MODEL BUILDER

volume 8, number 82 $2.00 NOVEMBER 1978

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THE COBRA JET SPEED BOAT
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Turbo-Trol jet drive, which comes installed in each boat, means there's no prop or rudder to damage . . . you get increased maneuverability, and can run in reverse.

THE PRICE IS RIGHT . . . and when you consider you've nothing to buy, most everything is not only included in the box, but installed, you'll find each an exceptional value. MRC's ready-to-float yacht or racer . . . for immediate enjoyment just add water.

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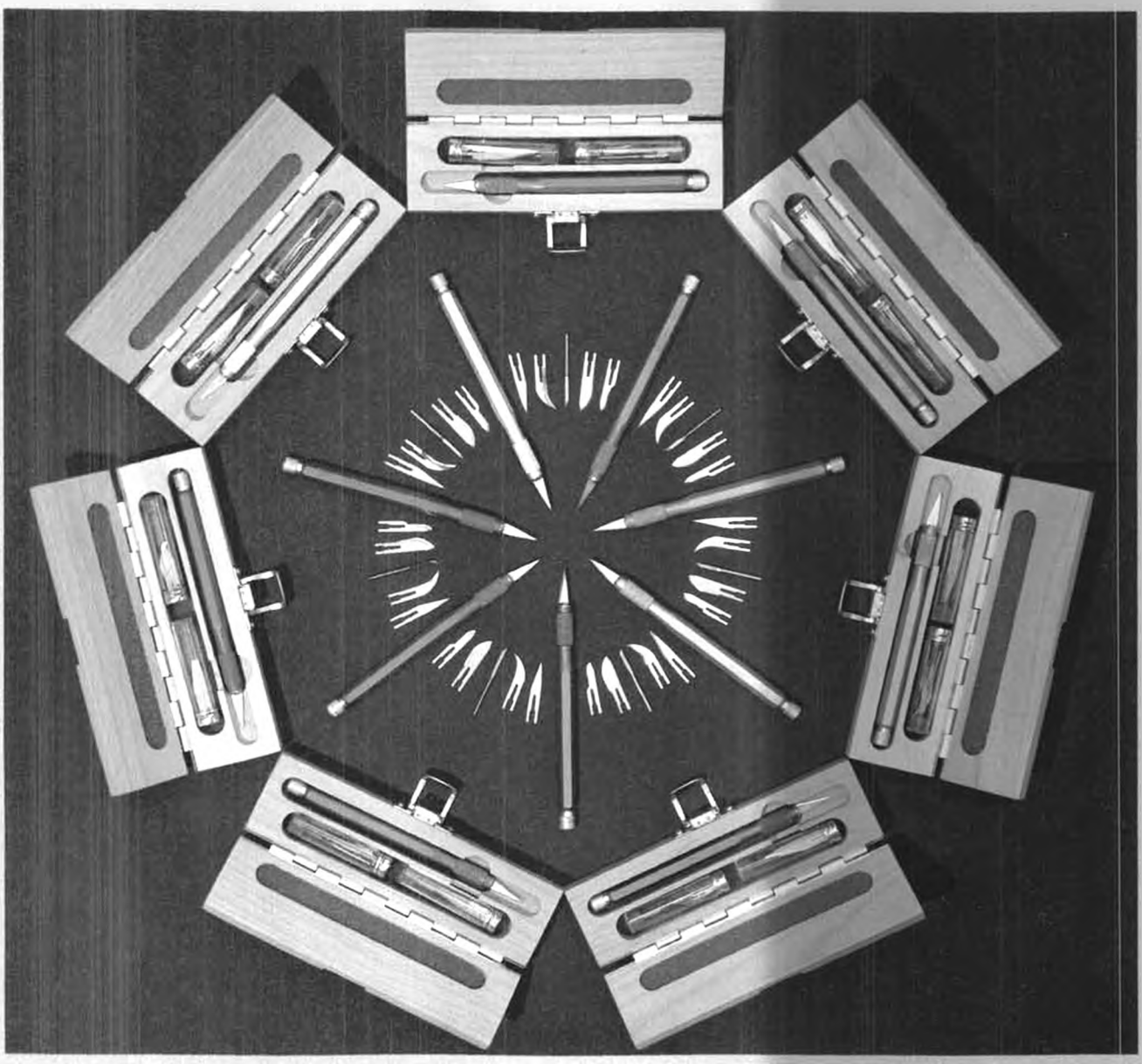

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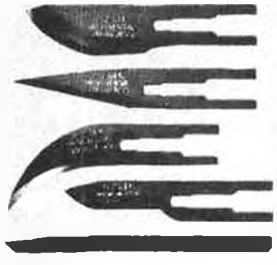

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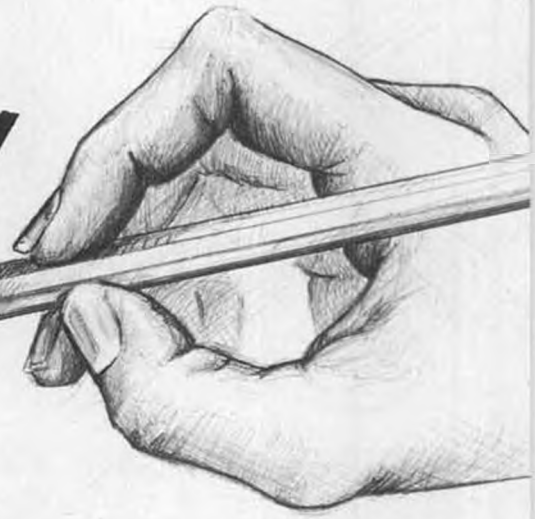
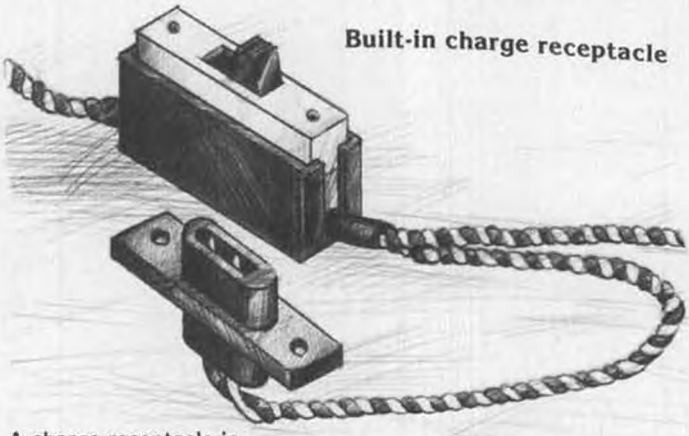


If you are considering the purchase of a Kraft radio control system, you may be impressed with our obvious quality and superior performance. However, you may not be aware of the many little features of our systems that make a big difference in their utility, convenience, and accuracy.

Crimped wire connectors

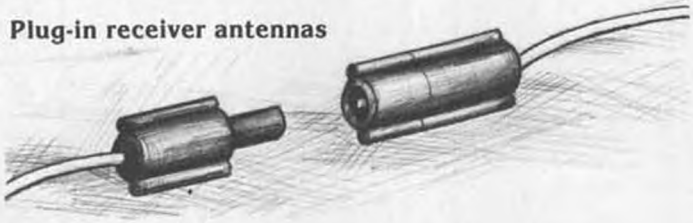
For example, we manufacture our own connectors which feature gold-plated beryllium copper pins and sockets for long life and corrosion and vibration resistance. Wires are crimp connected rather than soldered to minimize wire lead breakage.

Built-in charge receptacle



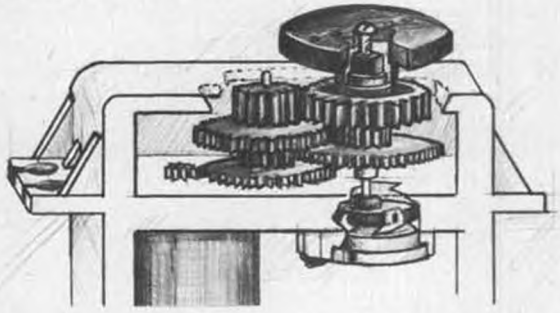
A charge receptacle is wired into our switch harness so that you may charge your model without the inconvenience of disassembly. Other systems require that the battery pack must be disconnected from the receiver and be connected directly to the charger.

Plug-in receiver antennas



A plug-in receiver antenna is standard with all receivers. This means that you may mount the antenna permanently in your model. Extra antennas are available in standard and special RF loaded short lengths. The short antennas are especially convenient for small aircraft, cars, and boats.

Direct drive servo mechanics



Our servos are molded of long wearing rugged nylon rather than the cheaper short life materials used in competitive servos. For accuracy, our servos have their reference potentiometers actuated directly from the output drive rather than indirectly through a gear which, because of gear teeth backlash, adds to centering error.

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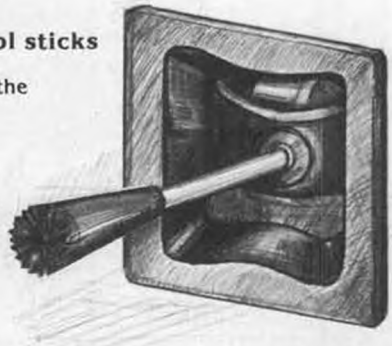
Servos are supplied with four or more channel sets, two rotating clockwise and two counterclockwise. This feature greatly simplifies the radio control installation.

Open gimbal control sticks

Our control sticks are the open gimbal type for better feel and accuracy. Their design eliminates any possiblity of centering error and is self compensating for wear.



These are but a few of the fine points which when added together make our radio control equipment the world's finest. Write for our free catalog and get the complete story.

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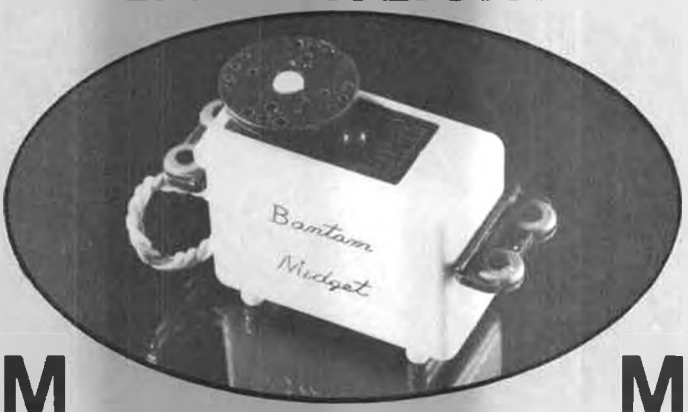
POWER



SPEED

BANTAM MIDGET

BY NOVAK ELECTRONICS

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

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

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DEALER INQUIRIES PROMPTLY ANSWERED

SPECIFICATIONS FOR BANTAM MIDGET

TORQUE: . . . . . 21 oz. in.
TRANSIT TIME: . . 0.3 seconds/100 degrees
SIZE (inches): . . . . . 1.125H x 0.6W x 1.43L
WEIGHT: . . . . . 24 grams, or .846 ounces
OUTPUTS: Rotary wheel, arm, adjustable arm. Compatible with ALL 3-wire digital radio systems, except Pro Line.

BANTAM MIDGET, Assembled	$29.95
Battery, 100 MAH, Square (35 gms, 1.2 oz.) . .	$15.95
Battery, 250 MAH, Square (60 gms, 2.1 oz.) . .	15.95
Battery, 450 MAH, Square, (100 gms, 3.5 oz.) .	15.95
Battery, 450 MAH, Flat, (100 gms, 3.5 oz.) . . .	15.95
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BANTAM MIDGET

Torque: 2* oz. in. Transit Time: 0.3 seconds/1.30 deg. Size (inches) 1.125 H x 0.6W x 1.43L Weight 24 grams or .846 ounces

Outputs: Rotary wheel, arm, adjustable arm. Compatible with ALL digital radio systems, except Pro Line. Specify radio **$29.95**

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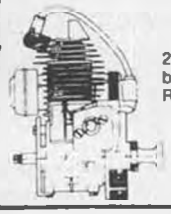

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R/C Pattern World Championships.
Peanut Fokker D VI.
LSF Tournament story.
Bi-Prentice, R/C bipe trainer.

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

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January 1972

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

Vol. 2, No. 4 $1.00

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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.
Spoiler, FAI Combat.

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

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Seahorse II, R/C seaplane. For .19-.35.
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Peanut Fokker V-23.
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Ryan ST 3-views.
Tethered Cars, R/C sail.

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

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

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August 1972

Bonzo stand[illegible] R/C sport pv[illegible] scale.
Counterf[illegible] ailless A/1 [illegible]ic.
Shoes[illegible] R/C QM.
Pear[illegible] aylorcraft on [illegible]ts, also big one.
Fairey Delta 3-views.

SOLD OUT

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Profile F4U Corsair C/L stunt, .40 power.
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Fabulous PEA POD, R/C sailboat.
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Finish painting of rubber scale models.

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Slope soaring technique.
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MODEL BUILDER

NOVEMBER

1978

volume 8, number 82

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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).

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

COVER: Modelers who competed in R/C Pattern or Scale at the 1978 Lake Charles Nationals will recognize the name on this month's cover credit. It's USPJA judge Bill Seidler, Hollywood, Florida, who was one of the Site Directors. His Travel Air D4D on the cover comes from a long association with the full size aircraft, including the ship in which he earned his pilot's license, back in 1937. Final finish is red Hobbypoxy over well-cured nitrate dope. Construction article begins on page 16.

from Bill Northrop's workbench . . .

Another photo out of the old scrapbook. MB's editor checks out his deBolt P-39 "Cobra" before taking off from the former Delaware R/C Club flying field, now a housing development. The radio was an Orbit, built under license in Canada. Engine was a Super Tigre .46 R/C. Photo taken around the fall of 1968.

• We're glad to see that interest is growing in the Indoor R/C Record Trials, which will be a star attraction of the 1979 International Modeler Show, scheduled for January 6 and 7, at the Pasadena Center, Pasadena, California.

Incidentally, those spectators and exhibitors who plan to attend the show, sure had an opportunity to "case the joint" by national TV on Sunday, September 17, 1978, when the Emmy Awards Show was held and broadcast from the center. You'll probably also get an aerial view of Pasadena on New Years Day in connection with the famous and colorful Rose Parade and Rose Bowl football game.

The tentative rules for the trials, as published in the *R/C World* column of the September, 1978 issue of **Model Builder**, still stand, with just one additional specification and one clarification. The use of one-shot, non-rechargeable batteries, such as silver chloride, lithium chloride, and lithium air cells will *not* be allowed. Standard or alkaline dry cells, and of course, nickel-cadmiums, are OK. Power for the lighter-than-air category may be CO_2, rubber, or electric, but no internal combustion engines. Helium, of course, is the only LTA gas that may be used.

We have talked to several modelers who intend to enter the trials, and their various approches to the problem remind you of the planning that went into the designs built to capture the well-published man-powered aircraft prize. Rather than disclose any of the ideas being worked on, we'll only indicate that most are going for large models of about 3 sq. ft. wing area (the maximum wing loading allowed is 4 oz./sq. ft.) and large, geared, electric-powered props. Mitch Poling talks a little bit about LTA design parameters in his *Electric Power* column next month.

Pre-registration in the trials is required so we can schedule flying time. Write to **Model Builder** (Record Trials), 621 West 19th, Costa Mesa, CA 92627 for a copy of the rules and registration form. Entry is FREE!

WRAMS AIR PARK

It's always encouraging to read about another successful acquisition of a flying field. This time it's the WRAMS Club, hosts of the White Plains, New York Consumer Trade Show.

"Westchester Radio Aero/Modelers Inc. (WRAMs), sponsors of the annual Eastern States R/C Jamboree, officially opened its new 80-acre flying site in Patterson, New York on July 15. Rented or leased fields had been used for many years by the 60-member club.

"Town officials and residents were invited for a ribbon-cutting ceremony which was followed by a large static display of models and by flying demonstrations.

"The field is set in gently rolling hills and features a 225 x 400-foot grass runway on high ground." "It's the kind of beautiful spot you'd like to go to even if you're still building after pranging your last airplane," said Club President Joe Wimbrow.

"The parking area has space for

Continued on page 144

OVER THE COUNTER

• ACE R/C has just announced a new addition to its family of servos in the popular Digital Commander line of R/C kits. It is the Bantam Midget, the little brother of the well-known and respected Bantam servo. Though smaller in size, the Bantam Midget boasts the same torque and gear strength as the larger Bantam, at a lesser weight and faster speed.

The size of the Midget is 1.125 high x 1.43 long x .6 inches wide, and the weight is .85 ounces. The thrust is rated at 20 in.-ozs., and the time for 90 degrees movement is under .5 second.

The amplifier uses the proven Signetics 544 Integrated Circuit, with external driver transistors. A conductive plastic pot element and other high-quality components add up to "competition quality" at a economical price.

The Bantam Midget will work with any modern positive pulse R/C system, and is furnished without connectors so it can be matched to your system. A wheel, arm, and adjustable arm are furnished.

The Ace Flite Packs and complete systems are also now available with the Bantam Midget. Details can be obtained upon request.

The Midget is priced at $28.95 assembled and tested; $23.95 in kit form. For owners of Pro-Line and other negative pulse systems, a pulse inverter can be purchased; No. 14G18, at $2 each. One for each servo is required.

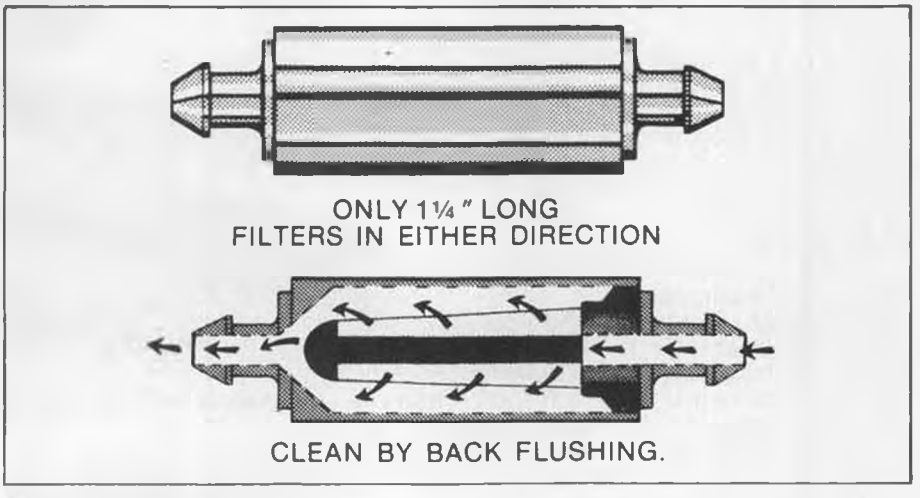
Ace R/C has just introduced another handy item . . . a charger that can be used for properly charging battery packs of from 100 to 500 mils. It includes a wall-type transformer and all necessary components, including an assortment of resistors from which you can pick the proper one to adjust the rate as desired. Receiver or transmitter packs can be charged. No conector is furnished, so that the proper one required for your equipment can be installed.

The new "Uni-Charger" is priced at $4.98, and along with the Bantam Midget and thousands of other items for the R/C'er, can be obtained from many dealers here and overseas, or directly from Ace R/C, Inc., Box 511, Higginsville, MO 64037.

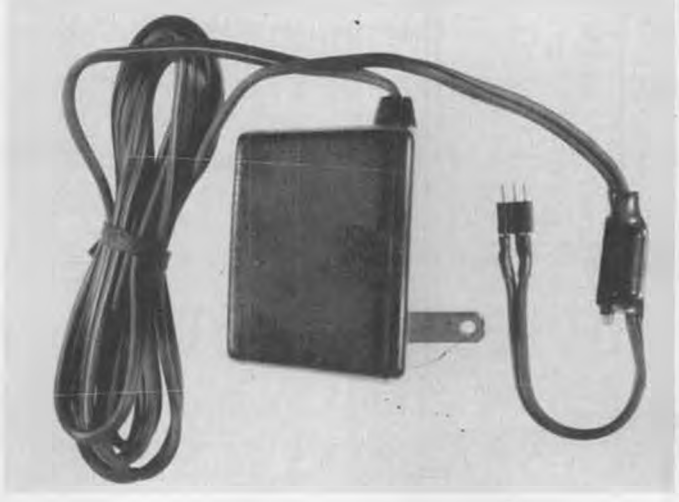
* * *

The most obvious thing at any R/C boat race is that K&B engines are always behind!

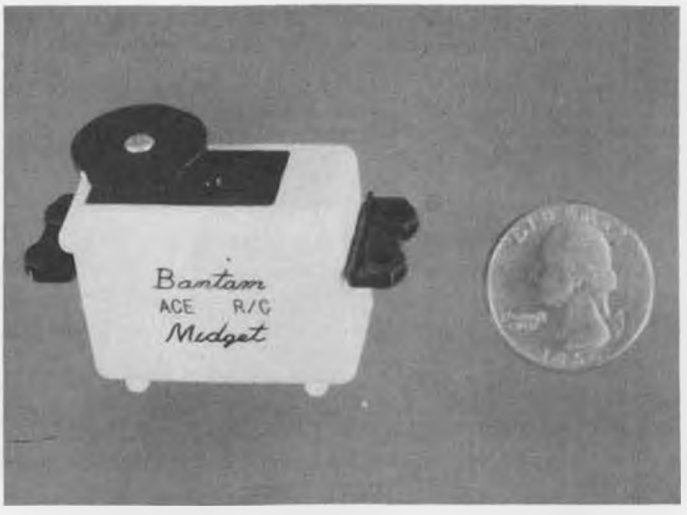
Behind on the boat, that is . . . which in most cases is the one that is leading the pack; K&B marine engines have proven themselves in R/C boat racing as beng extremely powerful and reliable.



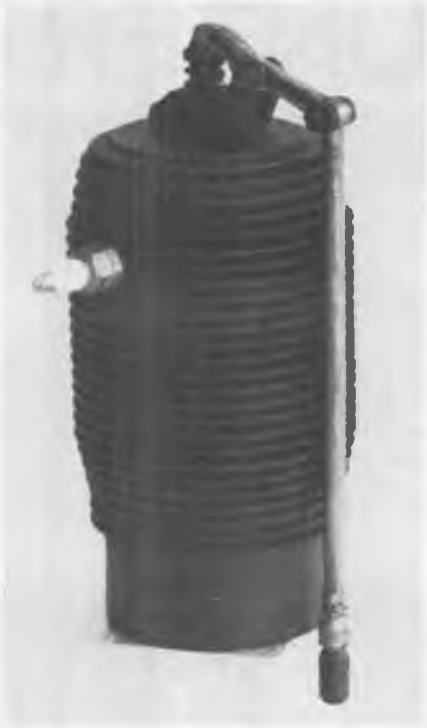
"Final Filter", by Du-Bro.



"Uni-Charger", wall-type battery charger, from Ace R/C, Inc.

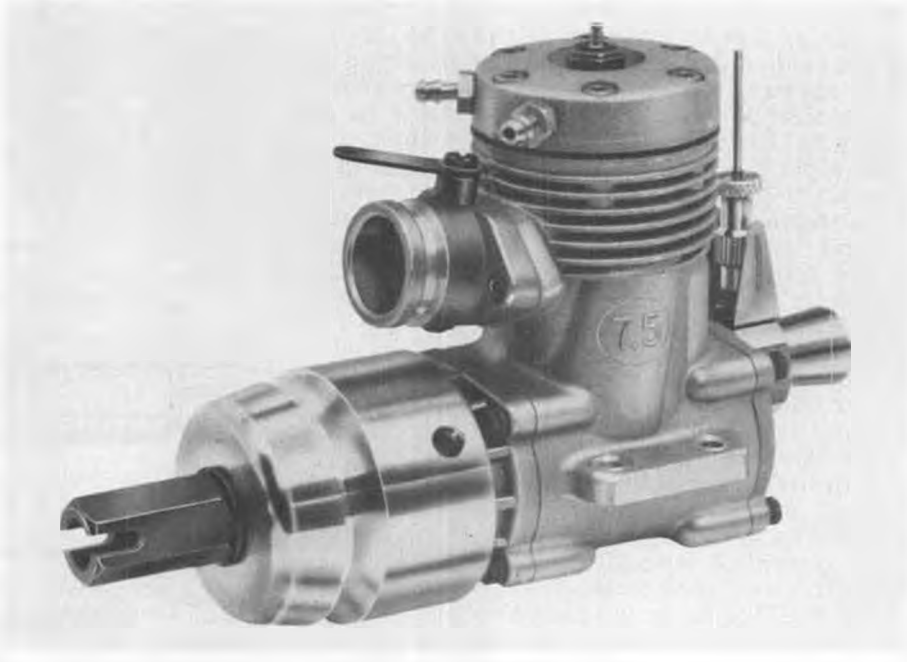


Impressive new "Bantam Midget" servo, from Ace.



Quarter-scale Gnome rotary engine dummy cylinder, from Williams Bros.

Tuned pipes and adapters for the HB .40, .50, and .61, from Bavarian Precision Products.



K&B's soon-to-be-released 7.5 cc (.45) Inboard Marine racing engine.

And there is a variety from which to choose; from the 3.5 cc (.21) Inboard and the only-one-in-its-class 3.5 cc Outboard, to the .40 R/C Marine Sport engine.

Soon to be released will be a 7.5 cc (.45) Inboard Marine racing engine, designed with all the well-known and proven K&B features, and the maximum displacement allowable under NAMBA and IMPBA rules.

All K&B inboard engines come completely equipped with water-cooled heads, flywheels, and couplings. The 3.5 cc Outboard, being unique, is 100% complete, requiring only that it be bolted to the transom, and the steering, throttle, and fuel connections be made.

Complete instructions are included with each engine, and parts are always readily available. Look for the .21's and the .40 at your local boat shop. The .45? Well, it is on the way . . . we suggest you hurry down and get your name on the list.

Further info from Ellie Tom's pit crewman, Bobby Tom, at K&B Manufacturing, 12152 Woodruff Ave., Downey, CA 90241.

* * *

More and more Mammoth Scale airplanes, and more and more accessories for them are showing up every day. I wonder if Eddie Morgan really intended them to get that big?

So much for a bad pun . . . let's get

New engine mounts from C.B. Associates are the C.B. .90, for monster engines, and a long and short 1/2A mount.

Pressure-sensitive letters and numbers, in different sizes and colors, are now available from Applied Design Corp.

to the important things, such as Mammoth Scale accessories. Being right in the thick of things with its wheels and pilot (**MB**, October '78), Williams Bros., Inc. has added yet one more interesting item. It is a 1/4-scale Gnome rotary engine cylinder, which will greatly ease the task of making dummy scale engines for pioneer and WW-I models, while providing more detail than most of us will spend the time to produce. The cylinder is molded of high-impact styrene, and has spark plug and exhaust valve detail built in.

Only $1.95 each, from the many dealers who sell the many fine products produced by Williams Bros., Inc., 181 Pawnee St., San Marcos, CA 92069.

* * *

Bavarian Precision Products, the US distributor of the German-made HB engines, has just announced the availability of HB-designed and manufactured tuned pipes and adapters for its .40, .50, and .61-size engines.

The pipes and adapters are finished in a distinctive black finish that is claimed to dissipate exhaust heat more effectively than conventionally finished pipes. All necessary hardware and silicone tubing are included, as are instructions for installation.

Though designed specifically for maximum performance of the HB engines, these pipes and adapters can also be used with engines of similar displacement and porting, and should give a significant increase in power and performance.

For additional information, write Bavarian Precision Products Co., P.O. Box 6, New Canaan, CT 06840.

* * *

If you are not filtering your fuel, ask yourself why not. After all, you paid plenty for the close-fitting engine, and certainly shouldn't be happy about its grinding itself away. We are sure that the fuel brewers take many pains to keep abrasive pollution out of their products, but junk can still get into the fuel and to the engine in many ways.

So be safe . . . use a filter. And take a look at the "Final Filter" from Du-Bro Products. It can be used either between the fuel can and the tank, or between the latter and the engine, and is claimed to have twice the fuel filtering capacity of most other filters. The large filter area, using a 130-micron polyester screen, does not restrict flow, though it is capable of filtering out the smallest particles.

The outer case is aluminum, for durability and lightness. Cleaning can be accomplished by back flushing, and it can be installed in either direction.

Only $1.75, from Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084, and its many dealers.

* * *

C.B. Associates, the manufacturers of those nice cast-aluminum engine mounts has added to the line . . . at both ends.

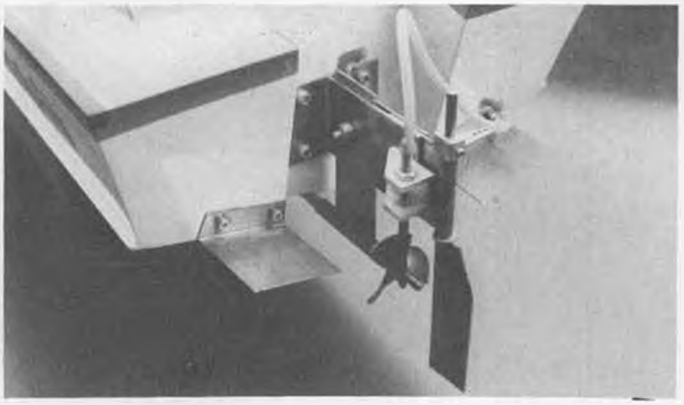
At one end, there is a new CB .90, for the Webra .91, O.S. .90, and other large engines. It looks much like all the others, except, of course, that it is larger, having a 1-3/4 inch spacing between the 3-1/16 inch long beams, as measured from the firewall. The back is drilled for five No. 8 machine screws, three on top and two on the bottom.

At the other end are two 1/2A mounts, pre-drilled for the Cox .049/.051 engines. One is a short

Stand-Off Scale Hawker Hurricane, manufactured in England, is now available in the U.S.

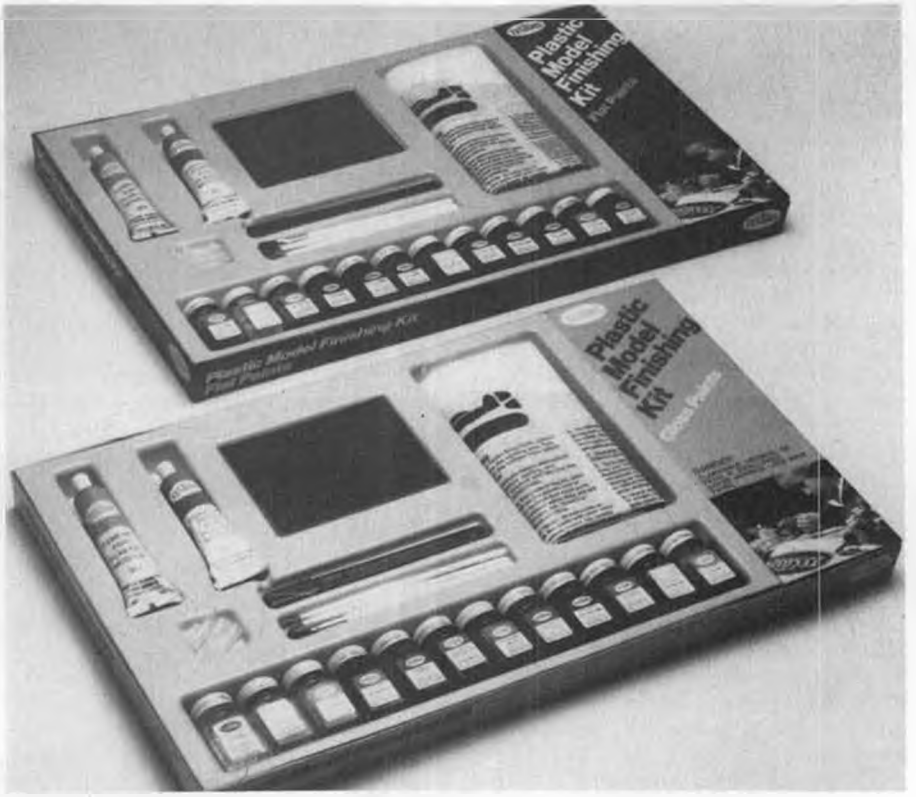
The T2-40, a .40-powered version of the T2-A pattern ship, by Bob Smith R/C Aircraft.

From Steve Muck's R/C Boats, the "Mighty Dolphin" deep-vee.



Stern drive hardware for the "Mighty Dolphin", from Steve Muck.

Galax IV Planetary Surface Explorer, now available from Testors.



New finishing kits for plastic models, by Testors.

mount, with the rear engine mounting screw at a distance of 7/16 of an inch from the firewall. The longer mount has the rear screw at 1-3/32 of an inch from the firewall. Both mounts are drilled to accept No. 2 sheet metal screws, which are furnished.

The .90 mount is $9.95; the 1/2A mounts are $2.45 for the short and $2.55 for the long model.

C.B. Associates' Bob Seigelkoff has informed us that a new Quadra mount will be available soon. We will have further news for you about it as soon as it is released.

Look for these and all previous models of the CB mounts at the nearest hobby shop, or inquire from CB Associates, Inc., 21658 Cloud Way, Hayward, CA 94545.

* * *

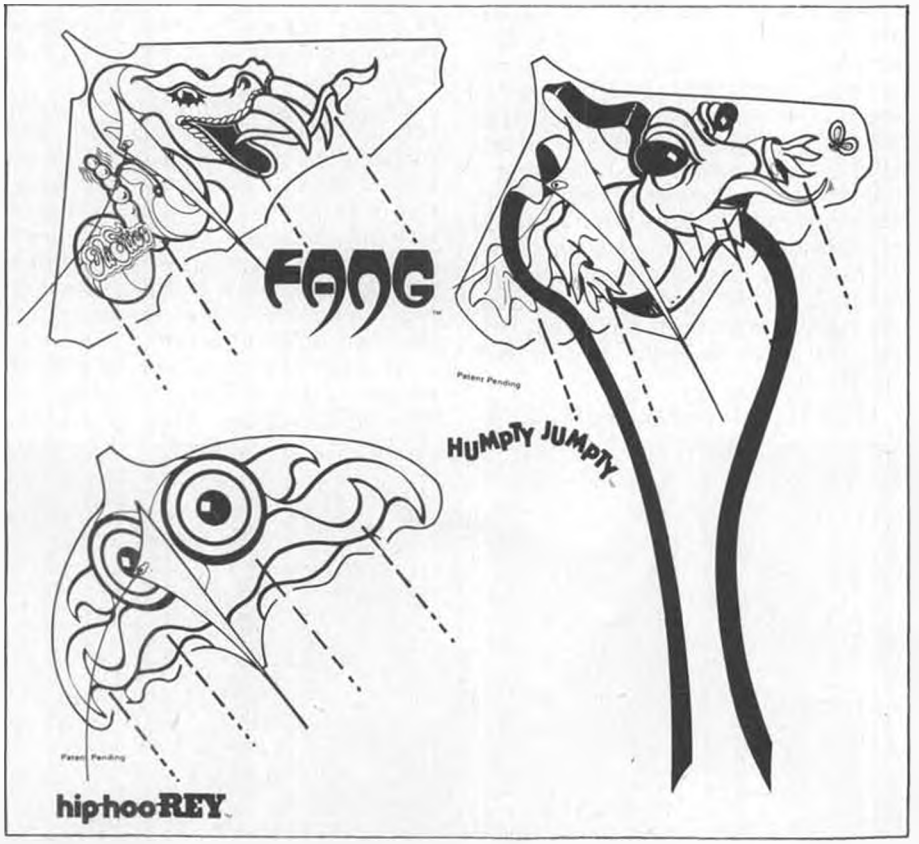
A 1/6-scale kit for the well-known World War II Hawker Hurricane fighter, manufactured by Mick Reeves Models, in England, is now available in the US from Ponchartrain Distributors, Inc., 901 Veterans Blvd., Metaire, LA 70005. At this scale, it comes out to 80 inches in wingspan, and a finished weight of 10-1/2 pounds. It is claimed to be an excellent performer with a good .60 in the nose.

It is designed for Stand-Off Scale, though it would be a serious contender in Precision Scale, requiring only the additional detail necessary for that class, and a slightly smaller horizontal tail.

The wing is foam, pre-covered with hardwood veneer, requiring only joining and the cutting out of the ailerons and flaps, if used. The fuselage is built up of die-cut plywood, shaped balsa parts, and stringers. All parts are mounted in the proper sequence that they will be used during construction.

The kit also includes a complete set of hardware, metal engine mount, fuel tank, and molded parts for the cowl, spinner, tank hatch, canopy, radiator, wing fillets, landing lights, and pilot. RAF-style decals are included and a copy of a booklet entitled "Camouflage and Markings" will help you select and properly apply a paint scheme. A detailed construction manual is also included.

The "Hurricane" is available at



New kites from the Hi-Flier Manufacturing Co. are the "Fang", "Humpty Jumpty", and the "hip-hoo-REY".

Continued on page 140

R/C WORLD

Ground level photo of Col. Art Johnson's impressive North American F-82-G, dubbed "Twin Mustang". Currently uses engines out of his sensational P-38L, which was a construction feature in June, 1978 Model Builder. More info in "R/C World" column photo caption.

As featured in John Pond's October "Plug Sparks", here's the 12-foot span, Quadra powered F7B-3M Fokker Trimotor "Southern Cross" over Port Phillip Bay, Australia, duplicating a portion of Kingsford Smith's and Charles Ulm's 1928 trans-Pacific flight.

R/C WORLD

By BILL NORTHROP

• "Young Jim Jones chose the Buzzard's Contest for the maiden flight of his Sport Scale P-51. Take-offs proved to be a bit of a problem. First flight started with a three-foot roll, then plop . . . on the nose. Second attempt, a little further . . . plop. Third attempt, it made a bee-line for the north flight line. They yelled, 'Take it further over next time!' Fourth attempt, straight bee-line for the judges again . . . this time chewing on the judges' shoes, and breaking a spinner and nylon prop. Needless to say, that was his last attempt to take-off . . . Tom Jackson did manage to get the bird in the air after the official flying was over!"

The above report was quoted from a recent model airplane club newsletter. Only the names were changed to protect the . . . well, that's the point where the popular movie cliche stops . . . only "Tom Jackson" was *innocent!* "Jim Jones", the "Buzzards" club, and particularly the club's contest director, were nothing but guilty with regard to AMA's Official Safety Code.

General AMA Safety Rule No. 1 states, "I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested." "Jim Jones" used the contest for his P-51's first flight (correction . . . attempted flight), and the CD allowed it.

Secondly, Safety Rule No. 2 under the heading of "Radio Control" states, "I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper." We don't know if "Jim Jones" was a qualified flier at the time, but from the description of his takeoff attempts, and the fact that "Tom Jackson" got the plane off the ground later, we'd suspect he wasn't. Again, the CD allowed it.

Of course, good ole AMA has to take some blame too. What is the measure of "Airworthiness" specified, and what constitutes a "Qualified Flyer", as mentioned in the safety rules?

In an attempt to give these rules a measuring stick, we have officially proposed that all R/C contestants should sign a Flight Safety Declaration at each contest entered, attesting to the fact that both they and any and all aircraft they will use at the contest, are qualified to perform at least as well as specified by the Official AMA Safety Code for Radio Control.

Specifically, the flier must declare

Crew of the Southern Cross flight (l to r): Geoff Tuck, pilot of 9' back-up Fokker; Kieth Hearn, pilot of 12' model on commemorative flight; Bruce Hearn, Cessna 172 photo plane pilot; Doug Anderson, Fokker co-builder; and kneeling, Kieth Hearn's son, Bruce, mechanic.

Seen at many exhibitions in Germany, this electric powered zeppelin by M. Busemeyer was star attraction at the annual Harsewinkel Flying Circus. All Circus photos by Flug Modell-Technik's editor Michal Sip.

Super Constellation is assisted to take-off position in Harsewinkel. No report on how well it flew.

The inevitable styrofoam saucer. Not for thermalling!

Easy winner of most original design was this sulky racer by H. Wenning. Latest on list of lawn mowers, wheelbarrows, and assorted out-houses!

Close-up of Mammoth Scale Bleriot seen at Harsewinkel. Quadra-type engine appears to use magneto ignition.

Fritz Bosch, of Microprop radios, checks trim on speed model as son, Mike, holds on for dear life!

The big Bleriot taxies back after flight. Model could be slowed to normal walking pace while in flight.

Oh no! Not clear here, but that's a ladder he's on.

that he or she has previously and is now capable of at least confidently performing a takeoff, a figure eight as described in Precision Scale, and a realistic landing within a designated landing area. Also, the contestant shall declare that the model(s) used in said competition has been test flown at least to the extent that it has performed the above maneuvers (substitute a towed or hand launch for R/C sailplanes).

It may seem unnecessarily repetitious for a modeler to sign more than one declaration, but the effort is small compared to the possibility of human injury and loss of flying sites. Disqualifying a contestant *after* a serious accident, resulting from an untrimmed model or lack of flying ability is pointless.

By the way, it should be noted that rules are made for basically honest people. Those who know they don't qualify will be reluctant to sign a declaration. Dishonest people pay no attention to sporting rules, and their problem must be dealt with in an entirely different manner.

* * *

While we're on the subject of safety, are you aware of the rule in Precision Scale (46.2.8) that actually allows a stand-by pilot, holding an auxiliary "buddy-box" transmitter, to take over the controls in case the official pilot has trouble while flying? This idiotic rule was supposedly put in for safety. What a joke!

Picture this . . . the "pilot" is nervously jockeying his overweight, underpowered, tail-heavy WW-II

Britten-Norman Islander in foreground is almost dwarfed by Hermann Sakbrook's 11 ft. span J-3 Cub.

Col. Art Johnson compares notes with Pete Sherman on their P-38L's. Big one was not as scale because of T-33 nose! Unfortunately, both Pete and the P-38 were later lost in a crash enroute to Oshkosh. Art's model was construction feature in June, 1978 MB.

"Jugularknot III" fighter over the transmitter for the figure eight (that's right, the ancient scale rules still call for the maneuver to begin and end over the transmitter instead of over the center of the runway!). It's a big contest, so our experienced "buddy-box" pilot doesn't want to take over and cost his friend a flight (it's cancelled if he takes over). Therefore, even though the "Jugularknot" is struggling along about 100 feet up and is drifting precariously over the spectators, he stays off the sticks. Suddenly the inevitable happens . . . the stall, the snap, and the spin, all in a fraction of a second . . . and the only thing "Joe Expert" can do is wish he had taken over sooner.

In brief, this rule is in direct contradiction to the safety rules, as well as plain common sense, and must be removed and used where it does the most good . . . at the home field during an off period, where the only thing at stake is the hours of work and the cost of materials in the airplane itself. A crowded field with loads of spectators is no place to play "Russian Roulette" with an untested airplane and/or pilot. If a modeler is not confidently capable of flying his own model without a back-up pilot, he has no business flying in the presence of spectators, let alone a whole bunch of fellow modelers

Continued on page 141

Another view of Col. Art Johnson's F-82-G (see inside cover, page 11) gives an idea of its size. No trim change for single engine flight. Plane just slows up.

TRAVEL AIR D4D

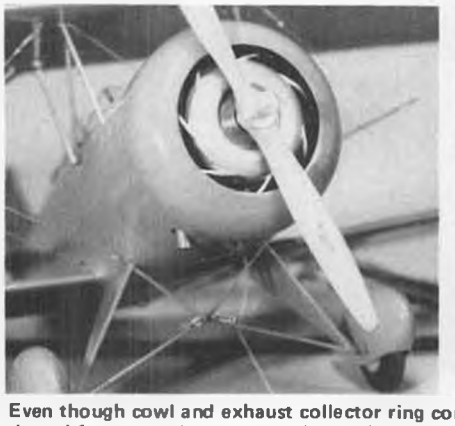
By BILL SEIDLER . . . One of the sexiest looking biplanes out of the Golden Era, and a natural for modeling. The author is quite familiar with the design . . . he restores the full-size machines!!

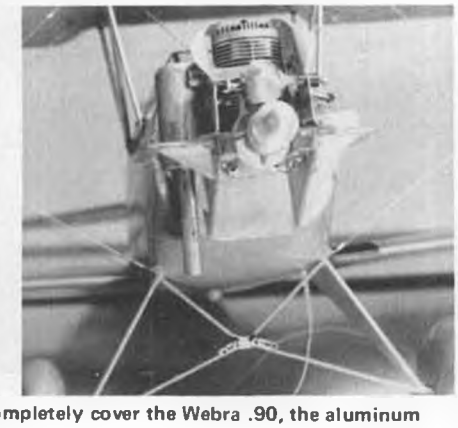
• "Travel Air" is a name that means an instant trip back into the past, into a network of wires and cabanes, a wide front cockpit and pilot behind. It was quite conventional, and it met the requirements of the goggled, helmeted pilots of the day who thought fliers had to sit in the open air. The Travel Air Manufacturing Company, of Wichita, Kansas, was incorporated early in 1925, with Walter Beech, Clyde Cessna, and Lloyd Stearman as the principal directors. (Those names may be familiar to you!)

The Travel Air series of biplanes established Wichita as the first main center of aviation in the United States. They were used for mail planes, dusters, and the like. In the movies, as Fokker D-VII's, they were called "Wichita Fokkers". Travel Airs played both sides in war films in the 20's and 30's; they were in "Hell's Angels" and "Dawn Patrol". They were very popular with the early Hollywood set. Both Wallace Beery, aviator/actor, and Robert Montgomery, another MGM actor of great fame, had Travel Air 4D's. It was a very strong and sleek airplane, perhaps one of the main reasons they were so popular. Wiley Post had his first job as an executive pilot for F.C. Hall, the Oklahoma oilman, in a 1928 Travel Air 4000. I haven't adequate words to describe their airplanes and the lasting effect on the pilots who have flown them.

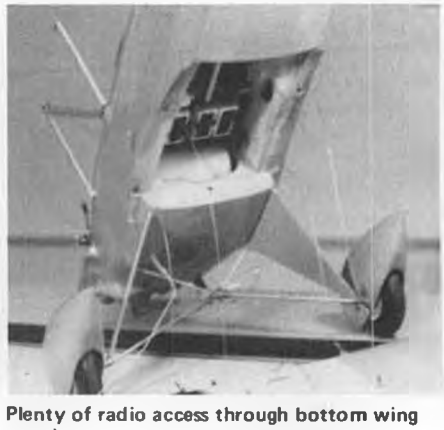
I received my license back in 1937 in a Travel Air B4000, NC174V, with a 220 hp-J5. It belonged to my high school teacher, Mr. Matty Mack, of Haaron High School, in New York. When I saw pictures of Wendell Reid's Travel Air D4D, in an old *Air Progress* (October 1969), the need for me to build a model of it was overwhelming. The easy part of it was data and blueprints, which I have used for the restoration of full-size Travel Airs. All I had to do was scale it down to 2 in./1 ft. Here is some information on Travel Airs that should help a scale builder.

The Travel Air biplane was designed in 1924 by Mr. Lloyd Stearman, and he did such an excellent job of designing that, throughout its life, the basic dimensions of the fuselage were never changed. An outrigger gear was added later to the B4000, BM4000 and D4000. Standard and Speedwing versions, both with Frieze ailerons, and a larger steel tail section for the outrigger gear models, were manufactured. All of these wings and tail sections were interchangeable with all fuselages. The Standard wings, with balanced ailerons ("elephant ears"), installed on the fuselage, have an upper wing span of 34 ft. 8 in., a lower wing span of 28 ft. 10 in., an upper wing chord of 66 in., and a





Even though cowl and exhaust collector ring completely cover the Webra .90, the aluminum shroud forces cooling air around cylinder.



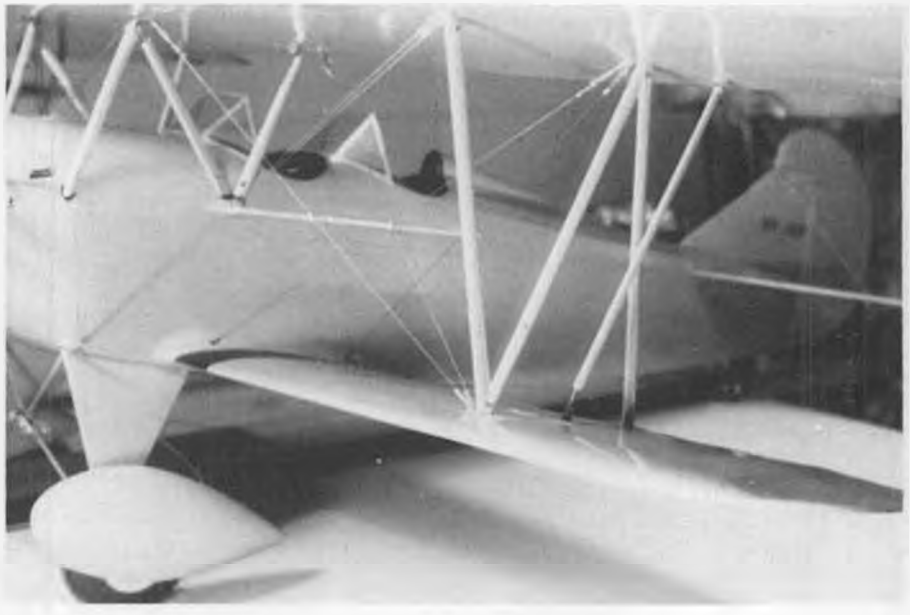
Plenty of radio access through bottom wing opening.

lower wing chord of 56 in. Wings, including ailerons, have 296 sq. ft. of area. The ailerons alone have an area of 27.5 sq. ft.

The Standard wing with Frieze ailerons, when installed on the fuselage, has an upper wing span of 33 ft., a lower wing span of 28 ft. 10 in., an upper chord of 66 in., and a lower wing chord of 56 in. These wings, including ailerons, have 289 sq. ft. of area. The ailerons by themselves have 19.5 sq. ft. of area. The Speedwing wings, with Frieze ailerons, when installed on the fuselage, have an upper wing span of 26 ft., an upper wing chord of 64 in., and a lower wing chord of 53 in. The wings, including ailerons, have 151.7 sq. ft. in the upper wing, 98.4 sq. ft. in the lower wing, and 20.4 sq. ft. in the ailerons. There were nine different wing center section struts and flying wire arrangements. The airfoil of the balanced aileron wing ("elephant ear") is a modified British Fage and Collins airfoil, which was later listed in the FAA records as the Travel Air No. 1 Airfoil. Both of the Standard wings use Travel Air No. 1 airfoils, and have the same dimensions, except for a change in the bow and aileron brackets on the Frieze aileron wing.

Not all of the Speedwings were 4000 series airplanes. The Speedwing is different in several ways. The wings are clipped (as were many Standard models for racing) and have Frieze ailerons. The determining factors between a clipped Travel Air Standard and a genuine Speedwing is that the latter's airfoil is slightly thinner and flat on the bottom, and the chord is narrower. They were small differences, but enough to make the Travel Air Speedwing one of the fastest planes of her day. The Speedwing was designated by the prefix D (such as D4000), and the later deluxe Speedwings were designated D4D. Speed with the reasoning, but beauty was the result. The D4D is one of the raciest-looking biwing machines ever produced. The final production version of the Travel Air 4000 was produced by Curtiss Wright as the D4D.

No Fokker-type "elephant ear" ailerons on this Speedwing version of the Travel Air. Remainder is almost exactly the same.

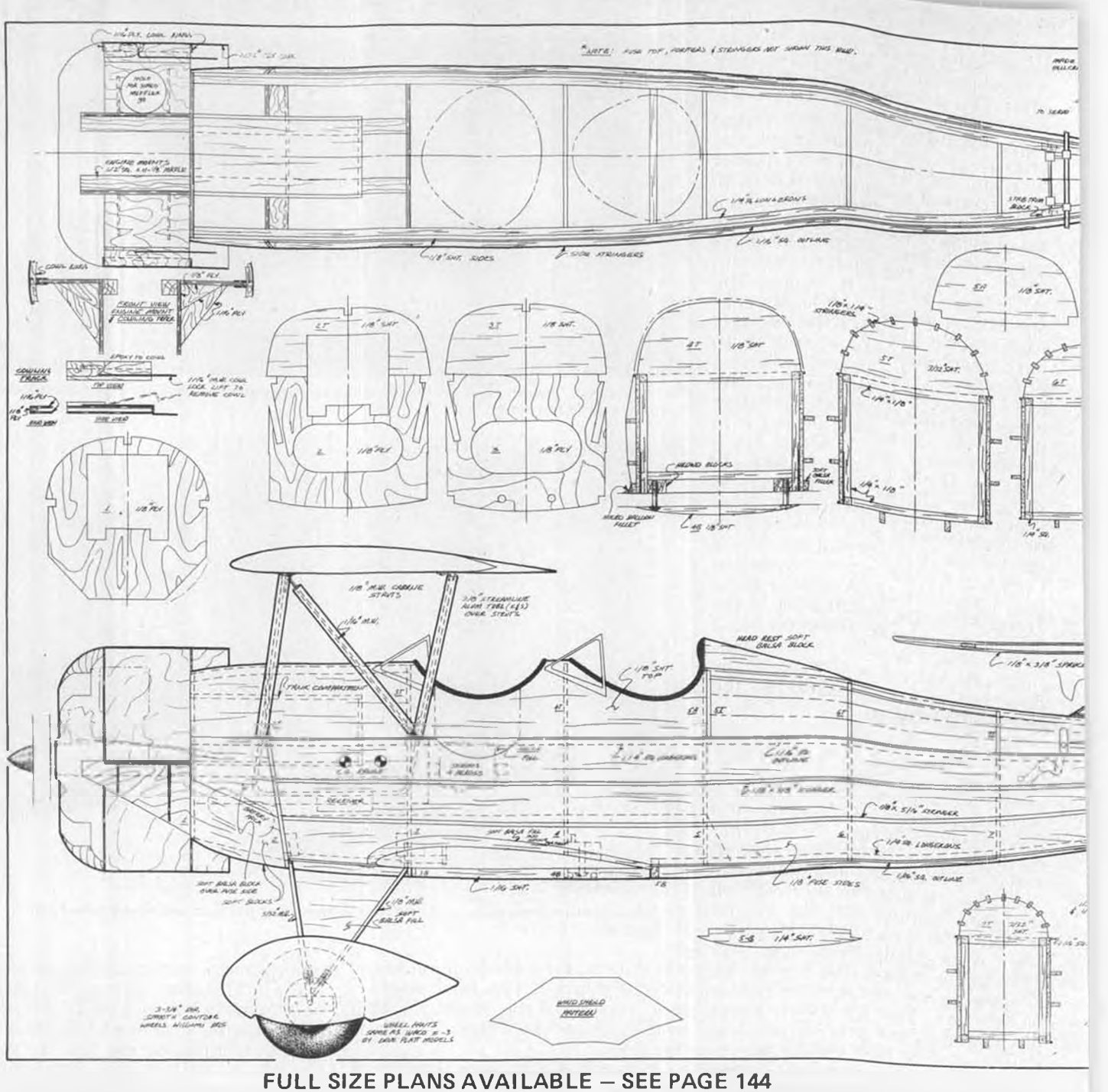


Nothing makes a biplane more complete than to have all of its struts and rigging wire. Note turnbuckles.

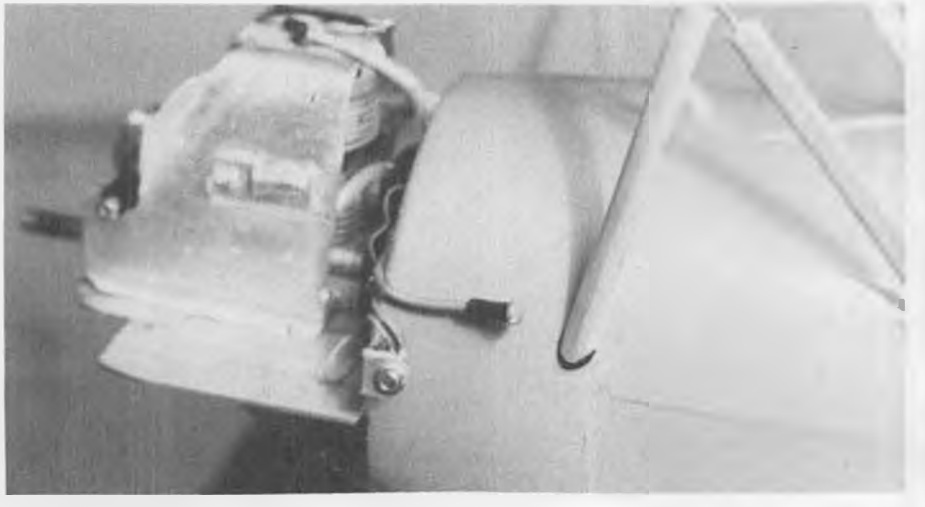
About 25 D4D's were built, and there are three left that are flying, and I mean *flying!* They do skywriting and airshows, and for a plane made in 1929, that's darn good! They belong to Nick Rezick, of Rockford, Ill., who does a lot of EAA air shows (it is something to see him do his thing in his D4D and talk with him); Jack Strazer and his Pepsi Cola-skywriting D4D; and Lane Leonard,

Author/Designer has all T.A. information. These ribs are for 12" = 12" scale version.

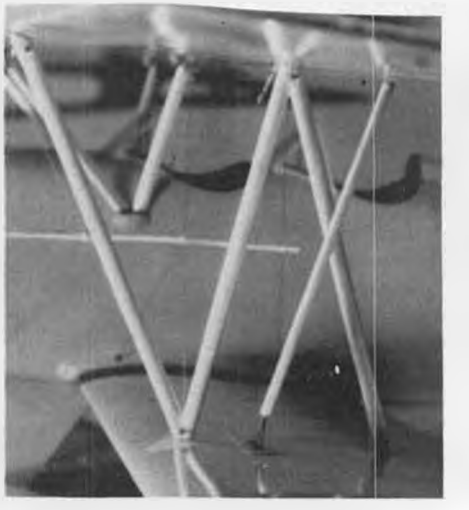
Finished and incomplete cowls . . . all-wood construction. Exhaust collector ring is molded fiberglass.



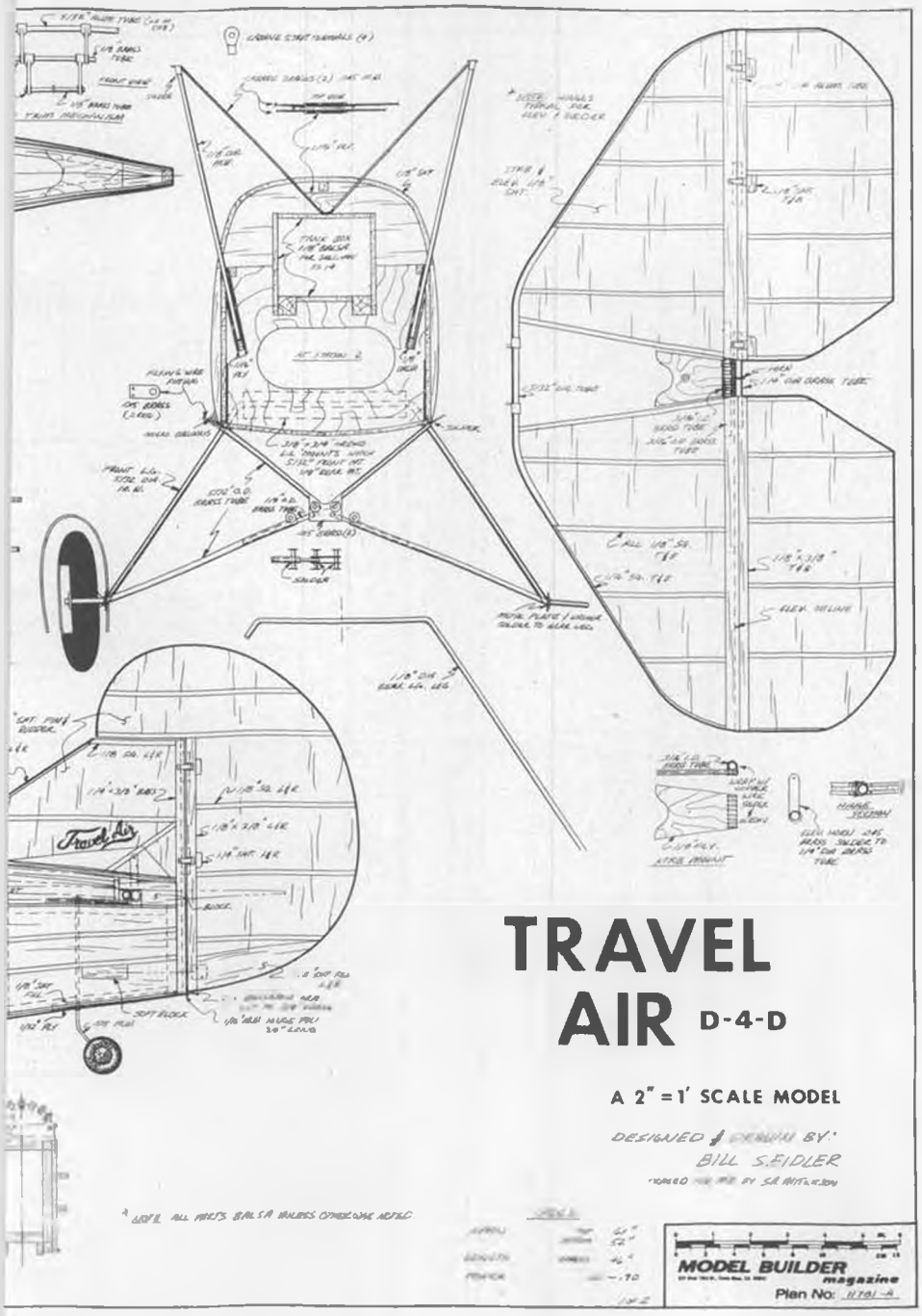
FULL SIZE PLANS AVAILABLE – SEE PAGE 144



Glow plug leads come to battery jack which is accessible through cowl. Gas tank filler line just clears cowl.



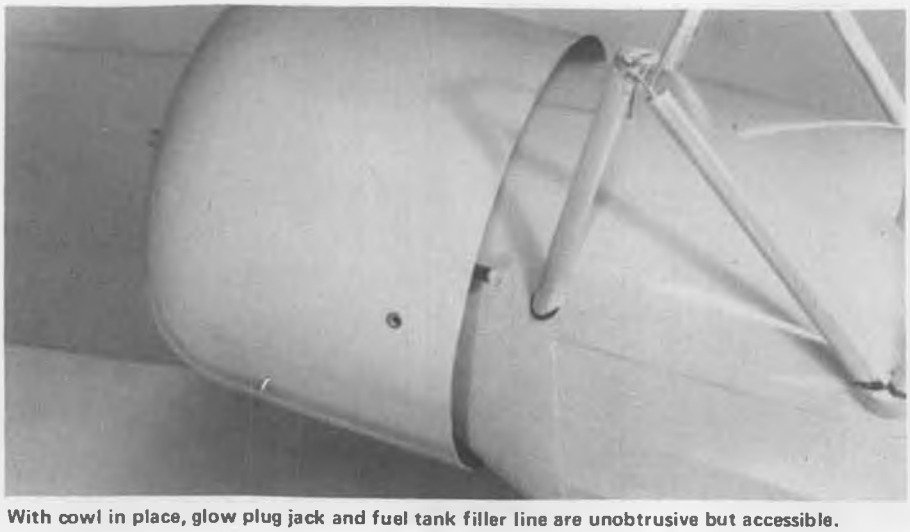
Top-only aileron actuated by pushrod from bottom wing, per scale.



a retired American Airlines captain from Los Angeles, California. Why the aerobatic boys have not learned of the outstanding performance of the D4D is hard to understand. It has the structure, power, and maneuverability qualifications. It will do the entire routine of airshow maneuvers from level flight, and can gain 1000 ft. while doing three Cuban Eights. It takes very little effort to perform an entire show routine other than a little elevator pressure. The D4D cruises at 130 mph + and makes an excellent cross country airplane.

A good print of the Travel Air 2000 is put out by Peter Westburg (July '75 **MB**) From it, you can make just about all models just by modifying engine and wings, if you know the airframe number and year. The model here is Wendell Reid's Travel Air D4D (CF-JLW). The Frieze-type ailerons are built to scale, with all hinges exactly like the real aircraft. I use Williams Bros. aileron hinges for the slotted ailerons, and they work out very well. For trim, the stab moves up and down 3/4 of an inch with a servo. It works superbly. The wings have a scale airfoil and are very thin. I set up the aileron controls the same as the full-size aircraft, and it worked very well. She has a full-swiveling tailwheel, but there are no problems in ground handling because the rudder is very effective (just like the full-size ship). It also has shock struts and shock cords. The plane does not wander on take-offs or landings. The only word for it is SMOOTH.

For power, use a .60 to .78, or even a .90. I use the extra power to swing a scale-size 16-inch prop. I found that the big prop at 5000 rpm is all you need. A Fox .78 R/C with a Kavan carb will run at 9000 and get a real good idle (which, incidentally, must be real low or the plane will keep on flying!). The fuel I use is FA1 80-20 castor oil. My model uses a Webra .90 (all the power you will ever need); with a 16 - 4-1/2, it will run at



With cowl in place, glow plug jack and fuel tank filler line are unobtrusive but accessible.

Inside of cowl, showing mounting tracks and two air intake openings.

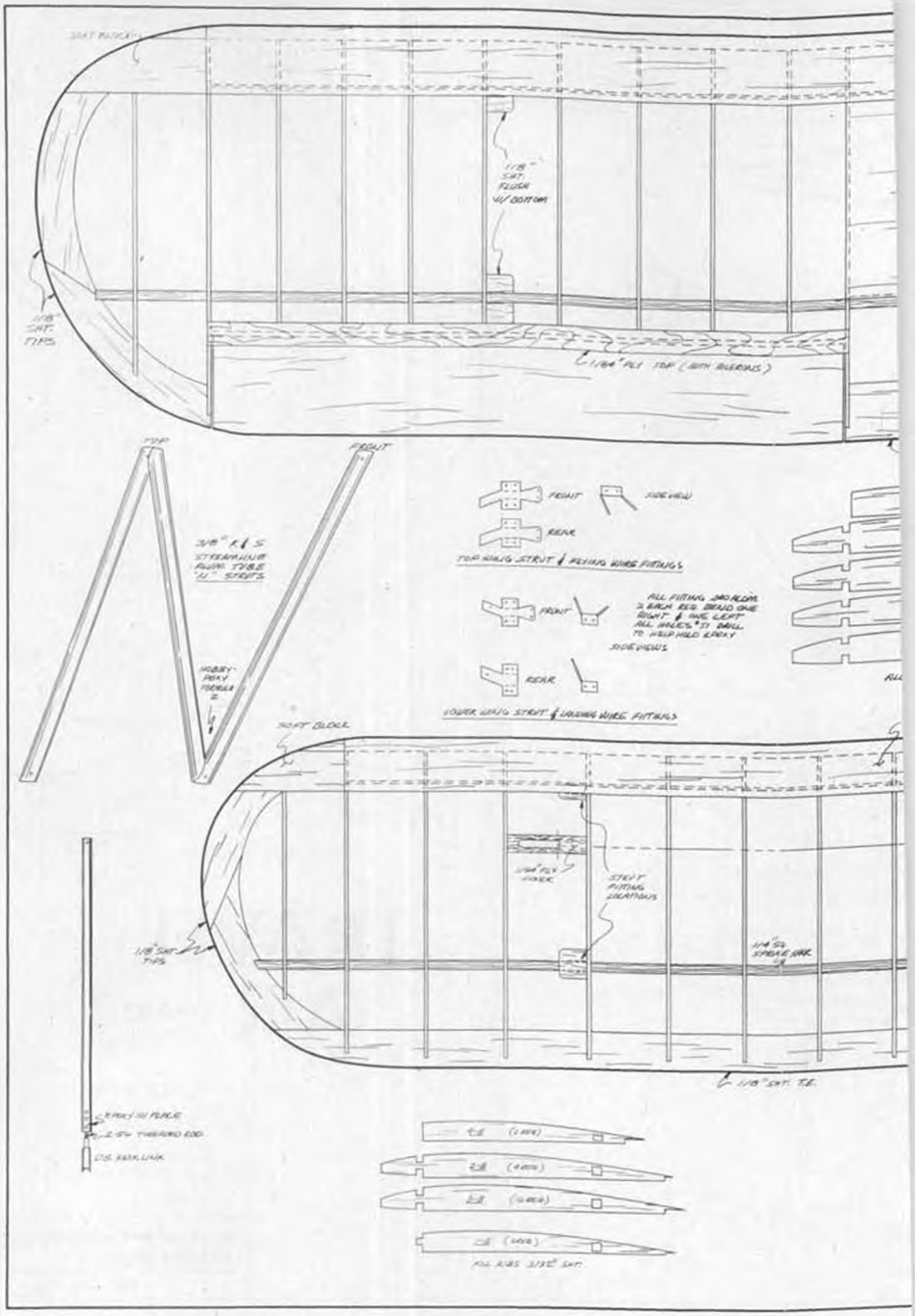
10,700 rpm, and at full power, it will take this 10-lb. plane straight up and out of sight. I think the big prop works very well.

CONSTRUCTION

Construction involves fairly straightforward all-balsa and ply techniques. Start with the cowl by making two 1/16 x 1/4 ply rings. Epoxy two 4-1/4 x 12-inch pieces of 1/32 ply together so it becomes 4-1/4 x 24 inches; then fit it around rings. Take the rings out and epoxy the seam; when it has set, put the rings back in and epoxy them into place. Glue some soft balsa blocks together for the front of the cowl (I used 1-1/2 x 3-inch blocks). Rough-cut the inside and outside dimensions, epoxy it on, and finish it by sanding. Cover the cowl with 3/4 oz. glass cloth and two coats of resin, and sand it smooth.

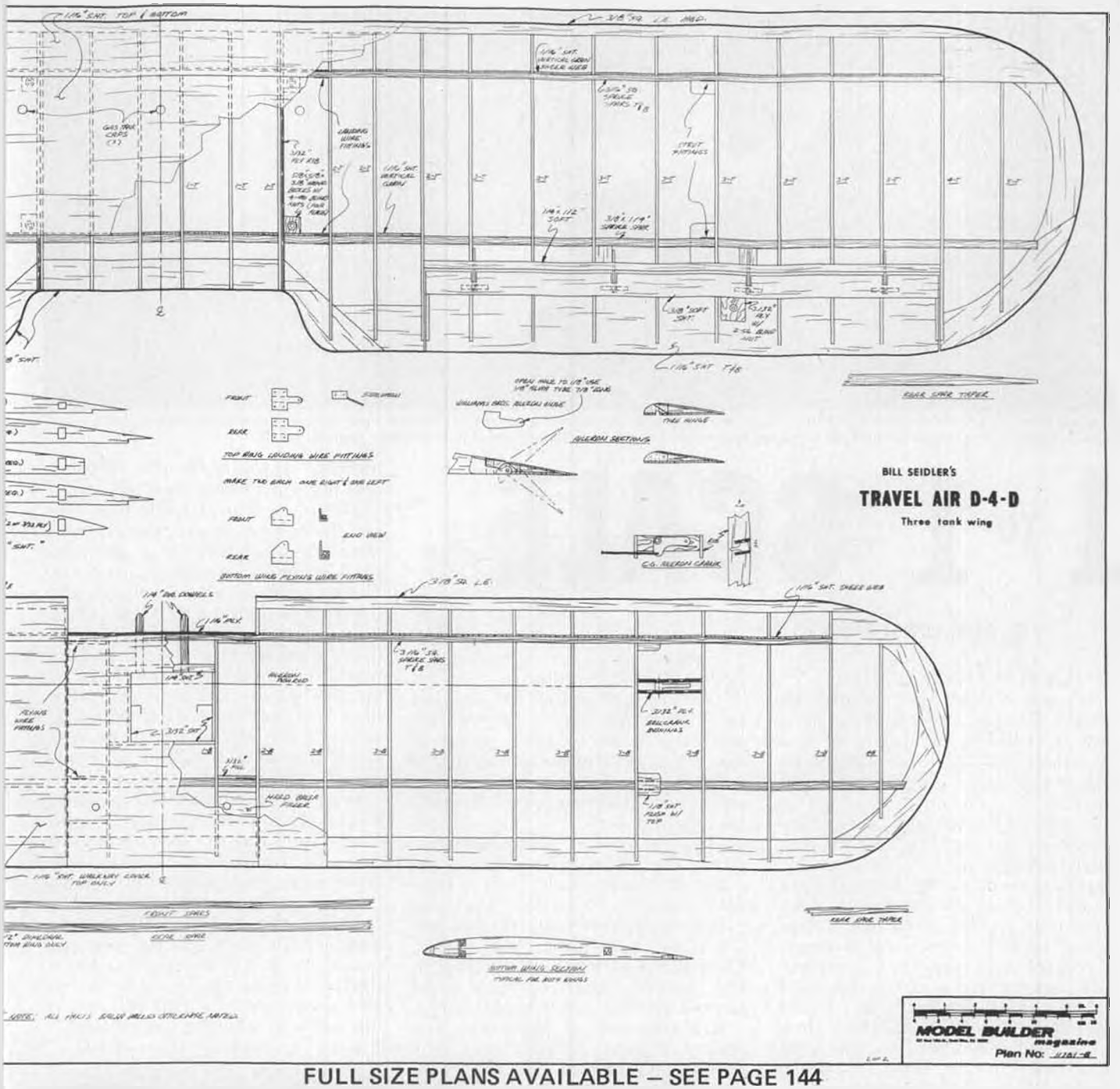
Make the cowling tracks. Glue 1/16 and 1/8 ply together, and epoxy it into the cowl. Note that the top of the inside track is on the

Neat fillet for bottom wing also houses flying wire terminals.

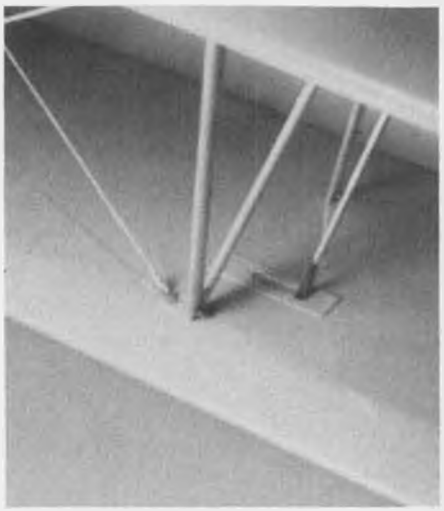


Underside shot shows nylon wing attachment bolts. Landing gear is 5/32 wire filled in with soft balsa.

Stab is R/C trimmable in the air. Note scale hinges.



FULL SIZE PLANS AVAILABLE – SEE PAGE 144



Aileron servo operates bellcrank in bottom wing. Struts bolted in place.

center line. I closed in the front of the cowl with a fiberglass exhaust collector ring. Inside the cowl are seven 2-inch scale radial engine cylinders. The only cooling air that goes in is through two openings on either side of the top dummy cylinder. An aluminum shroud is used on the engine cylinder to make the best use of the little incoming air.

Make up the fuselage subassemblies. Start by forming the cabane struts and landing gear legs, and cut out all plywood parts, balsa formers, and the 1/8 sheet sides. Laminate the cabane strut boxes from 1/16 ply and 1/8 balsa. Assemble the maple motor mounts with formers No. 1, 2, and 3, and complete the fuel tank box. Glue the top 1/4 sq. longerons in place and put in the cabane strut subassemblies. Glue the 1/32 ply doublers to the inside of the 1/8 sheet sides; then glue them onto formers No. 1, 2, and 3, making sure that it is square; allow the glue to dry completely. Glue the 1/4 sq. bottom longeron from 5B to the tailpost support. Put in the 1/4 x 1/8 cross braces and form the sheet top decks.

Epoxy the ply cowl support tracks in place. Now fit landing gear and solder.

Cut out all stab, elevator, fin, and rudder parts; glue all 1/8 x 3/8 and 1/8 sq. strips onto the stab, elevator, and rudder. The fin is different only because the t.e. is a solid 1/4 x 3/8 basswood piece, and is butt-glued

Continued on page 135

Bob was working so hard to get his Hiperbipe ready for the World Championships that there was no time to write a column for last month's issue. Luckily, Bob's efforts paid off, as he placed second individually, and helped the U.S. team place second overall!

1 TO 1 SCALE

By BOB UNDERWOOD

A TIME FOR REFLECTIONS

It's just a short time before the World Champs, and, tousle-haired and bearded, I sit and look at a Hiperbipe waiting for crating and a trip to England. I ponder the worth of it all.

I recall 13 years ago, when the summer mornings brought a trip to the window to see how windy it was that day. Shortly after, a lone figure would appear at the field, often amid mist and fog, to fly the "White Cloud" until it was in need of repair.

The following summer, someone hooked me on a contest, and I found that a Senior Falcon could hack it in Class III competition on a local level. I couldn't let the scale nuts have all the fun, so I built a Stafford Chipmunk and was totally committed (or is that *should have been* totally committed?).

Years have trundled on, and the total family has become active in at least the administrative phase of modeling; now I ponder the merits of 00-90 size Phillips head screws, and spend 15-18 hours each day on a Hiperbipe.

This particular readiness campaign for England has been traumatic. Problems with paint, a hospital stay, and myriad other imponderables have made the last few weeks an ulcer-producing session. Then there is that 11.02 lb. limit in FAI (recently changed) that gives some of us more inept builders a fit.

Is it all worth it? The hours, the dollars, the everything? Surely, my parents and many of my friends who visited during the "getting ready time" tend to doubt it. I missed last month's deadline for this column, and the grass has gotten too long.

Yes, it's worth it! Aside from the fact that it gives us an opportunity to travel to another country, it represents a challenge in so many ways. The creation of a new subject and the thrill of seeing it fly is difficult to equal. The honor of representing the United States in the eyes of the world is something to note. But by far, the biggest part of this moment of reflection comes when I look at some of the efforts that have survived the years and can be compared with the Hiperbipe.

I can't believe how crude my early efforts actually were, and while I still have a long way to catch up with so many of the excellent builders we have today, I find pride in the skills I've been able to develop.

That is the essence of the scale builder. His early efforts, perhaps crude by some standards, are a source of pride to him. As he learns and progresses, he can still retain this pride in what he has created.

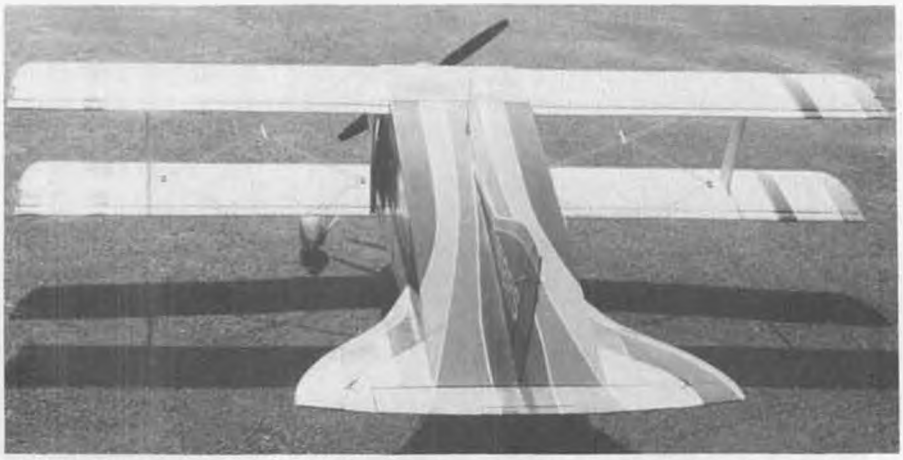
Yes, it's worth it; the late hours and frustration; the tribulation over CG, weight limits, and even whether or not it will fly; the consternation of how to provide linkage to two wings so it can't be seen.

To stand and feed power to the multi-striped beauty and see it run unerringly down the asphalt, tail lift, and gradually have the craft become airborne makes it all worth it.

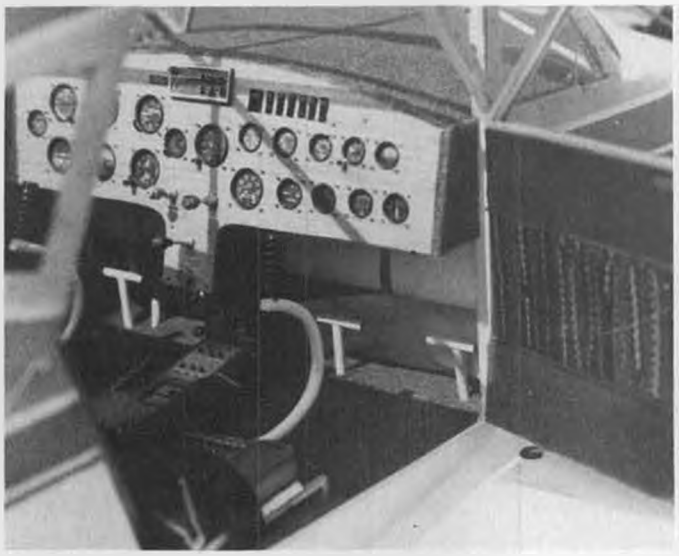
To watch the photographers gather to snap pictures and ask you myriads of questions about it makes it all worthwhile.

To create, amid a carbon-copy, stamped-out, mass-produced world, a small bit of one's self makes it all worth it.

The Hiperbipe goes to England to seek its fortune, much the way the classic story of Dick Wittington and



The Hiperbipe must be one of the safest airplanes ever designed. Even if the wings fall off in flight, the thing will keep right on flying, thanks to the wide fuselage!



Close-ups of the cabin and nose on the Hiperbipe. The wild cloth pattern on the door panels was reproduced photographically. Hopefully, Bob will never break the prop; if he does, all he has to do to get the spinner off is remove ten 0-80 screws!

his cat relates the adventure. It is worth it, regardless of the outcome.

SCALE CONTEST SCENE

An earlier report gave general facts concerning the all-scale contest featured at the first half of the Mint Julep meet in Kentucky. The success of this event came from the relaxed approach made possible by not having to squeeze in two types of events, and the efficiency of the workers.

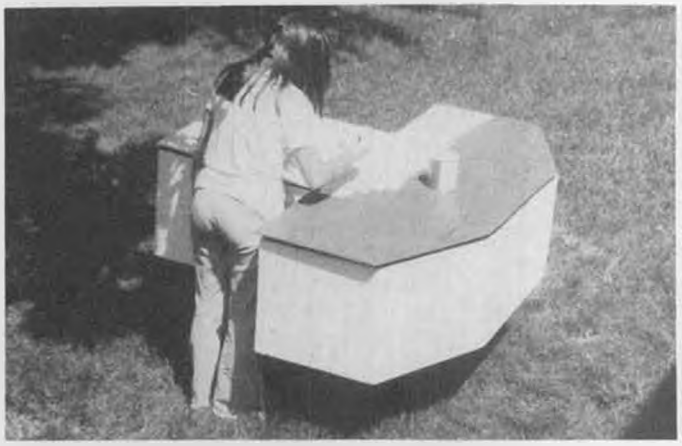
Monty and Pat Groves provided information on the success of the WW-II Scramble in California in an earlier issue of **Model Builder.**

In July, we held an all-scale event in St. Louis, featuring Free Flight Rubber and Peanut, Control Line Sport Scale, and R/C Sport Scale in two classes, novice and expert. The event was very much a success artistically and financially, but in actuality, one wonders where everybody was!

Six R/C entries appeared, three in each class. The number of static entries swelled the number some, but a combined entry number of 23 represented everybody. An interesting aspect was the very great spectator turnout, especially by the modeling public. People who rarely show up at a contest appeared to see the scale models.

MB's Chuck Blackburn did a beautiful job on this Brown Racer, built from a Bridi kit. Model weighs around 9 lbs., but Chuck says the Enya 60 XF makes it seem more like a fast seven!

At the risk of boring you, let me illustrate a few other departures from the normal contest. Each participant and worker received a 4 x 6 engraved plaque, and the entry fee was by donation only. The average



Cathy Underwood, Bob's daughter and 1/3 of Bob's super pit crew, paints Hiperbipe's box for the trip to England.

Part of the lineup of models for static judging at the St. Louis all-scale meet held on July 2. Photo by Cathy Underwood.

Michal Sip, of the German "Flug-Modell" model magazine, sent us photos taken at the annual Harsewinkel Flying Circus. Shown here are mammoth Tiger Moth and Nieuport 17 models.

donation was $3.86 per entry, with a high of $10.00.

The cost of the trophies and plaques was $339, and the portable facilities were $70. The total of a $1.50 per car donation for non-AMA members at the gate, the refreshments, and the entries allowed us to realize a profit of $190.92, which was sent to the Scale Team Fund.

All models . . . F/F, U/C, R/C . . . were judged by one panel of two judges. The Sport Scale models were judged from a true distance of ten feet, by using two lines and not allowing any portion of the model to intrude into the space. A steward was on hand to rotate the model as needed. The process seemed to work well.

Thus, everything seemed a success, except were were all those people who suggested to me a year ago that an all-scale contest would be a great idea?

All-scale contests and fly-ins are here, and it appears that they can survive on their own. They have a natural appeal, to both spectator and contestant.

Adjustments need to be made to the contest procedure (as compared to pattern or pattern-scale affairs) since the static judging needs to be done first. By making certain that the judges work quickly, and allowing flying to begin before all the models are judged, it can be worked.

Consider whether your group can handle such an event next year. It works well, and is most rewarding.

WHAT ARE YOU LOOKING FOR?

Scale modelers have been recognized as innovators in using unlikely items to simulate needed parts.

Let me pass on some discoveries made in the preparation of recent models. Many (or all) of these are probably on your list, but then again, maybe not.

A) Landing gear folding struts are easily faked with small black rubber tubing. When the gear is down, it looks like a metal strut, but when retracted (or retracting), it folds out of your way.

B) Carpet for cockpits can be formed from thin (1/8-inch thick) art and craft foam. It weighs virtually nothing, and comes in large sheets. Many colors are available, but if you need to match it closer, try a vinyl spray that comes in cans.

C) Head liners can be made from small felt squares sold in craft stores.

D) While in the craft section, look at the myriad types of fasteners, beads, and stuff used for making jewelry. I found some excellent clamps, clasps, chain links, etc., in that section.

E) Structo plastic parts have angles, strips, and tubes that make great window framing, panels, and ends for knobs on the instrument panel.

F) If you are simulating seats and upholstery, you can find a type of leather material sold in yardage stores that will work well. It is quite thick, but the backing and facing can be easily separated by peeling. The leather film is ultra-thin, light, and can be easily glued to any surface with a glue like RC-56. It retains the grain and mottled effect of leather. It costs about $8.00 a yard, but is 54 inches wide, and 1/8 yard will go forever.

G) Spring-loaded door latches can be difficult if you can't find very small springs. Look at the Du-Bro servo override hardware.

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Hermann Sakbrook's J-3 Cub was one of several big models that showed up at Harsewinkel. Model spans 11 ft., 9 in., and is powered by a Quadra.

This monster B-17 (with tricycle gear?) was another of the performers at Harsewinkel. Unfortunately, it was a victim of aileron flutter, crashed on top of a motor home.

Flight INSTRUCTOR

Conducted by
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Cincinnati, OH 45236

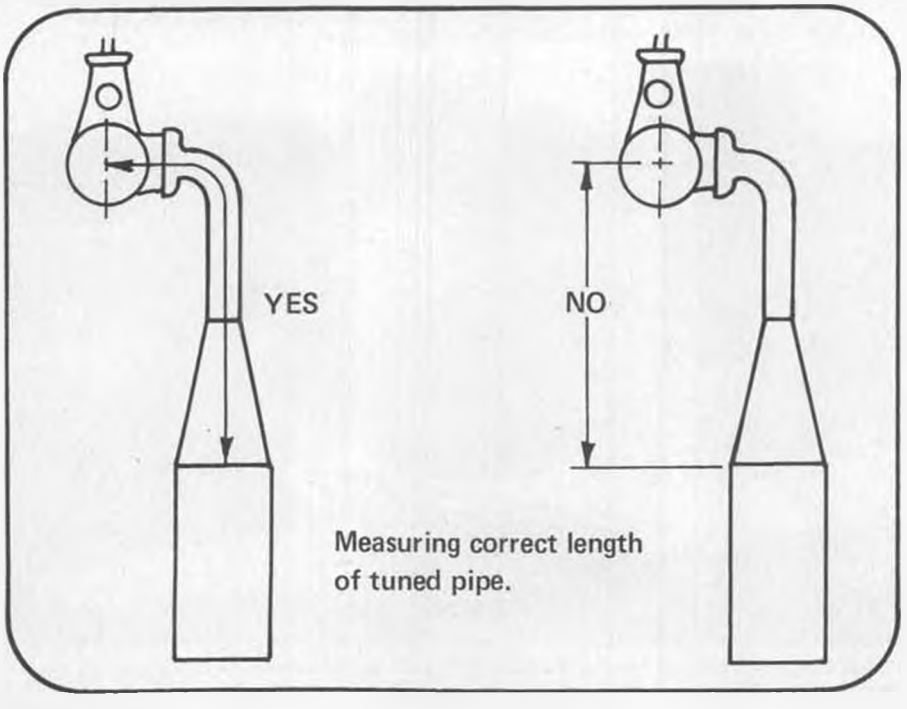
• Caution!! This column will self-destruct if I don't start getting some letters from our readers pretty quickly. Seriously, I haven't received a single letter with questions in it for this column during the last month, and although my flying buddies would probably not believe it, I'm running out of B.S. The column this month is being written in the motorhome while traveling through Mississippi, heading for the Nats. Sally will tell the story of the Nats pattern event in next month's **Model Builder**, as fearless leader (Bill Northrop) put through a frantic call yesterday.

During the last month I've taken in contests in Allentown, Pennsylvania; San Luis, Mexico; Warren, Ohio; and Lancaster, Ohio. The meet in Allentown was a first-time contest, and will serve as an example of how it should be done from now on. Among the things which made this contest so successful was the fact that it started on time; their method of getting started on time is simple and unique, but very effective. They actually held a countdown over the P.A. system, starting one hour before the scheduled first flight. Boy, was this effective in getting everyone ready on time.

The following weekend was spent in San Luis, Mexico, and again I learned a few tips which I can pass on. First, if you fly in very dusty conditions, look into the sealed electric retracts, such as Kraft or Giezendanner, or seal your present mechanical or pneumatic units to keep the dust out, as it will get into everything and possibly jam the landing gear. A second, and very important tip comes from an accident I had while down there. While starting and adjusting my engine, the prop kicked up a small stone which dead-centered the right lens of my sunglasses. The lens cracked and had a small chip out where the stone hit it, but it didn't shatter, so my right eye was saved. Had I been wearing cheap sunglasses or no glasses at all, my competitive career could very well have ended right there. Please, for safety's sake, buy good, shatterproof glasses and always wear them when starting the engine, as without eyes, you'll miss a lot more than R/C flying.

Tuned pipes seem to be the subject of a large amount of questions asked of me at various contests, so I'll cover the subject this month. There have been many columns and articles written on the theory of the tuned pipe, so I won't get deep into that here, but I think a simple explanation of what they do is necessary. First, when the exhaust port opens, the pipe creates a negative pressure at the exhaust port which sucks out the spend gases more quickly. Secondly, just before the exhaust port closes, the pipe creates a positive pressure which compresses the incoming fuel/air mixture into the cylinder, giving you a supercharging effect. Now, as you can imagine from this description of how they work, the timing (*when* it sucks/*when* it blows) becomes critical. This is adjusted by tuning the length of the pipe, and the proper length is dependent on rpm.

The muffled tuned pipe, which has become popular in the last few years, is more broad-ranged than the out-and-out speed pipes, and will almost always help the performance of any engine, when adjusted (tuned) properly. The old myth that only a special engine will benefit from a tuned pipe simply is not true. There are, however, ways to tailor an engine to tuned pipe performance by changing the exhaust timing. This usually involves raising the exhaust port about .025-.040 on a .60 engine, which increases the exhaust duration from approximately 155° to around 165°. I personally do not recommend this for anyone, unless they need the absolute most power available, as it makes everything



Measuring correct length of tuned pipe.

Continued on page 107

SCALE AT THE NATS

By TOM and ANDREW STARK . . . A pictorial review of scale activity in nearly all categories, at the 1978 AMA Nats, by top competitors.

R/C SPORT SCALE

A fair-sized number of entries with a good variety of models characterized Sport Scale. The models ranged from a huge twin ducted fan Me-262 jet fighter to .051-powered airplanes.

The first round saw some fine flying and a good share of engine problems, perhaps due to the high temperature and humidity. Art Johnson's F-82, Bob Violett's A-4, and McCallie's FW-190D were standout fliers.

A large number of biplanes were entered and did very well in the static scoring; however, the biplane flight scores just couldn't match the pattern-like flying of the modern fighter aircraft. The biplanes were further hampered by the lack of options such as bomb drops, retracting landing gear, and flaps. Perhaps some rule changes are in order.

Ralph White placed first with his Fliteglas P-51, followed in order by Violett's A-4, Johnson's F-82, McCallie's FW-190D, and Czikk's P-

Andrew and Tom Stark really cleaned up in Scale. Andrew won two 2nd's, and Tom won a 1st, a 2nd (in R/C!), two 3rd's, and a 4th. Good show!

Mike Fedor launches his Outdoor Peanut-winning .010-powered (!) B-70 Valkyrie.

Claude McCullough placed third in Precision R/C Scale with his Shinn. Only four entries in Precision Scale this year.

Allen Schnazle's Chambermaid won 2nd in Outdoor Rubber Scale. Also flew in Indoor.

Brunner Winkle Bird by Tom Stark won 2nd place in R/C Precision Scale. Model is powered by a Fox .36, color scheme is cream and red.

Larry Kruse ROG's his CO_2-powered F/F Scale Morane Saulnier. Placed 5th.

Joe Scuro releasing his red-and-yellow Curtiss Robin for an official flight in F/F Scale.

Sport Scale Savoia Marchetti SM 79, by Bud Atkinson. Reported to be a smooth, fast flier.

Duke Horn's F/F Kinner Sportster, built from a Flyline kit. Model is powered by a Mills .045 diesel.

A happy Tom Czikk and his scratch-built P-47, with which he won 5th in Sport Scale. Drops fuel tanks and bombs.

Al Krętz and his 1/6-scale Pitcairn Mailwing, built from Sid Morgan plans. Al's model had the highest static score in Sport Scale.

Tom Stark's F/F Scale winning Fokker T-2, held by son Andrew. Astro 020 electric motor.

Scale judges (l to r) Jim Scroggins, Dale Arvin, and John Preston give Ron Roberti's Curtiss Robin the once-over. Ron's model had the highest static score, placed 2nd overall.

Andrew Stark and Guy Larsen try an unofficial formation takeoff with a Hellcat and Heinkel He 100.

Dennis Grady did an excellent job on this Douglas A-4E, powered by a ducted fan. Flew in Sport Scale.

Mike Gretz, well-known C/L flier, flew this Zlin in R/C Sport Scale. Fine flier.

Gail and Ron Roberti with Ron's beautiful blue-and-silver Flyline Curtiss Robin.

Hurst Bowers holds while Don Srull packs the turns into his 2nd place Piper Vagabond.

Rolfe Gregory waits for good air before launching his 5th place Flyline Heinkel 113.

Dr. John Martin explains some of the funnier aspects of his WEL 10 to Chuck Marros.

Don Downing's 1/2A F-4 Phantom, soon to be a kit by Model Merchant. Has retracts.

Guy Larsen flew his neat little Nieuport 17 to 2nd place in (senior) F/F Scale.

Andrew Stark holds dad Tom's He 119A. One of several low-wingers at the Nats.

Nick Decarlis launching his Found 100 for an official in Peanut. Nick won four scale events!

Another low-winger! This time it's Don Srull's Swiss Schlepp C-3605 target tug. Won first in Outdoor Rubber Scale.

Don Srull again, with his Dornier Do-23. A very realistic flier, but a sick engine hampered its flights at the Nats.

47. Overall, the quality of the models and the flying were excellent.

R/C PRECISION SCALE

Only four models competed in precision scale. Three rounds were flown over a three-day period. In the first round, Dave Platt, Tom Stark, and Claude McCullough got airborne, but all three had engine problems which terminated their flights. Vito Tomeo had engine problems which kept him from flying.

By round two, Dave Platt had cured his engine problem and put in an excellent flight, putting him in first place with his Dauntless. Tom Stark was also able to make a complete flight with his little Brunner Winkle Bird. Tomeo's FW-190 still had engine problems, but it did get airborne briefly. Round three saw flights by Stark and Claude McCullough's Shinn. When it was all over, Dave Platt won first, followed by Stark, McCullough, and Tomeo. The small turnout can partially be explained by three of our top scale fliers being in England for the World Championship Scale competition.

FREE FLIGHT GAS SCALE

Unlike so many prior years, F/F Gas Scale was blessed with excellent weather. In Senior, Nick Decarlis, of Florida, continued his winning ways by placing first, followed by Guy

Eric Waterman was the only junior in R/C Sport Scale. Here he gets an assist from his dad in assembling his fine Stinson SR-5.

Duke Horn running up the Mills diesel in his Flyline Kinner Sportster. Quite a few Flyline models were flown at this year's Nats.

Cindy Brooks and Phil Hubert, with Phil's 3-year-old Acrosport. He learned to fly with it!

Vito Tomeo placed 4th in Precision R/C Scale with his big, beautiful FW-190. Unfortunately, Vito had engine problems which kept him from getting a higher flight score.

Larry Kruse flew this neat little Monoprep in Outdoor Rubber Scale, placed 4th.

Jerry Murphy's Cessna 170 recorded the highest flight score in F/F Scale, 3rd overall.

John Singer gets a good launch on his Kinner Sportster in F/F Scale.

Larsen. Tom Stark's electric powered Fokker T-2 won Open, largely on the strength of a very realistic take-off on his second flight. Ron Robertti's high scale point Curtiss Robin placed second, followed by Jerry Murphy's Cessna 170, which earned the highest flight points. California's Bill Stroman placed fourth with a pretty CO_2-powered Taube, followed by Larry Kruse's CO_2-powered Morane Saulnier. Out of the first five places in Open, only two were powered by internal combustion engines!

INDOOR SCALE

The site was the Burton Coliseum, which has about a 100-foot ceiling and a dirt floor. Although many fliers were a bit apprehensive about the dirt, it presented no problems for takeoffs . . . you just had to be careful not to drop a lubed motor! The trend this year was toward low wings and more realism, with many of the models being color doped. Typical of this trend were three of the Don Srull-designed Heinkel He-100's (or "He-113").

First in Open went to Dan Domina with a Piper Cub, which exceeded the maximum 90-second flight time. He was followed by Don Srull with a large Piper Vagabond, which was color doped and very realistic. Charlie Sotich came in third with his Volksplane, which also placed second in Peanut scale. Clarence Mather's PT-19 was fourth, followed closely

Continued on page 108

Not an official entry, Jim Gerwitz displayed his incredible twin ducted-fan F-15, turned everyone green with envy.

Mike Fedor caused quite an uproar when he won Outdoor Peanut with a gas-powered model. Rules changes are likely.

R/C FORUM with

Hal deBolt

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Buffalo, N.Y. 14225

Mail in your questions or concerns.

• Last month, we talked about flying fields and how great it is to have one that is government sponsored and maintained. I hope we made the point that obtaining such a facility is not all that hard to do. Also, that once established, it removes many of the inconveniences of modeling and allows us to go "first class". I want to finish up this subject this month, and hopefully reply to a few of the nice letters you readers have been sending in. So far, they have created several points of interest, which I am sure will answer many of your questions.

I do not believe that the Niagara Frontier area of New York is much different from the rest of the country, as far as R/C'ers and the government is concerned. Our experience here seems to parallel other areas, such as Los Angeles, St. Louis, Chicago, and New York City. I know that there are many others, and Rough River, Kentucky, would be an example. As an R/C'er it sure is wonderful to live in these areas and be able to enjoy these government-provided and maintained facilities!

In western New York, we have 3 adjacent counties that have provided facilities for a number of years now. The County of Erie provides 2, Niagara 2, and Monroe has one to date. All of them are excellent. Niagara probably has the finest flying field in the world, with a golf green-type grass runway measuring 500 x 1200 feet, right in the middle of open rural land! As a side note to those interested, the United Pylon Racing Circuit's 1978 Championship will be held on this field, at Lockport, N.Y.

The point of all this is that the question most asked of me by modelers who still have many of the usual field problems is "how can we have one, too?". In most cases, the answer is positive; you can have one if you will only take the time to do the necessary things to obtain it. These fields did not come to the Niagara Frontier without effort on the modelers' part. However, now that it has been done, reflection shows that the greatest effort was finding the proper procedure and *understanding* the government and what their criterion is when it comes to supplying *any* facility. I believe most modelers have a chip on their shoulder when they approach the government, figuring from past experience that everyone is against them and that they will have to fight with the powers that be to obtain what they want. Contrary to this, we were happily surprised when we finally talked to the "right" people.

The procedure that works is as follows:

1. First, unless you live in a very large metropolitan area, find out who is your County Commissioner or Recreation. Except in very large cities and/or towns, only the county will have a Department of Recreation with great enough resources for the job. Also, the county is concerned with ALL residents, whereas a city within a county is only interested in city residents.

Make an appointment with the Commissioner for several members of your club to sit down with him and explain what R/C is all about. Take along one model and transmitter, and use the time to simply talk R/C with him. Everyone should get into the act, so that he sees the enthusiasm. Do *not* press him for *anything* at this time; just leave him with an understanding of R/C and that flying fields are a problem for modelers. Tell him that you would like to come back in the near future and show him how modeling can be an asset to the county.

If your experience is similar to ours, you will find that the Commissioner has told you that the work of the Department of Recreation is to provide the necessities for the residents of the county to engage in ANY recreational activity which the citizens so desire. Their job is to take care of us, just as a hospital or any other county department does. The standard that the Commissioner will use in determining whether the county can proceed is how many people are involved, and even more so, *how much spectator interest* there is in the activity. Obviously, thousands of people are not involved in baseball, so it is the spectator interest that the county sees. Of further interest was the Commissioner's statement that any particular problems involved with an activity *have to have a solution*. In our case, an open area is needed and we do create noise. It becomes the county's job to find us a place where we can operate. In our case, the Commissioner mentioned having a noise problem when they provided a gunnery range; as you can imagine, they *did* find a place for the shooters.

Of further interest is the knowledge that once a facility is established for a particular purpose, it is there to stay. All of us have had a big problem with a simple complaint to the authorities about noise created at a private field. Quite often, just one complainer is enough to close the field. Not so with a government facility. Remember, the government is the people; it is the people of the county who are providing the facility. As such, it becomes the complainers against the rest of the population. Naturally, in locating a facility, the county will give consideration to *all* problems involved, so that the location will be the most suitable possible. Once established, that is where R/C will be flown in

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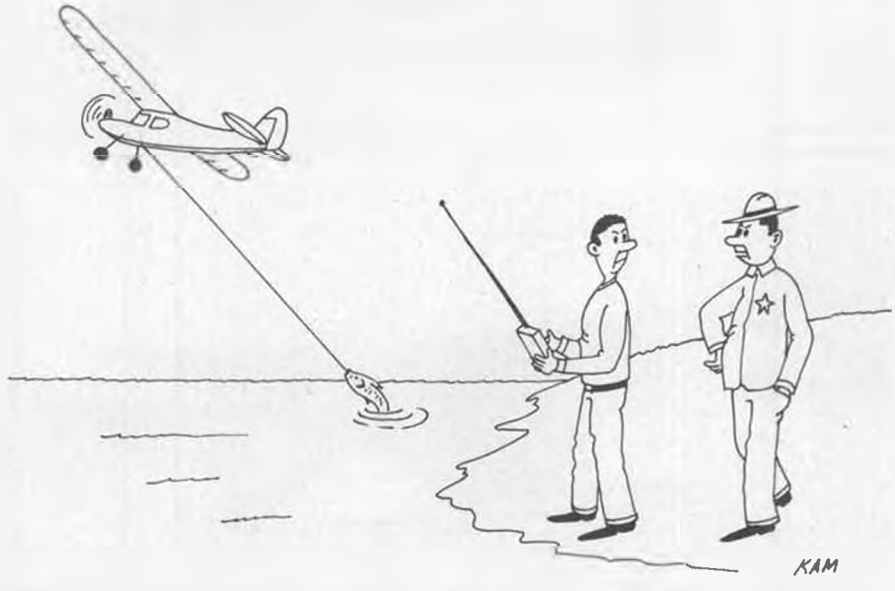

"When we gave you permission to use the park field, it didn't include fishing privileges!"

MODEL BUILDER VISITS... PETER WESTBURG

By PHIL BERNHARDT and PETER WESTBURG . . . A leading aviation historian/draftsman, Pete's scale-views are considered the "final authority" in accuracy.

• Anyone who is at all interested in scale models is no doubt familiar with the name "Peter Westburg". For several years now, Pete has been producing some of the finest detail aircraft drawings available anywhere. In addition to **Model Builder,** Pete's drawings have appeared in such magazines as Air Classics and Scale R/C Modeler. Several readers have mentioned that they would like us to do a short biography on Pete, using his airplane experiences as milestones. It was just too good an idea to pass up. So, if you would like to know more about the "King of the Drafting Board", read on.

Pete saw his first airplane sometime in 1920 or 21. At the time, he was living with his parents and six brothers and sisters in a big, ten-room house on a small farm in Masonville, Michigan, where he was born. He was playing in the yard when he heard an automobile engine, which wasn't too unusual, except this time there weren't any cars around. Then he saw this two-winged thing creeping across the sky. Pete believes it was a Jenny.

Pete's next experience with an airplane was three or four years later, in Michigan City, Indiana, where his family moved in 1923. He and some other kids were playing in the dirt street in front of the house when three or four airplanes (probably Navy fighters) roared over at treetop level.

But the first airplane Pete ever got close to was on a freezing day in January, 1929. He had heard that an airplane had crashed on the ice on Lake Michigan. He went out there the next day, walking across about a mile of ice. By the time Pete arrived, the engine was under the ice and the tail was sticking up. The wings had been pretty well stripped by souvenir collectors. The airplane was a Liberty-powered DeHavilland DH-4. Pete managed to get the registration number off one side of the fin and a piece of a fin rib.

The story in the local paper said the pilot had landed in a snowstorm, thinking the frozen lake was a smooth field. Three boys met him and took him to the local police station. The pilot said he didn't have any money, and had to get to Chicago. The police gave him ten

Pete considers his best model to be this control-line ship, designed and built in 1942. Model is powered by what looks like a Bunch. Realistic appearance is typical of Pete's designs.

Another view of Pete's 1942 control-liner. Note that it's set up to fly clockwise . . . not uncommon on U/C models in those days.

bucks and put him on the South Shore to Chicago. It was the last they saw of him.

Pete says the DH-4 eventually sank, but not before the police went back and looked it over. And what did they find in the front cockpit? Ten gunnysacks of Canadian booze! The pilot was running it from Canada to Chicago. The newspaper said the police tried to track him down, but he had given them a phony name and address.

But that's not the end of the story. Pete relates that, twenty years later, two of the boys who had found the pilot were attending an automotive engineers' convention in Detroit. They sat at a dinner table with some strangers, and when they mentioned they were from Michigan City, one of the strangers said he had once landed on the ice near there in a snowstorm, after losing his way to Chicago. He turned out to be none other than Bert Acosta, the famous pilot who flew the Atlantic with Admiral Byrd!

Pete Westburg hangs on while his buddy, Harold Ford, tunes the Baby Cyclone in their WF-2A gas model, built in 1936. The WF prefix probably stands for Westburg/Ford.

One of Pete's best-known designs was the WF-3, which was published in the July 1938 issue of M.A.N. under the corny title "How to Build a Pursuit Type Gas Model".

The WF-3 had a 65-inch span and was powered by a Baby Cyclone. Flew well despite a wing loading of 16 oz./sq. ft. This is the same model that lost a wing in flight . . . see text.

So, for a while, Pete had a piece of fin rib and the registration number from Bert Acosta's DH-4. Unfortunately, Pete doesn't have them anymore. You see, he hid them in a hole in the basement ceiling, so no one would find them. His father did, however, and used them to start a fire in the furnace one cold morning!

Pete saw a lot of airplanes in the early and mid-thirties. He never missed a chance to see the Indiana Air Tour, sponsored every year by the Linco Oil Company. Anywhere from 50 to 100 planes took part in it, stopping at all the bigger cities in Indiana. He remembers seeing Jimmy Doolittle in his red-and-yellow Shell Oil Lockheed Vega, and a lot of Wacos and Stinsons and just about every private and commercial airplane flying at the time. One of Pete's most vivid recollections was seeing Italo Balbo's Savoia Marchettis. They flew from Italy to the 1933 Chicago World's Fair, and on the last leg from Cleveland to

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Pete's WF-4 was much racier-looking than his previous models. Tricycle gear is hardly ever seen on a free flight, even today.

The WF-4 was a rather small model for its Brown Jr. engine, must have gone like a bomb. Model was built in 1938.

Dave Felsenthal with two of Bob Parks' 1/2A screamers, an F-15 (left) and MIG 25. Both use Tee Dee .049's with bladder tanks. Roll rate must be something else!

The 1/2-A SCENE

By LARRY RENGER

BEGINNER'S WORKBENCH

Tools are the key to your success in modeling. Although you can do a creditable building job with practically nothing, the correct tool will always complete the task quicker and better. Fortunately, good tools need not be expensive. There are several items which are indispensable, each of which cost in the two or three-dollar range.

First and very important is the razor saw. There are several makes, and they all seem to function. A companion item is a model miter box to match a large razor saw. When you want to splice spars or trim a leading or trailing edge, the razor saw gives you a finish cut. I have found a problem with the X-acto saws, in that the angle between the handle and the saw edge is too steep. Some people reverse the blade to make the saw cut on the draw stroke. I prefer to simply bend the handle down until it is nearly parallel to the cutting edge.

The second important tool is the modeling plane. Unfortunately, there are some really bad ones available! It is necessary that the blade position be adjustable, that the base be flat and firm, and that the blade can hold an edge. About ten years ago, there were several really nice planes that used razor blades . . . wow! Cheap, easy, and no sharpening worries. Nowadays, you can still get razor planes, but you can't get adequate blades. The great shift from high-carbon to stainless blades did wondrous things for shaving, but left us modelers up the creek. Stainless absolutely won't hold an edge in modeling use.

There have been a couple of imported planes that came with really good razor blades, but the importers don't import the blades separately! When you go through the four or so blades that come with the plane, you are stuck with a paperweight. If anyone knows where really *hard* double-edge blades can be found, let me know, and I'll pass it along.

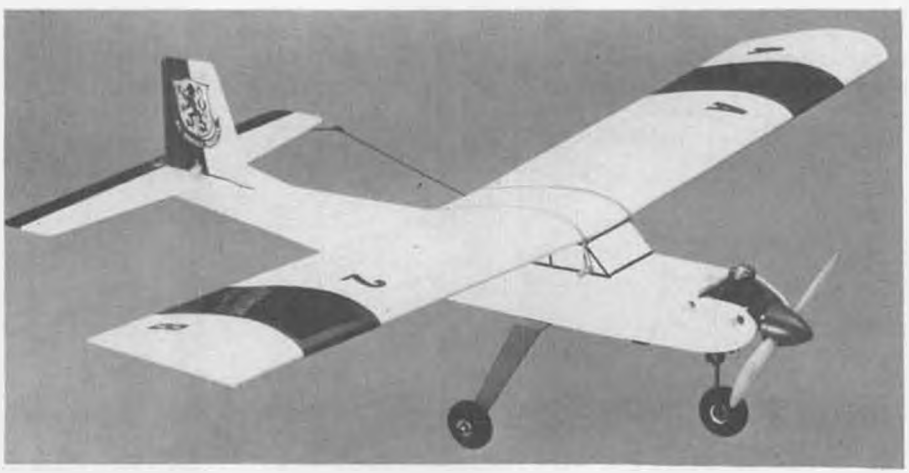
Right now, I can recommend only one small plane, the "Stanley" (also available through Sears as a "Craftsman") hobby plane. With this unit, you will have to learn to sharpen blades, but you need that for the next item anyway.

Third useful tool is a really super-sharp carving knife. Oddly enough, the best ones are made from really cheap kitchen knives. I got one called "Old Forge" brand for under $3; it can be sharpened to a shaving edge, and will hold that edge through quite a bit of wood cutting. The clue here is to first make sure the knife is *not* stainless. It should be high-carbon steel. Second, pick one with a fairly straight cutting edge; it will save much work as you re-shape the knife for your needs.

Most of these knives have a large curve at the end. I cut mine to about 5 inches long with a grinder. The cut was slightly back from perpendicular to the edge, so I can carve in close to edges, if needed. Once the knife is cut to length, all you have to do is sharpen it.

First, throw away any and all of those wretched black sharpening stones. They are OK for an axe or machete, but they are hopeless for model work. Buy genuine hard Arkansas stones . . . one coarse, and one medium. Don't bother getting the fine white stone, it doesn't seem necessary. Also, don't use any oil while sharpening! Clean the stones occasionally with an old toothbrush and soap.

To get an edge on a knife, you have to sharpen it in two stages. First is rough shaping. Take the knife, and, holding it at a low (10°) angle from the stone, work on just one side, until you have raised a burr



The Bridi T-10, for .09 to .10-size engines. Model can be built either as a high or low wing (low wing version was pictured in the August 1978 MB). Either version makes an excellent trainer.

over the entire length of the cutting edge. The burr is felt by running your finger off the edge on the unworked side. Usually, the burr is quite visible. You can work on the edge with any type of motion . . . back-and-forth scrub, rotary swirl, etc. The idea is to remove metal to get the basic angle to the edge.

When the burr extends over the entire cutting edge, flip the knife over and work the second side just as you did the first. When the knife has a burr, as felt from the first side, it is shaped and ready to sharpen. The sharpening is done much more gently and carefully than the shaping. Here is where the classic "stroke, switch sides, stroke" is used. Alternately stroke each side of the blade over the stone. Stroke direction is as if you were cutting into the stone. Use a blade angle of 15° to 20° between the knife and stone.

I usually continue this sharpening stroke until about 1/100 inch of high polish is visible all the way down both sides of the cutting edge. At this point, you should be able to shave hair off your arm or slice a newspaper page neatly.

The final tool which is indispensable is a building board. I use a piece of 3/4-inch plywood with Cellotex (ceiling tile) contact cemented to it. By careful selection of the plywood, you can get a piece that is flat and true. Any warps in the board will show up in both wings, and the warps will reinforce themselves, not cancel out! I have found that an 18 x 48-inch board is plenty large . . . even a 12-inch width is adequate.

By popular (1 person) request, I'm going to continue devoting occasional space to the art of photography. The camera shown this month is a "Rangefinder 35". Again, this is an inexpensive way to take really good photographs. By eliminating expensive features like through-the-lens viewing and interchangeable lenses, you get low cost without sacrificing quality. Negatives are 35mm size, so they are capable of great enlargement (I have made very nice 16 x 20-inch prints!). There is a wide variety of cameras in this class. The one shown is a Yashica GSN. I use an Olympus 35RC. Other excellent brands are Minolta, Canon, Konica, Fujica, and Rollei.

Another of Bob Parks' original designs is this Tee Dee .020-powered pattern model. Weighs only 8 ounces. Bob says it flies smoother than most .049 ships.

Most of the cameras are manually operated, but include an exposure meter. Several, such as my Olympus, have completely automatic exposure settings. Once you pre-set the number on the film into the camera, the camera will then give you a whole role of decently-exposed photos. Several of the cameras automatically adjust for flash intensity and distance . . . Konica even has one with a built-in electronic flash. Prices run from $50 to $150. Pick an amount you can spend, then see your dealer for the best buy.

I clobbered an airplane over the weekend. It was one built by a friend (no names please!), and he had added an extra brace in the center of the wing. The brace was huge and ended abruptly . . . Guess where the wing folded in a long dive! Hey gang, it's not enough to strengthen the center of a wing, you must carefully taper off that strength as you move outward. If you flex your wings from the tips, you should see an even amount of bend all the way along the wing. Sharp bends at one or more spots are a sure sign of trouble! You can actually weaken a wing by adding strength improperly.

It sure is spectacular (expensive, too) to see an airplane explode in mid-air. Looked like someone got it with a shotgun. There was Monokote still floating down after I ran the 200 yards to the wreck. Guess I'll build my own models from now on.

Bob Parks is a member of my old college model club, the MIT Tech Model Aircrafters. There are about 25 members, mostly undergradu-

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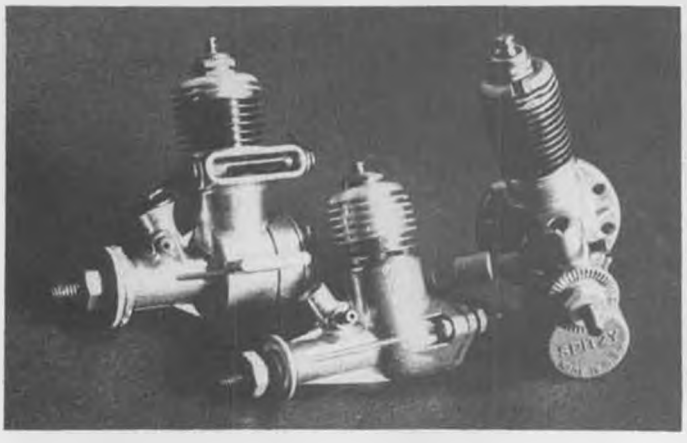


Dave Barfield sent in this photo of some of his old 1/2A's. From l to r, a Jim Walker .065, Atwood Wasp .049, and Spitzy .045.

In response to overwhelming reader response, Larry is continuing his review of cameras. Shown above is the Yashica GSN.

Bill Preis won 1st in Form I at the 1978 Fort Wayne Air Races, shown here collecting his $250 prize money from Jim Gager.

Rex Knepper gets his $250 from Jim Gager for his Q-M win at Fort Wayne. Rex's wife, Joan, is there to help carry it home!

PYLON "GO FAST AND *Turn Left!*"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

BANG THE DRUM SLOWLY. . .

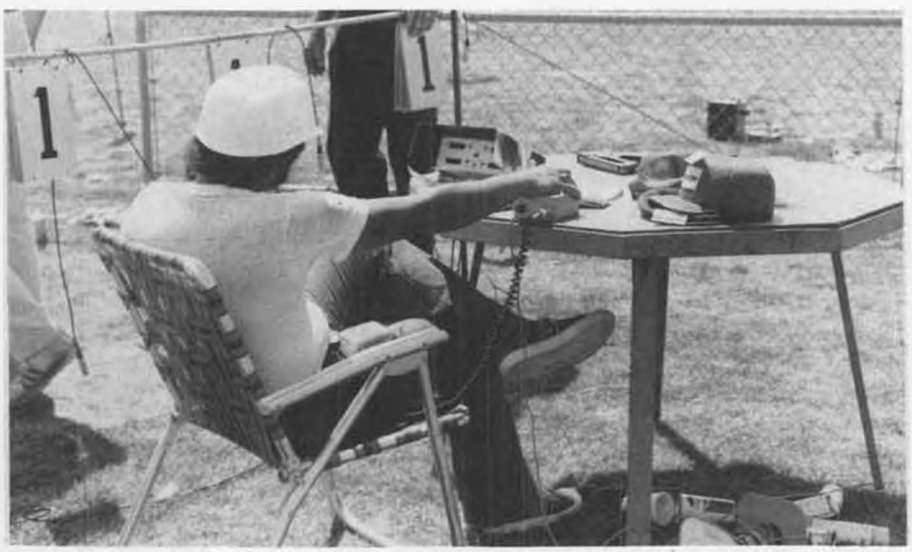
The death march rolls on. Reading the various newsletters we receive as a result of this column, and the conversations we hear while attending various races, would lead a person to believe that pylon racing is on its deathbed and will soon expire. Clubs are crying because all the efforts involved in putting on a race go virtually wasted when the number of contestants reaches a grand total of ten or twelve. With that kind of turnout, the workers outnumber the contestants, and at the average entry fee of $8-$10, the hosting club will probably lose money paying for the trophies it purchased. The problem feeds upon itself, for not only is the hosting club discouraged from wanting to hold another race, but the contestants also become discouraged with poor turnouts. Wasting a day's effort, and the expense of traveling anywhere from 200 to 400 miles to make a contest, often makes the contestant think twice before going to the contest scheduled for the next week, let alone return to one where turnout has already proven to be poor.

Racing should be enough in itself to draw contestants, and each contest should be larger than the one before, with the excitement creating the desire within "Joe Average Racer" to be a part of the thrill of racing. Perhaps we've gotten off the track of how to increase our numbers, though. The seemingly prevalent theory has been to have races on a weekly basis (that's the way it's been around the Mid-west until this year; now we're averaging a contest every three or four weeks), or at least every two weeks. Shooting in the dark as to what could be tried leads me to suggest that a racing association should try to create a major race on an annual basis in a given geographic area, say a four-hundred-mile radius of a good contest site.

Go for major valuable prizes to draw the racers from within that radius, or an even greater radius. Although not expected, it's nice to have a chance to reimburse some of your expenses.

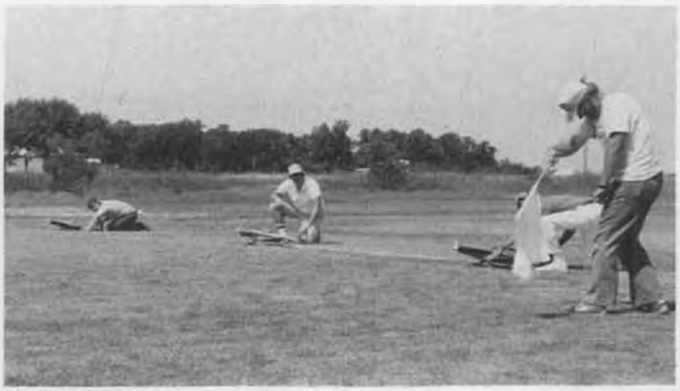
Go for tying your event into some other area attractions or doings, and use their nickel for free publicity. Push the involved club workers to go all-out to make a super contest. The non-workers can be expected to sell raffle tickets to help finance the prizes and make the club a profit. Social service organizations, such as the Kiwanis or Lions clubs, will go along 100% to help your contest be a profitable success, if you're willing to split the profits with them for charitable causes; and let me tell you . . . these groups are really enthusiastic and gung-ho. They can be a real asset to you. They also have experience where you may not.

Okay, you're sitting on the throne in your private library (you can tell a real modeler by the books he keeps on the tank shelf for diversion), saying to yourself, "Self . . . Gager's blowing smoke again!" Well, maybe not this time. I remember reading about the race they put on at the PGRC meet in Maryland. They get a



Chief lap counter, Phil Basile, with central communications system and digital readout timing system, at the Fort Wayne races. Timing system was designed and built by Allen Booth.

Jim Gager waits patiently, while three Formula I fliers get their ships ready to go at the Fort Wayne races.



They're off! Well, almost. Caller on the right should have let go by now.

good turnout of F-1's, running in the forty to fifty-contestant range, the attraction being valuable and plentiful prizes. The Tangerine race in Florida always draws a large contingent of racers, who are attracted by the warm weather in the middle of winter; the Fort Wayne Air Races drew the largest turnout in the Mid-west, the attraction being money; the Rough River Q-M Nats always draws a large turnout, the attraction being the super site and the cash prizes and silver trophies; Bakersfield always draws a great turnout, due to the superb competition that shows up to do battle. There are many other contests that fall into the category of a "good" race, for one reason or another.

With a calendar of "good" races, one a month, it seems that the chore of an even longer traveling distance, or having to make it an overnight trip, would easily be cancelled by the rewards of winning a major prize or competing with a large turnout of competitive racers. The longer period of inactive time between races would also allow for the building of new aircraft or repairs of the slightly bent ones.

The above type program may cut down on the number of races you get to attend, but do you really enjoy competing as one of only ten competitors at so many races? It is not the total solution to what appears to be a growing problem that could ultimately lead to the demise or reduced quality of pylon racing, but it has its merits.

MORE HELP FOR YOU, AND MORE BRAGGING FOR ME. . .

The club I belong to, the Fort Wayne Flying Circuits, doesn't air its club finances in public, and I have no intention of doing so now. But, at the pylon race we put on this year, we gave away $1000 in cash, with no outside sponsorship whatsoever (entry fees don't cover the prize money, either). We paid for equipment purchased only for use in racing, which is therefore charged as an expense of holding the race, rather than against the club's general funds, as this is not specifically a racing organization. Contributions were made to the Township Park, whose property we use, and the Fort Wayne Three Rivers Festival, whose advertising nickel we use and whose overall activities help us draw a crowd of thousands of spectators, who in turn buy our raffle tickets and concession food. Even after all of the expenditures, we still made enough money to make it worth working to solve the specific problems magnified by a "money race" and non-racing help. In our case, the club members are finding it a more attractive idea to put their time and effort into one big project each year to help keep the club financed and pay for improvements, rather than several smaller and less profitable ones. Besides the benefit to a club's treasury and pride, it means that each year the contestant can reasonably expect more bugs to

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Eagle-eyed Kieth Golembiewski holding down the No. 3 pylon at Fort Wayne.

One of the more peaceful moments during the two-day Fort Wayne meet. Quarter-scale Little Toni in background.

Steve Metzger (left) must be a good sport if he can still smile after doing this to his racer. Dave Sears helps with the display.

Formula I winner Ron Schorr, of N. Hollywood, Ca., with wife and daughter. Ron's Polecat was tops in appearance points.

Bob Reuther, of Nashville, Tennessee, was the big winner in Quarter Midget, with a total of 37 out of a possible 40 points.

PYLON AT THE NATS

By JOE KLAUSE

PHOTOS BY AUTHOR UNLESS NOTED

• Many people, hobbyists or not, like to watch pylon racing. Let's face it; it's exciting for pilots, pit crews, and spectators. If you're a real aficionado, then there's only one place you should have been during the first week of August . . . at the Nats. There were three days of Quarter Midget racing, followed by another three of Formula One. That's hard to beat, especially since many of the top fliers in the country were there.

Competition in Quarter Midget began early Monday morning. There were four rounds on each of the first two days, and two on Wednesday. Ten rounds are a very thorough and demanding test of the pilot and plane. No one can say that the winner was just lucky. How did things turn out? Well, when it was all over, Bob Reuther, of Nashville, Tennessee, was top man, with 37 out of a possible 40 points. Breaking it down, he had one third place, one second, and eight firsts! By any standard, that was a superb performance. Second place went to George Parks . . . for the third year in a row! Tom Baker was third; only one point behind George. Here are the top standings, together with their scores:

A close-up of Greg Doe's Little Toni says it all.

OPEN

1. Bob Reuther 37
2. George Parks 35
3. Thomas Baker 34
4. Brian Richmond 32
5. Thomas Christopher 31
6. Dennis Sumner 30½
7. Russell Eavenson 29
8. William Adams 26½
9. Bill Hager 25
10. Gregory Doe 23

SENIOR

1. Peter Campo 14½
2. Tom Giertz 7½

As for some of the nitty-gritty, 21 entries competed. Most of them flew Prather Little Toni's, there were several each of Midget Mustangs and Shoestrings, and two scratch-builts. Up front, approximately two-thirds used Rossi .15's, and the remainder were Cox .15's. It was not uncommon for a contestant to have

John Brodbeck Jr. of K&B fame, with his colorful Polecat, which he flew to 14th place. Hmmm . . . wonder what engine he's using?

Greg Doe, of Nashville, Tennessee, flew his beautifully finished green-and-white Prather Little Toni to 4th place in Formula I.

Dave Shadel, left, of Vista, Ca., and John McDermott, of Greensboro, N.C., with John's 5th place Form. I Little Toni.

Tom Christopher, right, flew his Little Toni to 5th in Q-M, also set a new heat record of 1:26.8. John McDermott, left, was Tom's caller.

Inspection time! Quarter Midget engine inspector Phil Bussell, center, stands by patiently as Q-M winner Bob Reuther pulls the head off his Rossi.

Tom Christopher's modified Rev-Up 7x6 prop, mentioned in text. Note swept tips.

Q-M winners circle. Top row (l to r): Dennis Sumner, 6th; Tom Christopher, 5th; and Brian Richmond, 4th. Bottom (l to r): Tom Baker, 3rd; George Parks, 2nd; and Bob Reuther, 1st.

two planes . . . one Rossi and one Cox-equipped. The dominant prop was the Rev-Up 7x5N. However, it's interesting to note what was used on the fast-time plane. Tom "Thumb" Christopher, flying a Little Toni with a Cox .15, turned the fast time of 1:26.8 . . . a new record. He also held the old record at 1:27.5. His prop started out as a Rev-Up 7x6, and ended up as a 6-1/2x5. One of the accompanying photos will give you a good idea of blade area and tip configuration. Tom was fifth overall, and might well have placed higher if he hadn't stumbled and jammed his left thumb into a running prop for one of those good ol' "O" heats. All in all, Quarter Midget competition at the Nats was excellent.

It's hard to resist using that tired old cliche' about a tough act to follow, but Formula One was up to it. Flying began on Thursday morning, and followed the same format as Quarter Midget . . . four rounds each on the first two days, and two on Saturday. What did it all prove? Maybe nothing, but it was pretty obvious that consistency again paid off a lot better than occasional flashes of brilliance. Engines? Super

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Don Lodge's fantastic Lockheed Cheyenne helicopter. This is without doubt one of the most ambitious helicopter projects to date.

The rotor blades on Don's Cheyenne are foldable for transport and storage. Model is one of the first to use a rigid rotor.

CHOPPER CHATTER

By JOHN TUCKER

PHOTOS BY AUTHOR UNLESS NOTED

• This month, it's welcome to Don Lodge . . . old time gas modeler and more recently, R/C helicopter enthusiast. Don, as you may know, is the builder of that fabulous R/C Lockheed Cheyenne compound helicopter . . . you've seen many pictures of it in the model magazines. As luck would have it, an old friend of mine, John Minasian, was telling me of his experience flying the Cheyenne and working with Don on the flight characteristics and tests. He said he would get in touch with Don and have him send a few pictures for the magazine. Well, Don did better than that . . . he sent an entire series of photos (never before published) and a letter describing the machine in detail. It was so well written and informative that we'll publish it as received so you can see how the design concept has evolved into an excellent chopper, and how the flight test program has been set up.

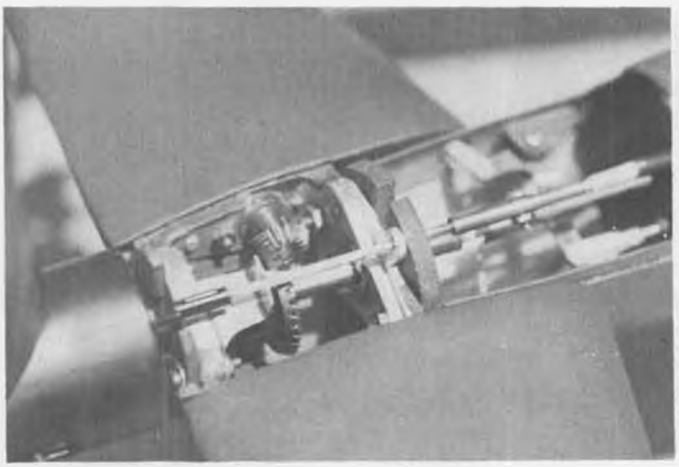
As a little background, Don Lodge was born (a few years ago) in Columbus, Ohio. He attended Purdue University, in Indiana, where he earned his B.S. degree in Aeronautical Engineering. In 1937, he held the FAI record for Senior Class "E" gas models with his own design. The following year, he was the overall champ at the American Legion Nationals in Indianapolis. Following a career in aviation, Don enlisted in the Navy and served as a primary and advanced flight instructor during the war. After the war, Don completed his college degree and immediately went to work for Cessna Aircraft as a helicopter engineering test pilot. (How many of you remember the Cessna helicopter?) He was with Cessna for 5 years, then worked for Hiller Helicopters for another 6 years, finally retiring from Lockheed after 12 years with them, as an engineering test pilot. Now, if you chopper designers have any questions about helicopter theory, Don is the man to see.

Around 1974, Don built a Kavan Jet Ranger and became hooked on the hobby. Naturally, his last project at Lockheed was the full-size Cheyenne Helicopter, so what else to do except design a scale R/C model of the Cheyenne? He cleaned out a corner of his garage, set up an Atlas 6-inch metal lathe, a drill press, bandsaw, and lots of hand tools, and started working with John Minasian on the fiberglass shell. Obviously, they became close friends and have enjoyed building and flying the latest in model R/C choppers!

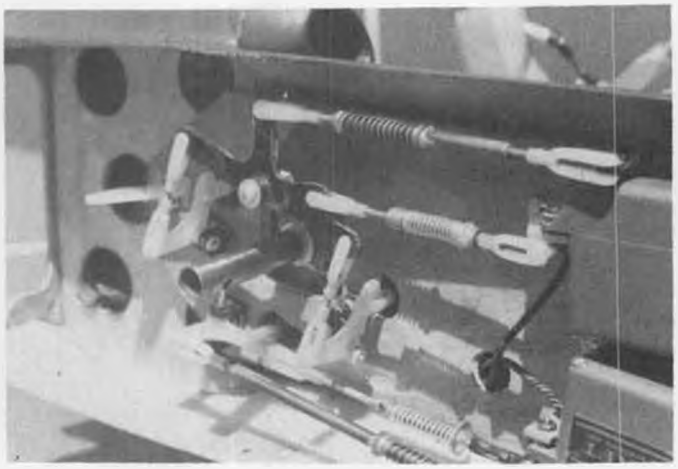
Now, to Don's own story, which begins with a description:

DESCRIPTION

MAIN ROTOR: 52-in. dia., 4 blades, Rigid rotor type, 1135 rpm



Close-up of the pusher propeller hub and tail rotor power take-off. Pusher prop is controllable from zero thrust to full forward thrust.



Don's Cheyenne uses the same positive/negative spring control concept as the full-size machine. Talk about authentic!

(approx.).

TAIL ROTOR: 10-in dia., 4 blades, 5318 rpm (approx.).

PROPELLER: Pusher, 10-in. dia., 3 blades, 3000 rpm (approx.), controllable pitch (by R/C), constant engagement with drive system.

FUSELAGE: Molded fiberglass, length 51 in.

LANDING GEAR: Scratch-built retractable main wheels.

GROSS WEIGHT: 11-3/4 lbs.

CONTROL SYSTEM: Collective: conventional. Cyclic: authentic Lockheed concept, positive/negative spring "force" system.

ENGINE: Webra Speed .61.

RADIO: Kraft, KPS-15 & 16 servos.

GENERAL COMMENTS

"To my knowledge, this is the only 4-bladed rigid rotor to ever fly using the authentic Lockheed positive/negative spring cyclic control concept. I think it should be noted that this is *not* the very first rigid rotor to fly. That credit goes, I'm told, to a small group of Lockheed researchers who, in 1958 or 1959, flew a *two*-bladed rigid rotor helicopter (using the old reed radio, yet!). One source claims that control paddles were used, while another insists that positive/negative springs with a flybar were used. I suspect both are correct, and that a little of everything was tried, since it was a research program.

"Also, to my knowledge, the Cheyenne has the first R/C controllable-pitch propeller ever flown on a model (in this case a pusher, of course). It may also have been the first R/C helicopter to fly with retractable landing gear . . . at least, I hadn't heard of any at the time although now, of course, we know that Schluter and others are producing kits with retractable gear. Finally, the Cheyenne is capable of *full* autorotation. More tests on this are planned for the future.

DESIGN NOTES

Landing approach. So far, only Don's friend, John Minaian, has flown the model.

With the gear up, the Cheyenne makes a high-speed pass at about 40 mph.

Don's Cheyenne has separate channels for cyclic pitch, cyclic roll, and the tail rotor. The fourth channel controls the throttle and collective, landing gear and pusher prop are on the 5th.

"All mechanical parts except the gears, bearings, and cooling fan were designed and scratch-build specifically for the Cheyenne. Even the engine muffler and heat sink are special, because of the space problem. Rod ends and bellcranks, where possible, were obtained commercially.

"Some of the unusual design features include: a thrust bearing in addition to two radial bearings in each main rotor movable hub (or fork); two intermediate ball bearings in the tail rotor drive shaft supports (in place of the usual plastic tube restraints); and because my radio has only 5 channels, a somewhat unusual control set-up. Cyclic pitch/cyclic roll, and tail rotor each have their own separate channels. Engine and collective use the 4th channel, and the 5th channel controls the propeller pitch and the landing gear. That is, with the lever full aft, the gear is down and locked, and the propeller is in flat pitch (zero thrust). Moving the lever forward increases prop pitch, and at

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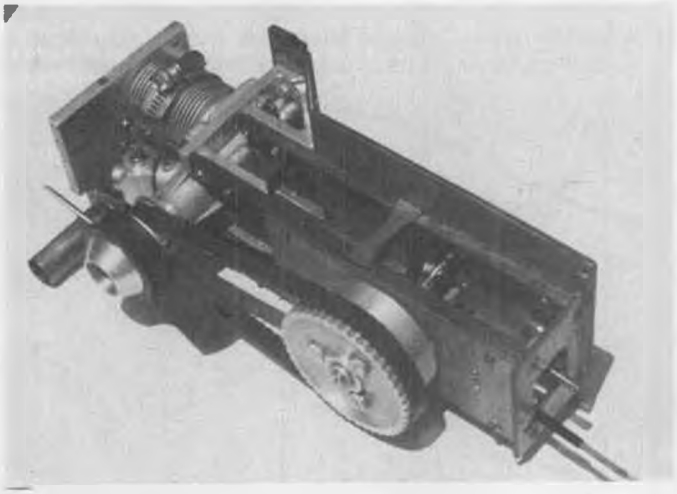

Power unit details, including the engine, muffler, heat sink, clutch, and tail rotor/pusher prop shaft take-off.

Close-up of the 4-bladed rigid rotor head. Outstanding design and workmanship is evident.

The pilot in Bob Bailley's Nosen Gere Sport is a perfect match to the WW-1 German fighter color scheme. Large pilot makes the model look a lot smaller than it really is !

MAMMOTH SCALE

By RON SHETTLER

• Before we get into the meat of this article, I would like to thank the many people who have phoned, written, dropped in, and otherwise commented favorably on what we at **Model Builder** are trying to do to help the builders and fliers of Mammoth Scale aircraft. I would also like to thank those who expressed concern over the safety of what we are trying to achieve, and how it would affect standard modeling, as their concern will help us keep on thinking safety first. I do believe, however, that we have to keep the facts straight. Let me comment on some statements made against our love of larger models.

Fact No. 1: Generally speaking, the many people with whom I have spoken and corresponded are the most responsible group of adults I have had the pleasure of working with, and I have been modeling a long time. Active and retired airline pilots, full-sized aircraft engineers, modelers with many years of experience, and builders capable of producing these engineering feats from scratch, are usually pretty responsible people. I hope this puts some confidence into the thinking of concerned people, as while large aircraft can certainly cost a lot less in dollars to build and operate, there is a lot of visible effort going into the final product, and certainly a lot of time. As a result, you don't try anything too foolish while flying, and tend to keep up your maintenance, which will eliminate many of those unexplained crashes, etc.

Fact No. 2: The destructive energy of large models isn't necessarily greater than that of smaller aircraft. In the August 1978 issue of MODEL AVIATION, under "Letters to the Editor", an article relating to the destructive forces of large models (which generally fly at slower airspeeds) in relation to smaller and *seemingly* safer standard models is quite an eye opener. It's interesting to note that this was written by a professional mechanical engineer who can present facts, not opinions. If this massive movement toward large mini-aircraft (that sounds contradictory!) has done nothing else but make us aware of our responsibilities, it has done a big service to modeling, generally. A short time ago, in England, a boy was killed by massive injuries sustained by a .19-powered sport model. I'm sure his parents and the unfortunate owner of that model find no solace in the fact that it wasn't a big model that so tragically eliminated their loved one.

Fact No. 3: We are *already* governed by full-sized air regulations in how and where we fly. Unfortunately, these are being disobeyed every day, in all countries. Air

Les Hard, of Lansing, Mich., is currently building this 1/4-scale Stearman. Cowl for the 8-foot model is made from a 6-qt. kettle.

Bob Bailley's Gere Sport makes a low fly-by. The only apparent change on the Quadra-powered model is the use of four ailerons.

regulation officials have recognized that we have what appears to be a responsible organization of our own, which should police our own activities. Maybe we should do just that, before it is done for us.

Fact No. 4: Air controllers are more concerned about what they *can't* see on their scopes than what they can. Ignorance is not bliss, in this case. I've spent nearly half my life working with real aircraft, and have taken courses involving ground approach systems. If the only reason you are able to continue flying in your area is because your model is too small to register on a radar screen, then you had better re-evaluate your position. Would it surprise you to know that a standard-sized model can easily bring down an airliner? Also, please remember that pilots of full-sized aircraft don't always follow the rules or realize the danger in colliding with a model. I don't know how many times I have been buzzed by a pilot who thought it was a big joke to watch my model tumble in his wake, not realizing how close he came to hitting a second model he didn't see. One thing for sure, our bigger models are going to be more visible, and we're going to have to be more responsible in what we do and how we do it. I'm confident we can do it. One columnist was concerned about the new 1/4-scale pylon events. Perhaps it would put his mind at ease if he knew that his organization wants to *slow down* the event, and has since run 1/4-scale events in which people performed slow rolls and loops in the course area and ended with slow, soft landings. They were described as real "pussycats" in flying, which hardly indicates any relatively dangerous traits in the larger airplanes.

Fact No. 5: Large Mammoth Scale models can handle the added weight of scale details better, and since they are generally more rugged, they tend to be flown more often and for longer periods of time. If adequately powered, this will cut down on the three major causes of accidents among scale modelers: excess weight, lack of usable power, and most important, flying practice.

A new one from Jim Messer is this Quadra-powered model of the brand-new Piper Tomahawk trainer. Jim hopes to have a kit for this airplane ready for delivery sometime in early 1979.

Jim and his Tomahawk. Modern light aircraft seem to be popular subjects for 1/4-scale, yet are seldom seen in normal-size models. Wonder why that is?

I sure wish the people who are throwing rocks at our section of the hobby would have something constructive to say, or at least something based on experience of actually designing, building, and flying Mammoth Scale aircraft. When I hear some of the comments, I wonder where the "experts" were when we flew big models with rubber-powered escapements, German Bellamatic servos with an *advertised* thrust of 5 oz., not 5 lb., and various concoctions of our own, using Mighty Midget motors with one 7-to-1 gear reduction. Midget? Vaguely. Mighty? No way! Since that time, new modelers have had it easy, never having experienced a hung-up escapement, etc. In a way, they are very lucky, but they did lose some very valuable experience in designing efficient control systems. I, for one, became lazy when the new powerful servos came out. Mammoth Scale has forced me to use them efficiently again. I wonder how many modelers realize that some fairly large model gliders were controlled by the influence of a magnetic compass. You didn't waste power there!

Mammoth Scale models have a built-in safety feature, in that they are not "instant airplanes". A lot of building experience and engineering is required to get one to the stage where it will fly. They are usually built by experienced modelers, or ones who realize that this is a serious project and that asking for advice from experienced modelers is no insult to their intelligence, but actually proves that they have some.

Another of Jim Messer's biggies is this Quadra-powered Ercoupe. This one is also due to be kitted, supposedly sometime late this year.

See sketches next page. ⟶

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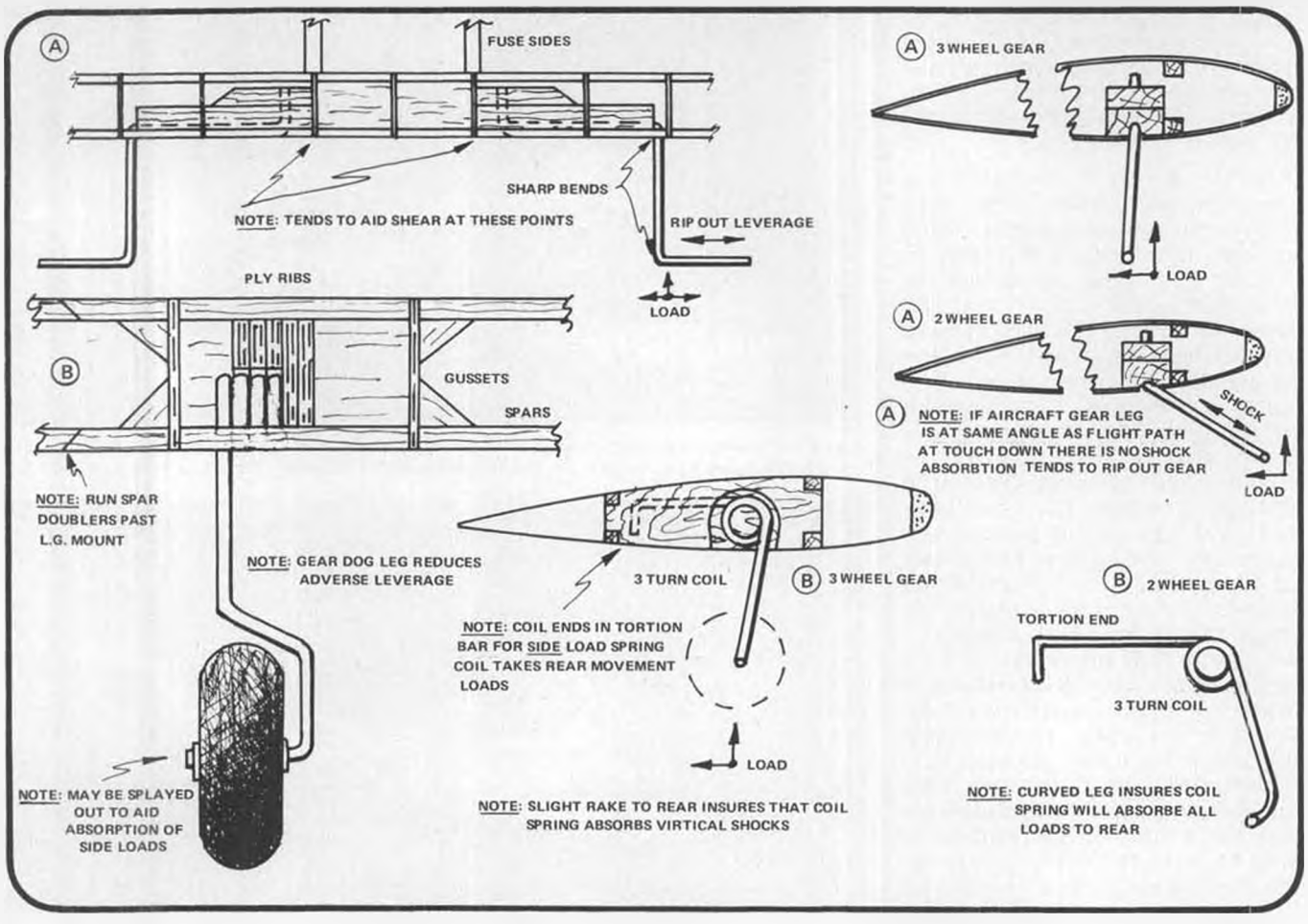
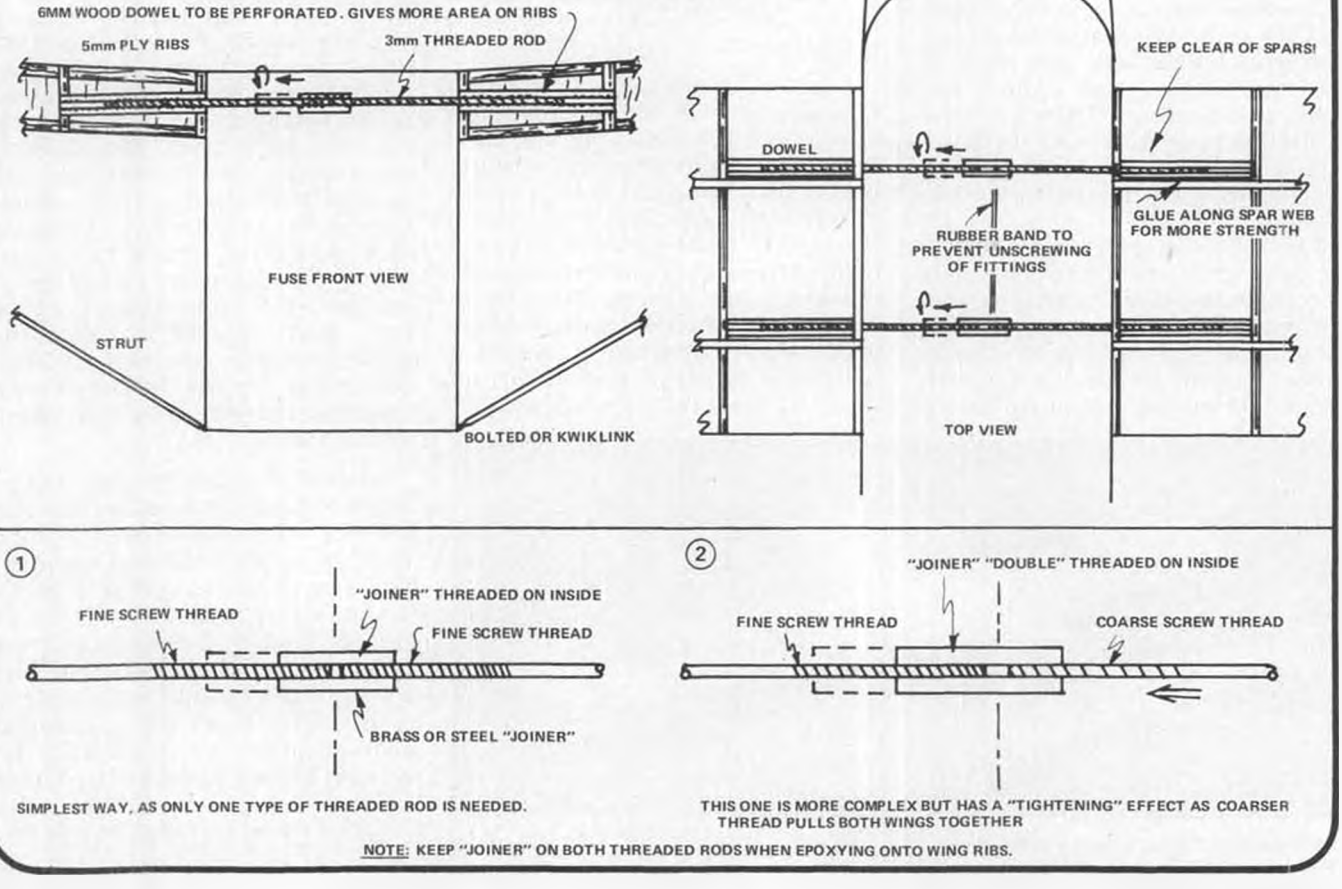


WING "JOINER"

IDEAL FOR LARGER HIGH WING MODELS W/ STRUTS OR GLIDERS, WHERE INDIVIDUAL WINGS MUST BE ATTACHED FOR TRANSPORT OR SCALE APPEARANCE REASONS



NOTE: KEEP "JOINER" ON BOTH THREADED RODS WHEN EPOXYING ONTO WING RIBS.

Here's an idea! Dan Crum's Mach I as modified for aerobatic slope soaring.

Murph Misiewicz, Encinitas, California, and Windspiel Fokker FK3.

Roger Taylor put semi-symmetrical section on Aquila inboard panels.

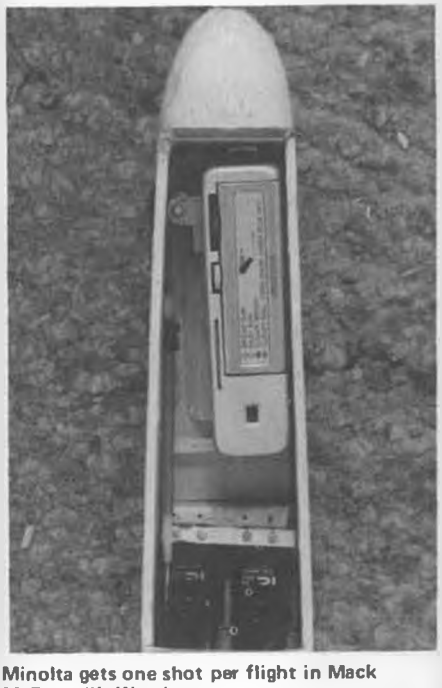
R/C SOARING

by Dr. LARRY FOGEL.

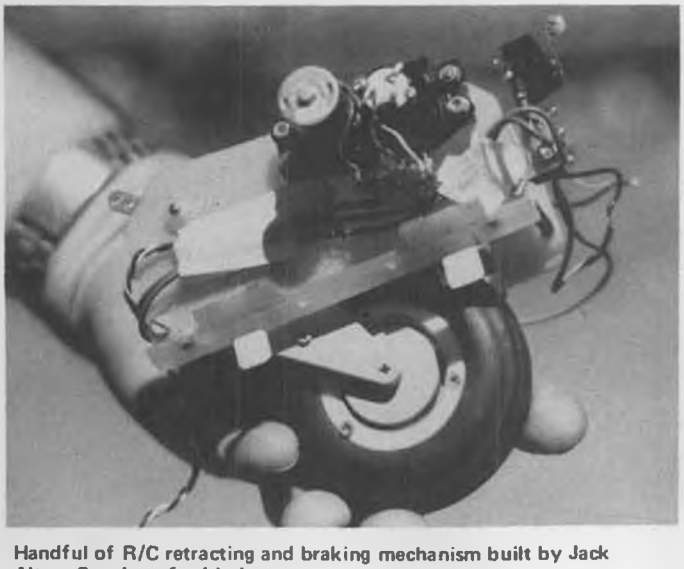
• The South Bay Soaring Society Scale Contest brought the big ones together in San Jose. The first day was devoted to static judging which was held indoors . . . and that was most appropriate, in view of the weather conditions. But you can't keep good pilots from flying, no matter what; the contestants put various birds into the air, saving their exquisite scale ships for the second day of the contest. The air was turbulent, and landing was exciting every time.

Vern Burger directed the contest, and things went smoothly. Jon Lowe entered his Soarcraft Glasflugel 604, and served as contest manager as well. The other aircraft ranged from

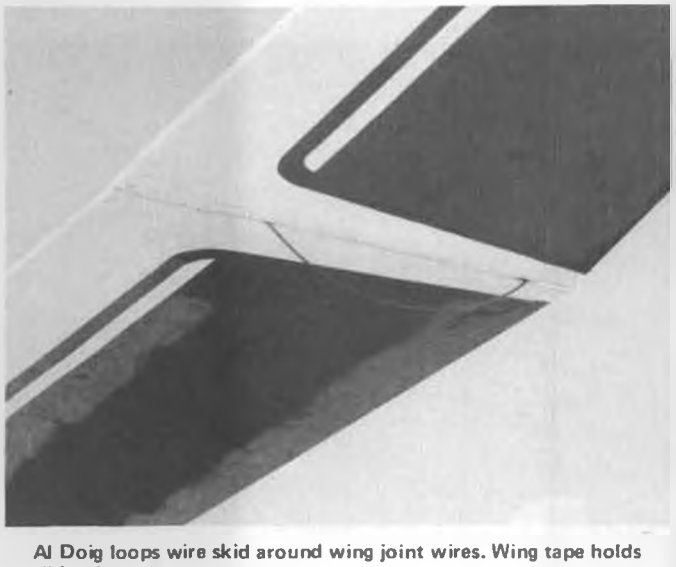
Jon Lowe and contest winning Soarcraft Glasflugel 604 in San Jose.



Minolta gets one shot per flight in Mack McDowell's Wanderer.

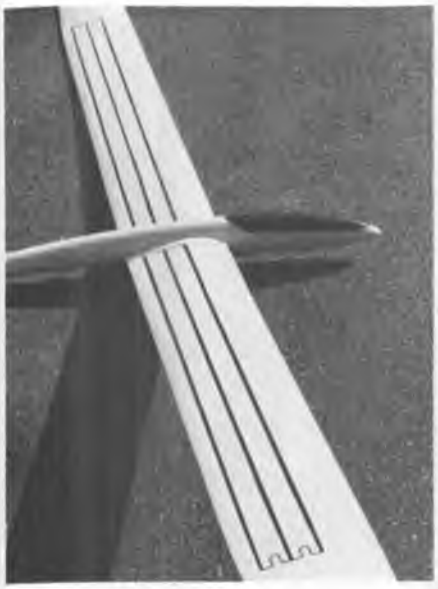


Handful of R/C retracting and braking mechanism built by Jack Alten, San Jose, for his Jantar.



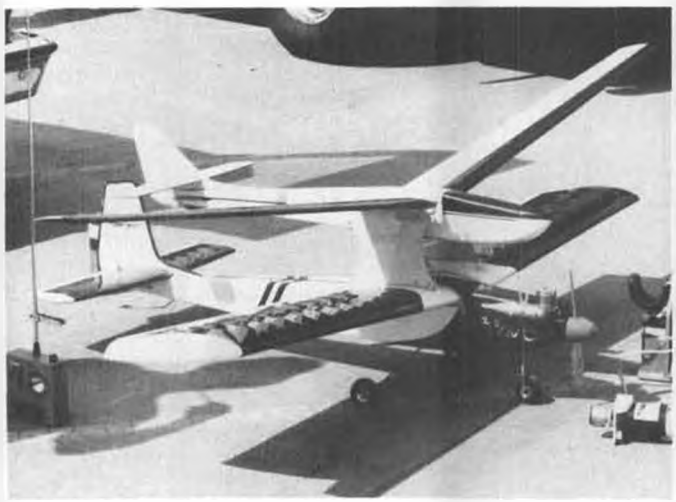
Al Doig loops wire skid around wing joint wires. Wing tape holds all in place.

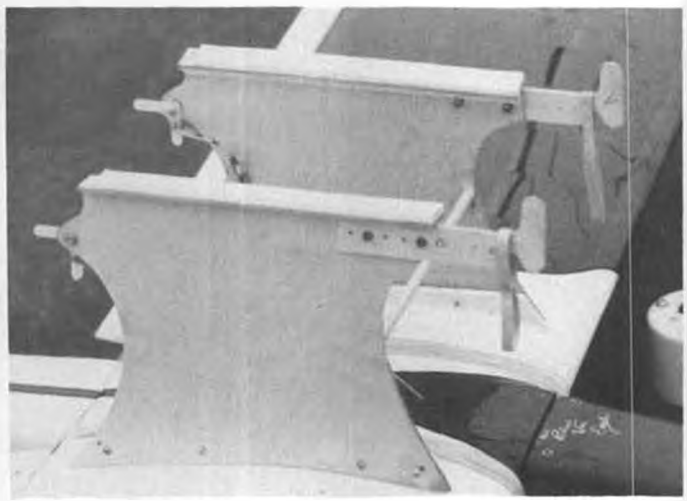
Scale ships lined up for judging at South Bay (San Francisco) Soaring Society Scale contest. Big scale birds are increasingly popular among soaring elite.



Al Nagele's LNG 3100 with experimental "terraced" wing. Clark-Y airfoil. Looks promising.

Pilot relaxes in cockpit of Ray McGowan's Jantar, built from German kit. Note folded quarter-scale chart . . . in case radio fails.

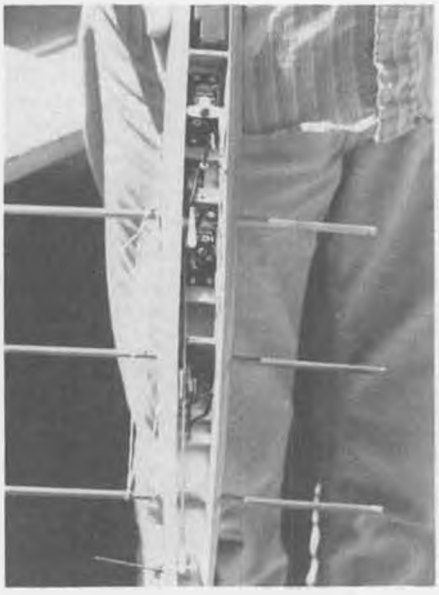




Dick Eagle, Chula Vista, Calif., built this Senior Falcon "Flying Atlas" glider launcher. Shown aboard is Larry Fogel's Windfree. Launcher is adjustable, has taken many gliders aloft.

Designer/builder Roger Sanders, Atwater, Calif., and his Windfreak flying wing.

Joe Newland's 8-pound Kestrel, built from outstanding Ralph Learmont semi-kit, Australia.



In-line radio installation in Roger Sanders' Windfreak. Glove-like fit.

Newland's Learmont Kestrel on final approach. Ship was first in static judging.

scale antiques, such as that offered by Jerry Arana, to modern quarter-scale replicas of the Kestrel 17 and Jantar. Joe Newland and I entered Kestrel 17's, built from the semi-kit offered by Ralph Learmont, of Melbourne, Australia. Joe included every detail, and his construction was immaculate. He clearly won first place in the static judging. Ray McGowan entered an eight-pound Jantar built from the German kit. The model pilot in the cockpit had a full set of instruments in front of him, and even a folded quarter-scale air chart, in case some navigation might be needed aloft. Other aircraft included the Diamant and Libelle. By the way, Jack Alten, of San Jose, is now building a Jantar which will have a retractable landing gear with remotely-controlled braking.

The weather was perfect on the

Continued on page 125

Retract mechanism builder Jack Alten and his Diamant scale entry.

Close-up of pilot in Jerry Arana's antique primary.

10 WAYS TO LOSE A SAILPLANE CONTEST

By DAVE THORNBURG . . . Our author applies a little "reverse phsycology" to point up various traps that some of us may fall into when getting a little too up tight about bringing home R/C soaring trophies.

• Everyone who visits the trophy wing of Chateau Thornburg asks the same questions during the tour: "How can a pilot with thirteen years of R/C soaring experience fly so consistently to FIFTH place?" "Ain't you got any first-place hardware, man?" "Be honest now . . . how do you *always* avoid winning?"

At first, I brushed these questions aside as mere polite chatter, but gradually I came to realize that people really were interested in the Art of Losing. After all, losers outnumber winners at every contest you attend . . . sometimes by as much as a hundred to one. Yet no one, to my knowledge, has bothered to compile any sort of checklist for all these prospective losers. No one has attempted to set down the basic guidelines for becoming methodically mediocre, dependably deficient, an accomplished also-ran.

I began to give the matter some thought.

Losing appears to be such an easy and natural thing, when we first begin to compete! The beginner goes to his first contest, hears his name called to launch, feels every eye on the field watching him as he stumbles to the flight line in a sweating, panting blur, and launches his "Sagwing 900" without benefit of either a timer or a transmitter. Hey, presto . . . he loses! How deceptively simple it all looks; without experience, without effort, without art, he simply steps up to the flight line and loses!

We call this "beginner's luck".

It never lasts. Too soon, our beginner starts to accumulate experience and sophistication, and his natural talent for losing fades quietly away. He attends too many contests. He becomes blase. It is then that the odds start to catch up with him; his scores creep slowly out of last place into the middle range, and finally into the top 10%.

Here the danger of winning, which had always seemed as distant as old age, becomes suddenly acute, threatening. All at once, our former beginner finds himself standing naked and exposed before Dame Fortune. All at once, the merest fluke of luck could destroy his unbroken string of losses forever . . . unless he is willing to stop trusting to chance and begin to make a *concerted effort to lose.*

If you find yourself in this position, don't panic. Here are ten simple rules to follow that are guaranteed to keep you in the loser's circle. Like the Ten Commandments, they're virtually impossible even to remember . . . let alone practice . . . all at once. But if you'll just follow any three of them religiously, you'll soon find yourself out of any danger of winning, safe in the fold of the also-rans:

GET DOWN ON THE CONTEST BEFORE IT STARTS

No contest is perfect, even on paper. Examine the written rules carefully . . . pick 'em apart. Remember, the rules are always designed by people who plan to cheat you out of your eyeteeth . . . who else would put all that time and effort into something they don't get paid for?

Make a list of the worst things you can say about the contest (don't omit personalities). Then find somebody else with bad digestion, and compare your list with his. Try to out-bitch each other, it's surprising what a little friendly competition can do for the quality and spirit of bitching. Even if you don't succeed in talking each other out of attending the contest, you can usually lower your joint enthusiasm enough to avoid any danger of winning.

DON'T PRACTICE THE EVENTS IN ADVANCE

If you do, you're sure to have an unfair advantage over 90% of the other contestants, who haven't even read the rules yet. And no one likes a person who takes unfair advantage.

For example, if you plan to attend a contest that requires precision landings, the very worst thing you could do would be to go out sport flying with a cheap tape recorder (or an expensive friend) to count off the last minute of every flight, so that you could set up a consistent landing pattern and practice it *under time pressure* every time you fly.

Simulating contest excitement and confusion is another way the unscrupulous gain an unfair advantage. I have known pilots who go out to practice landings and deliberately park their cars beside the field in a tow-away zone, or deliberately set their landing Frisbee underneath wires or goalposts, or ask a buddy to shout out last-minute pattern changes ("Switch to a right-hand pattern quick! Here comes a Sail-

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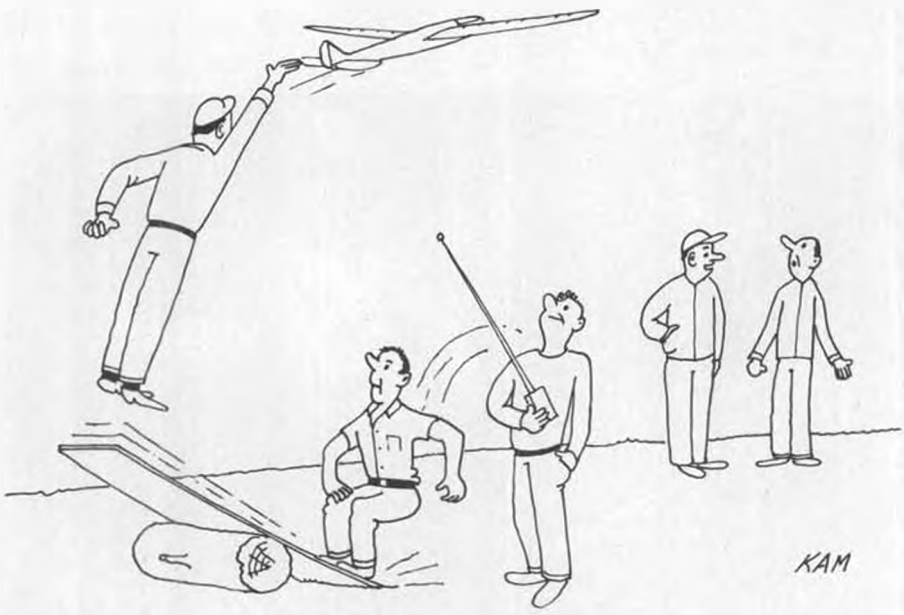


"The C.D. specified hand-launch only, but Dave is determined to end up higher than fifth place!"

Dear old Dad Moucha releases Powerhouse for son, Walt, during the 12th Annual SAM Championships.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• How does one summarize the 12th Annual SAM Championships? Simple, use that overworked word . . . Great! Before any more is said about the Champs, full credit should be given to Woody Woodman, Contest Manager, for all the extracurricular work he got himself involved in.

Not content with getting out all the literature, arranging for the field, and answering all telephone calls, he was host to ten of Britain's Old-Timer modelers. To say that Woody's summer home was slightly overloaded was the understatement of the year. Between he and his wife, Evelyn, the British boys learned what American hospitality is all about.

To cap things off, Woodman also hosted a special barbecue and supper for all the retiring and new officers of SAM. This, plus the English boys and a considerable number of late invitees on hand, made for a big crowd. You didn't dare leave your seat, as it would promptly be taken by another modeler wanting to join the bull session. Things like this make the SAM Champs what they are: thoroughly enjoyable fun!

The columnist and Bill Bowen drove across the country to arrive around 4:30 p.m. at the Annual SAM Bean Feed at the Coyle Air Drop Field. Things were in full swing, with hot dogs, hamburgers, and even steaks available to the lucky. Beer was the main beverage, with soda pop available to the teetotalers. Time went to darn fast, as usual, that it was dark when the party broke up.

We mentioned it previously, but well worth noting was the gang from England, headed up by Dave Baker and Ben Buckle. Surprisingly, quite a few places were taken by Ben Buckle, while Dave and the boys suffered some real tough breaks. One of them, Ken Hinton, brought an R/C Class A model and placed fifth against some very formidable competition.

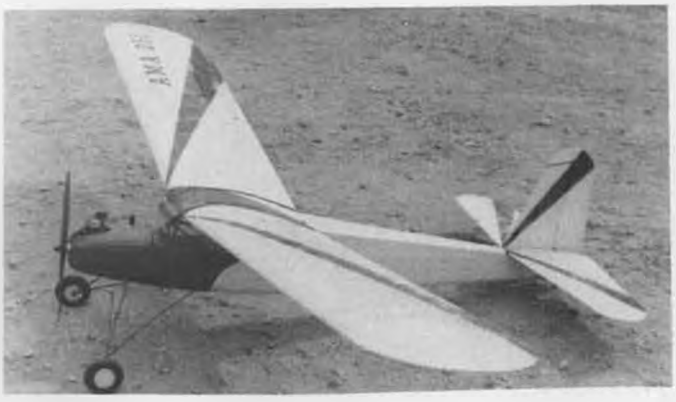
It truly was a shame the columnist lost one roll of film, as he spent the whole day at the free flight area (we're gonna be short on F/F pics this time). Some of the great shots were of Dave Baker holding John Haggert's version of the Lanzo R/C Stick, complete with radio. Other good shots were of Dave Dodge with a most unusual rubber job, designed by Kukavich, called the "Flying Broomstick". Other goodies were Sal Taibi's version of the Anderson Pylon (there's a plane that will dominate the Antique event); both Bill Henns (Junior and Senior) had excellent flying models; and quite a few of the English lads. Oh well, we'll gettum next time!

Henry Struck made one of his infrequent appearances at the SAM Champs with his original New Ruler. The original Brown Jr. has been replaced with an Anderson Spitfire, making it a real potent flyer. Hank also brought out his original Baby Cyclone-powered seaplane to show the columnist (hopefully, this will be a future **Model Builder** scoop). He has decided to call the seaplane the "Ho-Cat" after all these years.

We didn't talk about the weather or the surrounding territory, but we did try to tell you in previous issues. As promised, the area was surrounded by small trees and practically impenetrable brush. The first two days were pretty fair for weather, as the wind never got over 15 mph, but on the third day, contestants were greeted with a 15-20 mph wind to start with. As storm predictions arose, so did the wind.

Only a few models were lost on the first day, but the third day found the thickets dotted with models.

"SAM Speaks" editor, Pete Vano, nearly won Antique with his Powerhouse.



Pond's winning Dallaire for 1978 has reverse color scheme of the 1974 winner. O.S. -60 four-cycle power.

John Stott pumps up tires on his compressed air entry. Looks like beer can tank.

Stott launches his compressed air model. Extremely light structure required.

Photo can't do justice to this gorgeous Megow Soaring Eagle by Joe Coles. Also a graceful flyer.

Also, several cases were cited of passing motorists appropriating models that landed by Hwy. 70. If it hadn't been for the strong wind on the last day, most everyone would have to say it was a good meet from start to finish.

Contest Directors Tom Knakal (R/C) and Don Garafalow (Free Flight) deserve all the kudoes they can get. They put in their time tirelessly, and without complaint. Don was lucky, when he took over Jack Florenzie's job, in having Carl Hatrak as a self-appointed assistant. Carl did yeoman work that received scant appreciation at the awards.

Unfortunately, Tom Knakal started to have disconcerting chest pains on the third day, and had to leave his trusty aides, Keith Grote and John Kungl, to finish up the contest for him. We should also mention the tireless work of Arnie Hernandez and Dave Jagge: good men! Of course, John Hill, the frequency control man, lasted the whole route and did an outstanding job of monitoring. Only one model shot down, and then on a questionable issuance of frequency pin. Great cooperation!

Esio Grassi's version of the beautiful "M-G" antique. Finished well in a couple of events.

The electric events, run by Joe Beshar and John Pond (as sponsored by Astro Flight), were quite well attended, and flying was interesting. Joe Beshar ran a different type of contest, where he drained the battery to a certain point, recharged it for one minute, and then you were allowed to fly. Joe claims this is a great leveling factor in electric, but frankly, the columnist doesn't like the idea of draining a Ni-Cd battery every time. They don't like treatment like that!

The R/C Electric event was won handily by the columnist, using a Turner Special that employed a geared Astro Flight 25 motor and 18-10 prop! Cliff Schaible should be given credit for taking the time to troubleshoot the broken leads in the battery pack, which resulted from the long trip across the USA. After he got through checking over the batteries and charging system, the model never flew so good!

In that same line, word has just reached the columnist that Barnet Kernoff, of Tyro Models, is ready to place his kit of the Turner Special on the market. This seven-foot model kit will be sold for approximately $55 retail. All parts, as in his Playboy kit, will be completely cut and formed. If you have had one of these kits, you can appreciate the new Tyro kit. Write Tyro Models Supply, P.O. Box 11511, Palo Alto, CA 94306 for further information.

Probably the most spectacular sight was the mass launching of all twin pushers, to determine the winner. The columnist was really sorry to miss this event, as he had carried a Schmaedig-type twin pusher 3000 miles to compete. Unfortunately, the writer failed to plan properly, and found he had four events to fly on the last day! Plan ahead! The winner of this sudden-

Dave Dodge won the Compressed Air Event with this 1932 Hughes Hobart design.

Close-up of Dodge's winner. Motor mounts on nose of air tank.

Danny Sheelds' scaled up Burd Kingburd. Ship is either huge, or Danny has been dieting! Ohlsson 60 engine.

death type of flyoff, where everyone launches at once, was Dave Dodge. Even Bert Pond was beaten!

As usual, the .020 Replica F/F event was the heaviest entered, with over 40 entries. The old master, Sal Taibi, showed the boys how we do it on the West Coast by flying his Playboy to a convincing victory. Interestingly enough, Barney Onofri flew a miniature version of the Trenton Terror, designed by his friend, Mickey DeAngelis, and placed fairly high.

The guy who got the most mileage out of his models was Larry Boyer. He was able to win Class C Cabin, fourth in 30 Second Antique, and first in Fuel Allotment, using just one Bunch-powered Comet Clipper. A real good performer with that hot-running Tiger! Coupled with his places in Class A Cabin and Class B Cabin, Larry was far out in front of all others for the Free Flight Grand Champion.

On the other side of the coin, Tom Accavatti (who also flies a lot of free flight) won the R/C Grand Championship with models that had been well-tested during the contest season. Tom was in practically every event, taking second in Class A Glow, fourth in Class C Ignition, fifth in R/C Antique, third in Class B Glow, and fourth in Class A-B Ignition. Whew!! Not content with that,

Miss 1978 SAM Champs, Beverly Hartman, holding Jim Travers' Scorpion.

Tom also spent quite a bit of time at the free flight area, winning fifth in Class A Pylon, and third in 30 Second Antique. This guy never runs down!

We didn't mention the old master, Sal Taibi, attending his first East Coast SAM Champs, but the boys won't forget him in a hurry, as he won the 30 Second Antique event, the .020 Replica event, and the Flying Scale Gas event; not a bad haul.

Incidentally, for the benefit of the many modelers who have inquired about the model, Sal flew an Antique design called the Anderson Pylon. This design was developed at the same time the Zipper-type models were coming out. Anderson put his square model on edge, to form a diamond fuselage with a natural point for pylon installation. This 1937-38 design was uncovered by Louie Levine while doing some detective work on Melvin Yates' designs. It should prove to be the dominant plane in the Antique event in a few years.

About this time, Wednesday had arrived, and with it, the annual SAM Business Meeting. Here's the report:

ANNUAL SAM BUSINESS MEETING

Held on Wednesday evening at the Forked River House, on Route 9, this meeting turned out to be a live one over the present method of rule changes. So many frivolous rules have been introduced and passed that SAM President Joe Beshar appointed George Armstead to head up a committee and come up with a recommended procedure.

Armstead put forth three ideas as to how rule changes should be instigated, varying all the way from dropping most all present rules and flying by the local rules used in that particular region, to a strict AMA system of Contest Boards, review committees, etc. His proposal No. 2, the so-called group approach, was deemed the best, this being that the SAM Chapters would submit all rule changes.

Jack Bolton holds, Dave Jagge adjusts prop, Rich Tanis squeezes watch. Jack didn't bend Pylon Buster's fuselage, it's built that way!

This was challenged by the Western Vice President, John Pond, who put forth the Hellman proposal (in essence, quite similar to the Armstead idea), which allows any person or group who could amass 25 supporting votes to place the rule change on the ballot. For those individuals who could not get 25 votes, the proposal was to be published in SAM Speaks, in the hopes of attracting enough votes for the proposal.

After lengthy discussions, the two ideas were combined, with the idea that SAM Chapters or 25 members could propose rule changes. The idea of restricting members to voting on only one class was tossed out. However, a compromise was effected on this, as all ballots were to carry the admonition to vote only on those proposals that were in your field of interest.

Don Garafalow then read the results of the recent SAM elections. The following were elected to office:

President . . . . . John Pond
Secretary-Treasurer . Tim Banaszak
East Coast V.P. . . Woody Woodman
Central V.P. . . . . Woody Bartelt
Rocky Mtn. V.P. . . . . Lin Haslin
West Coast V.P. . . . . Jim Adams

The new president, John Pond, was then installed. Pond announced that he had prevailed upon Pete Vano to continue in his present position as Editor of "SAM SPEAKS". His excellent work was eulogized by both Beshar and Pond.

In addition, the present Rules Coordinators, Tom Accavatti for radio control, and Gene Wallock for free flight, have agreed to continue on in their present positions. After all, why say whoa in a horse race? The men have proven themselves able and competent.

The new President then brought up the idea of pushing SAM memberships by requiring all SAM Chapters to have 100% registered SAM members. This idea was shelved with the statement that each Chapter should be responsible for its membership in SAM. Also brought up at this time was the idea of restricting SAM contests to SAM members. Tim Banaszak reported that any contest with more than a Class A sanction from the Academy of Model Aeronautics does not allow such prohibition. It was resolved that entrants be charged on the basis of whether or not they belong to SAM.

The Treasurer reported that the SAM treasury was in good enough shape that several more SAM Cham-

Continued on page 113

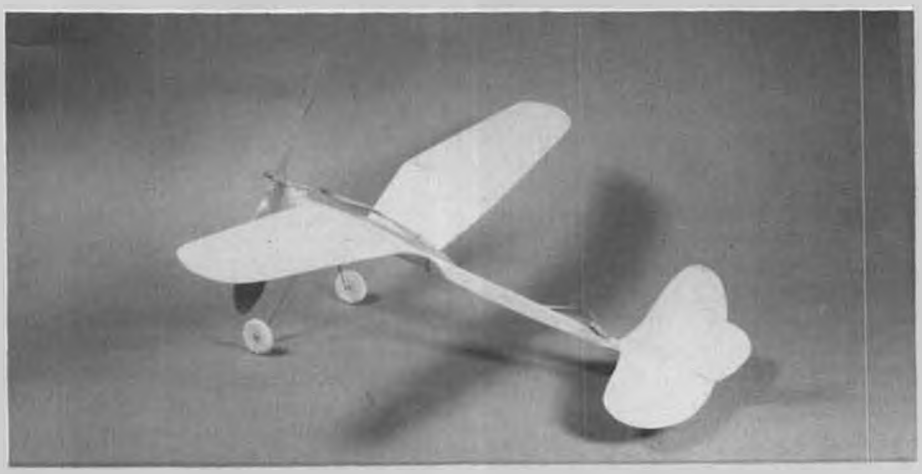
OLD TIMER Model of the Month

Designed by: Louis Garami

Drawn by: Al Patterson

Text by: Phil Bernhardt

GARAMI'S "GULL WING"



• This month's Old Timer is just one of a profusion of small rubber-powered fliers that continuously flowed from the bench of Louis Garami, who is well-known among O.T. enthusiasts as one of the most prolific model airplane designers ever. The May 1937 issue of Flying Aces featured full-size plans for this little gull-winged ship, which Garami claims was inspired by watching seagulls!

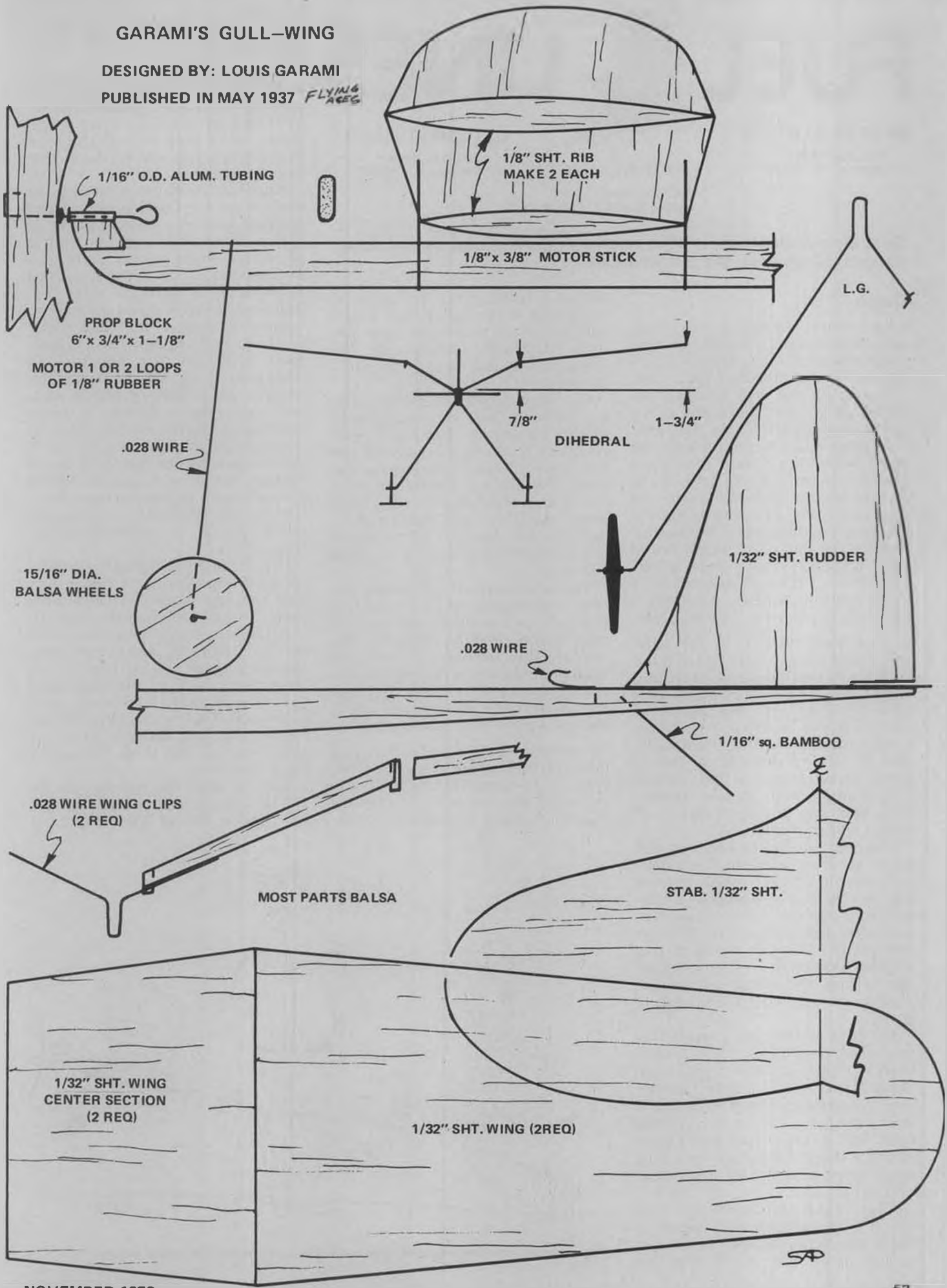
There really isn't too much to say about the model, as it follows conventional construction and flying techniques. **MB's** draftsman, Al Patterson, usually makes a little sketch of whatever Old Timer we feature, but this time he figured it would be easier and quicker to just go ahead and build one. Al used a 7-inch North Pacific plastic prop and nose bearing, and also made the front wing clip deeper than the rear, so that the wing incidence can be adjusted. Other than that, the little bird is built right to the plan, and flies great.

Now, to convert the model to R/C . . . what? •

GARAMI'S GULL–WING

DESIGNED BY: LOUIS GARAMI

PUBLISHED IN MAY 1937 FLYING ACES



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.

Klause

• Last month, we discussed various commercial fuels, and offered some suggestions for 1/2A engines. Let's assume you've decided on a fuel, and are on the way to the local hobby shop. Are there any other things to consider? There sure are!

To get into an inquiring frame of mind, pretend that you're going to a used car dealer. OK, you're going to do a lot of careful looking, and you sure are going to be suspicious if you hear anything like, "Yes sir, this here can of fuel is practically brand new. It's always been kept in air-conditioned storage, and it's only been brought out on Sundays." Seriously, look at the fuel container.

Does it look new, or is the label faded, and the can full of dust? If the container looks like it's been around awhile, then the fuel probably isn't fresh. If it's not fresh, the chances of it burning well are poor. You'll have trouble starting, setting the needle, and all sorts of other good things. This is so, because, just like you and I, fuel ingredients slowly decompose with age (my apologies to all senior citizen modelers).

The methanol in the fuel may also cause another problem, because it very readily absorbs moisture from the air. Methanol stored in a low-density plastic container will actually gradually draw moisture in through the plastic! Besides the fact that engines don't run well on contaminated fuel, the water will oxidize aluminum and rust steel engine parts.

For best results, we suggest that you: (1) start with fresh fuel; (2) store it in a tightly-sealable metal container; (3) keep it out of the hot sun; and (4) tightly recap it after each and every use. In a similar vein, if you have half a can of fuel that's been sitting around the garage for a long time, save yourself a lot of trouble, and get rid of it.

One other consideration. How much 1/2A flying do you expect to do in the coming weeks? If you buy in the quart size, it will cost you about a third more per ounce, compared to the gallon size. A pint will cost about two-thirds more per ounce than the gallon size. The difference is due mainly to packaging costs.

Our next subject of discussion is fuel filtering. Since very small specks of dirt can easily clog the needle valves of 1/2A engines, or foul the operation of reed valves, we must keep the dirt out by filtering the fuel. There are many brands of fuel filters available, and they're inexpensive. Just be sure to use those that have very fine screens . . . 80 or 100 mesh.

Our suggestions for usage are brief and simple. Always use a fuel filter: (1) when filling the tank of your plane, and (2) between the tank and the carburetor. This second recommendation isn't very feasible with reed valve engines, because the needle valve is an integral part of the backplate and tank assembly.

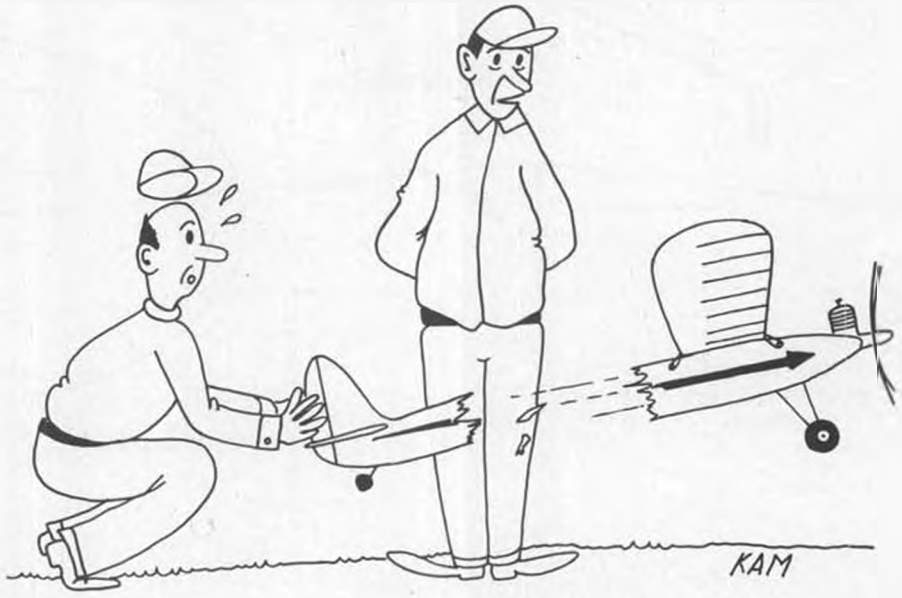
Therefore, it's essential that you filter the fuel before filling the tank. Filters are so important that it's really amazing that so few people use them. Long ago, a good and experienced friend told me, "Think of a filter as an airplane . . . don't try to fly without one."

Now that your tank is full of clean, fresh fuel, let's discuss some 1/2A starting techniques. The procedures outlined in the Cox instruction sheets work very well. We suggest that you use them during the engine break-in period.

Another method is to use an electric starter. This way you can be absolutely sure you'll have plenty of junk engines and parts in no time at all! Although an electric starter can be used on a T.D. without ruining the engine, it must be used very judiciously. Further, you will have to frequently replace the fiber thrust washer, and adjust linear crankshaft "play" so that the crankpin does not rub against the backplate. NEVER use an electric starter on a reed valve engine. Personally, we do not use an electric starter, if for no other reason than that the following technique works better, and it won't damage an engine. It was developed during Class II Mouse Racing, where fast engine hand-starts and restarts are a "must" if you want to be competitive.

First, begin by bringing the engine up on compression . . . piston just past the top of the exhaust port. Now, install the prop at the 10 o'clock/4 o'clock position, and secure it tightly in position with the spinner and the 5-40 machine screw. Note: In place of the standard round-head, slotted screw, we use a one-inch 5-40 socket head cap screw. It's much easier to torque it sufficiently so that there will be no prop slippage.

Second, open the needle valve 3-1/2 to 4 turns, and ensure that the fuel line is full of fuel. Then, as-



"Your engines sure have improved since you've been reading the 'Fuel Lines' column!"

suming the engine is not completely dry, hold the plane so that the cylinder is in the horizontal position. With the piston on compression, put one good drop of fuel on the piston/exhaust port area, and then flip the prop through once. Return the plane to its normal position so that, when the prop is on compression, it will be at the 10 and 4 o'clock position.

Third, attach the battery clip or "hot glove". Hold the plane off the ground. Then, starting at least 18 inches away, with a positive, forceful, and straight, downward motion, strike the 10 o'clock position prop blade with your index finger. Follow completely through, and the chances are nine out of ten that the engine will start. The secrets of this technique are that just-right amount of prime and sufficient force to rotate the prop through two complete revolutions.

In Mouse Racing, when we refuel during a pit stop, our tank arrangement automatically squirts over the cylinder exhaust port area with the piston in the on-compression position. Any excess drips off, and just the right amount remains on the piston. Since the engine is up to temperature, we then merely "hot glove" the glow head with the left hand, give it that hefty downward prop flip with the right index finger, and away we go.

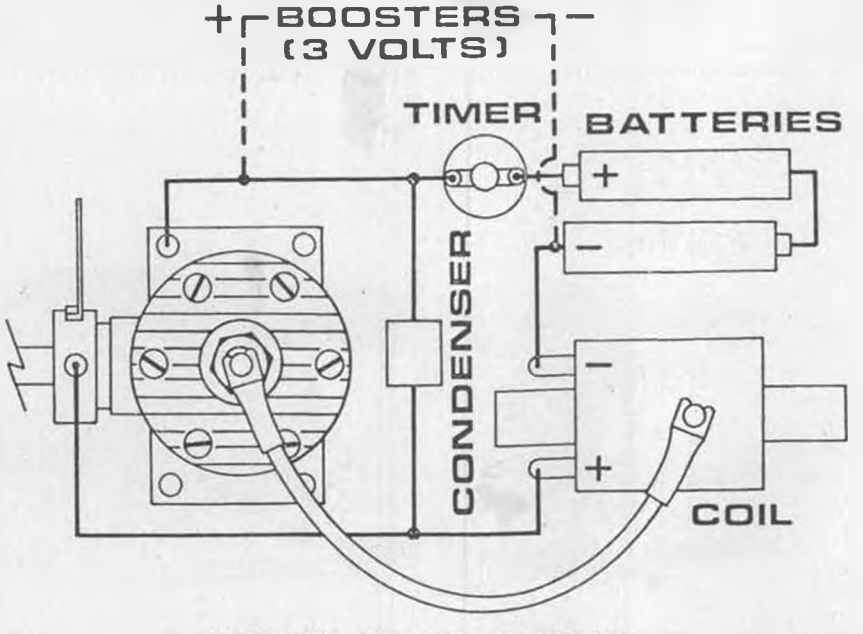
It will take a little practice to become comfortable and confident with this technique, but the results will be rewarding. Incidentally, we use the same procedure on reed valve engines rather than using the spring starter. In essence, that one hefty flip is equivalent to the force of the starter spring. For 1/2A pylon racing, if you use a pen bladder tank, simply unpinch the fuel line as soon as the engine fires on the prime.

The above procedures are good reference points. If you find some other slight variation that you like, that's great. Use what works best for you!

When you're through running the engine, use a preservative to protect it. At this point, we caution against the practice of flooding-out the engine to "protect" it. The theory is that by richening the mixture and flooding-out, the lubricant in all that extra fuel will coat and protect the engine parts. The methanol absorbs moisture, and that leads to corrosion. We suggest pinching-off the fuel line to stop the engine. Then, thoroughly coat the inside of the engine with a preservative. WD-40, Marvel Mystery Oil, or Rislone will do nicely.

Next time around, we'll provide some test stand data for various glow heads, and provide combustion chamber/nitro percentage guidelines. Again, if you have any questions, just send a stamped envelope to: Joe Klause, P.O. Box 2699, Laguna Hills, CA 92653. •

An FMO .61 twin, belonging to Ron Ford and converted to ignition by Otto Bernhardt. If you've got a photo of an unusual ignition engine, new or old, send it in!



IGNITION WIRING DIAGRAM

BERNHARDT

• Some of my readers have asked me to devote an entire column to troubleshooting an ignition engine, so this month, that is exactly what I am going to do. Some of the following could also apply to glow engines.

An analysis of the most common type of two-cycle ignition engine reveals that there are four basic moving parts, consisting of the crankshaft, conrod, piston, and breaker point. All other parts are static and not subject to movement during normal operation. Due to these very few moving parts, troubleshooting becomes very simple, and the solution is usually arrived at very quickly. In case the reader is not familiar with the proper electrical hook-up, a sketch is included, showing all components in their proper perspective.

"That's fine," you say. "Mine is hooked up just like you show, but it still refuses to start." OK, let's try to find out why, checking out each possible source of trouble.

Electrical wiring is the most common cause of ignition problems, primarly because of sloppy w workmanship. All wiring should be of the stranded type, and all connections should be soldered, not twisted together. So, for starters, check all of the wiring for loose or broken

Continued on page 123

Fins on leading edge of wheel fairings were carrier deck arresting cable deflectors. Cable was normally 12 inches above deck, and 2 inches above axle on Sparrowhawk! Photo at Long Beach Naval Reserve Station, California.

CURTISS F9C-2 "SPARROWHAWK"

PART TWO

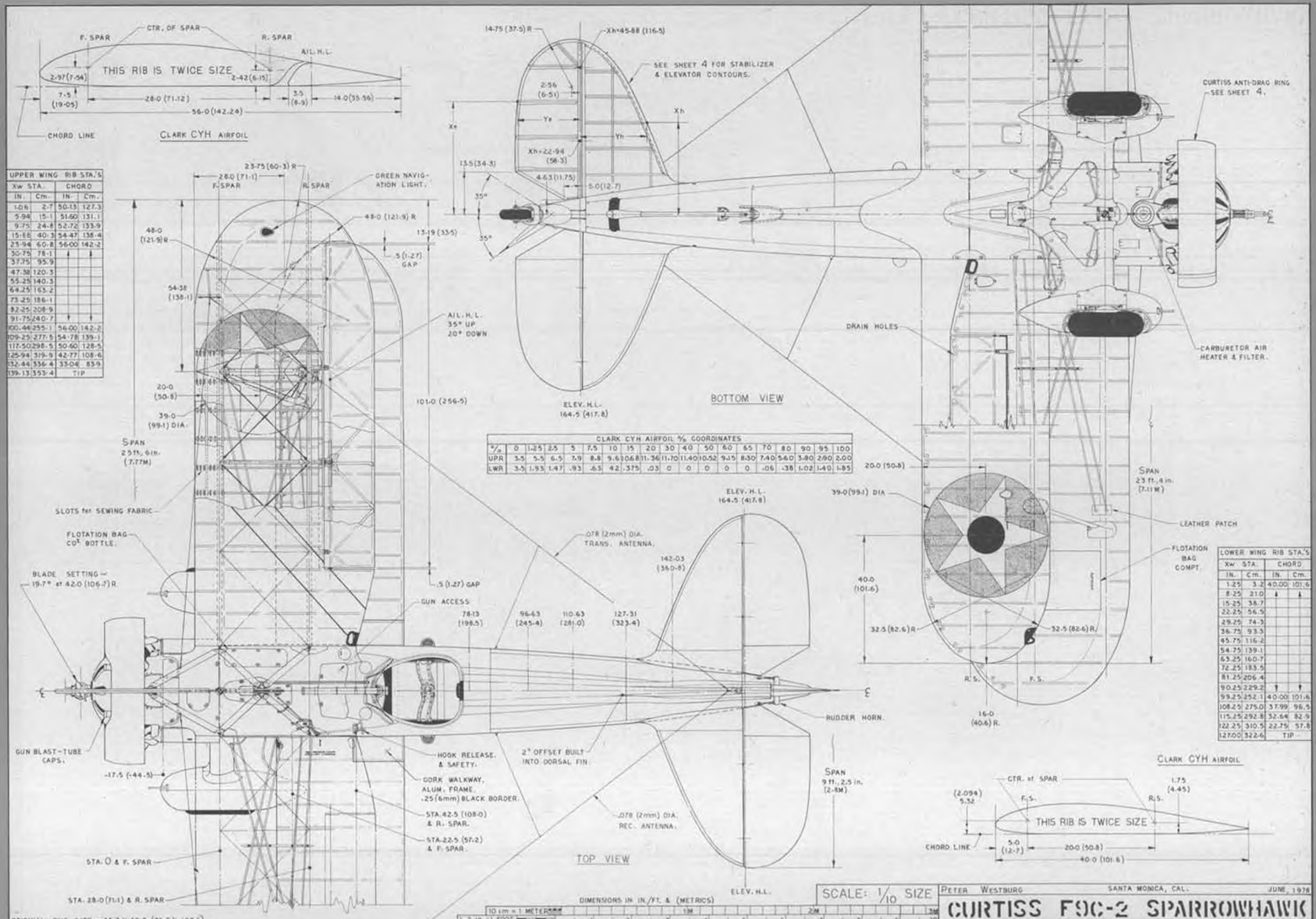
by PETER WESTBURG

• The XF9C-2 was like its predecessor, but the upper wing was raised four inches, and the landing gear lengthened to increase the angle of attack during landing. The latter change permitted the engine to be lowered one and a half inches and the prop diameter increased from 96 to 102 inches, without impairing prop tip ground clearance. The XF9C-2 was listed with the Department of Commerce as NX-986M, since it was a private venture civil airplane. The Navy paid Curtiss one dollar to demonstrate its performance; it passed the Navy's requirements, and two days later, Curtiss received a contract for six production units. Six weeks after the last airplane was delivered, the Navy bought the prototype, assigning it s/n 9264.

During the test program, considerable criticism was directed at the airplane by test pilots. The wheels were too small, the axle dropping two inches below the arresting wires during deck landings. The problem was solved by adding deflectors to the upper forward leading edges of the wheel fairings. The airship hook-on tests revealed that the directional stability during low speed approaches was so poor that full right rudder was needed, and that slight movements of the rudder caused the airplane to yaw violently. A rectangular section nine inches wide was added to the fin, causing a flat spot in the contour of the upper vertical tail. And there were problems with the hook release. Engagement and locking were automatic, but release was manual, with the pilot tugging on a cable and linkage mechanism to release the spring-operated locking cam. The system had too much give, but this was finally corrected.

The six F9C-2's (s/n 9056-9061) were assigned to the USS Akron. Fortunately, all were on the ground when the dirigible was lost in a storm off Lakehurst, N.J. The aircraft were reassigned to the Macon, and when it too went down in storm off Big Sur, California, February 12,

With dollars tight in 1930, Navy refused to spend $9.25 to have "U.S. Navy" painted on bottom surface of lower wing! Walt Stampfli photo.



UPPER WING RIB STA.'S			
Xw STA.		CHORD	
IN.	Cm.	IN.	Cm.
1-0.6	2-7	50-13	127-3
5-94	15-1	51-60	131-1
9-75	24-8	52-72	133-9
15-88	40-3	54-47	138-4
23-94	60-8	56-00	142-2
30-75	78-1	↓	↓
37-75	95-9		
47-38	120-3		
55-25	140-3		
64-25	163-2		
73-25	186-1		
82-25	208-9		
91-75	240-7	↓	↓
100-44	255-1	56-00	142-2
109-25	277-5	54-78	139-1
117-50	298-5	50-60	128-5
125-94	319-9	42-77	108-6
132-44	336-4	33-04	83-9
139-13	353-4	TIP	

CLARK CYH AIRFOIL % COORDINATES																		
%	0	1.25	2.5	5	7.5	10	15	20	30	40	50	60	65	70	80	90	95	100
UPR	3.5	5.5	6.5	7.9	8.8	9.63	10.8	11.36	11.70	11.40	10.52	9.45	8.30	7.40	5.60	3.80	2.90	2.00
LWR	3.5	1.93	1.47	.93	.63	.42	.375	.03	0	0	0	0	0	.06	.38	1.02	1.40	1.85

LOWER WING RIB STA.'S			
Xw STA.		CHORD	
IN.	Cm.	IN.	Cm.
1-25	3-2	40-00	101-6
8-25	21-0	↓	↓
15-25	38-7		
22-25	56-5		
29-25	74-3		
36-75	93-3		
45-75	116-2		
54-75	139-1		
63-25	160-7		
72-25	183-5		
81-25	206-4		
90-25	229-2	↑	↑
99-25	252-1	40-00	101-6
108-25	275-0	37-99	96-5
115-25	292-8	32-64	82-9
122-25	310-5	22-75	57-8
127-00	322-6	TIP	

DIMENSIONS IN IN./FT. & (METRICS)
10 cm = 1 METER
1.2 in. = 1 FOOT

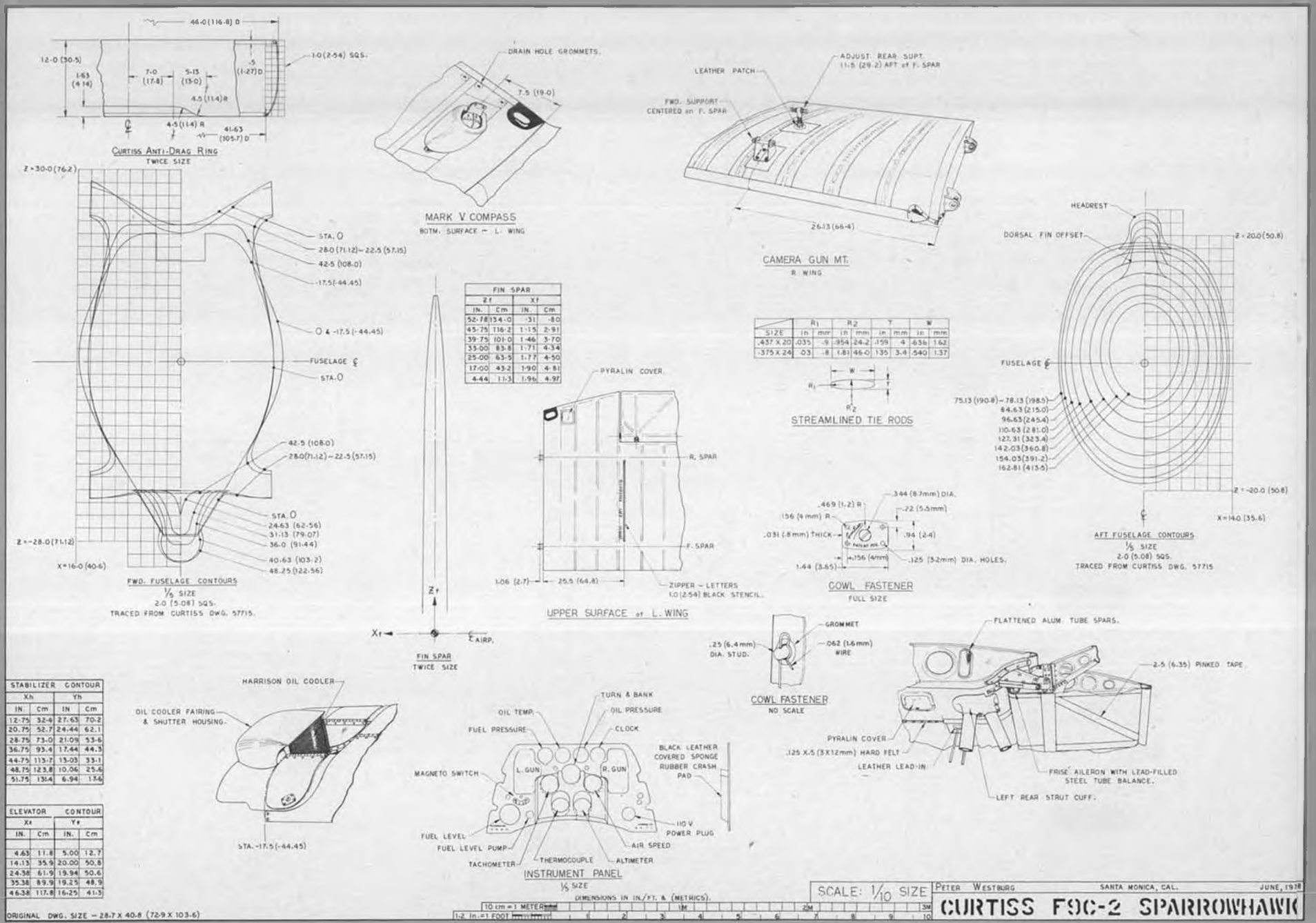
SCALE: 1/10 SIZE

PETER WESTBURG SANTA MONICA, CAL. JUNE, 1978

CURTISS F9C-2 SPARROWHAWK

ORIGINAL DWG. SIZE — 28.7 X 40.8 (72.9 X 103.6)

SHEET 3 OF 4



FIN SPAR			
Zf		Xf	
IN.	Cm	IN.	Cm
52-78	134-0	-.31	-.80
45-75	116-2	1-1.5	2-.91
39-75	101-0	1-.46	3-.70
33-00	83-8	1-.71	4-.34
25-00	63-5	1-.77	4-.50
17-00	43-2	1-.90	4-.81
4-44	11-3	1-.96	4-.97

SIZE	R1 in	R1 mm	R2 in	R2 mm	T in	T mm	W in	W mm
.437 X 20	.035	.9	.954	24.2	.159	4	.636	1.62
.375 X 24	.03	.8	1.81	46.0	.135	3.4	.540	1.37

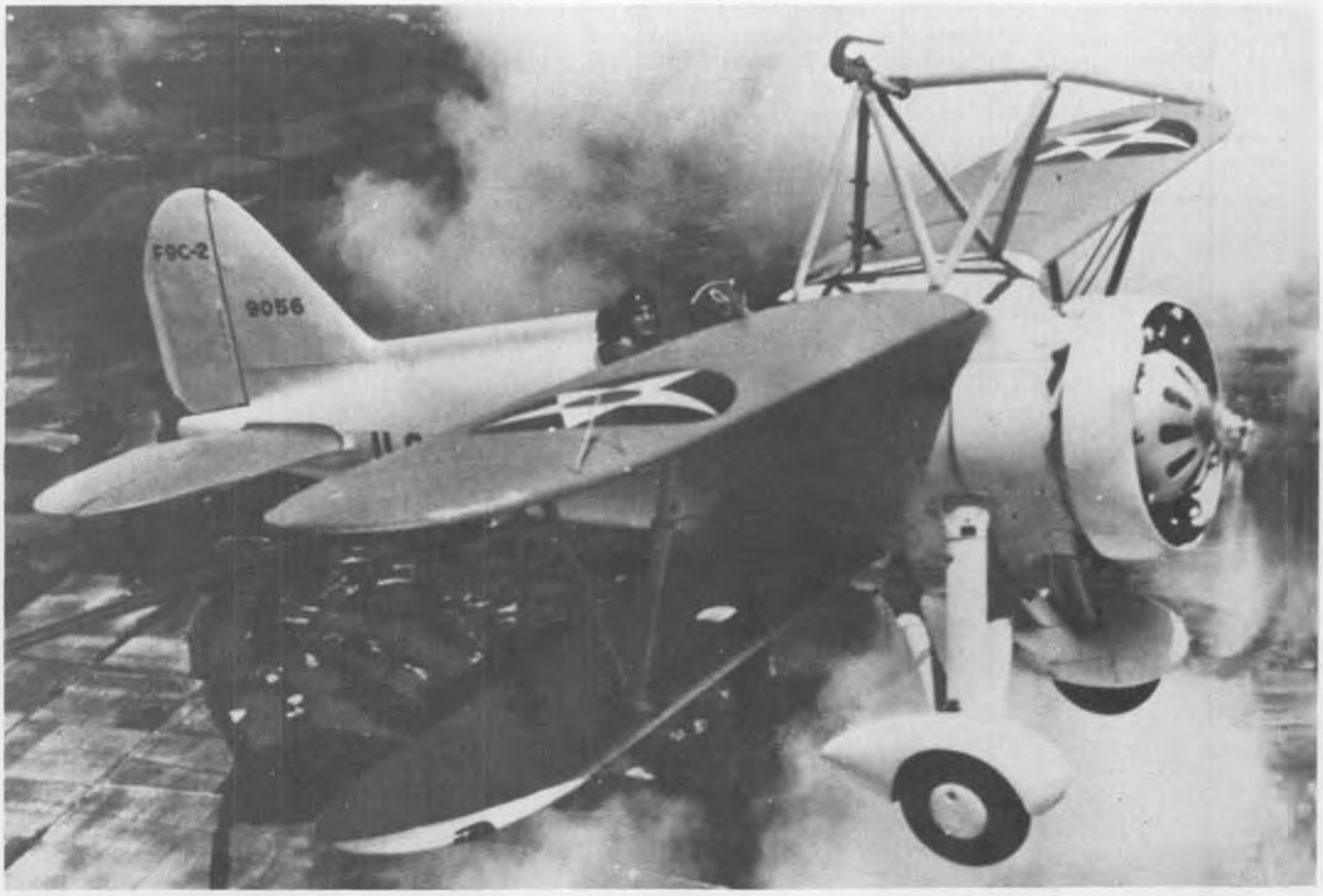
STABILIZER CONTOUR			
Xh		Yh	
IN.	Cm	IN	Cm
12.75	32.4	27.63	70.2
20.75	52.7	24.44	62.1
28.75	73.0	21.09	53.6
36.75	93.4	17.44	44.3
44.75	113.7	13.03	33.1
48.75	123.8	10.06	25.6
51.75	131.4	6.94	17.6

ELEVATOR CONTOUR			
Xe		Ye	
IN.	Cm	IN.	Cm
4.63	11.8	5.00	12.7
14.13	35.9	20.00	50.8
24.38	61.9	19.94	50.6
35.38	89.9	19.25	48.9
46.38	117.8	16.25	41.3

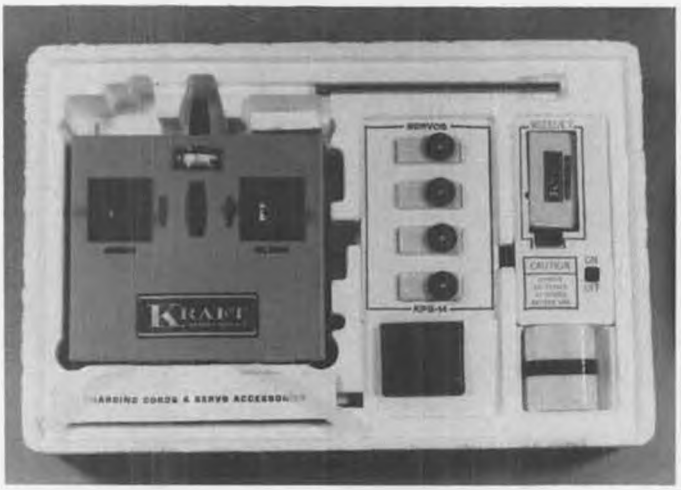
1935, four of the Sparrowhawks (s/n 9058-9061) were aboard. Of the four remaining aircraft, the original XF9C-1 was transferred to the Naval Aircraft Factory, where its useless hook was removed and where it was used as a utility plane until 1936, when it was scrapped. Aircraft Nos. 9056, 9057, and the XF9C-2, 9264, went to the NAS at San Diego. Later, the XF9C-2 went to Anacostia, where it was used as a utility airplane until it crashed in a pea garden near Monaskon, Va., in November of 1936, and was subsequently scrapped. No. 9057 was scrapped at San Diego, but 9056 was sent to NAS at Hampton Roads. In June of 1939, it was scheduled to be surveyed, but the Commanding Officer suggested that it be turned over to the Smithsonian as a historical aircraft. Recently refurbished and restored, s/n 9056 now hangs from the ceiling of the National Air & Space Museum.

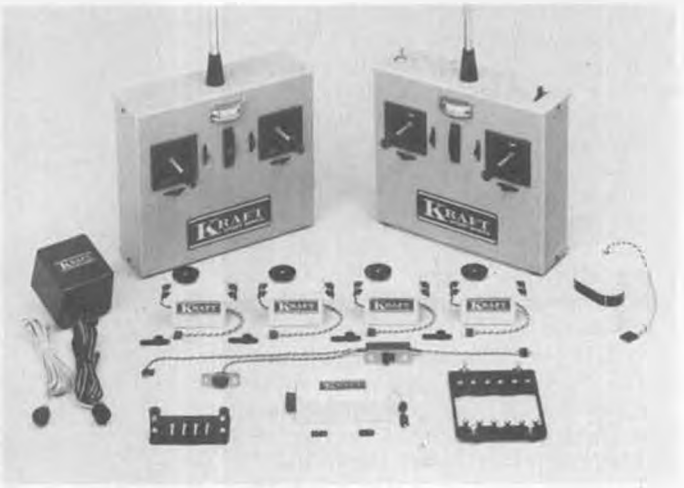
Assigned to the Akron, 9058 received blue recognition color; band on fuselage, chevron on wing, wheel fairings, cowl and anti-drag ring. Nine inches added to fin, blue portion.

The coloring and markings of the F9C-2's were unusual, making them good subjects for modeling. The basic color of the fabric on the bottom of the upper wing and both surfaces of the lower wing was aluminum pigmented dope. The top surfaces of the upper wing and the horizontal tail surfaces were the familiar chrome yellow. The rest of the airplane was entirely metal and was painted a light gray, nearly an off-white. Each of the six F9C-2's was given a recognition color which appeared on the anti-drag ring, the wheel pants, as a band around the fuselage, and as a chevron on the upper wing. The airplanes had the "Men on the Flying Trapeze" insignia, but these were supposedly removed when the Sparrowhawks were assigned to the Macon, during which time the horizontal and vertical tail surfaces were painted blue-black.



Prior to photo of 9058 above, 9056 in flight photo shows first increase in vertical tail area to overcome turbulence created by hook structure, a 2-7/8" wide strip on trailing edge of rudder.





PRODUCT$ IN U$E

KRAFT KP-6A SPORT SERIES SYSTEM . . . by ELOY MAREZ

• I had to fix it before I could fly it! The Kraft KP-6A Sport Series system, as impressive as it looked when it arrived in its protective foam container, had a serious production flaw. Jack Albrecht (Chief of Production) and his crew down in Vista must have built this one on a Monday morning, *before* the first coffee break!

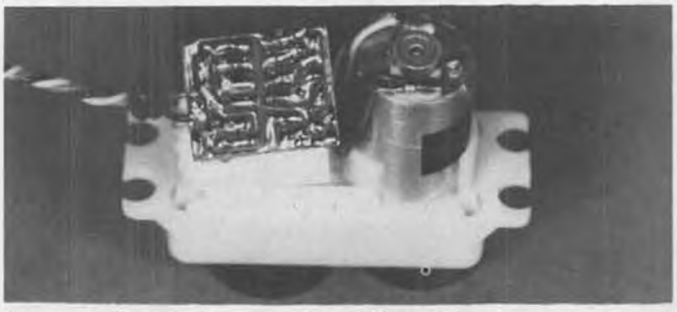
The transmitter's open gimbals looked and felt great, but the one on the left had a ratchet in vertical travel, and how can you fly with a ratchet on the elevator stick? The one on the right wasn't ratcheted, but was spring loaded in the center position. Now I ask you, how can you control your throttle if you have to overcome spring tension to go to high, and when you relax the pressure, the throttle automatically comes back to center? *(Mode I fliers just can't seem to get their act together! wcn)*

It wasn't quite as serious as it looked, though, as it took less than five minutes to locate and correct the problem. Only a pair of needle-nose pliers and a small screwdriver were used . . . none of those silly scopes and frequently-counters were necessary to make this into a proper Mode One transmitter that a person can fly.

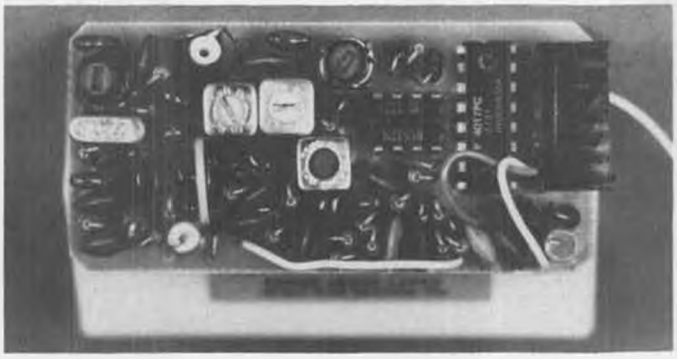
The Kraft Sport Series systems, available in four and six-channel versions, are that company's answer to the needs of the newcomer and sport flier who does not require the luxuries of the more advanced and more expensive systems, such as changeable frequencies, maneuver buttons, single sticks, etc. They are available only in the favorite two-stick configuration, and only on 27 and 72 Mhz frequencies. The one concession that has been made to the more advanced flyer is that the KP-6A allows him to retract his gear and operate one more function, with switch and lever-operated controls not found on the KP-4A.

TRANSMITTER

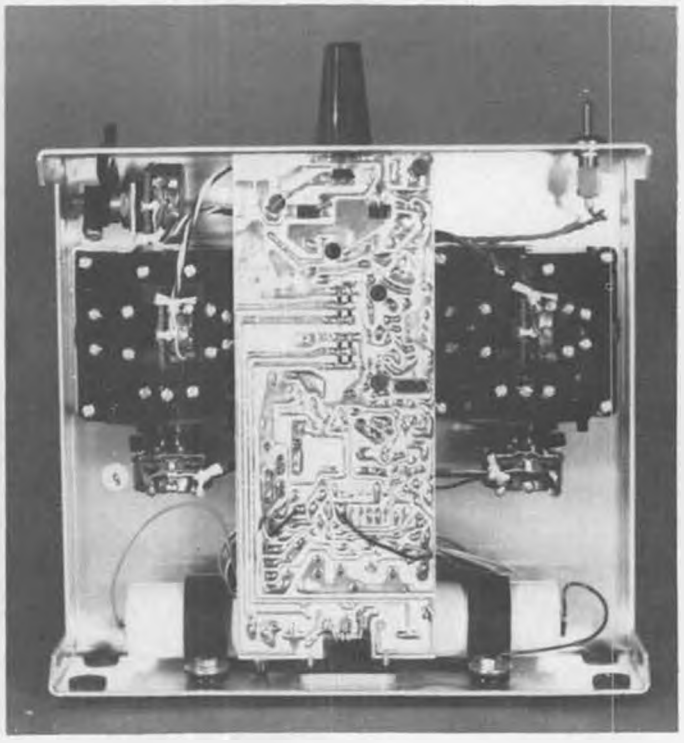
The transmitter, designated as Model No. KPT-4A and KPT-6A, four and six-channel respectively, is another in the series of gold vinyl-clad aluminum cases we are all so familiar with. Physically, there is



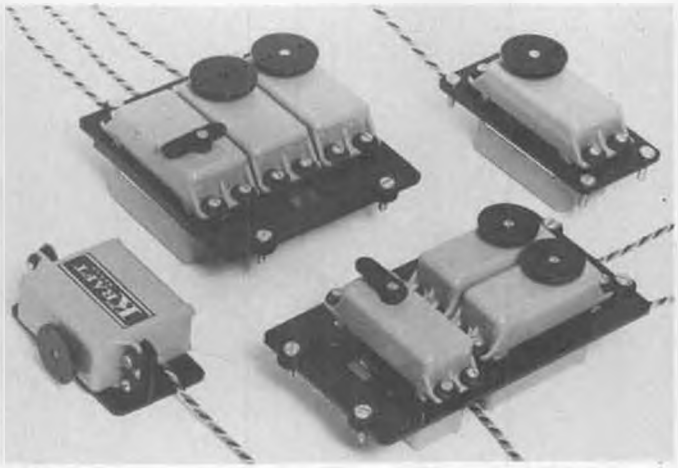
Servo guts. Note the uncluttered amplifier and the safe spacing between it and the motor.



Receiver guts. Note the open component placement. PC board has wide, cleanly spaced lands.



Transmitter guts. New Sport Series transmitters use only five 550 MAH cells, for a total of 6 volts.



Different servo trays available. Middle servo in the three-abreast tray is missing a screw . . . don't try to fly without it!

The Dynamic Duo! Connie Mosteller and Dave Shadel at one of the '78 trade shows, telling the world all about Kraft Sport Series radios.

little to distinguish it from other recent Kraft Sport Series transmitters. It measures 6.1 inches high, 6.75 wide, and a comfortable 1.9 inches thick. The smooth-working, good-centering open gimbals, fabricated mostly of plastic and using coil springs for centering, are well located, and the whole thing fits and balances well. The weight of the transmitter is one pound, twelve ounces for the four-channel version, and one ounce more for the six.

The more-or-less normal RF output meter is located on the front, as is the ON-OFF switch, which is protected from accidental operation by a simple but effective guard that doesn't interfere at all with normal operation of the switch, or get in your way when you are busy flying.

The six-channel KPT-6A has the two additional channels; one switch-operated (for retracts) and the other lever-operated and fully proportional, located on top of the case, easily reachable with the index fingers.

The trims are mechanical, and, as is traditional, located under and inboard of the stick function that they trim.

Circuitwise, the Kraft Sport Series transmitters are interesting, in that they are the first to deviate from the traditional eight-cell, 9.6-volt power supply. They use five cells, at a nominal 6 volts. The cells furnished are 550 MAH ni-cds. The use of the lower voltage is possible by the use of another innovation, an FET (Field Effect Transistor) used in the final RF amplifier stage. More about that later.

Let's start at the beginning, with the encoder. It uses some time-proven Kraft circuitry; an integrated circuit shift register and pot-switching transistors to generate the necessary sync and control pulses, which are then fed to the modulator and eventually the RF section.

The latter starts off with the usual half-frequency oscillator, going then to a buffer-doubler, at which point the modulation is introduced. The final amplifier, the FET mentioned, is one of a class of new D-MOS devices, which exhibit high gain and efficiency, and in this case, adequate RF power output at low voltages.

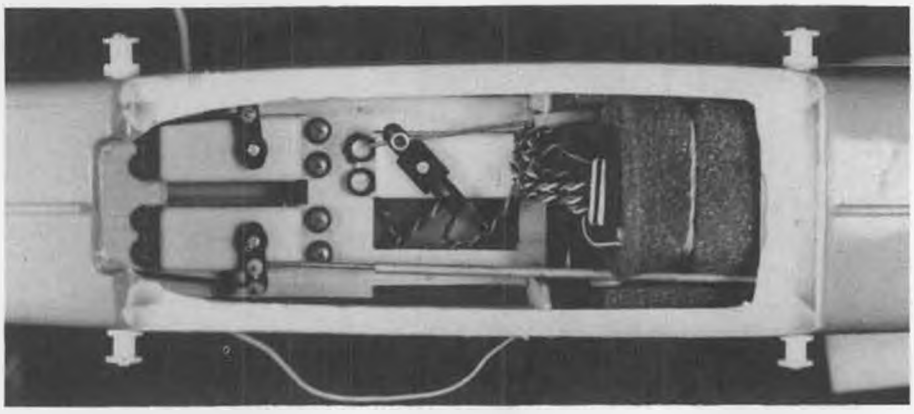
Would-be technicians and tinkerers are reminded that FET's are not to be tested with an ohmmeter in the manner that a go-no-go test can be made on normal transistors. Under the conditions used in this transmitter, the FET will run warm to the touch, but not uncomfortably so. However, if an internal short does occur, a higher current will flow which will generate enough heat in the FET to burn flesh. If the transmitter does fail, and you MUST work on it, be careful!

The antenna coupling is also of the old but dependable type, as is the metering circuit, which reads RF output (not battery voltage).

A nominal RF input power of 700 milliwatts is claimed. The current drain is listed as 120 MA; the unit under test measured less, though no appreciable difference was noticed in either output power, as com-

Continued on page 102

Eloy used a Hobby Shack "Shell Fly 20L", powered by an HB 25, to test the Kraft unit. Radio passed all tests with flying colors.



The radio installation in Eloy's Shell Fly. The Kraft unit is not supposed to be a "miniature" system, yet there is more than enough room in a .25-size airplane.

The author made a good choice when he chose the Craft-Air Windrifter and Mark's Models Windward as his first attempts at R/C sailplanes . . . either model makes an excellent trainer. Both of Jim's models are finished in black and transparent yellow Monokote.

FROM POWER TO Silent Flight

By JIM KITCHEN . . . A "fireside chat" in which the author shares his experiences of getting into R/C soaring after over four years of power flying. Familiar to the soaring pilot, and useful advice for the novice.

• After more than four years of building and flying powered models, I gave sailplane modeling a try, and guess what? I enjoyed it! I don't mean that I then sold off all my engines and powered models at the next Club Swap Meet. To me, sailplanes are a logical extension of my R/C building and flying skills. My sailplane is another option to consider when selecting models for those weekend flying sessions.

Soaring's leisurely pace gives my reflexes a respite from keeping up with my latest .40-powered ship. My sailplane flying has been limited to thermal soaring, because of sporadic winds and the lack of suitable sites for slope soaring here in the flatlands of California's Sacramento Valley. As a Civil Engineer, I find the challenge of trying to defy the laws of gravity particularly enjoyable. I don't qualify as a sailplane purist, because I normally use a power pod to gain my initial altitude.

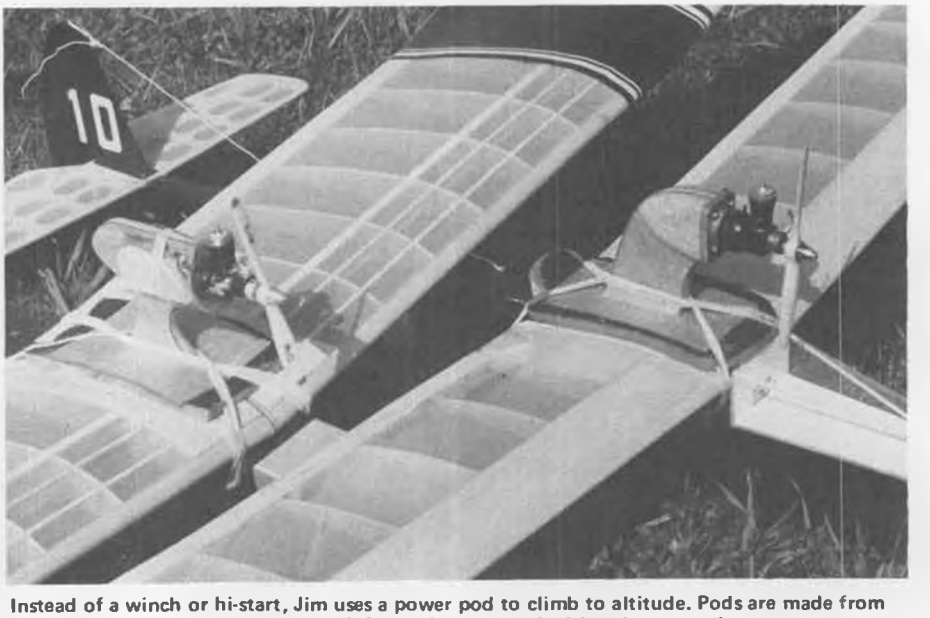
I chose a Mark's Models Windward as my first sailplane, and constructed a power pod using a Cox .049 Black Widow engine to do the launching chores. I am a lazy builder, in that I prefer to build from kits. My building disposition dictated that my first sailplane model should be a 72-inch span kit. Some of my reasons for selecting the Windward were: (1) highly recommended as a trainer, (2) well-proven design, (3) reasonably priced, (4) quality materials, and (5) scale-like appearance. Subsequent experiences have proven my reasoning to be valid.

I would like to share some of my experiences with you. They will have a familiar ring to the experienced soaring pilot, and provide some useful advice to the novice.

WATCH OUT FOR THAT LAST DOWNWIND TURN

It's a beautiful spring day. Lots of blue sky with a scattering of fluffy white clouds. Plenty of thermal activity. You've hooked into a good thermal . . . not a boomer, but a respectable one that continues to give you altitude, as your orbiting sailplane drifts downwind until it is a mere speck in the sky. Your good sense tells you that it is time to crank in down trim, straighten her out, and head back towards the field, but you decide to make just one more full circle. Part way into the turn, as she heads away in that most difficult seeing attitude, you blink those eyes that have been straining to keep her in sight, and suddenly, you have lost her. Panicsville! Visions of your model and R/C gear gone forever race through your mind. In your panic, you keep staring at the last point where you saw, or thought you saw your model, hoping that it will miraculously reappear. If you keep your wits, you will probably pick it up again, and this time head for home, post haste.

One thing you can do to avoid such a disaster is to enlist the help of any others present (except those who may be flying at the moment), and keep a pair of binoculars handy. The best solution is to get as many eyes peering in the same direction as possible . . . especially children,



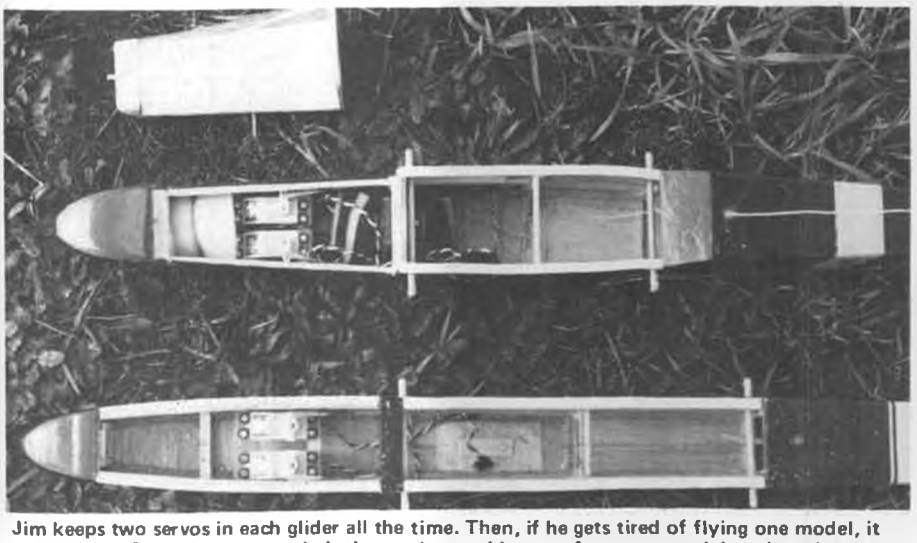
Instead of a winch or hi-start, Jim uses a power pod to climb to altitude. Pods are made from 1/4-inch balsa laminated between 1/16 ply, then covered with polyester resin or epoxy.

because their youthful eyes are stronger than those with many years of wear. Also, they may look in the wrong place, which just might be where your sailplane will turn up. The moral of this story is, "When you decide to make just one more downwind turn, don't!" I know, because I have been there several times.

LOCATING YOUR DOWNED SAILPLANE

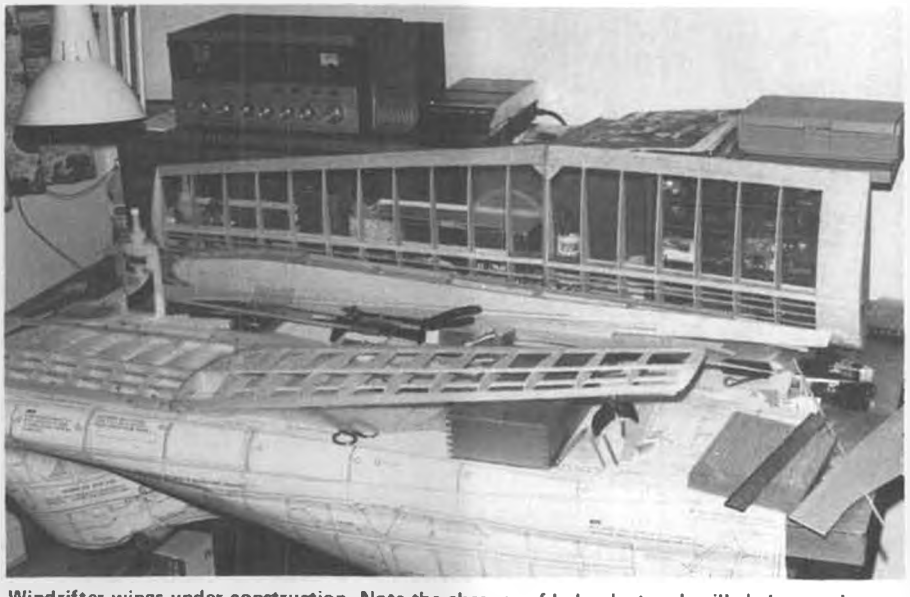
This is a variation on the preceding theme, and it is more likely to happen to an inexperienced pilot. In my case, I believe that it was a range problem, caused by either low batteries or a frequency change using plug-in crystals, that did me in. Same situation as just described, except that when you try to straighten her out to head for home, you can't seem to find the right combination of control and visibility to assure yourself of a home-base heading. Your maneuverings become more frantic as you try to cope with this new crisis, and you catch fleeting glimpses of the model slowly settling to earth.

When it becomes obvious that you are not going to make it back to the field, you should immediately start looking for some landmarks to use in locating the downed sailplane. Two points along the approximate line of last sighting are what you really need; one fairly close in, and the other beyond the downed model. When this happened to me, my sights were a telephone-pole at about 300 yards, and the middle of a quonset hut about a mile away. I used these two landmarks to sight along until I walked past the pole, and then I used the pole and my car parked at the flying field as a back sight to continue on the same bearing. I carried my transmitter, and when I approached the area where the model went down, I stopped every hundred feet or so to cycle the transmitter control stick, while listening for noise of servo movement.



Jim keeps two servos in each glider all the time. Then, if he gets tired of flying one model, it only takes a few minutes to switch the receiver and battery from one model to the other.

All eyes are on the Windrifter as the author launches her for her first powered flight. Tom Vincent, just to the left of Jim, handles the transmitter.



Windrifter wings under construction. Note the absence of balsa dust and spilled glue on the bench . . . sure makes us balsa butchers look bad!

Call it luck, but twenty minutes and about a half mile later, I stumbled onto the sailplane, completely intact.

This method may not work for you if your flying site is surrounded by a built-up area. Buildings and fences may discourage you from tracing a line of sight, but keep it in mind, and do the best you can. It is a good idea to have your name and telephone number on your model, so if it comes down in somebody's back yard, they can contact you.

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The first electric-powered seaplane to ROW was this twin Astro .15 design by Neil Whitman. The 7-lb. model had poor water handling and flight characteristics, led to the improved version shown at right.

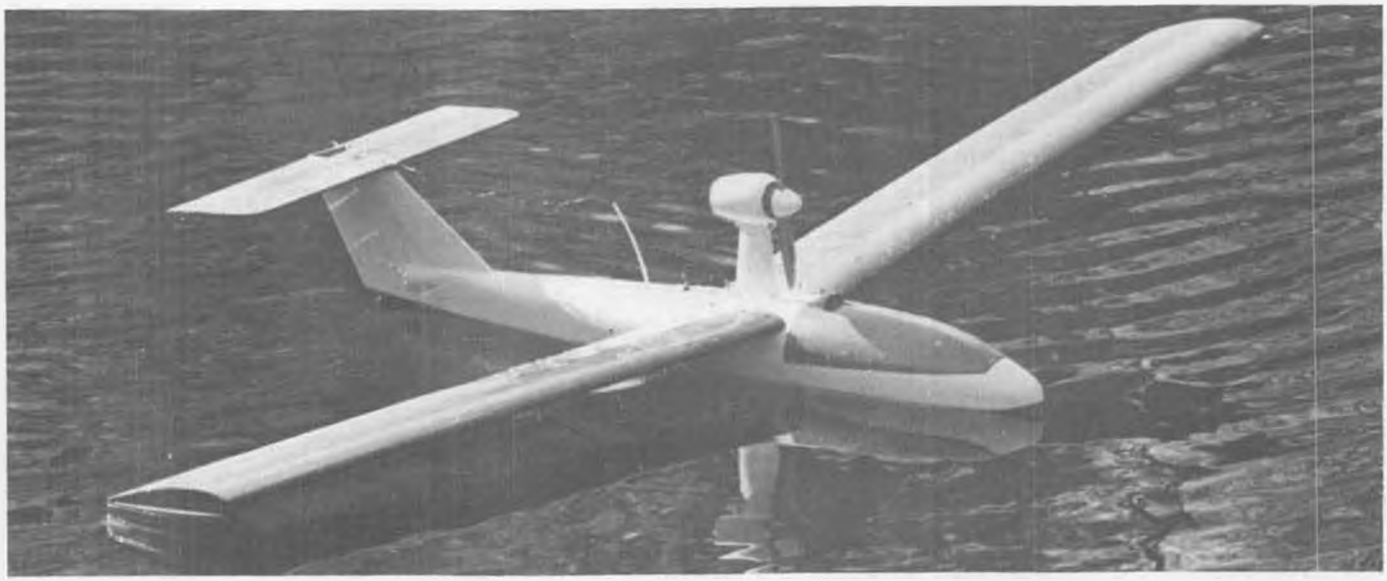
ELECTRIC POWER

By MITCH POLING

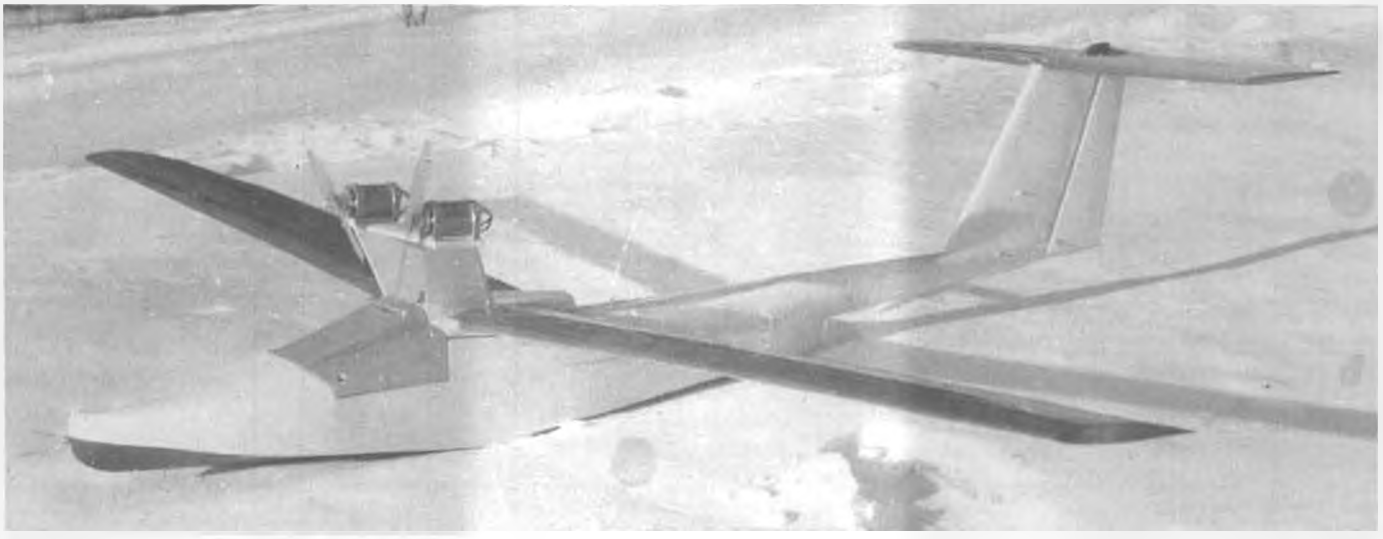
• Suddenly, electric flying is worth cash prizes! The International Modeler Show, to be held January 6 and 7, in Pasadena, California, will have indoor R/C record trials, based on duration around a figure-eight course. The longest flight time in each category is worth $150, and the longest flight time of all the categories (CO_2, electric, and rubber) is worth $250. That's enough to make things interesting! The tentative wing loading of a maximum 4 oz./sq. ft. is low for electric power, though it can be done. The models will have to be large, from 2 to 4 sq. ft., to accommodate the weight of the R/C equipment and electric units. *(The indoor R/C record trials rules are stiff because of the flying site . . . the exhibition hall,* during *the show! The requirements should keep the planes light and slow flying. There is also a category for lighter-than-air models, with the greatest distance covered determining the winner. wcn)* The usual weights for my planes with the Monogram unit (equal to an .010) are 8 oz. with an Ace Baby R/O unit, and 10 oz. with the Cannon super-mini two-channel. The Astro 020 planes come out at 12 oz. with the Ace Baby R/O, and 14 oz. with the Cannon super-mini two-channel.

Ken Willard designed and flew a rudder-only indoor R/C model twelve years ago, called the Gym Dandy, using the Cox .010. The plans are available from RCM, set no. 163, for $1.00. Ken was, as usual, far ahead of his time. The design looks very good, and should come out at 8 oz. with the Monogram unit and Ace Baby R/O. It has a 36-in. span, and 2 sq. ft. of area. The Comet 50-inch Taylorcraft has been flown indoors with R/C and CO_2 power (twin Brown unit), and has been flown outdoors as a free flight by Tony Naccarato, with an Astro 020, so it would be a candidate, too. Have at it, and let me know how you do! Photos are always welcome, and any type is just fine, from Polaroids to color prints. The magazine uses only black-and-white prints, but photography is also a hobby of mine, and I can convert most photos to black-and-white, so no problem.

Neil Whitman has been flying electric seaplanes since the spring of 1976. As far as I know, he is the first

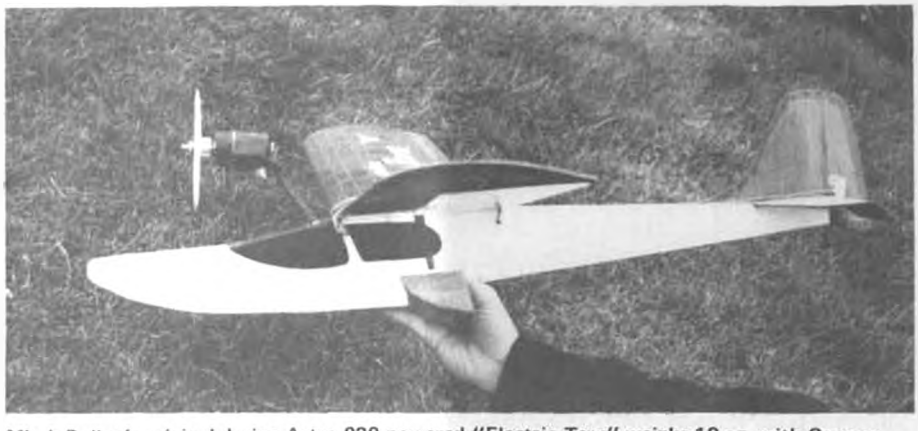


No, this is not a powered glider that didn't quite make it back to the field, it's Neil Whitman's beautiful Astro 15-powered seaplane. Like most of his models, it has a fiberglass fuselage. Weighs 4-1/2 lbs., flies great.

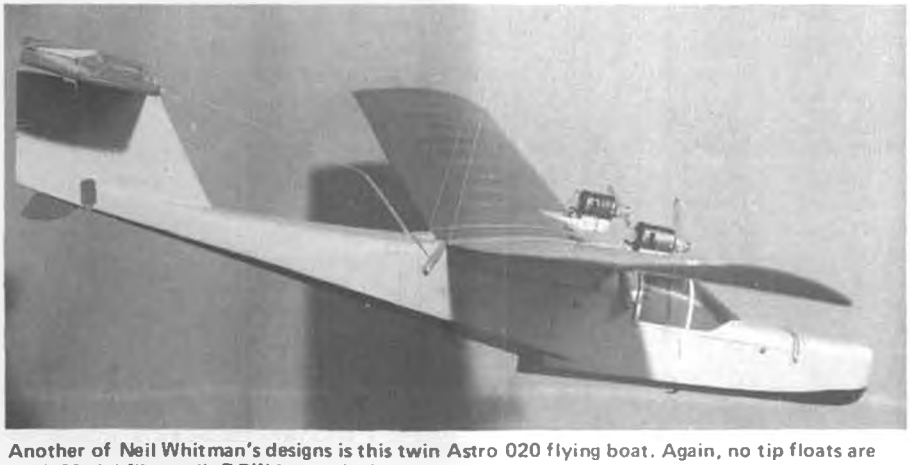


Neil Whitman's much improved twin Astro 15 design uses a wide fuselage instead of tip floats to maintain stability on water. Neil uses a 20-cell motor battery instead of the usual 16-cell pack. Model was flown at the 1977 Brimfield Spring Meet.

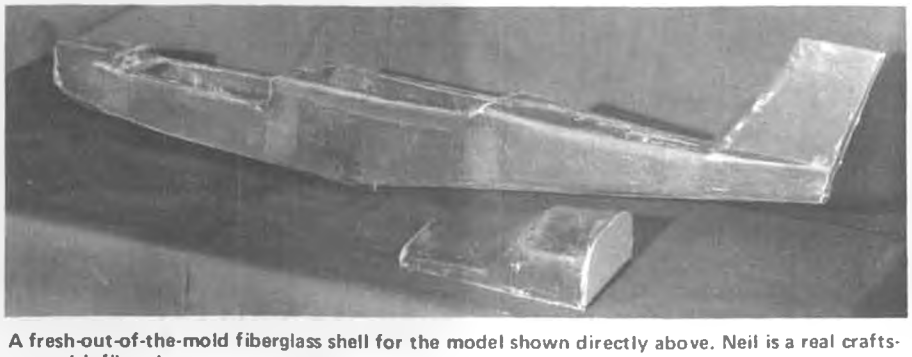
to ROW an electric seaplane. Neil is an excellent craftsman, and his planes show it. The fuselages on all his planes are fiberglass . . . very impressive! The twin Astro 15 plane in the swimming pool ROW'ed on the 24th of May, 1976. It weighed 7 lbs. and was sluggish in flight, with poor water handling. Neil built an improved twin 15, which handled much better on the water and in the air, and flew it at the 1977 Brimfield Spring Meet. It uses a 20-cell pack (24 volts), up four cells from the usual 16-cell pack (20 volts). Its flying weight was 6 lbs., 11 oz. Neil does not say, but I would guess that it used 7 x 4 props, instead of the 8 x 4 props used with a 16-cell pack.



Mitch Poling's original design Astro 020-powered "Electric Tern" weighs 18 oz. with Cannon super-mini radio. Made newspaper headlines with rooftop landing . . . see text.



Another of Neil Whitman's designs is this twin Astro 020 flying boat. Again, no tip floats are used. Model flies well, ROW is marginal.



A fresh-out-of-the-mold fiberglass shell for the model shown directly above. Neil is a real craftsman with fiberglass.

The twin 020 flew in 1977, tracks beautifully on step, and will ROW (marginally). It weighs 38 oz., has 371 sq. in., and flies well.

The single Astro 15 on the pond is new (as of the spring of 1978) and handles very well, both on the water and in the air. This is certainly a good-looking airplane . . . it inspires me to try one like it. It looks like it would make a good design for a full-size plane, too. Neil points out that it has only rudimentary tip floats, just enough to keep the wing out of the water, and that his other planes have none at all. He has found that tip floats keep breaking off, and are not really needed. The plane weighs 4 lbs., 9 oz., and uses a 20-cell, 550 mah pack. Again, Neil does not say what prop he uses, but it is probably a 7 x 4, not the 8 x 4 usually used on the 16-cell pack. This is because increased voltage will cause increased current, if the same prop is used. This can quickly cause overheating and armature burnout or brush damage.

A smaller prop decreases the load

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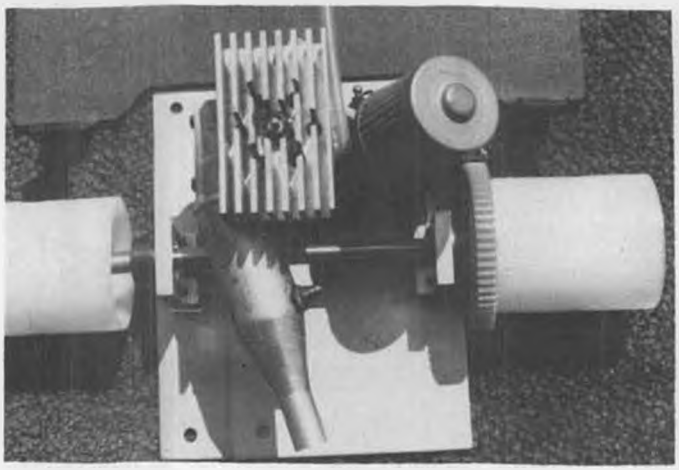
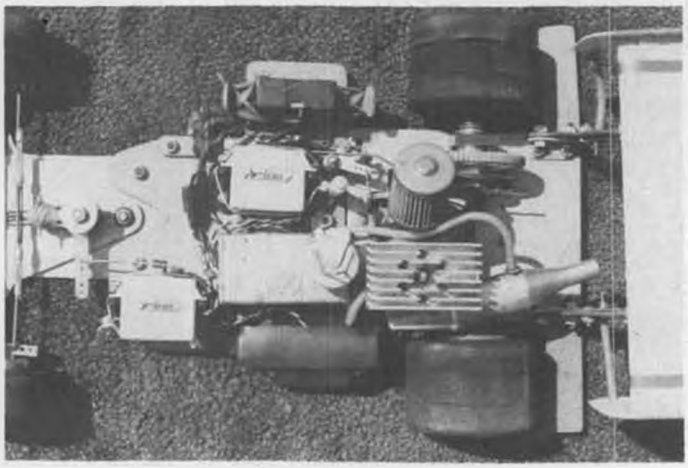


In this photo the engine C.G. has been moved to the right of the car centerline. Radio battery was also moved to right.



Moving weight to the left is helpful in an oval car. Forward weight shift will be explained in next tech article.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• For the first time in many moons, I'm going to get technical. The topic is weight distribution. We are going to cover axial (fore and aft), lateral (right or left of centerline), and vertical (up and down) center of gravity (CG) effects. You have probably experienced most of these effects, but didn't know why. Maybe some of my comments will be helpful. I'm trying to get this done before the 1978 ROAR Nationals, because some of the thoughts and ideas may be helpful to me at the Nats. I always find that writing about a subject forces me to think and understand what I am saying, so that you too may understand. So, this article is as much for me as it is for you!

To make the car work well, we need the majority of the weight on the rear wheels, so that power and traction forces can be delivered to the ground. But acceleration and cornering can alter the relative weight on each of the tires . . . as can aerodynamic forces, when the car is moving fast enough.

Initially, we will neglect the aerodynamic forces. It will help if you have read my earlier articles on tires and weight distribution, and also my article on drag cars. (For copies of past articles, write to Chuck Hallum, 18276 Foxglove Way, Irvine, CA 92715. Send 20¢ to cover postage and handling of catalog.) To start with, let's assume our typical car weighs 5 lbs.; has a 60%-40% (3 lbs. rear, 2 lbs. front) front-to-rear weight distribution; the CG is along the car centerline; wheelbase is 12 inches; the CG is 2.0 inches above ground level; front tire compound has 70% of the traction capability of the rears; and the rear tires are 2.5 inches wide; the front tires are 1.5 inches wide . . . that's all I can think of now.

Past articles on weight distribution and aerodynamics covered constant-velocity turns and effects of toe-in/out, and car aerodynamics. Well now, let's throw in forward acceleration and see what happens. Drag/Funny Cars at 4.5 lbs. can accelerate at an average of 1.3 g's, and have a maximum acceleration of probably about 1.6 g's. Hence, one would expect that a sports car at 5 lbs. can accelerate at (1.3 x 4.5/5) 1.17 to 1.53 g's. Let's assume our typical car accelerates at 1.2 g's. The weight shift off the front wheels to the rear will be (5 x 1.2 x 2/12), or about 1 lb. So, now we have only a 1-lb. total load on the front wheels, and 4 lbs. on the rear. That's quite a weight shift, right?

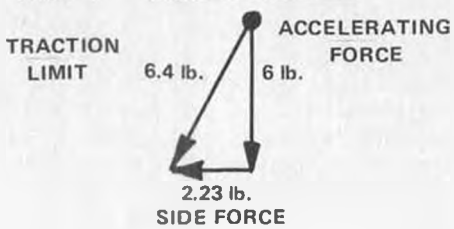
Now, let's do some cornering while the car is accelerating on a really high-traction track. From a simple-minded standpoint, we know that the rear tire traction

TABLE I
Side 'g', cornering*

	Front	Rear
Car I (60/40)	.56	.74
Car II (55/45)	.62	-0-
Car I +2 oz. in front	.79	.71
Car I with C.G. .12 lower	.60	.64

*Under hard forward acceleration.

FIG. 1 REAR TIRE FORCES



WEIGHT SHIFT (TOTAL FRONT & REAR)

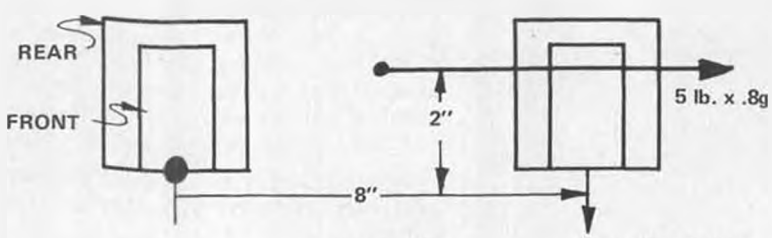


FIG. 2

OFFSET C.G. TIRE LOAD SCHEMATIC

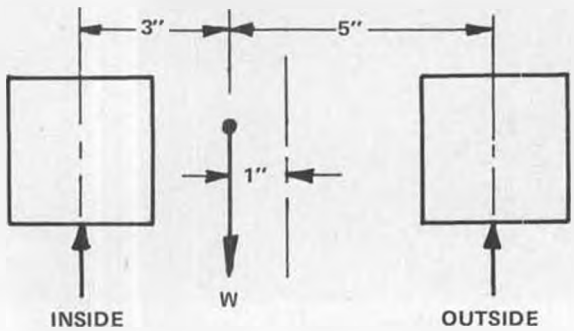


FIG. 3

limit is at *least* equivalent to the maximum Drag Car "g" acceleration (that is, for a full weight shift to the rear wheels). So the rear tires have an overall traction limit of about (4 x 1.6) 6.4 lbs. For a 1.2-g forward acceleration, a 6-lb. force is used, but the vector force difference (see Fig. 1) means that 2.23 lbs. are available for cornering. At the front, the maximum traction of about (1 x 1.6 x .7) 1.12 lbs. is all available for cornering. However, the equivalent mass of the front is 2 lbs., and the rear 3 lbs., so that the rear cornering "g" limit is (2.23/3) .74, while the front side "g" limit is (1.12/2) .56 g. Lo and behold, the front will begin slipping first, giving power understeer. This is fairly correct at relatively low speeds, before aerodynamics begin to take effect.

Now, if the car was driving through the corner at a lower forward acceleration (.6 g) equivalent to a .5-lb. weight shift, things would be much different. The total rear traction capability is now about (3.5 x 1.6) 5.6 lbs., forward force is 3 lbs., and side force availability is 4.73 lbs., giving a rear side "g" capability of 1.57 g's. At the front, total available side force is (1.5 x 1.6 x .7) 1.68 lbs., and the side "g" capability .84 g. The car still understeers under maximum cornering conditions, but it turns a lot faster.

Braking makes the front of the car bite even more. Assume a .6-g deceleration with a .5-lb. weight shift forward. The rear side force available is about 2.65 lbs. for .88 g, and the front side force is 2.8 lbs. for 1.4 g's. The car can now oversteer and possibly spin out if we have the front wheels turned far enough.

What the above exercises have shown us is that, on a high-traction track, understeer can develop during acceleration. If you really have a super engine and it is geared right, you may be able to induce power oversteer to help turning. What else can you do to the car? Of course, you can go to better-bite front tires . . . but we're on the subject of CG. So let's shift the weight forward a little so we have a 45%-55% distribution; 2.24 lbs. on the front and 2.75 lbs. on the rear. Let's call it Car II.

Assuming we can accelerate Car II at 1.2 g's, the weight transfer will be the same, so front tire down force will be 1.25 lbs. and rear down force 3.75 lbs. Rear tire traction capability is (3.75 x 1.6) 6 lbs. . . . and all of this is used for acceleration, NOT cornering force. Meanwhile, at the front, side force capability is (1.25 x 1.6 x .7) 1.4 lbs., and maximum side acceleration is about .62 g. So, just shifting 4 ozs. of car weight to the front has resulted in a power oversteer condition under hard acceleration. It's amazing what little weight shifts can do. The thing about Car II is that power oversteer can be induced, and some people can handle it . . . probably not me, though.

Now, let's add 2 ozs. of weight at

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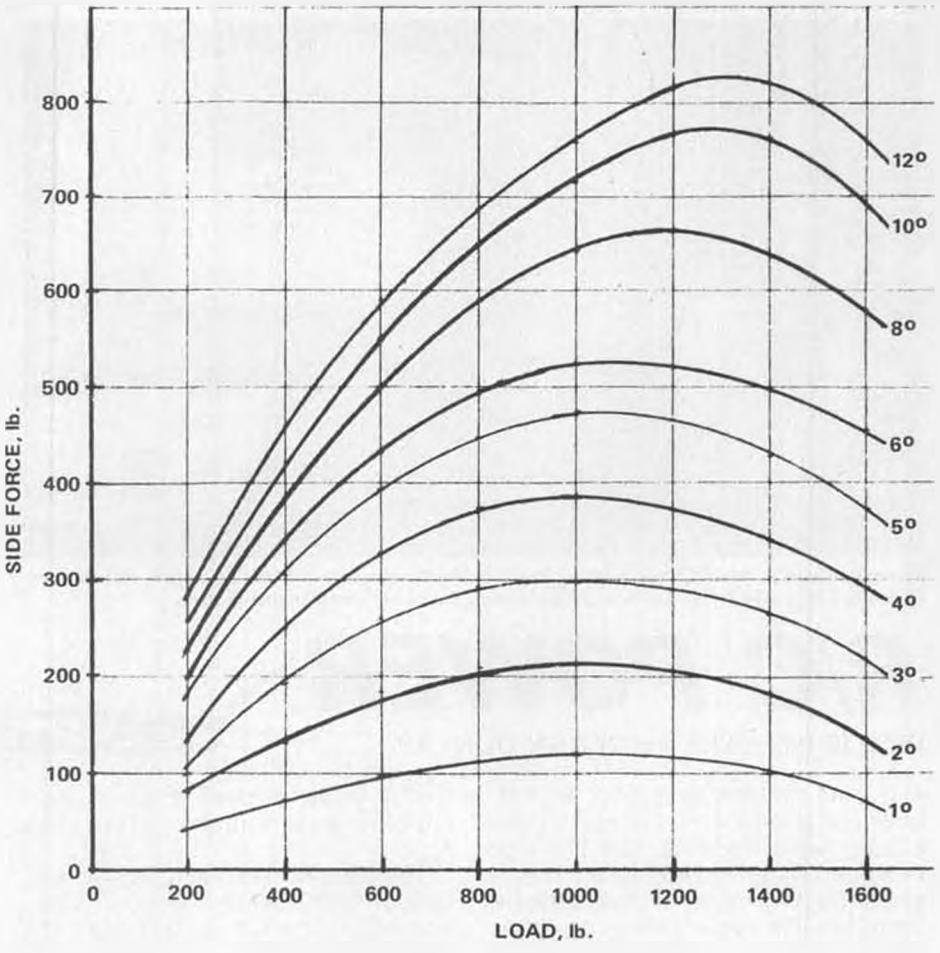


Fig. 4. For a given slip angle, a tire's cornering ability increases with the weight on it, but not in direct proportion; it peaks and falls off with further loading.

TABLE II
TIRE LOADS (lbs.), STATIC & .8g TURN

Tire	Centerline C.G. Static	Centerline C.G. .8g Turn	1" C.G. Shift to Inside Static	1" C.G. Shift to Inside .8g Turn
Inside front	1.0	.6	1.25	.85
Outside front	1.0	1.4	.75	1.15
Inside rear	1.5	.9	1.875	1.275
Outside rear	1.5	2.1	1.125	1.725

TABLE III
LATERAL WEIGHT SHIFT EFFECT ON CORNERING ABILITY (COASTING).

Item	C.G. Location	Front Inside	Front Outside	Rear Inside	Rear Outside
.8g Load		.6 (x500x1.33)	1.4 (x500x1.33)	.9 (x500)	2.1 (x500)
Equiv. 1:1 load		400 (fig. 4 x .7)	933 (fig. 4 x .7)	450 (fig. 4)	1050 (fig. 4)
Side force, 1:1 (12° slip)		319 (500x1.33)	518 (500x1.33)	495 (500)	780 (500)
Side force, ⅛		.48	.78	.99	1.56
Σ& approx. 'g'		1.26	.63g	2.55	.85g
.8g Load	1" inside	.85	1.15	1.275	1.725
Equiv. 1:1 load		567	767	638	863
Side force, 1:1		399	473	620	715
Side force, ⅛		.6	.71	1.24	1.43
Σ& approx. 'g'		1.31	.66	2.67	.89

The ingredients of the E-Z Vee project: the E-Z Vee fiberglass hull, K&B outboard, Hobbypoxy Formula 3 glue and P.F.C. filler, and the Hughey Boats outboard engine mount.

Jerry Dunlap displays the NAMBA record holder for the straight 1/16 mile at 31 mph.

R/C POWER BOATS

By BOB PREUSSE and JERRY DUNLAP

• If you thought building an R/C boat was a long winter project, then I have news for you. The E-Z Vee designed by Jerry Dunlap is a pleasant change of pace. It can easily be completed in two evenings, as either an inboard or outboard version. Why not try an E-Z Vee for those fall regattas?

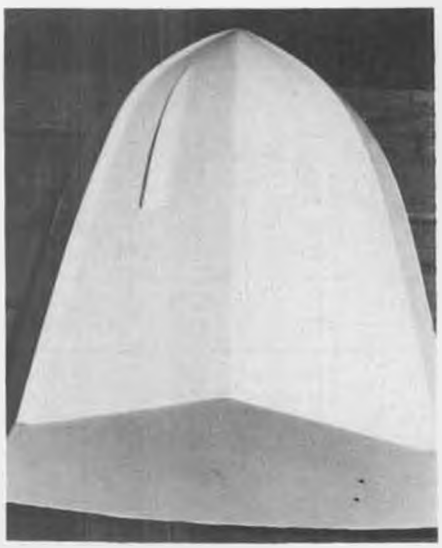
The E-Z Vee was first run by Jerry a couple of years ago in a plywood version, powered by a .40. The latest addition is a fiberglass version measuring 25 inches long and 11 inches wide. It is the current NAMBA record holder in class A outboard DV for the straight 1/16 mile, at 31 mph. In this class, outboard engines must remain stock, so this hull promises to be quick. I haven't seen it set up with the inboard version, but I understand from the West Coast boaters that it gives Ron Erickson good competition in class A.

The boat is manufactured by R/C Glass, 1628 Corona, Medford, Oregon 97501. The $55-dollar price tag is very reasonable, considering the fine quality cloth lay-up and overall neatness of the shipped product.

The deck and hull are already joined. I especially liked how carefully and accurately the hull and deck seat together. A plywood doubler is installed in the transom to give added strength for mounting hardware or the K&B outboard. To add to the good looks of its clean lines, is the brilliant metalflake deck, which is available in several popular colors. The boat I reviewed weighed in at 2 lbs., 2 oz., which tells me that the glass resin and cloth were not layed too thick. The light weight should result in a storming hull. Oh yes, don't forget the lap strakes on the hull for added lift and speed. The corners are sharp for clean running and require no improvements. This is very unusual on a glass hull.

CONSTRUCTION

The builder's first job is to decide what powerplant to use. I chose the K&B outboard, which is one of the most popular engines in R/C boat-



Out-of-the-box hull is excellent, requires no touch-up. Lap strakes have sharp corners.

Young Jimmy Preusse with the finished boat. The bolt-on engine and ready-made fiberglass hull would be an easy and quick way to get started in R/C boating.

ing. I made two modifications to the engine to increase the power. First, I carefully enlarged the exhaust port at the end of the lower unit with a Dremel hand tool (do not change this port if you plan to run it in stock class). Secondly, I removed the exhaust throttle and also installed a K&B .40 carburetor. The barrel opening has been reduced with 2 undersized pieces of Perfect brand tubing. This will allow you to find the proper needle setting and fuel draw. Also, the spray bar has been extended across the opening, to help cut down air draw. If these modifications do not work for you, remember, don't blame K&B.

Next, I made a plywood tray large enough to accept a standard 3 x 4-inch G&M Models waterproof radio box. The tray has four 1/16 plywood sides and bottom. The depth measures one inch. The bottom extends 3/16 of an inch on the long side ends; this is to accommodate the 3/16 spruce stringers which support four screw-eye hooks for the rubber bands, which hold the radio box in the tray. (If you build an E-Z Vee, be sure to leave some clearance when measuring the side pieces for the foam padding around the base of the radio box. You must have a foam insulator to absorb vibration and noise.)

The tray pieces were glued together with the new Hobbypoxy Formula 3 thixotropic epoxy glue. Formula 3 is packaged in 2 four-ounce cans, and is mixed at a one-to-one ratio. Working time is one hour, and it will cure overnight. This glue works great on vertical surfaces and thin edges, because it is formulated to a gel-like viscosity that doesn't run. As with all epoxy glues, be sure to have good ventilation. For more information, write Hobbypoxy Products, 36 Pine Street, Rockaway, New Jersey 07866.

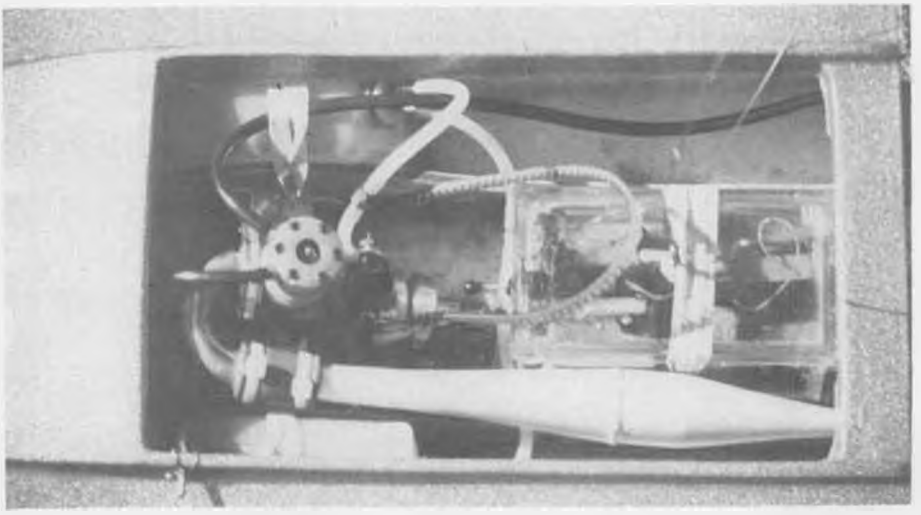
Next, secure the tray in place with 2 one-inch-wide fiberglass cloth strips and polyester resin. The tray should be centered over the centerline, approximately 6 to 7 inches from the transom. It is recommended that the area of the hull to be resined be roughened with coarse sandpaper for better adhesion.

Because my throttle output arm exits the front of the radio box (set up for conventional boats), I installed a Du-Bro flex-cable throttle linkage. The nylon liner is resined to the lower left-hand side (out of the way) and is routed through a piece of brass tubing which was bent into a half-circle with a 4-inch diameter. The end of the tubing closest to the radio is glued into a small hardwood riser, which was resined to the floor of the boat under the deck. Nylon keepers are used on both ends of the throttle, as well as the rudder linkage, to help absorb noise.

Test runs at Lombard, Illinois, showed a JG E-20 prop to be the best for this boat. At full throttle, very little of the hull is in the water.

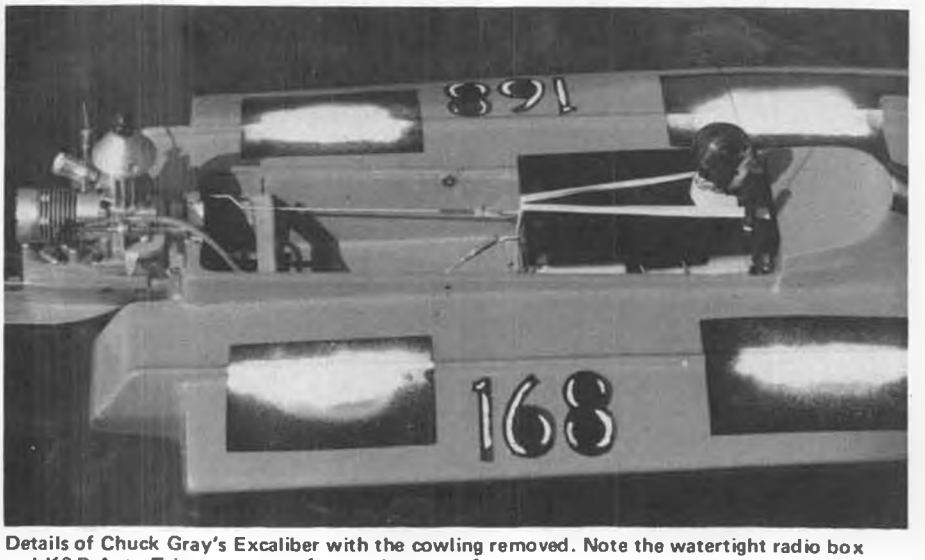
I used a Sullivan 6-oz. flat oval fuel tank. The tank is mounted about 3 inches from the transom on a 1/16 plywood platform, complete with four screw-eye hooks for rubber bands. Again, use polyester resin and cloth to mount the fuel tank tray.

To mount the K&B outboard, I decided to use a Hughey Boats Outboard Engine Adjustable Mount. I mounted the plate so that the prop hub is even with the keel when the engine mount is at its highest adjustment. From this extreme, the engine can be lowered about a 1/2-inch, right at the pond. The mount is complete with 4-40 cap screws, and is a must for outboard enthusiasts. I also used a Hughey Boats left-hand outboard arm for the rudder linkage, which mounts to the crankcase of the outboard. Its height is also adjustable, so that when you adjust the outboard, you also adjust the arm. In this way, you do not have to change your linkage. My rudder linkage passes through a small hole in the transom, so you can understand how helpful the Hughey



Engine and radio installation details in Jerry Dunlap's inboard version of the E-Z Vee. K&B .21 uses an International Products tuned pipe. Just as competitive as the outboard version.

Jerry's E-Z Vee inboard is a real movin' machine, as can be seen from this photo. Even though it's a deep-vee design, the boat does not do too well in rough water.



Details of Chuck Gray's Excaliber with the cowling removed. Note the watertight radio box and K&B Auto Trim . . . a must for maximum performance.

Greg Roth's Excaliber breaks loose. Didn't flip.

Another shot of Greg Roth's boat, doing what it does best. Clean hull design leaves very small wake.

Dennis Caines' Excaliber has lots of detail for a really authentic appearance.

arm is.

Next, install an antenna, fuel line, trim plates, and a few decals or numbers. You'll want to build a stand that supports the E-Z Vee and also holds the outboard engine rigidly in a neutral position. This prevents wear and tear on your servo when starting.

TEST RUNNING

Before I forget, my set-up balances 6 inches from the transom. In our test runs, we found a JG E-20 prop to work very well.

At full throttle, only the last one or two inches of the vee is in the water. The boat was somewhat unstable, so I lowered the engine about a 1/4 inch via the adjustable mount. Now the boat was quick and stable through the corners. With the engine depth about right, I began with minor adjustments on the trim plates. I must say right here that this boat *does* move, and it is downright fun to drive! I highly recommend the E-Z Vee for a beginner, or the pro who needs some fun again. •

EXCALIBER II

by JERRY DUNLAP

• This combination R/C Power Boats column and PRODUCT$ IN U$E report is rather unique to me in two ways. First, it is the first time in 10 years of reviewing model boats that I've reviewed a boat that I designed. Secondly, it's the first time I've ever had one of my designs, the E-Z Vee .21, reviewed by another writer, Bob Preusse. I talked to Bob about combining our reviews, since both boats are my designs and both are available from the same source; R/C Glass, 1628 Corona, Medford, Oregon 97501. Bob was most agreeable to the idea of lumping both reviews into the same article. However, prior to my portion describing the Excaliber II outboard tunnel, I'd like to mention what I've done with one of my E-Z Vee .21's. Although Bob is reviewing this boat using an outboard power package, the boat also works well with an inboard .21-size engine. I have been using a piped K&B .21 in my E-Z Vee .21, and have been fairly successful in racing the boat this season. Halfway through our District 8 racing schedule, my E-Z Vee .21 was leading in both the .21 Deep Vee Class and the .21 Monoplane class. Actually, it was leading in the enduro racing and heat racing phases of .21 class racing. However, I must say that the boat works much better on calm water than it does on choppy water. It never was intended to be a rough-water Vee design. I call it a Sprint Vee, since it works better in sprint events than rough-water events. But enough about the Vee boat, I'm supposed to be telling

you about the Excaliber II tunnel outboard.

The Excaliber II is a modification of the original Excaliber tunnel boat that was designed by my friend Dave Knowlen, in February of 1977. Dave is a well-known designer of full-scale racing boats, both limited and unlimited. The original Excaliber was featured in the November 1977 issue of R/C Sportsman. I ran the original for five months and then, just prior to the 1977 NAMBA Reno Nats, I decided to reduce the size of the boat. This proved to be a very successful modification, since the new boat, which I dubbed Recalibered, went on to win the NAMBA Nats, our District 8 Championships, and set an oval course record (since broken). It was also during 1977 that I met Vic Drew, owner of R/C Glass, and saw some of the fiberglass boats he was making. Vic told me he was looking for a new tunnel design to market, and I figured I had something he could use, so we got together and I turned over to Vic both the outboard tunnel and the little Deep Vee. Vic redesigned the cowling for the Excaliber II to reflect a full-scale outboard tunnel cowling. The Excaliber II has now been available since the first of the year, and has become the most popular fiberglass kit here in the Northwest.

I have been very pleased with the quality of work Vic has been doing on the boats. The Excaliber II is not really a kit at all. The top and bottom hull parts come seamed together. The boat can be purchased in three versions: white gel-coat, for $79.95; metalflake top, white bottom, for $84.85; and all-metalflake, for $89.95. The metalflake versions are heavier than the gel-coat hulls; however, no painting is necessary with the metalflake versions. Also included with the boat are material for a built-in radio box and a complete set of directions, with lots of photos and running information. Writing the directions for the kit was another first for me. The directions are very

Continued on page 129

Super-neat Excaliber II belonging to Tim Harvery, of New Westminster, B.C., Canada, complete with trailer. Excellent cockpit detail. One of the prettiest little boats we've seen yet.

At the 1978 NAMBA Nats, Myrtle "Mom" Coad, NAMBA Ex. Sec., with the $325 collected from the Paul Schumacher Memorial Fund raffle, and Futaba radio won and then auctioned off by Jim Fitzgibbon (left). Sid Broughton, 78 Nats CD, on right.

Jerry Dunlap (left) and Vic Drew, with Vic's Excaliber II. Placed 2nd at R/C Boat Champs.

Racing action between two Excaliber II's, just prior to the start of a heat race. Tom Dudley's boat on outside, Mike Might's on inside.

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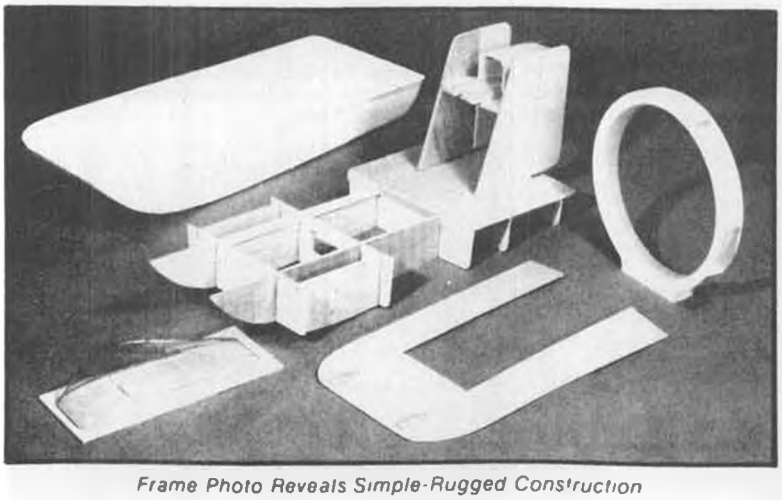

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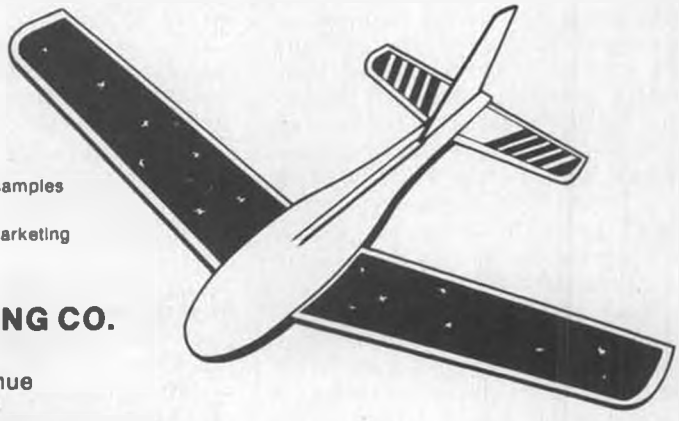

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Featured in this month's article, the "Magic Dragon", pressed to weather, resists pitching forward, lee bow wave helps pointing ability by pressing on port bow.

STRICTLY SAIL

By ROD CARR

• Back in July, 1974, these pages provided a comprehensive look at the state of the 50/800 Class. With boats from both the Potomac and Delaware Valley MYC making up the preponderance of the fleet, the 1974 version of the Garden State Regatta provided a good benchmark for the class. The regatta has been held in all succeeding years, though the name is now THE COLONIAL. As model yachting spread over the country, further developments in the class were natural. Some folks imported boats, such as the MOONRAKER from England. Others applied themselves to published designs like the BAMBI, and built from the ground up. A succession of home-grown boats appeared that ran the gamut of shapes, from the slim LIBERTY 76 to the buxom AQUILO. We even heard from "down under", and published in **MB** the lines for the powerful SONIC BOOM.

What are the latest trends in this popular class? Little technical information is forthcoming from the AMYA Quarterly. Those pages are used instead in fueling the fire of a squabble over whether American model yachtsmen should affiliate with IMYRU, or some other paper tiger.

Just when things were looking their bleakest, the postman brought a gift from the golden west. Chuck Black, who continues to make unselfish contributions to our sport, provided us with just the snapshot of 50/800 activity that we needed. With absolutely no shame whatsoever, the remainder of this column is turned over directly to Chuck, for his description of the 50/800 Western Divisional Championship. All photos should be credited to Chuck, as should our thanks for his assistance to those of us interested in the development of the 50/800 class.

MAGIC DRAGON BEGUILES 50/800 WESTERN DIVISIONAL CHAMPIONSHIP

"The 'newcomer' design from the mid-west was very impressive! Terry Allen sailed the first MAGIC DRAGON on the west coast in a masterful way against some of the best skippers. A large number of either new 50/800 models or modified models were in the competition. Twenty models entered the Western Divisional Championship Regatta. Each skipper sailed 12 long windward-leeward courses in typical spring wind conditions . . . 8 to 17 knots.

"Many of the skippers' models had never participated in a formal regatta; however, it was obvious that each was very pleased with his creation. Chuck Black, Bob DeBow, and Ritch Ritcheson sailed the new TEMPEST, which resembles the ORION in the forward sections, with a full after section like the EPIC. Jack Thomas sailed a modified ORION. This model had a fuller departure instead of the flat garboard-to-keel span in the after six inches. The BLACK MAGIC model sailed by Paul Black was designed by Bruce Nelson, who is an upcoming IOR designer. This model has a very flat section from bow to stern along the keel, and was probably the lightest model entered.

Then there was the MAGIC DRAGON, which was created by Ray Ozmun, from Sandusky, Ohio. This model placed a very close second in the 1977 AMYA 50/800 ACCR, in Indianapolis, Indiana. Although this model did well in the mid-west, it has never seen action here in the west.

"It was obvious from the beginning that the MAGIC DRAGON, sailed by Terry Allen, was the model to beat. The model did rather well to weather, but was much better off the wind. In general, the MAGIC DRAGON opened on all legs to where it had a convincing lead at the finish line. Although Terry swept first place in all his heats, there were several heats where his opponents had a bit of bad luck.

"Alvin Smith, the '77 Western Divisional Champion, also sailed impressively, but on occasions had some problems which prevented him from beating his competition. One of his problems, as well as

Bow slightly low on run, mast rotated 45° from slack rigging.

others, was making the decision as to whether to use the standard rig or shift to the short rig, when the wind conditions picked up to 15 to 20 knots. Terry Allen had no such problem, because he only had one rig . . . 70-inch luff. Although there were times in which the wind peaked around 20 knots, he handled it well. All in all, the racing was clean, the competition very keen, and each skipper came away with a better idea of his model's capability. There were reports that some models were being completely rebuilt on Monday morning!!!"

The results are as follows:

1) Terry Allen (Magic Dragon)
2) Alvin Smith (Orion)
3) Chuck Black (Tempest)
4) Bob DeBow (Tempest)
4) Don Prough (Epic)
5) Byron Sansom (Bingo)
6) Jack Thomas
7) Lionel Goodman
8) Andy Littlejohn
9) Bill LeBoeuf
10) Franz Obrikat
11) Tod Ryder
12) C. Fondacaro
13) Barbara Ronce
14) F. Ritcheson
15) Don Huckaby
16) Paul Black
17) Dave Elliott
18) K. Grunewald
18) Jack Kallin

I hope to provide a table in next month's column which will give all the pertinent dimensions for the boats discussed, as well as sources for hulls and other information. The MAGIC DRAGON is obtainable from SPORT, CYCLE AND HOBBY CENTER, 1801 E. Perkins Ave., Sandusky, OH 44870. I don't have price information this month, but hope to have it next month. I'm sure a letter to the SPORT, CYCLE folks will get you all you need.

In response to a number of requests, the following is a partial list of AMYA sanctioned model yacht clubs. Contact the fellows listed to find out where, when, and what is being sailed.

Naragansett MYA
Barbara Ryan
Seven Mile Rd.
Hope, RI 02831

H.M.S. Bishop
Bob Danks
Box 1026
Bishop, CA 93514

Salisbury MYA
Fred Frey
21 Deer Lane
Hicksville, NY 11801

Dupage County MYC
Jeffrey C. Gros
615 N. Center St.
Naperville, IL 60540

Potomac R.C. Sailing A.
John Huson
4604 Monterey Dr.
Annandale, VA 22003

Iowa MYA
Ed Niles
4229 65 St.
Des Moines, IA 50322

Western Division 50/800 champ Terry Allen and "Magic Dragon."

Sacramento MYC
Bill Robinson
4416 Elizabeth Ave.
Sacramento, CA 95821

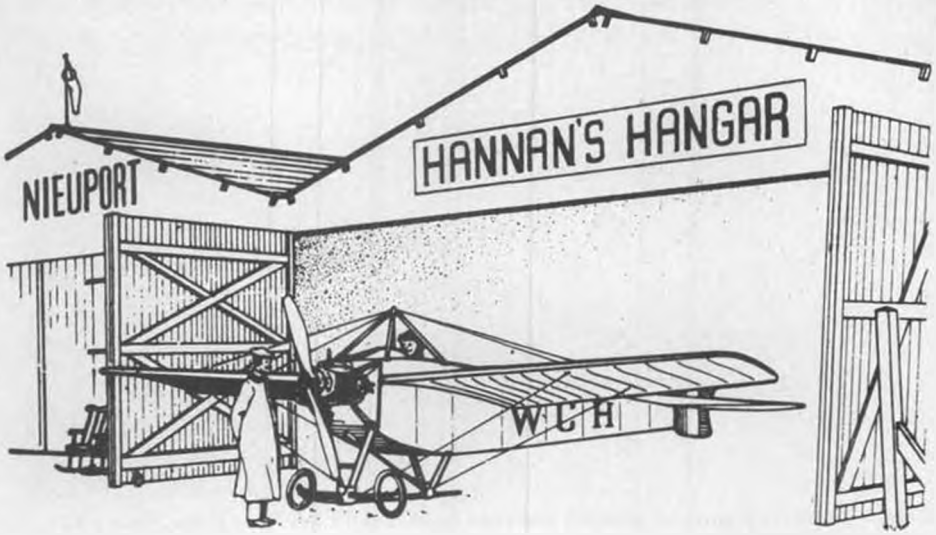
Bluegrass Open Yacht S.
Edward R. Tassman
4848 Bellevue Ave.
Louisville, KY 40215

Continued on page 138

Deep fin-and-bulb keel of minimal area promote stiffness without excessive wetted surface. Ray Ozmun, Sandusky, Ohio, designed it.

FREE FLIGHT AND CONTROL LINE

Tom Nallen, Sr's Focke-Wulf "Stosser" an its "one-way" flight at the premier F.A.C. (Flying Aces Club) Nationals. Ship was lost in a thermal. More about the F.A.C. Nats in Fernando's column, F/F Scale.



Aviation histery repeats itself . . . again.

• History is a dull subject to many people, but certainly not to scale model builders or constructors of full-size reproduction aircraft! We are pleased this month to present a photograph of another project designed to bring history to life. Leo Opdyke, Editor/Publisher of *World War I Aeroplanes*, forwarded this photo of Cole Palen's Nieuport Monoplane repro, which bears a similarity to the one in our masthead logo.

Although the name "Nieuport" is synonomous with biplanes in the minds of many enthusiasts, Edouard Nieuport himself was strictly a monoplane advocate, and the biplanes bearing his name were conceived by others, after his passing away. Nieuport's monos were among the most efficient types of their era, far surpassing the performance of most of their contemporaries. One version, powered by a tiny 28 hp two-cylinder engine of Edouard's own conception, reached speeds close to 80 mph, while another, powered with a 100 hp Gnome rotary, won the 1911 Gordon Bennett Cup race.

A few Nieuport monos were imported into the United States prior to World War 1, but no traces of them appear today. Also, a few American copies were produced, but they too, seem to have vanished completely. During the heyday of these machines, E. R. Armstrong, Technical Editor for the early *AERO* magazine, marketed plans for a pseudo-Nieuport. Copies of these were in the collection of the late William Fleming, a well-known model builder and plans draftsman. It is our understanding that the Cole Palen craft was largely based upon these drawings, with additional information from the German Rosendahl deliniations.

Palen has chosen to power his monoplane with a two-cylinder Aeronca engine, which is capable of swinging a large diameter prop similar to that of the original.

Constructed in Florida, the Nieuport repro is now at its home base, Rhinebeck, New York. The fuselage is pinkish-red, the wings a dirty white, according to Leonard Opdyke. Thanks also to Fred A. Komlosy and Herb Kelley, who supplied some of our information.

Reproduction Nieuport monoplane belonging to Cole Palen, Old Rhinebeck Aerodrome, N.Y., has Aeronca two-cylinder opposed engine. See text.

Monty Groves, Jr. makes a low pass in his Focke-Wulf "Stieglitz", featuring Swedish markings. Aircraft is powered by a 150 hp Siemens radial engine. Photo by Ken Hannan.

READERS REPLY

Every so often we toss a question to our audience, and it is satisfying to receive informative answers. Nope, we still haven't obtained the instrument panel layout of the Bellanca Trimotor Racer that Claude McCullough asked about; however, the "batting average" is high.

For instance, we wondered in print where the term "Big Apple," as applied to New York City, originated. Former resident Sol Berman provided a newspaper, which yielded this account: It seems that jazz musicians who traveled the country, had a saying: "There are many apples on the tree, but to play New York City is to play The Big Time, The Big Apple." So there you are. Here on the opposite side of the country, columnist Jack Smith refers to California as "The Big Orange" . . . perhaps because it has a-peel? *(Bill should pay us to print that kinda stuff! wcn)*

HANDY HINT

Frank Scott sez: "In order to see better what I'm doing while laminating parts, I find it convenient to work on a sheet of black polyethylene (from a trash bag)." Advantages are that the contrast between the light-colored balsa or basswood and the background permit easy examination, and of course, a glue-resistant surface for easy removal of the dried parts.

ONE MAN'S ACHIEVEMENTS

Most knowledgeable aviation buffs are well aware that Gustave Eiffel (of Tower fame) was also an aerodynamicist who operated a wind tunnel and developed airfoils during the pioneer days of flying. In fact, the Nieuport monoplanes and their airfoils were tested in model form by Eiffel. But did you know that he also designed the mechanical structure inside the Statue of Liberty? Eiffel conceived the supporting framework during 1884, five years before his world-famous tower was built. Our thanks to Doug Gillies, who unearthed the information from a July, 1932 *MECCANO* magazine.

All-balsa Opel rocket-powered plane, by Canadian Ron Limbrick, for Jetex power. Plans available from Peck-Polymers.

JOHN CLEMENS SUPPORTS SCALE

AMA Prexy John voiced this opinion while NASA was being formed (the modeling NASA, not the aerospace group!): "Everyone *ought* to try one, even if just a Peanut. Really not all that difficult, and most satisfying."

THOSE WRIGHT BROTHERS

During a lecture honoring the 75th anniversary of the Wright Brother's first powered flight, Bill Chana described some of the lesser-known products of this innovative duo, based upon his extensive study of their lives. It turns out that their ingenuity extended to their home, which featured such advanced ideas as a stainless steel sink, central vacuum cleaner system, and a specially-sculptured 3-dimensional toilet seat!

GEE BEE AWARD

Henry A. Haffke, leading East Coast R/C Gee Bee enthusiast, is donating a Granville Brothers Challenge Trophy. Featuring an engraving of the five brothers, the perpetual prize will be presented at the annual Rhinebeck Classic meets, to the most outstanding Gee Bee model entry.

AND SPEAKING OF THE GRANVILLES

Haffke passed this story along to us, credited to designer Pete Miller: It seems that "Grannie" Granville, sparkplug of the Gee Bee construction team, was involved in a few last-minute details of the R-1 racer assembly. He was having problems getting the rudder hinge-pin in place. It had slid through three of the four hinges, but stubbornly refused to budge into the last one. Grannie fumed, cussed, and finally, out of sheer frustration, threw his hammer across the shop floor. It careened off the wheel of another aircraft, bounced into the air, and came down through the top covering of the wing. No one said a word. Someone just got a piece of fabric, some dope, and quietly repaired the damage without uttering a sound!

WALT MOONEY, ENTERTAINER

To fill in his idle moments when not engineering, flying, designing models, and writing articles, Walt Mooney sometimes gives lectures.

Continued on page 106

Charley Roth's "model wall" shows divergent interests; peanuts, walnuts, helicopter, R.O.W., Coupe D'Hiver.

Doc Martin's dental assistant "BJ" (sure Doc!), holding Doc's "Cessna AW", covered in silver condenser paper.

PEANUT SCALE

IKARUS IK-2

By WALT MOONEY . . . Here's a Golden Age fighter that made it into the early part of World War II. The long nose and landing gear lend themselves well to rubber power, but check that fin area, you'll need a lot!

• Two sources of information are available for a three-view of this interesting Yugoslavian design. Aircraft Profile 242, "IK Fighters" (Yugoslavia: 1930-40's) has considerable information, as well as a three-view and several side views in color. "Warplanes of the Second World War, FIGHTERS", volume four, on page 203-204, also covers the IK-2, and has a three-view. This model was drawn up from this latter three-view.

When German forces invaded Yugoslavia in April 1940, eight of these fighters were still serving with the 34th squadron of the 4th fighter regiment, and took part in the early fighting. This design shows some of the influence that the Polish gull-wing fighter designs had on other aircraft designers. However, the designers of the IK-2 obtained their gull-wing effect only in terms of the chord and thickness of the wing. The spar was not bent, and as a result, this little gull-winged peanut model is a little easier to build than might otherwise be expected.

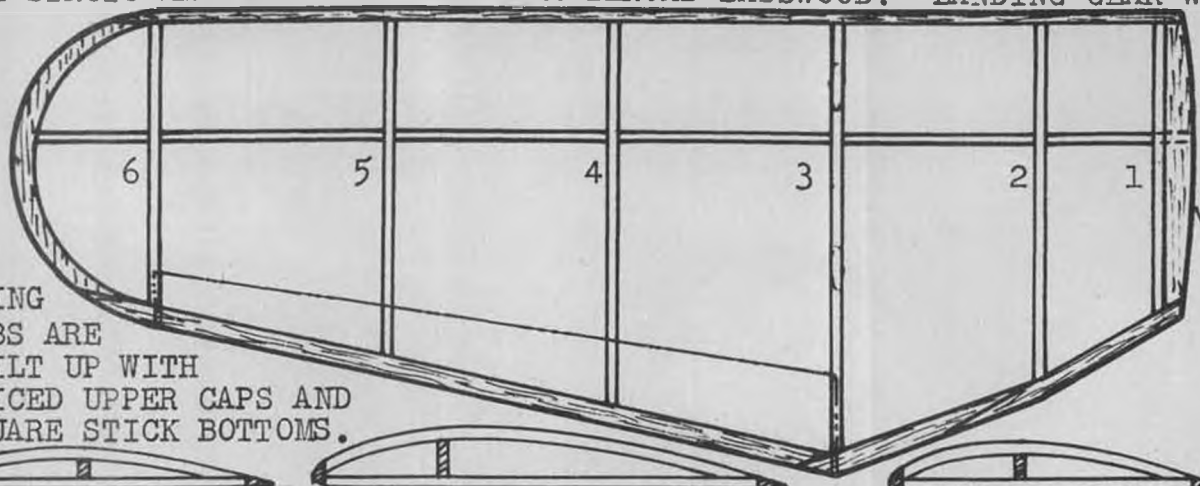
The author (ole prof, or whatever other names have been hung on him) expected this model to be an excellent flier, and easy to trim. "Sic transit gloria!" It sure didn't fly right off the board. Early test flying revealed a nasty spinning tendency. Standard cure-alls, such as washing-out the wing tips and moving the center-of-gravity forward, were of little avail. The final solution was the addition of more vertical tail area. A piece of clear plastic was added to the vertical tail, as shown by the phantom line, and then the model flew relatively well. Best times have been on the order of twenty-five seconds, which is somewhat disappointing. However, there is no doubt that someone will build a lightweight version that will give much-increased flight times.

The model is basically a simple design and uses very conventional structural techniques. The wings and tail surfaces are built directly over the plans. Both the horizontal and the vertical tail are flat structures. Note that the horizontal tail is built in two halves, and is later attached on each side of the vertical tail. Sand the leading edges of the tails round, and the trailing edges to almost a knife edge, for better aerodynamic streamlining.

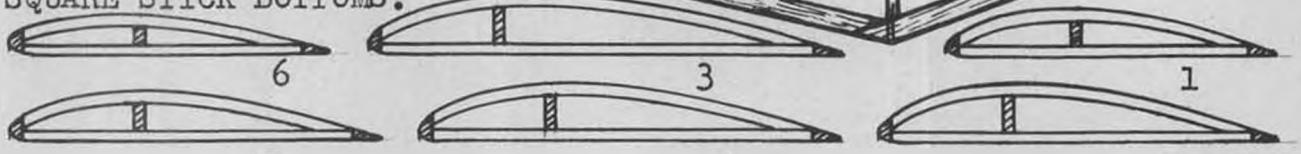
Continued on page 116

Long landing gear on this Yugoslavian design allows plenty of room for large flying prop, which is glued up from two Sleek Streek props and a rocket nose.

ALL STRUTS ARE MADE FROM MODEL RAILROAD BASSWOOD. LANDING GEAR WIRE.



WING RIBS ARE BUILT UP WITH SLICED UPPER CAPS AND SQUARE STICK BOTTOMS.



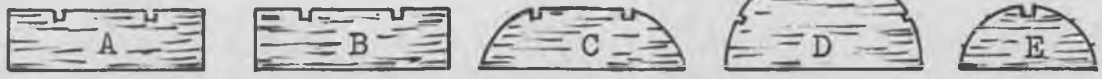
COWL SIDES ARE MADE FROM 1/8TH SHEET BALSA.

2 ←REAR

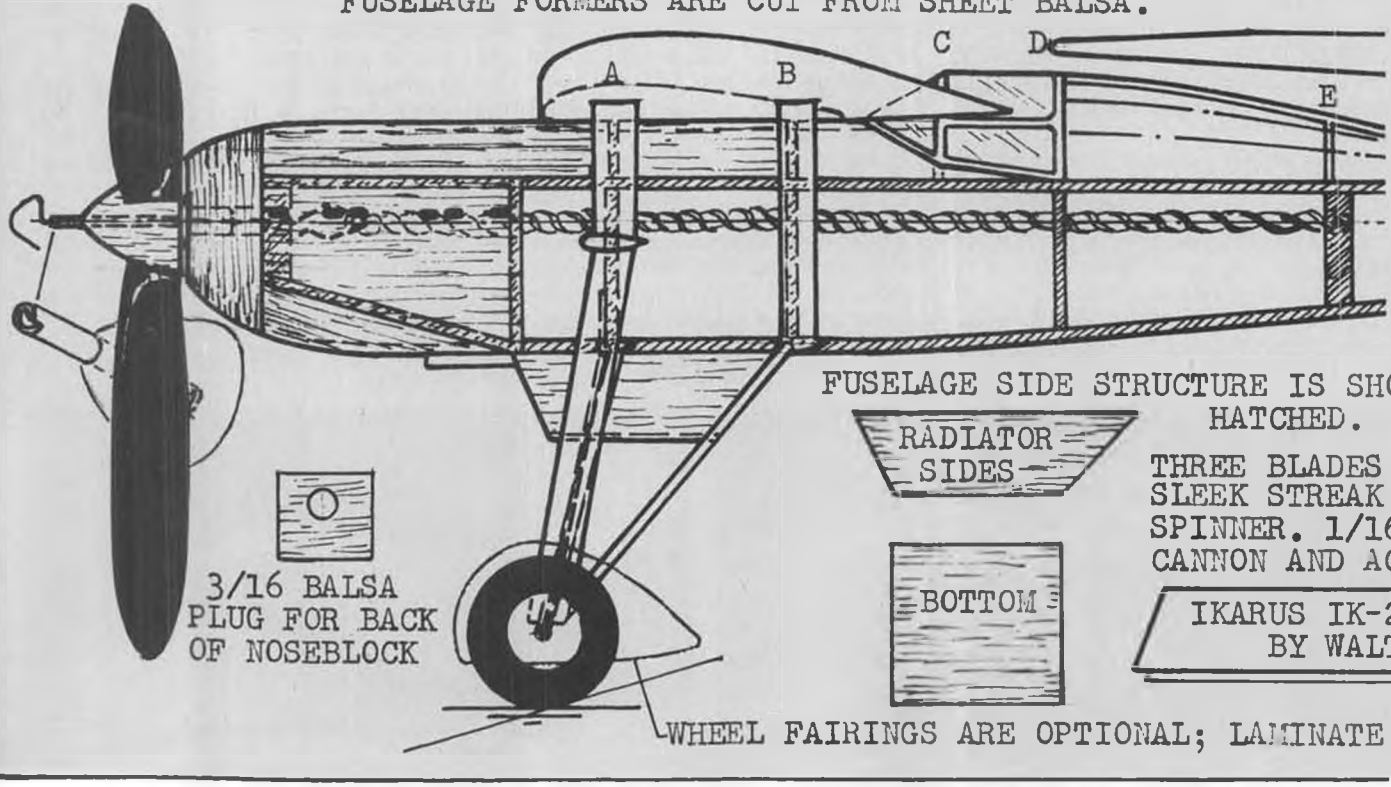
USE BALSA BLOCK FOR SPINNER, NOSEBLOCK, COWL TOP, AND COWL BOTTOM. HOLLOW COWL PIECES TO THE DOTTED LINES.

FUSELAGE PLAN VIEW.

ENLARGED -SCALE TAIL



FUSELAGE FORMERS ARE CUT FROM SHEET BALSA.



FUSELAGE SIDE STRUCTURE IS SHOWN HATCHED.

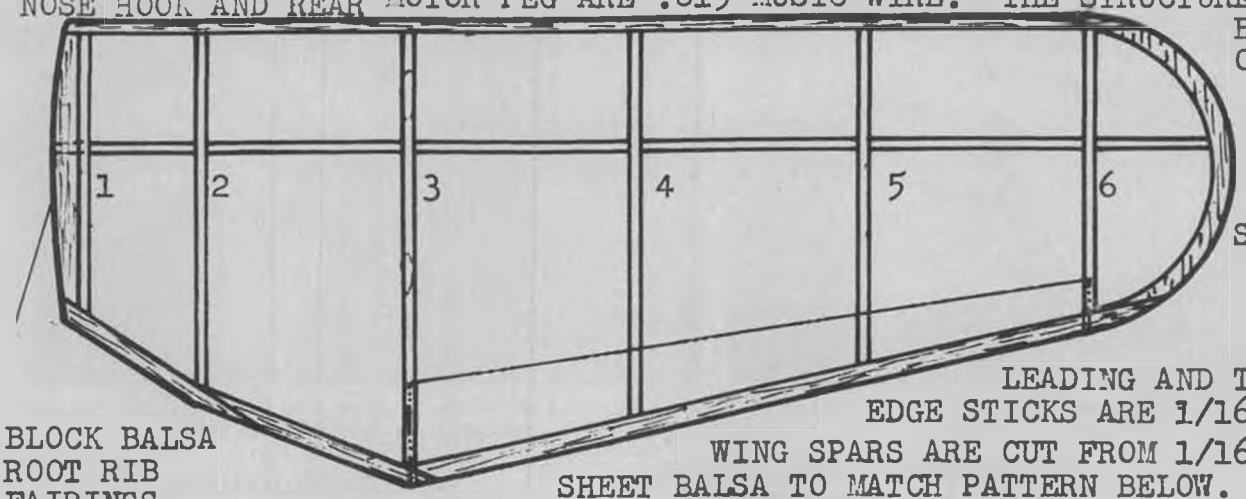
THREE BLADES SLEEK STREAK SPINNER. 1/16 CANNON AND ACTS

IKARUS IK-2 BY WALT

3/16 BALSA PLUG FOR BACK OF NOSEBLOCK

WHEEL FAIRINGS ARE OPTIONAL; LAMINATE

NOSE HOOK AND REAR MOTOR PEG ARE .015 MUSIC WIRE. THE STRUCTURE IS ALL BALSA OTHERWISE.

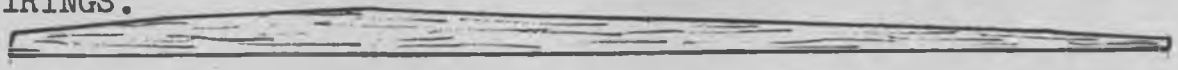


WING TIPS ARE 1/16TH SHEET.

LEADING AND TRAILING EDGE STICKS ARE 1/16 BY 1/8.

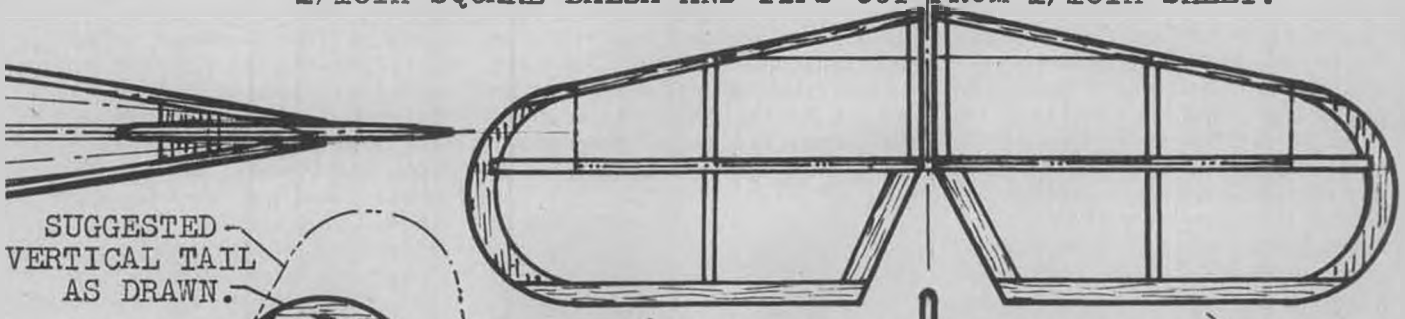
WING SPARS ARE CUT FROM 1/16TH SHEET BALSA TO MATCH PATTERN BELOW.

BLOCK BALSA ROOT RIB FAIRINGS.



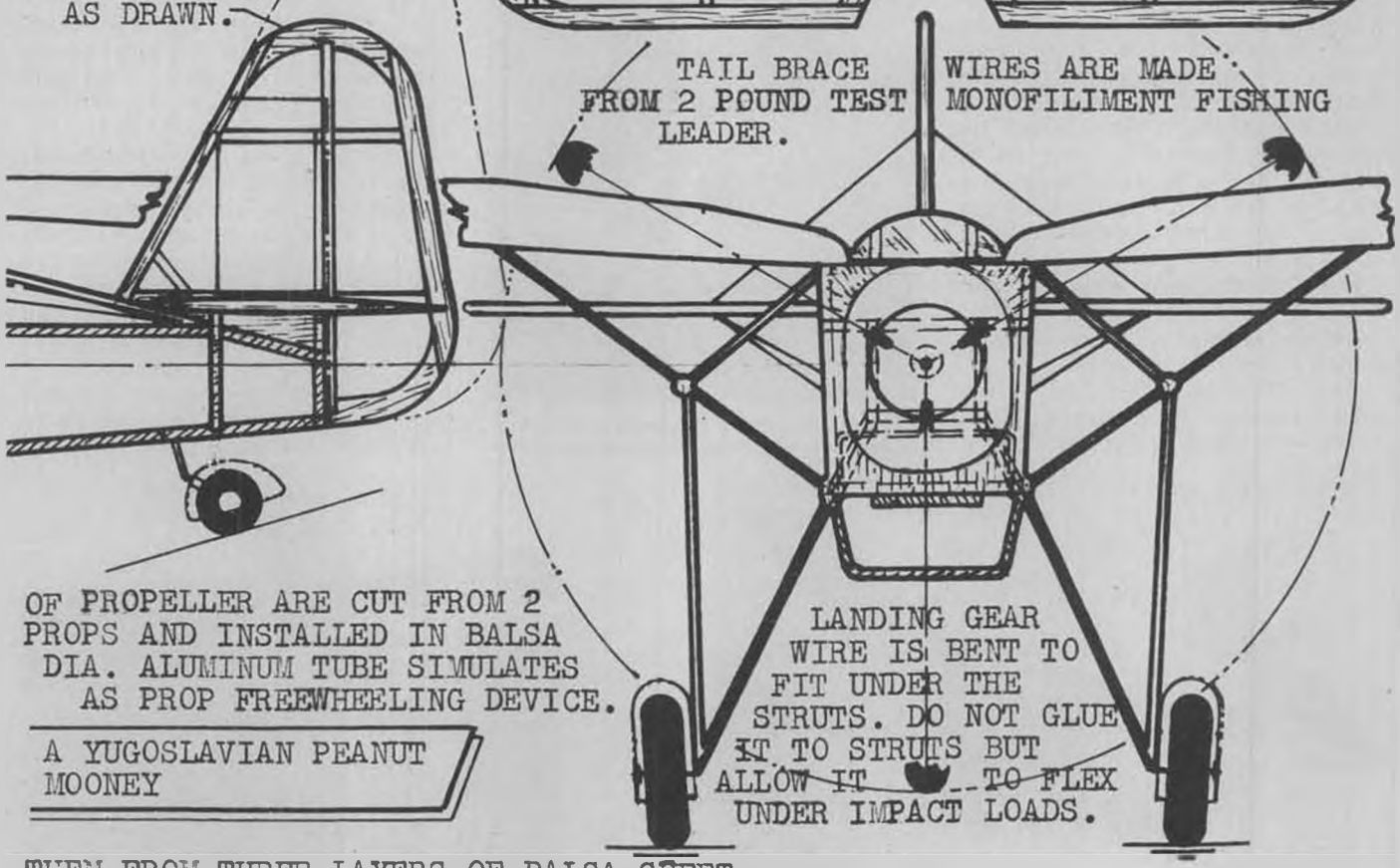
MOTOR PEG.

HORIZONTAL TAIL IS BUILT FLAT OVER THE PLAN USING 1/16TH SQUARE BALSA AND TIPS CUT FROM 1/16TH SHEET.



SUGGESTED VERTICAL TAIL AS DRAWN.

TAIL BRACE WIRES ARE MADE FROM 2 POUND TEST MONOFILIMENT FISHING LEADER.



OF PROPELLER ARE CUT FROM 2 PROPS AND INSTALLED IN BALSA DIA. ALUMINUM TUBE SIMULATES AS PROP FREEWHEELING DEVICE.

LANDING GEAR WIRE IS BENT TO FIT UNDER THE STRUTS. DO NOT GLUE IT TO STRUTS BUT ALLOW IT TO FLEX UNDER IMPACT LOADS.

A YUGOSLAVIAN PEANUT MOONEY

THEN FROM THREE LAYERS OF BALSA SHEET.

Pat Daily and Mike Midkiff launch their models in the final round of the WW-II Combat event at the Flying Aces Club Nationals.

Ed Heyn flew his Russian S-Z Quad at the F.A.C. Nats. Both Ed and his models are excellent fliers. Beautiful flying field!

FREE FLIGHT SCALE

By FERNANDO RAMOS

• On July 15 and 16, I had an *encounter like no other kind!* I attended the first Flying Aces Nationals contest, at Johnsville, Pennsylvania. Modelers, I can't express in words the overall sensation that this particular weekend had on me, but let me give it a try. First off, I had been on vacation with my family, which took us to many places in the East. One of our stops was in Washington D.C. (I certainly enjoyed myself at the Aerospace Museum). We stayed across the Potomac River, in Roselyn, Virginia. During our stay there, we were fortunate to be the dinner guests of Hurst Bowers and his wife, Betty. After dinner, Hurst took us to Flyline Models, where I had the pleasure of meeting the other half of the business, Herb Clukey. It is amazing what two individuals can do with lots of hard work and enthusiasm. While at Flyline, I was able to see the condition of the four models I had sent to Hurst. Two of the four models had very slight damage, which Hurst had repaired.

The following afternoon, Hurst and I made arrangements to go flying with some of the members of the Maxecuters Scale Club, out of D.C. The site was about an hour's drive from Roselyn, and is situated in Maryland. (I'm amazed at how quickly one can go from state to state with little driving. Out here, you can drive all day and never get out of California!) These Maxecuters really know how to live. They have a flying site that would be the envy of most clubs in the country. It is situated on a slightly rolling knoll, with nice, tall, green grass. The R/C'ers have a mowed strip for a runway. The weather, which is usually windy and humid in the summer, was absolutely perfect. During this session, I had a chance to visit with some old friends (Don Srull, Stu Meyers, and Joe Carter) whom I had not seen for quite a while. I also met Mr. Winter, who certainly needs no introduction, along with Allan Schanzle, and Pat Daily. After the flying, we all adjourned to one of the local eating establishments for more enjoyable camaraderie. This turned out to be a preamble of what was ahead.

Charles Schobloher's .020-powered Hiperbipe needed a thrust change, otherwise a good flier.

From D.C., we flew to Philadelphia, where we rented a car and drove to Willow Grove. We checked into the Fiesta Inn Motel, which was the F.A.C. Headquarters. By six pm the modelers were beginning to arrive from all parts of the East. Bill Noonan, Pres Bruning, and my family and I headed for a restaurant for dinner and a brief respite. I hadn't seen Pres for several years, so there was much catching up to do. When

Don Srull flew his Swiss Schlepp C-3605 in Jumbo Scale at the F.A.C. Nats. Model won 1st in Rubber Scale at 1978 AMA Nats.

Royal Moore with his Gee Bee model Z on left and R-1 on right. Looks like he's using geared rubber motors.

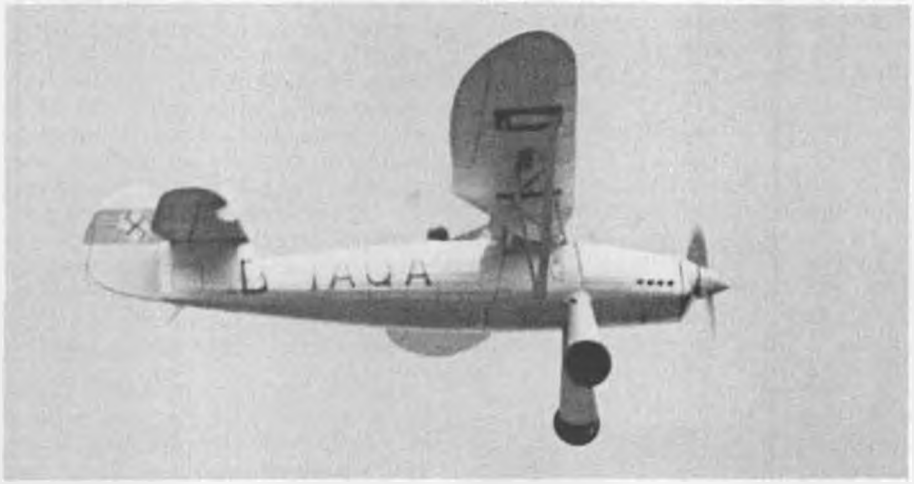
Superb Grumman Bearcat by Dennis Norman looks more like a static display model than a flying model! Excellent pilot and cockpit detail, too. No word as to how well it flew.

Big P-63 Kingcobra by Russ Brown took 2nd in Jumbo Scale event.

we returned to the motel, most everyone expected had arrived, and there were many pleasant introductions made. The air was filled with the anticipation of the weekend. The rest of the evening (until midnight) was spent visiting and preparing motors and the like, and above all, admiring the many superb and varied models that were present.

Saturday morning was wet and not very encouraging, as far as model flying was concerned. Bill Noonan and I drove together to Johnsville Naval Air Station. By the time we arrived at the field, it was hot and humid. However, by 10 am, everything cleared up and the weather turned out to be letter-perfect for the entire day! The field was a modeler's haven . . . I believe that the runways were 8000 feet long. We drove about three-fourths of the way down and parked. The runways are bordered by the same great grass I saw in Maryland . . . must be the water!! I wish we had some of that grass out here in California, because the models survived all kinds of disasters.

There were six events flown on Saturday, which included the following: F.A.C. Rubber Scale, F.A.C. Power Scale, WW-I Combat, WW-II Combat, plus Embryo Endurance and No-Cal Scale. The F.A.C. rules are fairly simple, with minus points given to conventional high-wing cabin types, and plus points to unusual designs such as low-wing, multi-wing, multi-engine, etc. Each model gets four official flights. The usual procedure is to make at least one official flight, then submit the model for scale judging. The model must score at least 40 points, otherwise it doesn't qualify as a "scale" model in the judges' opinion. There is a two-minute max, and naturally, if you achieve this, your model will



Tom Nallen's Focke-Wulf Stosser cruising by. Model is an excellent flier . . . in fact, it flies a little *too* well; Tom's airplane was the victim of a passing thermal and went O.O.S.!

Here's one flier's method of carrying Peanuts safely.

Typical action during a mass launch in the WW-I Combat event. Bob Thompson, in leather helmet, goggles, and cape, gets a head start on two other fliers. Bob is one of leaders of F.A. club.

Expert flier and master showman Bob Thompson kept everyone entertained . . . see text.

Hurst Bowers, of Flyline Models, and Pat Daily stop to watch the action. Pat is holding his Fiat G-50. Model is a fine flier, made it to the flyoffs in WW-II Combat.

receive more points.

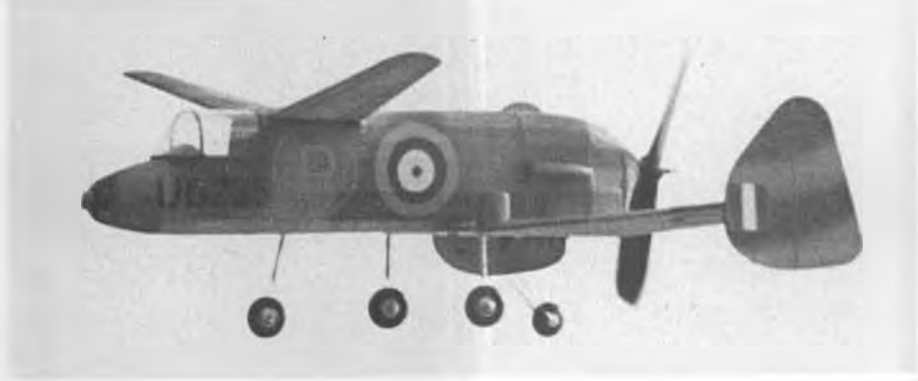
There were so many models dotting the skies that it was difficult to see everything that was going on. I had sent four models, but ended up flying only two . . . I just had to take pictures of the many splendid models and modelers doing their thing.

The most fun events to watch are the events in which a mass launch takes place. Both WW-I and WW-II Combat were this type of event. There would be several heats for each event, with six to seven models in each heat. There is a two-minute time period for the modelers to wind their models. Failure to do so, or a broken motor, eliminates you from the competition. After the countdown, the models are launched at the same time. It is really an impressive sight to see a squadron of models taking off in different directions. The first two models down are eliminated, while the other four wait for yet another heat. Ultimately, there will be a fly-off between two models. Rubber motors really take the supreme test during this type of competition, and many of the modelers are pros at getting the most from their motors. There is no changing of motors allowed between heats, either. Great sport!

Neat A-26 by Ralph Kuenz had a best time of 32 seconds, uses geared rubber motors.

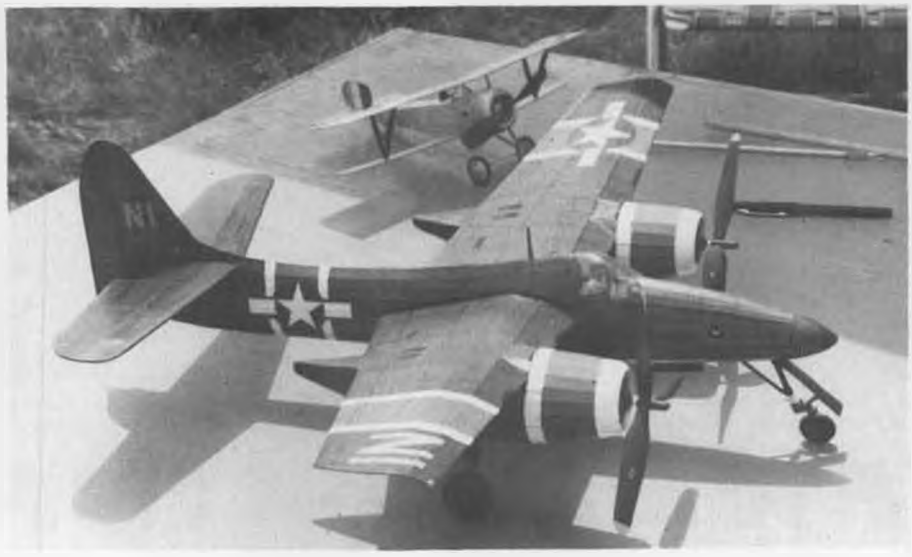
Dennis Norman and Ralph Kuenz both entered twin-engined models in F.A.C. Scale. Dennis had a very lightly built and very neat Grumman F7F-1 Tigercat, which had direct drive and used three-bladed props. On the other hand, Ralph's neat A-

Hurst Bowers carried his, Herb Clukey's, Don Srull's, and Fernando's models from Va.



In addition to his Stosser (which he lost), Tom Nallen flew this very unusual Miles pusher at the F.A.C. Nats. Model features an unusual force set-up (to say the least!).

Don Srull launches his Heinkel 100. Lots of low-wing models were present.



This Grumman F7F-1 Tigercat by Dennis Norman was one of two twin-engine models that showed up. Rubber motors are direct drive to the props.

When a guy does this nice a job on a model, it's just *gotta* fly well! Bob Bender's Taube.

Ken Bagdon did a beautiful job on this Curtiss FIIC-2 biplane. Model is powered with a .19 engine. Unfortunately, the model did not qualify.

26 had geared motors, a la Royal Moore, driving four-bladed props. Each nacelle had two separate rubber motors driving the gears. As it turned out, both flew exceptionally well, and their times were very similar. Dennis' best time was 30 seconds, while Ralph's best was 32 seconds. Both models looked magnificent, either in hand or in the air. Incidently, Dennis has a very unusual manner of making bulkheads, which I plan to cover in another issue. His method provides very light bulkheads.

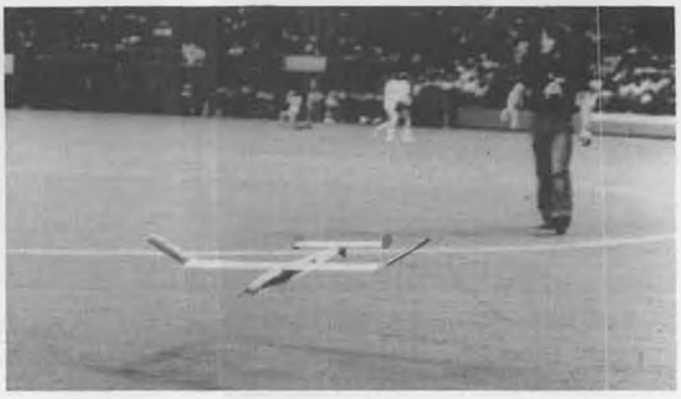
Bob Thompson, one of the two dynamic leaders of the Flying Aces Club (the other being Dave Stott, who was unable to attend, due to an illness in the family), kept everyone entertained with his leather helmet and goggles and black cape. Whenever he flew a model of a particular nationality, he would break out into the dialect of that particular country. It was really entertaining, and most

Continued on page 136

The big and small of it. Leon Bennett's Jumbo Pazmany PL-4A and Emerson Elwell's Dayton-Wright Peanut. Pazmany plans on p. 90.

Jumbo Scale Douglas TBD dive bomber by Gordon Roberts is a nice flier. Model looks to be very lightly built.

Ed Timoco watches as Joey (did'nt get last name) launches his Coupe at halftime at the Kingdome, in front of 30,000 spectators!



Bruce Kimball follows his landing Coupe at the Kingdome. Model flying at halftime was a big hit with the spectators.

FREE FLIGHT

By BOB STALICK

FREE FLYING AT THE KINGDOM

Thirty-thousand people, the Seattle Sounders soccer team, and some crazy modelers with everything from EZB's to Old Timer rubber models were there at the same time. As the first half of the soccer match drew to a close, those wild and crazy guys from the Boeing Hawks prepared their towlines and rubber motors for the big halftime show. Just as the teams left the field, the models started heading for the ceiling. Most of the spectators stayed in their seats and watched in awe as the ships gracefully climbed up to the rafters and then settled back down to earth. Those that landed in the spectator areas were carefully caught and returned to their owners with loving care. Television camera crews from Seattle and Minneapolis zoomed in on the models as they flew through the vast expanse of the Kingdome. Close-up cameras at the Dome would zero in on a ship and beam it onto the huge screens for the pleasure of the folks in the stands.

Near the end of the session, Tom Cashman decided to try to put his Coupe deVille up to the ceiling . . . 350 feet up. He had it wound up to the limit and ready to fly. There was some concern that it might not be down in time for the beginning of the second half of the soccer match to begin. The model was launched anyhow . . . Past the first level seats it climbed in a tight circle, accompanied by a chorus of oohs and aahs. It continued past the second level and beyond the highest television platform at 275 feet . . . the crowd cheering all of the way. A mere ten feet below the highest part of the dome, it flattened out into a beautiful transition.

The crowd was on its feet, now, cheering as if a goal had just been scored. C.D. Howard Phillips looked at the clock; only 30 seconds remained until the second half was to start. The referees and players were coming out of the locker rooms, and that Coupe was still circling overhead. As the referee got beyond the goalpost, he began to toot his whistle to get the match going. He was greeted very warmly . . . with a deafening chorus of boos! Stopping dead in his tracks, he looked up and saw the model floating so gracefully that the just shrugged his shoulders and decided not to brave the ire of the crowd. The promotion and sales manager came over with worried concern written on his face . . . the model was still quite a ways in the air, and not coming down very fast. His question, "Is there any way that he (Tom Cashman) might help it come down a bit faster?" was answered with a "Yes, he's working on that right now!"

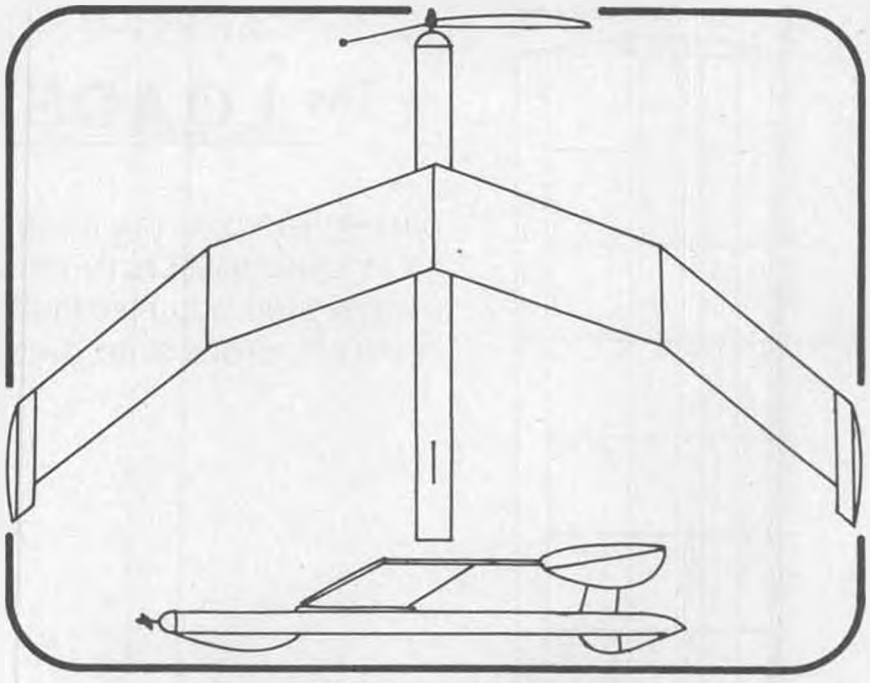
By this time, the model was almost within grasp and the spectators were on their feet. As Tom caught the model, a tremendous cheer went up to fill the Kingdome. Accompanied by more applause, the members of the flying team . . . Strat-O-Bats, Boeing Hawks, and others . . . left the field so that the Sounders could continue their game. So, what was the outcome? Well, first off, the Sounders won, 1-0. Secondly, the phone at Howard Phillips' home has been ringing constantly, with people on the other end wanting to know more about this Free Flight stuff. Probably the coupe de grace, the Seattle Seahawks want to know whether or not the free flighters might be able to stage such a demonstration for their upcoming exhibition game on August 17. The answer, of course, knowing Howard, was a quiet but very enthusiastic, "Yes, we'd be more than happy to do so."

I guess the moral of the story is clear; a bit of persistence and some luck, plus a smidgen of talking, and demonstrations of this sort could be staged in every big Dome in the country, and why not!? Why not allow others to be intrigued with the wonder of free flight?

DARNED GOOD AIRFOIL — Finnish M.P.

This photo, taken by Joe Klause at the 1978 Lake Charles Nats, shows Phil Sullivan, of Spring Valley, Connecticut, letting go for a max in 1/2A.

You'd smile too, if you had just set a new AMA record. Kieth Martin with his helicopter.



NOVEMBER'S MYSTERY MODEL

Back in the archives of the model press, there appeared this section which was developed by the Finns in the early days of Nordic flying (ever wonder why it's called Nordic?). The specs on this section indicate that it is a good one for very windy weather, especially cold and rough-air thermal conditions. It has a rather high top camber, as well as deep and aft undercamber. It should glide very slowly and be quite forgiving with its deep and rounded leading edge. The thin trailing edge could prove difficult to build, but there is adequate spar depth up front for really beefy structure. A capstripped t.e., or sheet on the back 25%, should help maintain a good rear end.

MYSTERY MODEL FOR NOVEMBER

This one was forwarded to me by fellow columnist Bill Hannan. His statement "You could really throw your readers a curve with this one!" aroused my interest. It was sent to Bill by his penfriend from Germany, Benno Sabel, who located it in a now-defunct German model magazine from 1957. It is a tailless rubber model which fit a particular class of models, having some success on the German contest circuit at that time.

Name the model, and Bill Northrop, genial editor, will send you a goodie. Only one right answer will be rewarded, and the one with the earliest postmark will get the prize, such as a subscription to **Model Builder.**

NOVEMBER 3-VIEW

The Loadstar

The three-view this month comes from that very good free flight newsletter, the CIA Informer, whose pages supply me with enough material to write most of this column every other month or so. The Model of the Month is a design by Dan Murphy, and was the winning Payload model at both the 1975 and 1976 Nationals. Dan snitched the wing and stab parts from a Competition Models "Eaglet" kit for starters, then scratch built the fuselage from the scrap balsa bin. He chopped a rib section from the wing plan and added polyhedral for increased stability. The stab is stock "Eaglet".

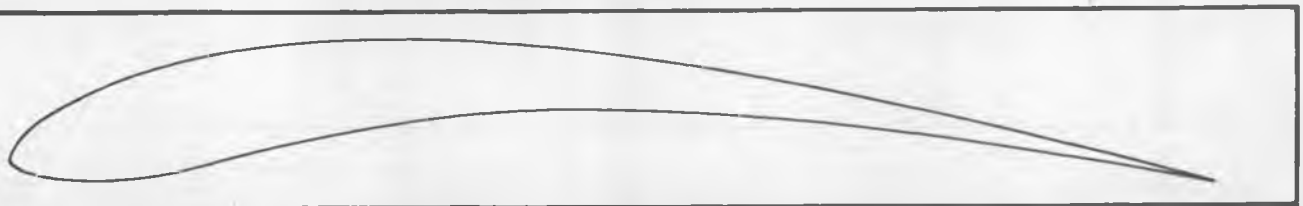
Dan gives a good bit of the credit for his model's flight consistency to his incorporation of a remote timer release mechanism. Youngsters tend to get a bit rattled by official flight jitters, and ROG'ing a model sometimes amplifies the panic tendency, so Dan went to school on one of Dad's (Harry Murphy) R.O.W. models, and added this feature to reduce his chances of the jitters causing ground loops, crosswind launches, or short engine runs . . . plus just plain simplifying the release of the model for flight. The feature is fully explained in an ROW article written by Harry and published in the July, 1977 issue of M.A.N. There is a simple "ripcord" method and a more sophisicated "trigger" method. Both work fine.

The airplane? It's a straightforward rear-fin pylon type model and flies the usual right-right pattern. Try it for Payload, you'll find it works for you.

A SYMPOSIUM PRIMER

The National Free Flight Society annually presents its State-of-the-Art papers at the Nationals. This year was no different. Those who were at Lake Charles had the chance of listening to some of the presentations. Those who weren't will have

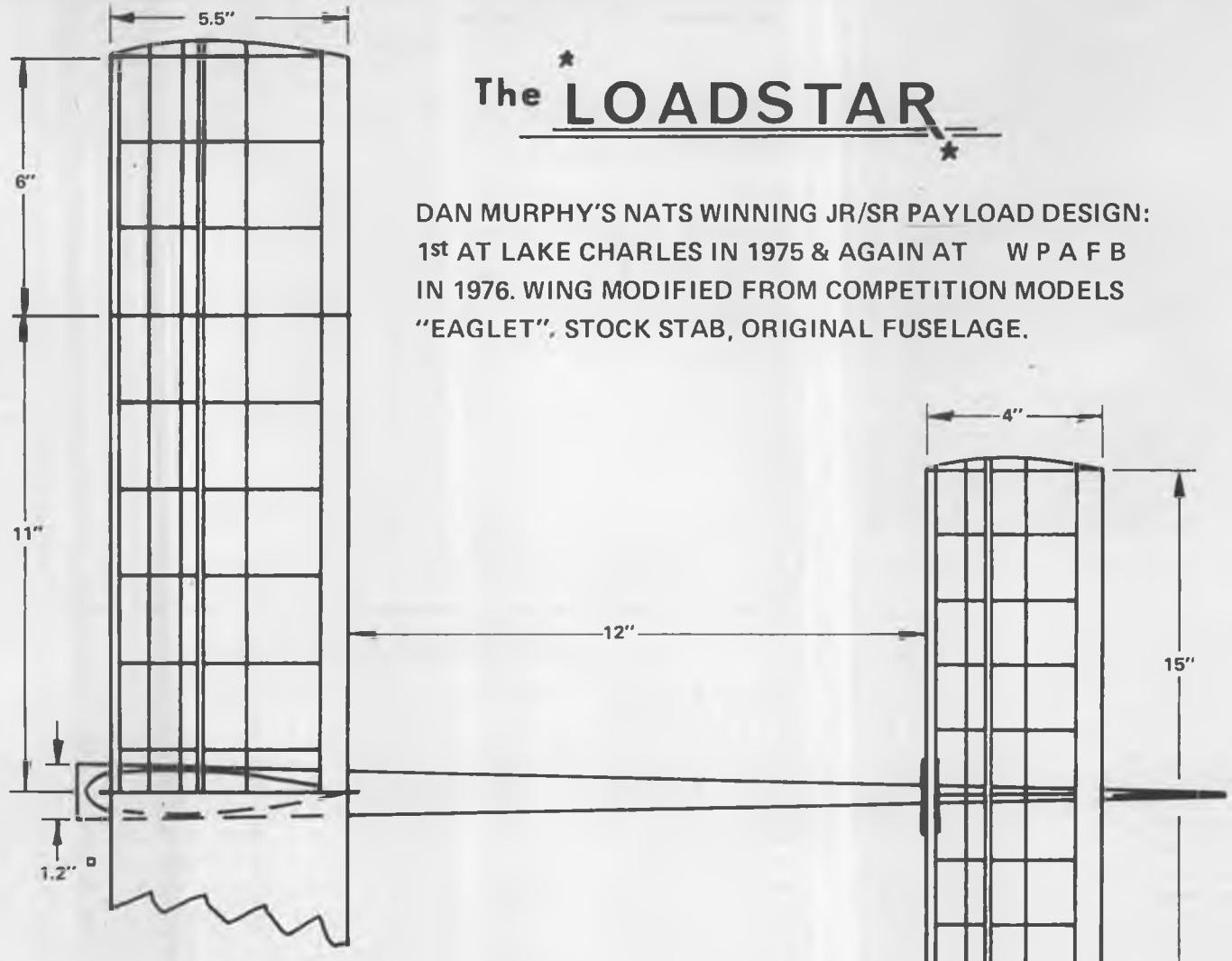
DARNED GOOD AIRFOIL – FIN. M. P.

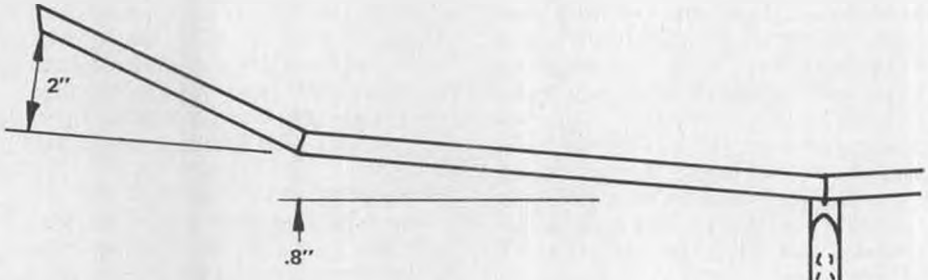


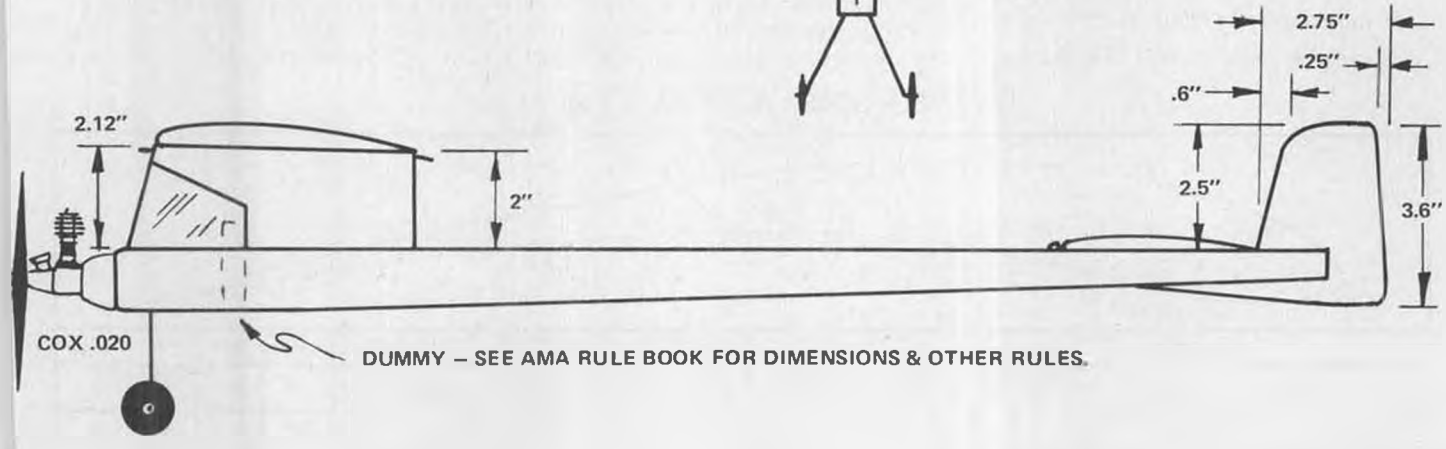
STATION	0	2.5	5	10	20	30	40	50	60	70	80	90	100
UPPER	1.6	5	6.4	8.7	11.1	11.8	11.7	10.8	9.4	7.4	5.2	2.7	0
LOWER	1.6	0.5	0.4	0.9	2.6	4.3	5.3	5.7	5.5	4.5	3.2	1.6	0

The LOADSTAR

DAN MURPHY'S NATS WINNING JR/SR PAYLOAD DESIGN: 1st AT LAKE CHARLES IN 1975 & AGAIN AT W P A F B IN 1976. WING MODIFIED FROM COMPETITION MODELS "EAGLET", STOCK STAB, ORIGINAL FUSELAGE.







DUMMY – SEE AMA RULE BOOK FOR DIMENSIONS & OTHER RULES.

to make do with reading about the ideas, theories, and thoughts in the symposium publication. You can get yours direct from NFFS Plans and Publications, 20267 Northbrook Sq., Cupertino, CA 95014. The cost is not known at this time, but last year's (a bit fatter) was $8.00. The editor is Bob Dodds, who also did last year's edition.

Besides the 10 models of the year, a special feature this year includes a dedication to the Free Flight Hall of Fame. To quote from Hardy Brodersen, "The NFFS has now taken a new focus on the History of Free Flight, in forming the Free Flight Hall of Fame. The impetus for this project comes from George Perryman, Tony Italiano, and Bob Dodds, each lending his energy to the project. First thought of as the National Free Flight Society Hall of Fame, which it is not, it intends to identify, celebrate and enshrine those special individuals whose life and work have been formative in a lasting way for Free Flight Model Aviation. Future appointments, proposed to be made annually, will be made under the direction of our Free Flight Hall of Fame Administrator, Tony Italiano, through a process of nominations from the general Free Flight fraternity, with selection by a specially appointed panel."

And so it goes: Some super articles, the Ten Models of the Year, and now the Free Flight Hall of Fame. To find out who these people are, order your Symposium copy today.

NITRATE DOPE, WHERE ARE YOU?

Once upon a time, nitrate dope was used by all modelers. Then came butyrate, and some of the glow-powered model types defected. Then came the plastic coverings, and many, many others defected. The fact remains that, for most purposes, nitrate dope is just hard to beat when

Continued on page 132

Bill Lovins poses with his much-modified "Cathexis" FAI ship. Bill has been working with Bill Gieskieng in developing this model from original design by Dave Parsons. Bill Wyscarver photo.

Ted Stalick prepares his Thermal King unlimited rubber job at the 1978 BMA Scholarship Meet in July. Model was featured as 3-view in September 1977 issue of MB.

Bruce Kimball holds his Coot HLG. He has been getting 29 seconds in a 25-ft. ceiling gym. High time better than 32 seconds.

Randy Archer, Phoenix, Arizona, took 2nd in Open 1/2A at the Nats with this modified Satellite. Joe Klause photo.

PAZMANY PL-4A

By LEO BENNETT . . . Before the limits were lowered, four-foot-span-and-over Jumbo Scale rubber models were the glamerous and colossal "big guns" of rubber scale. This 56-1/2" span ship represents that category.

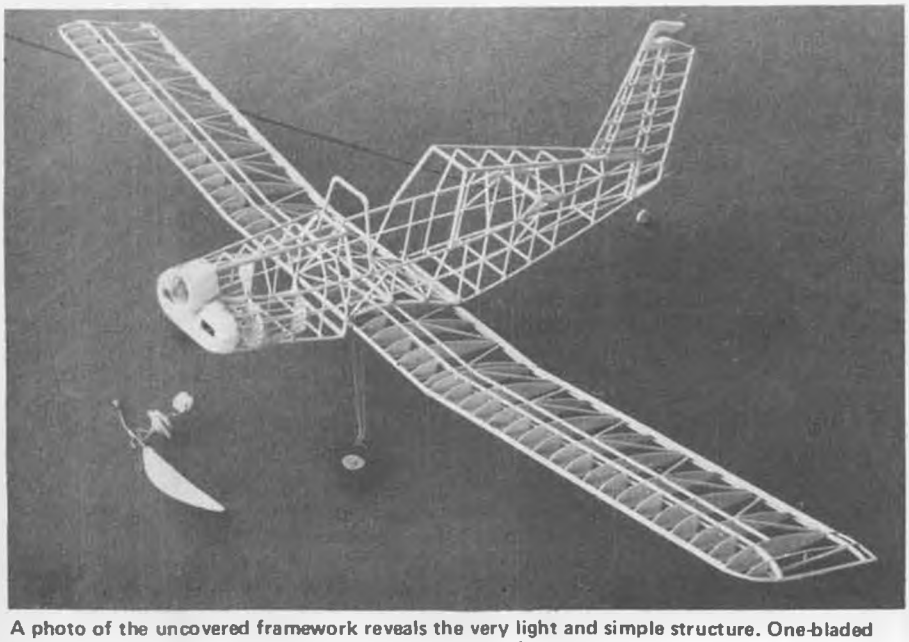
• OK, why build it? The drawbacks are obvious; a lot of work, a lot of materials. But stay with it; the virtues are just as real. Here is a machine whose flight pattern is stately, even lordly. She climbs slowly to about seventy feet and cruises for about twenty-five seconds. When the prop folds, she drifts downward for another twenty-five seconds. None of the usual dips and lurches in response to turbulence or motor run kinks. The glide is the flattest I have seen in forty years of rubber-powered scale work. Those big wings really help. The overall scale-like quality of flight is awesome; Peanut fliers actually stop in the middle of winding to watch this one go by.

The Pazmany PL-4A was designed for the basement builder by Ladislao Pazmany, a California engineer. By using a boxy design, he helped us keep the model's weight down (260 grams, ready to fly). The constant chord wing (370 square inches; better than fifty-six inch span) means that the stall starts at the dihedral break and slowly moves outward, instead of starting at the tip and then developing violently as it does on pointy-wing machines. Pazmany's use of a VW engine forced him into a belt drive reduction system. While a nuisance for him, it gives us a nice high thrust line which easily accommodates a fourteen-inch propeller. Pazmany has also done us the favor of scorning fillets and wheel pants, and finally flew his full-scale machine before mounting a blown canopy. This means that only a bent windshield is required on the model, hence there is no vacuum forming to struggle with. Even Pazmany's color choice (red, white, and black) fits in with standard tissues . . . no spray painting is required.

In short, Pazmany had done us the favor of designing a machine well-suited for large scale modeling. And this one is large. How large? Well, let's put it this way. You're familiar with the usual hassle involved in getting the rubber motor on the rear peg; the wires, bits of string, etc. On this model, you reach into the cockpit with your fist and then thrust your entire forearm into the fuselage, simply carrying the motor to the rear peg in your hand. Now that's large!

With the test motor you can expect a flight of about thirty seconds. With the contest motor, she will do a rock-steady fifty seconds at 85% allowable turns. At last October's Connecticut FAC meet, held in a light drizzle, I was able to get an official forty-three seconds. Considering the enormous weight of water the model carried, that's not bad.

Interested? Start by getting your scale presentation material together. *Sport Aviation* (March 1973, Vol. 22, No. 3) has an excellent article, including three-views and thirteen photos, of which two are in color. *Private Pilot* (Feb. 1973, Vol. 8, No. 2) has no three-views, two black and white photos, and one in color. As an alternative to the old magazine road, send four dollars to Pazmany Aircraft Corp., Box 800515, San



A photo of the uncovered framework reveals the very light and simple structure. One-bladed folding prop may not be scale, but really improves performance.

Diego, CA 92138, and ask for the introductory package on the PL-4A. The scale of the model presented here is one inch to five and six-tenths inches full size.

Construction is a bit novel. Study those fuselage cross-sections before you start. For one thing, the idea is to use lapped joints wherever possible in the fuselage, instead of butt joints, so as to get more gluing area. Further, do not use white glue on the fuselage or on the wing center section. You must use epoxy to get the necessary strength. Use it sparingly . . . the stuff is heavy and does not shrink; if you start with a blob, you end up with a blob. All strip wood is medium balsa, not contest balsa. Ordinary, run-of-the-mill, eight to twelve lb. wood is fine. The only exceptions are the carved blocks (rudder top, nose block, prop) which should be softer.

FABRICATING THE WING

Make all the ribs in two separate batches, using the mass production technique. One batch is to consist of twenty-seven full ribs in 1/32 sheet, plus two full ribs in 1/8 sheet. The other batch consists of twenty-six false ribs, or riblets, which stop short at the front spar. The first step of this technique is to make a pair of rib templates from 1/32 plywood. Sandwich oversize rib blanks between the templates and bolt through at two locations, say midway between the leading edge and the front spars for one, and midway between the trailing edge and the rear spars for the other. Use a 6-32 bolt with washers and get them as tight as you can without crunching the blanks. There is a variation on this technique, wherein pins are used instead of bolts. Forget it. The carving stresses are much too high and the pins will skew. Now carve and sand the package right down to the rib templates.

Laminate the wing tips out of three oversized pieces of 1/32 sheet that are soaked for half-an-hour in hot water, then formed around a balsa block carved to the proper interior shape. Use white glue for the lamination process, after placing a sheet of wax paper between the form and the first layer. Use a lot of rubber bands to hold the lamination together for the next twenty-four hours. Now carve and sand the tips to a half ellipse configuration of about 1/8-inch minor diameter and 1/8-inch major radius. Thin it out a bit, working towards the trailing edge. Viewed from the side, the tip lamination is straight, i.e. it contains no droop.

Cut trailing edge sections out of 1/32 sheet, and you are ready for assembly. Start by pinning down the lower trailing edge. Lay down the lower spars, but don't pin them to the board. Place the main ribs over the lower spars and insert the leading edge. Use pins pressing against the leading edge, so as to push the assembly together. Check to see that there are no gaps between pieces or built-in stresses in the lower spars (are they still straight?). Trial fit the false ribs by inserting a few. If all looks well, try inserting the upper spars, opening rib slots (if necessary) to maintain alignment. Now check the upper trailing edge member for fit. Use no glue until you're sure it all goes together, then bond. Now put in the diagonals, after whittling a pointy end on each and inserting the pointy end between the top and bottom halves of the hollow trailing edge. The forward end of each diagonal rests immediately behind the upper rear spar.

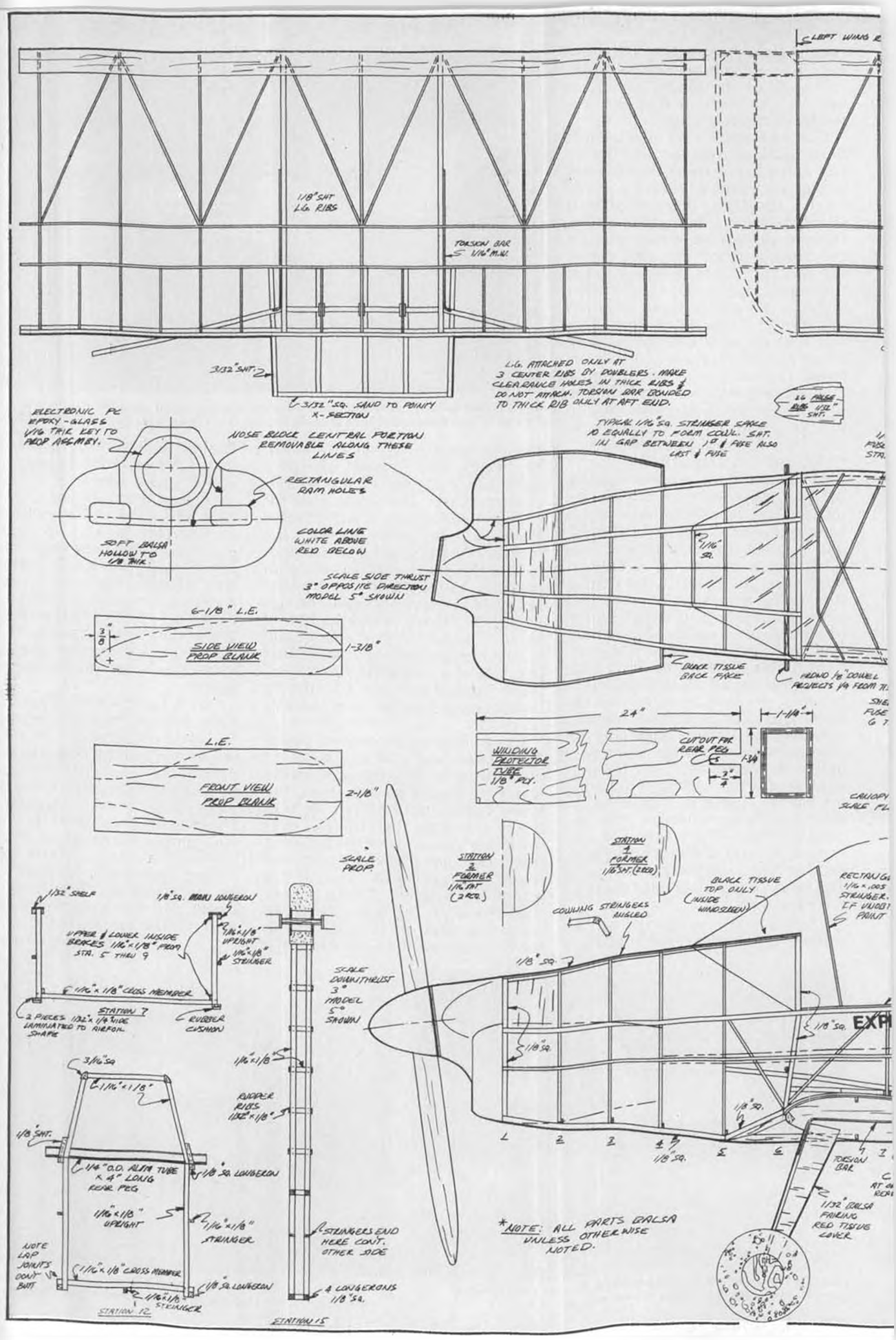
Continue in this manner until you have three separate wing panels. Now add the wing tips, after blocking up the trailing edges to accommodate the 1/4-inch droop supplied by trailing edge parts A and B. The wing tip rib blank is inserted now. There is no drawing of this part; it was simply whittled on location from an oversize blank until it looked reasonable (Pazmany gives no details in his three-view). The upper and lower spars are carried through the tip rib. These, too, are

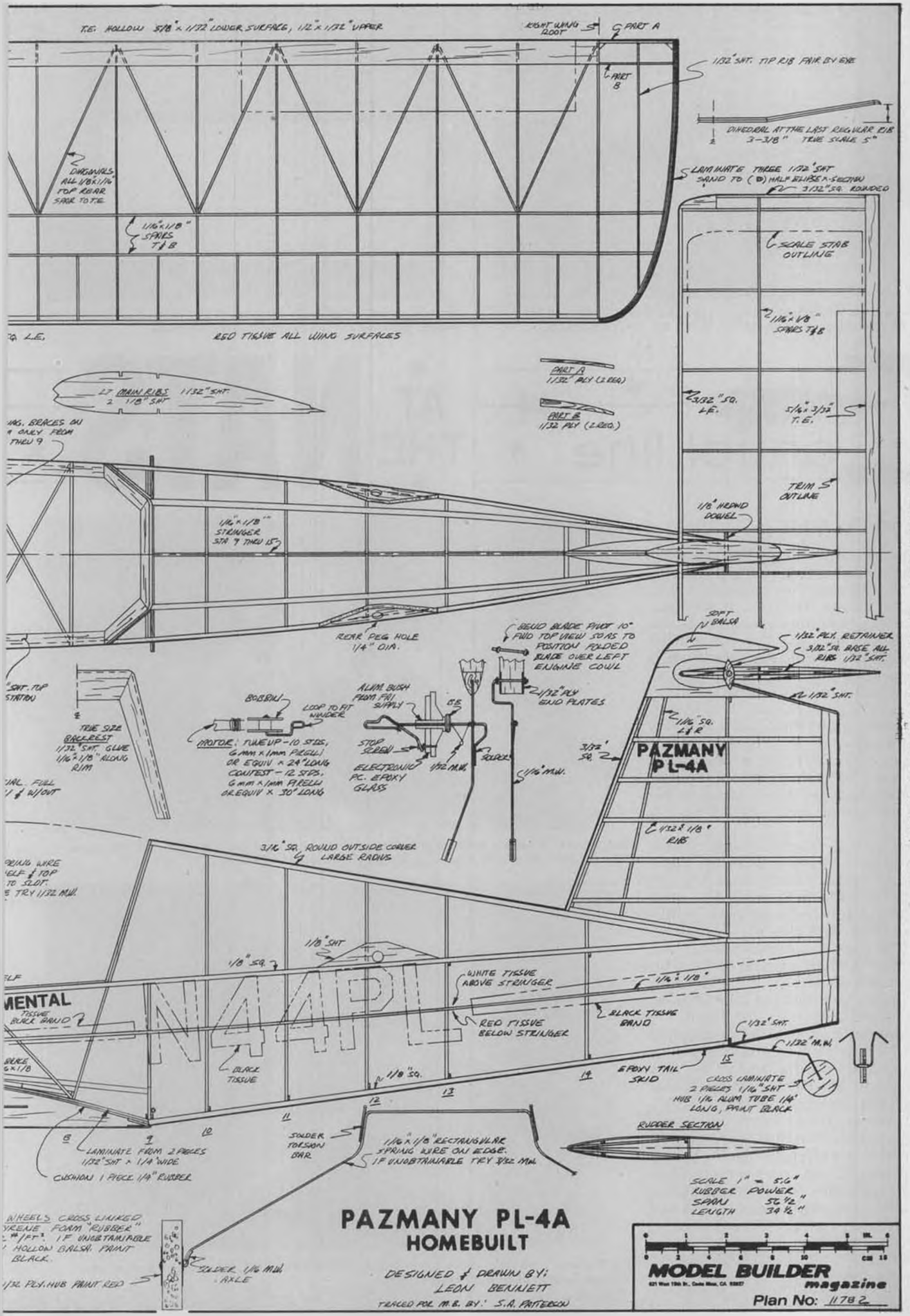
Continued on page 117

Living dangerously! Leon recommends using the winding tube if more than 150 turns are used. That long, high aspect ratio wing is no doubt one of the reasons for the excellent performance.

Checking trim before launch. Is noseblock seated? Tail incidence correct? Wing square? Car keys in your pocket?

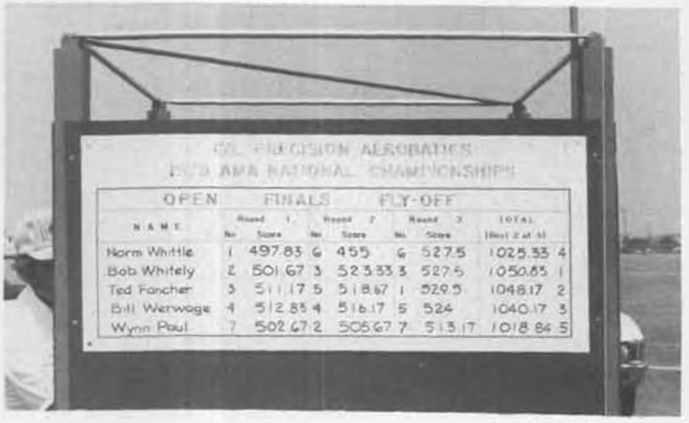
The heave. On low turns (125 this flight), launch it straight and level. On high turns, aim it about 15 degrees upwards and throw harder.


LEFT WING
1/8" SHT. LG. RIBS
TORSION BAR 5/16" M.W.
3/32" SHT.
3/32" SQ. SAND TO POINTY X-SECTION
LG. ATTACHED ONLY AT 3 CENTER RIBS BY DOUBLERS. MAKE CLEARANCE HOLES IN THICK RIBS & DO NOT ATTACH. TORSION BAR BONDED TO THICK RIB ONLY AT AFT END.
LG. FAIRING RIBS 1/32" SHT.
ELECTRONIC PC EPOXY-GLASS 1/16 THK. KEY TO PROP ASSEMBLY.
NOSE BLOCK CENTRAL PORTION REMOVABLE ALONG THESE LINES
RECTANGULAR RAM HOLES
SOFT BALSA HOLLOW TO 1/8 THK.
COLOR LINE WHITE ABOVE RED BELOW
TYPICAL 1/16" SQ. STRINGER SPACE 10 EQUALLY TO FORM COWL. SHT. IN GAP BETWEEN 1ST & FUSE ALSO LAST & FUSE
1/16" SQ.
SCALE SIDE THRUST 3° OPPOSITE DIRECTION MODEL 5° SHOWN
6-1/8" L.E.
3/8"
SIDE VIEW PROP BLANK
1-3/8"
BLACK TISSUE BACK FACE
BEND 1/8" DOWEL PROJECTS 1/4 FROM TI
24"
1-1/8"
WELDING PROTECTOR TUBE 1/8" PLY.
CUTOUT FOR REAR PEG
1-3/4"
2" 1/4
L.E.
FRONT VIEW PROP BLANK
2-1/8"
SCALE PROP
STATION 2 FORMER 1/16 SHT. (2 REQ.)
STATION 1 FORMER 1/16 SHT. (2 REQ.)
BLACK TISSUE TOP ONLY (INSIDE WINDSCREEN)
COWLING STRINGERS ANGLED
1/32" SHELF
1/8" SQ. MAIN LONGERON
UPPER & LOWER INSIDE BRACES 1/16" x 1/8" FROM STA. 5 THRU 9
1/16" x 1/8" UPRIGHT
1/16" x 1/8" STRINGER
1/16" x 1/8" CROSS MEMBER
STATION 7
2 PIECES 1/32" x 1/8 SIDE LAMINATED TO AIRFOIL SHAPE
RUBBER CUSHION
1/16" x 1/8"
RUDDER RIBS 1/32" x 1/8"
SCALE DOWNTHRUST 3° MODEL 5° SHOWN
3/16" SQ
1/16" x 1/8"
1/8" SHT.
1/4" O.D. ALSTA TUBE x 4" LONG REAR PEG
1/8" SQ. LONGERON
1/16" x 1/8" UPRIGHT
1/16" x 1/8" STRINGER
NOTE LAP JOINTS DON'T BUTT
1/16" x 1/8" CROSS MEMBER
1/16" x 1/8" STRINGER
STRINGERS END HERE CONT. OTHER SIDE
4 LONGERONS 1/8" SQ.
STATION 12
STATION 15
1/8" SQ.
1/8" SQ.
1/8" SQ.
1/8" SQ.
1/8" SQ.
1 2 3 4 5 6 7
TORSION BAR
1/32" BALSA FAIRING RED TISSUE COVER
*NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.



FULL SIZE PLANS AVAILABLE – SEE PAGE 144

P-40 by Dick Harding, McGregor, Texas, tied Bob Whitely with 19 out of 20 appearance points in C/L Stunt. S.T. 60, 13 x 5 prop.



OPEN FINALS FLY-OFF									
NAME	Round 1 No.	Score	Round 2 No.	Score	Round 3 No.	Score	TOTAL (Best 2 of 3)	
Norm Whittle	1	497.83	6	455	6	527.5	1025.33	4
Bob Whitely	2	501.67	3	523.33	3	527.5	1050.85	1
Ted Fancher	3	511.17	5	518.67	1	529.5	1048.17	2
Bill Werwage	4	512.83	4	516.17	5	524	1040.17	3
Wynn Paul	7	502.67	2	505.67	7	513.17	1018.84	5

Score board tells it all about the Open Stunt Finals. Bob Whitely the winner, followed by Ted Fancher and Bill Werwage.

Control line AT THE NATS

by JOE KLAUSE

• An editorial in the June issue of *Model Aviation* read, "This might be the last opportunity to enjoy a Nats in the classic tradition. If so, Lake Charles offers the best combination of factors to make the trip worthwhile." OK, the die was cast. We had to go, if for no other reason than to see a real live "Coonass".

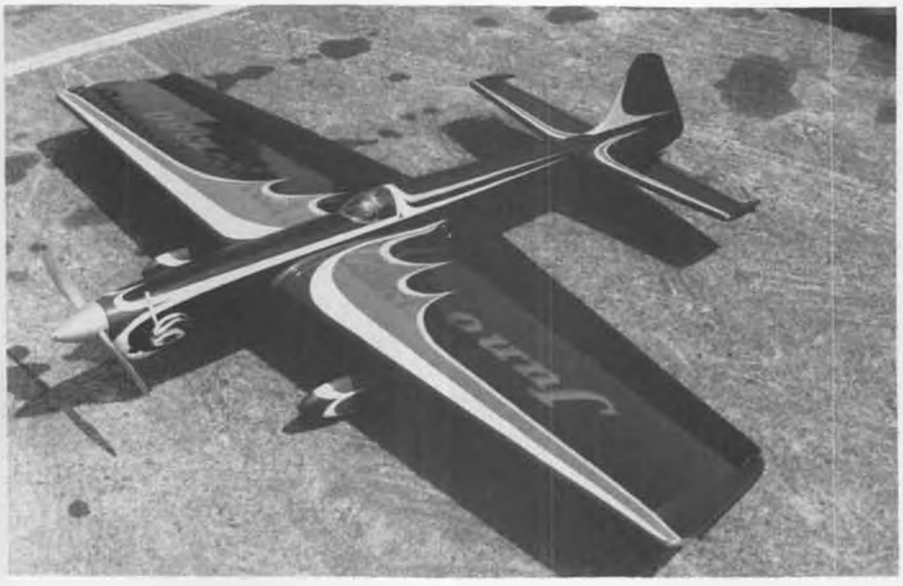
Travel started out on Sunday with a non-stop flight from Los Angeles to Houston on a "Proud Bird with the Golden Tail". We were looking forward to visiting their famous libation lounge, but contrary to the TV commercials, "Sorry bub, no pub".

Houston, space capital of the world, was steeped in Texan tradition . . . and had humidity 2-1/2 feet thick; quite a climatic shock to this Californian quinquagenarian who's used to 80° and 20%. But so what, we didn't come to complain, so let's be on with it. With a rental car, and an enjoyable drive, we arrived in the pleasant community of Lake Charles, and settled down for the night.

Monday morning, things certainly did NOT get off to a slow start. It's Open Scale Racing, and in the very first heat, Les Pardue (Flipper) and Phil Shew (Whipper) turned a 2:59.9. Sub-three-minute heats have only happened within the past two years, and not very often at that. Well, race fans, would you believe there were 23 contestants, 10 of them became finalists, and every one of them had heat times under three minutes? Here's how they stacked up:

ENTRANT	TIME	HEAT
Les Pardue	2:59.9	1

Bob Whitely, Fountain Valley, California, and his own-design "Derringer 46". S.T. 46 engine, 12 x 6 Zinger prop, J&K Products foam wing core. Built in 28 days!!



Bill Werwage's 3rd Place Open Stunt "Juno". C/L Stunt and R/C Pylon racers seem to have the best finishes of all competition types.

Dick Perry launches George Voitik's profile carrier ship for its second place flight.

George Voitik's ship in a slow flight lap. George hails from Evanston, Illinois.

Yipe! George Voitik went on to win 2nd place with a score of 226.09 points. Sturdy pilot!

Former Navy Carrier Adv. Comm. Chmn., Dick Perry, with his 2nd Place (Class I) " Seamew". Bladder tank, ST G-40, 8 x 9 glass prop.

Scott Sornberger .	2:54.1	2
Jim Ong	2:57.0	2
Dick Lambert	2:59.9	3
Bud Harris	2:47.4	8
Walt McTier	2:57.4	9
John Ballard	2:48.2	9
Kerry Turner	2:54.0	10
Stu Willoughby ..	2:56.5	11
Hal Lambert	2:51.7	11

With times and heats like that, it doesn't take much imagination to realize that literally everyone was pumped-up for the finals. First final: Hal Lambert and Les Pardue. Hal was faster in the air, but broke a fiberglass prop on the catch for the first pit. Les had some multiple-flip restarts, and turned 6:30.8. Second final: Kerry Turner and Stu Willoughby. Thanks to three single-flip restarts by Mike Wheeler, Kerry turned 5:54.9. Stu had problems in the pits, for a 7:06.3. Third final: Scott Sornberger and Jim Ong. Scott was plagued by pits and needle settings. Jim turned a very respectable 5:56.7, despite one pit stop with many flips. Fourth final: Bud Harris in the pit, son Doug on the handle versus John Ballard at the controls, with Gary Fentress in the pit. Thanks to Gary's start, John was off and running at the word "Go". He got a lap on Harris right there, and with the pits about equal, that was it. Harris did 5:47.6 and Ballard 5:45.9. A great race! The fifth and last final: Walt McTier and Dick Lambert. Walt started well, but had very lengthy pits. Dick ran well, but was the victim of a long second pit for a 6:29.9. The top five:

John Ballard	5:45.9
Bud Harris	5:47.6
Kerry Turner	5:54.7

Rich Brasher (kneeling) and combat crew, from Redwwod City, California.

Rich Brasher "takes off" in a Fast Combat match with Steve Hill, Redondo Beach, California. Rich won with a kill.

The Jacksonville, Florida "Swamp Rats" are very big on Fast Rat. A super-competitive team.

Dick Lambert, left, and "Jolly Green Giant", Larry Hill, mix it up in Fast Rat.

Carl Layman's 1/2A Speed ship. That's laminated wood, not a fancy stipe paint job!

Frank Garzon carries Nick Sher's B Speed ship to the flight circle.

Jim Ong 5:56.7
Dick Lambert 6:29.9
Without question, it was the finest day of Goodyear racing we've ever seen. Congratulations to all concerned.

Tuesday was limited to FAI Team Race and some unofficial Mouse Racing. In the Team Race final, Jim Jolly and Ken Mogi put it all together, and took first place with a fine 8:42.1. Stu Willoughby was second with 164 laps. During a landing for refueling, the plane skidded into the circle and out of reach of the pitman. The Wallace-and-Wallace team was third with 54 laps . . . blown engine. One other highlight was that Stu Willoughby's plane set a new American heat record of 3:58.9. That's fast! Of course, it was probably due to a very experienced diesel pit man, right? Wrong! Bob Oge was in the pit, and he swears that he had never started or tuned a diesel until the day before the race!

The Greater Houston C/L Modelers Association sponsored the unofficial Mouse Racing event. There were ten entries, and the top three were Les Pardue, Joe Klause, and Bob Oge. Interest in this event is developing rapidly throughout the country, if for no other reason than the fact that it is relatively inexpensive.

In recent years, besides reading gobbledegook everywhere about "God is dead", it's been rumored that Fast Rat is gasping its last breath. Think so, huh? Not if this Nats is in

Marshall Busby applies battery power as Paul Tune hits prop on his Slow Rat. "Nashville Rats" members. Paul was 1st, Marshall 2nd.

The busy pit area on B Speed and proto day. Entries were a little lower than usual.

any way indicative. There were 32 entries! Haven't heard of that many in a long time. How about the level of competition? Judge for yourself, and remember there are now three pit stops required in the final:

OPEN FINALS

1. Harold Lambert 4:51.1
2. Richard Lambert 4:54.55
3. Les Pardue 4:56.3
4. Kerry Turner 5:03.3
5. Robert Oge 5:05.9
6. Gary Fentress 5:10.55
7. Ronald Esman 5:14.95
8. Paul Tune 5:20.9
9. John Ballard 5:30.25
10. Mike Wheeler ..... 63 laps

The performance by the well-known father-and-son team of Hal and Dick Lambert is especially noteworthy. Their team and pitwork in this event were flawless, their engines really honked, and they deserve our special congratulations.

Junior-Senior Fast and Slow Rat were not exactly inundated with contestants, but those who were there had all the enthusiasm it takes to be extraordinary competitors.

FAST RAT

JUNIOR

Fast rat winners (l to r): Hal Lambert 1st, his son Dick 2nd, and Les Pardue 3rd. Lamberts from Daytona Beach, Fl., Pardue from Albuquerque.

1. Tom Fluker 6:10.3
2. Tobey Busby 6:28.75
3. Anthony Smedley 8:17.2
4. D.J. White 10:55.55
5. Glenn Fultz ..... 14 laps

SENIOR

1. John Wolfe 4:55.05
2. Chris Busby 5:06.30

SLOW RAT

JUNIOR

1. Anthony Smedley 7:26.5
2. Glenn Fultz 7:49.35
3. Tom Fluker 8:14.45

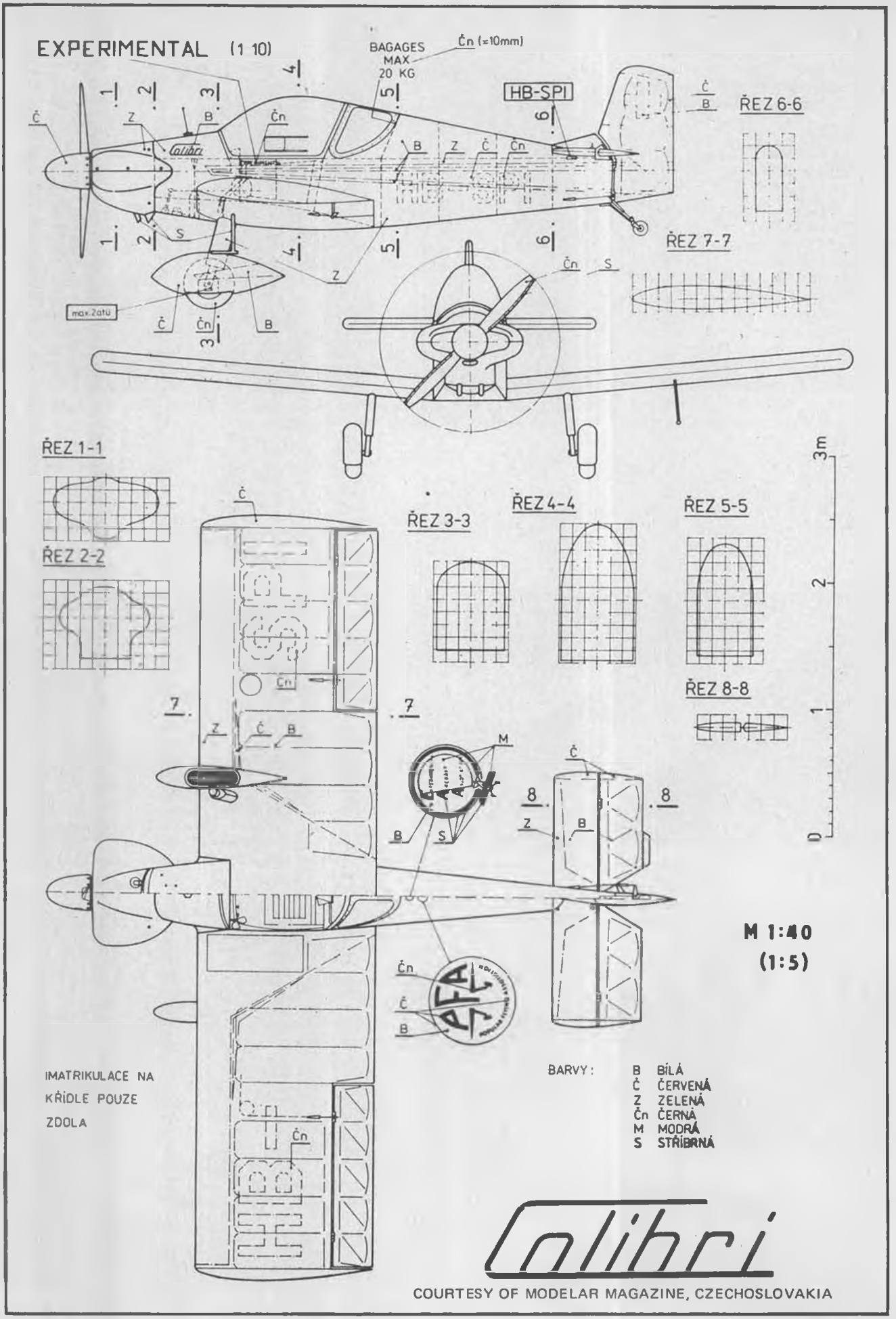
Continued on page 100

John Ballard's 1st place Goodyear, Rossi 15. All 10 finalists under 3 minutes, all Rossi's.

Reverse of photo at bottom left, previous page. Paul Tune holds, Marshall Busby flips.

Stu Willoughby, British dentist now living in Illinois. Pitman Bob Oge, never before started diesel. They set U.S. FAI record.

Ken Mogi and Jim Jolly, Southern California, with their First Place FAI team racer.


EXPERIMENTAL (1 10)
BAGAGES MAX 20 KG
Čn (=10mm)
HB-SPI
ŘEZ 6-6
ŘEZ 7-7
ŘEZ 1-1
ŘEZ 2-2
ŘEZ 3-3
ŘEZ 4-4
ŘEZ 5-5
ŘEZ 8-8
max. zatíž
3m
2
1
0
M 1:40
(1:5)
IMATRIKULACE NA KŘÍDLE POUZE ZDOLA
BARVY:
B BÍLÁ
Č ČERVENÁ
Z ZELENÁ
Čn ČERNÁ
M MODRÁ
S STŘÍBRNÁ
Calibri
COURTESY OF MODELAR MAGAZINE, CZECHOSLOVAKIA

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24 TO CARTON

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12152 WOODRUFF AVE., DOWNEY, CA. 90241

C/L ..... *Continued from page 97*

4. Austin Thomerson 8:27.3
5. D.J. White 12:25.6

SENIOR

1. Larry Hoffman 5:43.2
2. Doug Harris 6:04.45
3. Ron Esman 6:14.15
4. Russell Crawford 6:35.75
5. Mark Seigler 8:16

Saturday, the last day of C/L racing. The event: Open Slow Rat. The foremost question: Will the Nashville Rats do it again? They did, and there's no question in our mind about why they did. It's very obvious that those guys really work at it. When you watch Paul Tune and Marshall Busby work together as a team in the pit, you know right away that they've spent many hours practicing. They've also got a good pilot out in the center: 6-foot 5-inch Larry (Jolly Green Giant) Hill. It's no surprise, then, when we read the results:

Paul Tune 5:33.8
Marshall Busby 5:38.1
Larry Hill 5:39.9
Ron Esman 5:41.1
Larry Miller 5:50.6
Mike Wheeler 6:04.0
John Ballard 6:13.4
Dick Ritch 6:25.8
Mike Tallman 6:27.9
Dick Lambert ..... 112 laps (prop)

How about the engines these guys used? The first three (Nashville Rats) all had the new O.S. Max .36, fourth had a new HP .35, and fifth was a K&B 5.8. In the top ten, there were 5 O.S.'s, 3 K&B's, 1 TWA, and 1 HP.

In summary, it was a mighty fine week of racing at the Nats. Those who did well were obviously well prepared, and they justly deserve their awards. For all racing fans, take Bill Cooksey's advice: "Go drummer, get 'em drummer!" •

1 to 1 ..... *Continued from page 24*

H) Do you need a piano hinge that works? Try the small Klett hinges, strung on a single wire. Clip the ends of the tab on the hinge and anchor it in the door and jamb. Substitute a finer wire for the size used in order to prevent the joint from gluing itself solid when installing it.

What innovative items have you found to substitute for real things on your model?

WHAT A HEAD PHILLIP HAS!

I was faced with the problem of coming up with a profusion of fasteners for the Hiperbipe I built for the World Champs. The 00-90 slotted screws were no problem, but 480 pop rivets and 230 Phillips-head screws were another story.

It was solved, however, by the keen perseverance of your handy-dandy writer, along with the understanding aid of a next-door neighbor who tolerates the airplane nut who forgets to cut his grass.

He provided a block of steel with a slot, through which I drilled a hole matching the diameter of the head I wanted to duplicate. You then need a close-fitting punch to go through the hole. (In my case, I used the drill bit I ruined drilling the hole in the first place!)

File or grind a curve into the punch. You'll need to experiment to find the degree of curve you need.

The stock I used to punch the rivets out of was Sig's Aeroplastic sheet, .010 in. thick. This material is easily glued, painted, etc.

The sheet is inserted into the slot; a gentle tap on the punch produces a beautiful little curved circle of plastic.

At this point, you can go in several directions. A gentle touch with a pin and a small drop of instant glue, or better yet, RC-56 by Wilhold, and you have a rivet head. If you wish to make it a pop rivet, pre-drill a small hole into the plastic before punching out the rivet. Pick the head up with a pin, apply the glue, and put the head in place with a gentle push

of the pin. As the pin point goes through the hole, it will collapse the rivet inward, just like a pop rivet. Later, you can clean up the hole with a small drill or pin point.

The Phillips head requires a bit more work. You need to grind down a small Phillips bit to fit the hole in the steel block. Inserting it into the bottom of the block so that it is just below the slot (1/8-inch or more) will allow you to punch the head and imprint it in one operation. You may have to play a bit with a file to get the Phillips imprint correct.

All of this may seem terribly time-consuming, but it really isn't. For the rivets, you can punch a dozen or so and push them through. The Phillips, of course, are a one-at-a-time deal.

HOW MUCH ENGINE FOR A TWIN?

Some of the articles about twins and engine sizes may lead some modelers to confusing thoughts. Often, I have heard people say that they like lots of power in the event of an engine failure. Many of us have watched a twin roll over and die when an engine fails. Of course, there are many exceptions to this, but I'm not all too certain that the extra engine size is what it's cracked up to be.

For the past year I have been flying a DeHavilland DH88 "Comet" that spans 88 inches and weighs 12 lbs. 8 oz. It flies beautifully on two HP .40's, and indeed, must be throttled back somewhat to maintain an acceptable scale speed.

Others have written about why two engines put out more oomph than one engine of the same size. As I recall, it comes down to the square of the cube root being larger than the sum of two propellers minus the radical of the framistan. All that may be true, but the simple fact is that two do more work than one.

I am constantly asked how the DeHavilland flies on one engine. I don't know, and if I'm lucky, I'll never find out! Okay, I agree that somewhere along the line I'll lose one and we'll find out. In the meantime, the performance is great, the vibration is lower, and I burn less fuel. In addition, .60's would never have fitted into the nacelles . . . neither would the tanks.

Consider a twin, if you have some experience to bank on. They sound great and draw a lot of attention. A tail-dragging model is a little more sensitive on takeoff than trike gear, but with cautious rudder, you can make it.

A large number of twins used inline engines, which make them suitable for hiding engines.

Think twice . . . then build two!

THIS AND THAT

While working on the Hiperbipe, I managed to ding the same wing tip twice. I used the little gouges as an excuse to try Pettit's new PFC as a filler. The white, polyester material worked beautifully. It feathers so that the patches are invisible, and sets up quite quickly. It was not necessary to fill any pores, and I painted directly over it.

One small problem exists, however, that with a little practice can perhaps be solved. The instructions suggest so many drops of catalyst per "golf ball-sized" amount of filler. A warning is given that too much catalyst may result in leaving the material rubbery.

In no way did I need a "golf ball-sized" amount, so I was forced into trying to guesstimate how much catalyst to use. Gradually, I managed to arrive at a workable solution, but there is probably some solution to this that would involve a more scientific approach.

The product surely is a scale builder's helper, especially if he keeps dinging wings.

Up till now, I have used two forms of retract slower-downers on the DH 88. Hydra-locks, from Idea development, provide an almost infinite amount of control, and make the gear very dependable.

The constant lubrication, and the fact that both gears tend to work at close to the same speed, is an important consideration.

I have also tried the small in-line restrictors available through Fliteglas. While it is not possible to regulate the flow, they slow the gear down quite well. It is recommended that air alone be used; however, Ralph White has used gas, which is okay as long as liquid does not enter the line.

There you have your choice of restrictors. Neither one forces you to restrict the line externally, which sometimes results in damage.

SOME CLOSING THOUGHTS

Next month's column will present the results of the World Champs, and observations of a contestant. In addition, I will pass on to you, even though this is an R/C column, my first free flight experience.

As reported earlier here (and in Fernando Ramos' column), there will be an unofficial, informal F/F competition at Woodvale. I will be proxy-flying Tom Stark's free flight model.

Earlier, when I requested some briefing on "how to", Tom said he'd give me a "crash course" on what to do.

The session went something like this: Tom and Bob walk out on R/C runway.

Bob: "What kind of fuel do I need?"

Tom: "Oh, anything will do."

Tom fills tank until it overflows. Says it will give a 20-second run. Attaches glow plug clip to .049. It fires. No adjustments.

Tom reaches over, sets model on runway facing wind, releases, followed by perfect takeoff into 18 mph wind. Big circles, for 20 seconds. Engine stops, floats down from 100-foot altitude. Lands.

End of lesson. Now I am an expert. Look out Woodvale, here I come!

•

Kraft Review . *Continued from page 61*

pared to other transmitters available, or range during flying.

The transmitter antenna is a 9-section, 47.5-inch whip. It has a screw-in base mounted on top of the case, and is easily removed for the antenna-less range check that is recommended and fully described in the manual.

The charging system is shared with the receiver battery. It starts with a wall plug-in transformer, which supplies low-voltage AC to the rectifier and charge indicator LED, located in the base of the transmitter. A connection is then made with the cable provided to the charge connector on the airborne system switch harness. All connections are done quickly and simply with fool-proof polarized connectors. Both switches must be in the "OFF" position before charging takes place; the LED will not light unless everything is normal and the batteries are actually taking current.

I liked the safety feature of this charger; a fuse that is actually a land on the printed circuit board, and which will offer protection in the event of a sustained short circuit or high-voltage surge in the line.

Note that this is not an owner-replaceable fuse of the type that we are familiar with. The proper testing and repair of the charging circuit, if this fuse does open, will require a technician. However, having seen what damage (and even fires) can be caused by rampant electricity, I think that this protection, or something similar, is definitely a good idea.

The charge current of the test system was measured at 44 mils; a safe but adequate rate for the 550 MAH battery used. The manual recommends an initial charge time of 24 hours, and subsequent charges of 16 hours prior to each flying session.

I liked the fuse, but I did not like the unprotected back of the transmitter case. We all have our habits, good or bad, and one of mine is to get everything ready before I start the engine. This includes extending the antenna. To keep the transmitter from toppling over, I then lay it on its back, which would eventually get scratched by the paved surfaces on which I do all my flying. On grass, this is not a problem, and even so, was easily solved with the drilling of four holes and the installation of four nickel rubber feet.

All the electronics are installed on a single PC board, securely mounted vertically in the center of the transmitter. I have always preferred single to double-board designs, considering them to be mechanically superior. I like the elimination of as many wires as possible. A piece of wire from point "A" to point "B", properly soldered at both ends, can be almost perfectly reliable, but using a 1/16-inch land on a high-quality PC board eliminates the "almost".

The stick-to-servo link is tight enough for any practical requirements that we might have for this system. Stop-to-stop stick movement resulted in a measured average of 99 degrees of servo output movement. Trim range measured exactly 15 degrees average. The difference in these figures, and in centering, from channel-to-channel, and in moving one servo from channel-to-channel, were inconsequential and well within the range of the trims.

RECEIVER

The Kraft Sport Series receivers, known as the KPR-4A and -6A for the four and six-channel models, respectively, are encased in white plastic, as are the servos and the rest of the airborne components. This is primarily to differentiate them from similar components used with other Kraft systems, which are not interchangeable, and which are gold in color.

The receiver dimensions are 2.78 X 1.36 X .83 inches, at a weight of 1.7 ounces for the 4-channel and 1.8 for the six.

The circuitry of the KPR's follows

traditional and conventional lines. It is a superhet, single-conversion, crystal-controlled, three-stage IF amplifier receiver. The normal clipping, audio amplification, etc., is done with transistors and other discrete components, after which a dual op-amp IC takes care of the clock and sync reset, and another IC does the decoding.

Everything is on one board, with nice, wide lands, and an uncrowded component placement. This receiver could obviously be smaller, but there are two schools of thought on this subject. I often think that miniaturization is done for miniaturization's sake. There are obvious benefits to this, such as the myriad of 1/2A R/C's that have descended on us, and which would not be possible with the larger R/C systems. The R/C equipment manufacturer that caters to this has to live with the two-piece boards and other packaging problems of smaller receivers.

For the average-size sport and trainer airplane, into which you can stick your head without getting balsa dust on your ears, this is a convenient size, and I will gladly take the added reliability of the single, uncrowded board and wide lands.

The size is also slightly increased by the fact that the servo and power connectors are mounted on the board, instead of on the ends of wire pigtails. This is my first experience with this sort of arrangement, and I had to change my modus operandi somewhat because of it. Maybe I am guilty of overkill, but I like to pack the receiver in a plastic bag, and secure the protective padding to it with tape or rubber bands, and then put it in its proper location in the airplane. Using this type of plug arrangement, you can't quite do that with a wing-mounted aileron servo that you have to plug in every time.

Kraft Systems does make an extension to handle this rather minor problem . . . but where was I to get one on Saturday night, before the Sunday test hop? The extension does make it easier to properly pack and protect the receiver, and I would hope that all Kraft dealers stock them and explain their use and advantages to prospective buyers, especially the newcomers who need and welcome all the help they can get.

The claimed performance figures for these receivers are: sensitivity at 3.0 microvolts; selectivity of 3 db down at 3 KHz; spurious and harmonic rejection minus 60 db; and an operating range of 0 to 140 degrees F. The test receiver has a no-signal current drain of 5.6 milliamps, which is below the factory acceptable figure of 7 mils, and very economical indeed.

SERVOS.

Two different servos are offered with the Sport Series, the KPS-14IIA, at 1.4 ounces each, and the KP-15IIA, at 1.8 ounces. The -14 is 2.15 inches long X .76 wide X 1.5 high; the -15 measures 2.28 inches long X .92 wide X 1.5 high. These dimensions include the mounting ears, but not the height of the output arm or wheel. Torque figures are 14 ounces for the -14, and 24 for the -15. Both have a .5-second transit time for 100 degrees of travel, and both are rated at from 0 to 140 degrees F. Centering accuracy is claimed at plus or minus 1%.

Servo amplifier standing current is a measured 15 milliamps, with the no-load total running current of 150. The stalled current is 300 mils.

Mechanically, both servos are well made, with thick-sided cases and extremely smooth-working gear trains. The output gear, and the one preceding it in the train, are thicker than the others, to help them withstand the strains of flutter or if you insist on building mechanical stoppages in your control linkages.

Both servos use a single-board amplifier built around a Kraft-designed, Texas Instruments-produced IC chip. The IC contains most of the circuitry, with the exception of the feedback pot and the other timing components, and the external drive transistors. The latter usually add up to a higher current handling capability than the chip itself is able to deal with, a slight power increase, and a greater safety factor against amplifier fatalities.

Output arms are furnished in both the familiar rotary arm and wheel. One feature I especially liked is that the output shaft, or square peg, is brass-bushed and threaded, and an honest-to-goodness machine screw is used to hold the output arm in place. I consider this far superior to the sheet-metal-screw-into-a-plastic-shaft type, and it is a feature not often seen on the cheaper radios. The screws are 1-72 X 1/8-inch long, and only those furnished or similar ones should be used . . . none fatter, none longer, and no sheet metal ones. The thread is not exactly delicate, but it can be butchered up if you really try, and the only cure is replacement of the output gear.

The servo harnesses are much longer than I am used to, and my first thoughts were strictly negative. I could see that I was going to have to stuff a yard, oops, I mean .914 meter of wires someplace. Then I remembered that, as the receiver doesn't have any wire harnesses, the actual receiver-to-servo wiring is a nice, convenient 10-inch length.

ACCESSORIES

The airborne battery furnished with the KP-4A system is the KB-4EA, which is physically identical to the popular Kraft KB-4E, except for the difference in plug wiring and the fast-charge capability of the KB-4E. This pack measures 2.25 X 1.89 X 1 inch, and is rated at 550 MAH. Though I did not have any particular difficulties in installing this system in the .25-powered airplane that I did the test flying in, I feel that this is too

much battery, both in size and weight. Therefore, I was glad to see that you can also get some 450 mil packs, a KB-4SA, measuring 1.44 inches square by 1.37 inches long, and a KB-4MA, which is 2.77 inches long, .78 wide, and 1.37 high. Both weigh in at 3.4 ounces.

On second thought, that large battery pack is probably a perfect size for the type of flier for whom this system is primarily designed; the beginner and sport flier who generally has only one airplane and is looking for maximum flying time per session. I seldom take out one airplane . . . it is usually at least two, and sometimes three. And my thinking is further influenced by my Quarter Midget racing, where I really only require enough battery life for five or six flights of less than two minutes each during any one day. Even with this big battery, the receiver/servos/battery weight is only 12 ounces.

My flying habits are not important here; what is important is for you to remember that Kraft batteries other than those specified are not compatible with the Sport Series, so don't go plugging it into your KB-4L 225 mil job, in search of a lighter and smaller battery.

The switch harness is the same old switch harness . . . but how could you change it, and why? It uses the time-proven Noble switch, and has a charger receptacle which is designed for fuselage side mounting, if desired. The same warning applies to the Sport Series switch harness . . . it is wired differently from that of the other Kraft systems, and is not interchangeable. Multicon connectors are used throughout the system, which are as reliable as they come. Sure, you can damage them if you stand on the plug and pull on the wires with a pair of pliers, but with proper care . . . NEVER pulling on the wires, but only by the plugs, pulling straight out without twisting . . . these connectors will probably outlast other parts of the system, and probably most airplanes.

Two servo trays are included with this set; one which mounts three servos in a side-by-side arrangement, and a single mount for one servo on its side, for in-the-wing mounting. This probably takes care of 99.9% of the average requirements. For you other .1%, there is also a three-servo mount that holds two lengthwise and one across, and a single upright mount. Both multiple mounts also have provisions for mounting the switch, and enough rubber grommets, screws, and output arms are included to handle any possible combination.

One feature or accessory that I am reserving judgement about is the plug-in receiver antenna connector, which was introduced by Kraft Systems this year. This is a single-pin connector located 4-1/2 inches out from the receiver case, to which you can plug in a normal flying antenna 32 inches long; an 18-inch unit for small aircraft and gliders; or a 12-inch whip, which comes with mounting hardware for installation in a boat or car.

It really sounds great, you say, so why do I have any reservations? Because I tend to forget things, and having already done all the dumb things there are to do, I hate to start in on any new ones. And I KNOW that if I start unplugging receiver antennas, the day will come when I won't plug it in! One of my flying friends offered the perfect solution: FORGET it's there . . . which I will have no trouble doing. Treating this antenna as just another antenna will keep me from someday losing a bird for a preventable reason. For those of you with a better memory (or a good checklist), this is a good feature, in that you can permanently install the antenna in your machine and connect to it when you install the system, in the same way you connect batteries, servos, etc.

There are some other extremely useful, but not furnished, accessories which I recommend. One is an adjustable output arm, which has an adjustment range of .5 inches, and which is just the thing for getting that "enough, but not too much" throttle movement without bottoming out the servo. I also like the servo tray switch actuator, which eliminates cutting slots or drilling holes in the switch knob. I didn't use one, 'cause I happened to have a spare from another manufacturer, but the Kraft actuator is easy to install and works well.

In the bargain category, there is an assortment of horns, bellcranks, pushrod exit guides, flag clips, push-on collars, screws, wing hold-down bolts . . . in short, everything you need to install this system in just about anything from a T-tail glider to a wide-bodied Ugly Stik. Only $2.49 . . . See? I told you it was a bargain.

There are two maneuvers for which this system gets the full ten points: the manual, and the availability of service.

The manual is a 12-page, 8 x 11 affair that covers the subject thoroughly, without getting so wordy as to scare off the potential user. It touches on general subjects such as safety, FCC licensing, and basic R/C theory, then goes into specifics of charging, how to make the necessary connections, modes, flying, etc. As good as any, and better than most!

The all-important service is available at the factory in Vista, California, and at 27 service centers in the U.S. and many others around the world. This is indicative of two things: there are one hell of a lot of Kraft radios out there, which is further indicative of their high quality. And wherever you are, you'll be able to get them fixed . . . because, sooner or later, whoever you are, and wherever you live, or whatever brand of radio you own, it

will require service! It might take a rarity, such as being mid-aired by a pterodactyl, or the more common, "I was making a low inverted pass, and . . .", but you are going to need service. It is comforting to know that it is readily available.

In effect, the Kraft Sport Series system carries a one-year warranty to the original purchaser, from the date of purchase, and is validated by a registration card which must be returned to Kraft Systems. The initial warranty, "free from defects in material and workmanship", is for 90 days, during which time the system will be repaired without charge. A period of extended warranty follows for nine months, during which the system will be covered under the same terms and conditions, as long as it is determined to have received only reasonable wear and tear.

All of this is void if you or your well-meaning friend modify, alter, or otherwise tamper with any part of the system. This sounds fair and just to me, as does the rest of the warranty.

FLYING

As mentioned, the test flying was done in a .25-powered bird . . . an HB .25-powered Hobby Shack "Shell Fly 20L", to be exact. This airplane is fast and responsive enough to show up any unwanted characteristics of the radio, such as lack of servo power under air loads, poor centering or loss of trim under load, etc. We gave it the full treatment, including lots of flying, long and low, antenna collapsed at high altitude, and flying with adjacent frequencies in use and in close proximity to those transmitters. Through it all, it worked solidly.

During one of these flying sessions, one of my friends asked, "How do you like your new Kraft?" My immediate response was, "I like it, it works well, and it works every time." Working well, and working every time, and being built so as to continue to do so, is about all that we can ask of any R/C system, especially one in the Sport class. We bought it, knowing that it came without "air conditioner, stereo, and white sidewalls". Mine now has enough flying time to convince me of its reliability, and I fly it with the same degree of confidence that I fly my "oldies but goodies". It is a feeling akin to the one I used to know as we would clear Golden Gate Intersection outside San Francisco and set course for Hilo Intersection outside Honolulu, in one of the USAF's C-124's. It was never with the thought of "I wonder if this bucket of bolts is good for 2600 of water"; it was always with plans for that evening's dive into the salad bar, a lobster, and a Bacardi and Coke at the club at Hickam AFB. All of us who have flown big ones or little ones for any length of time know the feeling, often unspoken, of knowing that we can depend on a mechanical object . . . and hoping that it feels that way about us.

Overall, I found the quality of the Kraft KP-4A Sports System to be excellent, both mechanically and operationally. There are no "made in Transylvania from leftover Frankenstein parts" components anywhere in the system. The molded and machined parts are a tribute to Joe Pezak, the number-one machine shop man at Kraft, who is the finest craftsman in this field that I know of.

The electronics are state-of-the-art, at least within the price range that these systems are designed to sell for. In all, I found this an easy-to-install-and-use R/C system.

Price? The KP-6A is $329.95, with four servos. The KP-4A, also with four servos, is $299.95. From Kraft Systems, Inc., 450 W. California Ave., Vista, CA 92083, and its many dealers worldwide. •

Half-A . . . . . *Continued from page 35*

ates, and it is still under the adviser-ship of longtime modeler Professor Eugene Larrabee. The TMA was (and is) a very active group in indoor modeling, but R/C gliders have taken over as prime interest. Small R/C models have currently moved into second place, and Bob sent some photos for our entertainment.

First photo is Dave Felsenthal holding Bob's original F-15 and MIG 25 models. The MIG weighs in at 16.5 ounces with a Cannon Super Mini brick. The F-15 is 21 ounces with a standard-size radio. Flight characteristics are described as "tricky", but the visual effect is spectacular in the air. Fuel is provided by bladder tanks located at the CG to minimize flight trim changes. Next photo is another of Bob's originals . . . an .020-size pattern model. No name yet, but I bet the second word will be "Birdie". Again Bob used a bladder tank to feed the engine, a Tee Dee .020. Weight is 8 ounces, wing area is 95 sq. in. Bob says it is very smooth and uses almost no airspace.

It really pleases me to hear that this club is still going strong. I belonged to it exactly 15 years ago, and it had been around at least 10 years before that. Hey Eugene, how old is the TMA, anyway? Members of other college clubs, let's hear

from you too! College fields and 1/2A models are the ideal match.

Another letter I received recently is from David A. Barfield, 162 St. Mary's Court, Congers, GA 30207. He was kind enough to respond to my plea for photos of old 1/2A engines. He's been listening to my lectures on good photography, too! From left to right are a throttled Jim Walker .065 (originally an Anderson Royal Spitfire), an Atwood Wasp .049, and a Spitzy .045, by Anderson. The Wasp was one of the first "hot" .049's . . . it would get a 6 x 3 up over 15,000 rpm! Actually, with a weight of 1.1 ounces, the power-to-weight ratio was quite good. Many free flight and U/C models were powered by this revered trio of oldies!

Thanks a lot, David. Now, how about some of you others coming up with photos of YOUR collector's items?

Final item for the month is the alter-ego to the T-10A low-wing intermediate trainer I showed you a couple of months ago. This is the Bridi T-10. Designed as a real beginner's trainer, it uses a .10 or .09, and two or three-channel radio. Construction is rugged and simple, performance slow and docile. Just the ticket, eh what? •

Hannan . . . . . *Continued from page 78*

Floor shows might be a better description, since they are exciting presentations, illustrated with action models and illustrations. For example, his talk to Chapter 14 of the Experimental Aircraft Association, regarding the relationship between models and full-size man-carrying aircraft, was punctuated with flights from miniature "bats", gliders, and Peanuts. Not only did *he* fly them, but so did members of the audience! Needless to say, no one was bored, and doubtless, a few members may have had their interest in models rekindled. Sidelight observation: Walt writes with his left hand, but winds props with his right. Perhaps our resident psychologist, Dr. Dzus, can explain this?

FRANK TALLMAN REMEMBERED

Among the many items that have emerged regarding the late Frank Tallman, was the fact that he had accumulated more flying hours in World War 1 aircraft than *any* other pilot.

MORGAN HILL SPECTACULAR

We had the pleasure of attending the first annual Golden Age (Plus) R/C Scale Contest, conducted at Hill Country, Morgan Hill, California. Our little expedition chose the coast route northward from San Marcos, to avoid the searing heat of the inland roads. From a sightseer's standpoint, the coast would have few equals; however, we were unprepared for the eleven hours involved in traversing the course! To anyone contemplating the excursion, we would strongly suggest the allotment of extra time for photography stops and side trips. A more time-efficient approach would be to fly, as Lou Proctor did. Regardless of transportation mode, the visit is particularly rewarding.

In addition to a most impressive model flying site, Hill Country boasts fabulous collections of aircraft, automobiles, and horse-drawn vehicles. Admission is free . . . almost unheard-of for *anything* these days. Nearby is the Flying Lady restaurant, itself a mini-museum for aviation enthusiasts. Featured are dozens (perhaps hundreds?) of large models suspended from the ceiling, not to mention the full-size Bleriot reproduction and many smaller items of aero memorabilia. Staffed by attractive and pleasant waitresses, the Flying Lady offers tasty fare at reasonable prices. Only one drawback: the place is TOO popular! Owners Irv and Jan Perch are well aware of this problem, however, and are constructing a much larger facility next door, to accommodate the overflow crowds. On the other hand, it would be difficult to imagine a more interesting place to wait. Gives one time to thoroughly study the many displays.

The contest itself was quite successful, with a good variety of Golden Age models participating, in spite of rather breezy conditions on the first day. Spectators have an ideal situation at Hill Country, since the layout permits relatively close examination of the entries both in the pits and during flight. Also, the clever and informative banter of the P.A. system kept everyone entertained and aware of contest progress. Monty Groves shared microphone duties with Scottish C.D. Jim Adams, who sounds very much like racing driver/commentator Jackie Stewart. The "show biz" aspect of model aircraft flying is often overlooked, and we must congratulate this group for properly exploiting such possibilities. Of course, they do have a few rather unusual advantages . . . where else could one have access to full-size museum aircraft for demonstration fly-by purposes? Rhinebeck and Old Warden are the only other locations that come to mind. For this meet, Monty Groves, Jr. did the honors, with a spectacular display in the recently restored Focke-Wulf 44J "Stieglitz", resplendent in

Swedish markings. We were particularly fortunate in having a description of the machine's history and characteristics delivered by his mother, Patricia Groves.

The friendliness of all the people at Morgan Hill added much to our enjoyment of the contest, and several people offered kind words about **Model Builder** magazine, which we always appreciate hearing. One faithful reader has developed a novel system of model covering, which he promises to share with us soon.

With so many fine scale models present, it seems unfair to single out only a few for comment, but we were attracted to a highly-detailed Curtiss Hawk, a colorful Northrop A-17, a Hall racer, and a magnificently-flown Fairchild PT-19. The latter was a Mammoth scale, at 3 inches to-the-foot, and seemed little affected by the gusty wind. This was our first opportunity to witness Mammoth Scale models in direct competition with the more usual size examples, and our reactions were quite favorable. It would appear that the realism of the larger models is not simply a question of "Reynolds Numbers", as some have suggested. Rather, it is a combination of things, including sound, steadiness, and relatively slow flying speeds. Too many small R/C scale aircraft are far overweight and overpowered, yielding pylon racer-like speeds, totally out of keeping with realism. Yet, certain of the "normal-size" models did have more optimum wing and power loadings, as well as efficient mufflers, and audience response clearly showed the recognition of the difference!

Another entertaining spectacle was the arrival of the "Noon Balloon from Rangoon." Its commander took Pat Potega's charming assistant aloft for some aerial photos of the contest site, and we enjoyed their opening conversation, which went something like this: "Will you take me to Oz, Mr. Wizard?" "Well, I'll tell you Dorothy, it's like this . . ." Ad-libbing at its finest.

Our hosts for the Morgan Hill visit were Russ and Lorrain Barrera, who own a lovely home not far from Hill Country. Other guests included Mr. and Mrs. Wisniewski, Mr. and Mrs. John Pond, AMA Scale Rep. Frank Capon, and the Williams brothers. The conversation was fascinating and the refreshments superb. Later, we adjourned to see the new Russ-Craft Model Museum, which is rapidly nearing completion. Directly adjacent to Hill Country, it will provide an added attraction for all aviation enthusiasts. Russ tells us that it will have a new name, which we hope to announce in the near future.

It was with great reluctance that we left this mecca for modelers, to start the long trip southward. En route, we passed Shafter Airport, near Bakersfield, site of the Kremer Prize-winning Gossamer Condor man-powered aircraft flights. The remoteness and stifling heat of the location would seem to provide quite a test of man-power and determination, apart from the actual task. A sign held up by a grubby hitchhiker said it all: "ANYWHERE!" SIGN-OFF

It is becoming increasingly apparent that certain people would rather try to change the rules than build models to conform to existing ones. Larry Williams puts it this way: "Some modelers go to great lengths to avoid going to great lengths." •

Instructor . . . . *Continued from page 25*

more critical, and consistency is the name of the game.

Enough theory; now to the practical side of tuned pipes. Most tuned pipes are similar in performance, so the same basic set-up can be used with them all. The proper length on most .60 engines, measured from the center of the piston through the centerline of the manifold and pipe to the high point of most pipes, is approximately 12 inches. The only exception I've found is the E.D. pipe, which likes to run longer (approximately 13 inches).

After initially setting up the pipe, we are now ready to adjust it for fine-tuned performance. I've found that, if the pipe is too long, it will cause the engine to go very rich at the bottom of a split-S, where you usually enter your maneuvers, or it will go very rich at the bottom of a full-throttle loop. If the pipe is too short, the engine will tend to sag lean near the tops of maneuvers, and the exhaust will "bark" quite loudly at the bottom of a full-power loop. If it exhibits neither of these problems, then it must be pretty close to right! Some experts may cringe at my method, but it has worked for me, and it should work for you. Keep in mind that the flying field you save by using a muffled tuned pipe will probably be yours.

Now I'll answer some questions and sign off for this month.

Dear Dave: I've picked up a flutter in my new airplane that I can't cure. I think it is in the ailerons, as that servo keeps stripping gears, but I can't be sure. What do you suggest? M.T.

Dear M.T.: The first thing I'd try would be to seal the aileron gap; if this doesn't cure the problem, then try slicing off enough of the trailing edge of the aileron to square-off this back edge. A sharp-pointed edge or a rounded edge can cause flutter.

Dear Dave: How does rudder-only work, and how much can be done with an airplane equipped with rudder-only control? C.B.

Dear C.B.: A typical rudder-only airplane is trimmed to climb while under power, similar to a sport free flight. The rudder is used, not only to steer the airplane, but to control the airspeed by spiraling the airplane. Controlling the airspeed in this manner enables you to do maneuvers such as loops, barrel rolls, stall turns, etc. For example,

the loop the airplane, you would spiral to increase airspeed and then neutralize, causing the airplane to pull up into a loop. To roll the airplane, you would do the same thing, but apply full rudder when the nose comes just above the horizon. A few years back, when rudder-only was a competitive event, I remember seeing Harrison Morgan doing very nice four-point rolls with his rudder-only ship. That would amaze most fliers today!

Send questions (PLEASE) to me at: 8534 Huddleston, Cincinnati, OH 45236. •

Nats Scale . . . . *Continued from page 30*

by Doc Martin's Wyman Lepere WEL 10. Excellent performances were made by seniors Nick Decarlis, with a Fike (first), and Guy Larsen, with an He-100 racer. In Junior, Dan Isaacks won, followed by Andrew Stark's Hellcat.

Peanut was also well represented by low-wing models, with at least three of the first five places in Open going to low wingers. Clarence Mather's Davis won, followed by Charlie Sotich, Ron Robertti, Tom Stark, and Mark Valerius. Senior was won by Glen Anderson, then Nick Decarlis and Guy Larsen with a Peck Polymer P-51. In Junior, it was Tom Comparet in first, and Dan Isaacks in second.

OUTDOOR PEANUT SCALE

The big news in Outdoor Peanut was that it was won by a gas engine-powered model! Mike Fedor's nicely-built B-70 bomber, powered by a Cox .010, overwhelmed most of the field with a four-minute-plus flight. However, Wales Thomas, flying a Fike, came close with another four-minute-plus flight, depending on a thermal instead of a large fuel tank. Tom Stark placed third with his unusual Heinkel He-119A, followed by Fred Anderson and Charles Puckett. In Senior, Nick Decarlis was first with a beautifully-built Mooney-designed Found 100, followed by Glen Anderson in second. Dan Isaacks won first in Junior, and Tom Comparet placed second. The win by a gas-engined model brought promises by several people to submit rules change proposals to limit the event to rubber-powered models.

OUTDOOR RUBBER SCALE

The day started out with a rain storm, but by about 9 am, the sky cleared and the weather was nearly perfect. Low-wing airplanes were very much in evidence, as exemplified by Don Srull's first place-winning Schlepp (a Swiss target tug), Rolfe Gregory's fifth place Heinkel He-100, senior Guy Larsen's second

place Miles, and junior Andrew Stark's second place Hellcat.

Nick Decarlis continued his sweep of the scale events by winning Senior, while William Langley won Junior with a soon-to-be-released SIG Wittman Tailwind. Allen Schanzle placed second with his little (13-1/2-inch span) Chambermaid, followed by Tom Stark flying a Tailwind, which is the prototype for the SIG kit. Larry Kruse place fourth with a beautiful Monoprep, which earned highest scale points. Although there was some thermal activity, it appeared that most of the winning airplanes depended on consistant performance instead of a lucky thermal. ●

Mammoth . . . . *Continued from page 25*

If modeling generally has something to worry about, it is the instant model. I use the word "model" loosely. No wonder Customs agents around the world refer to our aircraft as toys! These items are sold by toy store outlets which offer no guidance, or in any way refer to the basic responsibilities required in the models' use. They are operated on school grounds (complete with kids), parks, approaches to full-sized runways, adjacent to freeways, and, heaven forbid, within shooting-down range of regular model fields. In my opinion, these constitute the biggest hazard to the continuance of our sport/hobby that there is. Mammoth Scale models are going to help separate the hobby from these toys.

One enterprising Canadian I heard about is way past the talking stage in building a permanent airport with hangar facilities for large models, dual-control trainers, full-time instructors (who also double as repair men, when not instructing), an aircraft rental system for model pilots (who are checked out first, as in full-sized aircraft), coffee shop, club house, model shop, evening construction and maintenance classes, rental tool shop and building area, and family picnic area. Far out? I wonder. Cash outlay is less than a few beat-up full-sized trainer aircraft, and overhead is very low. It wasn't practical until the Mammoth Scale models came along, as operating costs were too high with standard models.

Help! Help! Help! We need the following:

1. High grade spring steel wire heavier than 3/16 in., in straight lengths, hopefully four feet and longer.

2. Duke Fox has promised some decent wheel collars in larger sizes . . . hope he doesn't get bogged down on this.

3. Flanged bearings 3/16 in. and smaller, also some up to 5/16.

4. Good quality decals suitable for Mammoth Scale at a reasonable price.

5. Vacuum-molded 1/4 and 1/3 scale pilots which look real, not like a cupid in street clothes.

6. Quarter and third-scale instruments, landing lights, navigation lights, fuel caps . . . doggone it, if somebody doesn't pick up some of this stuff that people are hollering for, I'll have to do it, and I've got more to do than I can handle now.

If someone out there wants to produce something for majestic scale and wants some ideas, phone me at (604) 542-4151, as our mail is so heavy that I won't have time to give your letter the attention it would deserve. If you want me to evaluate something and can stand criticism, if necessary, shoot it to me prepaid. If it's good, **Model Builder** will tell the world. If it needs improvement, we'll check with you first. At any rate, phone us first to see if we can get at it during your time structure.

At this point, I would like to clear something up for modelers. Evaluating a product is work, and takes time and money. The product, when tested to the end of its useful life, is a

piece of junk with no value. If a product survives a complete test, it is unlikely that an evaluator will use it. More likely, he'll go out and buy it, and give it the care a fine product deserves.

I'm amazed at how well the new expanded **Model Builder** is being received. The only complaint I've heard is that they are not filling the additional copy orders fast enough. Although this is a compliment, it is a growing pain that I'm sure **Model Builder** is trying to correct as fast as they can.

The most frequently asked question that Mammoth Scale builders have is whether their aircraft is too heavy, too light, or strong enough for the performance they require. These questions are almost impossible to answer, because each combination has a different result. The nimbleness of the same model can turn one flier's knuckles white, his knees to jelly, and cause him to cease breathing for the duration of the flight. (I wonder if this could cause brain damage?) On another modeler, it would bring a satisfied smile while he wrings it out. It's obvious that we need some standard to judge these things by, so I'll give you some known facts that you can compare your model to.

Our shoulder wing drones are able to take off in about 90 feet with no wind, and they weigh approximately 40 lbs. with a full load. Wing area is 2160 square inches, Clark Y airfoil, 10° dihedral, dolly landing gear, Du-Bro 6-inch wheels, and Quadra engine swinging an Airflow prop at 7800-8000 rpm (static). Field condition is very rough with 2 inches of grass. Their performance in the air is like a loaded cargo ship, and they can fly and barely maintain height at half power. Controls are to the rudder, elevator, and engine. The takeoff roll could be greatly reduced if bearings were added to the wheel hubs; also, soft tires generate considerable rolling resistance at that weight. If you're flying a heavy model on a draggy field, spend some time getting your gear rolling with the least resistance possible. It can eat up a lot of power.

Our Thunderbird takes off easily in 60 feet, with no wind, weighs in at 22 lbs., and uses the same engine and prop. Fox wheels would cut the takeoff run appreciably, due to the freer-running aluminum hub. With its fully symmetrical 15% airfoil and 1450 sq. in. wing area, it will do about 1-1/2 turns of vertical roll from level flight and 100 to 150-foot round loops. Landing speeds can be ridiculously low. It will knife-edge but not climb out at that attitude.

Generally speaking, if weights are kept down to 24 lbs. or less, and with a decent wing area, your model with power similar to the Quadra will be sport aerobatic. If drag is low and it's a clean-flying model, it should have contest pattern capability even at 24 lbs. Ideally, for aerobatics, the weight should be kept to less than 20 lbs. The lightest *practical* aircraft powered by a Quadra or similar powerplant has been 14 lbs. Below that, you just don't have enough structure.

A landing gear/wheel combination capable of adequately handling your model can easily weigh 2 to 3 lbs.; you will rapidly find out that some of the crude gear our standard models were equipped with just don't hack it, and the poor engineering we used then just isn't practical. Here are some rules of thumb to keep in mind:

1. Minimum axle diameter is 3/16-inch high grade steel; 1/4-inch would be far better.

2. The landing gear leg length should always be shorter than the torsion length (if torsion sprung gear). If it isn't, your gear won't spring back on hard landings, as the leg will bend before the torsion portion twists. If your gear seems too spindly or soft when you follow that rule, either increase the wire diameter or add extra wire.

3. *Whenever possible*, when mounting torsion-type gear in

wings, spanwise, try to mount the gear so that the torsion runs across the center section; it will actually aid in strengthening the wing joint, rather than providing a shear point right at the wing saddle.

4. Use wheels that absorb shock even when cold. Some wheel products on the market have about as much give in cool weather as a manhole cover, and as much firmness as a burnt marshmallow when it's hot. If the tire has enough volume, it's amazing how little pressure you need to adequately support an aircraft of 30 lbs. The tires should only have to support the aircraft and take out the minor shocks. The major ones should be taken out by the gear. Don't worry about the low bounce wheels . . . a tire that has some give or bounce works fine, as there isn't enough energy released after a complete compression to throw one of these man-sized models back into the air on a rough landing. What you're striving for is a landing gear assembly which will give quite a movement in *all* directions, but also come back to its original position without bending.

The danger of folding your presently designed gears sideways is a real problem, and one which is certainly aggravated by the right angle bends we're so used to putting into the wire right at the highest points of stress . . . where the leg bends for the axle, or, worse still, where it bends to fit into the gear retaining block. Another problem we experience (especially with taildraggers) is that the leg angle and the touchdown angle in a full-stall landing could be identical, resulting in the gear not being flexed, and the only shock absorption would be in the tire itself. Spend some time looking at Figure A (our standard gear attachment) and you will soon see what I mean. If you really think about it, it's even a poor design for the standard-size models.

Figure B shows a combination coil and torsion bar arrangement that can give movement in all directions. This is only one of many possible designs. The gear leg is bent around the wheel to allow the load to be placed closer to the bearing surface. Note the "ripout" leverage available in Figure A. In Figure B, the coil takes the rearward shocks on both 2 and 3-wheel arrangements. The torsion bar portion takes side loads which would result in bent gear legs in our standard set-up. The torsion bar also has an important second feature, in that it has less tendency to rip out its longer base. Look at Figure A . . . you are usually depending on a very small area, normally a glue joint, to hold that block in place in torsion or vertical loads. In either A or B, with tricycle gears, it's a good idea to bend the leg slightly back, in case you perform a beautiful full-stall landing a few feet above the runway. For taildraggers, look at Figure B and note that the lower end of the gear is curved rearward. This feature, often found on full-sized aircraft, has a tendency to transfer vertical shocks to the horizontal plane, allowing the springs to work. The torsion bar can also run forward, and the anchor end can run spanwise to suit your aircraft.

It should be pointed out that Figure B's gear, if wing mounted, should have sub spars or spar doublers that extend just beyond the gear mount, and the coil should have room to operate. If you have problems with the coil spreading, rather than the torsion operating, a hard rubber insert can be installed in the coil opening, retained by two large, flat washers the same size as the coil's outer diameter, and a bolt. Note also that the coil or bent leg can be hidden by wheel fairings, pants, etc. Now you know why I need larger diameter gear wire! The larger automotive spring shops either have it or can advise where

you can obtain some, until we get some enterprising model supplier to fill our needs.

The wing connector drawing was submitted by Max Kremke, 2 Condor Circle, Willeton 6155, West Australia. I think No. 2 would be the one most used (production, anyone?). The joiner-nut lengths will be determined by the screw thread difference, and trial and error. As shown here, the threaded joiner would have to be threaded off toward one side, that panel removed and then the joiner threaded off the other side to remove the remaining panel. Seems to me that if a sleeve or bushing larger than the joiner-nut were placed at the rod's base permanently, the joiner would remain on the fine thread side without having to remove it. I would also think it would be a good idea to bush the fuselage where the threaded rods enter, to prevent wear. I would like to see the struts, if used, working and not only for show. I guess that's what makes Mammoth Scale interesting . . . new problems, new ways to solve them, and modelers helping each other (that's the best part).

The Quadra factory took a holiday during the time we intended to write up the repair and overhaul article we promised on the engine. It will be a much better article if we wait for their return to work. Please bear with us. ●

Pylon . . . . . *Continued from page 37*

be worked out, better competition, and more club money being spent to finance better equipment.

As I said, this is not a one-and-only cure-all for the current lack of participation, and I don't mean to be the Prophet of Doom. I love racing and everything it means. This idea doesn't leave out the smaller clubs, nor does it mean no normal-size races . . . we still need that. But maybe if two or three geographically close clubs pooled their efforts and resources, things could be worked out. Maybe one has a super flying site but not the ability that a club 75 miles away has for putting on a contest. Jot down your experiences as a contestant or contest sponsor and send them to me . . . don't just watch it happen. Bang the Drum Slowly? Maybe, but at least with a beat.

SAND SCRATCHES IN YOUR PAINT FINISH

Over the past few years, a problem in my paint finishes has occurred on a rather consistent basis. I put on two coats of K&B primer, the first being either wet or dry sanded with approximately 180 grit sandpaper, and the final primer coat being sanded with 360 or 400 grit paper used wet, prior to application of the paint coats. At this point, one could hold the airplane parts up to a strong light, and the surfaces would all appear to be filled, with no low spots or seam lines showing, and a flat, smooth surface would seem to indicate a favorable condition for a flawless paint job.

Another factor comes into play here; the major construction of airplanes in my shop is done during the winter months, and the amount of balsa dust in the air precludes using the shop for painting purposes during those months. Painting is usually left until early spring. The humidity here in the Mid-west is very low in the winter (around 20%), and zooms up to 70-80% in the spring. Now the problem: here we have a finely-finished airplane, and as soon as the paint hits the parts, sanding scratches appear as if by magic, or at least I *thought* it was magic. Not only does it ruin the looks of the airplane, but it destroys the expectations I built up over several months in my mind's eye. All this time I put the problem down to humidity problems (and magic).

Well, the other day I was picking up my favorite paint down at the automotive paint store, when my eye caught a brochure put out by the DuPont Company. The following is part of that brochure, and I can testify that it is the answer to the problem of sand scratches, at least as I've experienced them.

"Primer-surfacer is the shop material that is perhaps most susceptible to changes in temperature, as evidenced by the phenomenon known as sandscratch swelling.

Primers that dry too fast "bridge" cracks (top). This may cause flaw in the finish. Proper drying will fill the gap (bottom illustration). Du Pont recommends 3661 S Lacquer Thinner.

"Sandscratch swelling is often caused by the 'bridging' of primer-surfacers. This occurs when the primer-surfacer does not completely fill an imperfection in the surface, such as a scratch or grinder mark.

"These flaws must be filled from the bottom up. If a primer-surfacer dries too quickly, it will not flow to the bottom of the scratch. Instead, it builds a 'bridge' across it. The top-

coat solvent can then flow into the unfilled flaw and a swelling or 'scratch' will form.

"That's why you should avoid fast-flashing thinners during hot weather, and you should thin the primer-surfacer 150 percent, instead of the usual 100 percent. (Remember, a 150 percent reduction is three parts thinner to two parts primer.) Du Pont recommends 3661 S Lacquer Thinner, a good summer solvent, for primer-surfacers.

"There are several advantages to increasing reduction to 150 percent:

"The primer will be smoother, meaning less sanding will be needed, and the possibility of 'primer blushing' will be reduced. As a result, less sandpaper will be used.

"Less primer-surfacer will be needed.

"Primer-surfacer will dry faster than when it is thinned 100 percent.

"Most importantly, there will be fewer problems with sandscratch swelling after topcoating with color."

You'll have to experiment to determine the proper amount of thinner to use (either K&B epoxy thinner or Du Pont's 3608S lacquer thinner works fine), but start out by adding approximately 25% thinner to your mixed two parts of primer. It really helps.

Now is the time to get those race reports sent in, and also your ideas of how-to articles and the like that you would like to see over the long winter months. If you would like to share any ingenious ideas or discoveries you've made, send them also. The address is 3727 Shepherd Lane, Fort Wayne, IN 46815.

SEE YOU AT THE RACES!!! •

Plug Sparks . . . *Continued from page 52*

pionships could be put on without having to go to a higher entry fee. This was in response to a proposal by Woody Woodman, who outlined some of the deficit encountered in this SAM Champs.

A formal motion was made to have the next SAM Championships in 1979 at Salt Lake City. This was presented by the President on behalf of the SLAM (Salt Lake Aero Modelers) Club, which was bidding for the 13th Annual SAM Champs. Inasmuch as the Rocky Mountain Area was scheduled to have the Champs, and no bids had been received from the Denver Model Museum, the motion was passed unanimously. Lin Haslin, Rocky Mtn. Veep, is to be notified.

The meeting then broke up, with most members departing to get a good rest for the next day's flying. A few die-hards stayed to hold post-mortems on the meeting. In retrospect, the biggest item had been resolved; i.e., the elimination of easy rule changes.

BROWN JR. MOTOR ROUNDUP

While at the SAM Champs, the columnist noted that Herb Wahl was displaying a full line of his Wahl-Brown Jr. motors. Wahl, operating under the name of Herb's Model Motors, Box 61, Forksville, PA 18616, will offer three versions of the Wahl Brown Jr. engine, beginning late in 1978.

The three motors to be offered will be quite similar to the versions originally offered by the Junior Motor Corporation in 1940; i.e., B, C, and D models (in order of descending cost).

Herb, who has been producing the Wahl-Brown Jr. Custom with choke control, will now manufacture a new "Special" (without choke control and no spark plug), and a "Classic", with metal tank, choke control, wooden mounts, and finished in 24 kt. gold!!

The assortment of Wahl Brown engines will line up like this:

Wahl Brown Jr. Classic $169.50
Wahl Brown Jr. Custom . . . $139.50
Wahl Brown Jr. Special $119.50

Advance orders can be placed with a deposit of $40 per engine.

MORE MOTORS

Also noted on the field was a selection of Orr Tornado engines and parts. Although the columnist took pictures of the engines and parts, a faulty rewind mechanism destroyed the film.

Arthur DeKalb, who has purchased the entire Orr Engine production of motors and parts, is offering the Orr 65 for those interested in augmenting their collection. This is not to say the motor won't be a good runner, as there are numerous wins and testimonials credited to the performance of this

engine.

Those interested in the Orr 65 should write to Arthur DeKalb, c/o Precision Service Co., 10189 Crane Rd., Lindley, NY 14858.

MORE GOOD STUFF

Seems like the SAM Champs are always an excellent vehicle to display your new ideas, and John Kungl is no exception.

The new "Modeler's Swap Sheet" (now in issue No. 2) is the latest idea by John Kungl to get modelers together with items to sell, trade, or borrow. John is offering the first two issues for FREE, in order to get the Swap Sheet really rolling.

The "Modeler's Swap Sheet" is a biweekly publication strictly for modelers who want to swap or sell their unwanted model gear. Subscription rates are 4 issues for $1.00, 13 issues for $3.00, and 26 issues for $6.00. Advertisements are 10¢ per word to subscribers *only*. A free advertisement comes with your subscription to the Swap Sheet.

To subscribe, or for more information, write to The Modeler's Swap Sheet, 20 Sylvan Rd., Clifton, NJ 07012. Do it today!

ANNUAL SAM AWARDS BANQUET

It always seems that no matter how many seats are reserved or how many tickets are sold prior to the banquet, a considerable number of extra tables always has to be set up. This year was no exception, and things got a little warm with all the bodies in the banquet. Finally got the air conditioning unit into high gear to save the day.

Woody Woodman ran the banquet and seating facilities. Directly in front of the speaker's table (which included all SAM officers) were two tables; one for the Army, and the other for Miss SAM Champs and the outstanding old-time members. Woody made a particular point of thanking Major Seymour for the help and cooperation of the U.S. Army in using the Coyle Air Drop Area. Free Flight areas are very hard to find in New Jersey! Hope the New Jersey boys are able to keep this spot!

After several acknowledgements to the various luminaries attending the banquet, the awarding of the trophies was turned over to Don Garafalow, for free flight, while Keith Grote substituted for Tom Knakal.

Although the columnist didn't get the times of the winners, the list of names is long enough without the model and time info. After all, we printed your name, didn't we? The winnahs:

FREE FLIGHT

CLASS C CABIN

1. Larry Boyer
2. Henry Hill
3. John Lessig
4. Karl Spielmaker
5. William Jordan

30 SECOND ANTIQUE

1. Sal Taibi
2. Jim Perrson
3. Tom Accavatti
4. Larry Boyer
5. George Armstead

CLASS A CABIN

1. larry Boyer
2. Don Assel
3. Jack Chilmark
4. Jim Robinson
5. Ben Buckle

CLASS A PYLON

1. Mitchell Post
2. Joe Beshar
3. Jim Robinson
4. Jack Whittles
5. Tom Accavatti

CABIN RUBBER

1. Ron Sharpton
2. William Biggs
3. Bill Henn Jr.
4. Bill Henn Sr.
5. Fred Biggs

CLASS B PYLON

1. Mitchell Post
2. Jack Whittles
3. John Lessig
4. Mike Poorman
5. Ben Buckle

FLYING SCALE RUBBER

1. Bill Henn Jr.
2. Chuck Bukowski
3. Ed Novak
4. Carmen Botticelli

5. George Armstead

.020 REPLICA

1. Sal Taibi
2. Ed Kopski
3. Joe Kaiser
4. Barney Onofri
5. Dave Sweeney

CLASS B CABIN

1. Mark Hinton
2. John Lessig
3. Larry Boyer
4. Jack Chilmark
5. Jim Robinson

FUEL ALLOT. ANTIQUE

1. Larry Boyer
2. Herb Wahl

.020 ELECTRIC

1. R. Kopski
2. Joe Beshar
3. E. Brown
4. Ed Goretzka
5. A. Hernandez

STICK RUBBER

1. John Stott
2. Bill Henn Jr.
3. Ed Novak
4. Al Dashko
5. Bill Henn Sr.

CLASS C PYLON

1. Ed Rangus
2. Tom Lucas
3. Ben Buckle
4. Jack Whittles
5. Mike Poorman

SCALE GAS

1. Sal Taibi
2. Dave Sweeney

COMPRESSED AIR

1. Karl Spielmaker
2. Ed Novak
3. Tim Banaszak
4. John Stott
5. Gene Collins

RADIO CONTROL O/T

CLASS C GLOW

1. Hugo Mercoli
2. Esio Grassi
3. Gary Montana
4. Jim Clark
5. Dave Jagge

CLASS C IGNITION

1. Ted Katsanis
2. Larry Fair
3. Cliff Schaible
4. Tom Accavatti
5. Fred Quedenfeld

R/C CLASS B GLOW

1. Hugo Mercoli
2. Stu Murray
3. Tom Accavatti
4. George Haley
5. Gary Montana

TEXACO R/C

1. John Pond
2. George Haley
3. Jack Van Dusen
4. Pete Vano
5. Chet Lanzo

R/C CLASS A (GLOW)

1. Stu Murray
2. Tom Accavatti
3. Bill Haley
4. Mike Lachowski
5. Joe Beshar

R/C ANTIQUE

1. Mike Lachowski
2. Esio Grassi
3. George Haley
4. Jim Clark
5. Tom Accavatti

R/C CLASS A-B IGNITION

1. Joe Smith
2. Joe Beshar
3. Cliff Schaible
4. Tom Accavatti
5. Ken Hinton

.020 REPLICA R/C

1. Dave Jagge
2. Stu Murray
3. Fred Koval
4. Tom Accavatti

O/T ELECTRIC R/C

1. John Pond
2. Joe Beshar
3. Tom Wrob

SPECIAL PERPETUAL TROPHY AWARDS

Twin Pusher ..... Dave Dodge
Class C Cabin F/F ..... Larry Boyer
Pond Antique ..... Larry Boyer
Shailor Class B ..... Mitchell Post
F/F Grand Champion ..... Larry Boyer
Beshar-Woodman R/C ..... Hugo Mercoli
R/C Grand Champion ..... Tom Accavatti
Spcl. Trophy (Freq. Control) ..... Jack Hill

If we get any more perpetual trophies, we can have a contest for these alone! Furthermore, if we forgot to mention anyone, it wasn't intentional. This old man can only write so fast!

CONTEST PICKUPS

Those fellows remarking on how well Larry Boyer's Bunch Tiger ran might do well to copy a few of his ideas. First off, he uses an extra leaf on his timer (this was actually a standard accessory item in the old days) that prevents point "floating" at high speeds. This allows Larry to use a 10 x 6 prop, which really gets to turning up.

Bill Henn Sr. was just busting his buttons when his son, Bill Jr., beat him and a flock of other fellows in the Rubber Stick event. John Stott narrowly nosed out Junior and saved face for a lot of older guys.

Missed the Indiana-Ohio boys this time. Thought for sure that the unholy triumvirate ("Dirty Harry" Murphy, Bill Burgess, and Bob Larsh) would show. Guess they were saving their models for the big Wright-Patterson meet. You boys missed a goodie!

The English boys came with the neatest box ever seen. With most wings being shipped in halves, it was no great surprise to find all the models of the ten-man team in said box.

THE WRAP-UP

Despite what fellows say at the annual SAM Business Meeting, where one could get the idea there is a lot of discord, the main point from this columnist's viewpoint is that this is healthy. Anyone who is concerned about the well-being of SAM has every right to express his opinion and solution for the problem.

When we get to the point where the President asks for new business and new proposals, and everyone sits back fat and happy, then that is the time to worry! An animated discussion and participation by the membership indicates a healthy attitude. This is what keeps an organization on its toes!

In the meantime, as Pete Vano so carefully pointed out, "We get enough problems during the five days of the week, without carrying it over on the weekend. Let's remember what it is all about . . . FUN!" •

Peanut . . . . . *Continued from page 79*

Build the bottom surfaces of the wings directly over the plan, by laying down the trailing edges, rib bottoms, and the tips. Then cut out two spars to match the pattern, and cement them in place on top of the ribs. Block up the tips so they can be cemented to the ends of the spars.

Next, slice the rib tops from sheet balsa, and cement them in place on top of the spar and rib bottoms. Finally, make the balsa root fairings, notch them to fit over the spar, and cement them in place. Finally, remove the wings from the plan and sand them smooth, tapering the trailing edges to a triangular section, and the leading edges and tips to a half-round section.

The fuselage is a conventional stick box, made with two sides that are assembled directly over the plans. The side structure is shaded on the plan for clarity. Pin the longerons in place and add the uprights. Make the hole for the rear motor peg before you install those particular uprights, because it's easier to do it now than trying to make the holes after the fuselage is assembled. When the sides are dry, remove them from the plan and separate them by using a thin razor blade. Lightly sand the two sides to remove any rough spots, and taper the two tail posts so they can be cemented together at the correct angle. Cement the two sides together at the tail posts, and block them up so they are both vertical as they lay on their bottom longerons over the plan view. Let this cemented joint dry thoroughly before adding any of the cross pieces. The proper alignment of the tailpost joint is important for assuring an accurate fuselage box, so check it carefully as you support the sides. Then add the cross pieces, cutting them from 1/16 sq. balsa, except for the most forward one, which is 1/16 x 1/8 balsa. Although it doesn't show in the top view, all the bottom cross pieces (except at the very front) should be 1/16 of an inch shorter than the corresponding upper one.

Cut the fuselage formers from sheet balsa and add them to the fuselage box. Add the stringers aft of the cockpit (5), and the two forward of the cockpit. Cut, fit, and hollow out the cowl pieces, and then cement them in place. There is a vertical sheet filler outside formers A and B on top of the upper longerons, to help support the wings.

Make up the nose block and the plug, and cement them together. It is usually a little easier to make the noseblock a little oversize and do the final shaping with sandpaper, with the nose plugged into the front end of the fuselage. Sand the fuselage structure to remove any bumps or roughness.

Cover the major structural pieces with your favorite material. The model in the photos was covered with silver Japanese tissue. Water shrink the tissue, then give it a couple of thin coats of dope. At this point, add the insignia and whatever numbers you feel are required. The Profile article shows several color schemes. The model in the photos has wing insignia and rudder markings. The Cross is white, the outer circle is red, the next circle is white, and the inner circle is blue. The rudder is blue uppermost, then white, and red. Control outlines are made with a fine black pen. All the color added to the model was done with felt pens designed for marking acetate sheet, except the white, which isn't a color anyway. The white on the model is liquid paper correction fluid. It is very white, very opaque, and besides, it was handy at the time.

Install the landing gear wire in the fuselage. Then add the wings and tail surfaces. Block them up with books or blocks, so the cement will dry with all the components properly aligned.

Next, make the struts for the model. Obtain the model railroad basswood stock required, and sand it to the proper streamlined cross-section. Paint it with silver dope. When it is dry, cut it to the right lengths and cement it in place. Do not cement the landing gear struts to the landing gear wire, just alongside. Add the wire bracing to the tail. Poke a pinhole in the tail structure in the appropriate places, then thread the monofilament line through the holes and tie it under the fuselage. A drop of cement at each hole and trimming off the ends at the knot complete the job.

Finally, make the propeller assem-

bly. A small balsa rocket nose, available at the local model shop, was cut to length for this model. A 1/16-inch diameter hole was drilled in it, and a piece of aluminum tubing, filed to make a free-wheeling ratchet, was bonded in place with "Hot Stuff". The real plane had a nose cannon, so the free-wheeler is allowed to stick out a little. Two Sleek Streek plastic propellers supplied the blades for the model. These were cut off near the hub, and then bonded in slots cut in the balsa spinner. A washer and a "Peck-Polymers" plastic thrust button, in conjunction with a standard nose hook, completes the assembly.

A loop of 1/8-inch flat rubber will power the model. A smaller motor may be enough, if your model is light in weight. The model should balance in a horizontal attitude when supported at the wing spar. If it doesn't, add modeling clay ballast at the nose or tail, as required. Start your testing by giving the motor about fifty hand winds. Adjust the tail surfaces so that the model does a smooth, gradual descent with little or no turn. Then, gradually increase the turns in the motor. If the model shows signs of stalling under power, add a shim to get more downthrust. Similarly, use sidethrust to eliminate any violent turning tendencies. The ideal flight would be a gently-turning, climbing circle, followed by a gently-descending wide circle. The motor should run out of turns about the same time the model is landing. Experiment with motor lengths and sizes and with thrust adjustments, until the model flies to your satisfaction.

If your model continually falls off on a wing or tries to spin in, try adding some more area to the vertical tail. This was necessary to obtain reasonable flights from the model in the photos. •

Pazmany . . . . . *Continued from page 91*

to be faired by eye, from 1/16 sheet, until the fit seems reasonable.

To assemble, sand the center section members (4 spars, l.e., and t.e.) until the parts butt to the outboard panels with the proper dihedral (3-3/8 in.) set under the last full rib. Washin or washout is not used. Dihedral doublers are not used . . . simply butt and glue. The butt procedure is practical only if the wing is secured to the fuselage with the rubber band and rubber cushion technique. If you plan to glue the wing to the fuselage (which will probably get you more scale fidelity points), I would recommend a lot of dihedral spar doublers, for the dihedral break will then become an obvious weak point. The current design, despite the usual encounters with trees and cars over a three-year period, has failed only at the wing tip. Those apparently frail ribs, hollow T.E., and butt joint dihedral solutions are really OK, so long as you attach the wing with rubber bands.

FABRICATING THE FUSELAGE

Start the fuselage by laminating the wing support section (stations six through nine) out of two pieces of 1/32 sheet. Use the rib templates to carve the proper shape into a supporting block. When dry, cut the laminate to a width of a 1/4 inch.

Now build one side right over the plan, in the traditional fashion. Note, however, that the vertical supports lap the longerons. This means that the main longitudinal stringer must go in before the supports. When complete, you have the right side. To make the left side, smear the plan with oil and turn it over. You will see a ghostly image. With the aid of the old pin holes, work to make the second (left) side similar to the first. Fortunately, great precision is not required . . . the fuselage is so large that errors of as much as 1/16 inch cannot be seen in the final product.

Join the sides in the usual fashion, except for two factors: the cross members lap the vertical supports, and many of the upper cross members are only temporary.Temporary upper cross members (stations one through twelve) will ultimately be taken out to clear the motor. Attach temporary members with a light dab of white glue or traditional model airplane cement. Do not use epoxy. To remove, saw through near the middle of the member using a hacksaw blade (without a handle), or razor saw, and then twist each portion separately. They will come out with an ease that is disturbing.

With the temporary bracing in position, do the upper structure. The best approach is to make the cockpit frames (stations six and eight) first and mount them. Run longitudinal members between the cockpit frames and each end of the fuselage (stations one and fifteen). Then put in the horizontal cross braces between the longitudinal members. Next, put in the slanting side members.

Take out the temporary members and put in the diagonal floor braces between stations five and nine. Be very gentle at this point; the fuselage doesn't have much stiffness yet, and an oversized member jammed into position may well twist the entire assembly.

You are now ready for the upper and lower inner braces on each side, between stations five and nine. No precision is required here, just make sure that the braces are snug against each vertical support and well cemented. The fuselage should now possess considerable torsional stiffness. Drop the shelves in.

The noseblock consists of a large fixed piece, into which is set a removable portion, permitting passage of the winding protector tube. Finally, the propeller assembly, also removable, is set into the removable portion of the noseblock. I suggest that you make all the associated pieces at this point, before assembling the noseblock structure to the fuselage; otherwise

there may be real problems of fit later on.

The winding protector tube is made of epoxy-bonded plywood. While it requires more work and expense than the usual golf tube, it offers more room for the rubber and can be made straight, whereas the usual golf tube is banana shaped.

The only tricky part is coating the inside of the plywood tube with a protective surface. Stuff a rag into one end of the tube, pour in about half a cup of shellac, varnish, glossy paint, or whatever you have around, and then plug the other end with a rag. Turn the tube as though it was a baton, until the entire inner surface is coated, then pour out the excess. Repeat until the interior is glass smooth. The outside doesn't matter.

Carve the main noseblock out of relatively soft balsa and hollow it out to about 1/8 inch thick everywhere. Now saw out the removable portion, using a combination of knife scores to mark the outline, followed by the drilling of a small hole to permit the entry of a hand-held broken jigsaw blade. As the cut develops, you can switch to a razor saw or a hand-held hacksaw blade. To make up for the thickness of the cut, bond in 1/32 sheet liners to the removable part. If the cut seems crooked, trim the good side and build up the low side with a commercial mixture of balsa dust and epoxy, such as Epoxolite.

The removable portion is now reattached with some system of dress snaps or screws. Remember, the finished connection must take thrust and torque while being readily removable. My solution consists of one size 3/0 dress snap at the top center and one screw (plastic, 4-40) at the bottom center. While it does the job, this particular combination is too finicky for real contest conditions (rain, wind, nervous hands, etc.). In particular, seating the tiny screw is unrealistic. Give it some thought and you'll come up with something better.

Make up a nose ring out of 1/16 inch epoxy-glass PC board material, as shown on the plan. This ring will serve to key the propeller assembly. Do not glue the nose ring to the cowl yet.

Cut side and downthrust angles into the matching removable noseblock piece. When all the pieces go together, bond the main noseblock portion to the fuselage.

Cut the cowling formers and mount them. Do not notch the formers for stringers. While the plan supplies the number of stringers used on my model, the actual number is not critical. Simply put in enough to convey the impression of a rounded surface. Butt-glue overlong stringers, one at a time, to the noseblock and over the first former. Let dry. Then bend the stringer towards the last (aft) former. When it touches, saw off the excess length and bond. You will have to maintain pressure until the glue "takes"; use five-minute epoxy. Sheet in the gap between the fuselage and the first former; ditto the last former.

We're now ready to bend wire. The cockpit windshield wire suggestions are on the plan. Most any light spring wire will do. Balsa or soft aluminum tubing will not work . . . I've tried these. In a turnover landing, the windshield wire gets much of the load; a lot of give is required here.

Laminate the tail wheel as given on the plan, insert an aluminum tube hub, feed some 1/32 music wire through, and bend as shown. Epoxy to the frame after covering.

FABRICATING THE RUDDER AND TAIL

Make the rudder center post over station fifteen on the plan. Mount the "ladder" to the aft end of the fuselage. Carve the rudder top of soft balsa and balance on the ladder. Glue in the rudder leading edge. Put in the trailing edge, along with the sheet top and bottom supports. Glue in straight horizontal pieces of 1/16 square from each ladder rung to the leading edge (These are shown only in the rudder section view). Next comes the inclined 1/16 square members near the leading edge. Now bend in the 1/32 ribs from the l.e., over the inclined members, then over the ladder to the t.e. Last comes an extension of the main fuselage stringer to the rudder t.e.

The tail is built over the plan. The construction is pure Earl Stahl. First the 3/32 ribs, l.e., and t.e. are put down. Then the top spar goes on. Bits of 1/32 sheet are now spot-

glued to the base ribs and then streamlined by sanding in place. The entire tail structure is removed from the board, turned over, and the lower spar glued on. Again, bits of 1/32 sheet are added on to the base ribs and trimmed. To mount the tail within the rudder, add the piece of hardwood dowel between the center ribs. Before gluing, slide a 1/32 plywood retainer on to each side of the dowel. The retainer shape is given on the rudder plan. Inlay the retainer into the rudder top block.

PROPELLER

The propeller is a standard single-bladed folding affair. It's acceptable for AMA scale, but you do, in principle, require a freewheeler for FAC scale. This is a gray area . . . you'll have to check the local rules. If there is any choice permitted, go with the folding prop. The issue is not flight time, but one of simple survival. The only tall green things sticking out of the ground in my neighborhood are beer cans and mossy rocks. The life span of a free-wheeling prop is usually about three flights. If you must make one, try one 14 inches long by 1-1/4 inches thick by 2 inches wide, carved in the traditional style. I can't vouch for its performance; the one I carved didn't even survive the test flights. Now, that folder is something else; after three years of abuse, it's still going strong.

FABRICATING THE LANDING GEAR AND WHEELS

Pazmany's spring-type landing gear is probably best modeled in fiberglass. However, the forms are tricky, and I settled for a bent rectangular spring arrangement. The plans give all the bends in three-views. If you can't find rectangular spring steel, use 3/32 music wire. Good old 1/16 music wire just isn't stiff enough. The torsion bars help absorb energy and also stabilize the main gear. Soft solder these to the main gear, after wrapping the connection with copper or brass wire.

The model wheels were made of an unusually tough plastic foam "rubber" specified in the plans. Ordinary foam or sponge materials won't do . . . too soft or heavy . . . or both. If you can't find the cross-linked foam plastic, try the usual carved soft balsa wheels. To glue the ply hubs to the foam wheels, use rubber cement or contact cement.

To attach the landing gear to the wings, chop slots through the bottoms of the middle five ribs and false ribs. The torsion bars should fit alongside the thick landing gear ribs. Only the aft end of the torsion bars is glued to the thick ribs, the main landing gear is not. The main

landing gear must be free to move within a clearance slot cut into the thick ribs. After inserting the landing gear, close the slots within the middle three ribs by gluing doublers on both sides of each rib. Now add the false fuselage portion between the landing gear.

COVERING AND DECORATING

Everything above the main longitudinal stringer receives white Japanese tissue; everything below, red. The wing is all red, with no decoration of any kind except the aileron outline. The tail is all white, with no decoration except the trim tab outline. The rudder outline coincides with the "ladder". The entire vertical tail surface is white. A black tapered band is cut from tissue and applied to the fuselage sides after the basic red and white covering is complete. Check the plan for band dimensions. The large identification letters and numbers are traced from the plan and cut from black tissue.

The smaller letters (EXPERIMENTAL and PAZMANY PL-4A) are too difficult to make in the above manner. I used transfer letters (Letraset 28-point Helvetica Medium) rubbed on to a small piece of white tissue, which was then glued into position.

Use any conventional covering procedure. I use the thinned white glue routine, not out of conviction, but simply because there is less smell. The cowling and wing tips require many individual pieces of tissue; the rest of the machine is straightforward. Water shrink the tissue, then brush on two coats of dope mixed 50/50 with thinner.

Cut trial-and-error windshield patterns out of ordinary paper. When you have one that fits, transfer the outline to acetate sheet or celluloid of about two to five-thousandths thickness. Cut and glue. Bond a strip of 1/4 inch wide rubber motor in the wing well as a cushion.

FINAL ASSEMBLY

Mount the nose ring so that the propeller balance weight is roughly downward and the folded blade is over the left cowl. Make the rear peg as shown, and also a straight 1/8 inch diameter piece of music wire about a foot long, to be inserted into the rear peg as a means of holding while winding. Make a winding rod to fit your winder and the bobbin hook.

Make up the test motor as per plan and insert it into the fuselage. Check the CG location. It must be at or forward of the rear spar. If necessary, glue steel washers or other weights to the inside front cowl to get the CG located properly . . . mine required eleven grams of ballast. Any attempt to fly with the CG significantly rearwards of the rear spar will result in a spirally unstable model.

FLIGHT

Set the tail to a horizontal attitude and glue lightly at the dowel to retain the setting. Fold the propeller after putting enough turns on the rubber to prevent any slack.

Get on your knees over the softest terrain you can find, and thrust the machine into the breeze with the nose slightly down. Despite its size, the machine flies slowly . . . do not throw extra hard. The best place to grasp the fuselage is at the two lowest longerons, just behind the wing. Correct the glide for stalling or diving by changing the tail incidence angle. When satisfied, stand up and test again. If there is any pronounced turn, glue on a transparent rudder tab and deflect to offset the turn. Keep changing the tail attitude until you are getting the optimum glide.

Hand wind about seventy-five turns and release with your left hand at the prop tip and your right hand in the usual spot on those two lowest longerons. Watch for steep climbing or any strong circling tendency. A too-steep climb means that more downthrust is required; pronounced circling means that either the side thrust must be changed or that you have some horrible warp. Watch the transition to glide . . . does the prop fold correctly? Slowly work your way up to about one hundred and fifty turns. You should now see some climb, about twenty feet. Switch from hand winding to the full protector regalia at this point. At high turns, bond the rear peg to the fuselage with epoxy; should it vibrate loose, things will become awkward.

For maximum performance, switch to the contest motor. Check the CG position again to make sure that all is well. Do a few glides and then slowly increase the turns on the contest motor until you reach about 85% of handbook value (roughly 600 turns). At this power level, you can profitably change your launching technique. A release at about fifteen degrees above horizontal is best.

Should you have any questions, send a stamped, self-addressed envelope to me, care of **Model Builder.**

Now, let's go back to the beginning. Why build it? If you have the necessary experience, i.e., you can build a peanut or walnut or coupe and get an honest thirty seconds, and derive delight from flight realism, you will enjoy this one. •

Silent . . . . . *Continued from page 63*

MAKE SURE THAT YOUR POWER POD ENGINE IS RUNNING IN THE PROPER DIRECTION

This may sound a little ridiculous to some, but if you are like me, and power pods are your first introduction to .049 engines, be alert to the fact that the reed valve types frequently start backwards. Our regular propellers are designed to provide forward thrust when rotating in a clockwise direction, so when they rotate counterclockwise, you get reverse thrust. Reverse thrust may be great for braking real planes, but it sure doesn't do anything for launching model sailplanes.

My Black Widow worked perfectly for the first month. I became adept at using the recoil spring starter for one-flip starts and quickly tossing the sailplane into the air to get maximum altitude from my engine run. It came as quite a surprise when I once tossed the model and it floundered to the ground, hitting on the nose and putting a big dent in the nose block. Since the engine was still running, I gave it another toss, only to be treated to the same spectacle. The snickering of some onlookers convinced me that I had a problem, and I had better find out what it was. My prelaunch procedure now includes passing my hand behind the running engine to make sure the propwash is in the proper direction.

HOLLER WHEN YOU'RE HIT

While flying at about 400 feet altitude in a thermal search pattern, your model suddenly begins a series of unassisted dives, zooms, turns, and wallows. Attempts to bring her under control only result in more crazy behavior, and you realize that you're being hit by radio interference.

This happened to me the day that Tom Vincent brought out his new custom-built R/C system. It was one of the new generation systems, with such features as servo reversing, mixer controls, slow roll button, and so on. Tom and I are old flying buddies. Frequency 72.240 is his favorite. I was flying on 72.400. I hollered (expletive deleted) that I was getting interference on 72.400. Someone relayed the interference message to Tom, who had just started his engine to check throttle settings. He shut off, and my sailplane returned to its sedate ways as I hastily brought it down for a landing.

Tom was perplexed by his apparent interference, because he had ordered his new system on 72.240 and the transmitter frequency label indicated 72.240. But when I turned on my receiver, it responded to Tom's transmitter. We later discovered that the manufacturer was out of 72.240 crystals, and had temporarily installed 72.400 crystals in order not to delay Tom's order. It was very fortunate that the interference hit my sailplane at a sufficient altitude for me to attract attention and locate the probable source. The story would have been different with a powered model.

SAVE THE PIECES

No words can describe the helpless feeling that comes with the loss of control of your airborne model. I had just made a power launch. At about 50 feet altitude, I applied some right rudder to compensate for a leftward drift. The model responded by locking into a tight right spiral. No amount of frantic rudder and elevator stick movement would break it loose from this pattern. It immediately started to lose altitude and drift downwind. The normal power cycle of two and a half minutes seemed an eternity as the model came closer and closer to ground zero. Unfortunately, the altitude ran out before the gas, and it cartwheeled as the right wing tip struck the ground. Damages consisted of the wing broken in three places and the fuselage demolished back to mid-wing. I theorized the cause of the crash to be a loose servo case top, which may have resulted in the rudder servo gears binding.

I remembered Chuck Cunningham's advice about crashed models. He suggested that you pick up all the pieces, take them home, and store them in the corner of your garage. Don't make any hasty judgments about throwing away the remains. The rebuilding job may not seem as formidable when viewed a few days later with a cooler head.

CHOOSING YOUR SECOND SAILPLANE MODEL

Since joining the R/C ranks, I have developed into a compulsive builder. I am not a fast builder (average 2 to 3 months to a model), but I like to always have a model under construction, so that I can spend a few building hours whenever the mood strikes me.

It was more than a year and several hundred flights before my Windward met with the calamity I have described. After my first six months of soaring, with a best-flight time of 40 minutes , I was ready to build a second sailplane model. I decided that this model should be a standard class ship (100 inch or less wingspan) so that I might compare its performance to my Windward. Better

visibility was another reason for selecting a bigger model. I have already mentioned some of my visibility problems, and besides, these 44-year-old eyeballs were not that good to start with.

There are at least half a dozen good standard class kits with list prices in the 40 to 60-dollar range. Some models that I considered were the Airtronics Aquila and Olympic II, AFI Super Monterey, Craft-Air Windrifter, and Mark's Models Windfree. The Aquila has received lots of publicity as the winning model in the 1977 World Soaring Championships, but it carries the highest price tag of the lot. It also has a rounded fuselage, and probably should be built with spoilers and anti-vortex wing tips. I considered these features to be unnecessary complications at this stage of my sailplane activities.

I am sure that all these models would have satisfied my need for a good standard class model for advanced sailplane training. I finally settled on the Craft-Air Windrifter because I liked the polyhedral wing; because it has a respectable record in competitions; and lastly, because I was intrigued by the new high-tail version. I think the tail is really sexy, and the truth is that I always have been a tail man.

The Windrifter is an excellent kit, consisting of quality wood, full-sized plans and building instructions, and most of the required hardware. Tom Williams, the designer, states that it was not designed as a first sailplane for the beginner, but it is being recommended as a trainer by many dealers because it is easy to build, and the same inherent stability which makes it a winner also makes it easy to fly. He emphasizes the importance of following the plans and building light, and also indicates that spoilers have been tried and later discarded by many Windrifter owners.

My apologies, Tom, for not following your admonition to build the model as designed. The biggest change that I made was to use 1/32 plywood doublers to reinforce the fuselage from the trailing edge forward, rather than fiberglassing this area as called for in the plans. This change facilitates the use of plastic film covering, because films just do not work very well over fiberglass. Some other changes were the liberal use of triangular stock for fuselage and former reinforcement, diagonal bracing in the tail surfaces, and a piece of 3/16 square spruce facing on the stabilizer leading edge. The latter item stiffens the stabilizer, and will probably save me future repairs the first time that I hook the 27-inch span stabilizer while going through a 30-inch wide door frame. I paid the price for my modifications, because the finished model required three ounces of lead nose weight for proper balance.

I'm hooked on plastic film finishes. Their convenience and lighter weight make them hard to beat. My first such film was Monokote, and I have been using it ever since. I believe the Monokote ads when they say that it provides extra strength for covering open wing and frame structures. The light construction and large wing areas of a sailplane make this extra strength very desirable. The Windrifter was finished in the same black and transparent yellow color combination as the Windward.

The Windward was equipped with an EK positionable tow hook, but a power pod has been my primary source of altitude. I decided that, because of the added weight of a bigger model and the well-broken-in state of my Black Widow power pod, I would need a more powerful pod for the Windrifter. I had a spare Cox Tee Dee .049, and felt this would provide the necessary power assist to get the Windrifter up to cruising altitude. Construction of this new pod is similar to the first one, except that it has a cutout for a separate one-ounce gas tank, and uses a Kraft-Hayes engine mount to secure the Tee Dee.

Several years ago, I bought a four-channel Futaba R/C system, with the idea of using it for sailplanes and smaller two and three-channel models. I made sure that I got four servos. These servos now are handy for equipping my two sailplanes. You can permanently install two servos in each sailplane. It then takes only a few minutes to transfer the battery pack, receiver, and switch harness from one sailplane to the other. This can be done when packing your models for the trip to the flying field, or you can take both of them to the field and make the change there, if flying conditions favor the use of one sailplane over the other.

The Windrifter lived up to my expectations by being a fine-performing model. Hand gliding tests to check the model's tracking were successful, requiring only minor trim adjustments. I prevailed upon Tom Vincent to handle the transmitter for the first test flight. With a brand new engine, I was concerned that the model's flight responses might be sluggish, because of the

rich engine setting. After first making sure that the engine was running in the proper direction, I did the hand launching. A half-full tank was good for about 300 feet of altitude, and the Windrifter rewarded us with a 15-minute first flight. Several more such flights gave me hope that the Windrifter will provide the hour-long flight that I am still striving for.

THE THRILL OF IT ALL

My biggest thrill while flying sailplanes was the time that I picked up a thermal while on the base leg of a final approach. I worked the model up for another 12 minutes of flying time. I got a real sense of elation, because, after accepting defeat, I had temporarily triumphed in the constant battle of model and pilot against gravity. It's time like this that make it all worthwhile. •

Fuel Lines . . . . *Continued from page 55*

connections. DON'T OVERLOOK ANYTHING! TAKE NOTHING FOR GRANTED! The high tension lead from the coil to the spark plug should be isolated from all other wires and metal objects.

After assuring yourself that all electrical connections are sound and secure, you may wish to make a final check, using a voltmeter. With the ignition points open and the switch in the ON position, take a reading with your voltmeter across the stationary and movable points. If everything is as it should be, you should get a reading of 2.4 to 3.0 volts, depending on the batteries you are using. If you don't get this reading, recheck your wiring and the condition of your batteries. To take a check on the condition of the batteries, close the ignition points, and with the switch ON, take a reading across the output leads of the battery. A reading of at least 1.7 volts should register on the meter. If not, the batteries are probably weak and should be replaced or recharged.

Assuming that all of the above tests have proved satisfactory, the last step would be to check the condition of the spark. Remove the high tension lead from the spark plug and hold it about 1/16 of an inch from any surface of the engine. Using a small screwdriver, and with the ignition points open, make a momentary contact between the movable point and some part of the engine. A spark should jump from the end of the high tension lead to the surface of the engine. Oh yes; don't hold the high tension lead too near the exposed end, as you may get zapped when you make this test! Continue the test, holding the high tension lead further away each time. If everything is as it should be, a spark length of a 1/4 inch should be seen. If not, you probably have a weak ignition coil or faulty condenser. If so, replace these items and repeat the test.

A common mistake among modelers is to use electrical equipment manufactured forty years ago and expect it to perform on an equal basis with modern equipment. Ignition coils manufactured in the 1938 era are prone to have lost their wax sealant, and are therefore subject to internal wire breakage. It makes sense to rely on modern, high-quality equipment.

The next thing on your checklist should be the spark plug. If you get a good spark between the high tension lead and the surface, connect the spark plug to the lead and repeat the test, holding the spark plug body against the top of the cylinder head. Again, make contact across the ignition points with your small screwdriver. A healthy spark should be observed between the spark plug electrodes. Now, repeat this test by flipping the prop instead of using the screwdriver. The results should be the same. If there is no spark, or if it is intermittent, a close inspection of the ignition points is required. Contact points should be clean and have a gap of .008 to .012 inches. An excellent cleaner for

contact points is obtainable at most electronic stores in spray cans and is labeled "contact cleaner", and will be a compliment to your tool box.

Continued next month. •

ALDRICH

• Goodgoshamightydidjaseethatenginestartwithonlyabaddryconnectedtothesparkplug? Or, I'llbedamneddidjaseethatsunnybeachdoaloop'nflyupsidedown? There are many impressions indelibly etched in our modeling memory . . . like our first successful gas-powered flight . . . an Atom-powered Zipper A, O.O.S., but the word jammers that start our missive this month sit atop this modeler's fondest recollections.

As a wet-behind-the-ears kid so full of questions that none of the old fliers could stand him for long, everything that happened in the 1940's absolutely held me spellbound. How well we remember a 1946 contest in Laredo, Texas, where we saw Russell Snyder loop a "goat" Scientific Mercury with a rear-valve Contestor D-60. And a year or so later, the Corpus Christi boys flying bipes inverted. Everything was a mystery in those days. .Everything new was a distinct challenge.

Just about the time we got really proficient at wiring an ignition system, along came rumors of the boys back east running an engine on "Liquid Dynamite". Yeah, no coil, condensor, or batteries; nitromethane had hit the scene before the glow plug.

And then the first Arden glow plugs!

Gawd, what an innovation! Today, we wish we had kept our Aero Spark ignition packs, as with all our years of collecting, we've been unable to locate even one. I suppose they got thrown in the trash, because it was such a "breather" to use those first glow plugs. Methanol wasn't easy to get in those days, nor was good degummed castor oil.

Our first fuel was just three parts methanol, one part castor, and about 5% ether thrown in to keep it running. Some engines, such as the Orwick .64, had very high compression, too high for glow operation. Others were too low on compression, and would quit when the battery was removed. White gasoline and 70 wt. oil would work fine if nitro propane was added. Very few knew about nitromethane, and those who did, kept quiet, as they had a real advantage.

In those days, nitromethane sold for about $.15 or $.20 per pound. This meant only $100 or so for 55 gallons. Today, modelers are faced with tremendous rises in fuel costs.

To give you an insight, consider how the nitro paraffins are made. Basically, propane is elevated to 450°F., and under pressure, sprayed with a mist of nitric acid. The result is nitro propane No. 1 and No. 2, nitroethane, and nitromethane. Nitromethane delivers the greatest amount of power per unit, followed by nitroethane, and so on. Through distillation processes, these nitros are separated to various degrees of purity. The nitromethane we use today in the model fuel industry is around 95% pure, with the 5% containing a mixture of nitro propanes and nitroethane. Absolute, or 100% pure nitromethane would really be out of sight, pricewise.

Let's go back to that 20 cents per pound price for nitro in the 1940's. Even in the 1950's, it was below 30 cents per pound. Unfortunately, there is now but one source for nitromethane. Originally, it was produced by Commercial Solvents Corp., then about 5 years ago this company was sold or absorbed. Our only source for the nitro paraffins today is the IMC Chemical Group, Inc. Along with this change in company names came absolutely unreal price increases. In the past year, nitromethane has gone up $145 per drum . . . an increase of more than a whole drum cost in 1952! Some

manufacturers may have a reserve supply of nitromethane on hand, but when it is gone, they are at the mercy of a one-source supplier, and you, the modeler, must bear the burden. If increases keep on at the present rate, $20 or more per gallon for a 10% or 15% nitro content fuel will not be far away.

In view of the above, a no-nitro fuel doesn't look so bad. Our European brothers were forced to this solution years ago. Because of so-called FAI fuel and very negative action by the AMA contest boards in 1968, the Europeans have led the way in the development of the tuned pipe. We now have some really fine engines being produced that utilize the tuned exhaust system, not only as a power-boosting source, but as an excellent muffler.

In 1960, Bill Wisniewski won the World C/L Championships using a tuned pipe. Now, 18 years later, we wake up to the fact that he started the "answer" to many of our problems today. Perhaps it is time we all wake up to today's needs today, and not wait 18 more years to discover that *we are in trouble.* •

Soaring . . . . . *Continued from page 47*

second day, and flying was great. A 12-volt electric winch was used to carry the larger planes aloft. Joe Newland's Kestrel weighed eight pounds. He chose to move the radio rearward to make room for a full-depth cockpit; this required adding two pounds of lead to the nose. He traded appearance for added stress during takeoff and landing. The two Kestrels flew well and thermaled appropriately, but it takes a lot to properly judge their distance, especially on final approach. Ray and I launched ROG (right off the ground) . . . it's more scale-like, and seems more secure when handling a large plane. Remember, on launch you only gain stability after exceeding stall speed. It's hard to accelerate a six-pound weight fast enough, even with the help of the winch.

When the chips were in, Jon Lowe walked off with first place overall. Throughout the contest, there was a strong feeling of good fellowship and mutual respect . . . a precious commodity in today's world.

You may recall my mention of Al Nagele's LNG 3100. On my request, he provided further information: "The original concept for this plane was derived from a design shown in the August 1977 issue of *Model Airplane News* (John Hoover's "Vill Doo"). This design reflects some earlier experimentation by A.M. Pippish and John Hoover. Intrigued by the concept of the terraced wing, I decided to try a design of my own to see if it really works. My wing is flat-bottomed, and is similar to the Clark Y in cross section. The chord is 7-1/2 inches at the root, and each wing panel is 59 inches long. The terraces are similar to John's, but slightly smaller so as to fit the narrower chord. Specifically, the steps are 0.1, 0.08, and 0.06 inches, respectively, as you move toward the trailing edge. Each terrace is 1-7/8 inches wide.

"The fuselage was designed for minimal frontal area, and uses an in-line servo arrangement with a mechanical aluminum mixer to operate the V-tail. It was constructed of 3/16-inch balsa strips laid lengthwise over bulkheads every six inches, much like barrel staves.

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MEMBERSHIP APPLICATION

DUES ARE AS FOLLOWS:

Individual: $10.00 Family: $15.00
(Any Senior or Open AMA member and any of his immediate family who are also AMA members.)

Junior: $5.00 (Any Junior AMA member)

Each member or family automatically receives a subscription to the society publication SAILPLANE, starting with the dues an first issue published after payment of dues and continuing thereafter through the membership year.

Dues are payable prior to December 31st of each year for the ensuing year.

In the event a member joins during the dues year, he shall submit dues as follows: between Dec. 1 and June 30, full annual fee; between July 1 and Nov. 30, one-half the annual fee. Members joining during December of a year shall also be members of ensuing year.

These were then sanded to about 1/8-inch thickness, the gaps filled, and then painted. The V-tail is similar to John's, but the chord and span have been reduced, and the control cranks have been completely enclosed in the fuselage. The ready-to-fly weight is 45 ounces, and the initial flight of this craft was very promising."

I hope this description will inspire some of you designer-types to try your own hand at a terraced-winged craft. I guess the real test would be to build two identical wings; one with terraces, one without, and then fly the craft with one on each side, and note the amount of offset required to balance any tendency for the plane to roll, due to the difference in wing efficiency. Any comments?

There are many ways to launch a sailplane: hi-start, winch, power pod, tow plane . . . and even piggyback. Dick Eagle, of Chula Vista, devised and constructed such a mobile launching pad. His "Flying Atlas" can be adjusted to hold sailplanes of various size. Rubber bands secure the wing until he chooses the proper point for release of the glider.

I had to try this one myself. I first used a Windfree, then later noted that his rig would easily handle the Olympic 650, Avatar I, or larger sailplanes. After checking alignment, he taxied the "biplane" to the takeoff point, gunned the engine, and after a smooth roll, lifted off into a spiral climb. I expected him to release the glider at low altitude, but Dick was intent upon providing me with a long, free ride, and so separation took place at about 500 feet. I spend little time around power plane pilots, but this gave me a new excuse to visit their site. While in the air, I'm torn between wanting to ride that thermal and getting the frequency clip back into their hands.

There have been some other happenings on the San Diego scene. Roger Taylor has come up with a modified Aquila that really moves out. He uses semi-symmetrical inboard panels, counting upon the increased Reynolds Number for greater efficiency. A number of our best pilots have now flown this bird and speak highly of it. Perhaps this concept is worth trying on other aircraft.

Mack McDowell converted his Wanderer into an aerial reconnaissance platform. He cut a hole in the fuselage and mounted his Minolta 16 still camera, which is actuated by an extreme throw of the elevator. You get only one shot per flight, but the results are interesting, and provide a multiple mission for the Wanderer.

Al Doig solved the problem of tearing up the wing at the polyhedral joints when you land on rough terrain. He simply bent 1/16-inch wire to encircle the wing wies at the polyhedral joint and protrude under the wing in a neat arc. When the wing panels are taped together, the wires are held in place. It's simple and prevents unnecessary heartache.

Dan Crum wondered how well the Mach I would fly as a slope soarer. He added six inches to each wing panel and replaced the engine with a pound of lead. Here's a new, fast, formidable flying object in the skies over Torrey Pines. It's fully aerobatic and beautiful in its performance.

Murph Misiewicz, of Encinitas, California, built the Windspiel Fokker FK3. This kit is not for the beginner, but his effort and skill is really well worth the result. This 1/6 stand-off scale sailplane weighs in at 48 ounces. Wingspan is 128 inches. Wing area is 750 square inches, with an aspect ratio of 21.85. The tail section reflects similar high aspect ratio. Murph chose to install Magnum 12 spoilers in the wing. These provide smooth descent for landing.

The fuselage is molded in high-quality fiberglass. A primer coat was covered with classic white to set the stage for realistic decoration. In flight, this ship responds well, and there's no flutter, even in a terminal dive. Here's a good thermal ship for the advanced flier.

Roger Sanders, of Atwater, California, has designed two new birds worthy of your attention. The first is derived from the Ridge Runner, and is really a sleek slope soarer. The stab is of solid C-grain balsa, and there's no flutter at high speed. You can add weight at the CG by pouring mercury (which is denser than lead) into the small amount of room left unfilled in the fuselage. Using the same building technique, Roger has put together an amazing flying wing, which he calls the Windfreak. Here again, the servos are in line, and the construction fits like a glove. Here's wishing him well with his new creation.

For those who appreciate valuable reading material, may I recommend *Jane's Pocketbook of Re-*

motely Powered Vehicles: Robot Aircraft Today, by Jane Taylor and Ken Munson, McMillan Publishing Co., 1977. This book traces the development of radio-controlled aircraft, from the original work of Professor A.M. Low, in WWI, to today's RPV's. The book is a wealth of ideas bound to stimulate your imagination.

May I also call to your attention the valuable R/C Soaring, San Diego Area Handbook. It's crammed full of fundamental information for the beginner, and has good words of advice for those more advanced. It deserves to be in your library. You can obtain a copy for $2 (covering the cost, postage, and handling) by ordering directly from the Torrey Pines Gulls Radio Control Soaring Society, P.O. Box 1564, La Jolla, CA 92037. •

Electric . . . . . *Continued from page 65*

on the motor and drops the current back to a normal level (usually 8 to 10 amperes on the ground). The net result, if extra cells are added, is more power, but with a smaller prop and at higher rpm. This is sort of like adding nitro to make racing engines gain rpm; in our case, voltage takes the place of nitro. Remember, if you add voltage, go to a smaller prop, or you could burn out the motor. Anyhow, with the smaller prop, the motor pylon can be shortened on seaplanes, which makes adjustment easier. Congratulations, Neil, on some really fine work.

As far as I know, the Astro Sport is the first electric float plane to ROW. Let me know if there are others! The smallest electric seaplane I know of is my Electric Tern, which I designed and flew for the Boeing Hawks' Model Air Fair, in June of 1976. It weighed 18 oz. with a Cannon super-mini two-channel and an Astro 020. It handled well on the water and flew very well, but I never did try an ROW. For that matter, I have never heard of an R/C model powered by a Cox .020 that would ROW, though free flight ones have. The Model Air Fair was at the Seattle Science Center, and it was a real challenge to fly there, as the flying site was a fountain pond surrounded by the Science Center buildings. On one flight, a downdraft set the plane on the roof of one of the buildings, which rated a story in one of the local papers; "Mitch Poling's story in one of the Science Center Roof!". The Hawks were pleased . . . it gave them publicity for the Air Fair! Charge up and fly high! •

Choppers . . . . *Continued on page 41*

the midpoint of the lever travel the gear starts up. So, with the lever full forward, the gear is up and the prop is in full forward pitch. It's not ideal . . . but you make do with what you have!

"Another unusual feature of this machine is that the gyro has 100% authority over the rotor, as in the full-size Cheyenne. The transmitter controls the gyro by *force* inputs (not displacement), and the gyro "flies" the rotor. In the event the rotor tip-path-plane is displaced (by a gust, for example) the gyro maintains its original position in space long enough to provide a closed-loop feedback connective signal to the rotor, thus providing exceptional stability.

FLIGHT CHARACTERISTICS

"The first flight was on June 14, 1977. To date, the Cheyenne has around 26 flights totaling about 3 hours. The narrow gear, surprisingly enough, is not a problem as long as the cyclic is kept centered until ready for lift-off. You might be interested in knowing that the full-size Cheyennes had cyclic-stick *centering locks* which remained *on* until the rotor was up to operating speed.

"DIRECTIONAL CONTROL is no problem. The high yaw inertia of the fuselage apparently helps to minimize directional nervousness. COLLECTIVE CONTROL is solid and responsive. PROPELLER CONTROL . . . well, what is there to compare it to? No problem so far.

"CYCLIC CONTROL: The machine is exceptionally stable, being capable of IGE hover hands off for 3 to 4 seconds (this may be more a measure of John's bravery than the model's stability, I don't know). The cyclic sensitivity is marginally acceptable, at least for the present, but I personally prefer a very crisp response . . . almost to the point where the transmitter input is a 'suggestion' rather than a move-

ment of the stick. To achieve this, I'm looking for more powerful servos (I hope I can find some).

"I think the striking flight characteristic of the Cheyenne is the smooth, solid grace with which it moves. This is obviously a reflect of John's expertise, but also, because the four-bladed rotor becomes an enormous gyro, and because the fuselage is solidly mounted to it rather than dangling below it like a pendulum, the airframe is not subject to the short-period swinging oscillations observed in most R/C helicopters to date.

FORWARD FLIGHT

We have had it up to about 40 mph (estimated) and it has shown no tendencies to tuck, pitch, or spiral in. Even during a high-speed throttle chop, there is no appreciable pitch-up tendency as experienced with all other rigid rotors, unless they have closed-loop stability feedback. Incidentally, the rotors tend to pitch up during a high-speed throttle chop because of a combination of positive speed stability and negative angle of attack stability . . . *not* due to 'tip stall', as is often declared!

"Because of the model's extreme complexity, involving a number of untried concepts, flight testing is progressing cautiously. John Minasian has done all the flying to date (I don't trust myself). He has done a terrific job, and I'm thankful for his expertise and patience.

"Because I have had about 20 years' experience flight testing full-size helicopters (including the Cheyennes), it was only natural that we approach the model program the same way, and it has paid off. Before each flight, I brief John on any design changes and their predicted flight characteristics. After each flying session we sit down over coffee and discuss every aspect of the flights, which includes taking notes for possible additional mods (if required).

"Right now, I'm working to improve the cyclic sensitivity. After that, we're going to look into the autorotation characteristics again. It may open a whole new world in R/C helicopters!"

Don, thanks a million for the detailed report and fine photography. And thanks to John Minasian, too, for his efforts in coordinating this report. We hope to hear more about the Cheyenne in future issues!

HUGHES 500 REVISTED

While we were looking over the incoming mail, one letter stood out, since it concerned the dome on John Simone's rigid rotor helicopter. Rodney Taylor, Manager-Advanced Planning for Hughes Helicopters, did his bit and thoroughly explained the reason for the dome . . . I think you'll find his letter quite amusing and very informative.

"Dear John:

I just finished reading your column in the August issue, where you commented on the dome-shaped fairing on John Simone's helicopter and mentioned seeing a similar fairing on a Hughes 500 helicopter. You wondered whether it was done for looks. Perhaps I can answer your question, since I was the Project Engineer on the Model 500D helicopter during its development.

"You are not alone in wondering whether or not it was done for looks. One observer thought the helicopter might be of Jewish extraction, since he referred to the fairing as a 'Yarmulke' (a Jewish skull cap). Since I am a Mormon, I can assure you that religion had nothing to do with it either.

"Seriously, the fairing has a special purpose in smoothing the air flow over the rotor hub to prevent buffeting of the tail surfaces. If you are familiar with the Hughes 500 series, you will recall that all models up through the 500C incorporated a 'butterfly' tail . . . upper and lower vertical fins with an asymmetrical horizontal stabilizer opposite the tail rotor, and set at a high diherdral angle. Although these tail surfaces functioned satisfactorily, a visual signature was desired to set the 'D' model apart from its predecessors, and the T-tail was born . . . the horizontal stabilizer is now mounted symmetrically on top of the vertical fin. Incidentally, this configuration also provided some improvements in handling qualities in certain flight regimes.

"During the first flight tests of the 500D, a random lateral-directional (roll & yaw) oscillation was experienced in the speed range of 80-120 knots. The magnitude of the disturbance was sufficient to be uncomfortable, and was a bit disconcerting. After analyzing the problem, we theorized that the tail surfaces were flying through the shed vortices of the blade tips and the wake behind the main rotor hub. In an attempt to either cure the problem or at least learn more of its nature, the incidence angle of the horizontal stabilizer was lowered (nose down). This is a fixed stabilizer, not controllable in flight. The purpose was to cause the tail to fly lower, hopefully low enough to avoid the disturbed air.

"Flight testing helped confirm our

assumption that the phenomenon was rotorwake striking the tail, but the new stabilizer incidence did not cure the problem. It only changed the speed range where the problem appeared. Realizing that we would not be able to avoid the rotorwake, the next approach was to reduce the disturbance from the rotor hub.

"A fairing resembling an inverted salad bowl was designed and installed, in spite of the skepticism of the flight test department (Sometimes helicopters defy reason and analysis). Happily, after flying the helicopter with the fairing installed, the problem all but disappeared.

"I enjoy your monthly blurb even though my modeling activities do not include R/C helicopters. I fly sport power and sailplanes mostly, but have an eye for John Pond's Old Timer activity, having cut my teeth on those birds as a kid. If I can be any assistance technically, please let me know.

"I hope this clears up the hub fairing question."

FINAL APPROACH

Rod, thank you much for your letter . . . it did me a world of good to get the right info on that dome situation. Between you and Don Lodge, I got off easy on this issue, and didn't have to write until the wee hours of the morning! Hopefully, more good stuff will be coming up next month. Until then, BCNU.

●

Power Boats . . *Continued from page 71*

much like a kit review, and I don't plan to spend time in this article dwelling on the different phases of getting the Excaliber II out of the shipping box and into the water.

There is one item in the instructions, however, that I'd like to emphasize. For maximum performance, the K&B Auto Trim is a must with the Excaliber II. This little device allows for so many variations of engine settings that it is well worth the price. I use one on all my outboards. Something new that K&B has come out with since we wrote the plans is a Throttle Control kit. This is a neat package that includes the necessary tubing, cable, linkages, and parts to connect the throttle servo to the exhaust throttle on the K&B .21 Outboard.

I suppose one of the most important parts of any kit review is that part telling how the product works. I've had the opportunity to watch the progress of the Excaliber II during the first half of our outboard racing season, and the results have been quite good. The boat has won a good share of trophies at outboard tunnel events around our district. The boat can be made to run very respectfully. I'll just cite what I feel is its most significant achievement this year. At the 1978 R/C Boating Championships, held in early August at Kent, Washington, Vic Drew placed second overall out of 39 entries in the Outboard Tunnel Class. Those 39 entries marked the greatest number of outboard tunnels ever raced as a class. Vic piloted his Excaliber II to second in the enduros, third in heat racing, and third fastest qualifier. He also accumulated the highest single lap count for one five-minute enduro, with 11-3/4 laps. Another Excaliber II, raced by Curt Weston, tied for third place honors but lost in a run-off, taking fourth place overall. It was the only commercially-available boat to place in the top five. We're very pleased with the accomplishments of the Excaliber II. It has scale appearance and has proven it can run with the best of them. ●

R/C Forum . . . *Continued from page 31*

the county, and the population will have to understand it. You see, we R/C'ers DO HAVE RIGHTS, just as the rest of the idiots in the county do!

2) Appoint a "field committee" of two members from the group that first met with the Commissioner. These two should carry the ball through to completion. They are the *only* members to be in contact with the county. It is important to show leadership and not create any confusion.

3) The club should compile a dossier for presentaion to the county. At least 5 separate copies should be provided. There will be a number of officials who should have a copy as things proceed. The dossier does not have to be fancy, but it should be compiled in an orderly, neat, and easy-to-read-and-understand manner. The dossier should contain, in the following order:

A) A brief history of model aviation (probably obtainable from the AMA).

B) A brief history of the local clubs involved in the county. If there is more than one club in the county, be *sure* to include them all. The facility will be for *all* county modelers.

C) A statement of the numbers of people involved in model aviation . . . worldwide, nationwide, county-wide. Note that we said *modelers*, not just R/C'ers. *All* modelers have *some* interest in R/C. How many modelers are there? AMA has stated that its membership probably represents about 1/100th of the *active* modelers in the country. To this you have to add those with a "sometimes" interest . . . even the guy who puts together a few plastic kits is a modeler, and might show more interest if he was aware of all the possibilities. It has been said that it takes at least 1500 good customers to keep *one* full-size hobby shop operating. The point is that your club only represents a small portion of the county's population interested in modeling.

D) A statement of the nationally known people who are modelers. Examples: Neil Armstrong, President Ford, Orville and Wilbur Wright, etc. You probably have some locally prominent people to add to the list (doctors, lawyers,etc.).

E) A brief description of R/C and what it is. Tell in *layman's* terms how a model operates, what can be done with it, and include references to R/C and its use outside of the hobby (government and industrial uses, as an example).

F) Describe exactly what is needed for an R/C field facility. Do *not* minimize the requirements and/or needs. Describe exactly what you would consider to be the finest possible, including support facilities such as rest rooms and shelters. Remember that you can always cut back, but it can be difficult to add on later. Also, you will find that the bigger a project is, the more interested officials will be!

G) Do some research to find information about other government model facilities. Much has been written about such things in the magazines over the years. Clip out anything you find about the subject, no matter how small. Pictures are good. Index the clippings with the magazine name and date. At the end of this section, list all the magazines mentioned and the number of copies published each month. As further information, include the names of all other model publications.

H) To close your dossier, obtain a letter of support from a local politician . . . preferably two letters, one from a politician in each party.

To conclude this discussion: Do not expect immediate action . . . it takes time to get the wheels in motion. Do not be discouraged.

Keep an optomistic view. You will not be turned down coldly, but you may be put off. If you are put off, the door will be left open in some manner; FOLLOW UP ON IT. Be very prompt in providing any additional information asked for, doing any research requested, and in keeping all dates. You will be judged by your response to requests from the officials. Above all, remember that there is precedent showing that you are entitled to a facility for modeling. It is something which your county should provide; and you and your club should be the ones to create it. Just a little effort is required!

We received a very nice letter from Keith Carlson, of Lathrup Village, Mich. Keith has some nice things to say about the R/C Forum (Thanks!!!) and also has some servo questions. Apparently, Keith realizes that when you use cable controls attached directly to the servo, you impose a load on the servo that it was not designed for. I had to refer him to the September issue column, which covered isolating servos via walking beams, which, of course, is the ideal servo mounting for *all* reasons. However, remember that we get away without walking beams regularly, so the word "ideal" is important. Apparently, Keith has no room for walking beams, and asks if the use of the new "ball bearing" servos would not do just as well. From what I have seen to date, the answer would be that the ball bearings do not solve the problem. Mechanically, it would require an output shaft supported by *two* bearings some distance apart. Bearings have some play in them, thus the load would simply twist the bearing and be applied to whatever other structure there was to support the shaft. From what can be visualized here, all the bearing does, as it is now being used, is to reduce the friction of the output shaft. At the output of an extensive gear train, such a friction reduction advantage is questionable when compared to a good-fitting sleeve bearing, as is normally used.

Keith is also concerned about the servo pot problem we discussed some issues back. His question is whether these faulty pots can be found in both domestic and foreign equipment. My answer was that they have been seen in *all* domestic brands. I cannot speak for the foreign equipment.

Keith has also had a problem with some "mail order" servos that he purchased; they did not operate as advertised. My answer here is that such problems are between the manufacturer and the purchaser, and really not a subject for this column. It is interesting to know that the servos did not come up to the claim made for them, and that there has been a problem getting help from the manufacturer. I feel safe in saying that, had these servos been purchased from *any* of the regular (name brand) radio manufacturers, his problem would have been resolved.

To close this month, some interesting sidelights from my own flying so far this season. As members of the R/C fraternity, I think it is important that, when we delve into something a bit off the beaten path in R/C, we should let others know what we find out, how much fun we have had, and whether any good came from it. This column will be open to all such information, and if you will provide it, we can be the vehicle to pass it along for the benefit of others.

As you may have noted in *Model Aviation*, I have a full-blown pattern bird flying with one of the new .40 pattern engines. The M.A. story tells it all, but I do want to say that the project has proven to be a complete success, and the performance is even better than anticipated. If you are concerned with the problems mentioned, you will find this approach to be an excellent answer.

Otherwise, I have been continuing my propeller research, with some most interesting results. Again, the basic material has been presented in *Model Aviation*. If you have followed it, you know that there can be considerable improvement in propeller design, principally by reducing drag. Of interest at this time is that I have been able to be competitive in Formula I while using drastically *larger* propellers than is normal. Props with much wider blades, greater diameters, and even higher pitches have proven to be, at the very least, equal to the normal. At this time, some success has been had with props as large as an 11-7, using blades 25% wider than is normal. Ten-inch diameters have been proven repeatedly with wide blades and up to 7-3/4 inches of pitch. The point is, these have been one-of-a-kind attempts, and yet successful. Who knows what can lie on the other side of the mountain, after some experience has been gained?

One of the problems encountered with these large propellers is matching the performance of the engine to them. With the large reduction in drag, we have seen a combined "unloading" figure for the engine and the prop, which amounts to 60%

of the static rpm. Such a drastic in-air increase in rpm requires an equally drastic increase in fuel flow to accomplish it. This appears to be more than the normal fuel system can provide. If you would like to simulate the problem, run up an engine with a prop that allows 20 thousand or more rpm statically, and peak it out. Replace that prop with one which will only allow a peak of 15 thousand rpm. Without touching the needle valve, you will note that when the engine is started, it will be far too rich; to peak it out, you will have to greatly reduce the fuel flow. Our fuel system is obviously not linear to the rpm.

As of this writing, some flights have been made with a carburetor that provides in-flight fuel flow control. In other words, to compensate for an inadequate fuel system, an attempt is made to make adjustments in the air. I think that the results so far show much potential . . . you *can have* an in-air adjustable system. We have not yet obtained the full potential from it, as mechanical problems installing it in the available aircraft have not allowed its full ability to be used. Even at best, it appears to be just a stop-gap measure. What is *really* needed is a better fuel system, one which will compensate for the loads an engine encounters, and, of course, the great changes in engine rpm. It would be wonderful to just set a carburetor at peak power on the ground and to *know* that, as far as fuel flow is concerned, the engine will have all it needs, no matter how conditions change in the air! Anyone out there have any experience, or even ideas?

We have more letters but no more space this time. We have enjoyed receiving and answering them. We will be using them in future columns, and we would appreciate hearing from *you* also! The address is 49 Golden Court, Buffalo, N.Y. 14225.

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F/F . . . . . *Continued from page 89*

doing free flight model coverings. K&B once made a very good product, but they have quit the market.

Once you could order Flo-Cote to do the job, but . . . wait! You still can. Try Bob Ellington, United Modelers, 2913 Edwards Ave., Bakersfield, CA 93306. Cost is $3.50 per quart, plus 50¢ postage. It's an excellent product.

IN CLOSING

The next issue of **Model Builder**, December, 1978, will be the completion of my fifth year at the helm of the column. It will also be my last. I hope to be able to review some of the developments and changes in the free flight sport and hobby next month. In the meantime, if you have the usual cards and letters to send to the Free Flight editor of **Model Builder**, mail them to Tom Hutchinson, 3255 N.W. Crocker Lane, Albany, OR 97321. Tom will be taking on the column beginning with the January, 1979 issue. •

R/C Auto . . . . *Continued from page 67*

the front of Car I. Put it as low as possible, so that essentially no weight shifts to the rear. Acceleration drops to 1.17 g's, and the weight shift is .98 lbs. . . so now the load is 3.98 lbs. on the rear, there is a 6.37-lb. force limit, and a 2.14-lb. side force limit for .71 g. At the front, the tire load is 1.15 lbs., and side force capability is (1.15 x 1.6 x .7) 1.69 lbs., for a side acceleration of .79 g. So, for just 2 ozs. of weight increase, we lost less than 3% of the acceleration capability, but picked up 27% (.71 g compared to .56 g) in turning capability under hard acceleration. The car oversteers a little, however, and we have to be somewhat careful.

Again, look at the big potential performance change for a minor weight shift. I tried adding a little weight to the front end at the last McCoy race at Thorp Raceway, because I was having an acceleration understeer problem in the sweeper going into the back straight. About 1 oz. was added, and there was a noticeable change for the better . . . not a bad trade-off! In fact, this is better than Car II. And, we see that a little heavier car is OK, if the weight is in the right place.

Next, let's keep the weight of Car I at 5 lbs., but lower the CG .060 in. Again accelerating at 1.2 g, the weight shift will now be (5 x 1.2 x 1.94/12) or .97 lb. The rear tire load is 3.97 lbs., force limit is 6.35 lbs., and the side force limit is 2.09 lbs., for a side acceleration capability of .70 g. The front tire load is 1.03 lbs., side force limit is (1.03 x 1.6 x .7) 1.15 lbs., and the side turning capability is .58 g. The .060-inch CG lowering improved cornering ability about 4%. Lowering the CG another .060 inch changes the rear side acceleration capability to .64 g, and the front to .60 g . . . so, from the original Car I, we have a 7% (.56 g to .60 g) improvement in cornering limit, and the car still understeers a little. More lowering of the CG will cause power oversteer, and we'll have to back off the throttle to keep from spinnning out.

Table I summarizes most of the

above calculations. Notice that adding 2 ozs. of weight to Car I had more improvement than either fore/aft or vertical CG location. A little heavier car may not be all bad, if the weight is in the right place.

All the foregoing calculations are very idealized and have been neglecting the sideways (lateral) weight shift. The above results probably still show actual trends . . . but possibly not for the exact CG or weight changes.

Now let's look at lateral (sideways) weight shift. Assume that our car has a track width (to tire centerline) of about 8 inches at the rear, and about 8.5 inches at the front (we'll use the 8-inch track width). Also, assume that the car will corner at .8 g (calculations are easier for this "g") under constant velocity conditions. The weight shift will be (5 x .8 x 2/8) 1 lb. (see Fig. 2). For our typical car (Car I), about 60% of this weight shift is at the rear (.6 lb.) and 40% at the front (.4 lb.). From the earlier article on tires and weight distribution, we know that the cornering force will be greatest if the front and rear tire weights are as close to equal as possible; therefore, the above weight shift certainly hurts cornering ability. The approximate tire loads during cornering are .6 lb. inside front, 1.4 lbs. outside front, .9 lb. inside rear, and 2.1 lbs. outside rear.

If the above were an Indy car, we could shift some weight to the inside to compensate for the weight transfer during cornering. Let us suppose we could shift the CG one inch toward the inside. Under static conditions, the rear tire loads are (see Fig. 3):

Inside rear: 3 in. x 5 in./8 in.= 1.875 lbs. Outside rear: 3 in. x 3 in./8 in. = 1.125 lbs. Inside front: 2 in. x 5 in./8 in. = 1.25 lbs. Outside front: 2 in. x 3 in./8 in. = .75 lbs.

Table II summarizes the tire load calculations for both the centerline CG and the 1-inch inside offset CG under both static and .8 g cornering conditions. If the car were cornering at a more believable "g" value (.6 to .7), the inside/outside tire loads would be more equal. I worked a lot to shift the CG of my Indy oval car to the inside, but only managed to get the CG over only about 1/2 inch. There is no need to go further than the 1-inch shift.

Now, let's go to our old tire traction chart and see what the cornering forces and "g's" are for the CG and the 1-inch inside shift. For purposes of this set of calculations, let us assume the front tire compound has 0.7 of the capability of the rear and the relative load on the front tires is more than on the rears (2 lb./1.5 in. = 1.33, compared to 3/2.5 = 1.02). To be able to use the chart, we will multiply all the tire loads by 500 (about 8 cubed), to convert from 1.8 to full scale, and the front weights will be multiplied by 1.33; the resulting side forces will be divided by 1.33 to compensate for the relatively narrow tires, and then multiplied by .7 for tire compound difference. The results will be divided by 500 to get them back to our scale (1/8) again.

Table III summarizes the calculations and results for these assumptions when used with both a centerline CG and a 1-inch inside CG shift. An assumption that is part of the tire side force curves is that there is no acceleration or braking forces on the tire. The 12° tire slip curve was used. Looking at the results of the front and rear side "g" capability, note that the 1-inch inside CG improved the cornering ability over the centerline CG by only 4.8% . . . a relatively small amount. On my Indy oval car, everything heavy is positioned as far to the left as possible. The CG is only shifted about a 1/2 inch to the inside of the car centerline, but the cornering force should be about 2% better than a centered-CG car. Two

percent doesn't sound like much . . . but if we can pick up just a little, the car will really be better.

Another thing we have to consider is that when power is applied at the rear wheels, side force capability is reduced. We know that all (well, almost all) Indy oval cars have a tendency toward power oversteer. A slight improvement in rear traction, particularly the lightly-loaded inside rear wheel, may make a much bigger difference in true cornering ability.

For example, the inside rear wheel side force in the above calculations for centerline CG and 1-inch inside shift CG was .99 lb. and 1.24 lbs., respectively. One would expect that, for the same side force contribution of this tire, much more power can be applied before it begins to slip. The power application improvement before slip may be as much as 10 to 20 percent. This means the oversteer acceleration, or speed condition in cornering has improved considerably. The .5-inch CG shift that my Indy car has might give 5% to 10% more acceleration or side "g" capability before the car goes into power oversteer. Now that's more like it!

Now, in road race cars, we have to use a little more discretion in shifting weight sideways, because the car has to turn both right and left. The big decision is how much to favor one direction over the other, and what are the real effects on the overall car performance. To test some of these ideas, I constructed a car with the engine shifted to the right about .8 in., and moved the CG about .2 in. further to the rear. What happened?

On pretty high traction tracks, the car now has power understeer on mid-speed accelerating right turns, and some power oversteer on left turns. Also, the car seems to be a little harder to turn when accelerating than previously. Now I have to enhance right turning a little more than usual by means of rear tire stagger (bigger tire diameter on left side) and heavier right front tire loading. With these adjustments, the car seems to be more appropriately balanced. In other words, the car handling has changed about the way expected . . . but now, compensation has to be added to bring the car back toward more balanced handling. So, all that was accomplished was to show how car handling changes with CG shifts. But then, that's sort of what I started to do.

OK, now let's have a quick summary of CG locations, or shifts, and their effects on car handling. Realize that all the calculations that were made were approximations, and values may not be correct . . . but the trends are probably OK.

FORE/AFT CG SHIFTS

Toward the rear: tends to give power understeer when accelerating; best to use on slippery tracks; turns well under coasting and braking.

Toward the front: tends to give power oversteer when accelerating; some forward shift OK on high-traction tracks; turns good when coasting but may tend to oversteer under braking.

VERTICAL CG CHANGES (SIDE HEIGHT)

Raising: more weight transfer to rear wheels when accelerating; tends to give power understeer when accelerating; more side-to-side weight transfer when cornering; tends to reduce cornering ability at steady speeds; tends to give oversteer when braking.

Lowering: less weight transfer to rear when accelerating; tends to give power oversteer when accelerating; less side weight transfer; tends to improve cornering ability at steady speeds or braking.

LATERAL CG SHIFT

Tends to improve cornering ability in direction of weight shift (e.g., right cornering improved if weight shifted to right); reduces cornering ability in opposite direction; tends to give power understeer when turning in direction of weight shift; tends to give power oversteer in opposite direction. Probably beneficial in Indy oval cars; of questionable value in road cars.

Well, now you know as much as I do . . . probably more, if you really understood what the heck was said. Now can you understand why some of the cars perform the way they do? You might also understand better why some racers juggle things around and make certain adjustments. But, in the end, I hope it helps you get your car going better on a given track.

I'm not quite ready to explain some of the car layouts presented in past articles. I have to get back to car aerodynamics for an update first. "Car Aerodynamics: Revisted" will be my next technical article. If you have any questions, don't write . . . but if you want to straighten me out or make comments, please write: Chuck Hallum, 18276 Foxglove Way, Irvine, CA 92715. •

Nats Pylon . . . *Continued from page 39*

Tigre still seems to have a very slight edge, at least in numbers. Planes? Looks like the Polecat is beginning to do a number on the Little Toni.

Fuel? Amazingly enough, there seemed to be a lot less problems with high nitro than there were last year at Riverside; this, despite the much higher humidity at Lake Charles. From those we talked to,

generous head spacing was the reason so many seemed to be running so well.

On the unfortunate side, there were two mid-airs and four augerins. On the brighter side, Irwin Funderburk, of Monroe, North Carolina, turned the fast time of 1:13.8. Californians took the top three places. Ron Schorr was number one, with 27 points. He also took top honors in appearance for the beautiful work on his Polecat. Dave Shadel and Bob Smith both had 26's. Our vote for the top sportsman goes to Bob Smith. When approached about a fly-off with Dave, he said, "No, give it to Dave, we're a team."

We'll close out with one more statistic. There were 43 contestants in Formula One. Here are the scores of the top 25 in Open, plus the Junior and Seniors. Can't help commenting that Junior Drew Telford tied Open flier Bob Violett.

OPEN

1. Ronald Schorr 27
2. David Shadel 26
3. Bob Smith 26
4. Gregory Doe 24
5. John McDermott 24
6. Bruce Richmond 24
7. Robert Brogdon 23
8. David Pearce 23
9. Jeff Bertken 22
10. Bob Reuther 22
11. C.I. Funderburk 20
12. William Preis 20
13. Tim Edwards 19
14. John Brodbeck 19
15. Thomas Baker 19
16. Gale Helms 19
17. Cliff Telford 18
18. Dennis Grady 18
19. Robert Barrett 18
20. Jennings-Rippy Team 18
21. Thomas Christopher 16
22. James Stafford 16
23. Don Downing 16
24. Bill Hager 15
25. Robert Violett 14

JUNIOR

1. Drew Telford 14

SENIOR

1. Steve Barrett 13
2. Tom Giertz 6

●

Travel Air ..... *Continued on page 21*

to the rear edge of the fin. Now you can put in the scale hinges, as per plan, or use the hinges you like best. As for the moving stab, I think there is nothing like it . . . try it, you'll like it. Glue stab into place; now you can put the remaining top stringers on.

I don't think there will be any problems building the wings as per the plan. The top wing has no dihedral. The front spars are 3/16 sq. spruce, and the rear spars are 3/8 x 1/4 spruce. The bottom wing has

1-1/2° dihedral; and the spars are 3/16 sq. and 1/4 sq. The ailerons are covered with 1/16 sheet and have Williams Bros. aileron hinges. The N-Struts are 3/8-inch K&S streamline aluminum tubing, and the cabane struts are 3/8 streamline aluminum tubing over 1/8 M.W.

Covering is Super Coverite. I used three coats of clear nitrate dope and one coat of Pettit Hobbypoxy (no filler of any kind). Note: don't paint over dope for 72 hours or more, or the epoxy paint will stay sticky. Flying wires are Sullivan .021-inch diameter, and they work real well.

To make fillets out of micro balloons, proceed as follows: First, temporarily cover the bottom wing center section out past the fillet line with Monokote or equivalent, and mount the wing; referring to the plan and Travel Air 2000 3-view, mask off the shape of the fillet, mix the micro balloons, and fill the area; when set hard, pop the wing off and do the final sanding.

FLYING

This is an excellent, realistic flying model when it is rigged right (warpless) and the CG is in the right location. So please, before your first flight, make sure that all of these things are correct. Since this airplane will stay airborne on very little power, a reliable low idle is essential. Don't chop all power until you are ready to flair, and you will set it down on three points.

I hope you have as much fun building and flying your Travel Air as I do. ●

10 Ways ..... *Continued from page 48*

aire!") Doing such things helps them to develop what Hemingway called "grace under pressure". But, of course, Hemingway knew next to nothing about how to lose a sailplane contest.

PRACTICE ONLY WHEN THE WEATHER IS PERFECT

No one has any right to schedule a contest on a windy day, or during periods of extreme heat or cold, yet a surprising number of thoughtless CD's do just that. If you haven't practiced launching and flying in high winds (as well as in crosswinds and downwinds) then you're in a much better position to lose than many of your competitors.

This particular trick enabled me to drop from first place to a safe and sensible twentieth, in the last round of the 1977 AMA Nats in Riverside. By pulling too much up elevator and thus activating my towhook release during a vicious crosswind launch, I managed to pop off the line at less than fifty feet altitude and get back on the ground in well under the seven minutes I was allowed by the rules. Had I practiced crosswind launches before the contest, I might not have been so lucky. As it was, my action caught Pat Potega completely off guard, and he was catapulted from second place into the embarrassing limelight of first. (Too bad, Patrick; win a few, lose a few.)

SWITCH AIRPLANES A LOT

Variety is the spice of life. The pilot who flies the same boring airplane week after week will soon find himself reacting instinctively to its every twitch and shudder. He will ultimately find that it can tell him

things about the air that even the six o'clock weatherman doesn't know. And such knowledge can be fatal to a pilot's amateur status.

DON'T EVER USE A WINCH, EXCEPT AT CONTESTS

God invented latex. Henry Ford invented long-shaft starter motors.

From these two facts, it should be obvious that God intended us to launch sailplanes with high-starts, not winches. Winches are a malevolent by-product of the Military-Industrial Conspiracy. They were meant to be feared, intended to stimulate our adrenalin flow. Avoid them when sport flying, and especially when practicing for contests. To spend an entire afternoon with an electric winch is to lose one's innocence forever, to become friendly with the enemy. Can you really afford to lose that blinding, paralyzing flash of adrenalin that comes from stepping up to a strange and frightening launching device? Not if you want to continue losing, you can't.

Besides, people who alternate between winches and high-starts soon find that the optimum rearward towhook position for winching may be as much as a *full inch behind* the optimum position for high-start launching . . . and such knowledge can easily lead to much higher contest launches, another unfair advantage.

FLY ONLY THE MAJOR CONTESTS

One or two contests a year are usually plenty to maintain your amateur status, especially if you avoid practice in between. Try to support as few of your local and club contests as possible, to avoid gaining too much competition experience.

AVOID MAN-ON-MAN CONTESTS

Nobody likes to measure themselves against "better" pilots, especially in the same air: it makes a person's mistakes too painfully obvious. And how mortifying it is to discover that someone else in your launch group is getting a higher launch out of the same design you're flying!

DON'T WATCH THE CYCLES OF LIFT AND SINK BEFORE YOU FLY

Don't ever volunteer to sit on a winch for five or ten rounds before your own flight group is called. If you did, you'd have nobody asking you to time, nobody interrupting your study of the air with their idle chatter, nothing whatever to keep you from scrutinizing the flying and landing habits of the best pilots on the field. You'd be in mortal danger of learning something that would improve your flying, and we all know *that's* not what losing is about.

DON'T PLAN A FLIGHT IN ADVANCE

It's always better to come off the winch and simply follow your instincts, you can always follow somebody else's airplane, or the outline of a convenient cloud, or the flight of a passing bird (be wary of hawks and buzzards, which may lead you inadvertently into lift. Stick with chickens or passenger pigeons.) Above all, trust to luck . . . almost all losers agree that thermal soaring is largely luck, anyway.

NEVER PITCH IN TO HELP RUN THE CONTEST

Timing, scoring, running the winches . . . all of these tasks tend to distract a pilot from his own nervousness, to take his mind off the seriousness of the competition. Under such conditions, a potential loser is apt to relax just enough to make that fatal, last-round decision that will catapult him unceremoniously into the winner's circle.

Someone once observed that, of the top ten pilots at any contest, at least four of them will be out on the field helping run the contest at any given time. Don't mix with these high-energy, overenthusiastic types . . . their spirit is contageous. The only way to be certain of losing is to sit the contest out in your RV, watch a little TV between your flights, chug a few beers. You might want to check your watch every few minutes, and bitch about how slow the contest is going. But the important thing is that you *never for even a minute* take your mind off the mistakes you made on your last flight, and the mistakes you're likely to make on your next. In short, stay tight.

I realize that no list of this sort is ever complete (even the Ten Commandments are a bit sketchy about certain points of International Maritime Law, and how many cocktails constitute a deductible business lunch). But the main rules for successful losing are all here . . . it remains only for you to put them into practice. Tack a copy of them to the inside of your liquor closet, or your water closet, or your neighbor's closet, or any place you're likely to see them often. Memorize them. Then shuffle off to your next contest with the confidence of a born loser . . . you know just what you want, and how to get it, now!

Welcome to the crowd. •

F/F Scale . . . . *Continued from page 85*

enjoyable. Bob had an array of models that were very competitive.

At 6 pm the flying stopped, and everyone went back to the motel to get cleaned up for the evening's festivities. There was a banquet that I'm sure no one missed, and after eating, Bill Brown, of Brown Junior Engines, was the guest speaker. He told about some of the history of his company and what is going on today with his CO_2 engines. One item that you may find interesting is that he is planning to come out with a CO_2 engine small enough to fit into a Peanut-size model. He hopes to get this going in the fall.

Sunday's flying did not start until noon, due to the restrictions of the Navy base. The weather this day was not as good as Saturday's, but it was still quite good for flying. The events for this day were Thompson Trophy, AMA Rubber Scale, Peanut Scale,

Jumbo Scale, WW-II Jumbo, and WW-II Peanut Dogfight. Another day where the skies where deluged with models of all sizes and shapes!

The most thrilling event for me on Sunday was the Thompson Trophy. This is another mass launch event and includes some of the most beautiful airplanes ever designed.

Of course, this is my opinion, but it is sure hard to knock the racing planes of the thirties for sheer beauty. The Flying Aces have elimination heats, called the Grieve and Shell Dashes. Those models that survive these heats end up flying in the Thompson. Therefore, only the best six or seven racers compete in the Thompson.

I didn't get a chance to see any of the Peanut models in the air, but I did get to see many of the fine Jumbo models fly. There is no question that the larger models are poetry in motion. These majestic fliers are a sight to behold as the sunshine filters through the structure while they circle overhead. Jack Moses won hands-down with a Boulton-Paul Defiant, which had a best time of 82.5 seconds. Other models in this event included a Kingcobra P-63 by Russ Brown, a Schlepp C-3605 by Don Srull, Bob Thompson had an Ant-25, Leon Bennett had a huge Pazmany PL-4A (featured this month in a construction article!), and Gordon Roberts had a neat Douglas TBD. Jack also won the Jumbo Combat event with his Defiant.

Trophies and prizes were awarded at the field at the end of the flying day by Lin Reichel, the C.D., and his hardworking judges. There was certainly a note of sadness as the rains started and all the modelers packed and headed home ... an experience in modeling that I will never forget. There is a lot more to say and cover, but no matter what, I would not be able to do justice to it. There was just too much taking place all at once!

I would like to consider the following as kind of a postscript to this "happening". First off, Bill Noonan and I were, I'm sure, the only two in attendance west of the Mississippi. We were treated absolutely like royalty. I had so many modelers come up and introduce themselves and compliment this magazine and this column, that I was continually walking on a cloud. One such gentleman was Earl Stahl ... this really made it for me!

One of the remarks I kept hearing was, "How does this compare with your scale contests out West?" My pat answer was, "There is no comparison." The Flightmasters draw from three counties. The western states are so large that most modelers will not drive the required number of miles for a weekend of flying. Our Annual here is not in the summer; therefore, the time factor is a very important consideration. In the eastern half of the U.S., the states are so much smaller by comparision that driving from state to state is not that much of a problem. Yet, two definite similarities between fliers here and there is that they are at contests to have fun, and not to hassle some judge for not doing this or that. This seems to be the common bond that most all scale free flighters have, and it is a good one.

What about the future of the F.A.C. Nationals? One thing for certain is that it will not be an annual occurrance. Why? Bob Thompson feels that is it were held every year, it would not have the significance it had this first time around. Most of us feel pretty much the same. Now, the thought is to have it every other year. Where? That is a good question. My initial thought was to have it on the West Coast one time and on the East Coast the next, but the more I consider it, the more I realized that it just wouldn't work. What would happen is that when it is held in the West, only western modelers would attend. When in the East, only the

eastern modelers would attend. Let's face it, how many are willing to drive two thousand miles for a weekend of flying? It's a tough problem. I know that I'll make the second one, no matter where, because I've been to the first one, and I don't want to miss out. Plus, where else can you see nearly 400 scale models? There were 252 models entered (those that qualified), with 81 contestants and 743 official flights! I'm lucky that my wife and family like to travel also. Whatever happens, I'll keep you posted.

In closing this month's column, I want to say that my homebuilt biplane is going together for the final time. Hopefully, by the time you read this, it will have flown. While waiting to get enough hangar space to assemble this five-year project, I have been helping in the assembly of the full-size replica Gee Bee Model Z. If this isn't thrill enough, Bill Turner, who is having the Gee Bee built, flew into Flabob Airport in his replica Brown Racer "Miss Los Angeles". So, both the Gee Bee and the Brown Racer are parked together in the same hangar. It is a sight that few will ever have the pleasure of seeing! ●

Sailing . . . . . *Continued from page 75*

Rochester MBC
Jim Latoy
32 Baylor Circle
Rochester, NY 14624

R/C Vikings
Cliff Niesen
345 Modoc St.
Crescent City, CA 95531

Mystic Model Yacht Club
John E. Garbarino
Skiff Lane, Masons Isle
Mystic, CT 06355

Saginaw Bay R/C Boat C.
Robert Hughes
126 Vestry Dr.
Saginaw, MI 48601

N.J. Model Corinth S.C.
Walter Pilcer
150 Mohawk Trail
Wayne, NJ 07470

Orlando R/C Model Yacht Club
Mark Norris
627 Delaney, Apt. 15
Orlando, FL 32801

Ocean State Model Yacht Club
Harold Belknap
511 Logee St.
Woonsocket, RI 02895

Heckscher R/C Model YC
Richard Wischer
3 Gary Street
East Northport, NY 11731

No. Cal. Soling O/D Fleet #2
Howard P. Brown
130 Bayview Ave.
Vallejo, CA 94590

Michigan Model Sailing
William P. Crump
1301 US 131 So.
Petosky, MI 49770

Tidewater Model Sailing Club
Virgil H. Haywood
3900 Bruce Rd.
Chesapeake, VA 23321

So. Australia Radio Y.S.
Ric Doorey
28 Huntington Ave.
Fulham 5024 S. Australia

Miami Valley MYA
Don Theobold
918 DeSales St.
Vandalia, OH 45377

R/C Skippers Assoc. of Baltimore
Jim Macneal
9 Haylock Ct., #101
Baltimore, MD 21236

Montreal Model Y.C.
Fred Jennings
2082 LaPierre St.
Ville LaSalle, Quebec, Canada

After a very long stint as AMYA Secretary, Bob Crysler is finally going to call it quits. I'd like to doff my hat to him for sharing these columns, as his name has appeared in almost every one of them. Bob's replacement has been designated, and all AMYA dues should now be sent to: Robert Espenshade, 7221 Casa Adobe, Citrus Heights, CA 95610. ●

Westburg . . . . *Continued from page 33*

Chicago, they split up into two flights, one going north and the other south. They rendezvoused over the Michigan City beach, where Pete was an assistant lifeguard. It must have been an incredible sight . . . Pete says that every P-6E, P-12, and P-16 from Selfridge Field must have been escorting them.

Pete was quite an active modeler at this time. he had built quite a few

rubber and scale models, and when Maxwell Bassett flew his Brown Jr.-powered ship, Pete just had to have one too. He and his buddy, Harold Ford, pooled their money and bought a Baby Cyclone for $12.50. They built a model out of soldered aluminum tubing, balsa, and paper, and used Firestone ashtray tires. The thing was tailheavy, but it flew. They chased it through fields and a farmer's potato patch until it ran out of gas. It broke up and never flew again, but Pete and his friend were walking on air because they had the first gas model that was ever flown in northern Indiana.

Model Airplane News published several of Pete's later designs. He told us that one of them, the WF-3, was flying in a big, lazy circle at 600 feet one day, when the left wing gave up the ghost and fell off. The rest of the airplane spiralled into a swamp, and just as Pete was picking it up, a flatbed farm truck roared up and the driver yelled, "Where's the pilot?" Needless to say, gas models were rare in those days, and virtually unheard-of by people in rural areas.

It didn't take Pete long to decide to make aviation his life career. During the lean years of the Depression, he studied from books and took a correspondence course in aircraft drafting from Curtis-Wright Tech, paying for it with money earned from a WPA job. In 1939, Pete hitchhiked to California and got a job with Lockheed. He quit three months later to go to work for Douglas, in Santa Monica, California. In December, 1939, the engineering department asked any employee with drafting experience to come in for an interview. Pete did, and was hired, but it wasn't the certificate from Curtiss-Wright that did it; it was a copy of Model Airplane News that had one of his gas model plans in it!

Pete stayed with Douglas until 1947, when he took a leave of absence to work on the infamous Davis three-wheeled car; he was the chief engineer of the company. When the law caught up with them, Davis went to jail for two-and-a-half years, and Pete went back to Douglas via North American Aviation. He worked as a designer, doing such things as control surfaces and wing flaps. He worked on the Mixmaster, C-75, Super DC-3, and the DC-6, 7, and 8; he holds a patent on the wing flap on the DC-8.

In 1956, he transferred to the Tulsa, Oklahoma, division along with sixty other engineers. He was supervisor in charge of doors and control surfaces on the XC-132, a turbo-prop transport bigger than the Lockheed C-5A. President Eisenhower cancelled it, but Pete and two other engineers got a job designing a new nose for the Honest John nuclear warhead rocket. They did so well that the then-new Santa Monica Missile Division gave them the job of designing the Bravo missile, which turned out to be a rousing success. When NASA came into being in 1958, they took over the Bravo program and renamed it Delta. The Delta missile was used to launch the Echo balloons and early weather satellites, and is still going strong with something like a 2% failure rate.

In 1960, Pete was transferred from Tulsa back to Santa Monica and worked in missile engineering management for the next ten years. After the moon landings, Pete could see a downturn coming in the missile business, so he took advantage of a good retirement and savings plan and left ten years early, in April of 1970 . . . almost exactly 31 years after arriving in Los Angeles with five dollars in his pocket. Today, he has more than five dollars, a wife, a daughter and son-in-law in Seattle, and two grandsons.

Before he retired, Pete knew he had to have something to do to keep him off the streets, so he began making detailed drawings of airplanes of his favorite era, the 1920's and 30's, and especially biplanes. Pete draws mostly for model

builders who like to design and build from scratch, but who have trouble finding accurate plans. Pete also draws for collectors who like old airplanes. Half of the letters he receives are from fellows who write to say how much they enjoy just looking at the drawings. One fellow wrote to say that he went home from the hospital a day early because his Falcon drawings had come! Pete says that one of the letters he received was really eyeblinking. The handwriting was horrible . . . then at the end the writer apologized. It turned out that his hands were useless from a burn accident and he had to write with his toes. Maybe that's another reason Pete keeps drawing.

You probably won't be able to find drawings more accurate than Pete's. At first, he got a lot of his data from the Douglas engineering files. Then, as he became better known, other people started helping out with photos and drawings. It's a self-generating thing; the more drawings he makes, the more contacts he makes. One of his best sources of data is the Wright-Patterson AFB. They have microfilms of production drawings of just about every Air Service and Air Corps airplane ever built. Another good source is the National Air and Space Museum at the Smithsonian, which is regularly visited by Walt Stampfli, a good friend of Pete's. Walt flies DC-10's for United, and whenever he goes to Washington D.C., he tries to spend a few hours in the NASM looking for data. Walt has found all kinds of goodies and has brought back pounds of xerox copies of test and flight reports, microfilm, drawings, etc. Pete says a lot of his drawings would not have been possible without Walt's help.

Pete's drawings begin with a pencil layout, drawn on vellum, and consists mostly of basic lines and dimensions, such as frame and rib stations. The final drawing is done on two mil mylar, frosted on both sides. Areas with a lot of detail, such as the landing gear, engine, etc., are drawn on separate sheets of vellum and then traced onto the mylar. Pete uses Rapidograph jewel-tip pens, which cost about fifteen bucks each. He uses a No. 2, 1, 0, 2X0, and 3X0.

The actual drafting on the mylar takes about one week per sheet, if Pete works eight hours a day, which he doesn't. On the average, he turns out five or six sets a year. By far, the most time-consuming thing about doing the drawings is the research and waiting for answers. Pete says he has been researching the Stearman 4E (which will soon appear in **Model Builder**) for two-and-a-half years, and still hasn't located any factory drawings. Just recently, he found out why; all the original drawings of the Boeing/Stearman aircraft prior to the PT-13 were destroyed in a flood. Fortunately, Pete has been able to come up with enough data, including measurements and quite a few photos of the one in the museum in Ottawa, Canada, to produce some excellent drawings.

Pete says his future drawings will include the P-12/F4B, Keystone bomber, Thomas Morse O-19, Helldiver, Hawk P-1, Goshawk, Consolidated PT-1/PT-3, A-12 Shrike, and whatever else he can get his hands on.

Pete would like to thank everyone who has sent him data, as none of his drawings would have been possible without someone's help. He also requests that if anyone writes to him for any reason, please include a stamp, as his postage bill has gone out of sight! •

Counter . . . . . *Continued from page 10*

some dealers, or direct from Ponchartrain Distributors, for only $145.

* * *

Next to "the radio quit", probably the most-used excuse for crashing is "I couldn't see it". Well, present-day radios just don't quit as often as claimed, and if you use Applied Design Corp. "Jewel Stripe" tapes, figures, and letters, you are going to have to go to excuse No. 3. These self-adhering mylar tapes and precut characters are not only decorative but practical as well, as they will add to your model's visibility even on those dull, dingy, cloudy days.

New additions to the already extensive line are letters and numbers, in 1, 2, and 3-inch sizes, and in your choice of silver, green, blue, orange, green, or red.

These new ADC goodies are introductory priced at 10¢ each for the 1-inch, 25¢ for the 2-inch, and 39¢ for the 3. The 1-inch "Jewel-Lettes" are also available in packs of 84 assorted characters, at $3.99 per pack.

Look for them at your local shop, or write Applied Design Corp., 738 Penn St., El Segundo, CA 90245. Obviously, the use of these letters and numbers is not limited to models; they will work anywhere that you need a sign or lettering.

* * *

Bob Smith R/C Aircraft has informed us that it has started shipments of the new T2-40, a .40-powered version of the popular T2-A pattern and sport aircraft. The T2-40 spans 40 inches, with an area of 540 squares. Flying weight is between 5-1/2 and 6-1/2 pounds, depending on engine, radio, finish, etc. It uses a precision-cut foam wing, with a 16.5% thick root airfoil and 18% at the tip.

The kit features an epoxy fiberglass fuselage, which has the canopy and vertical fin molded in. The stab is also foam, and the 1/64 ply covering for it and the wing is furnished. All wood parts supplied are ma-

chine-cut, and all necessary hardware is included.

The T2-40 may be built with either fixed or retractable gear; fully detailed plans are enclosed.

At $89.95, this sounds well worth considering next time you are looking for a high performance, yet economical, low winger. Dealer and distributor inquiries are invited. Contact Bob Smith R/C Aircraft, 9525 Cozycraft Ave., Unit H, Chatsworth, CA 91311.

* * *

A new IMPBA and NAMBA-legal deep-vee R/C boat has just made the pond. It is Steve Muck's "Mighty Dolphin", a deep-vee day cruiser for 6.5 cc engines and two-channel radios.

This all-wood kit features frames, formers, and sheeting pre-cut from high-quality aircraft plywood, and includes a radio box, plexiglass radio box lid, turn fin, screws, and step-by-step illustrated building instructions.

A stern drive hardware set for the "Mighty Dolphin" is available separately. It includes ride plates, stern drive and rudder brackets, rudder, water pickup, screws, and 3/16-inch flex-cable drive line assembly.

Kits No. 59 for the boat, and No. 65 for the hardware set. From Steve Muck's R/C Boats, 6003 Daven Oak Dr., Dallas, TX 75248.

* * *

That interesting looking vehicle in one of the photos is Testor's newest . . . the Galax IV Planetary Surface Explorer. This ground effect machine, or "powered space skimmer", as Testor's calls it, is powered by an .049 engine, and actually floats as it moves, without touching the ground.

Air is drawn through a vent on top of the body, and is then blown out underneath to form a cushion of air upon which the vehicle rides. It will stabilize itself about 3/4 of an inch above the ground, and slowly move forward. If it meets with an obstacle, the Galax IV will bounce off, change direction, and continue on.

The Galax IV is 16-1/2 inches long, 8 inches wide, and over 4 inches high. It is made of rugged polypropylene, and is impervious to all fuels and solvents.

It comes complete with engine, and an exclusive 5-minute instructional recording about starting and operating the engine.

Sounds interesting! Wonder if it has enough payload for a radio?

Also interesting, and also from Testors, are two new finishing kits for plastic models. They are also of interest to builders of flying models, since so many of us use these materials for pilots and scale detail. Both finishing kits include cements, plastic putty, brushes, a knife, sandpaper, a drop cloth, and gluing tips, and your choice of all flat or all glossy paints in the most-used colors. Look for them at your favorite model shop. For further info, inquire from The Testor Corp., 620 Buckbee St., Rockford, IL 61101. Tell them **MB** sent you.

* * *

Kite lovers, behold the latest for 1979; the "Fang", the "Humpty-Jumpty", and the "hip-hoo-REY". Superior construction and outstanding performance are but two of the features of this new line of plastic keel-kites developed by Hi-Flier Manufacturing Co.

The keel-kites combine long-lasting plastic bodies and wood-dowel cross-sticks with exclusive Snap-Lok junctions on plastic wing sticks. They also feature tear-proof plastic grommets on larger keels, and reinforcing safety tabs on the bodies.

These are big kites; 48, 50, and 54 inches in span, beautifully printed with imaginative designs that will appeal to all. Some of the kites have long plastic tails for more flying action and in-flight stability.

Priced from $1.29 to $5.00, they will be available at some hobby shops, and in many general merchandise stores.

From The Hi-Flier Manufacturing Co., 510 East Wabash, Decatur, IL 62525.

●

R/C World . . . *Continued from page 19*

and contest officials.

WHERE-AT'S THE PILOT?

This seems like "Pick on Scale" month, but we might as well mention another pet peeve that we've taken a whack at with a proposal.

We're sure Bud Nosen won't mind our using one of his models as an example, because it describes the situation so well.

At one of the last Glenview NAS Nationals, Bud entered and flew a beautifully detailed P-47 "Jug". We're not sure how it placed now, as this goes back about 6 or 7 years, but we certainly remember watching a particular flight.

Bud's P-47 was already in the air when we moved from the other line at the two-line, back-to-back site. Following a fine flying demonstration, Bud got into the traffic pattern, lowered flaps and landing gear, greased in on the spot, rolled to a stop, and then taxied back to the parking circle. As we watched from nearby, the "Jug" rolled into the circle, braked to a stop, and whaddya

know, the canopy slid open . . . but no pilot got out or was even sitting in the fully detailed cockpit! It was actually spooky!

Are you getting the message? Right! Like Herbert Hoover's "chicken in every pot", we want a pilot in every cockpit! Before you get all excited and knock over the dope bucket, listen up.

What we want is a scale-size bust or full-figure *human* pilot aboard all canopied or open-cockpit aircraft *during the flying portion* of competition (this means it *doesn't* have to be there during static judging). If the pilot happens to be a permanent fixture, it is *not* to be judged, and it shall not in any way penalize the contestant's static score. Although pilots could also be required in models of many cabin-type aircraft, it was felt that trying to define the line between those and models of scale transport type aircraft with small-windowed cabins, would get too complicated.

Incidentally, Col. Bob Thacker was responsible for the insertion of the word "human" in this proposal. He had dropped by the office shortly after we had mailed the proposal, and was enthusiastically agreeable with the idea. However, he felt that dolls, dogs, cats, Snoopys, Flintstones, Yogi Bears (sniff), and the like, were just not suitable. We had to agree, and called AMA Headquarters to have the word "human" added to the specifications. In case you're wondering, the proposal also calls for a pilot that is to the same approximate scale as the aircraft, and its width must be in proportion to its profile, no silhouettes. Also, it's gotta be in the proper location. Not stuffed in with the radio or fuel tank!

Hope you agree with us on this proposal.

HOW BIG IS TOO BIG?

With the rapid growth (no pun intended) of both size and interest in R/C scale models (which we can take as much blame for as anyone), the most often pondered question is, "How big can they get and still be legal?" The word "legal" in this question is usually associated with two thoughts; insurance coverage and FAA limitations. At this point in time, a perfectly accurate answer to both parts of the question is, "As big as you want!"

We have been copied in on many of John Worth's answers to questions about insurance coverage and know the basic part of his answer by heart . . . "It's not *what* you fly but *how* you fly, that governs the AMA insurance coverage." And as for the FAA, there have never been any specified guide lines in existence, or in effect, that separate the "toys" from the man-carrying aircraft . . . but that's not to say we aren't on the verge of needing those guidelines . . . at least on *our* side of the separation.

Model aircraft were in existance and flying long before man succeeded with heavier-than-air flight . . . Icarus, with his "Feather and Wax Works Hang Glider Special", didn't do too well . . . and for the most part, models have always been considerably smaller than the man-carrying kind. For this reason, even with the coming of World War II target drones and then the RPV's, the size of model aircraft has never been a concern relative to common use by the average modeler . . . until now.

With the advent of large scale models, and it's inevitable now, with several proposals for the 1980-81 period already in the works for larger engines and larger aircraft, to-wit our own mammoth scale proposal, the time is ripe to consider *legal* upper limits for model aircraft . . . before someone does it for us.

The point is this . . . although we will undoubtedly end up with a set of competition rules for a category of large model aircraft, starting January 1, 1980, we will still have, before and after that date, larger heavier model aircraft that are still legal even though they exceed the proposed competition limits.

What we need is a set of legal limitations, which if exceeded, becomes the sole responsibility of the owner of the "non-model." As an AMA illegal device, it would not be covered by AMA insurance, and in fact if it left the ground, would be under jurisdiction of the FAA. We must protect our right to determine our own rules, and the only way to do that is to establish and maintain them ourselves.

Our own suggestion is that we establish limits slightly above the proposed Mammoth Scale rules, which call for a maximum weight of 25 pounds, a maximum loading of 30 oz./sq. ft., and maximum engine displacement of 2 cu. in. (ignition) or 1.5 cu. in. (glow). Wing loading, incidentally, is based on a 15% minimum airfoil thickness. For anything thinner, the loading calcula-

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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.

1930-1950 MODEL AIRPLANE KITS, Aviation/Model Magazines wanted. Many items for trade. Jerry Antczak, 46064 Green Valley, Plymouth, MI 48170.

VINTAGE Ignition and Glow Engines. Back-issue magazines; MAN, AT, FA, etc. 25¢ and SASE for list. F.V. Hansen, 3118 Fairway Drive, Las Cruces, NM 88001.

FF/UC SCALE PLANS. Peanuts, Walnuts, Hazelnuts, Rubber, CO_2, Gas. Modernistic Models. P.O. Box 6974, Albuquerque, NM 87197.

PRO SHOP For The Sport Flyer, also quarter scale models. Charge cards accepted. King R.C., P.O. Box 897, King, NC 27021; 919-983-5660.

AERO HOBBIES: Rubber and CO_2 specialists. Kits, rubber, accessories from Peck, Vintage Aero, R/N, Classic, Moorehouse, Micro-X, SIG, Lee's, Keil Kraft, Flyline and others. Catalog 50¢. Send to: Aero Hobbies, Box 115, East Glastonbury, CT 06025.

NEW PEANUTS: Piper Super Cruiser, Bristol M.1C, Fokker Triplane, Davis DA-2, SBD Dauntless, OV-10 Bronco, $1 ea. Stamp for new Peanut/Grapenut catalog. Aero Era, 11333 N. Lake Shore Dr., Mequon, WI 53092.

OLD-TIMER REPLICAS: Bombshell, Clipper, Ranger, Buccaneer, New Ruler, Playboy, Mercury, others. Catalog 25¢. Micro Models, Box 1273B, Covina, CA 91722.

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.

FOR SALE: Morton 5-cylinder model airplane engine factory engineering drawings, 1944 series, 48 pages, full size, including operating instructions, wiring diagrams, carburetion adjustment, prop removal and general tuning hints. $8.00 complete in plastic binder plus $1.00 postage, first class. Mark Wallach, 220 East 63rd St., New York, NY 10021.

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MODEL BUILDER, 621 West Nineteenth St., Costa Mesa, Ca. 92627

tion is penalized by deducting wing area equal to double the the percentage under 15%, if, given a 2000 sq. in. wing averaging 11% thick, deduct 2000 x (.04 x 2)% = 1840 sq. in.

We'd like to hear your ideas on this matter. It's important, and something has to be done about it soon.

FAAMAI?

Perhaps that is how you might combine FAI and AMA. Our fourth proposal is a little more involved, but the idea is the same.

For several years now, pattern competition in the USA, particularly the Masters class, has been administered by various portions of the rule book . . . some AMA and some FAI . . . a continually confusing situation which has resulted in numerous hassles during the heat of competition. The confusion is a result of conflicts between certain portions of the "ground rules" more than in the actual flying of maneuvers. Differences occur in engine starting time, definitions of attempts, number of attempts, definition of official flights, limitations to the use of two aircraft, etc.

In our proposal, we have taken

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MODEL BUILDER

the FAI rules as the backbone of the event, and added to it, all of the AMA rules that do not conflict with the FAI rules. This provides us with one complete set of pattern rules which includes all of the best and necessary parts of both AMA and FAI, yet there is no confusion or conflict. The rules are basically FAI, as used all over the world, but include the AMA skill classification divisions and lists of maneuvers. If you're interested in pattern competition, watch for this proposal when it's published in *Model Aviation*, and let us have your comments. •

Workbench . . . *Continued from page 6*

about 50 cars and the transmitter-impound rack is topped by a windsock. Future plans may include a field house.

"The WRAMs welcome spectators. Field hours are 9 a.m. to dusk on weekdays, and 11 a.m. to dusk on weekends and holidays. Patterson is located in the northwest corner of Putnam County."

Read Hal deBolt's R/C *Forum* in this issue for some good ideas on obtaining the use of a suitable flying field. As usual, no one is gong to come to your club and beg you to use their site. It takes a certain amount of leg and mouthwork on the part of club members to accomplish it, and also as usual, the same few "do-ers" will handle the job.

INDOOR WORLD CHAMPS

Just received a phone call from Jim Mosely, of England, who will be giving us photos and text on the recently concluded Indoor World Championships. A brief run-down of the results are as follows:

1. Jim Richmond (USA) 8442
2. Bud Romak (USA) 8122
3. Ron Hicks (CAN) 7629
4. Laurie Barr (G.B.) 7357

Team Placings:

1. Great Britain 21802
2. United States 21429
3. Canada 21252
4. Japan 21038
5. Poland 20521

•

John Simone, Jr., 1977 AMA National/ Expert Champ.

Performing against Experts at the AMA Helicopter Nats leaves no margin for error. That's why John A. Simone of Mission Viejo, California, chose the Futaba FP-5FN system to pilot his Rev-olution II to victory. Precise control and exceptional reliability are essential in helicopter competition, and that's exactly what John's Futaba delivered. And with John at the sticks, spectators and the opposition alike were treated to the first perfect loop performed by a scale chopper.

The Simone Rev-olution. Power by K&B. Radio by Futaba.

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Check out the system that gave John the edge. Futaba can make you a winner, too.

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John Simone, Jr. National Helicopter Champion.

SIG KITS AROUND THE WORLD

Upper Left: Dennis Green (Tompson Station, TN) and his father learned to fly 3 years ago with a Sig Kadet. Since then they have built the J-3 Cub, Kommander, Liberty Sport, and now the Smith Miniplane.

Upper Right: This beautiful Kougar was built by Jerry Morgan (Apollo, PA) and carries scratch-built rockets and landing gear details.

Left: Art Topa (West Palm Beach, FL) created this artistic red and yellow paint scheme for his Sig Kommander. Art said in his letter; "I am a member of the Skyhawks, a Florida club that has many members who owe their flying skill to your fine product. Most of us started with the Sig Kadet and went on to the Kommander and are proceeding up the Sig ladder."

The steps in learning to fly RC the Sig way are to start out with the Kadet (a 3 channel high wing trainer); progress to the Kommander or the new Kavalier (shoulder wing aileron trainers); then go to the Kougar (a midsize stable low wing). After the Kougar, designs like the J-3 Cub, Smith Miniplane, Komet, P-51, etc. are easy to fly.

Lower Left: This Kougar built by Howard Kofoed (Omaha, NB) sports a racy yellow (on wing leading edges, fuse top, tail surfaces) and white paint scheme with black pin stripes.

Bottom Left: Finn Johansen (Norway) is a Sig Skybolt fan having built and flown two. He says that he was surprised at how well the Skybolt performs in the air, and that it is obedient and easy to handle. "There is not a thing you cannot do with a bipe like this." His Skybolt has been flown in many shows and on a TV program in Norway.

Finn also informed us in his letter; "Sig kits have become very popular in our country. I have test flown your Cub J-3, Zlin, Ryan STA, Kougar, Kadet, Kommander, and Komet, and all of them were excellent planes."

Bottom Right: A standard 3-channel Kadet flown by Marv Goldberg (Omaha, NB) is coming in on final approach for landing.

RC-38	SMITH MINIPLANE - .40 - .45 Engines	$49.95
RC-35	KOUGAR - .40 - .45 Engines	$44.95
RC-32	KOMMANDER - .40 - .50 Engines	$39.95
RC-34	SKYBOLT - .60 Engines	$62.50
RC-31	KADET - .19 - .35 Engines	$34.95

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Cox/Sanwa's 8040 radio system helped Skip Miller become the 1977 World R/C Soaring Champion. And now, one of *four* advanced versions of the 8040 can help make you number one. Whether you're flying for sport or competition.

Want reliability and performance at a reasonable cost? Then you want our new 8044 or 8054 system, available on all 72 MHz frequencies. The 8044 is four-channel. The 8054 has a fifth channel with toggle switch to retract landing gear.

Both inherit all the 8040's outstanding features while adding innovations of their own. Such as *totally new miniature servos* for easy installation in smaller models. These have everything you want in a servo—plus 60% more power than micro-servos offer!

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Including the low-force open gimbal sticks with a unique dirt-resistant design. Variable rate adjustment on aileron and elevator channels. Adjustable stick lengths to suit your own style.

And you get *new miniature ball bearing servos*—with a ball bearing output shaft plus an isolated, long-life potentiometer and waterproof case. There's even a modular gear train for easy servicing.

The 8048 provides four channels. The 8068 adds a proportional fifth channel, and sixth channel with toggle switch. Both are available on all 72 MHz frequencies.

All four systems feature the quality, engineering, craftmanship, and affordable pricing that's made Cox/Sanwa famous. Behind each one stands a world champion. Pick the one that'll win for you.

All systems include transmitter, four miniature servos, receiver, dual charger, servo trays and accessories.

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MRC-TAMIYA PORSCHE TURBO 935 RADIO CONTROL CAR KIT
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MRC-Tamiya's Porsche Turbo is what R/C electric cars are all about. If you're a hobbyist you'll appreciate the difference between this precisely engineered road car and so many of the toy R/C kits now on the market.

First, there's the satisfaction you'll get when you assemble this 1/12th scale reproduction of the Turbo Charger Porsche 935 that won the 1976 and 1977 Maker's World Championships. From decal detailing to airfoil construction, the Porsche is the spitting image of the 590 hp champion. And when MRC puts its well earned reputation for R/C electronics, together with Tamiya's know-how for producing precision kits, the result is a new plateau in hobby performance.

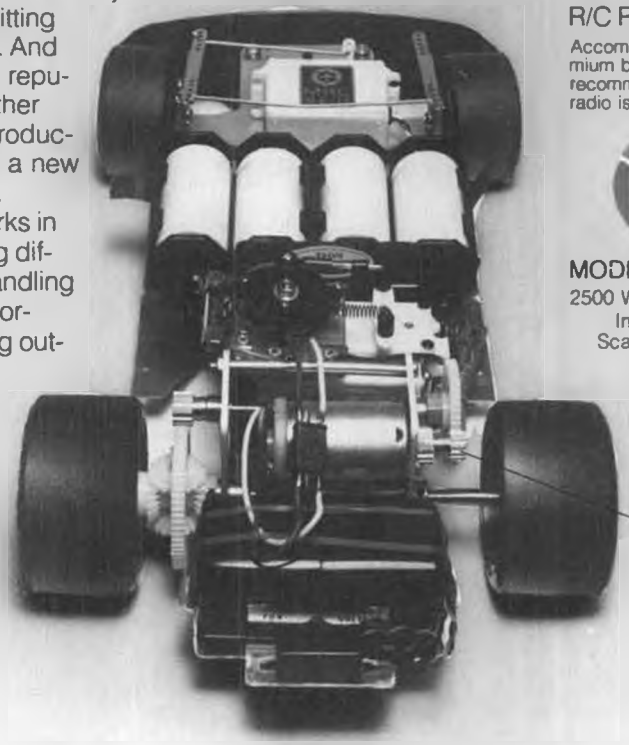
Operating rear suspension works in tandem with rear end operating differential for sure and steady handling in corners. A finely honed proportional steering system and a big output electric motor put power and responsiveness in tight harmony.

AN INSIDE TRACK FOR ENJOYMENT

And while a lot of electric R/C cars can run in a gymnasium, or open area, how many of them also offer versatility (in the form of special adjustable gear ratios) to let you continue your hobby in your house? With this MRC-Tamiya Porsche Turbo 935 you have two forward and two reverse speeds. Select the gear ratio you need, choose from 4.7 to 1 (fast); 5.8 to 1; 15.5 to 1; or 19.4 to 1 (slow). Then, depending on what you've chosen, you'll have the speed ratio to run full out and still be compatible with any course . . . indoors or out.

It's this kind of advanced engineering that lets you get the most out of your R/C car hobby. Someday they'll all be made this well . . . until then, see your hobby dealer for the MRC-Tamiya R/C Porsche Turbo 935.

Accommodates dry cells or rechargeable nickel cadmium batteries. MRC two channel 772 series radio recommended, although any comparable two channel radio is sufficient. Radio and batteries not included.



Easily adjustable gears allow you to choose ratio (there are four) best for the course, indoors or out.

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