RETURN

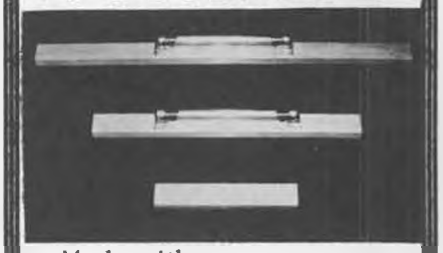
Another pair of world travelers, Bob and Sandy Peck, who recently returned home after a month in Europe, presented some 500 color slides to an enthusiastic group of Southern California model builders. After viewing such ample evidence, the conclusion reached was that flying scale is indeed alive and well on the opposite side of the pond! A list of the people who welcomed the Pecks would read like a Who's Who of European Modelers. In addition, literally hundreds of magnificent models were seen in England, Switzerland, France, and Germany.

All in all, the Pecks reported, model builders are pretty much the same everywhere . . . friendly, cheerful, and helpful. Yet, it must be admitted, a little different from your average citizen. For instance, English Peanut expert Butch Hadland was living in a brand-new house, but the workshop contained the typical accumulation of fascinating "junque", looking as though it had been there forever!

HAPPY BIRTHDAY LAX

Los Angeles International Airport will be 50 years old on October 1, 1978, according to Carl Hatrak. Originally known as Mines Field, it was the site for the 1928, '29, and '30 National Air Races. For the first 25 years of its existence, the airport lost money, but by 1977 had netted a profit of 12.25 million dollars for the year. Over 28 million passengers utilized the facility last year, but expectations are that more than 40 million people will pass through the terminal by 1984. Imagine what the surface traffic will be like then!

STANDOFF SCALE PEANUTS?



Dr. Dee Mathews favored us with a new grocery product. Feaster's "NU-NUT" imitation pecans are made out of peanuts! The object, of course, is to provide pecan flavor at peanut prices. Hmmmm. Dr. Mathews and his cohort, Larry Kruse, may have another Peanut surprise (the flying variety) for us within a month or two, so keep tuned!

AND SPEAKING OF PEANUTS

Dr. John Martin reports enthusiasm for the new M.I.A.M.A. Peanut rules, which offer a choice between the traditional 13 inch wingspan upper limit, or a 9 inch maximum fuselage length. The goal was to enable the high-aspect ratio "long-wingers" to be more competitive against the low-aspect ratio subjects.

George Chaulet, of France, likes the idea, but opines that a 10 inch fuselage length limit would be more convenient for metric-system oriented countries,, since it converts exactly.

NEW EVENT?

Richard Allen, of Vancouver, Canada, sent in the following suggestion: "I have an idea for a bizarre contest. I think there are enough skilled scalers who are also designers, so that there could exist an "Extended Scale" event. By extended, I mean to take a well-known

type, such as a P-26, and push its present configuration into something slightly more flamboyant. I'll bet you'd see some wonderfully creative and interesting inventions."

By coincidence, another Canadian, Ron Limbrick, wrote in to comment about Ron Shettler's reference to "Could Be" Scale. He liked the concept, but wonders if it might not be applicable to small models as well as Mammoth types. He would like to see "scale" drawings provided by each contestant to prove the model could really be a practical proposition (This is to avoid some of the absurdities encountered in control line team racing.) "Who knows . . . maybe there is a whole bunch of Burt Rutans out there!"

COVERING MATERIAL

Charley Roth was kind enough to give us some samples of a clear polyester film, called FasCal. Manufactured by Fasson, the substance is available in different thicknesses, is suitable for covering model aircraft, and has become quite popular with the control line combat set. FasCal is also usable as a base material for club emblems, since it accepts silk screening readily. The furnished samples feature striking color renditions of World War I aircraft printed on 1 and 2 mil stock. Information requests should be directed to: Fasson, Avery International Company, 250 Chester St., Painsville, OH 44077.

PROFOUND THOUGHT FOR THE DAY

"The people who started this rumor that you can't fight city hall are the people at city hall." Barbara Hutchinson.

THIXO-WHAT?

Thixotropic, that's what! This new epoxy glue from Pettit Paint Company (the Hobbypoxy people) is specially formulated to stay put, and will not drip or run off surfaces, even when vertically aligned. At first, we were somewhat puzzled as to finding uses for this product, especially since small models seldom employ much epoxy. However, upon reflection, several possibilities became evident. The product is ideal for "sandwich" style landing gears, where music wire must be glued between two ply or hard balsa members. Other glues just don't answer the need as well. Ditto making small strengthening fillets around ply firewalls. A third use is in making small spinners for plastic propellers. These spinners offer useful ballast for short-nosed subjects, and reinforce the usually thin propeller hubs in the process. Two methods of making the spinners have been tried. One approach is somewhat unpredictable, and may require more than one application, plus "clean-up", after the glue has cured. Alternatively, the epoxy may be cast onto the propeller, using a plastic or wood female mold. Working time for thixotropic epoxy is about an hour, and solid setting takes about four. Overnight curing assures maximum strength.

GALLERIES, ANYONE?

Hurst Bowers, genial proprietor of Flyline Models, offers this opinion: "I think we are missing a golden opportunity by not pushing 'stick-and-tissue' scale models as an art form. It could pull lots of potential, frustrated modelers from the rolls of would-be artists, and into our fold. Think about it."

Hurst's message rang a memory bell, initiating a search of our old correspondence files. Sure enough, in a letter dated August 18, 1972, Bill Brown, of Brown Junior Motors, had this to say: "The tiny flying scale models should be considered an art form." Great minds run in the same avenues.

PROFILE PROMOTION

Phil Koopman reports that several manufacturers are trying to boost interest in profile scale models, as useful learning tools for Juniors. With success, they may later graduate to built-up types of aircraft. Several contests have been conducted in various parts of the country, including Connecticut, Ohio, and California.

Two basic types coexist: the powered models (rubber, CO_2, and gas) and catapult gliders.

For some years, the San Diego Orbiteers sponsored such events for Juniors. However, the adults took to the idea so eagerly that it threatened to outdraw participation in the regular categories! No-Cal scale, as it is aptly termed, will have been flown at the Flying Aces Nationals by the time you read this, and the response may well have an important bearing on the future of the event.

YANKEE MODELS

Congratulations to author and Phineas Pinkham fan Bob Whittier, who wrote "The Motor Starts Every Time", devoted to rubber-powered models, for the prestigious YANKEE magazine. Featured in the June issue are seven full-color photos of models and modelers in action. Additionally, the editor has offered to provide information about such models to anyone who may care to send a stamped, self-addressed envelope to: Aviation Editor, Yankee Magazine, Dublin, NH 03444.

WINGED VICTORY SCALE AERONAUTICS

Howzat for a company name! Jim

Dougherty has just launched the firm, and initial releases will include a variety of tissue coverings and pre-colored condenser paper in a varied assortment of colors. Also offered is a revolutionary form of rubber lube, totally unlike other concoctions. Pink in color (rather like calamine lotion), it seems to sink into the pores of the rubber, and is much less apt to fly off inside the model's fuselage. We've sampled it under contest conditions, and found it most impressive. Without a doubt, more scientifically-minded readers may care to perform controlled experiments. Why not drop a stamped, self-addressed envelope to W.V.S.A., c/o Enfield Vector, Gateway Pavilion, 1700 Gateway Blvd. S.E., Canton, OH 44707. As usual, we'd appreciate a mention that you learned about them from **Model Builder.**

NASA HOMEBUILT?

From the Northeastern Sport Aviation News, we learn that the National Aeronautics and Space Administration is building two VariEzes, one for actual flight tests and the other for extensive wind-tunnel tests. A small model will also be built for wind-tunnel spin testing.

HUMAN POWERPLANTS

Again from the Northeastern Sport Aviation News, who received it from the Experimental Aircraft Association's Chapter 188 newsletter, we abstracted the following:

"The recent Kremer prize-winning flight of the Gossamer Condor is to be applauded by aviation enthusiasts. As this branch of aeronautics progresses, doubtless man-powered aircraft will be certificated by the Wizards of Wichita.

"When the pilot becomes the powerplant, some very interesting questions arise. Who will be allowed to work on the powerplant when it gets sick? Would an A&P mechanic be charged with practicing medicine without a license, or would an M.D. get a citation from the FAA for working on a powerplant without an A&P license?

"Would an annual physical exam do in place of the annual inspection? How do you charge the battery . . . feed it an electric eel or show it a centerfold from Playboy?

"In order to boost the horsepower, do you bore and stroke the powerplant or feed it more Wheaties? Do you get sludge out of the crankcase by dosing it with STP or castor oil? How do you get it to stop smoking? Would shaving its head make it go faster?

"If it begins to drink too much oil, do you refer it to AA? May higher octane Gatorade be used when the prescribed grade is unavailable? Is it necessary to safety-wire the nut that holds the control stick? How are you going to install a seat belt without cutting down on the power output?

"The questions seem endless! So, we suggest that Washington hire about 200 more bureaucrats to study them. After all, Washington should be ready with at least three new volumes of regulations covering man-powered flight, to be ready for the day the spam-can factories start producing aircraft that are fueled with Spam."

PARTING SHOT

Blame Larry Williams for this groaner: "Whenever an aeroplane stalleth, it falleth!" ●

Fuel Lines . . . . *Continued from page 41*

are labeled Nitrotane 1/2A 15, 30*, 50, 60 and 70. Standard Nitrotane fuels have 23% synthetic lubricant. The 1/2A fuels contain 18% synthetic lubricant. Standard fuels contain 1-2% propylene oxide as an igniter. Half-A fuels contain 10-15% propylene oxide. All Nitrotane fuels contain a rust inhibitor and anti-oxidant.

SIG Champion CL Stunt	5%	25%
SIG Champion R/C Fuel	10%	25%
SIG Champion 15	15%	25%
SIG Champion Racing*	35%	25%

Note: All SIG fuels contain a combination of Klotz synthetic and castor oils as the lubricant, as well as 2% propylene oxide (igniter) and 2% Lubricin. The latter is an additive designed to increase the lubricating qualities of castor oil.

As mentioned above, some modelers have strong feelings about lubricants. Some will swear *by* one, and swear *at* another. You also may have heard something like this: "Synthetic oils are okay, but there's nothing like castor oil to protect an engine." There's some truth to that, but the complete truth of the matter is that *all* lubricants must be used within their thermal and physical limits for satisfactory results. There are many lubricants. Water is one, but its limitations are rather severe. So, generally, when we talk about lubricants, we mean some kind of oil; be it animal, vegetable, mineral, or synthetic.

What we want to do is reduce friction, thus allowing higher rpm's, cooler running, and lower engine wear. All the oils in the above fuels will do that, provided that we do not exceed the upper thermal limit of the oil. At some upper temperature for each oil, its lubricity will begin to decrease rapidly because of molecular breakdown. When that happens, more heat is generated, because of increased friction, and we have a heat/friction spiral that ends up with galled or seized engine parts.

The enemy, it seems, is heat. If we don't get the engine too hot, we'll be okay with any of the above fuels. What's the quickest way to get it hot? Simply run it on too lean of a mixture. This will do it, despite the fact that there is plenty of cool air flowing around the outside of the engine. Fuel is a major coolant of an air-cooled, two-cycle engine. A rich mixture means a cooler engine temperature. Get it too lean, and you're into the heat/friction spiral.

One can now logically reply, "That's all fine and dandy, but obviously some *one* oil has a higher thermal limit than the others, and that's the one I want." True, but the difference is rather small. Lubricant flash point, although not a completely true indication of thermal limit, will give us some reference for comparison. The flash point of a lot of synthetics is in the neighborhood of 450° F. Castor oil is about 495° F. With a mixture that's too lean, you can very quickly pass through the range between the two. Well then, why do some experts swear by castor oil? Well, it does not burn completely (generally, synthetics do), it contains carbon (generally, synthetics don't), and if the engine gets too hot, the castor tends to gum up or form "varnish" in the engine . . . usually both. This slows down the engine. It may kinda slowly sag away and just quit, without causing serious damage, but it will almost certainly do it with a lot of varnish and gunk that could be interpreted as "protecting" the parts from galling. That's really a little closer to what castor oil does, rather than attributing great things to those magical words, "film strength". With synthetics, everything's usually fine until we pass that upper thermal limit. Then ZONK! Friction and heat skyrocket, and engine parts can be ruined very quickly.

Sounds like synthetics are all bad, and castor oil is the "good guy". Not necessarily so. Many synthetics, used within their thermal limits, will result in significantly lower coefficients of friction between engine parts than castor oil. That means more power! Let's cite some pros and cons. Castor oil tends to "protect" engines, but it doesn't burn very cleanly (engine "varnish"). It is not completely soluble with nitromethane, and it isn't as "slippery" (lower resultant friction) as some synthetics. Synthetics, in general, are completely soluble with nitromethane, methanol, and propylene.

Generally, they have no carbon (low "varnish"). They are very "slippery", but they break down rapidly at their upper thermal limit. This is why some manufacturers aim for the best of both worlds, by using a combination of castor and synthetic oils.

"Okay, all that's fine," you say, "but what commercial fuel should I use in my small-bore engine, and what about competition and mixing my own fuel?" Here we go off the "deep end". For general flying with Cox Tee Dee or reed valve .049/.051 engines, we suggest that any of the above commercial fuels which are followed by an asterisk, will provide excellent performance, assuming you have properly broken-in your engine.

As for "home brews", our preferences in fuels are as follows:

	NITRO	LUBRICANT	PROPYLENE OXIDE
Break-in	15%	20%	None
Sport & secondary break-in	25%	20%	None
Mouse race & free flight	50%	20%	5%
1/2A pylon	65%	20%	15%

Any remaining percentage is methanol. Also, the percentages of nitro and propylene oxide will vary somewhat for racing, depending

upon atmospheric conditions. Those listed are a good starting point. In all cases, the lubricant is Klotz Special Formula Super Techniplate 2-Cycle Racing Oil (KL-100). The flash point is 510° F. It is available at most cycle shops. Nitromethane, methanol, and propylene oxide are available from good hot rod and cycle shops. If there are none nearby, you can order them in single-gallon quantities from Nitrotane Space Age Fuels, RR 3, Kewanee, IL 61443. If you send them a stamped, self-addressed envelope, they'll tell you how to order.

Next time around, we'll discuss fuel handling, filtering, combustion chamber/nitro percentage guidelines, and 1/2A starting procedures. In the meantime, if you have any questions, just send a stamped envelope to: Joe Klause, P.O. Box 2699, Laguna Hills, CA 92653. •

Sailing . . . . . *Continued from page 49*

ther expand the class I thought it would be wise to leave it open to other builders for the future so the class could expand. It then evolved as a Stand-Off Scale type class as there were originally 10 boats built in the 1930's as 'J' boats to compete for the America's Cup. Six boats were built in the U.S. which were the Enterprise, Whirlwind, Yankee, Rainbow, Weetamoe and the Ranger. Four 'J's were built in England which were the Shamrock V, Velsheda, Endeavour, and the Endeavour II.

"Because of the size of the models I knew that there would never be widespread interest in them so I decided to keep the class as free of restrictions as possible so that the true modeler who might become involved would not feel that he was boxed in. I felt they should have room to have different sails as the original boats did, like double and triple headsails, even a Park Avenue Boom, etc.

"I have started to do some research concerning your question of whether I would be able to supply line drawings of the 'J' boats. The Mystic Seaport has the line drawings of both the Enterprise and the Rainbow which can be reproduced. They have suggested that I write to the Hart Nautical Museum for further help. I have done so but have had no response as yet. If it is possible I will try to provide line drawings for those who want them. I am not sure how much luck I will have with the British Boats.

"Recently in Florida I found a book which is about the 'J' boats entirely. It is fascinating to read. Their sheer size was amazing. The sails would cover an entire football field. The mainsail weighed one ton. The sails then were made of Egyptian Cotton. The costs were also very large. The crews were large and the parties were extravagant. The book is called 'Enterprise to Endeavour' by Ian Dear by Dodd, Mead & Co., New York. There is an interesting picture in the book which superimposes a 12-Meter Yacht against a 'J' boat. I have been close to the 12's and they are impressive but the top of a 12's mast would come only halfway up the J's mast, about to the spreaders. A Twelve is about as long as the boom of a J boat. They really must have been something to see! The hulls of the 'J's' were made of Tobin Bronze. Have you purchased a piece of bronze lately? Some of the masts were made of wood and some were made of aluminum with about 100,000 rivets in it. Bought any rivets lately?! I could go on and on.

"I recently had a letter from a club in Virginia Beach which indicated that they were interested in 'J' boats and had a few and were thinking about maybe holding a regatta either this year or next. I will be encouraging them to do so and maybe even the ACCR."

I'd like to urge any of you with an interest in a serious project to contact John at the above address. In my response, I asked him if hull lines and sail plans were going to be made available to ease the difficulties involved in obtaining acceptable plans. He indicated that an effort would be made in that direction, and that any assistance he could get from others would be most welcome.

Remember to mail in your $5.00 AMYA dues to the Secretary, 2709 S. Federal Highway, Delray Beach, Fl. 33444. I'm still fielding questions on all aspects of the sport; send a self-addressed, stamped envelope, along with your inquiry, to Rod Carr, 7608 Gresham St., Springfield, VA 22151. •

Plug Sparks . . . *Continued from page 62*

hours, and just what you can expect to see.

DARN! ANOTHER ONE GONE!

Seems I just wrote about Mal Smith and the great times he had in Minneapolis, when I receive a letter from his mother, Winifred Lakey, announcing his death.

Mal had been suffering from several heart attacks, and finally, after open heart surgery on May 25, he never recovered from the next attack on June 25. As his mother says, she is lost without him, but is happy he won't be in severe pain anymore.

Interestingly enough, Mal Smith will be buried at Fort Snelling Military Cemetery, in St. Paul, Minnesota. The return of the prodigal . . . the hard way. Looks like the free flighters up on topside are going to have to make room for another great competitor.

THE "GREAT WALDO" PARKER

And now for the good news. Walter Parker (known as the "Great Waldo") has undergone open heart surgery for a quadruple bypass operation. He is doing simply great, but the bad news is that those long shags for free flight models are out for quite some time. How about a black box, Walt?

"LITTLE ITALY" STRIKES AGAIN!

Well, the boys had no sooner gotten over the shock of seeing Sal Taibi win the Flying Scale event at the 1977 SAM Champs, than Taibi pulls another switch.

Sal is known as a staunch free flighter, and his long list of wins at contest after contest stamps him as truly a hot flyer who flies only high-performance models. To see any other kind of model in his hands is unthinkable.

Due to an error in reporting (via Bob Oslan), credit for winning the Beauty Event at the U.S. Free Flight Champs was given to another modeler. Imagine this columnist's surprise when he received a phone call from Sal, stating that *he* was the winner! That tops it all!

To be sure, Sal worked quite hard on the finish of his model, and he was justly proud of it. Seems like these guys can win just about anything, if they put their minds to it!

REBEL RALLY

Terry Rimert, of the North East Florida Flying Model Council (located in Jacksonville), reports on the latest competition, called the Rebel Rally. Unfortunately, this meet was "blessed" with contrary weather, with the wind blowing the wrong way (towards the woods).

This caused quite a few "chickens" (Terry included) not to fly very much. However, the diehards like C.C. Johnson ("Cadwell"), from Houston, showed the way, with eighty-year-old Bryton Barron right on his heels. For those who were complaining about the trees, Bryton said a little chase through the brush was good for the game. Ron Sharpton, who retrieved Barron's model on the last flight, shook his head in disbelief.

Noted at the meet were a considerable number of Foo-2-U models. As Terry sez, the Nationals are going to be swarming with these .020 gnats. Between Tom McLaughlin, Dan Berry, and Bill Kirby, there won't be much left in the way of places. You can blame Ron Sharpton and "Cadwell" for this state of affairs. We expect to hear more from these Florida boys.

OUTDOOR HAND LAUNCHED GLIDER EVENT?

Although this event has been proposed many times for the SAM Championships, it appears that not enough interest has been generated to warrant the inclusion of glider events. Actually, SAM Chapter 7 has been staging these events at its Eastern States Championship meets, but no further interest has been indicated.

Now, according to Harry Murphy, Editor of the CIA "Informer", Bob Larsh will try to pioneer the event in his area. Rules are rather simple (at present!) and consist of the following:

1) Model design must have been published in magazines, books, or kitted prior to 1943. Plans must be shown for documentation.

2) Undercamber may be used only if shown on plan.

3) Fuselage type wood and thickness may be varied, but not height distance between wing and stabilizer.

4) D/T pop-up tails are permissible as long as basic design is unchanged.

This should be interesting. We are looking forward to reports from Murphy on how the event came out on June 25, at Wright Patterson AFB.

MORE "BEEP" TONE

We reported some time back about the novel method of tracking a model in those model-eating corn fields, as originated by Keith Fulmer. Harry Murphy, of the CIA "Informer", failed to give Fulmer's address, so those who wish to contact him for advice on the radio tracker can now do so: 15688 Kern Road, Mishawaka, IN 46544, or phone him at (219) 255-6151.

Of course, improvements are always on the way, and Jerry Fowler, of COFFC (Central Ohio Free Flight Club), otherwise known as the "Flying Frisbees", has come up with a better battery source. The 90 mah silver oxide wafers made by Ray-O-Vac, Type 10L120, appear to be better than the Mallory R400 60 mah cells utilized by Keith. Battery life expectancy is naturally greater, which should assure the hunter he can recover that errant model.

According to reports from Jerry, the device works fine, giving at least a two-block range with two feet of snow on the ground. Any free flight modeler worth his salt should be able to easily get within this range of the model.

PENINSULA CHANNEL COMMANDERS O/T R/C ANNUAL

This columnist recognizes that all new O/T contests should be properly publicized and given recognition, if they are to survive from year to year. The PCC Second Annual is no exception, and full credit should be given to Tom Bristol, C.D., for organizing and running an excellent meet.

Not satisfied with that, Tom also contributed 100 dollars to the pot, to help swell the cash awards being given out. The amount of the awards for each of the three events (Texaco,

Limited Engine Run, and .020 Replica) were based directly on the amount of entrants. Hence, if 18 entries in Texaco comprised 50% of the total entries, then 50% of the cash was distributed among the winners of that particular event. Neat, huh? I know for sure the winners thought so!

Winners of the events listed above were Karl Tulp, Ed Solenberger, and Don Bekins, respectively. However, the big attraction of the day was excellent weather, good lift, and a relaxed meet. What else could you ask for on your day off?

FIESTA OF FIVE FLAGS

Boy! Is that ever a classy name for a contest! Trust the Floridians to outdo the Californians for a neat contest name. Although we have mentioned it in previous columns, we never did get a good report until John Roberts, of Cantonment, Florida, sent in a good review.

John reports there were 20 separate events for this well-attended meet held at Pensacola, on June 17 and 18. John got stuck for judging the flying scale, but did find time to make a few observations about the contest.

Weather was near perfect, warm, bright sun, light breeze from the east (no one had to change the location of the takeoff area!). This, coupled with a square mile of excellent field of grass and hard-surface runways made flying a most enjoyable day.

Perhaps the meet should have been called the "Jim McNeill Benefit", as Jim copped three firsts and one second in all the Old-Timer events. (Guess who was high point man?) For some strange, unexplainable reason, Jim got beat in the O/T Rubber event, by Paul Miley. Guess Jim must have been plain tired . . . haw! (He was also flying modern stuff, winning a first and third there!)

"Cadwell" Johnson continues to make the trek from Houston to the Florida meets, and does very well, flying and winning in the gas and rubber events. (Cadwell is famous for his rubber designs.) He managed to drag Frank Parmenter with him, but Paul Marchal (the Swoose flyer) didn't show up. How about that, Paul?

As a side note, Roberts enjoyed himself hugely with a CO_2-powered DeHavilland Hornet Moth. Using a Telco motor, John claims if there had been an award for the most popular model, the little Moth

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would have won hands down. All spectators were fascinated by its consistency of flight. That's what it's all about . . . FUN!

THE WRAP-UP

Generally, we like to close off the column with an anecdote, but the letter from Barney Snyder of Modelcraft to Model Airplane News in 1938 will fill the bill. I quote directly from the latter portion of his letter:

"To join our association, you must own a gas model. Entrance fee is $1.00 and dues are 25¢ a month. All members use the field without charge if their dues are paid. Nonmembers pay 5¢ each and 5¢ per ship on Sundays. All other days, the field is open to all without charge. Spectators are charged 5¢ each. Sunday's gate pays the rent and upkeep of the field. We also make and enforce all necessary rules, even to grounding a ship when necessary.

"Long ago, we recognized two facts: first, duration contests are fine for rubber models, but were out for gas models. Secondly, models had to be smaller with a higher wing loading to keep them from drifting all over the country. Flights should be short, with models landing on the field if possible. Flight timers were necessary; even the first gas models had timers. Builders learned it was more fun to make 20 short flights than to make one and spend the rest of the day hunting for their ships."

Food for thought. Did we miss something after all these years? •

Power Boats . . *Continued from page 43*

right, Ron? The Bridge twin sounded good, with all those gears purring and whining.

Scale class was a Chicago sweep, with Miss Budweiser U-12, driven by Gary Preusse, taking the winner-take-all finale. Yours truly took 2nd with U-22 Sunny Jim. The Bud got a better start, and we just couldn't catch her. Bill Pistello, rookie scale driver, powered his Oly Beer Wagon to 3rd place. Nice job, Bill. Don Boka's Miss U.S. took the beauty award. The dummy engine in Don's boat is unreal! It is completely detailed, even showing heat discoloration on the exhaust pipes. All this beauty, and yet it snaps in easily for running.

Well, that's all for now. Next month we'll look at the E-Z deep-vee by Jerry Dunlap. •

Counter . . . . . *Continued from page 10*

is possible to run in reverse, or brake in an instant, and the sharpest turns are an everyday reality. The Turbo-Trol uses ball-bearing bronze bushings, and has a water outlet for engine cooling.

The Mariner measures 36 inches in length, with a beam of 12-1/2 inches, and is priced at $259.95. The 32-inch-long Cobra, with a 17-inch beam, is $269.95. Two channels are required for steering and throttle, while a third control is needed for brake or reverse.

See your hobby dealer first; if he can't help, contact Model Rectifier Corp., 5200 Woodbridge Ave., Edison, NJ 08817.

* * *

Glaskote, described as Coverite's "ultimate finish", is a pre-mixed, lightweight, hi-gloss, fuel proof, tough, non-shrink finish that goes over any painted surface and produces a clear protective finish.

It is a one-part clear liquid, claimed to go on so smoothly that it can be applied with a brush, directly out of the can, and which leaves no brush marks at all. The special resins used contain a greater percentage of solids than previously possible, resulting in the kind of glossy finish that was previously possible only with multiple coats of dope, or with two-part paints.

Glaskote is compatible with all normally-used model finishes, and will instantly transform them all from flat or semi-gloss to high gloss. It can also be used over Coverite, to achieve the gloss of mylars, while still retaining the fabric look. It dries rapidly and is sandable. It is available in half-pint cans, at all hobby shops handling Coverite products.

Coverite, 2779 Philmont Ave., Huntington Valley, PA 19006.

* * *

Excuses, excuses, excuses! If one of your excuses for not starting on your Mammoth Scale project is that "they don't make any wheels large enough", you'll have to think of a

better reason. Williams Bros., Inc., has just started production of its Vintage and Golden Age wheels for large scale and sport R/C airplanes.

The Vintage wheels, as used during WWI and into the 30's, are 6-5/8 inches in diameter. The Golden Age'rs are 6-1/2 inches. Both feature semi-pneumatic tires and . . . get this . . . are brass bushed, for low friction and long wearing. They are priced at $16.95 a pair.

And of course, you'll need a pilot . . . which is also now under production down in San Marcos. This guy is true 1/4-scale, molded from paintable styrene, and has more torso than previous Williams Bros. pilots, so he will appear more realistic in those old-fashion open cockpits. And, being as some of those open framework jobs pose a problem when it comes to the installation of the radio, it is nice to know that our intrepid flier is large enough that one of the smaller servos that recently became available can be installed and hidden in the base.

Check any of the many dealers that carry the Williams Bros. line, or write direct to Williams Bros., Inc., 181 Pawnee St., San Marcos, CA 92069.

* * *

Do you think you can handle the "Winningest U-Control in History"? If so, you are ready for the Gieseke Nobler, soon to be available from Top Flite Models, Inc. This famous controlliner certainly has an impressive list of wins to its credit, having won four National Championships, four Walker trophies, and gained frequent membership on the FAI and USA teams for the World Champs.

The Gieseke Nobler is designed for .35 engines, features a 50-inch wingspan, with an area of 510 square inches, and a flying weight of 38 to 42 ounces.

The kit is designed with light weight and strong construction in mind. A "Superform" fuselage top is used, for the least possible weight and to eliminate block carving. The kit also features "positive alignment" ribbed platform wing construction, precision die-cutting, molded canopy, and a molded adjustable leadout guide. Included also are extra-long maple motor mounts, hardware, formed landing gear fairings, nylon bellcrank, leadout wire, silver soldered control horns, and, of course, the well-known Top Flite plans and instructions.

This is an ideal airplane for championship-caliber aerobatic flying, and could be your first step towards the winner's circle. Available soon at all hobby stores, from Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

* * *

This month, we have a complete line-up of the Flite Line Products' Air Force, from down Texas way. It starts with the "E Z Trainer"; a tough, simple airplane that uses rudder, elevator, and throttle, and which can be built either as a taildragger or with trike gear. It features a balsa-and-ply fuselage and foam wing. The E Z Trainer spans 48 inches, with an area of 480 squares. A .19 to .35 is recommended. All-up weight is 3-1/4 pounds. Price is only $29.95.

For an aileron trainer or sport model, you may choose the "E Z Fli", which may be flown with either three or four channels. It also uses plywood and balsa for the fuselage, foam for the wing, and a .19 to .40 engine. The span is 51 inches, area is 510. Flying weight is 3-3/4 pounds, and the price is $34.95.

The "E Z Sport" is described as a versatile fun-fly plane, perfect for one-design events or sport flying, and can be built with either trike or taildragger gear. The span on this one is 51 inches, for an area of 505. It weighs about 3-1/2 pounds, with a .19 to .40 engine. Price is $29.95.

The overall favorite is the "Skoot-

er II", a low-winger for one-design events or fun flying. It is available with a 480-square-inch, 15% thick wing, or with a 500 incher, 12% for racing. The span is 48 inches, and total weight will be 3-1/2 pounds, with a .19 or .40 for power. The Skooter II is priced at $29.95.

Check your dealer first, or write Flite Line Products, 3207 34th St., Lubbock, TX 79410.

* * *

The world of steam-powered R/C boats is a far cry from what most of us consider the R/C hobby, but nevertheless, the more we explore it, the more hobbyists, supplies, and suppliers we find.

Impressive too, is the variety of boats that are available. For example, all in one photo, we have for you a Deep Sea Salvage Tugboat, the "Chiba Star"; a steam yacht, the "Kamomee"; an escort ship, the DDK 116; a tugboat, the "Hercules"; and the "Star", an open-style boat. All of these are available in kit form from Saito, who also manufactures a complete line of model steam engines, burners, and all accessories for engines and boats.

Of course, each boat kit varies as to the amount of hardware and accessories included, being of such different types, but each kit is complete, with the exception of the steam engine, boiler, burner, radio system, paints, and glues. It does include brass, aluminum, steel, and plastic hardware. The hulls are precision molded of high-grade heat-proof fiberglass, and each kit includes complete plans showing power and radio installations.

These and other R/C steamers are pictured in color and described in Hobby Shack's 1978 Modeler's Catalog, available for $3, from Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92708.

* * *

It looks like cherry syrup, but we don't think you'll like the taste. And it'll help your engines more than it'll help you, unless you suffer from gummy and rusty bearings! On second thought, that kinda describes my stomach on race days.

Anyway, we are talking about Terry Prather's new After-Run Engine Oil, to be used in all engines (racing or not) after every flying session, to prevent the gumming of fuel residues and the internal rusting that often takes place. It should mean longer engine life, and easier starts at your next flying session.

It comes in a convenient 2-ounce squirt bottle, which can later be used as a primer bottle.

The already well-known and previously mentioned Drill Jigs are now available in three new sizes, to fit the Rossi and Cox 15's, the Kraft and Webra Speed .61's, and the OS .60 SR. These jigs will insure accurate drilling and tapping of your metal and plastic engine mounts, so important for proper engine operation and long life.

At most dealers, or inquire from Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744.

* * *

You probably have a valid complaint about something in this column, but it can't be that we DON'T have something for everyone. How about an R/C book for those of you who speak and read Swedish?

OK? OK then, such a book is NYA RADIO FLYBOKEN, by Par Lundquist. It is a 5-1/2 x 9-inch, 275-page hard-cover book which includes a large number of photographs (some in color), depicting all phases of the R/C hobby in a how-to-start and how-to-succeed context. It includes some three-views, and many line drawings of such vital items as control hinging and hook-ups.

This book has just been published and released in Sweden, and can be ordered for a price of 57 Swedish crowns from Spektra Publishers, Box 7024, 300 07 Halmstad 7, Sweden. Tell them you read about it in **MB**.

* * *

Tarno Aero Engines, the manufacturers of the popular Tarno-Carb for Cox Tee-Dee's, has announced its new 1/2AR Tarno-Carb, for the

Cox .049 reed engines.

In this case, with the carburetor installed at the rear of the engine, cowling and installation are simplified, and a more scale-like appearance is possible. And, since the reed engines operate equally well in either direction, they can be used in pusher configurations, and still use standard props.

An idle of as low as 3000 rpm is claimed, though 3500 is recommended as best. The 1/2AR Tarno-Carb is $12.95.

Also available is a 1/2AR Reed Housing and Motor Mount, which is required to install the carb to the engine, and to easily and securely mount the engine to the airframe. The mount can also be used for control line or free flight, using a Tee Dee venturi and needle valve assembly, which is claimed to yield a power increase of 10 to 20%.

Look for these new goodies at your favorite hobby shop, or write Tarno Aero Engines, 942 Grou, Montreal, Quebec, Canada H4N 2C7.

Keep tuned in. We hear rumblings of a Tarno 1.9 cubic inch ignition engine for Mammoth Scalers, to be released later on in the year. We'll bring you news as soon as we have it.

* * *

Need a pilot for your new Mammoth Scale project? If so, have a look at Dave Platt's new 1/4-Scale (3" = 1') figure, suitable for his new quarter-scale Jungmeister, Bud Nosen's models, and all other biggies.

This pilot torso . . . it is more than a bust . . . is hand-laid of polyester resin, and can be customized, for which instructions are included. It is only available directly from Dave Platt Models, 6940 NW 15th St., Plantation, FL 33313, and is priced at $11.65 postpaid.

* * *

From a name that has become synonymous with Sport Scale, Jemco, come two more kits for this increasingly popular event.

They are the Grumman "Hellcat", for .40 to .60 engines; and the North American AT-6 "Texan", for .29 to .40's. They both feature Jemco's self-aligning balsa and plywood fuselage assembly, and foam wings for which all covering wood is furnished. Decals and markings for various color schemes are also included.

The Hellcat spans 56 inches, with an area of 610 squares. It requires a 4 to 6-channel R/C system, and will weigh 7 to 8 pounds, ready to fly. The kit also comes with molded drop tanks and bombs, and scale gear strut covers.

Plans, instructions, three-views, and profiles are also supplied. The price is $74.50.

The "Terrible Six", as it was called during the Korean Conflict, spans 54 inches, with an area of 470, for a 4 to 5-pound flying weight. The kit includes a scale canopy and molded cowl, which also incorporates a dummy engine. The wing juncture fairings, or "humps", are also included, as are the necessary plans and instructions. The T-6 kit is $58.50.

Both are available from most better-stocked hobby stores. Jemco, 1305 Foothill Dr., Vista, CA 92083.

* * *

Even though I have never raced an R/C boat, I have to disagree with the people at The Pipeline, who claim that "an unbalanced prop is a boater's worst enemy". It always looked to me like that *=!#¢& guy who is about to pass you is your worst enemy!

Nevertheless, anything hanging out there on that crankshaft must be balanced for best operation and longest engine life, and model boat props are no exception. To handle this important and delicate chore, The Pipeline is producing its "Spin-A-Prop", a precision prop balancer that can be used anywhere. It does not require any leveling, and can be

used for props for any size shaft.

To use the "Spin-A-Prop", the prop to be tested is supported on a precision ground shaft, between two tapered stainless steel cones. The conical ground ends of the shaft are then inserted between stainless steel uprights, which allow it to spin freely. Instructions on what to look for and how to correct undesired conditions are included.

The "Spin-A-Prop" sells for $22.50, and can be ordered from The Pipeline, P.O. Box 1868, Fremont, CA 94538. Tell Judy that **MB** sent you.

* * *

It won't do a decent four-point roll, or give you that extra thousand rpm you need to win the next race, but maybe it will reduce the complaints about how much time you spend in the workshop, and it most definitely will help to satisfy the craftsman in you.

What will? A Westwood Clock kit, that's what! And they are available in many types and sizes, from over-six-foot-high Grandfather clocks, to wall-mounted models and those designed for tabletop or mantel. All the clock case kits are made of precut fine woods, such as oak, birch, or cherry, and the pieces include miters, tongue and groove, rabbets, and mortises . . . all done for you by experienced and skilled woodworkers. You need only to assemble, finish (using either your choice of materials or a finishing kit available from Westwood), and install the movement of your choice.

The smaller clocks are complete kits, consisting of case and movement components, but to allow you complete flexibility in your choice of styles, the Grandfather sizes are all sold as separate parts. Thus, you can pick the exact case that you like, match a face and movement of your choice, and even customize it further with your favorite pendulum.

Kits start as low as $160 for a Grandfather clock case, and $130 for the movement. They can also be ordered already assembled, for over three times the cost of the kits. The smaller clocks are as little as $129.95 for a wall-mounted School Clock with an 11-inch dial that strikes the hour and half-hour.

Get a catalog! They are FREE, and interesting. Write Westwood Clocks 'N Kits, 3210 Airport Way, Long Beach, CA 90806.

R/C World . . . *Continued from page 15*

pointed by the R/C Contest Board Chairman, replacing the previous committee.

Chaired and assembled by Horace Hagen, the new committee, at this time, consists of the following members:

Hubert Bitner
7101 Shady Vale
Houston, TX 77040

Don Chapman
355 Geneva Ave.
Tallmadge, OH 44279

Horace Hagen (Chmn.)
15 Parkway Place
Red Bank, NJ 07701

Grady Howard
Route 10, Box 769
Salisbury, NC 28144

Ernie Huber
31 Locust St.
Danvers, MA 01923

Larry Jolly
5501 W. Como Ave.
Santa Ana, CA 92703

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R/C systems and engines, old-timers, scale, gliders R/C Country, 610 E Alosta, Glendora, CA 91740 (213) 963-7310

OLD-TIMER REPLICAS: Bombshell, Clipper, Ranger, Buccaneer, New Ruler, Playboy, Mercury, others Catalog 25¢ Micro Models, Box 1273B, Covina, CA 91722

WANTED, any pre-war gas powered race cars Send price with first letter Tony Silva, 12 Red Maple Rd., Coventry, RI 02816

FREE 1st ISSUE: "The Modelers Swap Sheet" This bi-weekly publication will enable modelers of all kinds to sell whatever they have no more use for, and others to buy similar merchandise Free advertisement with subscription. Rates: 4 issues - $1.00, 13 issues - $4.00, 26 issues - $6.00 Ads - 10¢ per word to subscribers only Write for free issue and more information. M.S.S., 20 Sylvan Road, Clifton, NJ 07012.

OLD-TIME AIRPLANE KIT COLLECTORS interested in starting a national directory, send — S.A.S.E., 25¢, and description of collection First list out in 30 days Ira Keeler, 572 Deodara St., Vacaville, CA 95688.

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F1A, F1B, F1C, Coupe, Unlimited, Old-Timers, Indoors, Peanuts, best FAI rubber accessories. Send 25¢ or S.A.S.E. for catalog Che Hobbies F/F Specialists, 10900 Eastwood Ave., Inglewood, CA 90304

WANTED: Old-Time spark-ignition model airplane motors, magazines and gas powered race cars of the 1930's and 1940's Russell Stokes, Rt 1, Box 73J, Keller, TX 76248

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MODEL BUILDER, 621 West Nineteenth St., Costa Mesa, Ca. 92627

Jacksonville, FL 32211

The new advisory group will act in the same capacity as the former committee, serving as an advisory group to the R/C Contest Board. In addition, the committee has announced its willingness to assist in the forming of a new national association of R/C helicopter fliers, replacing the dissolved NRCHA, if enough interest is shown. Anyone wishing to further this possibility should contact his or her nearest representative on the committee. ●

Workbench . . . *Continued from page 6*

time you read this, the contest will be over, and we hope Bob is among the winners. We also hope he is able to find time to record all the action, so we will have a first-hand report for our readers.

Bob's last few weeks before going

ADVERTISERS INDEX

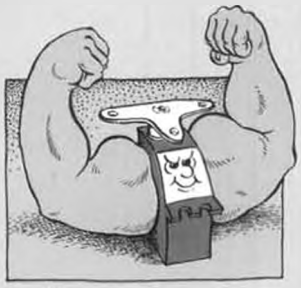
MODEL BUILDER

have been frenzied by the usual competition modeler's last-minute frustrations. His Hiperbipe has been finished and test flown. Bob says it is extremely comfortable to fly. However, the final finishing turned out to be a nightmare of incapatability. It takes a lot of intestinal fortitude (spelled G U T S) to clean off a bad finish all the way down to the covering and start all over again. That's what Bob had to do . . . and that's why there's no column.

Any questions. . .?

VOSA vs. DeANGELIS

In the August issue, we published a photo of some 1938 modelers and their bus, in John Pond's "Plug Sparks". However, we messed up on some identification. The fellow holding the tip of the pennant was Steve Vosa. Mickey DeAngelis, designer of the still popular "Trenton Terror", is standing in the doorway.●



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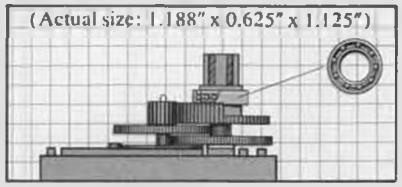
Precision cut, metal transport gears.

So all of that power doesn't go to waste, metal gears efficiently deliver every gram of torque. And an output shaft ball bearing keeps your servo action smooth, effortless and precise; matched with the quickest transit time of any servo in its class... a rapid .5 of a second.



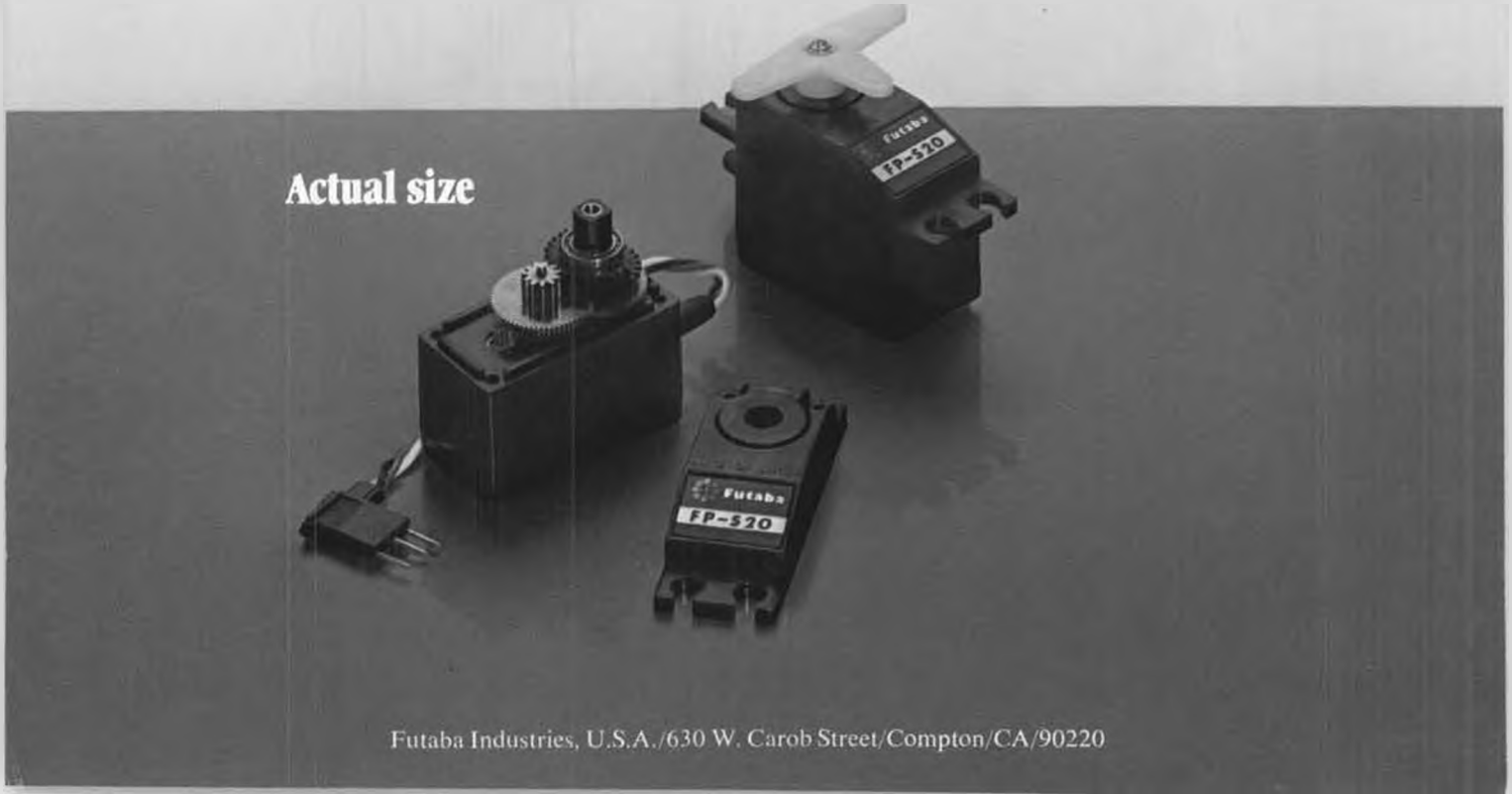
Completely compatible.

Like all of our fine servos, the S20's electronics and mini, three-pin connectors are compatible with every system we make, from the FP-2GA to the Contest 7.

Value. The S20 is very big in performance, but we've kept it small in price. $39.95. Because with Futaba less is definitely more.

Futaba

The Futaba S20. We put a lot of servo into our little servo.



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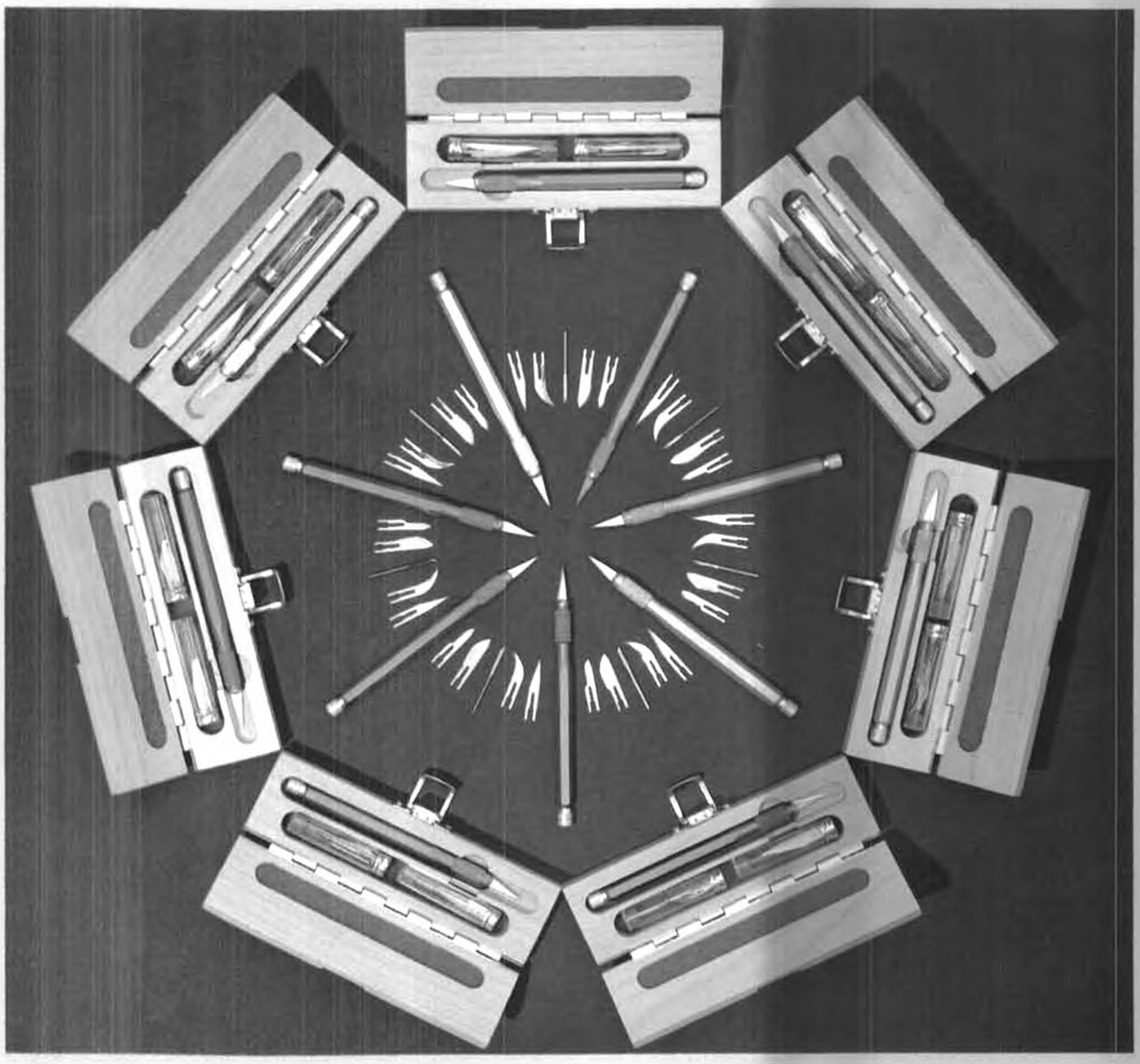

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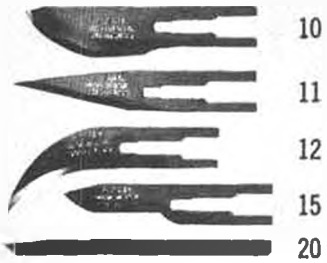

Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, violet. Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $14.95
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