

MODEL BUILDER

Volume 8, number 78

\$1.50

JULY 1978



EXPANDED R/C COVERAGE!

New!

KIWI

RC SPORT PATTERN FLIER

SIG
KIT NO. RC-42

Designed by HANK POHLMANN

KIT FEATURES:

Built-up Wing
Die-Cut Sig Balsa and Plywood
Printed Balsa Fuselage Sides-
Build Directly on the Wood
Sheet Balsa Tail Surfaces
Shaped Balsa, Ply and Hardwood Parts
Clear Bubble Canopy
Pre-Bent Torsion Bar Main Landing Gear
Coil Spring Nose Gear
Nylon Nose Gear Bearing and Steering Arm
Aluminum Motor Mounts
Nylon Strip Hinges
Nylon Control Horns
Wire Aileron Torque Rods
Nylon Wing Bolts
RC Links and Threaded Rods
Screws, Blind Nuts
Full Size Plan
Illustrated Instruction Book



\$37.50

The strong, simple construction of this low-wing sportster gets you into the air fast and keeps you there for many a flying session. Lots of room in the fuselage for easy mounting of almost any kind of RC equipment. The large area control surfaces give sensitive maneuvering response for fast action in fun-fly competition. Or you can reduce the movement and cruise around in a relaxed and easy manner. Check that list of features!

WINGSPAN: 54"
SUGGESTED ENGINES: .35 - .45
SUGGESTED RADIO: 4 CHANNEL

New!

CESSNA 150 CLEAR PLASTIC WINDOW KIT

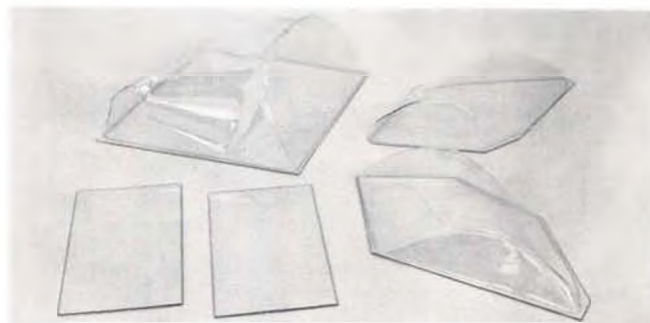
Featuring:

RP-WK-404
WINDOW KIT

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Windows must be installed before fuselage sides are joined.

- * Step By Step Instructions
- * One Molded Windshield
- * Two Side Windows
- * Two Molded Rear Windows



The Clear Window Kit is optional and is not included in the Cessna 150 kit.

ENGINES: .50 to .60
WING SPAN: 65 IN.
WING AREA: 645 SQ. IN.

WEIGHT 7-1/2 LBS.
4 - 5 CHANNEL RADIO

SIG
KIT KBRC-4

CESSNA 150 CONTAINS:

Molded Plastic Fuselage Sides
Molded Plastic Skin Covering for Aileron
And Flaps With Realistic Crimping
Cessna Factory 3-View Drawing
Formed Plastic Fuselage Halves
Door And Window Detailing
Molded Plastic Engine Cowling
Molded Wheel Pants
Precision-Cut Foam Wing Core
Formed Plastic Wing Tips
Solid Balsa Internal Fuselage Profile
Sheet Balsa Tail Surfaces
Formed Aluminum Main Gear
Strong Coil-Spring Nose Gear
Decorative Decal Sheet
Step-By-Step Instruction Book
Die-Cut Plywood Parts
Sig Quality Balsa
Molded Nylon Control Horns
Molded Plastic Hinges
Tuf-Steel RC Links and Rods
Double Coated Servo Mounting Tape
Aluminum Motor Mounts
Nylon Nose Gear Bearing And Steering Arm
Nylon Wing Screws
Blind Nuts And Bolts
Assorted Small Hardware



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CESSNA 150 WITH
ACCESSORY WINDOWS INSTALLED

Designed by HANK POHLMANN

FOR RC SPORT SCALE AND SPORT FLYING

FEATURING ABS PARTS THAT ARE EASY TO GLUE AND PAINT

Unlike other models with plastic fuselages, the Kwik-Bilt Cessna doesn't depend on the shell for strength. The Cessna fuselage is based on a solid balsa center profile, beefed up with plywood doublers. Tail, wing, engine and landing gear are all mounted on this profile center. The plastic fuselage shells are really only streamlined fairings, decorations that add the scale shape, instead of functional parts of the fuselage. Minimal flight and vibration loads are imposed on the shells. Even if they should crack, the structural integrity of the model is maintained.

Some kits use styrene or other types of plastic that are difficult to glue and paint. The ABS plastic parts furnished with the Cessna can be welded together in seconds with butylate dope thinner, acetone or MEK. A wide variety of finishing materials - Sig Supercolor dope, epoxy paints or enamels - can be applied to the ABS plastic used in Sig kits.

- * EXACT SCALE OUTLINES
- * SMOOTH AND STABLE
- * RESPONSIVE TO CONTROL
- * BUILDS FAST
- * 4 OR 5 CHANNEL RADIO EQUIPMENT

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- 3.** Proportional steering that's sharp and accurate.
- 4.** Easily adjustable gear ratios to match your course needs inside or out;

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Martini Porsche 935 Turbo: 1 to 4.7, 1 to 5.8, 1 to 15.5, 1 to 19.4.
FMC XR311 Combat Vehicle: 1 to 9.3, 1 to 16.1, 1 to 21.

5. Operating double wishbone independent suspension on all four wheels of the XR311 for excellent off-the-road capability; operating front suspension on the Tyrrell and operating rear suspension on the Porsche.

6. Big output electric motor with power-to-spare for quiet running indoors or out.

7. Semi-pneumatic rubber tires grip and hold on just about any surface.

8. FMC Combat Vehicle and Martini Porsche in precise 1/12 scale . . . Tyrrell 6-wheeler in 1/10 scale. An excellent size for on the road realism . . . the Tyrrell for instance, measures over 17" in length.

9. Rugged ABS plastic bodies and long lasting Delrin gears will keep you on the road with minimum pit stops.

10. Run a rally, obstacle course, drag race or put them through their paces indoors. Set up a Grand Prix, or take the FMC XR311 out in the field. There's a big enough selection to do just about anything.

11. MRC-Tamiya detailing gives scale appearances with deft accuracy in all areas, including interior cockpit, prototypical striping, decals, air foils, racing mirrors, right down to the nylon lock nut that keeps the wheels in place.

12. Accommodates dry cells or rechargeable nickel cadmium batteries, 2-channel radio recommended. (Batteries and radio not included).

To get the complete run down, see your hobby dealer. Then take to the road, track or field with a precision engineered MRC-Tamiya R/C car . . . designed to satisfy the hobbyist.



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2500 Woodbridge Avenue
Edison New Jersey 08817



READ ABOUT THESE RESULTS with

MAGNUM POWER



Dear Carl,

RECENTLY, I WAS ASKED BY A FELLOW CLUB MEMBER FOR SOME HELP. Sid Greenleaf was flying a Sig Cadet with an OS35, but had never gotten a complete flight because of engine problems. The engine felt stiff to me, and after starting it with his well-known national brand fuel, it wouldn't idle. From a moderate 2-cycle, it would flood out when the throttle was opened. I fiddled with it for some time, and finally decided to fly the ship with the engine nearly full throttle.

After take-off and flying out about 300 ft., and making a 180° turn, the engine quit as though it were lean. I brought the plane in, restarted the engine, set the needle valve 5 clicks richer, and took off. Again the engine quit the same way. With Sid's permission, I drained his tank and filled it with Magnum Power 10. We restarted the engine, set the needle valve, and Sid noticed an immediate improvement. We now had a good idle and good transition from low to high. I took the plane off, got up to altitude, and handed Sid the transmitter. For the first time all summer, the engine ran fine for a complete flight. After landing, Sid said that Magnum Power had made a tremendous difference in the way his engine ran. It was much freer and the first few minutes of running had cleaned out all the varnish from the old fuel. Sid then made many more flights, and his engine ran reliably from the beginning to the end of the tank.

Another time, Dr. Alan Spievack asked me if it was true that engines ran longer with Magnum Power. Alan flies a tri-motor Stinson with three OS Wankels. He was getting only 8 or 9 minutes running time with his fuel (also a well-known national brand). I gave him a gallon of Magnum Power 10, and he decided to run a test. Using a regular fuel, he flew an entire flight until the engines quit — rather daring with a scale job. He then filled with Magnum Power, and restarted. He had to lean his engines more than with his old fuel, and picked up several hundred RPM as measured with a tach. He then flew an entire flight again until the engines quit. After landing, he could immediately touch the engines, which he had not been able to do for several minutes with his old fuel, since they ran hotter with it. He also noticed a black residue that had been cleaned out by the Magnum Power, and now his exhaust was clear and clean.



Dr. Allen Spievack with his tri-motor Stinson with 3 O.S. Wankels.

He was extremely surprised to find he was getting well over 10 minutes with Magnum Power. He now had plenty of time to complete his schedule of running maneuvers. Alan went on to run tests with various airplanes and engines, and found that everything that is said about Magnum Power is true and then some.

These two cases just confirm all the experiences I have had with this fuel. In every case when Magnum Power was substituted for the previous fuel, there was an immediate slight RPM increase, the engine ran longer per tankful, and the exhaust was very cool and clean. There is no doubt in my mind that Magnum Power fuel has something that none of the other fuels has.

Very truly yours,

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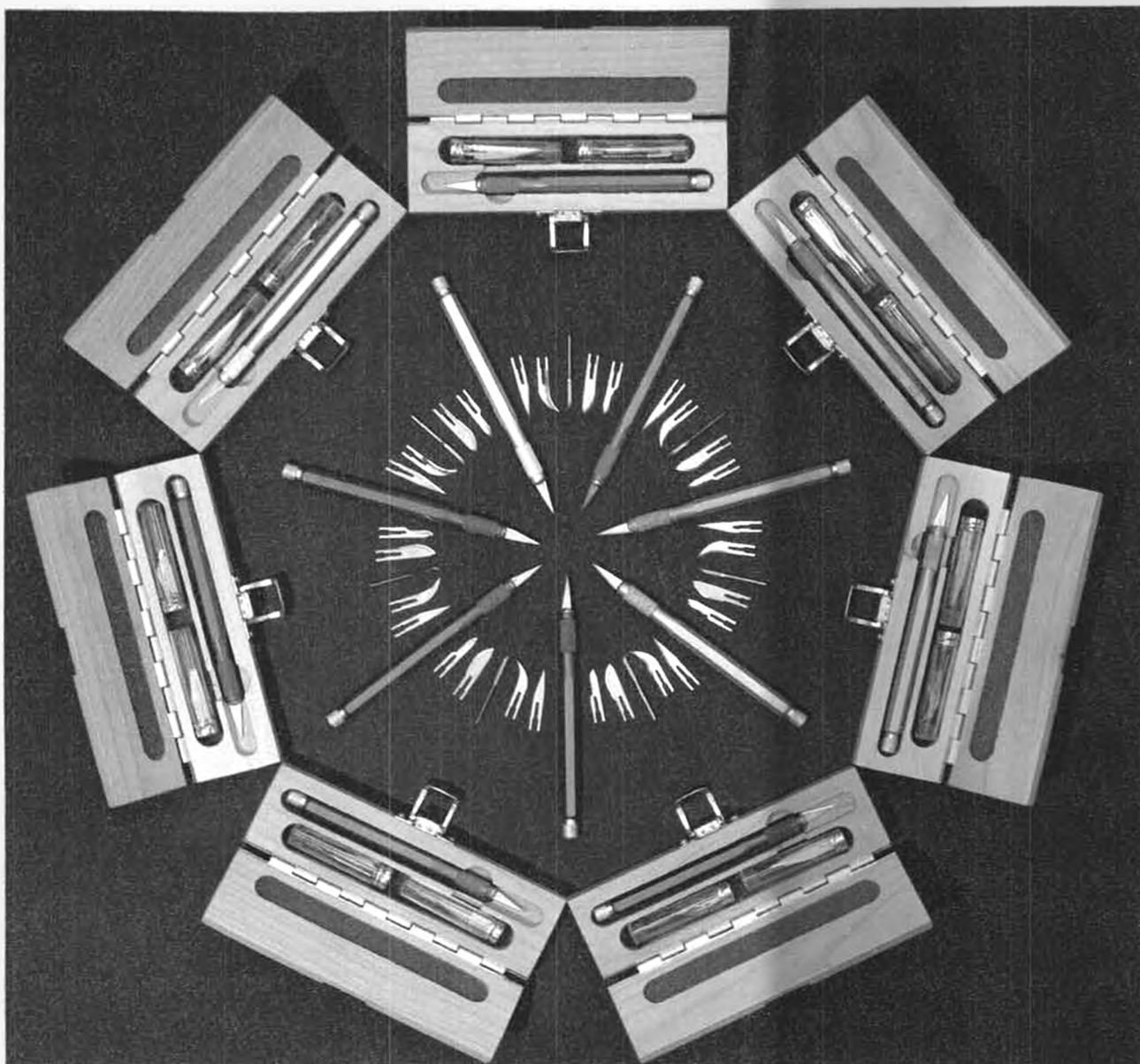
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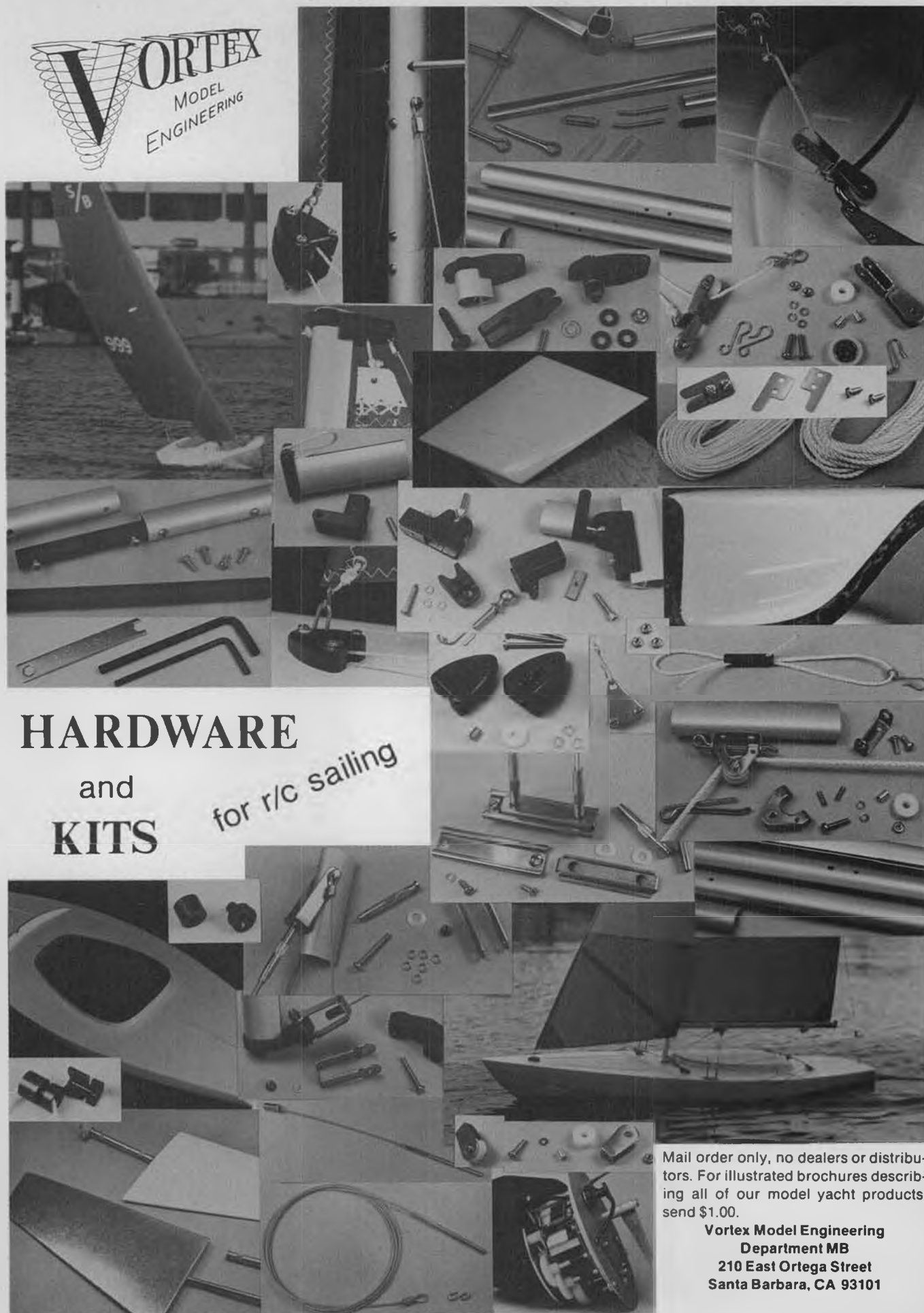
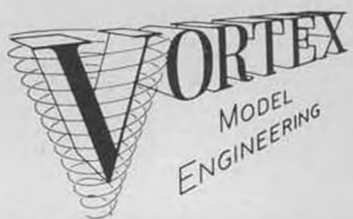
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Nancy, R/C soarer.
R/C Pattern World Championships.
Peanut Fokker D VI.
LSF Tournament story.
Bi-Prentice, R/C biplane trainer.

Vol. 1, No. 2 \$3.00



December 1971
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R/C Twin Trainer 75" span, for .40's.
Peanut Laird LC-DC.
Volkspine 3V-1 3-views.
How to build light "wire" wheels.

Vol. 1, No. 3 \$2.00



January 1972
SHOCer F/F by Mel Schmidt.
White Trash, famous R/C soarer.
Peanut Ord-Hume.
Chet Lanzo's famous rubber Puss Moth.
Curtiss Robin 3-views.

Vol. 2, No. 4 \$1.00



February 1972
Minnow U/C profile scale racer.
Fokker E-III R/C scale.
Al Vela's E-Z Boy 1/2A E-Z Boy 1/2A, Al Vela.
Peanut Ford Flivver.
Fiberglassing over balsa, by Le Gray.
Spoiler, FAI Combat.

Vol. 2, No. 5 \$3.00



Mar/April 1972
Yankee Gull R/C glider 8' to 12' span.
Miss Cosmic Wind, QM R/C Pylon racer.
Peanut Scale Bucker Jungmann.
Siebel 1/4A F/F scale.
Mr. Mulligan 3-views.
FAI power "Folder."

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May 1972
Seahorse II, R/C seaplane. For .19-.35.
D.H. Humming Bird, F/F or R/C pulse.
Peanut Fokker V-23.
Whetstone 1/2A U/C combat.
Ryan ST 3-views.
Tethered Cars, R/C sail.

Vol. 2, No. 7 \$2.00



June 1972
Bob White Wakefield.
Monster QM biplane R/C pylon racer.
Calif. Coaster R/C glider. Sheet wing.
Three profile Peanuts.
Daperdussin 3-views.
Pesco Special 3-views.

Vol. 2, No. 8 \$3.00



July 1972
Fairchild 51, 1" scale, R/C or F/F.
SAM-5 A/2 Nordic.
1912 Avro G rubber.
Comanche C stand-off R/C scale.
Travelair 2000 2" scale R/C, by Editor.
Chester Jeep 3-views.

Vol. 2, No. 9 \$4.00



August 1972
Bonzo stand-off R/C sport pylon scale.
Counterforce sailless A/1 Jic.
Shoes' R/C QM.
Pearl aylorcraft on ts, also big one.
Fairey Delta 3-views.

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Feb/March 1973
Profile F4U Corsair C/L stunt, .40 power.
Beecroft's Satan, Class A free flight.
Indoor Ornithopter.
Peanut Travelair 2000 PT-3 Scale Views.
Thermal hunting with R/C gliders.

Vol. 3, No. 16 \$2.00



April 1973
Fabulous PEA POD, R/C sailboat.
Briegleb BG-12, scale R/C soarer.
R/C Spirit of St. Louis, semi-scale, .049-.09.
Peanut Volkspine
Finish painting of rubber scale models.

Vol. 3, No. 17 \$3.00



May 1973
Bantee mini-pattern R/C 3channel, .19 power.
Woodwind A/2, all sheet covered wing.
Slope soaring technique.
Teakettle, twin-boom CO2 pusher.
Peanut Monocoupe 110.
Aerbo, .020 Replica, OT

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JULY

1978

volume 8, number 78

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GENERAL MANAGER

Anita Northrop

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| Rod Carr | Bob Preusse |
| Hal deBolt | Fernando Ramos |
| Larry Fogel | Larry Renger |
| Jim Gager | Dan Rutherford |
| Chuck Hallum | Ron Shettler |
| Bill Hannan | Bob Stalick |
| Dale Kirn | John Tucker |
| | Bob Underwood |

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COVER: The Curtiss Robin was the first gas model kit produced by Comet Model and Supply Co., coming out in April of 1937. This is Ron Martelet's Robin, just recently recovered, now powered with an old Veco 35, and radio controlled by a Kraft 3-channel system. For more information, and construction plans, see page 70 and 71. Excellent 2-1/4 x 2-1/4 color transparency by John Harast.



from **Bill Northrop's workbench**

...

- Ordinarily, we confine our publication of last farewells to members of the modeling fraternity, however, this is one exception that is a must, and in fact, still ties into modeling.

Frank Tallman was killed on Saturday, April 15, 1978, when his twin-engine Piper Aztec crashed into Santiago Peak, in the Santa Ana Mountains, practically within sight of Orange County Airport, where his aircraft firm and museum are located. The plane struck approximately 50 feet below the top of the ridge, under freak weather conditions that suddenly brought about zero visibility and a rapid drop in barometric pressure.

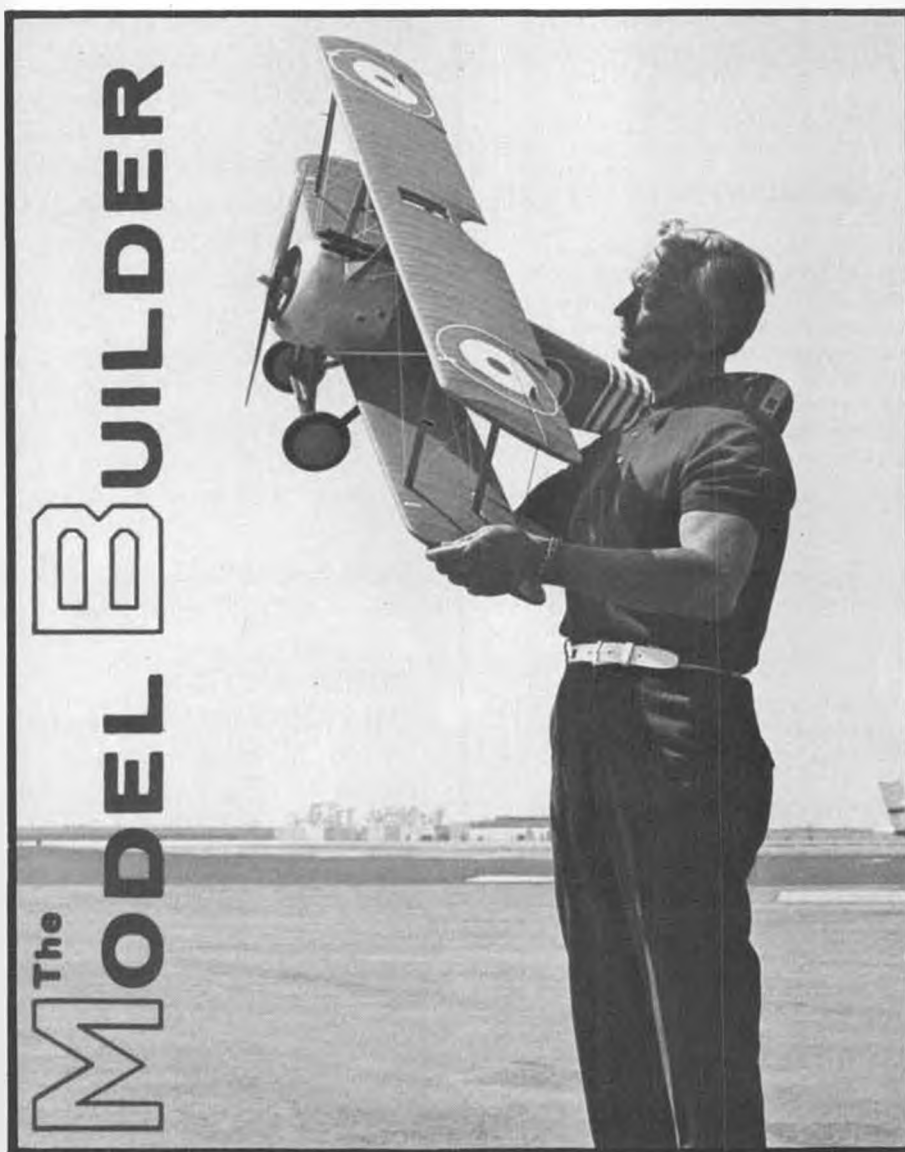
Frank started flying when he was eight years old (1927). His father bought him a two-seater biplane when he was still pre-teenage, and he soloed at 16. He was a Lt. Commander in the Navy during World War II, was a charter pilot, crop-duster, test pilot, and stunt pilot in more than 150 movies and television films. The most recent TV series for which he provided all the aircraft and flying scenes, is "Baa Baa Black Sheep."

One of the toughest stunts for Tallman was flying a twin-engined Beechcraft through a billboard with only three feet of clearance on each side, between steel girders. He ended up with a cockpit full of wood and paper, and his front windshield

Continued on page 142



Members of the R/C helicopter fraternity gathered at MODEL BUILDER's booth in Toledo, shortly after their reorganizational meeting, which was brought about by the withdrawal of support of the NRCHA by RCM. (l to r) Eloy Marez, MB Editorial Assistant; MB's editor; Horace Hagen, Don Chapman (back to camera), Ernie Huber, and John Simone, Jr. NRCHA has been dissolved, and a new organization will probably be formed around the AMA Helicopter Advisory Committee.



FRANK G. TALLMAN on the September 1973 cover of MODEL BUILDER

OVER THE COUNTER

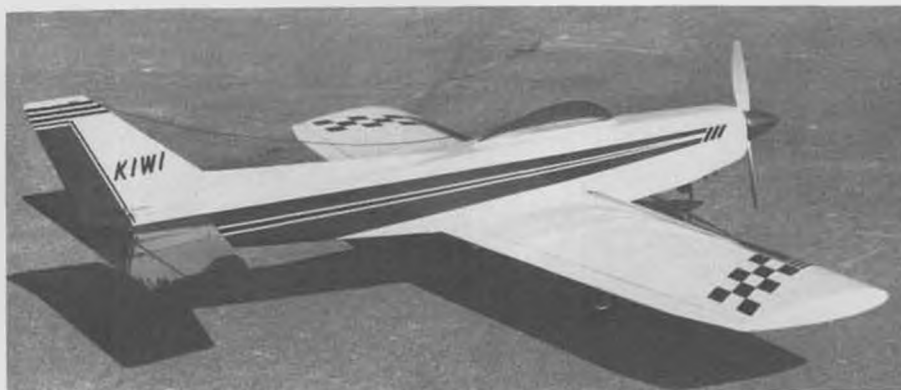
• If you are one of the countless flyers out there who own Futaba systems, or if you have been thinking of a new system, and have also been eyeing a 1/2A racer or other small airplane, you'll be happy to learn about the new Futaba S20 servo, which measures a mere 1.188 x .625 x 1.125 inches.

The size, and the price, at \$39.95 are the only small things about the S20. It is rated at a respectable 22.2 ounce-inches of torque, with a stop-to-stop time of .5 second.

A number of friction decreasing, thus efficiency increasing, features are apparent. It uses metal gears, and a ballbearing-supported output shaft. It uses a five-pole micro-motor, and an integrated circuit amplifier that draws only 5 ma at idle. Thus, it should be possible to get sufficient flight times without resorting to the larger battery packs. And all of this at .8 ounce, yet!

The S20 is completely compatible with every Futaba system, from the FP-2GA to the Contest 7. See it at your Futaba dealer, and for more information, check with Futaba Industries, USA, 630 W. Carob St., Compton, CA 90220.

"Battery efficiency . . . good cells, fully charged . . . is a major key to safe, successful R/C System operation", quoted directly from the



Sig's "KIWI" for .35 to .45 powered R/C on four channels. Fine for sport and pattern.

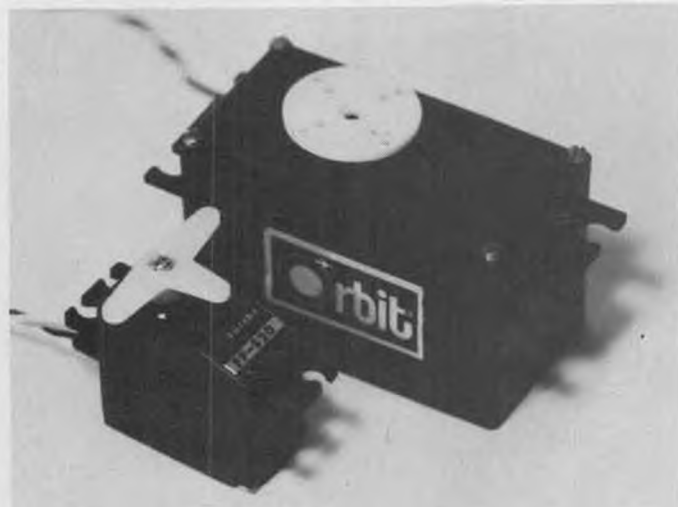
instructions sheet for MRC's new "Charge'n Test". And truer words were never spoken. If you are flying around with old, tired marginal batteries in either your receiver or transmitter, it is only a matter of time before they let you down, in the worst way possible.

Obviously, this is a well-known fact amongst the more experienced among us, as indicated by the large numbers of expanded scale voltmeters and quick chargers we see in use. The new MRC "Charge'n Test" takes care of both chores at once, with no sacrifices being made in going from one to the other.

The testing is done under load, exactly as required for each type of battery. Readings are displayed on a



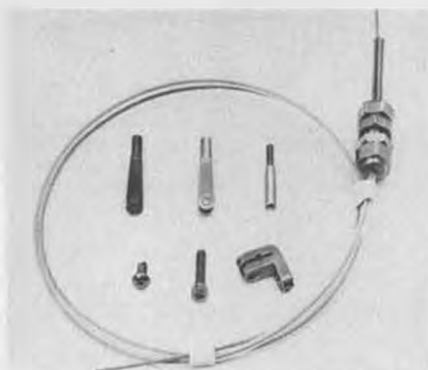
MRC's Charge'n Test takes care of your batteries.



Futaba's new S20 super-miniature servo retails for \$39.95. We've come a long way since the old Orbit PS-2!



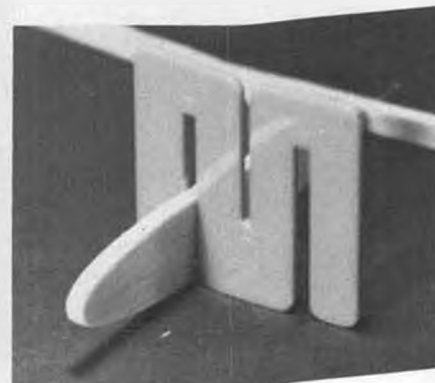
The MRC/Mabuchi Electric Power System.



K&B Exhaust Valve linkage for the outboard 3.5 cc engine.



Tough cut-off wheel from House of Balsa.



House of Balsa's "Up Right".



This "Dauntless" is not a dive bomber! It's 49-1/2 inch long scale power boat by Dumas.



House of Balsa's .29 to .40 powered P-51D Mustang.

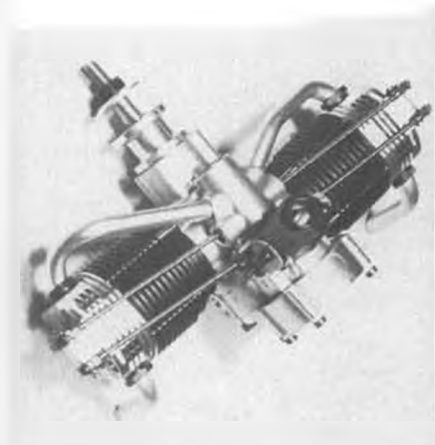
high visibility, extremely accurate, but easy-to-read meter that is expanded not only electronically, but physically as well, as it runs the full width of the case. The markings are in various colors, to avoid confusion, and easy to see and interpret.

Charging rate is also read on this meter, on a different scale, also easy to read and monitor. As with most chargers of this type, charging is done from a 12-volt DC source, and the "Charge'N Test" comes equipped with a plug to insert in your car's cigarette lighter.

A very important feature is that you can also charge transmitter batteries . . . something that cannot

be done with many other field chargers.

Recently, there seems to be some doubts as to the value of the extremely high rate charging that is being done, which shows up as reduced capacity and life. The "Charge'N Test" charges at a lower rate, C/3, or one-third the amp-hour capacity. Naturally, this increases the time required for a full charge, but is enough to permit you to put back in what you are taking out at the field. With a little practice, it shouldn't be difficult at all to establish the safe flying time that you have left, or have put back into your system's batteries.



The sensational new Damo is imported by Midwest Model Products.



The .049 version of the Midwest Products Axi-Flo Ducted Fan kit is now ready for delivery.



Polystyrene A4D-1 Skyhawk from Midwest Products, designed by Nick Ziroti.



Diesel with "throttle control" by Davis Diesel.



High velocity fuel pump by Sonic Tronics.



Spring starter by Davis Diesel for the Cox TD and Medallion engines.



Custom needle valve by Kustom Kraftsmanship, for several larger engines.

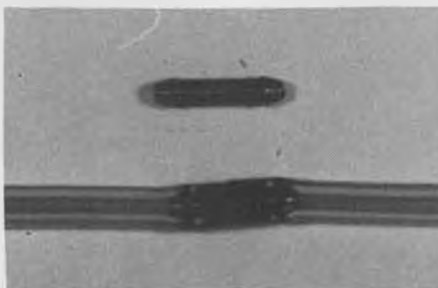


Experimental left-hand prop from Top Flite. Lettun know if you'd be interested in owning some.

You'll need a set of plugs to mate with those on your system. Otherwise, it is all complete, including a set of can't-go-wrong instructions. The price is only \$59.95, at your nearest MRC dealer. More info from Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.

Did you ever notice how many things eventually come around in a circle? Take electricity, for example. Ben Franklin first sucked it out of the sky with his kite and key, and now many R/C'ers are putting it back in the same place with electric airplanes. And no doubt, there will be many more in the near future, as the problems of electrically turning that prop have suddenly been reduced with the introduction of the MRC/Mabuchi Electric Power System.

Available as a complete package of airborne components, the system also includes all the support equipment and necessary accessories. The high reliability motor can success-



In-line pneumatic retract "slower-downer" by Fliteglas Models.

fully fly models of up to an .09 size, and is powered by a 9.6 volt, 600 Mah battery that also powers the R/C receiver and servos. An ammeter-equipped quick-field charger, to plug into your cigarette lighter, is also included, as is a cut-off voltage regulator (CVR) that can be considered the brains of the unit.

The CVR provides the proper voltage to the receiver and motor, and cuts off the latter long before the voltage drops too low to operate the radio. You are assured of plenty of time to get your bird down, no



Sonotrak picks up RPM's in the air, and also figures speed of aircraft.

matter how high, or high up, you may be. The CVR can be servo-controlled, so you may glide around between periods of powered operation. It also automatically prevents full discharge and possible cell reversal or other damage to the battery.



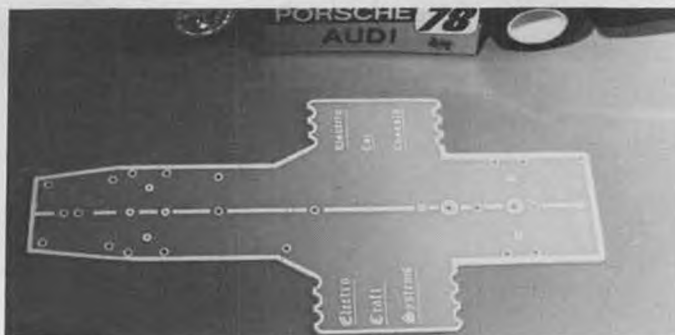
Adhesives by Custom Model Products.



F-86A Sabre for ducted fan motivation, by Air-Forms.



Flight Dynamics' Ryan ST.



Electric car chassis by Electro Craft.



Wingsox by G.B.S. Enterprises have a tailored fit.



Latest Rossi from Bill's Miniature Engines.



Flight Dynamics' J-3 Cub.



"Trans-Bag" by Custom Model Products.

The battery pack has some safety features of its own, such as a built-in thermal circuit breaker that will prevent heat damage, either during the charge or the flying periods.

The fast charger, complete with cigarette lighter type plug, will

charge the battery at the proper safe rate within 25 minutes, if fully discharged; less time if only partially discharged.

Seems as though MRC/Mabuchi has it all together for us . . . look for this nothing-else-needed package

at your dealer's, available now for only \$129.98. If he doesn't have one on hand yet, contact Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

* * * Continued on page 135



AT-6/SNJ by Flight Dynamics.



P-51 by Flight Dynamics.

Has d'Galt's beautifully built Formula 1 "Lil Quickie", which is this month's feature R/C construction article.



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ME 110 by Dale Kitterman won award.



Pitcairn PA5, also an award winner, by Al Kretz.



WORLD

by BILL NORTHROP

PHOTOS BY DICK TICHENOR

● 1978 TOLEDO R/C EXPOSITION ●

• The Granddaddy of all consumer shows for the R/C model industry, the Toledo R/C Exposition, has completed its 24th annual session. For three frantic days, 165 exhibitors, occupying 256 booths in the Toledo Sports Arena, fielded questions from and handed brochures to thousands of spectators who mobbed the huge facility from 9 a.m. each morning, until 6 p.m. on

Friday and Saturday, and until 2 p.m. on Sunday.

Among exhibitors, the Toledo show is known not only for its largest spectator turnout, but also for the fact that the largest percentage of these spectators are live, interested modelers who have come out of a long winter's hibernation to see what's in store (or perhaps we should say "in hobby shop") for the

coming active season.

Each year that we go to this show, and this was our 18th in a row, it has gone through a continual growth in actual exhibition area, in numbers of exhibitors and booths, and in spectators. And each year that we have written a report about it, and that's been going on for about 14 years, the task becomes more and more monumental. Obviously, to



Joe Bridi congratulates "Best of Show" winner, 17-year old Bill Besler, Cedar Rapids, Iowa. Ship is a "Dirty Birdi", natch.



Dieter Schluter was extremely pleased to receive "Father of R/C Helicopter" award, presented by Bob Hisey and Gail Wehner.



Cliff Rausin (left) and Alberto Dona, of Condor Hobbies, with KGH engine and KO Digiace radio.



Award winning Berkeley Brigadier Old Timer, by Gordon Pearson.



Andy Wahl, from company making Damo engine in Sweden. Experimental 4 not for sale!



No, M.E.N.'s Jerry Jarvis isn't short, everyone looks up to Mike Taibi, Superior Aircraft Matl.



It's good to see John Tatone back with his many accessories.



Kraft's Jack Albrecht displays the super-tini KPS-18 to an interested spectator.



Joe Fitzgibbon, Golden Age Reproductions, is producing many old rubber scale ships.



Tom and Marie Williams in their Craft-Air booth. Their gliders are winners.



Current national helicopter champ, John Simone, Jr., in American R/C Heli booth.

do a thorough job, we would have to mention all 165 exhibitors, and/or publish a photo of their booth and/or products. Doing this would take up practically a whole issue, and then our image of being a magazine of general coverage would be shot to hell. Consequently, we hope to give you our overall impressions with photos, and the comments herein.

Headline . . . BIG IS BEAUTIFUL, BUT HUGHMUNGUS IS MONSTROUS. We figured that this would be the year of the large R/C aircraft, and eagerly looked forward to it. However, like every trend, it has to go overboard before it settles down to something reasonable, and this



Lee Renaud, Cox Hobbies.



Cass Engineering's Pulsar and new Steen Skybolt. With one extra rib bay in each panel, the Skybolt qualifies for the Las Vegas rules.



Joe Bridi's bundle of birds will soon include Upton's Baby Ace, as presented in the May, 1978 Model Builder.



Steve Szabo, Tony Wilford, and Bob Karlsson talk about some ideas they have developed. Hydralocks a big item for pneumatic retracts.



Jerry Jarvis is doing great things with die-cut plywood in his M.E.N. line of kits. Gotta sore throat from so much talkin', Jerry?



Glen Toma, Manager of Service and Administration, Futaba USA. An excellent selection of radios, backed up with reliable service.



Herb Wahl (any relation to Damo's Andy?) makes fine ignition engines. Note Hurleman Twin.



Paul Bender, owner of Hobby Shack.

year it went overboard. There were very many sensibly large aircraft, but the unfortunate necessity of establishing parameters on the biggies is obviously at hand. We must not allow our good relationship with the FAA to be shot down by allowing oversized, overweight model(?) aircraft to get in the hands of less-than-expert fliers. Fortunately, without easy-to-assemble kits, and without the engineering ability to create such monsters on their own, amateurs aren't likely to get into that trouble . . . but let the model industry and AMA be forewarned . . . it will take only one serious incident . . . let's keep the law of averages on our side.



Toledo Queen, Gail Wehner (amazing resemblance to movie star Ann Sheridan) and Aling Lai, Thunder Tiger Model Co. owner, Taiwan.



Paul Tremarco, with Edson, showing new high temperature covering iron.



Joe Acosto, Tech. Sales Eng. with Westport International, makers of Variant radio.



Duke Fox points out something funny about his new 1.2 twin.



Ralph Stompanato, for Carrera USA, Box 566, Westmont, Ill 60559, importers of large scale gliders, now very popular in Europe.



Hurst Bowers shows off Flyline Models' new Great Lakes Trainer. These F/F and R/C kits are very popular.



Pert Charlie Cannon tells about the kit line. Bill Cannon in background.



Alex Amarillos, General Manager for Bavarian Precision Products . . . HB Engines.



Dapper Sid Gates, Royal Electronics.



Larry Stanfield, Stanfield Mfg. Co., Dallas, Texas. Fuels and great sanding bars.

Headline . . . ELECTRIC IS HERE TO STAY, BUT STILL HASN'T TAKEN CHARGE. Surprisingly, electric power for model aircraft and boats is slow in gaining the popularity enjoyed by 1/12 scale cars. Obviously, the power-to-weight ratio is an important factor in aircraft, but progress in this area is rapidly being made. Perhaps the most significant advance in electric power for aircraft was the advent of belt reduction, pioneered by Astro Flight. Bob Boucher is certainly doing his part to encourage more use of electric power (logically), but even though he introduced belt reduction drive for electrics at last year's show, it is



Ken Bless, representing Specialist radios in the Hammond, Indiana area.



Roger Christy, hard working plant manager for Carl Goldberg Models, has made it possible for Carl to enjoy semi-retirement in Calif.



Dave Gray, long-time H/C'er, showing off many of the accessories developed and marketed by Du-Bro Products.



An overall view of the main arena area, in which 95 of the 165 exhibitors had their products on display. This area also included the static model display, shown in some of the close-up shots on this page.





Sid Axelrod looks up from his 6,283rd demonstration of covering with Monokote.



John Brodbeck, Sr., the 'B' in K&B. See historic note in "Plug Sparks" column.



Harry Higley shows off belt reduction unit.



Ron "Quadra" Shettler, also MB's "Mammoth Scale" columnist.



Bill Hannah, originally responsible for getting Heath Co. into R/C kits, with Earl Witt, AMA.



Lee Robinson, Robinaire, with experimental concentric speed reduction unit.



Dee Hughey shows jig set-up for Dial-A-Prop assembly. Modeler can set or change pitch.

still only making slow progress. With the obvious environmental advantages of quietness and cleanliness, it would seem that public ignorance might be the only thing that's holding it back.

Headline . . . POWERBOATS ARE MAKING THEIR BIGGEST SPLASH. A glance at the boat model display area in Toledo could tell the whole story. In the past, it would almost seem that boat modelers and manufacturers were trying to keep their hobby a big secret . . . especially the complicated procedure of connecting the engine to the prop, the drive train. In recent years, some of the leading manufacturers have succeeded in breaking down this



Tom Perzentka, Octura Models Inc.



Nic Wildeboer, VP Sales, Fusite Div. of Emerson Electric (left), and John Kilsdonk, in the Glo Bee booth.



Larry Jenno, the "J" in J&Z Products, with a batch of props.



Bob Violett, with his "Polcat" and "Skyhawk" models overhead, fields interested questions from the spectators.



Bev Smith in the Pettit booth. Guess what, folks, you really don't have to wait 45 minutes after mixing. Write to Bev and find out!



Lou Holwitz (left) and Bob Garabello show relative sizes of stand-ard and mammoth scale retracts.



Jim Goad, Indy Sales, Curare 40 kit from Kato Model Aircraft Co., Japan.



Bob Smurthwaite, GS Products Corp., with new Stinson. Howard DGA-15 in foreground.

barrier, and last year, K&B smashed it wide open with its 3.5cc outboard. Here is the whole power, cooling, and steering bundle in one handful ... bolt it on, hook up fuel line, throttle and steering linkage, and head for the pond!

Ralph Warner, of Radio Control Models (RAM) has opened up another area of instant R/C boats. His molded plastic airboats will get you into (or onto) the water in no time. And to further encourage this hobby, he has shown how electric prop drive will allow clean, silent running on the most sacred water spots. This year, he came up with still another



Joe Baca demonstrates adjustable pitch gauge for helicopters.



Ralph Warner showed adaptor kit for mating Astro Flight electric motor to K&B outboard lower drive unit.



Howie Whitaker (left) and Mike Parsons with their Crapshooters.



Gene Miller, Reading Hobby Supply (Penna.) and the new YS engine from Japan. Their slogan . . . "YS . . . Hell Yes!!"



Cathleen and John Heisch, Aeromobis, N.Y., N.Y., show what you can do with cardboard.



D.C. Engineering's 40-size belt prop drive.



"Butch" Schroder keeps 'em running at the MRC booth.



Art Kramer (left) and Larry Leonard in the Coverite booth.

idea . . . combining the Astro Flight electric motor with the K&B out-board drive train using an adapter kit he is producing.

And now, we must turn this report over to the visual portion. Incidentally, all of the photos were taken by Dick Tichenor, who, by his own choosing, is no longer with **Model Builder** magazine. We are sorry to lose his photographic capabilities, but are sure that his work will continue to appear elsewhere.

Next month's R/C World will cover the premier of the Interna-

Continued on page 142



John Fotiu makes 1/2A and QM racers as JM Glascraft.



Display of OPS engines and accessories in the Shamrock Imports booth.



Jay Alter, of Hobby Market, Dallas, Texas (left) with Chuck Holden, one of Southwestern Modeler Show executives.

nothing radical to detract from efficiency. The fuselage is minimum, just enough to cover the pilot and enclose the needed equipment. The landing gear is simplicity. With an excellent engine and the right prop, you have to go! But George did not stop here, he went on with that "little bit more."

Note the "different" surface tips. They are developed from the Hoerner ideas, with the objective being to reduce tip vortices and remove drag. They do work. Most outstanding is the engine cooling system and the method of taking in the cooling air. The "Lil' Quickie" design admits the cooling air through an annular ring about the spinner. You have to think a minute to understand the real advantage. Normally, cooling air is admitted through slots in the nose of the cowling . . . a slot on each side. When air enters a slot, it disturbs the air about it. We wish a smooth flow of air about a cowl to reduce drag. When you disturb the flow at its inception, it remains disturbed while it flows back, thus drag is increased. With the annular intake, you have a smooth airflow over the cylinder cowls. With a revolving propeller, even with a spinner on it, you will have disturbed air where the prop joins the spinner. No way to prevent it. With the annular intake, the air is taken in where disturbed air already exists, you add little drag with your air intake.

Whether these facts have any value for our models is questionable, we louse things up much worse than that in other areas! However, this method of air intake has proven to be of great value in other ways. For the first time we can have a forced airflow over our ENTIRE engine . . . we can positively cool the whole engine. This annular intake is much larger than the normal slot, thus you have more cooling air to begin with.

Part of the intake flows past the crankcase and lower cylinder, exiting through the exhaust duct. Part of this same air is used by the carburetor. The remaining portion is channeled to the cylinder fins and head, being forced through the fins by the close baffling. This portion also exits through the exhaust duct. The exhaust pipe is also in this duct, nothing in the breeze. Obviously, the pipe is also cooled, resulting in less heat transfer to the engine. This system can be interesting, because it is different from the "norm". What is important is that, in practice, it has proven to be the finest cooling system I have ever seen for a model engine, and I do not believe there are any which I have not tried!

What are the other interesting



Removable engine pod allows complete power plant checks, even between heats. Radio system also becomes quickly accessible, making for easy maintenance.

features of this Form I model? First, of course, has to be the "power pod" that I have successfully used for so many years. Anyone will certainly subscribe to the utility of it, there is no other way to compare to it in that respect. With the "Lil' Quickie", it is hard to see any other way to take full advantage of the cooling system offered.

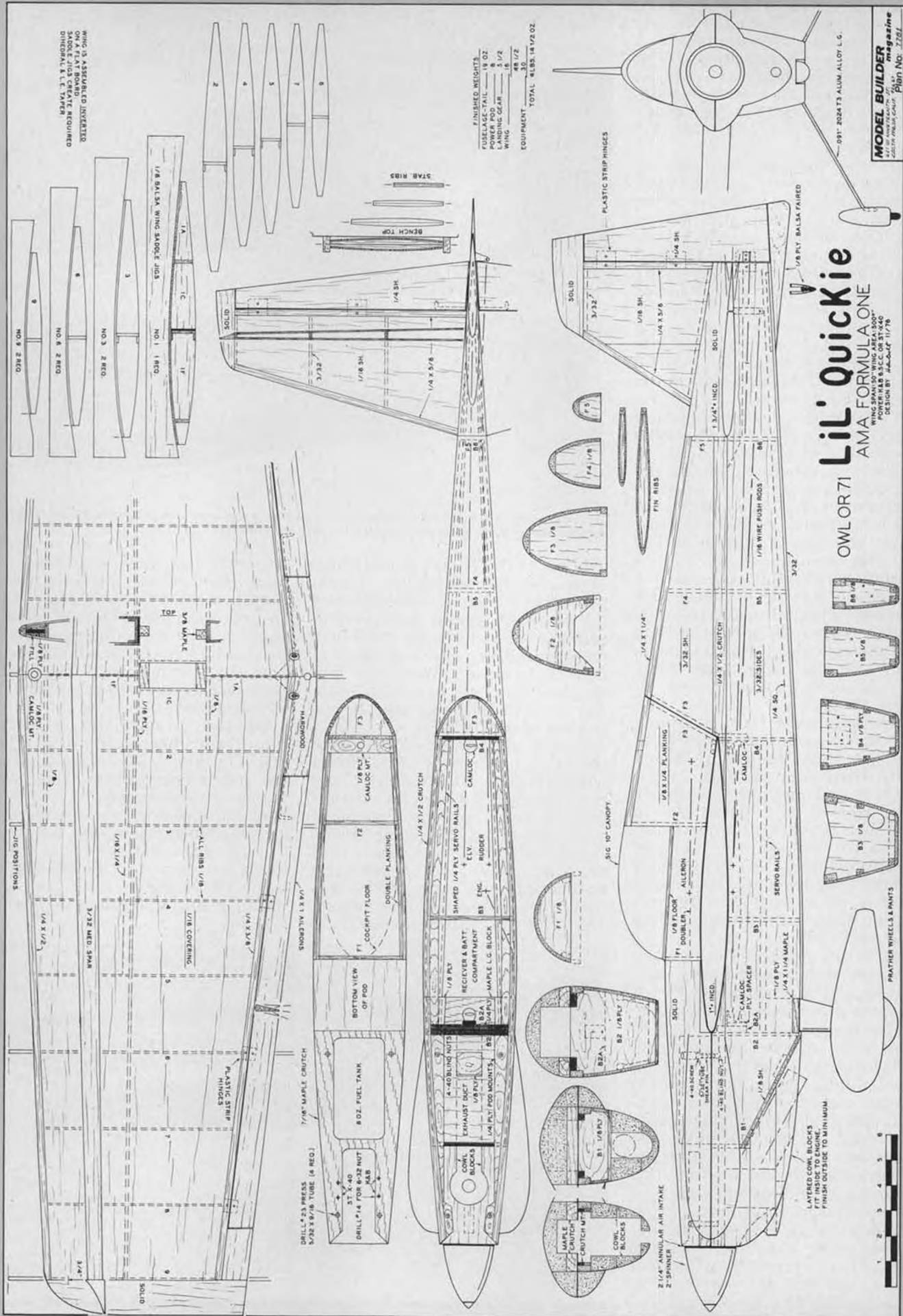
People often question me about the value of a power pod. After a while you begin to think that you may be right, when few others follow in your footsteps. A couple of years ago I had the lesson driven home to me until it hurt. For a whole season, I flew aircraft with the normal side mounting and installation. These were top line aircraft. The result was that normal mainte-

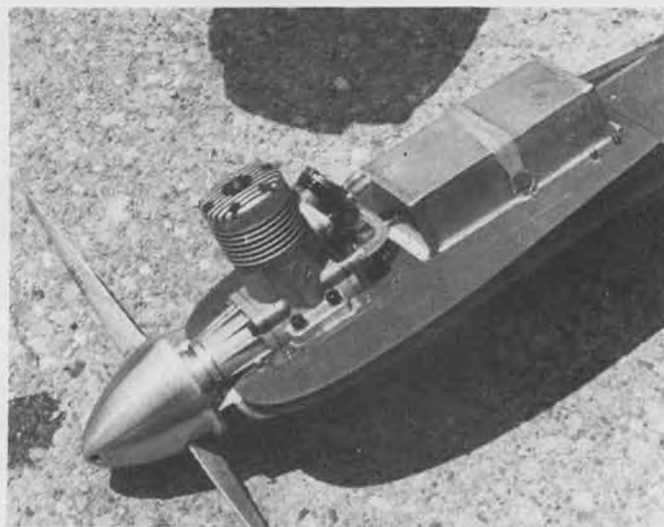
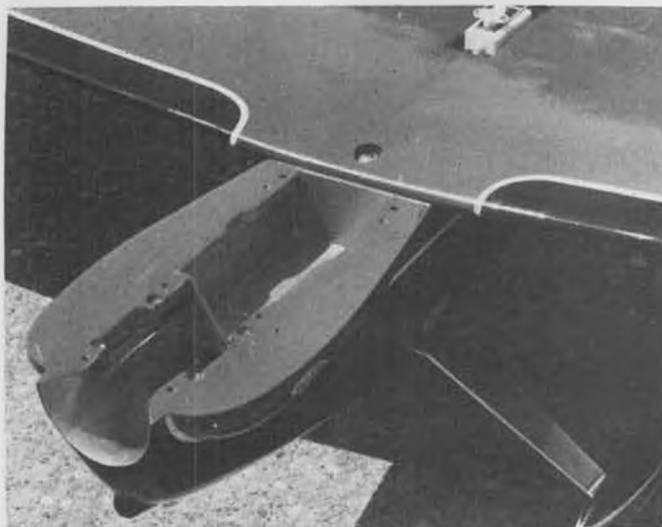
nance during the year required more than double my usual time, disturbed my radio installations, and cost me a couple of races because I could not get at a problem between heats, which would have been a lead pipe cinch with a pod. I guess you have to go both routes before you appreciate a power pod. . .

Fuselage cross section is always important in reducing drag. The "Lil' Quickie" was shaped around the pilot's front profile, thus it is minimum. Fortunately, the shape is easy to duplicate, and allows the greatest advantage to be taken of our cross-section rule. The basic fuselage is widest at this point and tapers drastically bore fore and aft, resulting in the absolute minimum possible.



Although the wing is larger than on most Form I models, there is less drag and more lift, which keeps the model from "sliding out" and losing speed in turns. Uses stressed skin construction.





Use of power pod combined with a portion of fuselage solves wing removal problem. Power force transferred to fuselage by shear pins. Pod held in place with screws, wing with Camloc.

With shoulder-wing models, the construction of the portion of the fuselage that is on top of the wing is always a pain. To do it well, the construction usually involves working with the wing attached to the fuselage and, of course, the wing is always in the way. A removable engine pod also creates other problems in this case.

We found a real neat solution with the "Lil' Quickie". The power pod was combined with the portion of the fuselage above the wing so that the whole bit is removable. Construction becomes real simple. The entire fuselage is assembled as one unit, the wing cut out made, and then the extended pod is removed. The wing does not become involved in the fuselage assembly!

A little more thought than normal was given to the wing configuration, with good results. The outline is fixed by scale. The minimum thickness and area is fixed by the rules. Otherwise, we have a free hand. Normally thinking, you would expect a wing of minimum area and thickness to have the least drag and develop sufficient lift. The usual minimum wing has a maximum chord of 11 inches and a span of 48 inches . . . area 450 sq. in. The thickness rule allows the use of about a 9% airfoil. Such a wing will have a front plate area of about 38 sq. in. . . . Most of us have used such wings in the past, and have noticed the model "drop out" in the high speed turns. Obviously, more lift would help in the turns. We found sufficient lift by increasing the airfoil to about 12% in thickness. This increased the front plate area to 48 sq. in., but we did get better lap times.

The "Lil' Quickie" does not drop out in turns, instead it seems to be accelerating out of the turn, at times. The reason? We obtained 50

more inches of area, an 11% increase in lift, while adding only 2 sq. in. to the minimum front plate area, and having only an 8.4% airfoil.

The airfoil used is the highly efficient, low drag NACA 65009, slimmed a bit to meet the rules. This foil is extremely stable, as well as fast. There are no problems with it when slowed down for landings, or in high speed stall conditions.

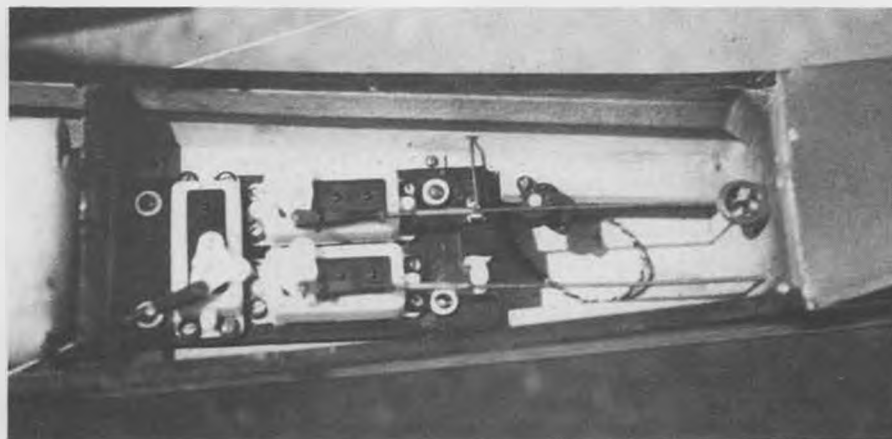
CHOICE OF POWERPLANT. . .

The "Lil' Quickie" power pod and cowl arrangement adapts easily to any of the current Formula I en-

gines. The K&B 9001 rear rotor and 9020 front rotor can be interchangeable, if the cowl is shaped to the front rotor engine. Unfortunately, no easy way has been found to make the ST X-40 interchangeable with the K&B. However, the installation adapts to this engine just as easily as it does to the other two. The choice is yours.

There is plenty of room in the pod for an 8 oz. fuel tank, with its ample supply. The tank should be bedded in foam and can be held in place

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Radio installation is purposeful throughout. Servos mounted in tray, which is fastened to aluminum rails that are screwed to wood rails on side of fuselage. Antenna well away from servos.



The "Lil' Quickie" was designed by George Owl as a successor to the "Pogo" and "Fang". It has been National Champion in full scale for several years.



A Gipsy Moth on one of its maiden flights, in Nova Scotia. Built by Arie Hakkert, the Moth weighs 19 pounds, and is powered by a Quadra. A Kraft 5-channel Bi-Centennial radio works without interference from the ignition. Takeoff is as half-throttle, while cruising is at 1/3.

1 TO 1 SCALE

By BOB UNDERWOOD

• How often have you seen a beautiful model that flies in a most wonderful fashion and is entered in contests, but is never winning. It's a most frustrating experience for the builder, but the fact may be that he has never come to grips with one simple fact. He has never convinced the judges that the model is accurate.

There are perhaps two reasons for this situation. First, the model may not be accurate, but more likely, the second condition is closer to the fact; he may not have *proved* that

the model is accurate. Both of these causes are often the result of a common modeling disease called Buildicus Backwarditicus; the modeler has built the model and then sought to prove that what he has is accurate. This, of course, sometimes creates insurmountable problems, and at the least, it causes an annoyance.

Therefore, we must present cardinal rule number one in scale: Collect *all* necessary information *before* gluing the first stick. Pay attention to the word "all" as well.

Often we've seen a model prepared from a three-view, but leaving the color documentation until later, only to have that become a major problem, especially with pre-WW II aircraft. As an aside, it appears that judges are often far more affected by the color rendition than the model outline.

The collection of information leads to one important second consideration: Is the information obtained accurate? You will find a tremendous variation in some materials collected on some aircraft. As an illustration, consider the information gathered for the Wittman D-12 "Bonzo". Ultimately, four three-views surfaced, not one of which was completely accurate, and two of which were quite unsatisfactory. One involved simple errors, such as an oil filter cap position or a cowling panel line misplaced. The



Arie "Harry" Hakkert checks out his Gipsy Moth before a flight. Quadra was a snug fit in the cowl, required cut-out for carburetor. Ship is all yellow, with Halifax Flying Club registration.



Patricia Groves demonstrates method of getting scale info without letting your friends know what you plan to build.

more flagrant had inaccurate dimensions and even had neat little touches added, such as padded headrest and the like. For Sport Scale, there would not be any serious problems created. However, for AMA or FAI scale, frustration might set in.

It was interesting to note that while four three-views were available for the "Bonzo", the EAA museum indicated that to their knowledge no one had actually measured or visited the aircraft during its tenure at the museum. It makes one wonder where the information came from to prepare the three-views, doesn't it?

The important point for both you, the builder, and the judges, is that when one element of the documentation is proved inaccurate, it opens the Pandora's box to doubt other items as well. It behooves you then, if at all possible, to visit the aircraft you are modeling (Visit, visit, and revisit.). Beyond the obvious reasons of being able to verify aspects of the aircraft and relate them to a three-view, it allows you to savor the flavor of the aircraft. By this, I refer to the less clinical but more psychological aspects of scale aeromodeling. I feel that this is of prime importance in capturing the true essence of a subject. In addition, it allows you the opportunity to see the many things a three-view or photos cannot reveal. Subtle curves, intersections and the like, can often only be surmised from a three-view, but be prepared for a shocking revelation, for each time you visit the aircraft, new things will appear that you missed before. Write these impressions down, photograph



O.U. Larsen has worked out a scale wing folding system for his Gipsy Moth, down in Marietta, Georgia. We'll publish sketches and instructions on this very soon. Color photo print is dark.



O.U.'s Moth on a low pass for the camera. Power is a Webra .61. Many plan sets sold.

them, or sketch them.

In many cases, of course, it is impossible to visit the aircraft. Under that condition, you must use a practical eye to determine many of the things you need to know. Be

especially careful of military aircraft, for so often, subtle variations appear between supposedly the same model of aircraft. For instance, in WW I, some squadrons modified things like headrests, etc. to suit their particular desires. Thus you may have photos of what should be identical aircraft, but they are not due to these changes.

I feel that many modelers make a costly mistake, especially in Sport Scale. Often the modeler will wish to use a color scheme not used on the aircraft in the three-view. As a result, he is forced into asking the judge to shift mental gears in order to arrive at the aircraft modeled. I have found it far more successful in Sport Scale to utilize something like a Profile Publication, which combines the three-view and the color presentation in one. As a result, the judge can make a direct comparison between the model and the aircraft. In addition, it shows, in most cases, all sides in respect to the coloration, rather than just a side profile, leaving the upper and lower surfaces, as well as one side, open to interpretation.

A very common failing occurs when the modeler does an excellent job of *proving* that what he has is *inaccurate*! This condition is perhaps more common in AMA Precision or FAI Scale, where too much information can be provided. Reading the rulebook, you will discover what is required for a presentation. In most cases, several pictures of each scoring section is all that is required. Of course, in Sport Scale, you are limited to 6 pages, 8-1/2 x 11 in size. To provide copious numbers of detail pictures can result in overkill. It numbs the judges mind and will, without fail, result in proving an inaccuracy. This statement is not to be construed as an attempt at cheating by not providing information.

I ended last month's column with the comment that you should remember that you have lived with the

Continued on page 108

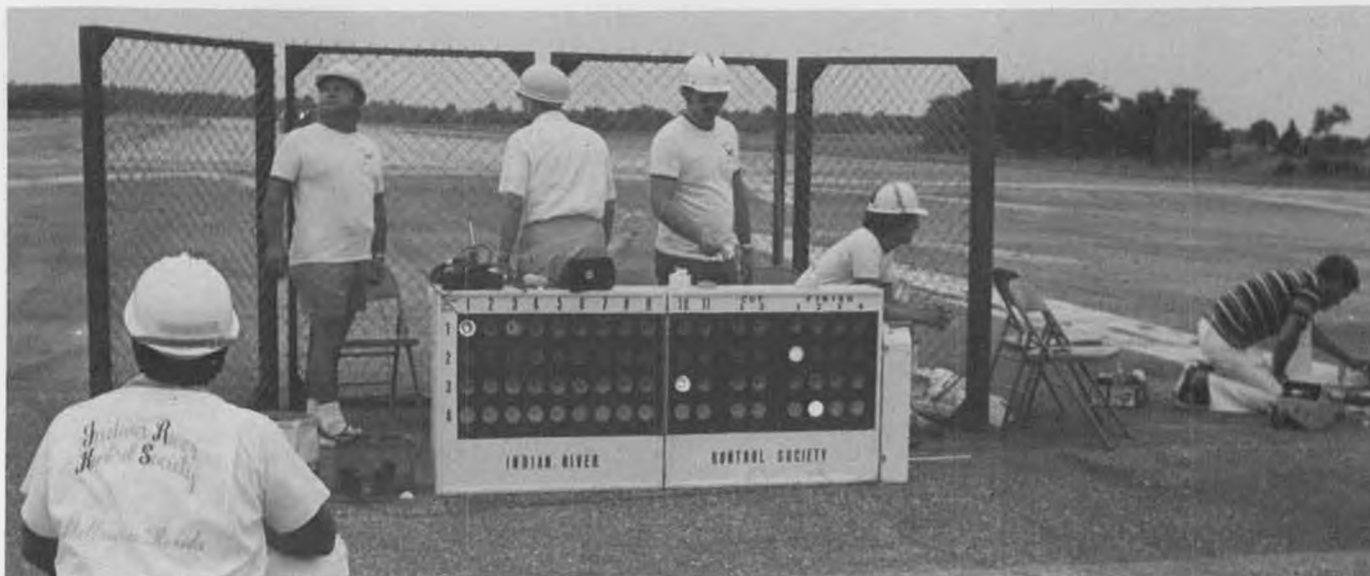
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| SOCIÉTÉ ANONYME DES ÉTABLISSEMENTS NIEUPORT ISSY-MOULINAUX | |
| MODEL XI | No. 111 |
| MOTEUR - LE RHONE | |
| BIE S.G.D.G. 15 MARCH 1914 | |
| ACCOM. REPER. PERUCA 1913 | |

| | |
|--|-----------------------|
| EXPERIMENTAL AMATEUR-BUILT AIRCRAFT | |
| MODEL | STEPHEN SORRELL SNS 7 |
| SERIAL NO. | 209 |
| DATE OF REG. | 4-77 |
| ENGINE | YC10 360 BIE |
| NAME | RAY H. STEPHEN |
| ADDRESS | 450 SARATOGA AVE |
| CITY & STATE | SANTA CLARA CA |

| |
|--|
| PASSENGER WARNING |
| THIS AIRCRAFT IS AMATEUR BUILT AND DOES NOT COMPLY WITH THE FEDERAL SAFETY REGULATIONS FOR "STANDARD AIRCRAFT" |



Scale aluminum information panels, with adhesive backing, are available to your specifications from Rare Birds, see text.



Computerized light system for counting laps and cuts, developed and used by the Indian River Kontrol Society. Works just great! Like that double-wired fence, too!

PYLON

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

'GO FAST AND Turn Left!'

IT BLOWS ME AWAY!!

I just got through reading an article in another magazine, in which the author was proposing we make it easier for the newcomer in racing to win a trophy. It seems these kinds of ideas run in cycles, as we'll go along for a period of time with basically stable rules, and then somebody gets a bug up his (censored) and wants to change things.

Look . . . racing is a costly and demanding sport. It's the peak of R/C modeling, combining the realism of miniature aircraft with their full scale counterparts, the flying ability necessary for aerobatics (although not quite the same skill level), and the excitement and glory

that only speed imparts to modeling. Do we want to retreat from this lofty and respected image that belongs to racing, after working so hard to get there? There is no easy way to win . . . it's going to require money for competitive engines, competitive aircraft, and attendant support gear. As a rough guess, it probably will cost the serious racer at least twice as much to compete over a season's time as it would a Pattern flyer. And, like any other skill hobby, it's going to take long hours at the building board and at the practice field to acquire the talent to become a winner.

So don't kid yourself or someone else interested in becoming a racer,

'cause it's a long rough road to even get near the top. And it's that very same road that makes the arrival so very special and respected.

The trend towards breaking races into "expert" and "standard" classes is one of the moves designed to make it easier for someone to win a trophy, as if just having a "trophy" should be the ultimate goal. I find it hard to believe that this move is going to promote racing. For instance, let's say you have a race with 50 entries; 25 in "expert" and 25 in "standard". If, at the end of race day, you're in first place in "standard" class, what did it prove? You're still only really in 26th place no matter how you rationalize it, and 20 guys who probably flew better than you weren't recognized at all. The situation seems similar to being asked 'who was the 5th man to set foot on the moon?' Probably the only people who could answer that include the guy who did it, and his mother. Too many winners make winning less of a victory. Anyway, that's my opinion.

Okay, we'll get down off the soapbox and put it back into the closet for awhile and try to pass some information along that will help the beginning or non-expert QM flyer we just destroyed.

Three factors make up a racing combination; the pilot, the engine, and the aircraft. The pilot is listed first, because if he can't take off



Action shot from NMPRA Championships in Valkria, Florida, October 22 and 23, 1977.



Bob Violett and his Polecat, which he kits. Can be built as a one or two-piece airplane. Picture taken at NMPRA Championships.



Bob Brogdon and his "Bandit", at the NMPRA Championships.

properly and get around the course, nothing else is going to matter. A racer should at least possess moderate flying skill and have enough flight time in his logbook so that he'll be able to fly instinctively; there's very little time to think about flying during a race. The only way to get this experience is to go out and set up the pylons and fly the course. Practice just as if it were a race, coming as close to the pylons as is comfortable, and at a height that will allow you to see just where the airplane is in relation to the pylon. True, it's not going to be quite the same as in a race, when there are as many as three other planes fighting for the same airspace, but at least you'll be more confident of your ability.

Another area that seems to cause some problems is in racehorse starts. We've seen many airplanes get zeroed or wiped out entirely due to ground collisions or mid-air right after takeoff, as everyone releases their planes at the same time. One or more of the aircraft is sure to veer to the right or left, wiping out one or more of the planes before the race is ever underway. Use some strategy to avoid this situation. It won't hurt to hold your plane back for an extra second or two and let the airspace clear out a bit. It's doubtful that this extra time would cost you the race. If it's that close a race, you're already flying with the hot shots and don't need this advice. Conversely, you can also anticipate the drop of the starter's flag and pick up an extra second's lead. Just don't be too blatant about it or you could wind up with a zero.

Since the takeoff is the prelude to a successful race, you should practice flying the pylons. Learning to play the rudder stick with the wind coming at the plane from various

quadrants is of prominent importance. No matter how carefully the course is laid out in regard to wind direction, chances are the wind will shift during the day of the race, and you'll be faced with the crosswind takeoffs. So when you go out to fly, don't just point the nose directly into the wind. Try setting the plane at an angle to the wind, even so far as to have a 90° crosswind. The experience will pay off on race day.

Most racers are now building their planes with a fixed tailskid, having found that a movable one makes it too easy to over-control on takeoff. It seems that with our engines screaming at full throttle, there's enough air moving over the rudder to allow sufficient control. Of course, as the aircraft picks up speed, the rudder becomes even more effective, and these babies are moving right from the release. You might also find it helpful to lower the plane's angle of attack while sitting on the ground, by lengthening the tailskid wire. In making this change, it forces the plane to take off at a lesser angle of climb. There are

several benefits to this approach . . . one being that most of the other planes will be climbing to racing height right away, so you'll be below the air traffic; two, a lower angle of attack will allow the airplane to accelerate to maximum speed quicker; also, in a strong wind, your airplane will be less subject to stalling and snapping into the ground should a strong wind gust hit your plane before it reaches flying speed.

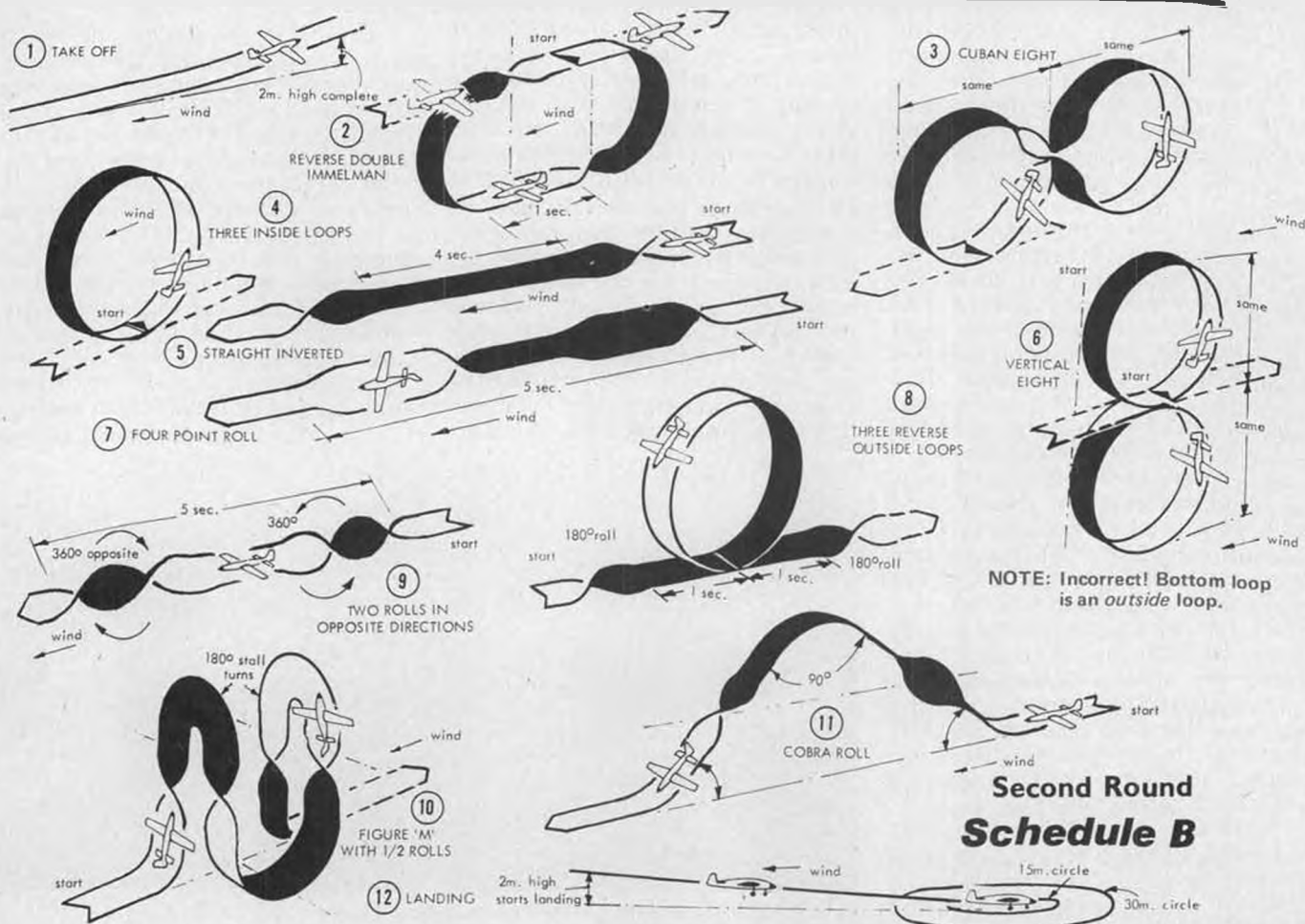
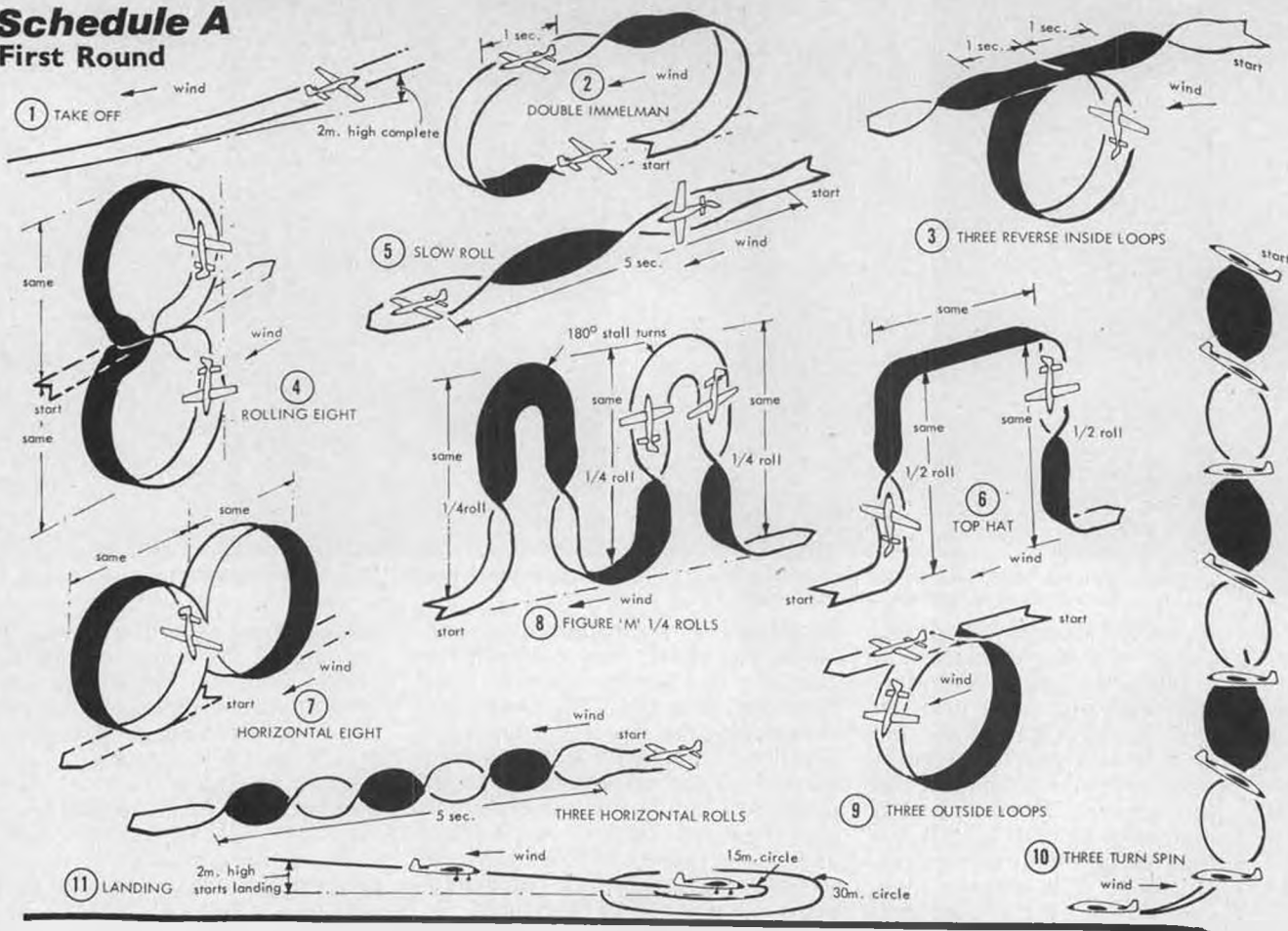
Turning to the engine, there are only two competitive QM engines on the current racing scene, those being the Cox Conquest 15 and the imported Rossi 15. It's a toss-up as to which is better. The Rossi held the lead for quite some time, but appears to be in decline, while the Cox is rapidly moving to the forefront. We base that statement from reading race results and having talked with a number of engine experts, who maintain that the Rossi quality and workmanship have declined ever since many clubs instituted their own fixed retail cost to engines

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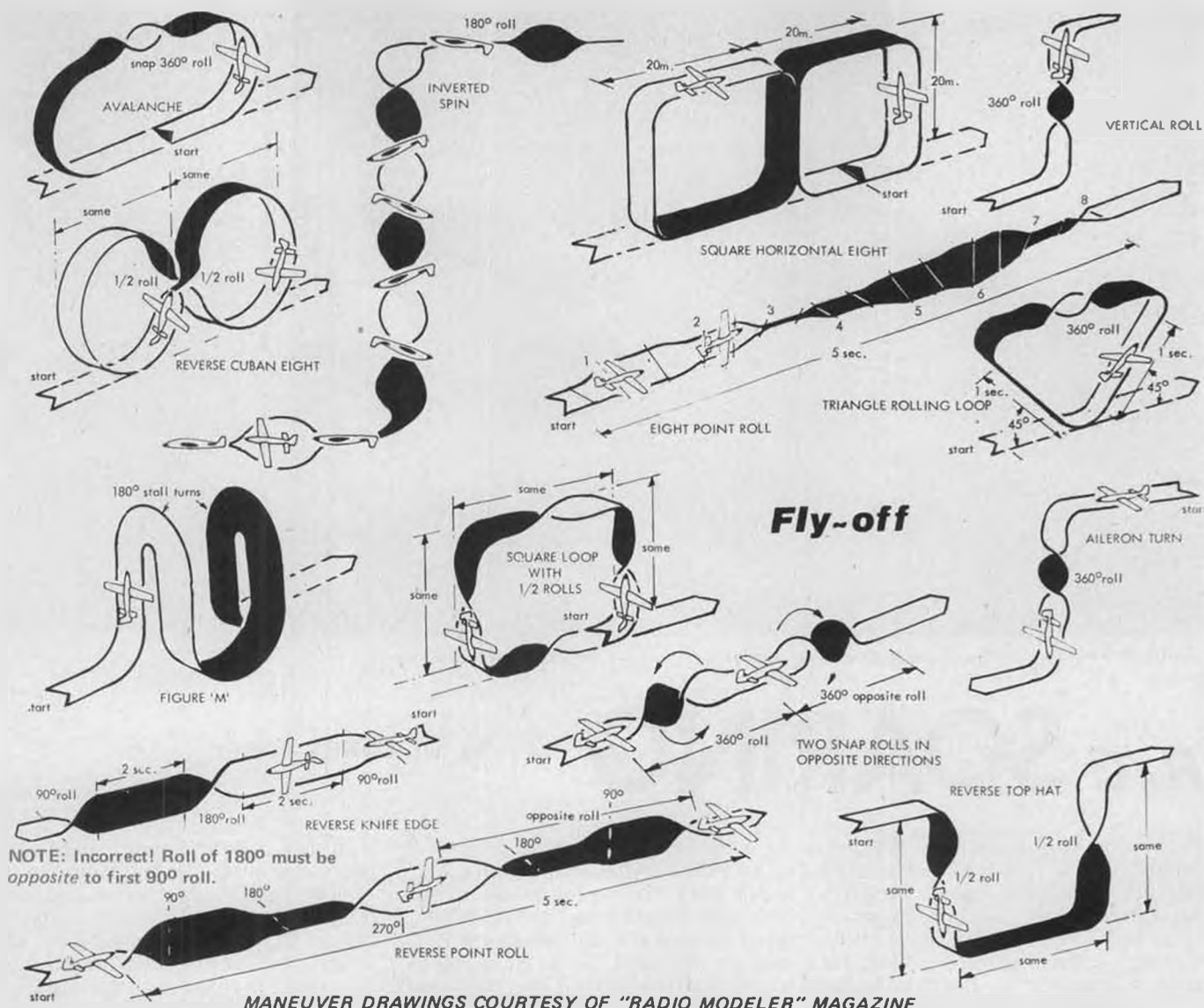


Action shot at the NMPRA Championships, Valkria, Florida.

Schedule A First Round



Second Round Schedule B



WHAT'S A JUDGE TO DO?

By BILL NORTHROP . . . The 1978 FAI Pattern has some new maneuvers, but except for the snaps, they are still combinations of rolls, loops, and stall turns . . . just *different* combinations! Be prepared for them!

WHAT'S A JUDGE TO DO!?

After weeks of juggling with the new, 1978 "ABC" Pattern, which the FAI handed us around the first of the year, the R/C Contest Board has finally settled on the AMA Expert and Masters official pattern schedules for the 1978-79 rules period.

As the Board had originally decided, before the FAI threw its curve, the Expert class will fly the 1977 FAI World Championships schedule. In the Masters class, two closely related choices are available. One choice is the complete 1978 "ABC" Pattern, which consists of two rounds of Schedule A, two rounds of Schedule B, and then, for those who qualify for the finals, two rounds of a fly-off schedule which is determined by each contestant.

The second choice for Masters

competition is a compromise for small one-day contests, or ones in which Novice, Advanced, Expert, and Masters Pattern are scheduled, in addition to Sport and/or Precision Scale. In either case, there may simply not be enough time and/or person-power to run a complete 1978 FAI series of A, B, and Finals rounds for Masters in addition to the other events. The second choice, therefore, is for the Masters to fly the Finals schedule only, in all rounds of the contest.

What's a 1978 and 1979 Pattern Judge to do? In Novice, Advanced, and Expert, judges will find only two new maneuvers in the 1978-79 schedules. In Novice, the Straight Inverted Flight maneuver replaces the Two-Point Roll. Unfortunately, the last-minute FAI description of

the maneuver conflicts with the description previously voted on by the Board. In accordance with the statement in the first paragraph under Section E on page 42 of the new book, the FAI version overrules the AMA description, which thus becomes void. The primary difference is that the FAI description allows the second half-roll to be in either direction, whereas the AMA description does not. Official ruling on this will be verified by the Board.

In Advanced, the Four-Point Roll and Double Stall Turn are new. However, the Four-Point is already a familiar maneuver to judges.

The D.S.T. is sort of a mild preparation for the various Figure M's to come in Expert and Masters. Although none of the Figure M

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Scotty Jenkins launches his extensively modified (Hobie) Hawk off the cliff at Torrey Pines.

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• Let me introduce Fred Weaver, winner of the 1977 National Soaring Society Excellent Award Program (and more than 50 other first place trophies). Fred first started with U-Control at age seven in 1957. He then expanded his horizon to include free flight gas powered planes, but in 1964, found it necessary to put aside all this serious activity for the sake of higher priorities (high school). He was sidetracked into motorcycle racing and picked up a number of trophies, until he was hit

by a car in routine traffic.

In 1970 he married Cynthia, and went back to model aviation, but this time it was radio control. After a brief encounter with powered R/C planes, he used his Kraft radio to control a Cirrus. Fred then became infatuated with the Espirit. He contacted its designer, Lee Renaud, and soon became involved in flight testing the Grand Espirit . . . a classic design. He flew the Soarcraft Kestrel 19 for awhile, then helped to prototype the Aquila. According to Fred,

it allows a wide speed range and precise control during landings. It handles easily, thus providing the pilot with more time for thinking about strategy. I pressed him for more comments on how to win contests. He reaffirmed the old saw, "If you want to win, stick with one plane. It's wrong to keep trying new planes in search of the 'winning aircraft.' It's better to pick a good plane and fly it consistently under all weather conditions. It's a good idea to build two identical planes, one as a back-up. In summary, the moral of the story is practice, practice, practice." On the average, Fred puts in two to three hours of air time each weekend during the contest season.

For a time, he flew the White Trash (an MB plan), but this became boring, even though he won a number of important contests with that craft. Fred feels that the Aquila "brings it all together." For extra speed he flies it loaded up to 75 ounces . . . and that's a lot of lead.

Last year Fred also won the RCM Trophy Races, using the V-tailed Avenger III. This racer has plywood-covered foam wings and he operates this 96-inch spanned model at from 7 to 10 lbs., 18 to 19 ozs. per square foot. It moves along at 75 to 80 mph, with a stall speed around 25. It's no mean trick to land this bird.

What about the future? Fred fore-



Bill Liscomb is a hang glider pilot who is now very active in R/C slope soaring.



Bill's Hawk with a pound of lead at the C.G. for better penetration. Hope it stays put!

sees greater interest in variable camber, fully sheeted wings, and in standoff scale competition. His new Aquila has experimental smaller spoilers. This allows for full operation with less severe results. Essentially, Fred wants to have two predictable glideslopes, spoilers on, and spoilers off. He went on to comment on the importance of keeping your plane simple and being proud of it. He believes in helping the beginner to avoid common mistakes. He went on to complement the many friends he's found in R/C sailplaning and the help they gave him in becoming the third person to reach LSF level V.

Fred's 7-year-old son is being carefully indoctrinated into the sport. His wife is standing by with another on the way. It looks like the next generation will have to face the competition of some real threats. In addition to all this activity, Fred serves as purchasing manager for Ramtek, Inc., has built and flown hang gliders, and is now interested in amateur radio. You can get to meet Fred by attending any of the serious contests.

I pressed him further for some key which might allow me to walk off with an award. According to Fred, "You've got to understand thermals and how they develop. Even if you're in zero sink, stay there ... that thermal might break loose. Being greedy for a better thermal can be your downfall." He ended with a remark about, "You've gotta have guts to win ... that is, you can't be afraid to fly out to the limit of visibility. You've gotta have confidence that thermals are out there just waiting for you to find them." From his record, I'd say that Fred has more than enough faith and guts. Here's wishing him continued success.

What's up at Torrey Pines? Well, Scotty Jenkins is now flying his



Jimmy Ealy III, age 8, and his collection of 1977 trophies. He soloed at 5, and is now working on his LSF Level III. He also placed 13th in Standard and Unlimited at the last Canadian Nats.



Cecil Mead's modified Little Plank coming in for a landing at Torrey Pines.

version of the Hobie Hawk. He uses the same fuselage and tail assembly (with modified tips for style) but with very different wings. You'd be amazed at the performance difference. Scotty cut these wings from two-ounce-per-cubic-foot blue foam, covered these with 1/16-balsa, then Monokote. They are 9% thick and have 6% camber at the root, 3% camber at the end of the first taper (two-thirds of the way out from the root), and a symmetrical

airfoil at the tip. Scotty uses a quarter-inch spruce leading edge and three-quarter inch wide redwood trailing edge. The wings are flat, but mounted at six degrees dihedral. The Hoerner tips improve the efficiency of flight at high angles of attack. The wings are mounted at three degrees to the fuselage centerline. This allows the stab to operate in neutral position exactly as indicated on the Hobie fuse. These

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Cecil has modified the Little Plank by adding sweepback and twin fins. Ship doesn't stall, but "porpoises" when it needs downstick.



Plank uses a Kraft brick with mixer mounted directly on top, providing elevon control without sliding tray.



John Tucker presents "Plaque of Tribute" to Dieter Schluter, with wife Heidi. This was just before the Toledo show, where he was awarded another for his helicopter pioneering.



Schluter preps his Bell 222 "Heli-Boy" version for a demonstration flight at Santa Ana.

CHOPPER CHATTER

By JOHN TUCKER



PHOTOS BY AUTHOR UNLESS NOTED

TRIBUTE TO SCHLUTER

On the weekend before Toledo, an informal fun-fly was organized at the "Lighter-Than-Air" Marine Helicopter base at Santa Ana, California. The objective was to get as many R/C helicopter pilots together as possible, and to have the opportunity of meeting the gentleman who started this hobby of ours, Dieter Schluter. With a promise of demo flights on the new "Heli-Boy" aerobatic chopper, by the master himself, it wasn't at all difficult to fill pad No. 5 to capacity with both choppers and pilots. Also in evidence were a considerable number of airplanes and a few race cars. Dieter even brought his R/C land

sailer and let the kids run it around the ramp.

I would estimate between 20 and 30 choppers were on display, and the great majority of them flew... occasionally, there were 5 or 6 in the air at the same time, but fortunately there were no mid-air! Toward noon, Dieter unpacked his Heli-Boy and proceeded to assemble and preflight it with meticulous care. As soon as the engine fired-off (Profi .61 with tuned pipe), a hush fell over the crowd and everyone watched intently as Dieter flew his warm-up routing. If you've ever had the pleasure of watching him fly, you'll remember he is a cautious pilot and starts every flight with a hover, then

goes into lateral flight, left and right, before moving his chopper out into the traffic pattern. Next came the brilliant vertical climbs, high speed flight and vertical banked turns, and finally, all-out aerobatics. Several consecutive loops and rolls were accomplished with ease, along with Immelman turns and Split-S's. The highlight of the demonstration was his hammerhead stall with two complete 360 degree turns on top. He then outdid himself with a final hammerhead consisting of 6 (yes, six) turns on the way down! I'd like to say the crowd gave him a standing ovation, but since they were already standing, let's just say he received a large applause.



Kim Tucker flying his Heli-Boy for Dieter Schluter.



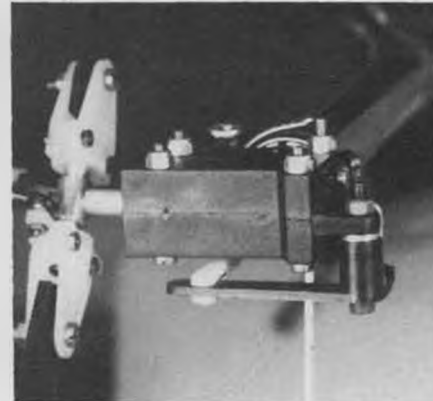
Mounting of engine and fuel tank in Schluter Heli-Boy. Tank is held in place by giant rubber band. Fuel line filter recommended.



Main rotor head, less pushrods. Pitch arm has single ball installed for slow response version.



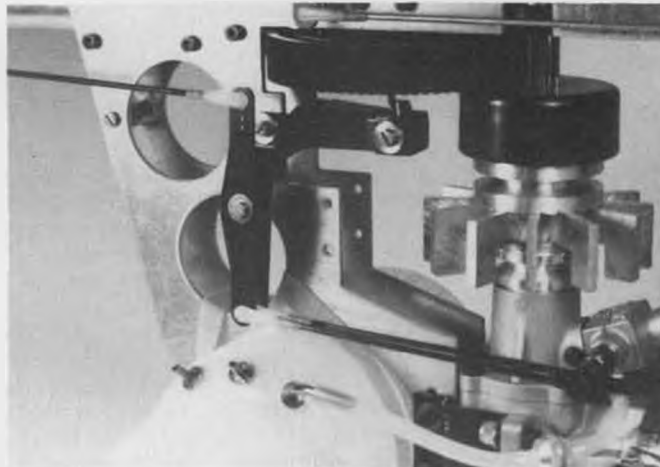
Main rotor head with pushrods. Pitch arm has mixing levers added for fast response version.



Tail rotor assembly and skid. Bellcrank lowered slightly using washer.



Clutch and gear assembly with transparent cooling fan housing, not yet painted.



Rudder and collective pitch mixing levers . . . note close proximity of pushrods to needle valve.

To close out his participation in the fun-fly, I was given the distinct pleasure of presenting Dieter and his lovely wife, Heidi, with a finely engraved plaque from the R/C helicopter pilots of Southern California, honoring him as the "Father of R/C Helicopters" and paying him tribute for his outstanding contributions to the hobby. Following this presentation, everyone fired up their trusty birds and tried to outdo one another by seeing if they could duplicate the performance given by Dieter. Out of this melee came a couple of outside loops (one not too successful) and a conventional loop done from hover without gaining altitude. Perhaps this one should be better described as a vertical pitch roll?? All of this done with the "Heli-Boy" helicopter. What more needs to be said? Let's get on with the construction details of the Schluter Bell 222-Heli-Boy trainer.

BUILDING THE SCHLUTER HELI-BOY

It's hard to believe that a moderately sized helicopter can be packaged in such a small box, but when you start to pull out the pieces, you realize that you really have a fist full of parts! So you won't become confused with the references, let's get the name right. The kit and

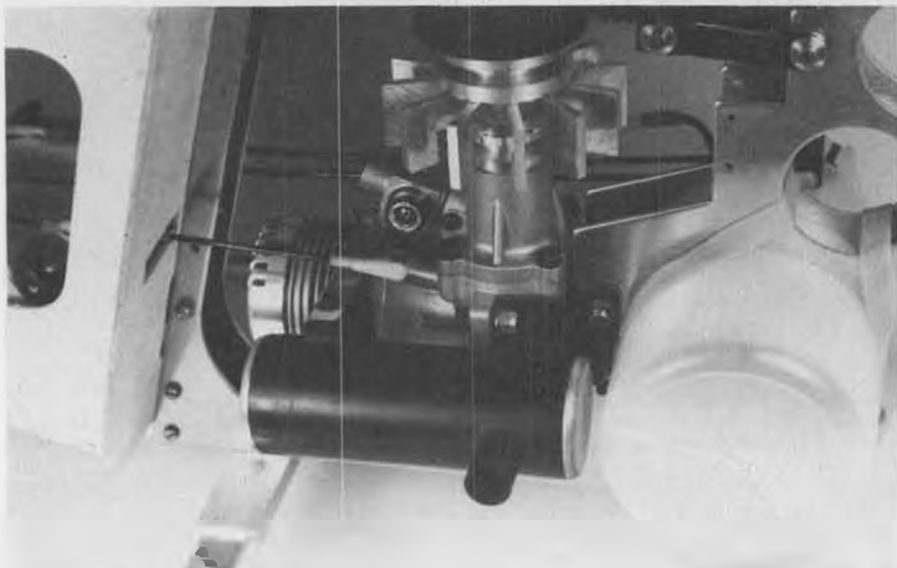
instructions call it a Bell 222, however, the basic kit provides everything, including body shell, to make the Heli-Boy aerobatic trainer. An optional body shell kit is available for installation on the basic trainer, rather than the small canopy. This makes it a Bell 222. The conversion takes about 10 minutes to go from one to the other!

Inside the box, you'll find a 17-page book with 28 photos and illustrations to help you, step-by-step, through the construction. Unless you read fluent German, the steps in the book will mean little to you, however, the photos and drawings are easily understood. Now don't panic because of what I just said . . . Dieter thoughtfully included 14 pages of English instructions! Gorham Associates, which distributes the kits in the West also included 10 additional pages of supplemental building notes, and a parts list with prices. Without a doubt, you won't lack for instructions on how to assemble the Heli-Boy, and for this reason, it would be superfluous for me to go into the construction details. Instead, this article will concentrate on special areas which we feel need stressing, or will elaborate on extra details that were not otherwise covered.

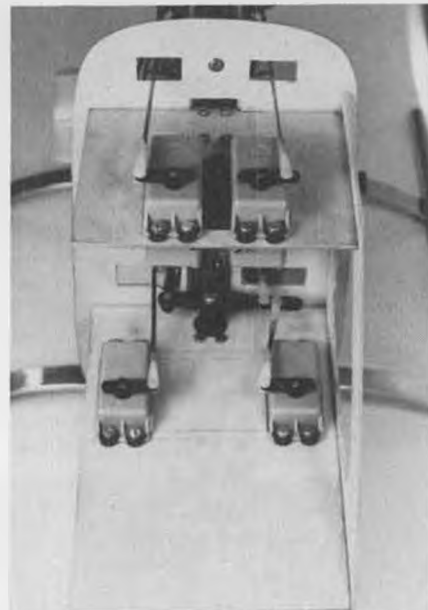
Obviously, you should unpack the kit first and spread the parts out on the workbench. Then read the instructions to get the feel of the kit. There are 17 stages of construction, each having a stage number, a description or name of that particular item, and a bag number to show where to find all the parts. During the cross-reference between the two instruction manuals, I found it advantageous to know the meaning of a few German words, listed below:

- Baustufe - stage
- Beutel - bag
- Bild Nr. - photo number
- Siehe - see
- Teil - part
- Hebel - lever
- Vollgas - carb. open
- Leerlauf - carb. closed
- Nick - pitch
- Ruckwärts - backward
- Vorwärts - forward
- Querlinks - roll left
- Querrechts - roll right

Each plastic bag is numbered from 0 through 16; there is no bag No. 9 (to avoid confusion with bag No. 6). Bag "0" contains special tools needed for assembly, and a tube of the best grease in the business! Unpack each bag as you assemble that stage, so parts won't get mixed!



Note throttle linkage and muffler, closeness of fuel tank. Everything very compact.



Plenty of room to locate servos for either arm movement, eliminates need for reversing.

Let's start with stage 1, bag 1, photo 1, "basic frame": the instructions are self explanatory. Since a helicopter consists of many mechanical parts, most of which are either turning or vibrating, it is essential to assemble carefully, use tight fittings and lock all metal screws, nuts, etc. Loctite (or equivalent) must be used on all nut/screw assemblies where lock-nuts are not provided. Loctite can be purchased in most all auto supply or motorbike shops . . . use the "blue" variety for future disassembly ease . . . the "red" variety is very difficult to break loose. Remember, the parts to be locked must be free of grease and oil. It's best to clean such parts in alcohol or acetone first.

The kit was built exactly as described in the instructions, with a very few minor exceptions. Results were excellent and verified that the designer had good reasons for doing it the way he did. I would not recommend modifications at this time!

STAGE 2 NOTES

The roll lever (446) is not clearly seen in photo No. 2, but it is important to install the ball-end (434) on the flat side of the roll lever.

STAGE 3 NOTES

Main gear (148) fits very tight on main rotor shaft. It might be necessary to ream "slightly" a small chamfer to get the shaft started in the hole. We finished the job by clamping the main shaft in a padded vise and tapping on the gear with a long wooden dowel and hammer.

STAGE 4 NOTES

The toggle joint, or collective pitch lever (443), needed a slight reaming to attain proper clearance for the four collar bearings (566). They should be snug fitting to permit free movement, but don't over-ream, as this will create slop in collective pitch control.

STAGE 5 NOTES

You may find it difficult to feed the tail rotor driveshaft through the tail boom, unless you feed it from the rear to the front! The bearing

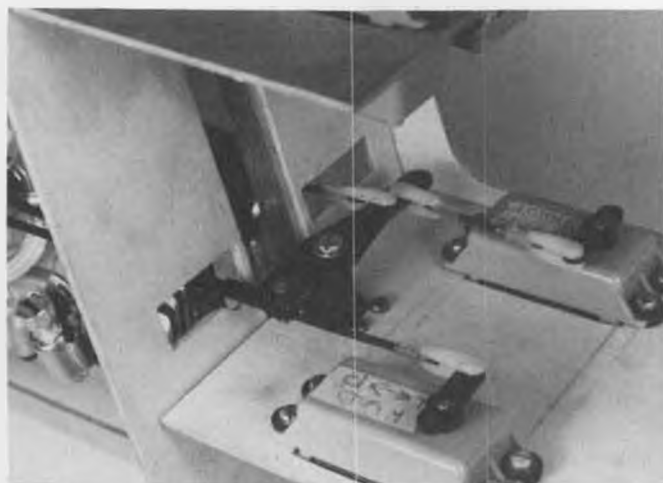
plug in the middle of the tail boom has been made and installed in such a manner as to present a funnel shape at the rear for easy insertion of the shaft. Just the reverse is true on the forward side of the bearing; it is almost impossible to hit the hole right in the middle!

Previous experience with other choppers which clamp the tail boom between the main frames, prompted us to insert a 2-1/2 inch hardwood dowel into the boom at the main frame end. This is to prevent crushing the tail boom when clamped too tightly. A 3/16 hole was drilled for the driveshaft, and the dowel was lathe-turned for a tight fit. Perhaps this isn't really necessary, but we felt better for having done it.

STAGE 6 NOTES

It might be advisable to seal the two lower holes in the tail rotor gear box with small set-screws to prevent grease from dripping out when hot.

Continued on page 118



Lower servo plate. Servos marked with tape for directions. PK screw in center of bellcrank instead of bolt. Allows easy removal.



Dr. Richard Smith and his unfinished Bell 222. Transparent body makes it look like ghost ship. Smith is holding chopper.



30's SPORTSTER

By TOM HOULE . . . For relaxed R/C fun, nothing can beat a small, rudder-only, glow-powered parasol. Just be sure that the tempting small field near your home is a safe distance from the regular R/C airport!

• The 30's Sportster had its beginning in my collection of AERO ERA plans, as a 14 inch span stick-and-tissue rubber powered design. The darn thing flew so well that I began to consider enlarging it for Ace pulse flying. Two years later (these things take time) I did enlarge the plans to 28 inch span. The nose arm was shortened and the fin was re-worked slightly, but other than that, it is the same configuration as its rubber powered little brother.

Mine literally flew off the board, the only adjustments required were to add just a bit of nose weight and unwarp a wing panel that had taken a set due to overzealous doping and shrinking. Incidentally, the Sportster

will do very nicely as a free flight. Just don't get carried away and install a brand new TD .020. She'll do quite well with an anemic .020.

For those of you who like detailed how-to-do-it commentary, read on. For those of you who have built-'em'all and don't need the commentary, proceed directly to the plans and start hacking.

I started with the fin and stabilizer because those are the two items I least like to make. Cut the stabilizer and fixed elevators from medium 3/32 sheet and butt glue together on a flat surface. Do likewise with the 2-piece fin. Cut out the rudder and hinge with Robart or thread hinges, ensuring that the fin can freely flap

back and forth on its own weight. The fin must be free. Magnetic actuators typically have low output torque.

Set these aside and start the fuselage by cutting out and assembling all bulkheads. While these are drying, you can cut out the sides from medium 1/16 sheet and install the 1/16 nose doublers . . . one right and one left. I personally like to run the doubler grain vertically, at 90° to the side grain, but take your choice here. You should also glue in the 1/16 x 1/4 upper side reinforcement strips at this time, butting them to the doublers.

After the bulkheads are dry, install the bulkheads in the cockpit area, ensuring that the fuselage is square. Next, bend the landing gear from 3/32 music wire and sew it to the 1/8 ply landing gear bulkhead. It's a good idea to coat the sewn wire with epoxy . . . just in case. Epoxy this bulkhead in place and wrap the fuselage with rubber bands to retain the bulkhead while the epoxy cures.

The 1/8 ply firewall with blind 2-56 nuts can be installed next, again using plenty of epoxy. In fact, I make it a habit to coat both sides of the firewall to prevent fuel soaking into the plywood. Install the firewall with 0° and downthrust, unless you must install a super-hot engine. In which case, add a couple of degrees of down and right thrust.



The 28 inch span Sportster looks very much like its 14 inch span, rubber powered descendant. It's also just about as easy to build.



The little '30's Sportster should provide many hours of inexpensive R/C flying fun. Just think of how many flights you could get from the 12-ounce tank you have to stick in that 60 guzzler.

Pull the two sides together at the back end and install all other bulkheads. Bend the wing cabane struts from 1/16 music wire. Note that there is a 1/16 difference in height between the aft and forward strut sets, providing about 1° of positive wing incidence. Bind the struts to the 1/8 ply cross pieces and epoxy them into the fuselage, bracing with 1/8 balsa gussets.

Use 1/8 birch dowel or 1/16 music wire for the wing supports, and bind these to the struts, ensuring that the cabane struts are parallel as viewed from the side. If they are not parallel, you've messed up your incidence angle. You experts out there may want to reduce the incidence angle, allowing a more aft center of gravity and faster flying. However, you never get something for nothing, as



Framework shot from the same angle as above. With such simplicity, there just isn't much to say about it . . . Schoolyard flying is OK, but make sure of your distance to club flying fields.

the ship will be highly sensitive and may do funny things in the air . . . snap rolling for example.

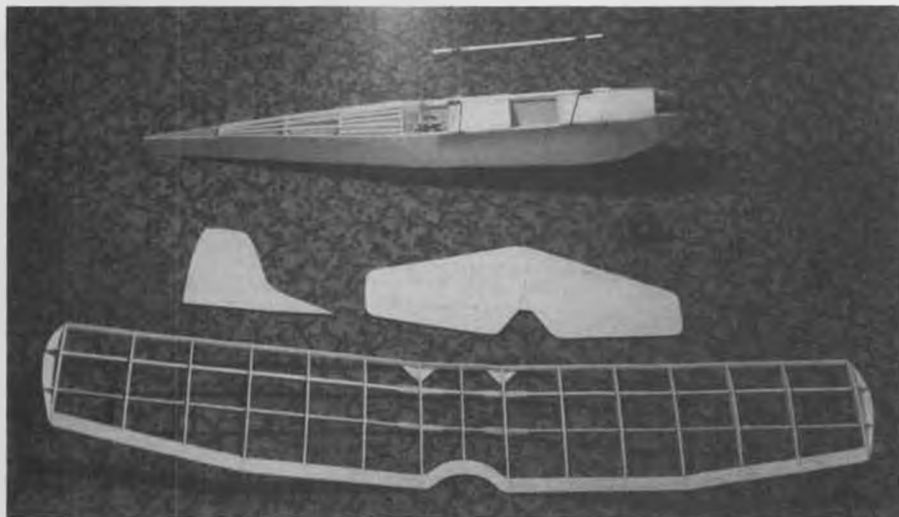
There is some latitude in that the wing can be slid fore and aft about a 1/4 inch to reduce stall tendencies.

More on this later.

This is the time to install the actuator and .045 music wire torque rod. Make sure that there are no binds in the system. As stated earlier, the actuator puts out so little torque that any binds will simply cause the steering system to hang up . . . always, it seems, with full right or left rudder . . . never neutral. The torque wire should ride in nylon or teflon 1/16 I.D. tubing. Do not use brass or aluminum tube, as it will generate electrical noise that can glitch the receiver. In short, before you button up the fuselage, make sure that the actuator and torque wire assembly run smoothly. Extend the torque wire approximately 4 inches beyond the fuselage tail post. It will be bent up later.

When you are satisfied that all is well inside the fuselage, install the 3/32 sq. stringers and sheet the bottom of the fuselage, cross-grain fashion, with 1/16 sheet. Also install the 1/32 top decking from the "rear

Continued on page 103



Come on, Pop, take a few hours off of that pattern or scale bird, stick one of these together, and introduce your offspring to the fun of controlled flight!



Flight

INSTRUCTOR

Conducted by

DAVE BROWN



• "We're going to have a contest. . .". That line has struck fear in the hearts of almost as many modelers as "Omigod, we're on the same frequency!" Why this is true has always baffled me, as I have always felt that contests were a great opportunity to learn, have fun, and socialize at the same time. I believe the problem is that most people think that the only reason to enter a contest is to try to win, whereas, if the attitude was to enter to compete and learn, not only would the club members enjoy themselves more, but they would become more proficient fliers.

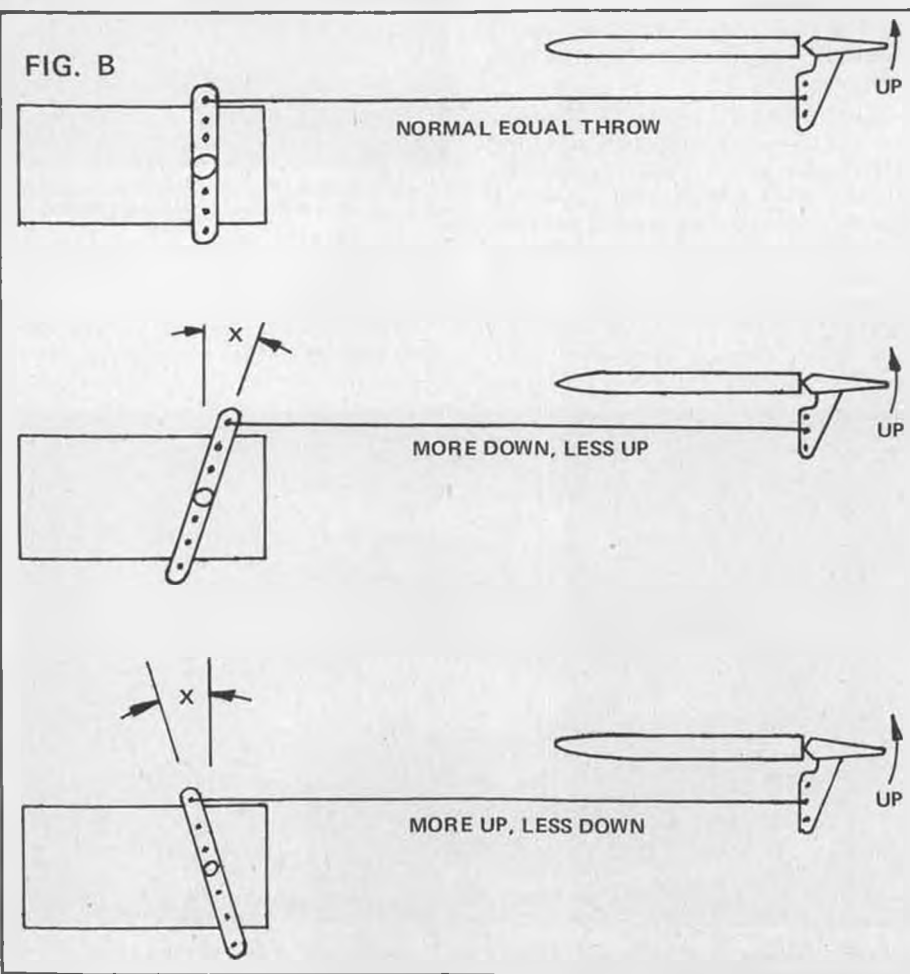
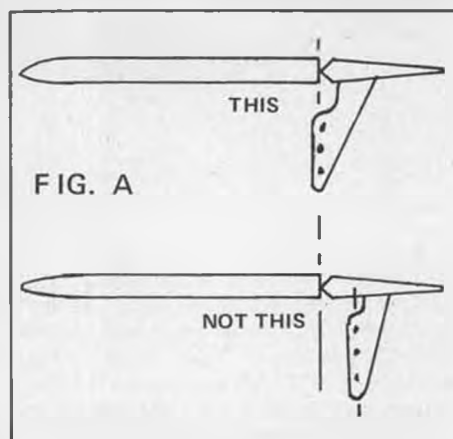
Club fun-flies afford the members the opportunity to improve their flying skills while competing against others of the same skill level. Many of the events flown at local fun-flies are of the luck type (example; the hidden spot landing), whereas many are of increasing skill levels (example; limbo). Along with the normal loop, spin, and roll events, the bomb drops, and limbo, which are fairly well-known, I have run across the following fun events which were enjoyed by all at any place they have been run.

TEAM TAXI: Two airplanes are tied together tail-to-tail and one must pull the other the length of the runway (100-200 ft.) and then the other one must tow the first one back. This sounds easy until you try it. (Lou Penrod and I had everyone at Dayton in stitches trying this one.)

MUSICAL AIRPLANES: As many airplanes as can be flown at the same time safely are flown around a pair of pylons located on the ends of the field. At unknown random time intervals (30 secs. to 2 min.) a car horn is sounded and all airplanes are required to do a touch-and-go (upwind side of pylons only, for safety). The last one to touch, along with anyone who kills the engine, is out. This procedure is repeated until you have only one left and he is the winner of that heat. Multiple heats,

awarding points or leading to a fly-off, can be run if necessary to accommodate many fliers.

GLIDE RATIO: In this event, it is necessary to adjust the linkage so that you can shut the engine off. The idea is to time the length of engine run from release of the airplane and then time the glide to a landing. The winner is determined by the greatest glide/time ratio. The results of this event can be very interesting. The last time I saw it run, the order of finish was Pilot Cavalier ARF, Falcon 56, Phoenix 5, and then a powered glider! Needless to say any airplane has a chance. *Continued on page 120*





Paul Major's "Alley Cat" taxis back after a flight. Power is a K&B 40, and the floats are 33 inch Gee Bee Line.

SEAPLANES aren't ALL wet!

By DON FOSTER . . . Having trouble finding a flying field? Take off those wheels, put on a pair of floats, and head for that wide open water spot. It's fun, and it's not that difficult. The author tells how.

• After many years of model seaplane flying, and reading numerous articles on the subject, I think that it is about time the average modeler got a chance to read how much fun water flying can add to our sport, and how simple it really is as long as you get started right.

The purpose of this article is to introduce both the newcomer and the old-timer to the fun of seaplane flying, and to dispel any fears one may have about it being complicated, or in any way difficult.

Many modelers are reluctant to try float flying because they are afraid that they are going to lose their expensive radio and engine to the deep. In all of my water flying, I have never seen an R/C model aircraft sink, even after the most severe crash. In fact, most accidents

occur during landing and takeoff, when your model is going relatively slow, and you hardly ever break a prop. We have had models last for many years that have been flown exclusively off water . . . at slow speeds, water is very forgiving.

The next consideration is: what model should one try on water. A mistake that many people make is that they take an old clunker that never flew very well on wheels in the first place, or one that is over-the-hill in many respects, and strap on a pair of floats and expect to have good results. Obviously, they end up having nothing but trouble.

If a model has been a poor flyer most of its life, putting it on floats generally does not make it any better, and you are getting off to a bad start.

For your first attempts, select one of your good flying ships . . . one that has ample power and is structurally sound. You will then have half of the battle won.

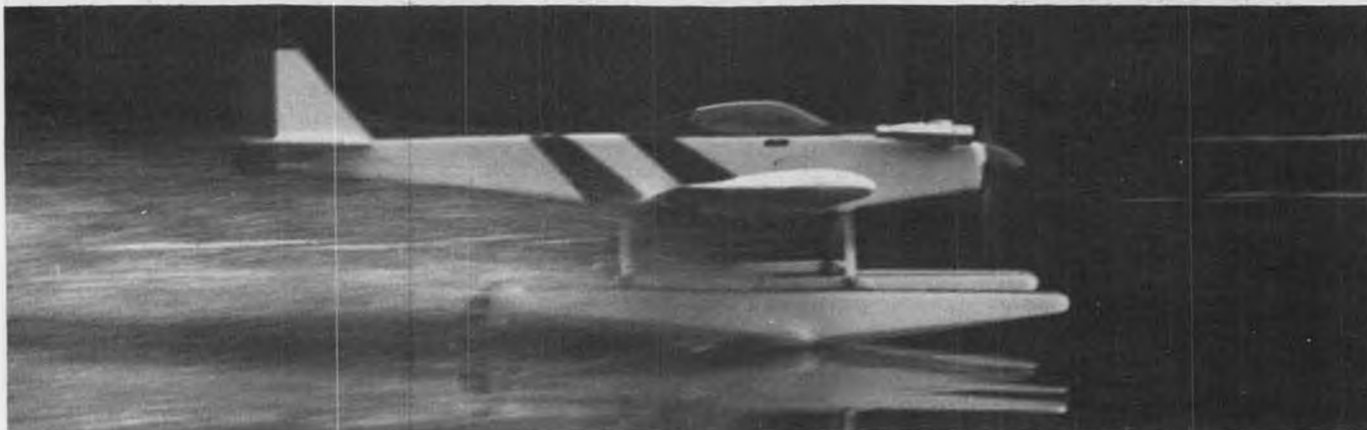
The type of model is not important; high wing, low wing, shoulder wing, three or four-channel, they all make good float planes. I lean towards high or shoulder wing, because it is usually easier to mount the floats on the plane in a more conventional manner. However, I have had many low wing ships that work fine.

Many prefer flying boat type models. These are excellent for the simple reason that they are easier to get off the water, because there is only one float in the water and directional control is no problem. More on that later.

One of the things that has really bothered me in reading most of the water flying articles in the past is the emphasis waterproofing. Some advocates of seaplanes go into such elaborate waterproofing systems that they scare the novice away before he even gets started. Let me tell you what we do in our group about waterproofing . . . absolutely nothing. Now please bear in mind, I am discussing *fresh-water* flying only. I have done plenty of saltwater flying and I do not waterproof anymore than for fresh water . . . but I do take other precautions, such as wiping down the model completely before disassembly, locating the on-and-off switch inside, and spraying



Gee Bee Line's "Islander" taxiing out for takeoff. Built by Dick Calderigi, it is powered by and Enya 40. Seaplane's hull is a Gee Bee float.



"Alley Cat" on takeoff run. Perfect attitude for proper rotation and liftoff. Note glassy water surface. Model is riding on tip of step. Alley Cat is a Southern R/C Products kit, the 33 inch floats are Gee Bee.



An AAMCO 'H' Ray taxis out for takeoff on 28 inch floats.

all radio equipment with CRC, available at all marinas for boat radios.

Saltwater flying really is a separate story; so for the purpose of this discussion, we will stick strictly with freshwater.

If your model has a good wing seal at the fuselage, and it has no holes in the covering, do not be concerned with water getting in.

Switches should be located inside the fuselage and operated with an external wire. Du-Bro has an excellent product on the market to solve this problem.

I do not like to wrap the receiver up tight to keep water out, because if it is too tight, condensation will

form inside and you will be worse off than if you just wrapped it in foam as you normally do. Occasionally, if I have a model that is prone to small leaks, I may wrap the receiver lightly in a sandwich baggie to keep foam from soaking up the few drops that may get in. The same for battery packs.

Servos are usually suspended off the floor and if any water does get in, they are out of the way. Sometimes, if I have a leaky model, I will put a folded paper towel on the floor under the servos to soak up any water that might get in. It works fine.

During the construction of a

model, I also give the radio compartment a couple of coats of dope to seal the wood. This just makes them last longer.

As for engines, I have yet to see a model engine get damaged by flying off water . . . water of any kind . . . except frozen. yet, I have seen many get ruined, some mine, with just one crash on land. If a model engine gets dunked, it is a very simple thing to pull the plug and turn the engine over a few times to work the water out and then start it right up. Just make certain that all the water is out, so that you do not get a hydraulic lock from a cylinder loaded with water.

On models that have a tank hatch cover that can be removed, some water will probably get in if the model flips. It is a good idea to seal these with silicone rubber (RTV). It is also a good idea to educate your model retriever, if it does flip, to keep the retrieved model in the same position out of the water as it was in the water, so that any water that got in can go out the same way.

The model should be well doped, or if plastic covering is used, all the edges should be well sealed. The Nyrod system is excellent for control movement, as all exit holes are usually tight.

To sum up the airplane requirements, your model should be a good land flyer, it should be of sound construction, and it should have ample power.

Mounting the floats is not a difficult job for the average builder. The more rigidly they are mounted, the better they work, but not so rigid that you add too much weight. Two flat struts of dural aluminum fore and aft, with the same material for spreaders, is sufficient.

The angle of the floats is not terribly critical for most flying. The calmer the water, the more critical it might become. I like to start out with the top line of the floats parallel to the centerline of the fuselage, with



The 'H' Ray just after takeoff. Power is an OS .40.

the step location on or slightly ahead of the model's C.G. with model planes, we are not like the FAA, in that almost every plane has its own model number for floats. There are only a few sizes of model plane floats on the market, so we do have to do some compromising to make them work. Of course, you can always make your own floats to fit your particular model, and there are many good plans available.

The distance that the floats are spaced apart is somewhat critical, depending on the type of wind you like to fly in, and the type of model you will be flying. Close-spaced floats on a three-channel plane with normal dihedral (4° - 5°) can be a little hairy on crosswind taxiing, unless you keep your speed up.

I like to space the floats about half their length apart, i.e. a 30 inch pair of floats should be spaced about 15 inches apart. This may be off scale, but bear in mind that we are playing with full scale wind, water, and waves.

After you have attached the floats, try a flotation test somewhere convenient . . . bathtub, neighbor's pool, or local duck pond. Without the wing on, the plane should set about level in the water. With the wing attached, she should rest slightly nose high.

Setting on land and resting on the float step, she will rock forward without the wing on, and backwards with wing attached. This set-up is a good starting position.

Now a few facts on water rudders. I have seen lots of fellows lose directional control during the takeoff run, and I have heard them say "Gee, I wish I had a water rudder." We are not running high speed boats, men. These are airplanes, and all high speed turning is done with the air rudder. We all have, at one time or another, lost directional control during the takeoff. However, rather than fight it, abort the run and start again. Generally, we have lost direction during the first ten feet of the run.



Gee Bee Line's "Mallard", again based on a single Gee Bee float. Power is an OS .30.

Let's go back to full scale. The first thing that you do at the start of the takeoff is retract the water rudder, and extend it at the end of the landing run. In other words, a water rudder is used strictly for taxiing at slow speed, not during your high speed runs.

I have seen many Ugly Sticks on floats, and with their big air rudder, the owners never have to bother to attach a water rudder. They steer beautifully at slow speeds.

I use water rudders on my models because I often have to taxi out around docks and rafts to get to the takeoff position, and I want positive slow speed control. If I were always flying off an open beach, I do not think that I would bother with one.

Now let's go out to your local pond and get on with some real flying. Before launching your plane, spend a little extra time and get your engine to idle reliably. I have to admit that it is a little frustrating to have the engine die 10 feet out from the launch.

For your first attempt on water, it is not a bad idea to have a small two-man boat available for retrieving, or a good fly casting rod (and someone who knows how to use it) for close-

in retrieving. As you get more proficient, you can forget these things.

Okay, the engine is running, you have checked all controls, and you are set to go. Launch the plane and let it taxi out a few feet and then start to make a few turns with the rudder. If your water rudder is attached, you will find that she will turn very easily at low throttle. If there is a slight breeze, you will learn that it will possibly turn in one direction better than in the other. Learn to play with the wind and let it help you to turn. Going upwind and attempting a turn to downwind, you will find that you will have to add more power . . . the more wind, the more power . . . and the turn will have to be made faster.

Turning from a downwind position to upwind requires very little power . . . just start the turn and the wind will weather-vane the model very nicely to an upwind heading.

Continued on page 116



The "Islander" on a takeoff run. Note that tip floats are out of the water, and model is in perfect takeoff attitude. Just a little more flying speed . . .



Islander on a fly-by.



Quarter-scale Fleet Model 2, from the latest Concept Models kit (Box 7335, Madison, Wisc. 53711). Span is 7 feet, 1 inch, and it is designed around the Quadra engine. When you see the amount of strip-wood and the carefully machine-cut parts, the price of \$179.95 is very reasonable.

MAMMOTH SCALE

• Last month, I promised an article on an old and new wonder material called by its trade names of Arborite or Formica backing. I say old, because it has been around for a long time and new, because we have neglected to use it as we could have. Perhaps the reason it was never discovered by the modeler is because it was always installed behind or below something such as high-grade counter tops, coffee tables, etc. Here its purpose is to provide a smooth finish, seal out moisture, prevent warps and provide tremendous added strength by forming a

“sheeted core construction”.

With the flood of very large models and the discovery of balsa by other world industries, such as for use in insulating super-tankers, aircraft cargo drop pallets used by the military, etc., we really have to take a hard look at the alternatives. Balsa, the wonder wood that is nearly unreplaceable in rubber, hand launched gliders, and other light model applications, isn't really all that necessary for biggies. Having been an avid modeler for nearly 40 years, I feel like I have just said, “Mom’s apple pie isn’t the world’s

greatest!”

Now that we have thrown rocks at it let’s list balsa’s disadvantages:

1. It varies in strength and weight dramatically, which is great if you have a choice and can afford to select your material, however, this often makes it difficult to duplicate a good model built from plans or even a kit.

2. It can contain flaws, dry rot, etc., which could and has caused structural failures, so we compensate by overbuilding to make up.

3. It’s very easy to crush, dent or otherwise mark, especially when used as sheeting and covered by iron-on materials which don’t harden the surface.

4. It’s almost impossible to maintain a very sharp edge on a vertical fin, for example, again especially if iron-on covering is used.

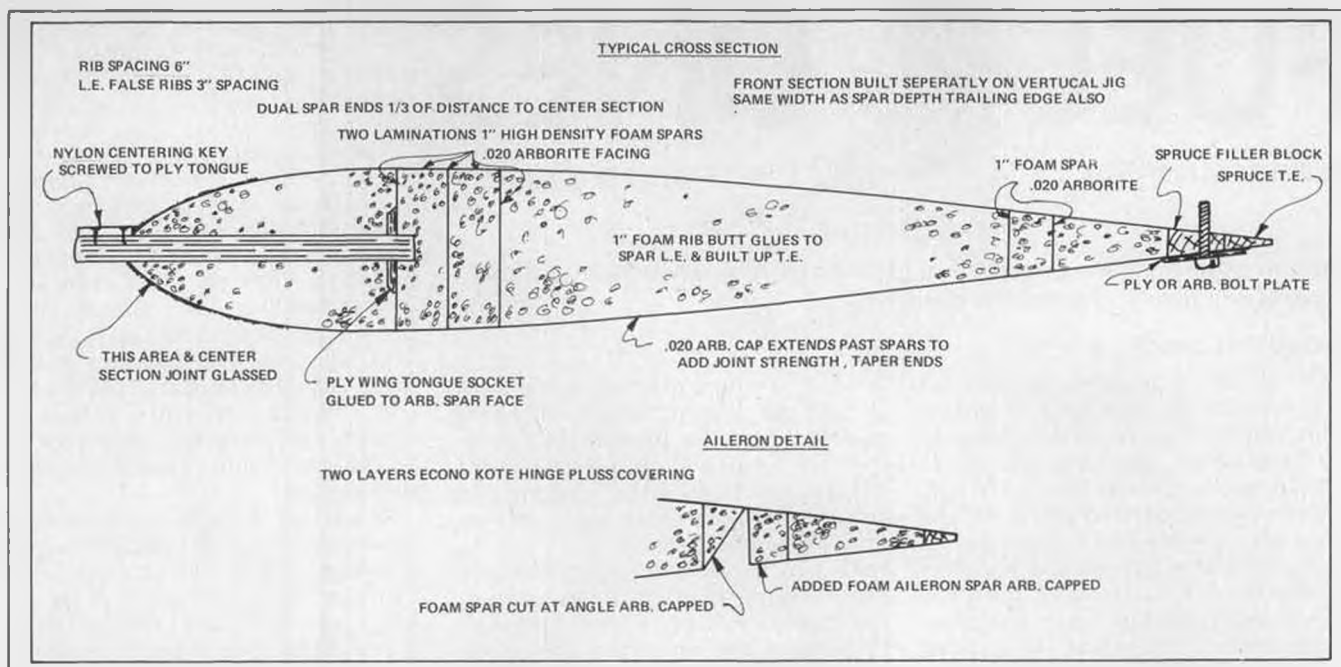
5. It’s a ‘soaker’. Put a drop of fuel or oil anywhere near it and it’s got it, defying any further attempts to glue, cover, paint, or even sand it properly, and it then cracks, shrinks, and/or warps.

6. No matter how well you sand it, it is still fuzzy and should be sealed no matter what covering you use, as the best you can buy only sticks to the fuzz.

7. If you are trying to repair a sheeted section, especially one that was applied under stress, it’s difficult to patch in a section so that it still provides the same strength and hasn’t altered the flex characteristics of the original construction.



Don Jetter, Elkhart, Indiana, and his 23 pound, fully aerobatic, 1440 sq. in. model. Has smoke provision, foam wing, Heath radio, and 12 flights logged when the photo was taken.



Balsa . . . terrible stuff, isn't it? Not really, but it is scarce, expensive and should be used where it is difficult to replace. Balsa does not have to be used in large models. Okay, what are the alternatives? Even a politician is smart enough to find fault, but few find the solution or alternative. I am presently working on drones for our government which necessitated that I find some alternatives.

Here are some of the specifications which had to be met:

Provide a vehicle capable of withstanding repeated belly landings on Arctic tundra, small rocks and frozen ice and snow, with minimal damage which is easily repaired.

Repairs capable of being made by personnel with little or no modeling experience, and from as few materials as possible, with the resulting repair having little effect on the original design strength.

Materials used had to be able to withstand operating conditions down to -56°C , be salvageable if landed in the sea at temperatures which would turn the drone to instant ice on retrieval, and remain buoyant even if separated into several parts.

Provide an insulated radio and cargo compartment which can be heated by engine heat or a supplementary heating system, with as much interior space unimpeded by structure as possible (at least $10 \times 20 \times 10$ inches totally unimpeded).

Carry 10 pounds of cargo, fit inside an Otter aircraft, and be easily assembled in extremely cold conditions.

Total weight to be under 40 lbs. with fuel for 2 hours duration.

Engine able to be hand started at

temperatures down to -56°C and using standard fuels available at Arctic posts (i.e. motor oils and gasoline).

Provide high visibility without resorting to paints (confined temporary living quarters excludes using highly odorous materials for repairs).

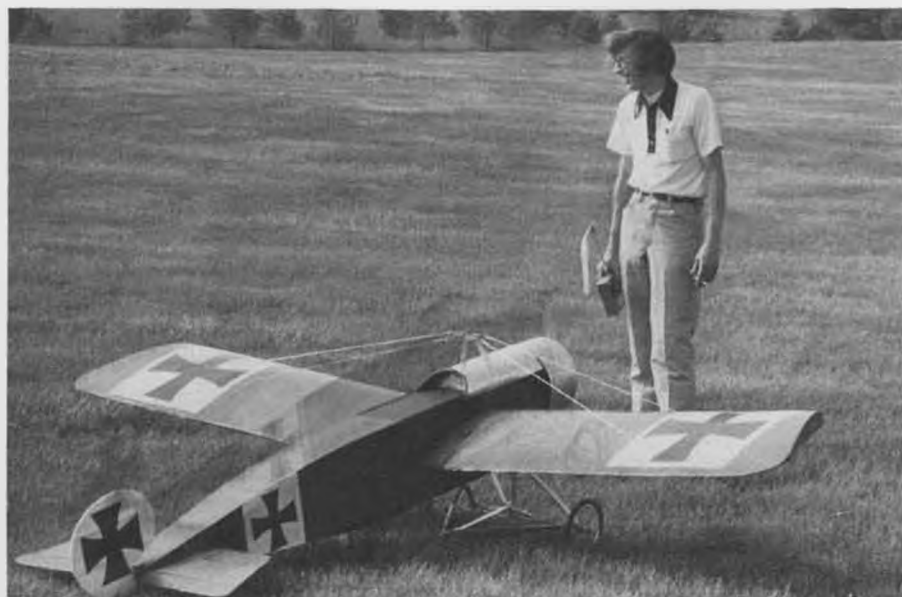
Must have change of mission capability (field modified, holes cut, etc.) without drastically affecting the strength.

I was almost ready to give up my search even though the Quadra engine had passed the tests with flying colors, the Royal Super Sport radio had the range and duration necessary (the transmitter is operated inside an oversize Arctic parka with only the antenna protruding

and the receiver kept warm by the engine heat), and the JoMac servos had passed tests of prolonged use down to temperatures of -56°C (servo amp is separate), thanks to the Delrin gears which aren't affected by cold as is nylon, etc., which sheds teeth like icicles at those temperatures.

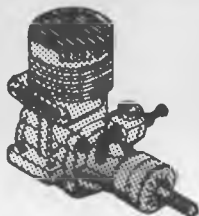
On a trip down to the local cabinet shop to buy more spruce, I noticed the workers using arborite backing and picked up a piece of scrap which was the discovery of the solution to my requirements for the drones. Here was a material that is most commonly found in 4×8 foot sheets in a thickness of .020 (twenty thousandths, or a little over $1/64$ of an inch) at a weight of .16 pounds

Continued on page 103



Fokker Eindecker by Bill Lyons, Long Grove, Iowa. Span is 11 feet, weight is 24 pounds, power is Quadra, and the wheels are baby buggy. Very realistic in the air.

FUEL LINES



GEORGE ALDRICH

OTTO BERNHARDT

DALE KIRN

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

GEORGE ALDRICH

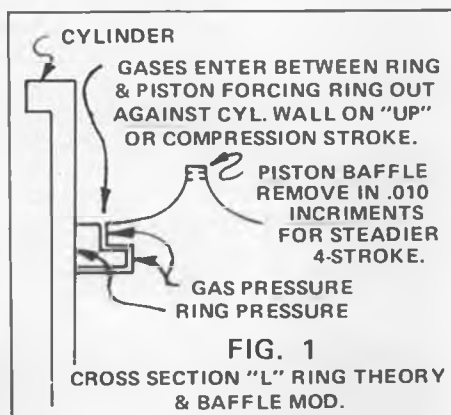
• Of all the questions we get on engines, the fit and care of piston rings requires more time to answer than any other. Not long ago, while out flying our test-bed Falcon 56 MK II, someone wanted to know if I had any parts for the old SuperTiger G 21/40. This brought on a discussion of why the S.T. G 21/40, or parts for it, was not available. From there we progressed into what .40's were available, the life span of one over another, why some engines lose compression; and that led to the main reason the G 21/40 was so popular; and that led to the heart of any engine... compression... or in this instance, ring seal. Still with us? Hang on and we'll try to get it on paper.

What started this whole bull session was that a friend had cracked up his G 21/40 powered model, damaged the engine, and failing to find parts, had replaced it with a new K&B .40, #8011, front rotor engine. After six months or so of flying, the K&B had lost its compression, and my friend was not going to fly any more that day.

To digress a moment, the first engine we ever reworked commercially was the old K&B .40 RV Pylon engine. This was the original pylon racing version with the Dykes or "L" ring K&B still uses today. There are definite advantages to this ring system, the most important being that the K&B .40 needs little or no break-in right out of the box. In order to get this quick-run type of set-up, the piston, ring, and cylinder fits are somewhat more free than on some engines. A fairly rough cross-hatch honing of the relatively soft cylinder helps the ring seat and gives a good seal quickly. The life of such a set-up may not be as long as some, but the parts are inexpensive. As the ring seats, metal is worn off both it and the cylinder. This causes the ring gap to increase and a lip to be worn in the cylinder at the top dead center (TDC) position. When this occurs, a standard size ring will no longer fit and both the ring and cylinder must be replaced.

Compression can disappear suddenly on even a new "L" ring en-

gine, if grit or a glow plug element should get caught between the ring opening and the piston, thus causing the ring to stick. Occasionally, the ring can be freed by washing and rinsing the piston and ring in solvent and carefully getting the ring to rotate in its groove again. Because the "L" ring is made from a rather malleable cast iron, it is very difficult to remove the ring from the piston without distorting it. A sudden loss of compression usually occurs after an over-lean run, which, if it doesn't cause extraneous particles to hang up in the ring groove, it can cause the ring to just collapse from overheating. Whenever a sudden loss of compression does occur, with an engine which utilizes the "L" ring system, there is a quick cure to try before taking the engine apart.



Invert the engine and squirt several drops of machine oil, or something like Rizlone or Marvel Mystery oil (these are also good for preventing rust) in the exhaust. By quickly, snap-flipping the engine over, sometimes the ring can be forced out by the extra pressure, freeing the ring. Don't overdo this, as a hydraulic lock could cause a bent rod, cut finger, etc.

Recently, the Control Line stunt boys have been adapting this same K&B .40, as they can use smaller diameter lines if they don't go over the .40 engine size. There are a few neat tricks that can be performed by some of the custom engine boys (Remember, you guys, I no longer "do" it anymore). The first thing to do is have the cylinder chromed. If

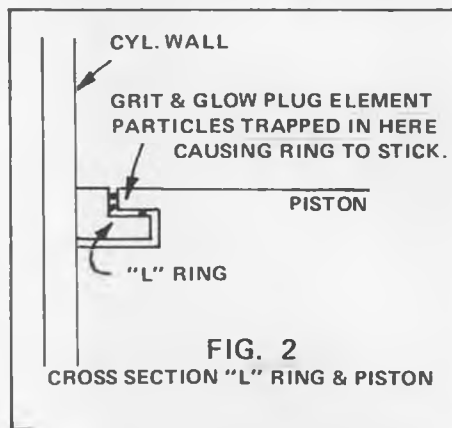
the cylinder is just chromed and the same taper (i.e. none) and fit is used, the first thing that will be noticed is overheating and a loss of 1000 to 1500 rpm.

Okay, so here's the scoop.

The cylinder should be honed out oversize by at least .001 inch, and while honing, tapered .0005 inch from the exhaust to the top of the cylinder. Let's say the cylinder is exactly .8400 at the exhaust. When honed properly and ready for the chrome tank, the cylinder will be .8415 at the exhaust and .8410 at the top. These are only reference figures, for the piston diameter and amount of chrome govern the actual dimensions.

In order to get a really hard chrome surface, at least .001 inch of chrome should be put on each cylinder wall. You can get by with less, say .0005, but .001 is harder. Piston clearance is more important with a chromed cylinder, and it should be approximately .0035 ATDC, which means it will be .004 at the exhaust. The ring end gap should be .004-.006. This type of set-up is on the tight side, and needs careful break-in, avoiding lean runs. For non-chromed cylinders, zero end gap can be used if careful break-in is exercised.

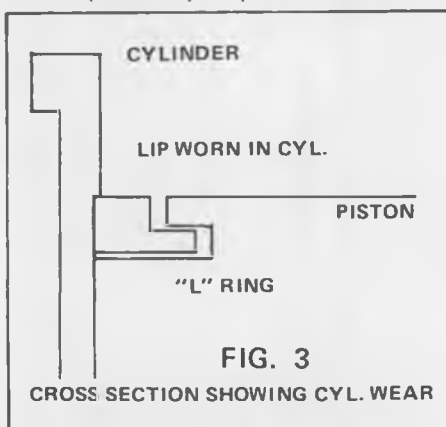
For those who want their K&B to be less "peaky", i.e., to hold a steady 4-cycle better, try dressing .010 at a time off the piston baffle. By sacrificing a piston, you can file off .010 at a time until you go too far. Too far is an engine that will only run 4-cycle.



By this, we mean it will not lean out, but just die as the needle valve is turned in. When this happens, a new piston can be prepared, adding back the correct amount. We did this on a number of "peaky" engines, including Jim Silhany's G 21/40's, with excellent results. This piston baffle mod will take some of the top end power off, but not only will it 4-cycle steadier, it will also have less tendency to load up and quit when using a throttle in R/C. A chromed engine set-up in the above manner

should last for years, with only an occasional ring change. Henry Nelson, 729 Valemont Dr., Verona, PA 15147, is a more-than-qualified man to contact for custom engine work. If there are others out there who can perform this type of work, just let us know.

Why the SuperTiger G 21/40 is no longer available is still a good question. The G 21/46 is available and has been used more and more by the C.L. stunt group since 1964, when we first used it in our AG-1 stunt design. My only guess is that there is not enough volume in sales for the .40 vs. the .46 for R/C to warrant reissuing it. If Mr. Garafoli and John Maloney, of World Engines, are listening, there are lots and lots of modelers who would love to see the old G 21/40 return, with the same porting and timing used on the G 21/46 presently in production.



For those of you unfamiliar with this series, both the .40 and .46 were/are built in the G 21/29 crank-case. This gives a very light but amply strong engine with an excellent power/weight ratio. Like the .46, the .40 had a chromed cylinder, and when a used one can be found, it usually has many hours left in it. Cylinder timing on the .40 was inclined toward racing, but with the baffle modification, would give a good strong, healthy 4-cycle.

This being the third time around to meet WCN's deadline, and the first column has not appeared in print yet, we haven't had time to get a reading as to what you guys out there want to hear about. If the "trick" stuff as presented this month appeals to you or if it doesn't, let us know.

OTTO BERNHARDT

• Many of the letters and phone calls I receive are from individuals requesting information on the requirements for a good, reliable ignition system. Well, this is a subject that cannot be covered in just a few words, so in this article, I will do my best to cover as many points of



The "Simplex 25", designed by Louis Garami, who also designed many popular free flights in the great pre-World War II era. Plans, and an article on constructing the Simplex appeared in the March and April 1947 issues of M.A.N. This one was beautifully constructed by John Morrill, of El Segundo, California, on a Logan lathe of about the same vintage as the engine.

importance as I can.

First and foremost, the model builder *must* know which wire goes from one electrical component to the next (I will be pleased to send an electrical hook-up diagram to anyone sending a self-addressed, stamped envelope to 17991 S. Harvard Blvd., Gardena, CA 90247).

Now that we understand how to hook this thing up, certain conditions must be followed to make your system operate at its highest efficiency (i.e., good, hot spark versus poor, weak spark). The hotter the spark, the easier your engine will start, and it will have less tendency to misfire while running. All electrical components should be grouped as close together as possible. This would include the engine, coil, condenser, ignition timer, batteries, etc. Doing this will reduce the total amount of hook-up wire to a bare minimum. The more wire you use, the less efficient the completed package becomes. Remember, the batteries used in ignition operation can sometimes be quite small, especially when attempting to make the lightest system possible, and any obstruction to the current flow will detract from the performance of the system.

Never use solid insulated wire for your electrical hook-ups. Vibration from the engine will invariably cause this type of wire to crystallize and break, resulting in your engine stopping at the most unexpected time, and this can be most embarrassing when trying to impress your friends with your flying skill! A thinly insulated, fine stranded wire, no smaller than 20 gauge, is ideal. Also, it is a good idea to use a wire

color which matches the polarity of the batteries (red for positive and black for negative). This can be very useful when troubleshooting.

Switches used for shutting the engine off should have a load capacity of between three and five amps, with a style of your choice, such as push-pull, toggle, or slide. I don't recommend using any of the ultra-small switches, however, as they don't seem to be as reliable as the medium size models. Switches used with clockwork flight timers are usually of the micro-switch variety. This switch is manufactured under different brand names, but all are similar in operation and size. Choose one with a low operating pressure and a load capacity of not less than 5 amps. The minimum physical size should have an overall length of about 3/4 inch.

All wire connections to electrical components (coil, condenser, etc.) should be soft-soldered with rosin core solder. Never use acid core solder on electrical circuits, as the acid fumes up when heat is applied, and will attack and corrode certain materials and alloys. Almost all manufacturers of electrical equipment will void their guarantees if acid core solder is used for making connections.

I have been asked by many modelers who have considered using an ignition set-up as to what this will add to the overall weight of their model. This is a perfectly sound question, but difficult to answer in a few words. For example: I have seen ultra-light ignition systems, constructed for use in small free flight models, that weigh as little as 2-3/4 ounces, including the coil, condenser, battery, flight timer, and hook-up wire. In general, the weight of a complete ignition system will depend greatly on the size of batteries used, which, in turn, will determine the length of flying time before recharging or replacing. Three "C"-size nickel-cadmium batteries can provide up to three hours of engine running time in an R/C model before recharging, and that could represent a full day of flying. Ni-Cd batteries are our preference for R/C flying. They are lighter in weight than carbon or alkaline types, hold their charge without gradual voltage drops, can be rapid-charged on the field, and have an indefinite life. I have been flying with one set of Ni-Cd cells in my LANZO RECORD BREAKER for over seven years with still no sign of failure. While this may seem excessive life to some modelers, it may indicate what is possible if your batteries are given proper care and attention.

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Reminiscent of the Standard Oil Lockheed Vega, is this Monocoupe 90A in the famous red eagle on white. Photo was taken at the 1935 National Air Races, Cleveland, Ohio, by Ced Galloway.

Velie Motors was succeeded by the Lambert Engine Corp., which produced a much improved 5-cylinder radial of 90 hp; it is this airplane that most of us remember as *the Monocoupe*.

The basic airframe and engine installation of the 250 Model 90 Monocoupes built were all alike, though they appear to be slightly different airplanes. Part of the reason is in the shape of the fin, which had its area increased by extending and curving the leading edge, and partly because three different engine cowlings were used. Early 90's had no anti-drag, later, a narrow ring, which made them hard to tell from the Model 110 with a Warner Scarab engine. Still later, a Watters tunnel cowling which completely enclosed the engine, leaving only inlet air openings for each cylinder and outlets for exhausts, was used; the Watters cowling had less than desirable cooling qualities, and the last Model 90A, the subject of our plans, had an NACA bump cowling which hugged the engine and gave much improved visibility over the nose.

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MONOCOUCPE 90A

PART TWO

(Conclusion)

by PETER WESTBURG



Seattle based Monocoupe 90 on Edo floats. Light area at base of fin is reflection from natural fabric fillet.



Model 113, so-named from ATC number, like earlier Model 1, but with Velie M-5 instead of Detroit Air-Cat engine. Top of 98 mph.



Model 110 powered by 110 hp Warner Scarab. Basic Model 90 airframe, but with single leg gear, braced with wires, shocks in fuselage.



For all the "scaled down from .60 ship" fans, here is the popular "Banshee" in 1/2A size. Kit by Cathedral Models.

The 1/2-A SCENE

By LARRY RENGER

• The word is out! Cox has agreed once again to sponsor the unofficial 1/2A Precision Control Line Aerobatics event at the Nationals. The rules are unchanged from last year. If you have any questions, contact: Keith Trostle, 10900 Phillips Dr., Upper Marlboro, MD 20870, (301) 864-9473. It should be better than ever, as everyone goes gunning for Bob Whitely and young Dave Fitzgerald; both are two-time winners.

This month, for the beginner's workbench, I would like (try and stop me) to tell you about glues. There is a bewildering variety of new adhesives available in your friendly hobby shop. Old-timers probably have fond memories of sitting in a schoolroom chewing model cement off their fingertips, and going quietly insane trying to figure out how to do large area bonds such as plywood doublers on a profile U/C fuselage. Ah, the good old days!

Times have fortunately moved on, so we have more interesting problems, such as how to get your left thumb and forefinger simultaneously unstuck from each other and the fuselage; how to tell your wife that the cat now has the world's first epoxy reinforced cat-fur flak jacket; and how DO you get polyester resin out of a Bone China saucer!

Enough of that! The basic classes of cements and their characteristics are:

Model Cement: This prehistoric stuff is OK for moderately fast repair of lightly stressed, completely oil-

free balsa parts. The only really good current use for it is to bond ABS and ASA plastic parts together in ARF models. Carefully used, it does make strong, light joints, and it is inexpensive. In practice, it is necessary to use a technique called double-gluing on porous materials such as balsa. You must wipe a pre-coat of cement into each side of the joint, let that dry, then reglue and assemble the parts. YUK!

Aliphatic Resins: These are the "white" and "yellow" glue you see in large polyethylene bottles. They are a water soluble material, so they are very safe and easy to use. Clean-up is easy too. We even used a thinned white glue mixture as the adhesive for covering indoor tissue models when I was in college. These glues work extremely well on wood-to-wood joints. The glue is strong, penetrates well, and is highly vibration resistant. For general model

assembly work, this is my choice of glue.

Epoxy Resins: Here we have a two-part plastic material. Since no solvent system is used, and the glue is self-setting, it works well even in locations where there is little or no airflow. Strength and rigidity are tops, though it is more brittle than, say, aliphatic glue. Epoxy is fuel-proof, waterproof, and builds up nice fillets for adding strength to firewalls and landing gear mounts. It is my choice for use on most styrene foam bonds, because solvent and polyester glues eat up the foam, and water-base glue takes forever to dry.

Epoxy joints do tend to be heavy, and mixing the two parts is annoying too. There really isn't a good way to apply really small amounts of epoxy, so it is usually used only for large glue jobs. One final word of warning: Epoxies tend to cause skin allergies, so touch the uncured goo as little as possible, and don't use a solvent such as alcohol or thinner to clean your hands, it just carries the stuff in deeper.

Cyanoacrylates: These are the wonder glues: Hot Stuff, Zap, etc. This stuff is a water-like liquid which sets up as soon as it gets away from



Ace R/C's "Whizard" is a nifty trainer. Designed for pulse rudder control, but it can handle up to three channels.



A classic you can own! The fabled Mills .75 diesel has been revitalized and is living at Indy R/C Sales. This version is made in India!



One of the top three "Tens", the Tee Dee .09 is also the strongest and most powerful per cubic inch of the Tee Dee line.

the air. It travels deep into joints by capillary action, so it can be applied with the joint fully assembled and aligned. The reaction is extremely fast; between five and thirty seconds for a full strength joint. The added weight per joint is negligible. There are now two ways to apply the glue.

The classic way, is to use a small applicator tube stuck in the top of the glue bottle. The *right* way, is to use the eye of a needle which is dipped into a small puddle of the glue, then held against the joint location. Make this applicator by jabbing the point of the needle into a dowel or pencil. Cyanoacrylate glues are rather expensive, and the fit of a joint must be nearly perfect to achieve full strength. You must use extreme care with these glues, one friend nearly glued an eye shut when a bit of the stuff accidentally flicked off the end of the applicator tube. It cost him a \$40 contact lens, and he really got off lightly at that!

Polyester Resin: This was used

primarily before epoxy became readily available. Polyester resins are now mostly relegated to use in laying up glass-reinforced plastic parts: fuselages, cowls, wheel pants, etc. It can be used as a glue in the places where epoxy is normally chosen, but it is less convenient to mix, and less fuel-proof. The catalyst is mean stuff! Heed all cautions about skin contact and room ventilation!! (Worst of all, *no recovery is possible* if it gets in your eye and is not washed out within *seconds*! Loss of sight is guaranteed!)

Contact Adhesives: These are single-part, air-drying, rubber-based adhesives. You paint the material on each side of the bonding surfaces, let it dry, then mate the parts. Advantages are that this rubbery type glue is very vibration proof, it is really easy to use, no pinning of parts is required. Align perfectly before contacting parts, you'll have only one try! Contact cement is only used for large area

bonds such as fuselage doublers or foam wing skins. Two basic types are available: water-based for use on foam, and solvent based for use on wood.

In general, it is wise to use more than one type of glue on a model; select each one for the type of joint which it serves the best.

For our next topic, I have three more engines to show you this month. A diesel which is imported by Hobby Hideaway, Box 19, Delavan, IL 61734 is first. The engine is a Davies-Charlton Super Merlin .75 (That's in cc's. It comes out to .047 cu. in.). As is typical of diesel engines, the preferred props for this one are huge compared to those for the same size of glow engine. You want to run an 8 x 4 for sport, a 7 x 4 for free flight, and a 6 x 6 for control line or R/C use. The engine is British made and includes an integral tank and a spring-starter system. Spring starters are an immense help in

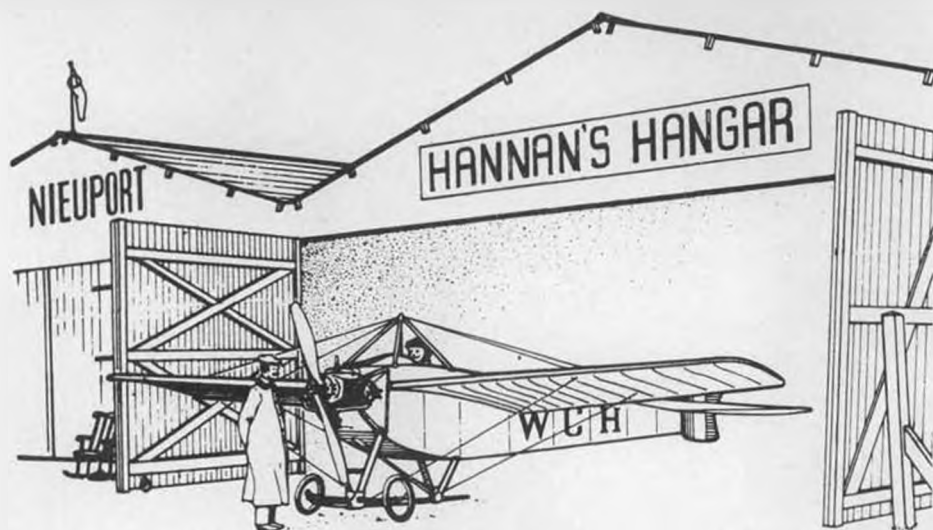
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D-C Super Merlin .047 swings an 8 x 4 prop! That spring starter is the secret, for all you non-diesel persons.



Beauty and the beast. Bill Sestito's daughter holds the Tiny Ace. It's a tiger with a Tee Dee up front. She's a doll!



You are only old if you are bored with life!

• A quote from the calendar of J.D. Gillies seems an appropriate introduction this month. We think one of the greatest attractions of aviation is its inexhaustible challenge . . . whether in model or man-carrying form. Thus, an enthusiast need never be bored, and can remain young in spirit, regardless of chronological numbers.

For his 60th birthday, Colonel Robert Thacker celebrated by test-flying his brand new Hughes Racer R/C model. His beautiful wife, Betty Jo, followed that act with the presentation of a tasty cake, which we were privileged to sample.

Meanwhile, Clyde "Daring" Goehring, 73 years young, was appearing at the Chapter 14 EAA group meeting, in San Diego, with his nearly finished manpowered machine. In a fund raising effort for the San Diego Aerospace Museum, members were invited to run-up the propeller, via bicycle drive, with their top rpm being recorded on a tachometer. In spite of the vigorous

efforts by many younger "pilots", Goehring simply ran rings around the entire lot of 'em, smiling all the while with his arms folded across his chest.

AND SPEAKING OF BIRTHDAYS

Sir Thomas Sopwith, famous for his many aircraft designs of yesteryear, celebrated his 90th recently, yet remains active in business, and in good health. Certainly he personifies a lifelong devotion to the support of aviation in all its many forms, including modeling.

HUGHES "GOOSE" UPDATE

According to a UPI release, the Summa Corporation is preparing to turn over ownership of the giant wooden flying boat to the "Air Museum of the West". This group hopes to build a ten million dollar facility to house the machine, as well as additional artifacts. Expected location is near the Queen Mary in the Long Beach, California harbor. The Hughes bird, which is constructed largely (!) of 3/16 birch plywood, is expected to attract the

Reproduction of A.M.L.A. watch fob, by Ced Galloway, souvenir of 1st national contest 50 years ago, by American Boy mag and NAA.

general public, as well as hoards of aviation buffs. Count us in! (We understand the complete airplane was covered with silkspan before painting! wcn)

CONTROL LINE FLYER

This is the name of the "spin-off" publication from "Patty's Pinky." According to editors Ben and Patty Sasnett, the newsletter will concentrate on combat, stunt, carrier and speed topics, as well as a comprehensive calendar of forthcoming control line contests. Subscriptions are available at \$6.50 per year from CONTROL LINE FLYER, 1443 McKinley Ave., Escondido, CA 92027.

OLD-TIMER NEWS

Everyone knows that pterodactyls were the earliest living flying crea-



P.T. "Pete" Capon, England, who worked with Juan de la Cierva on full-size autogiros, shows "Tyro-Gyro" rubber model. Gillies photo.



Modified Tyro-Gyro, built by Warren Shipp, in flight. Model descends vertically in autorotation, in the manner of a parachute.

tures, right? Wrong! According to England's Natural History Museum, a 300 million year old dragonfly has been discovered in a coal mine. Spanning eight and one-half inches, the remains have been catalogued in typically overblown scientific yukspeak, as "Erasipteron bolsoveri". (One of many children produced by Mr. and Mrs. Bolsoveri, no doubt! wcn)

HOIST ON HIS OWN PETARD

Dave Gibson reports that his two teenage daughters had nearly filled his house with trophies earned in horse riding competitions. "I used to tell them that anyone could win a trophy riding a horse around in a circle. But, I got it right back when my Orbiter's contest trophy arrived. Said the girls: 'Nice Dad, but you know... anyone can win a trophy flying model airplanes in a circle.'" Well Dave, at least now you can better understand each other's hobbies!

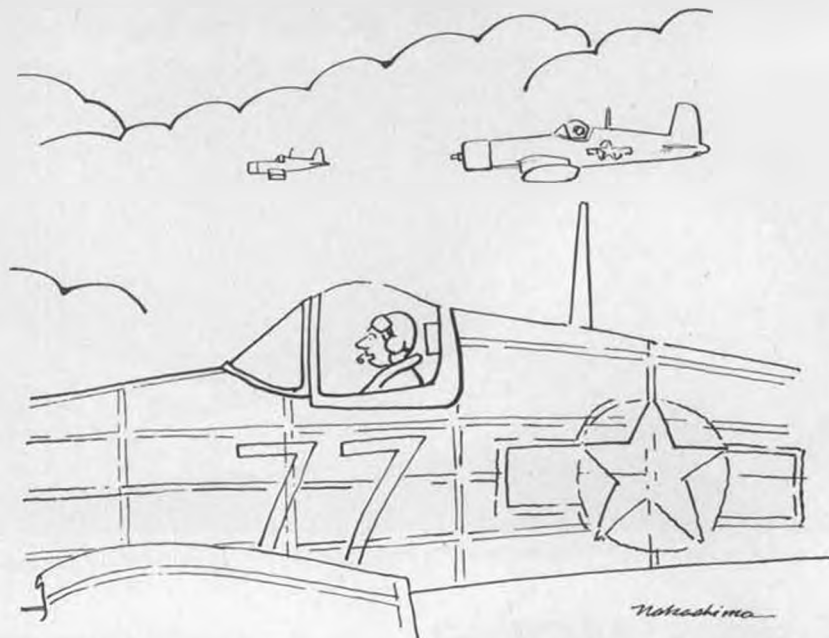
AND SPEAKING OF UNDERSTANDING

It is unfortunate that the various specialty groups in the model hobby do not relate more cordially. It is almost as if they are afraid to share each other's fun. A pity, as each could learn from the other.

Martin Dilly, who writes "The Free Flight Scene" in *Aeromodeller* magazine (England), offers these thought-provoking comments: "Have you ever wondered why there seems to be some antagonism towards free flight from the 'Sundays-in-the-local-park' radio flyers, and towards competition flying in general? Ignorance. The majority of these people have little or no idea what the aims of free flight are; one non-contest R/C flyer (and who incidentally is currently working on the SMAE Council) (*British equivalent of AMA.* wcn) literally did not know the general idea of free flight is to stay in the air for as long as possible, until I happened to mention it in conversation. Maybe we in F/F need to do a lot more 'hard sell' on our branch of model flying; at present it looks as if the powered R/C flying majority think free flight is a kind of poor relation, and that we would really all rather be steering our aircraft in pretty patterns around the sky like they do.

"How about making a friendly approach to your local R/C club, with an offer of a talk, and maybe a demonstration of what contest F/F is all about? Most of these clubs have fairly regular non-flying evening meetings and ask guest speakers along to talk to their members; perhaps you could book SMAE's print of the film *180 is Max*, to show

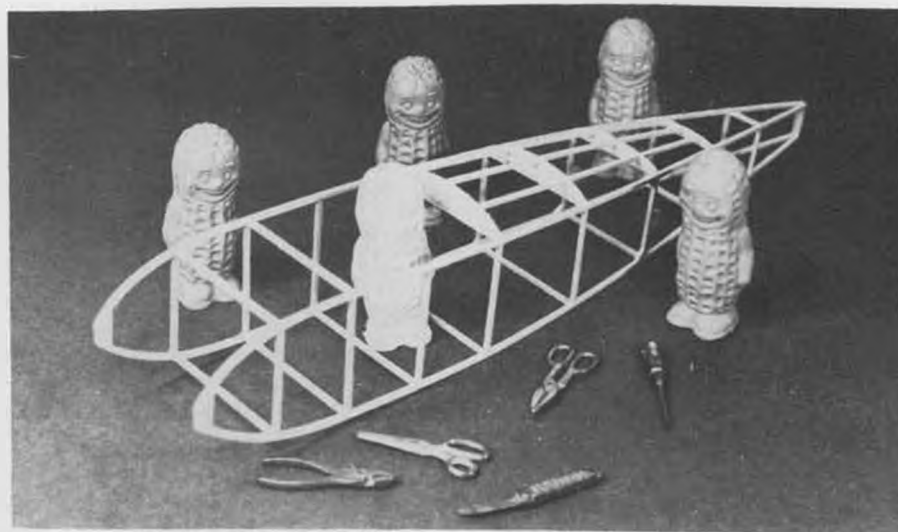
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"Pappy, let's turn back. My rubber band's about unwound."



Rubber powered Folkerts racer, by Roger Aime, Salon, France.



Happy Peanuts supervise assembly of Peanut Scale Pemberton Billing P.B. 9 biplane. See ordering details for rubber peanuts in text.



Mark Smith, at last year's MAC show, with the prototype "Sunny" biplane for .15 size engines.



Mark, in 1973, with one of the R/C birds used in the movie, "Jonathon Livingston Seagull".



MODEL BUILDER VISITS...

**MARK'S
MODELS**

By ELOY MAREZ . . . First of a new series that will take you behind the scenes and get you better acquainted with the people responsible for many of our fine hobby products.

• Recently, as I stood in what is referred to as the "balsa room" at Mark's Models, I was reminded of the most unusual use to which I ever put this favorite material of ours.

It happened during my USAF days, at a time when I found myself in the unenviable position of having to hike and hack my way through Panama's jungle, instead of the usual and preferred way of winging over it in one of Uncle's big silver birds. There are some basic rules for this sort of situation; one being to find a river and follow it downstream, as they always flow towards the sea, and hopefully, civilization of some sort. But once you find the river, you still need something to navigate in it, as anything is much

faster than walking along the almost non-existent banks.

So, you find a balsa tree; an easy chore for any dyed-in-the-wool model builder in any rain forest in the world. Under it, there will always be dead, dried-out branches. You machete off a couple of six-inch thick logs, about a yard long. Then you take two pieces of parachute cord, and tie it between the logs at the ends, parallel. After launching it, and waiting for whatever termites, tarantulas and torrijos are in it to crawl to the top so you can brush them off, you lay in the contraption, with one parachute line under your knees, and the other under your armpits, with the logs alongside your body. The Kon-Tiki it isn't, but

it will support your weight, and with your mind trying to block out visions of Bogart and the leeches in the "African Queen", you paddle out to where the current takes over and ride to the nearest bus stop. It sure beats chopping your way through a bamboo grove, but nevertheless, I was really happy that even before the first bus stop, a helicopter appeared overhead and dropped a hook. Even if it was an Army chopper, and not my Air Force friends that I was expecting, I did not decline the offer.

Things have improved somewhat for me since that time, and the only similarity was in having to hack my way through Freeway 5 Friday traffic down the coast towards San Diego



Rod Smith, Mark's father, takes a turn at the drafting table.



Disc-sanded parts, ready to be placed in sorting boxes.



A day's supply of balsa lumber . . . well, not really, but it goes fast once the saws get into it.

for an hour, and then inland for 18 miles to Escondido, which in Spanish means "Hidden"; the home of Mark's Models.

Mark's Models certainly needs no introduction to the R/C glider flyer, and almost none to any R/C'er. The company officially started in 1969, with the introduction of the first run of 500 "Windward" gliders. Obviously, the choice of the first design was the right one, this ever-popular glider is still seen at every slope and field in California, and is still being ordered and produced. Mark's estimate is that over 25,000 Windward kits have gone out to date.

We often hear that a company is only as good as its people, a statement that cannot be as important anywhere else as it is in something as personal as the model business. I don't believe there are many of us left with any illusions at all about the auto or large consumer product manufacturers in the U.S. Some of the products and service we receive from them certainly don't say much for their people, and we don't like it, but have learned to live with some



Stick and sheet bundles, ready for kitting.

of it. And let's face it, not too many of us are as concerned with who made our toaster or coffee pot as we are about who designed and built our model products.

So, let us take a closer look at Mark Smith, the man. Or maybe we should say, Mark Smith, the boy . . . because, at 27, while he is perfectly serious about Mark's Models and his own personal involvement with model airplanes, Mark Smith has managed to keep a young and happy attitude about the whole thing. It is completely obvious to those of us who know Mark that, while he is well aware of the fact that his livelihood and future depend on modeling, he has not forgotten what many others involved in modeling but not in the model industry tend to forget; that it is supposed to be FUN!

Mark's introduction to model airplanes came at a rather early age, from father Rod, who had him flying a Jim Walker "Firebaby" at the tender age of five. The exact dates get hazy between Mark and Rod, but the first radio experiences were with a Tri-Squire on single-channel,



Carol Swagart lays a set of plans in each box as a run of kits are assembled.

with a Miller receiver and some kind of ground-based transmitter. This was later followed with a set of F & M reeds, and in 1967, with the first digital proportional, which came from Kraft Systems.

About this time, Mark also got interested in R/C soaring, which lead to the "Windward" and later, the "Windfree", the second design to be kitted. It is also the airplane that helped Mark win the National Glider Championship in '70, '71, and again in '75. It is interesting to note that at the '71 glider Nats, as at many regional and local contests, Mark's fly-off for first place was with his own father, Rod.

Needless to say, Mark is an excellent flyer, and has managed to find time to build for and enter contests far removed from gliders. But even knowing this, many of us were surprised to see him show up with an airplane at the big Formula One race at Bakersfield a couple of years ago. He raced for a couple of seasons, well enough to upset some of those who have been in the racing game much longer. Currently, how-



Parts are accumulated in sorting boxes, ready for transfer to kit boxes. These are wing tips, servo mounts, landing gear blocks, etc.



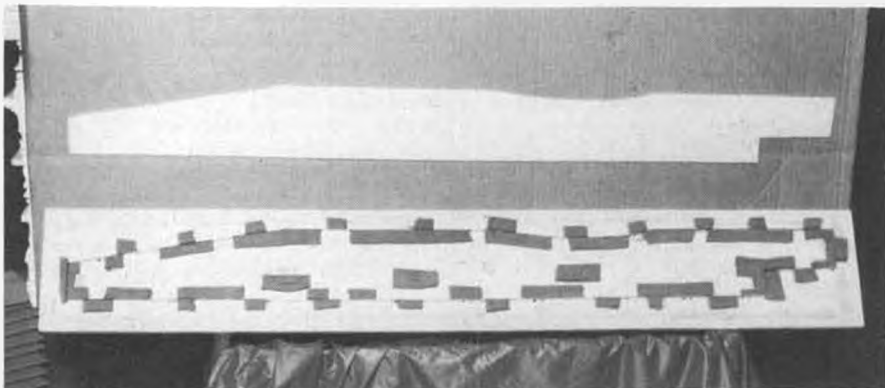
Margaret Bristol "deals out" some sheet wood, one of the first items to be placed in the kit boxes during a production run.



Sheet wood, after it has been cut, planed, and sanded, ready for die-cutting.



Wood is dampened before die-cutting, which prevents "die-smashing". Then it is stacked between spacers for room temperature drying.



Die for a fuselage side, and a finished cut. Blocks of foam rubber along the cutting edge force the cut balsa away from the blades after cutting.

ever, racing has become a victim of that old modeler's perpetual problem; lack of time.

Back to the gliding ... about which some of Mark's flying can definitely be said to be for the birds. In this case, the birds were Jonathan Livingston Seagull and his friends, in which movie all the aerobatic and crash scenes were of a Mark Smith-designed and flown, 18 inches to-the-foot scale 'gull'. He was the last

of a series of local modelers contacted for the project, which was so successful from the beginning that it was immediately accepted by the producers. A number of birds were built, and flown, mostly at Torrey Pines during the development and training phases. Actual filming for the movie was done at Carmel, California, and in Hawaii. Though no screen credits were given to Mark, or was any mention made during the film, that in parts, Jonathan was an R/C glider (*The studio went to great lengths to hide this fact. wcn*), it is a well-known fact throughout the industry and the hobby.

Mark has also worked in RPV's, the Remote Pilotless Vehicles now in development and production by many countries for various military uses. While working for an American firm, he was sent overseas to train foreign pilots to fly these large, heavy, and expensive radio controlled model airplanes ... certainly a far cry from a U-Control Firebaby!

Another Mark Smith first was the establishment of a closed-course record for R/C gliders, also done in Hawaii, in June, 1973. The FAI certificate for this feat, which hangs on the wall in Mark's office in Escondido, lists the distance as 457.8 kilometers; 284.4 miles. The bird used in this case was a more or less stock "Wind-

free". Less, because it had a sheeted wing. The all-up weight was 3.75 pounds, and an Orbit radio using alkalines for power operated the controls.

The flight time was 13 hours, 11 minutes. Mark describes this kind of model flying in a manner somewhat similar to that used to describe another of my Air Force experiences, transport flying, which has often been referred to as "hours and hours of boredom, punctuated by seconds of stark terror". In this case, the terror was periods of decreased lift, and tricky winds that sometimes took the glider out of sight and required the aid of Rod to "talk" him back. In answer to the other, obvious question, Mark said that you train for it, by not eating or drinking much the day before or during the flight.

So it isn't exactly all work and no play down in Escondido. And while it may sound like a one man operation, it isn't, as Rod has been around from the beginning in various capacities from Advisor to Go-fer. In addition, there is a crew of guys, some of whom are modelers, as you might expect, doing most of the wood processing, and a number of young ladies who handle kit assembly, shipping, and similar chores. One operation I did not understand, is the girl who works UNDER her desk???

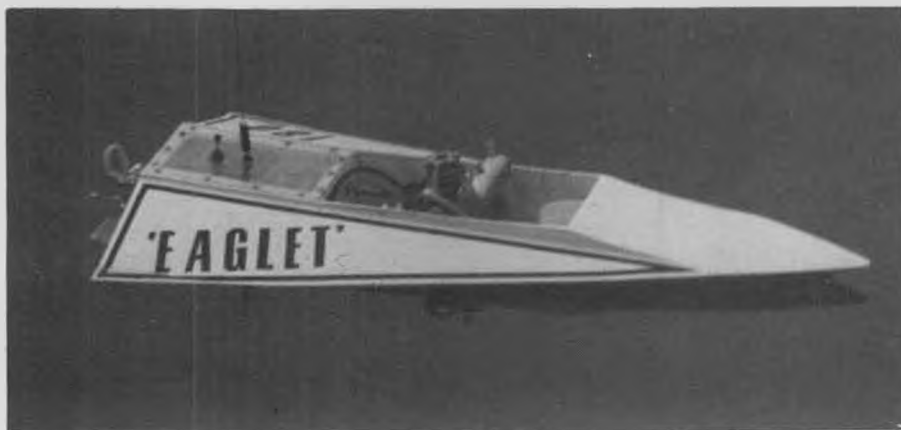
They are busy ... in addition to the Windward, they are making daily shipments of Windfrees, Wanderers, McDonalds, Bushwackers, Sunnys, and the new Wanderer 99. Mark's is also cutting balsa sheets and sticks, and shaping parts for eighteen other kit manufacturers. Certainly impressive, and interesting, and it is quite possible that the kit you are now building started off in one of the Smith machines.

The latest addition to the plant facilities is a machine for cutting and shaping music wire, a chore that

Continued on page 125



Mark parades off to the shipping area with a handful of Wanderer kits.



PRODUCTS IN USE

PHOTOS BY AUTHOR

NORCO MARINECRAFT'S "EAGLET" by JERRY DUNLAP

• It will probably come as a surprise to many of the readers of this review to be told that Norco Marinecraft, 13556 Chase St., Arleta, CA 91331, is among the pioneer firms to offer model boats for radio control. Founded by Roger Norsikian back in 1955, Norco's first offerings were large cabin cruiser models, designed to accommodate the large radio systems of the mid-50's. The Norco Catalina cabin cruiser has become a classic among large model boats. The Norco line has been expanded to include more popular type racing designs, such as the deep vee and flatbottom hulls for today's racing events. The Eaglet is a 25-1/2 inch flatbottom or monoplane design intended for use in the .21 monoplane racing class. The kit lists at \$38.95.

Designed by George Campbell, a well-known model boater from the Los Angeles area, the Eaglet has

proven to be a very successful raceboat in the always competitive .21 monoplane class in NAMBA District 9. Dick Norsikian, Roger's son, has successfully campaigned this hull the last two years. Dick used an Eaglet to place third at the 1977 NAMBA Nats in .21 mono class. Another Eaglet, raced by Jack Garcia, placed fifth at the NAMBA Nats in this class. Dick had three straight heat wins going into the fourth and final round and then flipped the boat while attempting to lap a slower boat. That little miscue cost Dick the championship, but there was no denying that his Eaglet was one of the top boats in the class. During part of 1977, Jack Garcia held the NAMBA oval competition record with his Eaglet.

CONSTRUCTION

The Eaglet kit features all plywood and spruce of top quality. All the framework pieces are hand cut. The



Four-year-old Denise Dunlap holds dad's Eaglet. Both nice looking models.

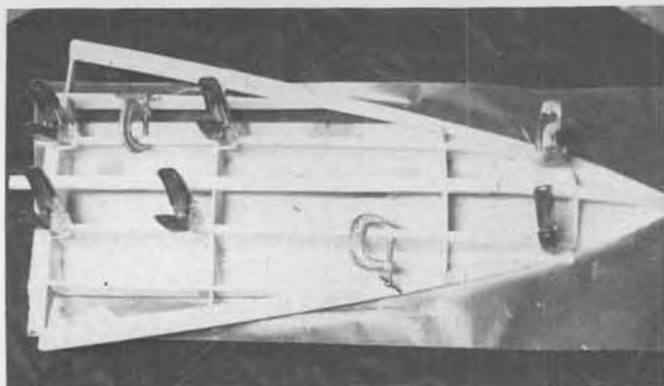
1/16 ply for covering is in sheets, and requires fitting and cutting to proper size. For the modeler with a Dremel type jigsaw, this will present no problem. The building plans and instruction sheets are well done and adequately explain the steps necessary to hatch an Eaglet. It is also possible to purchase an outdrive unit designed especially for the Eaglet. Norco is also offering flex-cable and universals designed to couple the engine to the flex-cable.

I found the Eaglet kit to be one of the easiest to assemble model boat kits I've built in the dozen years I've been reviewing model boat products. I guess the reason I especially enjoyed building the Eaglet is that it uses the same basic building principles I've used in boats I've designed and built. Design wise, the Eaglet is well laid out to insure ease-of-building and a strong boat.

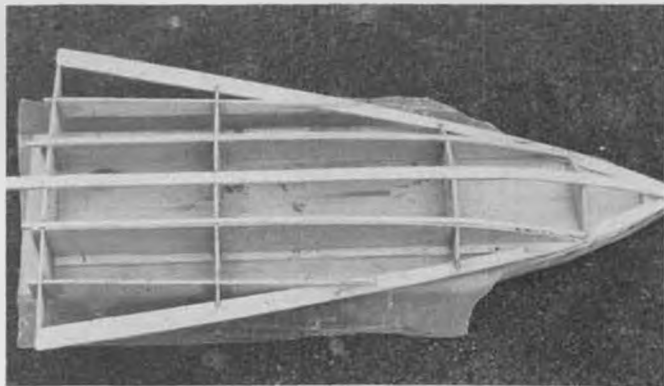
The Eaglet is assembled upside down on a flat building surface. It is necessary to cut the forward part of this building surface to conform with the top sheer pattern of the boat. During the initial construction



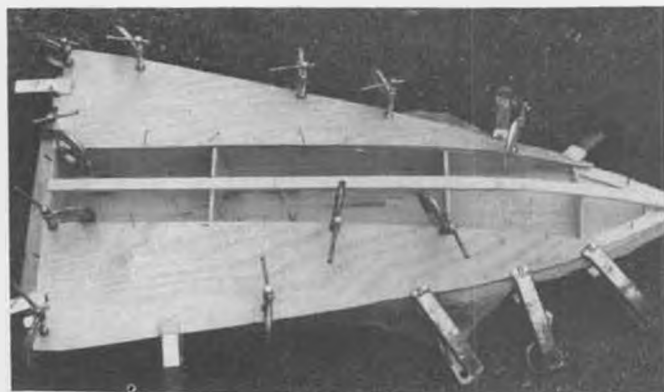
Material and instructions for Norco Eaglet.



Framework on flat building surface. Bottom stringers being held in place by clamps.



Framework ready for plywood covering.



The outside bottom covering is applied to the framework first.



The running pad being glued in position.

phases, the framework is removed from the building surface on a couple of occasions to allow fitting and trimming of framework and plywood covering material.

I made one slight modification to the framework. By cutting out the center section of the forward bulkhead, it is possible to provide a larger area for the fuel tank. This small change allows for more than sufficient room for an 8 ounce rectangular plastic fuel tank to be placed ahead of the engine.

The Eaglet's center section is designed to accept a 4 inch motor mount like those available from Octura Models or K&B Marine Specialties. The T-nuts or mounting brackets used to hold the mount in

place must be installed prior to gluing the deck onto the framework.

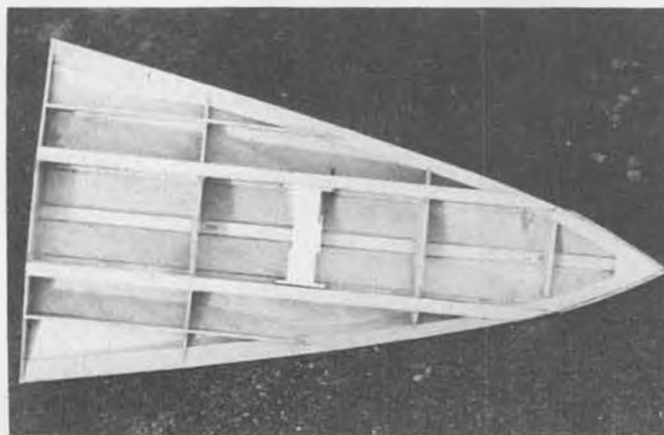
As mentioned earlier, I found the Eaglet a very easy model to construct. By paying attention to the building instructions and plan sheet provided in the kit, even a modeler with limited experience at building wooden kits, should end up with a well-built model.

INSTALLING THE HARDWARE

I made mention of the motor mount installation previously and it is an important part of the running hardware. A cable drive shaft system is recommended for the Eaglet. As mentioned near the beginning of the article, Norco offers an outdrive unit combining strut and rudder on one assembly. Norco is also offering

a flex-cable with a streamlined coupler on one end for connecting the prop shaft to the cable. Both of these items were provided so I might use them on the Eaglet I was building. And both were of excellent quality.

The locations for all the running hardware are shown on the plan sheet. The flex-shaft housing tube for my boat is from K&B Marine Specialties. It was necessary to do a little rebending of the brass tube to conform to the shape required for the Eaglet. Other flex-drive systems can be adapted for use on this boat. Auto body putty was used to secure the brass tubing to the hull. For a turn fin, one-half of a K&B Marine Specialties double-skeg fin was



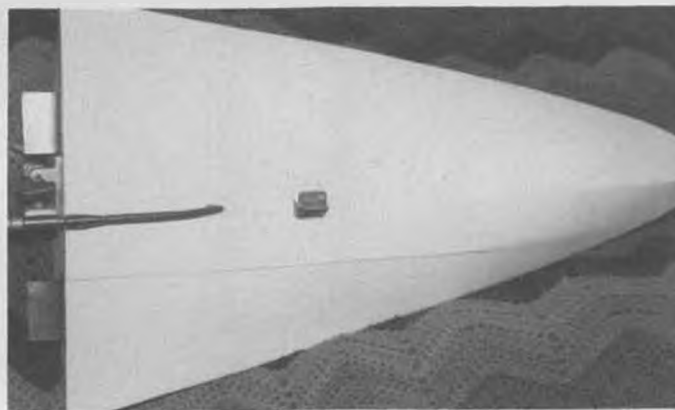
Motor mount is installed prior to decking the top framework.



After motor mount is fitted, the deck siding can be applied.



The top deck section is held in place with clamps. Don't try to apply decking without these extra "hands".



Bottom view, showing running hardware.

pressed into service. The fin depth was reduced to the same as the fin shown on the plan sheet. The transom ride plates were made from .032 brass sheet.

INSTALLING THE RADIO SYSTEM

The Eaglet is designed for a self-contained radio compartment. However, there is nothing to prevent the modeler from using a removable radio box if that method of control is preferred. Since I had an extra radio system available, I elected to use the self-contained radio compartment. A plexiglas top for the radio compartment is not provided in the kit. Obtaining a piece of plexiglas suitable for this application isn't difficult to do. Of course, a piece of wood will also perform the same function.

The radio compartment has more than adequate room for today's proportional radio systems. I used a side-by-side servo installation in my Eaglet. The servos are screwed into wooden rails running across the radio compartment. A Robart Boat Seal was used for the motor control exit arm and a K&B 1/8 inch seal was used for the rudder control rod. It wasn't possible to use the Robart Boat Seal on the rudder, because the control arm was too near the transom for a connecting linkage to be used. This was my first usage of the Robart Boat Seal. It seems to be an excellent method for exiting control arms from radio compartments or radio boxes. A DuBro Kwick Switch was used to install the on/off switch. Remember to place foam around the receiver and battery pack. A little rerouting of wires can make a much more sanitary radio installation than what is shown in the photo of the radio installation in my Eaglet.

What to do with the receiver antenna often presents a problem for a new model boater. A small plug-in jack with a wire whip aerial was used in my Eaglet. The antenna lead from the receiver was cut off at 4 inches and an alligator clip was soldered to it. The alligator clip is

attached to the female portion of the plug-in jack that extends through the radio compartment lid. Another method for exiting the aerial lead is through the use of a piece of small diameter plastic tubing running through the lid. The aerial lead can be pushed through the plastic tubing. *(The 1978 Kraft radios have plug-in antennas, and various antennas to suit car, boat, and airplane installations. wcn)*

FINISHING THE EAGLET

My Eaglet was finished using K&B Manufacturing Finishing Resin and Super Poxxy paint. Prior to applying any finishing material, the hull was sanded with 150 sandpaper. All gaps and holes were filled with auto body putty and this material sanded smooth.

One coat of finishing resin was then brushed on the hull. After the resin set, an electric sander was used to sand the boat. A coat of K&B Super Poxxy Primer was then sprayed on the hull. The primer not only serves to prepare the hull for the base color, but also helps in revealing areas in need of additional filling. Auto body glazing and sport putty work swell for filling pin holes and small cracks. The boat was sanded again and another coat of

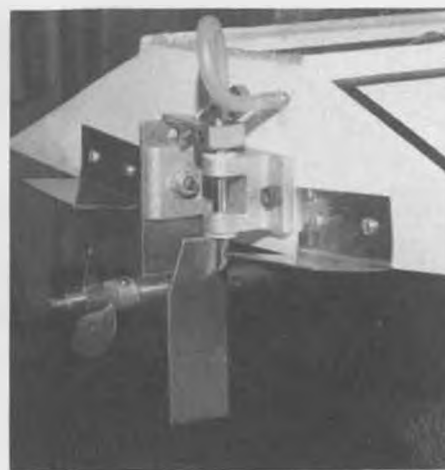


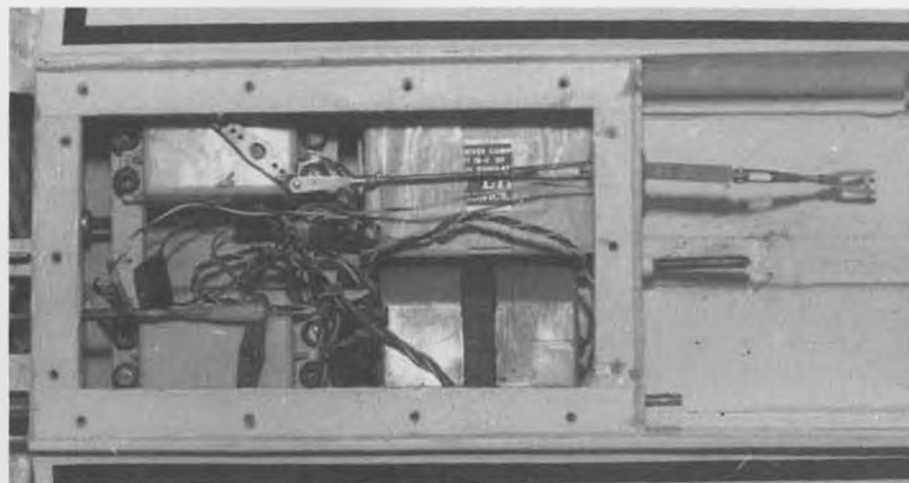
Photo of the Norco Outdrive unit and ride plates.

primer applied. When dry, this second primer coat was sanded smooth and the entire boat was painted with K&B Super Poxxy white. Mylar letters and numbers, along with D.J.'s Striping Tape provided the trim.

RUNNING THE EAGLET

When my Eaglet was ready for its initial running in early February, many parts of our nation were experiencing severe blizzards. But here in the Puget Sound region of

Continued on page 129



Understatement of the month, "A little rearranging will eliminate all the wiring being crammed together, and possibly snagging pushrods." Alternative is a solid cover so you don't see it!!



Taking a little extra time to build a nice stand for your boat not only enhances its appearance, but also protects it from accidental damage and general "boathouse rash". This month's article tells you how to build a stand you'll be proud of.

R/C POWER

By BOB PREUSSE and JERRY DUNLAP



BOATS

PHOTOS BY AUTHOR

• What better way to compliment your favorite boat than to display it on a glossy finished redwood stand? Whether you are entering an R/C show contest or just want to impress the fellows at the pond, a well-built stand can be both functional and beautiful.

For many of us boaters, the stand is a necessary evil. You must have some means of supporting the hull for starting the engine, protecting the underneath hardware, and transporting your boat in the family car. Too often, boaters are in such a hurry to try their new hull that they neglect the stand. And in many cases, I must say some stands look neglected. Why not spend a few extra evenings and do the job first class. Build a redwood stand!!

For this month's article, I visited J & B Custom Marine Equipment, 542 N. Yale, Villa Park, Illinois 60181. The proprietors are Bill Pistello and Joe Palek who, among having other noteworthy modeling qualities, are outstanding wood craftsmen. Bill and Joe are relatively new to R/C boating, however, they have become famous in a very short time for their redwood stands. They are true hobbyists at heart, and have agreed to give their construction secrets to the readers of **MB**. However, if you do not have the time nor the ability to build the stand you really would like to have, then I suggest that you write them and get a cost estimate for the type of stand you need. Bill

and Joe specialize in stands for the 1/8th scale hydros and deep-vees. For example, the basic price for a pickle-forked scale hydro stand is \$40 plus shipping. A round nose scale hydro stand requires more materials and sells for \$50 plus shipping. A \$25 deposit payable to Bill Pistello or Joe Palek is required on all stand requests. When ordering, include accurate dimensions of your hull's length, beam, tunnel width, bottom break, etc. Also, be sure to include your address and phone number. These are custom stands, and bill or Joe will call you if they are not sure of any dimension. In fact, I have seen seven of their stands and they fit the hulls perfectly.

Now let's look at the steps for construction.

1. The following materials are used: a 1 x 12 redwood board (length as needed), 2 inch flathead wood screws (about 2 dozen), Elliott's Vitra-Thane (clear polyurethane), .082 aluminum plate, six 3/4 in. chrome trim screws, Petit's Hobby-poxy Formula II, 3/4 in. self-adhesive foam strip (weather stripping), sponge, small modelers roller, 4 rubber legs (auto hood bumpers), sandpaper, good wood files, template or hull jig, and Dremel Moto-Shop and/or circular table saw.

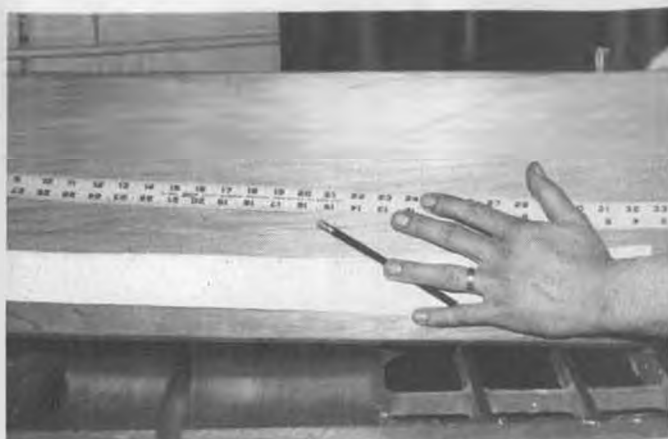
2. If you build the hull from a jig, then you have an easy task of outlining the top surface of the jig on the redwood (length with the grain).

The height of the stand will vary with taste and hull requirements. The stands for the scale boats are 4 inches, to give you an idea. If you do not have a jig, then you must make a template of the hull bottom and then trace as above. Special note, if your stand is for a hydro with a bottom break (packing point), you must decide at this time whether the nose or the transom will angle upward. Again, personal preference is the key; although with the nose level the chances of flooding the engine are reduced.

3. As noted in the photos, the stands have a built-in rudder and prop protector. Have you ever seen someone kick a rudder walking through the pit area? Well, an added 3 inches to the length of the stand could prevent this from happening to you. The aluminum prop protection plate also keeps your prop out of the dirt and rocks in those more rugged pit areas.

4. The sides can be cut out on a Moto-Shop or circular table saw. When using the circular table saw, be sure to stop at least one inch before the bottom break point so that the blade does not cut too far on the other surface. Carefully finish the cut with a hand saw (straight up and down) to bottom break. Remember that the redwood is very soft, so be careful not to dent or bang it up.

Continued on page 129



Lining up template on the redwood 1 x 12 for the sides of the stand.



Cutting out pieces on table saw.



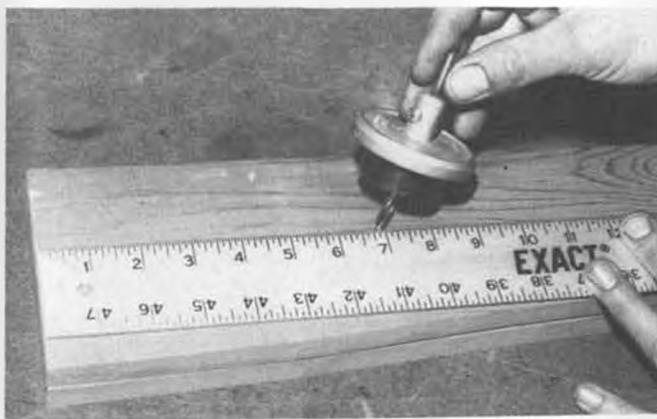
Final inch on either side of break point is cut with hand saw.



Line up both sides on flat surface and file even.



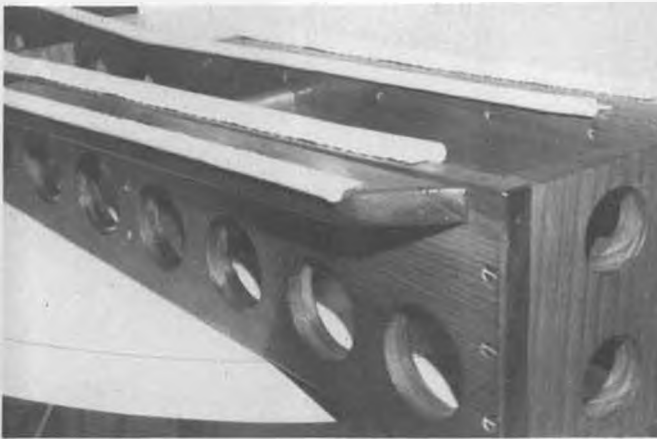
All wood pieces cut and sanded. Quart can of polyurethane finish.



Locating positions for cut-outs with hole saw.



Added treatments for 2 unlimited stands. Miss U.S. has script cut-out "U-2", and Olympia Beer sports appropriate beer can.



Another type of stand, designed for scale round-nose unlimited. Note added support pieces up forward.



Tempest 50/800, by Peter Duclos, Westport, Massachusetts.

STRICTLY SAIL

By ROD CARR

• A couple of columns back, we discussed sheeting arrangements using the swing arm winches in R/C model yachts. For simplicity, we first attacked the system which has the sheets exit the hull through sheet exit guides on the centerline of the deck, directly underneath the sheet attachment points on the jib club and main boom. It is my opinion that this arrangement will prove satisfactory for two to three seasons of sailing. The reason is that there is so much else to learn, that your time is better spent on discovering how to handle the helm, how to get a good start, and what kind of a course to sail. These are points we have touched upon in past columns, and will again in the future. But if you are now familiar with your boat and are comfortable in the midst of a fleet of 10 of your pals, then maybe you would like to improve your pointing ability a bit. Or you might want to have better control over the heeling tendencies your boat shows in heavy air. The answer to these needs is the installation and use of travelers for your sheet ends. What a traveler does, and how it should be operated, have been discussed elsewhere, and I refer you to any of the good books on full-sized yachting for an erudite presentation. Wally Ross' book, *SAIL POWER*, is particularly good in its presentation.

Our efforts will be centered on the sheeting arrangements required for utilizing travelers on an R/C boat. In the previous arrangement, the sheets were fixed in the boat, were manipulated by the swinging arm of the sail control unit, and then exited to the main boom and jib

club. That end of the sheet was free to be easily adjusted. Most folks erected their mast, turned on the R/C gear and hauled the winch in. Then they attached the sheets to the boom and club for the close-hauled position. If a change was required, it was a simple matter to uncleat the sheet from the boom or club, make an adjustment and recleat it. The traveler system makes this kind of adjustment difficult, and is the reason for a somewhat more complicated leading of the sheets, both within the boat and without. What we will see is a system I've used for 4 years now. I tape my hatches shut, and at the same time wanted to use the traveler rig to maximum advantage. Easy adjustment of the sheets was a must, without the necessity of opening the boat and retaping.

In Figure 1, not to scale, we see the final configuration after about a year of experimentation.

We will trace the system, using the mainsheet starting at the traveler car. I tie the free end of the sheet to the traveler car with a bowline. I have seen all kinds of unneeded tangles and problems develop with the cutesy little fishing swivels, and I stay away from them. The sheet then goes directly upward to a screw eye on the main boom. I often make sure that the screw eye goes all the way through the boom and then solder a washer on the upper point above the boom. This will eliminate having the threads strip and the eye pull out of the boom. Rather than run the sheet parallel to the boom, route it directly to the sheet exit guide. This eliminates at least one



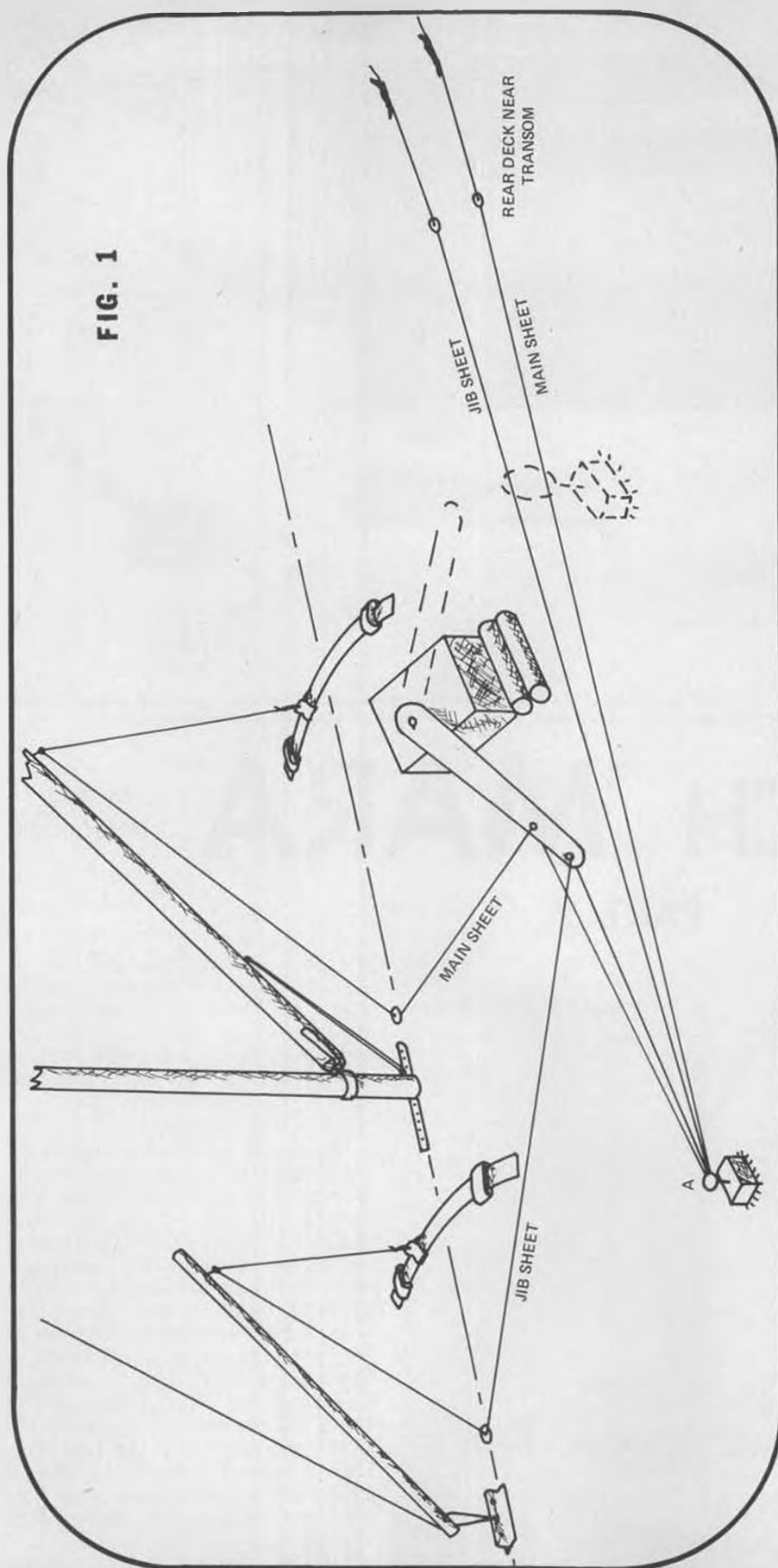
Good planing hull form for heavy air, in this model of the Olympic class boat.

more eye, cuts down on sheet friction which in light air can prevent the boom from going out in a soft purr, and will require that your deck be absolutely smooth without hatch fittings or switches to snag that sheet.

Through the sheet exit guide, the line turns aft and goes to the main hole on the sail control unit swing arm. Note that all the measurements we previously discussed and how to calculate them, are the same. But now, we calculate where to put the traveler under the booms, rather than where the sheet exit guide is located. In the system we are discussing here, the sheet exit guide is really only a fairlead, a means of turning the sheet in the direction we desire. Note that the sail control unit must be located on one side of the hull in order that a long swing arm will fit athwartships. It can be balanced with the batteries on the other side of the hull. Also, the sail control unit must be behind the mainsheet sheet exit guide when the arm is in the "sails out" position.

The mainsheet now runs forward to a sturdy eye affixed to the inside of the hull. This eye should be placed with an appreciation of where the sheets will run afterwards toward the transom. It should be the strongest installation you can make, not simply glued. Use some fiberglass cloth, and do a job on it. The

FIG. 1



sheet now runs aft with the purpose of exiting the deck somewhere near the transom. I've shown a phantom eye and block, since you can route

the sheets in a convenient manner for the rest of your installation. (You don't want to have them wrap around the rudder mechanism!!!)

When the boat is set up, nothing moves from the bow eye "A" aft. So it doesn't matter if you use 2 or 3 eyes. I've used some tubing, but you must prevent it from moving under sheet tension, or your trim will change when you get hit by a puff.

The mainsheet finally arrives at the exit guide and comes out onto the deck to be cleated down. I put these exit guides about an inch off the centerline of the boat so that water won't go in if the boat heels. I also place the cleats as far aft as I can, and usually put a chunk of tape down to prevent accidental snagging of a sheet.

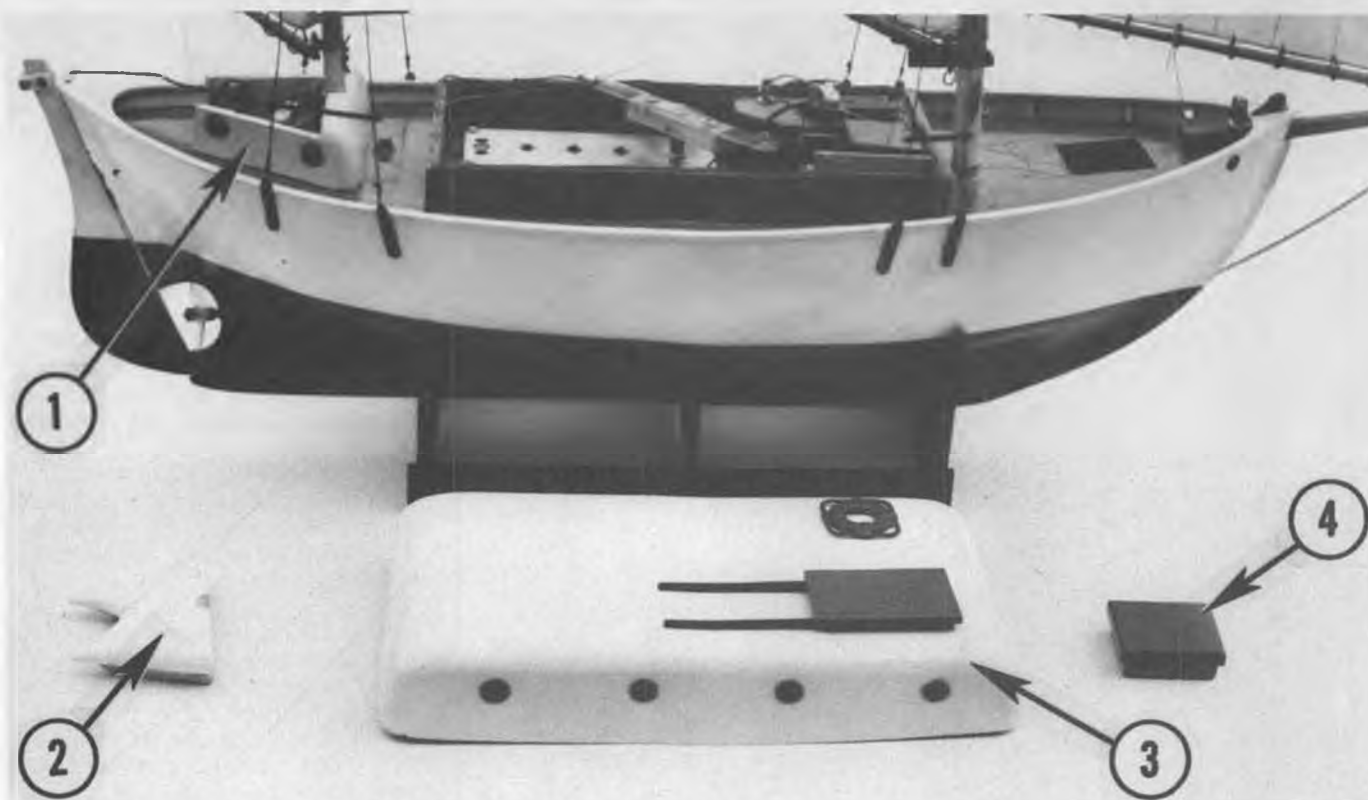
The jib sheet takes a similar route from traveler to the SCU and finally to accessibility on the rear deck.

The drill for setting the boat up is as follows:

- A) Set up rig, attach all stays.
- B) Uncleat sheets from rear deck, then cleat only the last 2 inches. Don't let them disappear back inside the boat!
- C) Lay the boat on its side.
- D) Turn on radio and pull SCU to close-hauled position.
- E) Adjust traveler car stops for prevailing conditions.
- F) Tie forward ends of sheets to traveler cars, using a bowline knot.
- G) Uncleat mainsheet and set close-hauled position of the main boom, recleat.
- H) Uncleat jib sheet and set close-hauled position of jib club, recleat.
- I) Slack sheets with SCU prior to picking boat up for launching. Close-hauled sails will make for trouble if you are carrying the boat.

Note that this arrangement is a more sophisticated way of controlling the leech tensions and sail shapes while sailing close-hauled. It does relatively little for you on the runs and only a bit of help on close-reaches. If you do not know how to use your vang, nor how to adjust your jib leech tension using the swivel offset . . . there is nothing for you to gain by making your boat more complex. There is nothing you can glue or bolt onto your boat that will make it faster. However, a lack of knowledge of the power producing elements of your boat will keep you at the back of the pack. Get smart . . . get fast. It is as simple as that.

I'll continue to answer questions that are accompanied by a self-addressed, stamped envelope, either direct or in care of **Model Builder**. Rod Carr, 7608 Gresham St., Springfield, VA 22151. While you have the writing equipment out, why not send in your \$5.00 annual dues to the American Model Yachting Association, 2709 S. Federal Highway, Delray Beach, FL 33444. ●



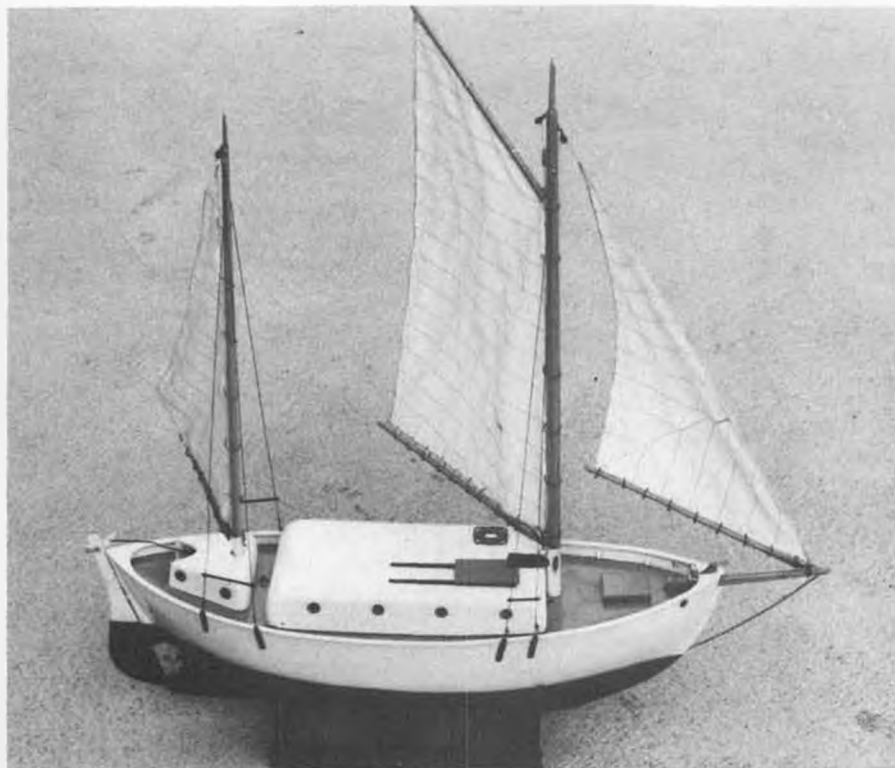
"Mara" shown with access openings uncovered. The cockpit enclosure (1) is 1/8 by 1/2 balsa, cemented to deck and mast. Cockpit roof (2) is 1/2 inch balsa. Main Cabin (3) is 1/8 by 1/2 balsa. Forward hatch cover is 1/8 sheet. Covers fitted with plugs for snug fit over openings.

PHOTOS BY THE AUTHOR

R/C KETCH "MARA"

By WALT
MUSCIANO

PART 2



At rest on a stand made from 1/8 inch ply, "Mara" makes a fine decoration for coffee table, shelf, mantel, or desk in living room. Life ring and cabin hatch from 1/8 inch balsa.

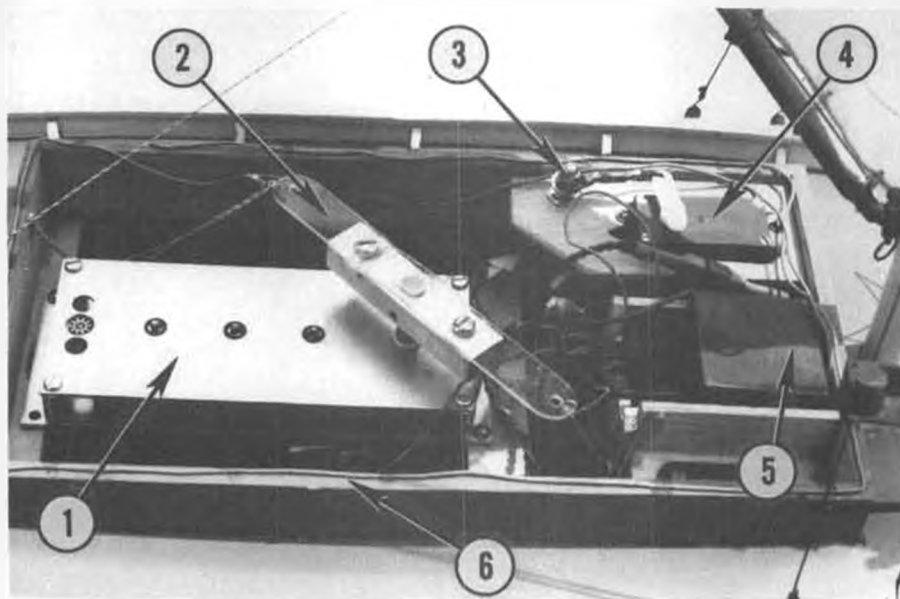
- Last month we covered the hull construction and equipment installation for "Mara", our two-masted, double-ended ketch sailboat. This installment concludes with masting, sails, rigging and miscellaneous details, plus operation.

MASTS AND BOOMS

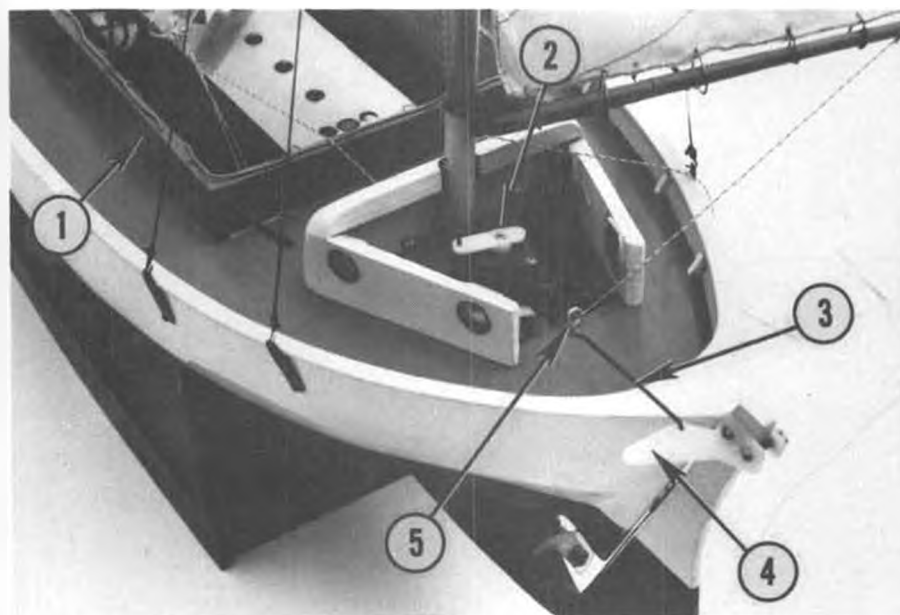
These are cut from straight-grain hardwood strips or good quality dowel. Trim and taper gently, cutting a little at a time. The final shaping should be done with coarse, medium and then fine sandpaper wrapped around a block. When sanding the masts and booms, they should lay flat on the worktable so that pressure can be applied without the danger of breaking. In addition, it will be found that a more accurate taper will be easier to achieve. The masts are tapered at the top and a step is carved into the bottom of each. The booms taper very little and are rounded at the end, as shown.

Drill the necessary holes in the completed booms and masts and then seal and paint them tan. The sheet brass vang and cleats can be made or purchased. Bend as neces-





(1) Probar sail control unit. (2) Probar control arm cut to length. (3) Probar switch mounted on ply base. (4) Sail control servo. (5) Receiver in 1/8 balsa box. (6) Antenna spot cemented.



(1) Coaming of 1/8 inch balsa. (2) Steering servo in steering cockpit. (3) Control rod, .045 wire. (4) Sig nylon horn. (5) Screw-eye that acts as fair lead for the mizzen sheet line.



In a fairly strong breeze, "Mara" heels gently and really knifes through the water. Note bow wave, plus good hull wave form which keeps rudder well submerged for positive steering.

sary and hold in place on the masts with small wood screws in pilot holes and cement. Attach the goose-necks to the masts, booms and bowsprit with screws, and cement.

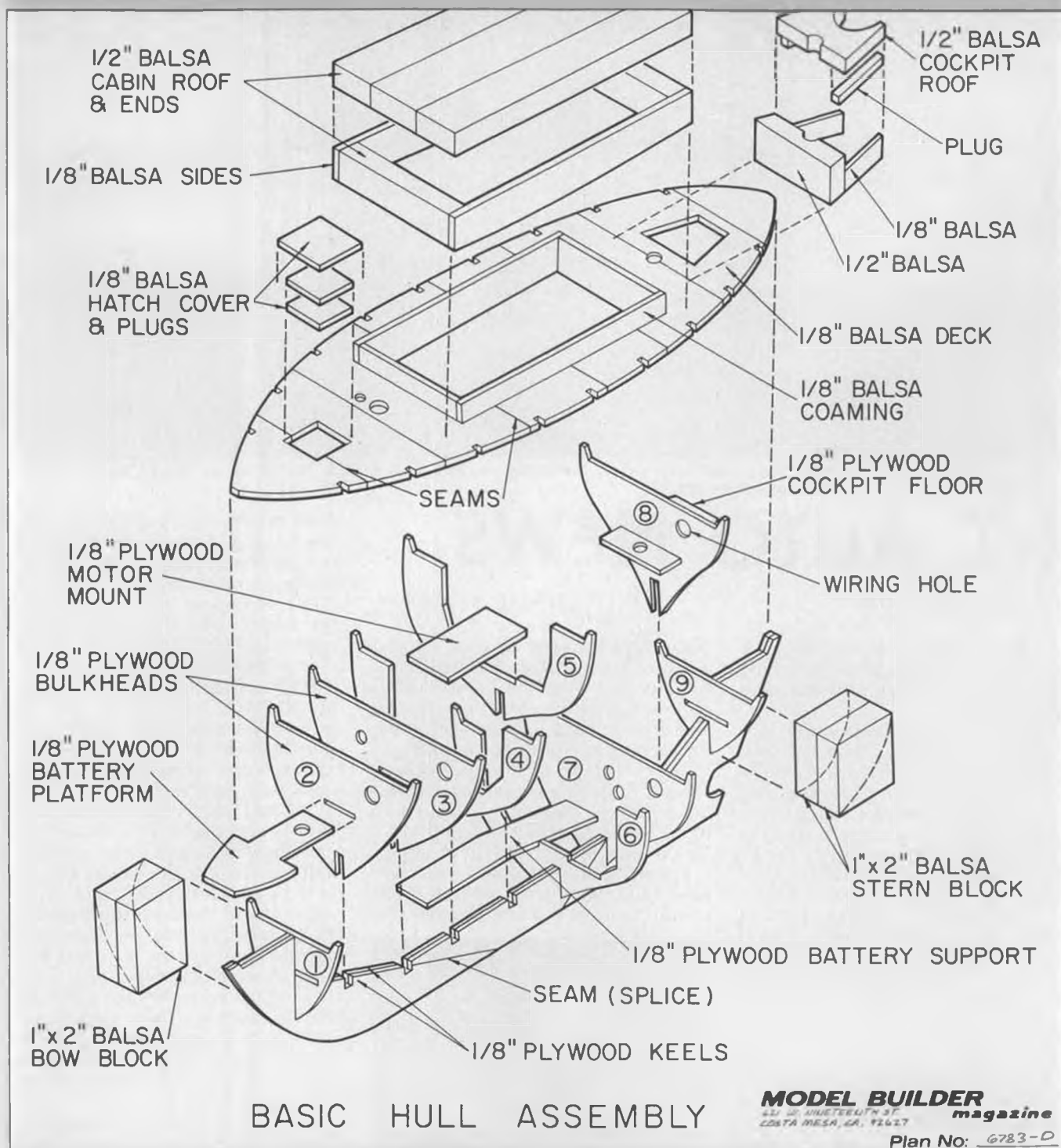
Trial fit the masts in the holes in the deck, being certain that the stepped bottom fits into the hole in the mast support. Check the mast alignment and correct as needed by sandpapering the hole in the deck with the sandpaper wrapped around a dowel. When the fit is good and position acceptable, cement the masts in place by applying plenty of cement to the step at the bottom and slip the mast through the deck hole into the hole in the plywood mast support. Now apply cement to the mast/deck junction. Several applications are recommended. Let dry overnight.

The mast stays are added now. Attach the large vangs to the bulwark with round head wood screws and cement. It is advisable to also apply cement to the protruding screw points on the inside of the bulwark. The stays are cut from heavy black carpet thread. They can be tied securely to the mast and bulwark vangs, or tied to small hooks bent from straight pins. The hooks are slipped into the vang holes. This permits the removal of the stays at any time. The stays are a scale item and not necessary for the operation of our ketch. Dummy navigation lights can be made from scrap wood or plastic and cemented to the stays as an added scale feature.

SAILS

The sails are cut oversized as shown, from close-woven cloth a bit heavier than a man's handkerchief. Bedsheet material will do. Mother, wife, girlfriend or sister can help with the sewing of the sails, which should be done with a sewing machine. The material can be cotton or any of the synthetic materials. We used cotton because the slight nap on the threads closed the spaces between the threads, thereby making the sail more efficient. A folding or hem is required on every side of the sails. This should be about the size shown on the sail plan and is a rolled hem as the detail illustrates.

Iron the material free of wrinkles before cutting, and be sure to allow material for the hems. Hold the folding in place with straight pins, and use thread of the same material as the sails, i.e., cotton thread for cotton sails and synthetic thread for synthetic sails. The folding should overlap at the corners of the sails in order to add extra strength at these points. When the folding has been sewn, the brail stitches should be added. These not only add required stiffness and strength to the sails, but



FULL SIZE PLANS AVAILABLE — SEE PAGE 144

also add considerably to the scale appearance of the model. The brail stitches should be a heavy style, using plenty of thread in order to add stiffness to the sails. Don't try to attain this by using heavier cloth for the sails because it will not work as well. The completed sails should be ironed flat.

The mast and boom rings are bent to shape and cut to length as shown on the sail plan. Mark the ring locations on the sails and make holes in the sails with a sharp awl. The boom rings are inserted through the holes in the sails, while the mast

rings are sprung just enough to install them on the masts. Slip the boom into the rings and then carefully slip the mast rings through the holes in the sails.

Blocks are attached to the vang with short lengths of fine soft wire. Form a loop through the block shackle and the vang hole and twist the two ends of the wire together. Cut off all but 1/8 inch of the twisted portion.

Sail installation starts by tying the corners or clews of the sails to the booms and gaff by looping a short

length of 20 lb. line through holes in the sail and the hole in the booms and gaff. Holes in the sail for the lines can be made with an awl. Knot securely, snip away the excess line and seal the knot with a bit of cement.

Sew the mainsail to the gaff using cotton thread. Measure and cut oversize the halyards "A", "B" and "C" that raise and lower the sails.

Add 20 inches plus to the measured length to allow for the added line required when the sails are lowered

Continued on page 128



The Second World R/C Car Championships will be held in Geneva, Switzerland, on July 7 and 8, 1979. Track site is the Vernets (sports arena) parking lot, situated in town. See text for more details.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• Some miscellaneous ramblings by our R/C car editor about upcoming races, events, new equipment, and things to try.

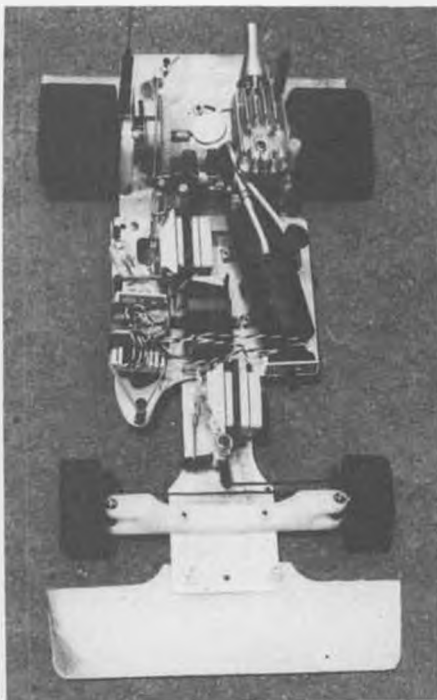
I've already received some info and pictures about the Second World R/C Car Championships. Geneva, Switzerland is the site, and mid-July 1979, the date. Race site is the downtown sports arena parking lot, and accommodations range from close-in hotels (\$100/nite for two) to further out hotels (\$30/nite for two) to a free dormitory that's reasonably close. Right now, round trip air fare from L.A., during the season, is a little over \$600. Not too bad a trip cost if you do it right. But by 1979, who knows what the air fare might be . . . or the conversion of dollars to Swiss francs.

A picture and layout of the track were also included. The layout appears typical European . . . a straight in front of the driver's stand with pitting on the outside, then a large sweeper to the left coming back toward the driver's stand in a high speed ess . . . then a short straight to the left, brake fairly hard for a 180° right turn into a short straight back to the right, then another brake point into a 180° left turn and short straight, and then a final left sweeper into the straight-away. As you've guessed, the course is run counterclockwise. It's really a high speed track with only two real brake points. I think the American drivers and cars should do just great on this course.

I know that I'll be going. I'm saving my quarters and have sort of

decided what kind of a car should work well on that track. The car for the Second World Championship race will be different from what I'll be running here this year and next. I'll be making some minor changes to my car for the '78 season, and they should help the car perform just a little better. There are a bunch of ideas in the bag. I just hope there'll be enough time to try them out.

Speaking about ideas, if you have any, talk them over with a good friend-racer or a team member. All



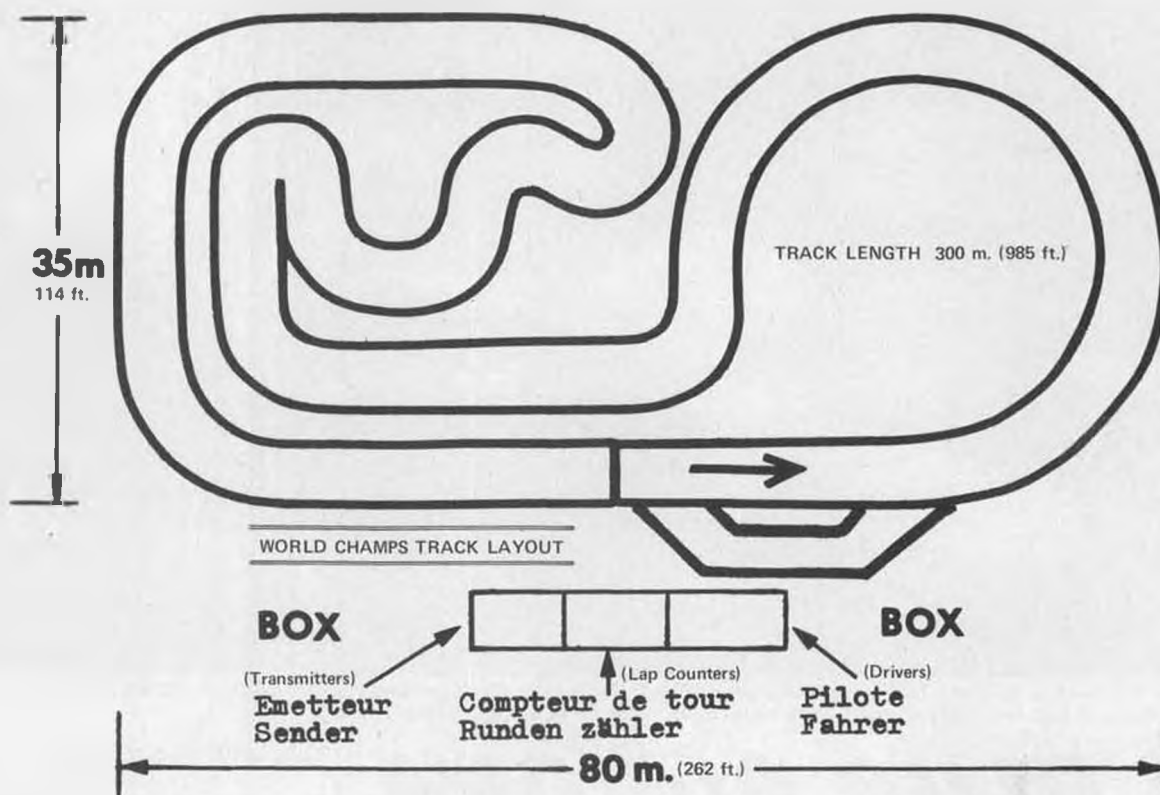
Franco Sabatini's S.G. car from Italy. Future article on weight distribution justifies layout.

kinds of things can happen. The idea may change a little . . . for the better, new ideas may come out, or the idea may be canned. But at least ideas get a little screening and usually come out better. You'll probably even understand your idea better and see it from another viewpoint.

Kraft has really decided to move into the R/C car market. Kraft will soon have a new radio set designed specifically for R/C cars. Up to now, Futaba seems to have the 1/8 scale market pretty well tied up, and Jomac and Futaba the 1/12 market. I would guess that Kraft has seen how many new radio sets have been sold in the last couple of years to R/C car (and boat) enthusiasts, and is impressed with the quantity. For one, I'll be glad to see another radio manufacturer in the car and boat fields. At one of the last races in San Diego, I talked with Mike Cowen of Kraft Systems for a few minutes. The first car/boat radio system will be rather straightforward and competitive with Futaba and other car radios. The second system will be more sophisticated, and will incorporate features determined to be desirable following lengthy field surveys. This radio will obviously be a bit more expensive. One of the neat Kraft items is a tuned transmitter antenna (for 27 MHz) which is only about 10 inches tall. No more fencing duels between racers on the driver's stand! There may be electronic trim on both the throttle and steering.

What has happened to the ROAR recommendation as to the probable muffler noise allowances for 1979, which were going to be announced in January of 1978? Personally, I want to start running a quieter muffler as soon as possible. Meanwhile, here in Southern California, the "council" has tentatively decided to ini-

Largeur de la piste 4 m.
 Fahrbahnbreite 4 m.
 (TRACK WIDTH) 13 ft.



tiate use of the European noise standard as soon after the 1978 ROAR Nationals as possible. The EFRA noise limit is 80 db at 10 meters (about 39 feet). Quite a bit quieter than 85 db at 50 feet. In fact, at any given distance from the noise source, the energy level of an EFRA muffler is only about 19% of that from a ROAR legal muffler. Many more old track sites would still be in use if we had had the EFRA muffler regulations in the U.S. At the last Southern California race, several people were using the English P.B. muffler.

The only thing about this whole muffler mess is that it means more dollars again. I hope some of the U.S. manufacturers who get into it will have a retrofit kit so we can at least use the elbows or initial adapter of the current mufflers.

Already there are complaints about the 1978 ROAR Nats schedule. The complaints that I've heard are related to the holding of the 1/12 and 1/8 scale Nats at the same site. As a consequence, these complaining racers cannot practice during the week before the 1/8 Nats to get their cars and themselves 'dialed in'. How do you feel about this situation? Personally, I think that the ROAR Nats are for the total R/C car fraternity. The great majority of racers cannot afford the extra time or money required to be at the race

site a week ahead of time. Hence the edge would always be given to the guy with big bucks or very strong factory backing. But I feel the Nats are for the average R/C car enthusiast. No special provisions should be made for extended practice ahead of time. If the track is available, fine, if it isn't, that's fine also. In fact, anything that can be done to even out the advantage/disadvantages would probably be beneficial to the sport. Ideas in this direction may include neutral sites/new track layouts. The 'home' drivers will always have an advantage. Look at the 1st World R/C Car Champion-

ships . . . the week of practice that lots of racers had still wasn't enough. A new neutral site would have been better, a new track layout (same site) would have helped.

The latest word on the 1978 ROAR Nats now has the 1/8 scale events first, then the 1/12 scale. I guess whoever makes the most noise wins. I still hope that the track is closed for one day shortly before the 1/8 scale program starts so a new track layout can be put in. Then only allow for about 2 days of open practice . . . so that the majority of racers will not be completely out in the dark (wet,

Continued on page 127



Phil Booth's P.B. car, from England. Has EFRA legal (quiet) muffler. Will this sound level be required by ROAR in 1979. (If it wants to use public sites, it better! wcn)



Now how does that cowl go back on? Leon Bazurto at Moffet NAS, in 1937, with TD Coupe (MB Plan No. 574-O.T., \$3.50). Note original wood motor mount, as sold with Baby Cyclone. Tank seems to be raised above normal position.



PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• Hi there! Interested in old-timers? the column this month is aimed at the fellow who is interested in old-timers, but just doesn't know how to go about it; i.e., procurement of plans, motors, kits, etc. So, welcome to the best darn phase of modeling you would ever want to get into. As proof of the popularity the old-timers are enjoying, the membership of the Society of Antique Modelers (SAM) has grown from 400

to 1,800 in less than four years.

We could brag on interminably about what an easy, relaxing method this is to get into radio control, but this applies equally well to free flight. You don't need those screaming demons!

To pursue the thought of radio control for old-time models (especially in congested urban areas), this columnist feels this is the way to go. For openers, the original design is

stable, control is very easy, any flying done is always in a relaxed atmosphere, and best of all, you will have time to meet some of the best fellows it will be your pleasure to know. You will find out that in this old-timer game, you don't have to apologize for your models. They look and fly extremely realistically!

At the risk of being repetitious to those already enjoying this fun phase of the modeling hobby, we are going to review the whole old-timer movement and properly introduce the newcomer to the fun. After all, isn't that the name of the game?

MEMBERSHIP

Although not compulsory, it is a good idea to invest five bucks in an annual membership in the Society of Antique Modelers (SAM), to find



Bob Von Konsky (SAM 21) at Santa Teresa Park, with his trophy winning Ehling Contest Winner. OS 30 glow. R/C, of course.



Real nice GHQ Sportster by Bruce McAviney of Hobby Shack. At Pond Commemorative, Santa Maria.

out if the jewel you are considering would be eligible to enter a contest. I know the idea of a contest repels many of the sport modelers, but an old-timer "contest" is really a group of fellows out to enjoy themselves without due regard to winning. The competitive angle is just to stir up a little interest in that, "Maybe my Shershaw Champion glides better than your Lanzo Record Breaker." As you will find in the old-timers, it is not so much who won, but who had all the fun.

So, quick like a bunny, get your five bucks out and fill out the printed application blank in this magazine (published whenever we have the space) and send it in to Tim Banaszak, the perennial SAM Treasurer.

If you are still hesitant, write to the columnist for a pamphlet on SAM and what it is all about. If you need it bad enough, we will also include a rulebook for 25¢ postage. Do it now while you are thinking about it! Write to John Pond, 4269 Sayoko Circle, San Jose, CA 95136.

Incidentally, in the SAM publicity pamphlet, you will find a list of SAM Chapters that may be near you. If not, one may have sprung up since publication date. In any respect, we'll get you started right!

SAM NEWSLETTER

As part of your SAM Membership, there is the Society's newsletter, known as "SAM Speaks", ably edited by Pete Vano. This publication brings you all the latest news of the various chapters, and viewpoints of the individual members.

Rule changes generally dominate the newsletter, as members are constantly looking for a clarification of some rules. Inasmuch as the SAM Rulebook has only been out for three years, it is undergoing some growing pains.

SAM has one president and four regional vice-presidents, plus a Secretary/Treasurer, who are elected every two years. Elections and results are carried in the publication. Contributions to the newsletter are always solicited. Who knows, you too can become a reporter!

OTHER INFORMATION SOURCES

Of course, this column also serves to disseminate activities and doings of the various SAM Chapters. New ideas and events are described for those interested in trying different things. New products in the form of old-timer kits and motors are announced and sometimes reviewed as to power and efficiency.

In addition to the numerous photos of various old-time model designs appearing in the column, a three-view of an old engine is given for those who are unfamiliar with the era of 1936-1952 ignition types.

Model Aviation, the official AMA



The scene is the Eastern States Champs, Hadley Field, New Jersey, 1940, and the young man launching the "Jersey Javelin" is none other than M.A.N.'s Walt Schroder. Nice, legal launch!



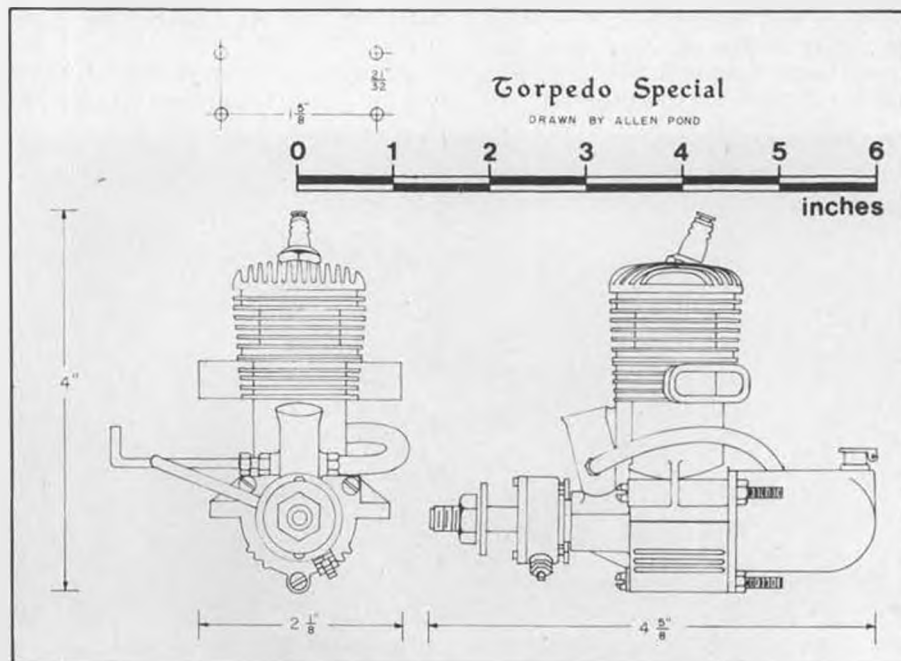
And sitting out there in the grass, third from the left, with the straw hat, SAM's boisterous president Joe Beshar, also seen at the Eastern States Champs. Photos provided by Lee Shulman.

publication, features two writers, Clarence Haught on free flight, and D.B. Mathews for radio control old-timers. At present, Mathews is running a set of three-views each month. Also, **Model Builder** features a full-size drawing of an old-time flight each month, only missing occasionally.

In passing, one should mention the Engine Collectors Journal, as edited and published by Tim Dan-

nels. Although directly primarily toward the engine collectors, a lot of good stuff on engines can be gleaned from each issue.

Probably the best source of old-timer motors, kits, plans, etc., will come from SAM itself, as one of its industrious members has embarked on a program of compiling all sources in a comprehensive handbook. Some of the material has already been published in SAM



COMET'S CURTISS ROBIN

OLD TIMER Model of the Month

Designed by: Joe Konefes

Drawn by: Al Patterson

Text by: Bill Northrop

• The April 1937 issue of M.A.N. carried a full page ad by Comet Model Airplane Supply Co., announcing its first gas model kit, a 6-foot span Curtiss Robin. It was to be the forerunner of many famous gas model kits produced by Comet; including Carl Goldberg's Clipper, Zipper, Mercury, and Sailplane.

Though you wouldn't know it from the ads, the plans did credit Joe Konefes, co-designer with Charles H. Grant of the famous KG, as designer of the Robin.

The model had enough gingerbread features to drive a gadget-nut out of his gourd; detachable wings and tail assembly (now wasn't that

unusual?), adjustable rudder and elevator setting, adjustable motor skid to accommodate various engines, variable engine thrust, real airplane type shock-absorbing landing gear and tail wheel, removable cowl and hatches for easy accessibility to motor, battery, and wing springs.

Contents of the Comet Robin kit read like a Lou Proctor Antic; all ribs accurately die-cut to shape (this was in the age of printwood), landing gear wires bent to exact shape; ignition switch; booster clips; machine screws, nuts, washers; springs for holding wing, landing gear and tail wheel in place; printed aluminum cowl sheet and firewall; special hooks and wire fittings all bent to shape; cement, 1/2 pint of covering liquid(!); 1/2 pints of red and yellow dope; three sheets of bamboo paper; two large plan sheets; get this ... a pair of 3-1/2

inch airwheels; rubber-tired tail wheel; streamlined struts; shaped leading and trailing edges; many large printed balsa sheets; special bass blocks all shaped, grooved, and slotted; and a birch prop blank, outlined, drilled and tapered, ready to carve.

The price for all of the above. . . ? Would you believe \$6.50? And if you happened to already own a pair of airwheels, you could buy the kit, less wheels, for \$4.95 . . . Move the decimal one digit to the right, and you still couldn't meet today's prices!

The Comet Robin holds a special place in the heart of MB's editor, because he shared the thrill of helping with the first trial flights of his modeling buddy's Robin, "way back then." We were the only modelers in the small university town of Newark, Delaware who were involved in gas models at that time, and Jack's Robin was completed prior to our Scientific kit of Bassett's "Miss Philadelphia." Neither of us had seen a gas model in flight, and the Robin's first test hop came at the end of many exciting hand-glides down the 7th fairway of the local golf club.

With our hearts in our throats, we turned the Robin loose on its first hop, the engine set at about half-throttle. Actually, it was another hand launch, and the ship then proceeded to complete two large circles at about twenty feet of altitude, and as soon as the engine cut, it settled into a smooth and realistic landing. With Jack in close pursuit, we ran to the model, shut off the ignition, and picked up the Robin at the leading edge of the wing. The nose swung up and the hot Gwinn Aero branded our left forearm with a mark that is still faintly visible.

Even without the branding, we'll never forget the excitement of that first gas model flight.

The plans presented herein were traced from the original kit plans, however, many of the small "how-to" sketches have been omitted. Ron Martelet, who sent us the cover photo, taken by John Harast, also loaned us the original kit plans.

Ron's Robin was recently recovered. It now weighs 5-1/2 lbs., has an old Veco 35 for power, and a Kraft 3-channel radio for control.

The model is quite accurate in outline, the main departure being the landing gear. It would not be difficult to modify the gear to scale configuration, but then, it would only be a scale Curtiss Robin . . . not a Comet Curtiss Robin! •

Speaks.

Newsletters are quite numerous. Among those are the SCAMP Hot Leads, SCIF Flight Plug, SAM 21 Newsletter, SAM 7 Yankee, and several other smaller ones. When one organizes a SAM Chapter, the first thing to be done is to arrange for an exchange of newsletters. What the other fellow is doing is always of great interest. The brand new club paper by SAM 49, "Arcing Point", is a case in mind, as its publication is full of ideas for different types of fun events.

Incidentally, if you, as the newcomer, have several other fellows along with you who want to form a more or less informal club or chapter, write to Everett Woodman, 389 Floral Lane, Saddle Brook, NJ 07662, for an official SAM Chapter number.

Of course, you will be required to list who is in your club to support your application.

MOTOR OF THE MONTH

As mentioned previously, this column features a monthly old-time engine review primarily to show what the old engines looked like, and in addition, to supply motor mounting information to help plan your next old-timer project.

The September 1946 issue of Model Airplane News featured a full page in the front section announcing that Torpedo was back. This was the Torpedo twin stack as manufactured by Miniature Motors, Inc., of 8400 Higuera St., Culver City, California.

(However, if you went back a few
Continued on page 74



Carl Goldberg still has the original "Whizzer" control line model (Surprised that Russ Barrera hasn't acquired it for his museum!).

Presenting . . .

STERLING MODELS' BIG BEAUTIFUL "Mk. II" Puddle Jumper

R/C Air Boat/Amphibian
for .15-.35's

Kit B-27

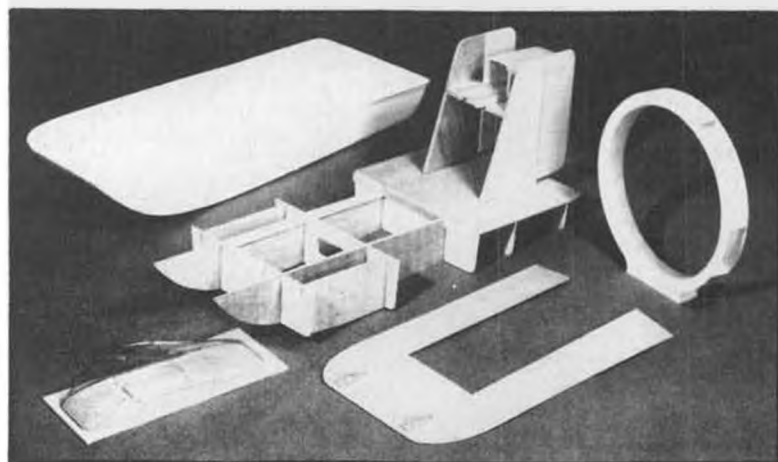
Length 30" Beam 11"

\$39.95



For Sport
or
Coast Guard Version !

Run it on land Or in the water



Frame Photo Reveals Simple-Rugged Construction

About The Kit:

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

STERLING MODELS • 3620 G ST. PHILA. PA 19134

If no dealer available, direct orders accepted — with 10% additional charge for handling and shipping (60¢ minimum in U.S. \$1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50¢ enclosed
 - ☐ Secrets of Model Airplane Building — including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25¢ enclosed
 - ☐ Secrets of Control Line and Carrier Flying — including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions 25¢ enclosed
- No checks. Only U.S. money orders or currency accepted

Name _____

Address _____ City _____ State _____ Zip _____

1/2 A, SPORT, STAND OFF SCALE, 2 CHANNEL RADIO



P-51D

\$29.95

Features:

- Semisymmetrical airfoil that builds flat on the full-size plan
- Formed plastic fuselage, top, and canopy
- Illustrated instructions
- Decals
- All balsa construction

Specifications:

- Span 36 in.
- Area 216 sq. in.
- Length 28.5 in.
- Weight 22 - 28 oz.
- Engine TD .049
- Wing loading 14.6 - 18.6 oz./sq. ft.

ME-109E

\$29.95

Photo of actual model built from kit

The House of Balsa *P-51D Mustang* and *ME-109E* are big steps ahead in low cost RC that gives both realism and performance. These high quality kits build quickly, using preshaped balsa fuselage sides, light weight moulded fuselage tops including the canopies, and shaped blocks. Rugged balsa and plywood construction make light yet strong models that are ideally suited for schoolyard and small field flying.

See your local dealer first.
Distributor and dealer inquiries invited.
California residents add 6% sales tax.
Foreign Orders - U.S. Currency on U.S. Bank ONLY



2814 East 56th Way, Long Beach, California 90805



Unusual O.T. flying scale by Gordon Coddling. A Storms "Flying Flivver" with Evans Four, using Brown pistons and Cyke porting.



Karl Tulp flies his R/C Playboy with an OS Wankel engine.

issues, this ad began to look more than a little suspicious. Several months earlier, Miniature Motors had placed ads for the Bullet motor, one of several designs by Bill Atwood, which he had sold to Miniature, inventory, name, and all.

Meanwhile, back at the ranch, Lud Kading and Johnny Brodbeck [K&B, get it?] had teamed up and started production of their own engine. Discovering that Atwood still had the name and inventory on the Torpedo, they purchased it all, and assigned the name to their new engine. Their first order amounted to half of the first production run, for Bob Morgan's Model Supply Co., 3473 Tweedy Blvd., South Gate, California, a large West Coast distributor. Morgan ran an ad in the July 1946 issue of M.A.N., with the following headline "BACK AGAIN, and hotter than Ever, The Record Breaking TORPEDO '29'."

Getting back to the Miniature Motors ad which appeared two months later, close examination verifies the fact that the illustration was indeed a clever artist's air-brushed modification of a photo of the K&B Torpedo!

Obviously, Kading and Brodbeck slapped a lawsuit on Miniature Motors over its illegal use of the Torpedo name. Miniature, in the meanwhile, went into production on the twin-stacker that apparently didn't even exist at the time their ad appeared. The suit dragged on for about a year, and just when K&B was about to collect a sizeable payoff... Johnny Brodbeck laughingly says he had already figured out how to spend it... Miniature Motors declared bankruptcy, and that was that! wcn)

For the above reasons, Torpedo Specials are a little rare and harder



Monty Terrel's Dennyplane photographed against Australian background. Plane is equipped with Futaba radio and powered by a Webra 40 engine.

to find than the standard K&B Torpedo. Actually, in retrospect, the glow plug made the K&B Torpedo the tremendous success it was, as it fit perfectly with the new glow fuel and plug. This helped hasten the demise of the Torpedo Special.

The Torpedo Special when first placed on the market, sold for \$18.50 less coil and condenser, though deliveries didn't start until late in the year. The rival K&B Torpedo sold for

exactly the same price. However, the specifications of the two engines differed slightly as the Torpedo Special (commonly called the twin-stack) featured a .300 cu. in. displacement, with a .711 bore and stroke of .750, giving all-up weight of 7 oz.

Compare this with the K&B Torpedo, claiming a .299 cu. in. displacement, with a .725 bore and

Continued on page 131

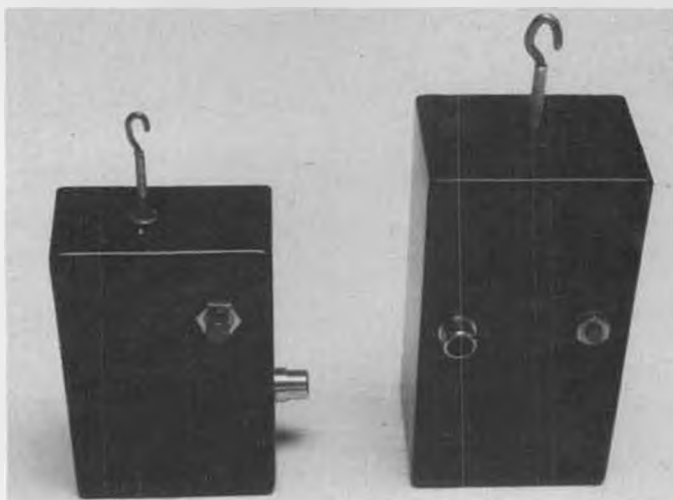


Nick Sanford came up with something different this time. It's an Ehling "4-1/2 Hour Flyer" out of the JASCO 1936 Yearbook.

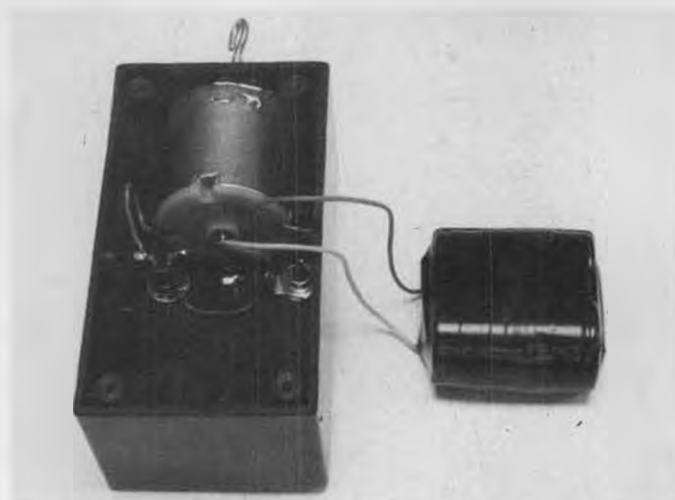
FREE FLIGHT AND CONTROL LINE

Built by Walt Winberg, Richmond, British Columbia, Canada, this 30-inch span compressed air model weighs only 3.35 ounces. Designed as a test bed for Walt's scratch-built, 1 1/32 inch bore, one-cylinder engine, the little ship has flown 55 seconds on 70 pounds of pressure. The engine turns an 8-1/2 inch prop, and the tank has been tested to 220 pounds (Tested to bursting, with a duplicate tank).

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Winder on left is low-powered unit, size of cigarette pack. BPW on right is subject of this article.



BPW with cover removed, showing motor, button, jack, and battery.

ELECTRIC WINDER Symposium

By JOE CARTER, FRED HALL, and BILL NOONAN . . . Add a modern touch to the oldest type of model aircraft flying. Here are three different approaches to eliminating the finger and the hand crank.

FRED HALL

BACKGROUND

I have been using battery-powered winders since 1971. All of them use simple, direct drive. The original intent was to eliminate the requirement for another person (or winding stooge) to hold the model while the "pilot" winds. This BPW has no turns counter, thus the determination as to when to stop winding is based on the feeling of torque from the rubber. One might think that winding in this manner (without counting) would result in many broken rubber motors. Well, this has not been my experience. In rapid-free contests in Connecticut (WWI Combat and Grieve Races) not one rubber motor was busted by BPW, although those contestants to the right and left of me were break-

ing rubbers while counting. Whether you count or not, the time to stop winding is before the rubber breaks. With a little practice, this is just as easy to accomplish while using a BPW.

WINDING TECHNIQUE

The model is held by the nose with one hand, with the rubber passing between two (scissor) fingers of the same hand. The other hand holds the BPW with the thumb ready to press the button. The BPW is hooked onto the rubber (or the winding loop at the end of the prop shaft), and the rubber is stretched out by drawing the BPW away from the nose. The button is pressed and the rubber is allowed to pull the BPW toward the nose as it tightens. As the rubber approaches the higher torque area (about 80% full) tug the BPW outward several times to get

the "torque reading" while still winding. When the rubber begins to resist the outward tugs, it's telling you that busting torque is near. Move the BPW toward the nose and "scissor" the prop shaft, nose assembly or winding hook as the button is released. There is no brake function to prevent the rubber from turning the BPW backward.

This describes the technique used by the author to fully wind a rubber. For trimming or practice flights, there is no need to fully wind the rubber. Simply stop winding well short of the high-torque region. At 3000 RPM, it takes only 15-30 seconds to wind most rubber motors. There is no need to return to the "winding station", because you carry it with you, as BPW easily fits into your pocket. BPW as constructed in this article has enough power to break 1/8 Dolby, and can wind 3/16 for practice flights.

BPW CONSTRUCTION

The construction of the BPW is very simple and straightforward. Only three holes need to be drilled in the plastic case for the motor shaft, charging jack and pushbutton switch. The motor is epoxied inside the case as shown in the photo, with the cover removed. The electrical circuit is series-wired; from one battery terminal to the switch, from the switch to the motor then back to the remaining terminal of the battery. The polarity must be correct so that the rubber is not wound backwards. The two wires from the charging jack go to the battery; the middle terminal of the jack goes to



Electric winder developed by Joe Carter. A magnetic reed switch mounted on the winder picks up the count and transfers it to the inexpensive calculator.

the positive battery terminal and the outer jack terminal goes to the negative battery terminal. The battery consists of two NICAD cells in series, 2.5V total. The two cells shown taped together in the photo were removed from the insides of standard (size D) NICAD cells (General Electric). They must be taped individually to provide insulation from each other before they are wired in series and taped together to form a battery. The Mabuchi RE56 motor is a little too large in circumference to fit in the plastic case, so the plastic columns inside the case must be shaved slightly. The winding hook shown is an iron coat hanger. The hook on my BPW was epoxied to the sleeve at the motor shaft and Hot Stuff was used at the hook end of the sleeve.

Consult the photos and illustrations for details in building and wiring the BPW and a suitable NICAD charger (For a faster charging rate, put two lamps in parallel). The plastic case is from Radio Shack and measures 1-5/8 x 4 x 2-1/8 inches (catalog #270-231). Mabuchi motors may be obtained from Aristo-Craft, 314 5th Ave., New York, NY 10001. ●

BILL NOONAN

● It is possible to wind rubber motors using only the tip of your index finger. This is probably the simplest and most trouble-free method available. But it has its drawbacks; it is laborious and time



Black & Decker 9000 cordless drill. Handle is battery unit. Cam-activated mechanical stroke counter is mounted on drill. Reset knob visible at rear of counter. Exploded sketch of part

consuming.

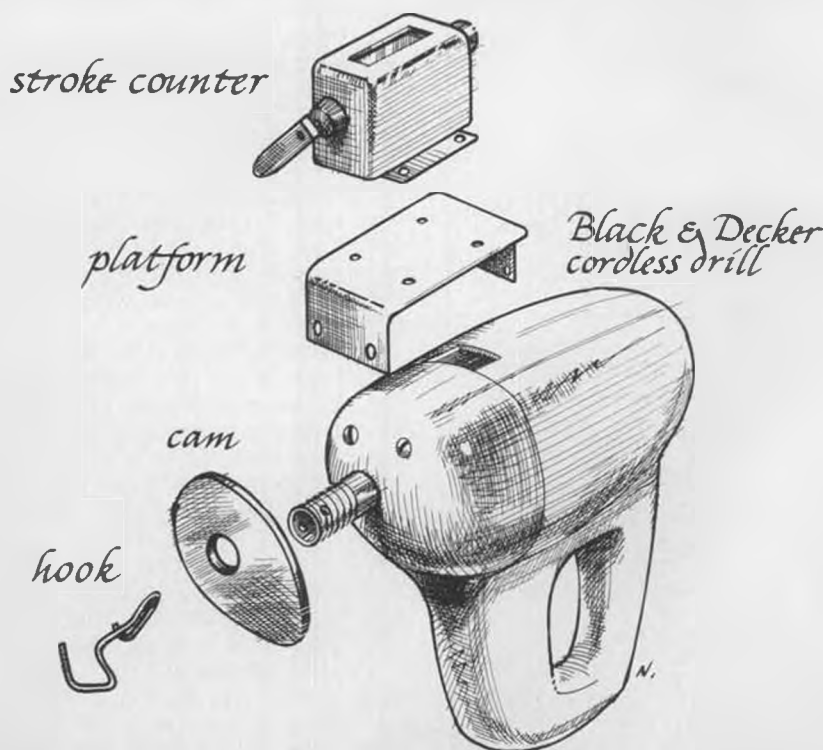
The carpenter's hand or breast drill has been the most time-honored and familiar method of transferring energy from you to storage in the stretchy stuff. Today, it is getting difficult to find reliable hand drills at a reasonable price that can be easily modified and take the reverse pull stress imposed by 12 or

more strands of 1/4 inch rubber. If you can find one, it may cost in excess of \$25.

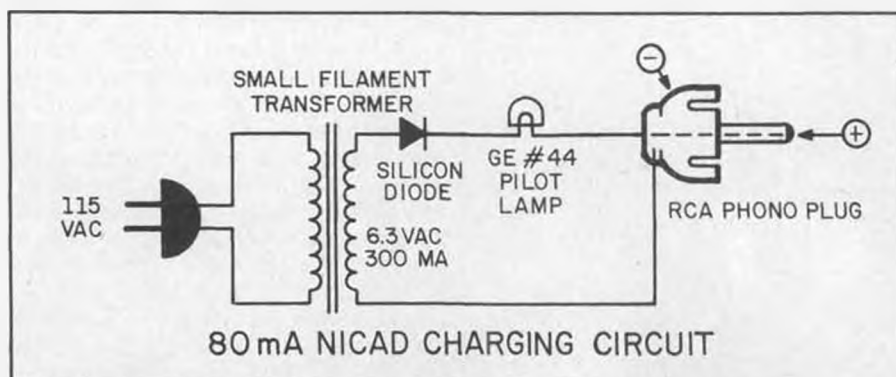
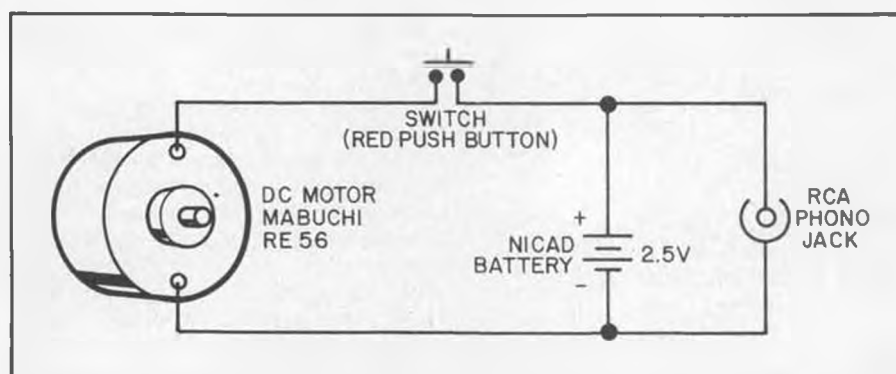
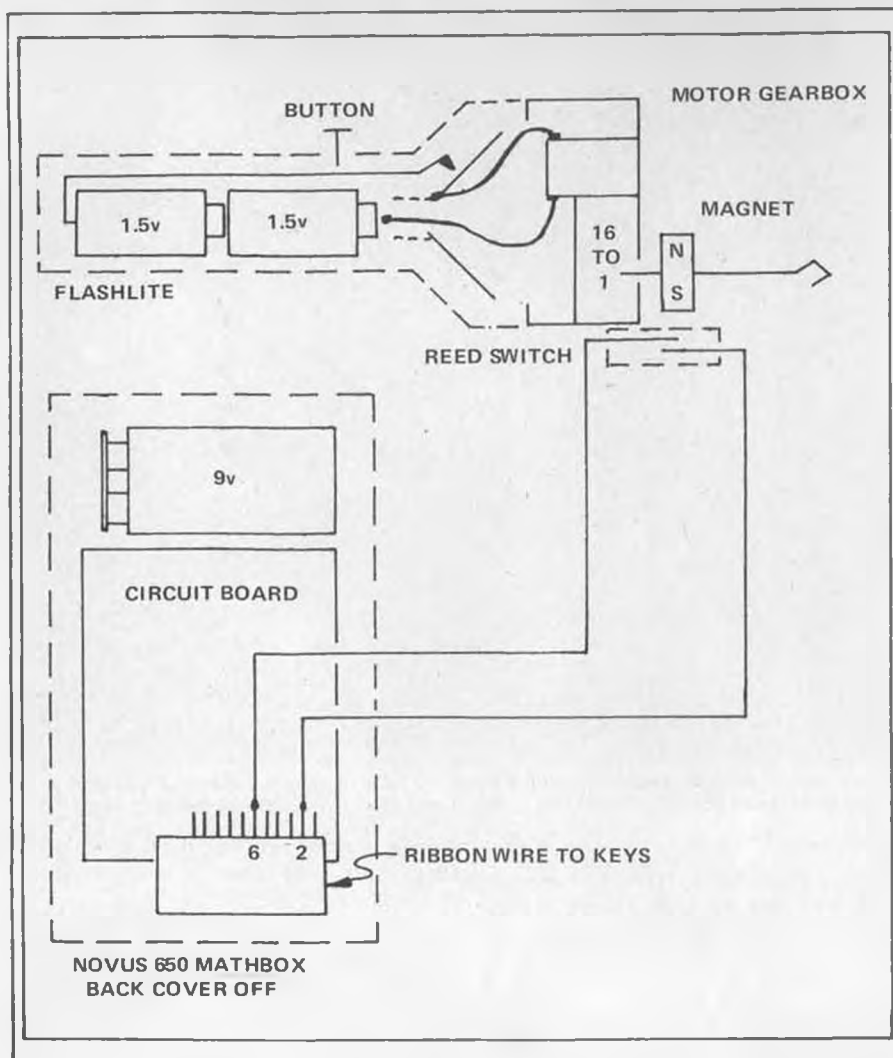
While browsing through the hardware department of the local discount store, I purchased a Black and Decker rechargeable cordless electric drill for \$17.95. I think the purchase was motivated by subliminal thoughts of converting it to make a winder.

Within a week, the conversion was made, with some simple modifications.

In order to make the electric drill usable as a rubber winder, it is necessary to add a mechanical stroke counter. For those who have never seen these devices, they are like an odometer on your car's dashboard, except they record revolutions instead of miles. The one I use has a five digit capacity (more than enough for this application) and is activated by means of pushing a cast metal arm through about a 40 degree arc. Each push records one revolution. A convenient knurled knob allows reset to 00000 after packing in the turns. There are two other types of counters, one being activated by depressing a vertical shaft through about a 1/2 inch stroke, the other utilizing a plastic wheel which is designed to rub against a driven wheel or shaft to record revolutions. I imagine either of these might be adapted with a little mechanical ingenuity. Our counter, the "Micro", cost \$5.95, was nicely made with a black enameled metal case with mounting flanges on the



Exploded sketch of parts required to assemble the winder/counter developed by Bill Noonan. It will handle 10 strands of 1/4 flat, but you must prevent backwinding when turned off.



bottom.

Modifying the electric drill does not ruin it for its intended use. Indeed, it is possible to turn it back into a drill within a few minutes if needed. This could be a bonus on the field.

Each cordless drill has a different case configuration. I will describe briefly what was necessary to modify the Black and Decker number 9000 (model 4).

In order to secure the counter to the drill, it is necessary to fabricate a simple sheet metal platform which is screwed to the drill chassis. The motor housing of the drill is held together with two long screws, easily removed from the front. Once these are removed and the case disassembled, it will become evident where the logical mount points will be for the sheet metal platform. The plastic portion of the drill housing will require some filing to accommodate the platform. We made a cardboard template to confirm the platform fit, before cutting the metal.

After the platform is secured to the drill chassis, and the motor housing screws are replaced, the counter is fixed to the metal platform with four screws.

The 1/4-inch drill chuck is easily removed from the threaded shaft. Before the 1/8 inch plastic (PVC or Plexiglas) cam is positioned, it will be necessary to drill a hole about 3/16 from the end of the shaft. This should be of sufficient size to accommodate a 1/16 diameter wire winding hook.

A little experimentation was necessary to determine the correct cam design. Our early design did not work because of "float". This term describes what happens to the counter arm at 750 RPM, the cam literally slapping the arm rather than allowing it to ride smoothly through its natural stroke. The first cam was rather egg-shaped. The working cam is closer to a circle, with a gentle flattening on one side.

The cam is locked to the drive shaft by means of two nuts compressing against the plastic. Obviously, the cam and counter arm must be in alignment in order to operate.

After the cam has been checked out, bend the winding hook and secure it to the shaft end.

The B and D drill has a rated RPM of 750. This seems to be ideal. Other drills on the market run from 300 to 1300 RPM. It takes about 90 seconds to wind 12 strands of 3/16 rubber to capacity with the Black and Decker. It is easy to see that the lower geared drill (300) would take more than twice as long. The possible draw-

Continued on page 106



SWEDISH THULIN-K

By WALT MOONEY . . . Looking quite similar to last month's Siemens-Schuckert E-1, this Swedish design from the same era has a few hardly noticeable deviations which make it just a touch more interesting.

• This airplane follows a classic trend in aircraft configurations that was started by Morane before World War One, and was carried along by such famous names as Fokker, Phalz, and Siemens-Schuckert. Probably the most familiar similar airplane was the Fokker E-111. In any case, the design is not new or strange, so why build a Peanut Scale model of it?

There are several reasons that can be mentioned. First, there was an excellent 3-view of this particular aircraft drawn by Bjorn Karlstrom several years ago, that gave good documentation on structure, finish and color. Second, the Thulin K had a larger set of tail surfaces than most of the other "look alike", and thus can probably be made to fly better as a model. Third, the tail surfaces

were plywood covered, and can thus be simply made of sheet balsa while keeping to scale type structure simulation. Fourth, the fabric was clear varnished, and a good simulation can be achieved with condenser paper covering, and fifth, the wing insignia consisted of three black crowns, easy to create out of black tissue and a nice change

Continued on page 124



The next Peanut by Walt Mooney will be this Yugoslavian Ikarus IK-2, a World War II fighter.



Enough details to pick up some static points in competition.

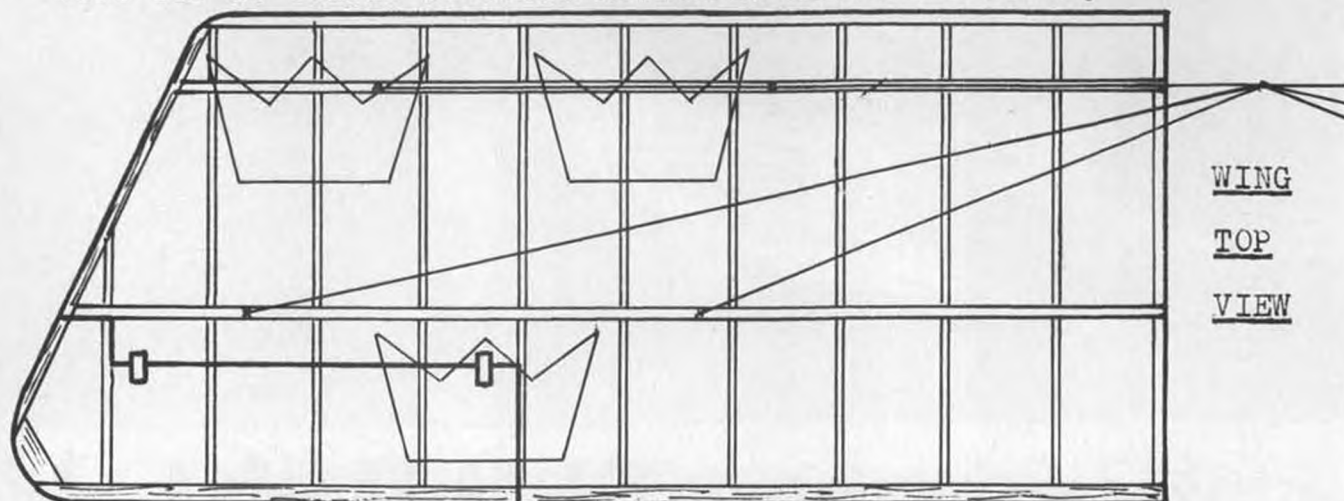


Very typical design layout of early World War I aircraft. Similar to Fokker, Phalz, and last month's Siemens-Schuckert.

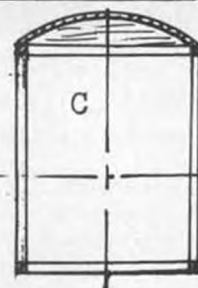
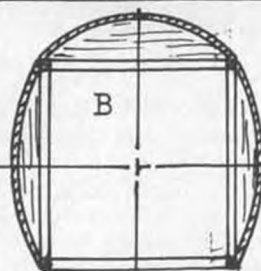
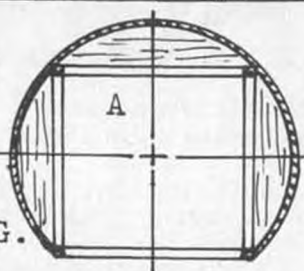


This underside shot is a help to detailing the landing gear. Swedish markings are a nice change from the usual circles and crosses.

WING TIP IS CURVED TO MATCH BOTTOM OF AIRFOIL CONTOUR.

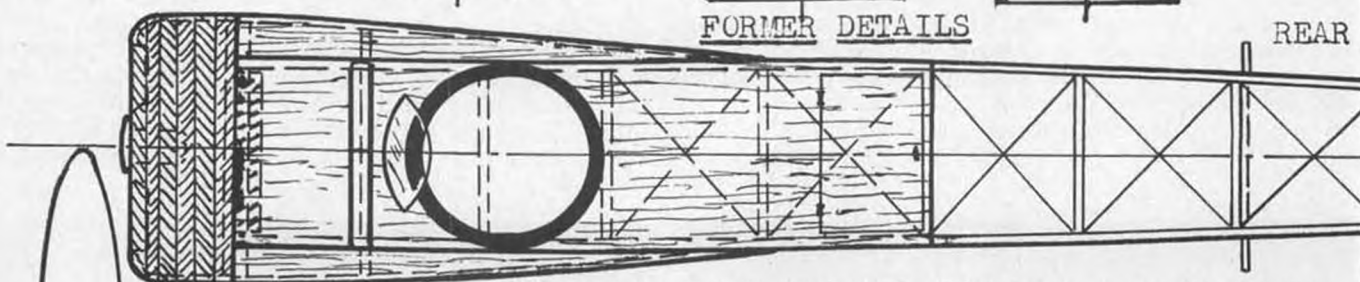


AN ALTERNATE NOSE BLOCK CAN BE SOLID OR LAMINATED AND THE ENGINE DEPICTED BY A SIMPLE PAINTING.



FORMER DETAILS

REAR



FUSELAGE SIDE AND TOP COWLING - THIN Balsa SHEET

FUSELAGE TOP VIEW

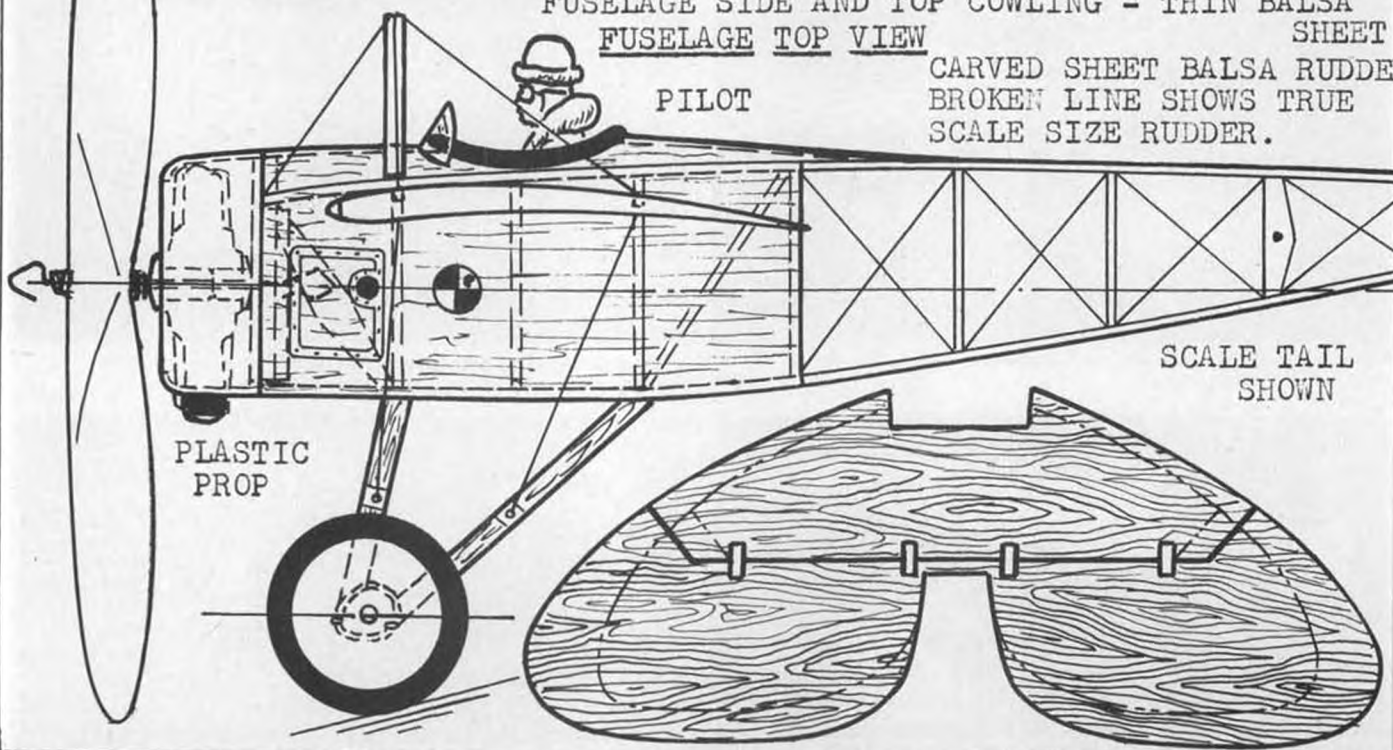
SHEET

CARVED SHEET Balsa RUDDER
BROKEN LINE SHOWS TRUE
SCALE SIZE RUDDER.

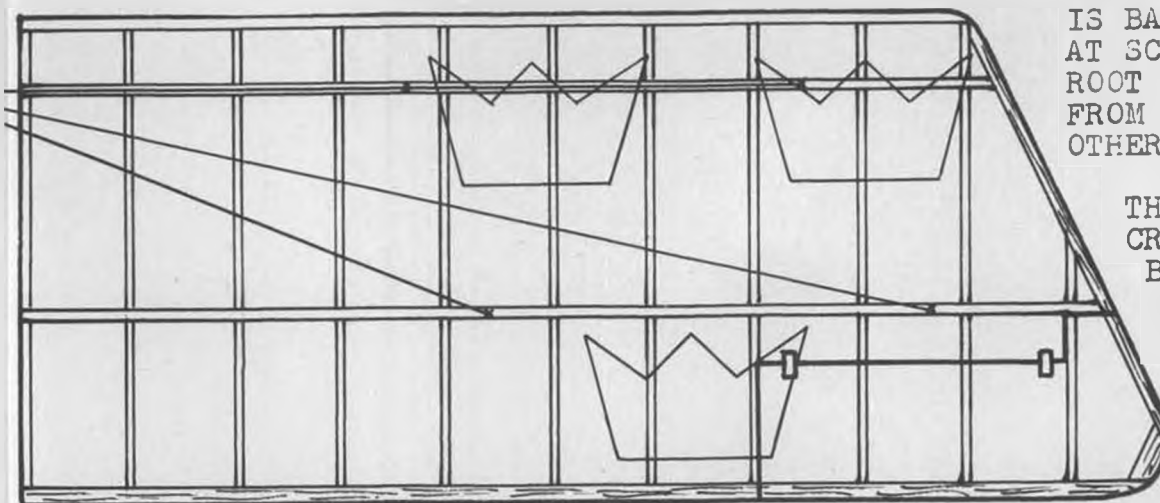
PILOT

SCALE TAIL
SHOWN

PLASTIC
PROP



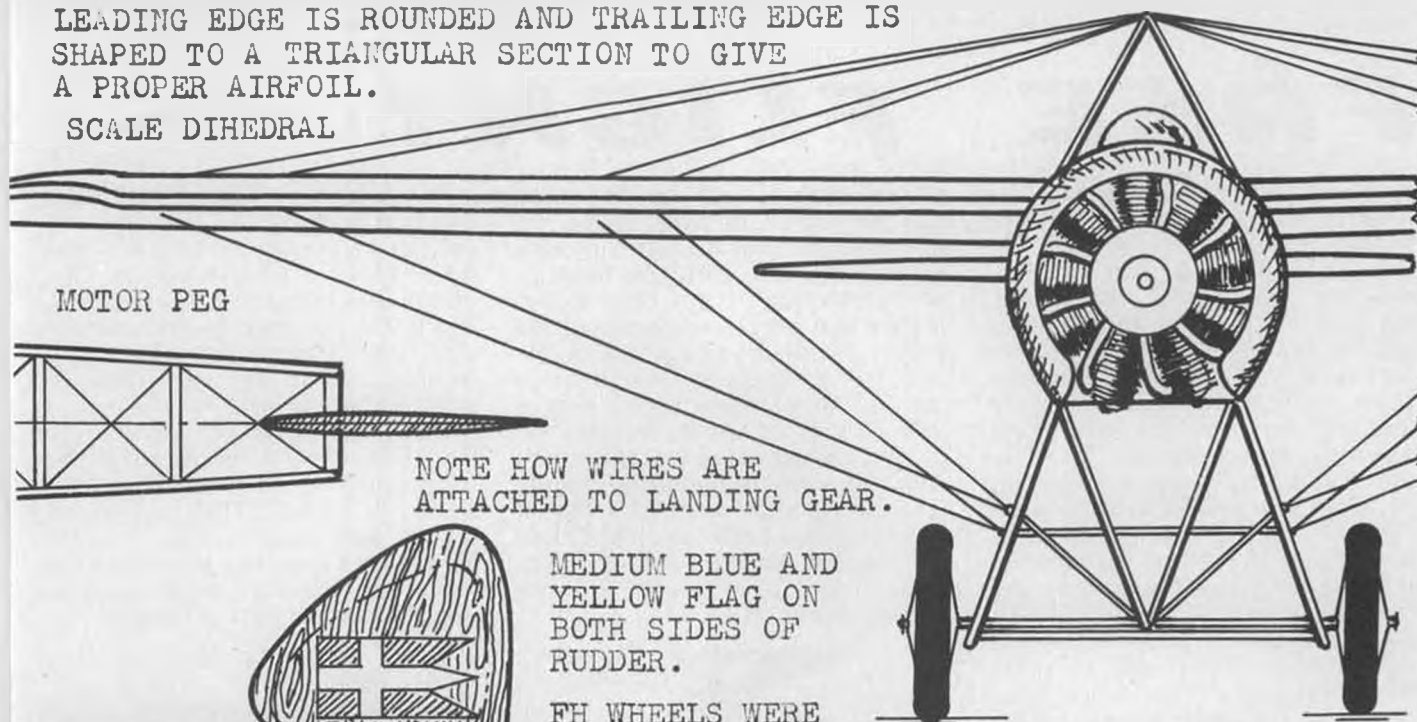
NOTE WHERE WING WIRES GO - THE SMALL "X" MARKS THE SPOT. ALL WING STRUCTURE IS BALSA. RIBS ARE AT SCALE SPACING. ROOT RIBS ARE CUT FROM 1/16TH SHEET. OTHERS ARE LIGHTER.



THE THREE CROWNS ARE SOLID BLACK ON TOP AND BOTTOM OF BOTH WINGS.

LEADING EDGE IS ROUNDED AND TRAILING EDGE IS SHAPED TO A TRIANGULAR SECTION TO GIVE A PROPER AIRFOIL.

SCALE DIHEDRAL



MOTOR PEG

NOTE HOW WIRES ARE ATTACHED TO LANDING GEAR.

MEDIUM BLUE AND YELLOW FLAG ON BOTH SIDES OF RUDDER.

FH WHEELS WERE USED (HUNGERFORD).

FRONT VIEW

(PROPELLER OMITTED FOR CLARITY)

COLOR SCHEME:

CLEAR DOPED FABRIC (CONDENSER PAPER) AND VARNISHED PLYWOOD (DOPED BALSA)

ALUMINUM COWL BLACK TIRES, SKID, ENGINE CYLINDERS, INSIGNIA AND OTHER DETAILS.

TAILSKID SUPPORT
DETAIL - IT
IS A FOUR
LEGGED INVERTED
PYRAMID.

ALL MAJOR STRUCTURE IS BALSA, EXCEPT THE EXTERNAL STRUTS WERE ALL MADE FROM MODEL RAILROAD BASSWOOD STOCK. (FIRM BALSA WOULD WORK ON A LIGHTWEIGHT MODEL.)

1917 THULIN K-JAGAREN A SWEDISH PEANUT

BY

Walt Mooney



The latest in retrieval methods! Paul Lidberg returns his brother's A/1 Topkick and a Walnut Scale Porterfield. Not recommended for Taft!

FREE FLIGHT

By BOB STALICK

• Happy Birthday to you, Golden Anniversary Wakefield, Happy Birthday to you.

Does it seem just like yesterday that the magic word, "Wakefield" hit your mind? If so, then you are getting on in years, probably use Serutan in your breakfast Wheaties, think Mother Tums looks young, and still don't trust automatic transmissions. But, gang, it's true. The Wakefield trophy was first won just 50 years ago. And still it carries on, through the aeronautic advancements of micro-electronics, cyanoacrylate adhesives, plastic coverings and all the rest. It's the simple-in-concept rubber-powered model which still endures. It still challenges the mind and the modeler. Aero-modeller Magazine had an idea that is worth pursuing along the line of the event established by Lord Wakefield: "Maybe a static display of the actual models that survive; those multi-stringered streamliners, steam pressed balsa fuselages, feathering folding props, retractable undercarriages, multi-skein, gear-driven propellers. The creativity and invention of these early models has to be seen to be believed, now in the super simple Seventies".

Maybe so . . . Maybe the pictures and the memories aren't enough. I hope that the same may be said in another 50 years.

MYSTERY MODEL FOR JULY

There was a time in the older days of the AMA that all classes of gas models were flown to the then in effect FAI Power Loading rules. Around the same time, the old standby Class C (and D) were dis-

continued. In fact, any model which had an engine of over .20 cu. in. displacement was a Class B model. Such is the case with this month's Mystery Model. It's a Class B. No matter that it has a wingspan of 126 inches, is powered by a McCoy .60, and has a fuselage length of 59 inches. All of these didn't matter then. It was a Class B. Weight: 104 oz. No official name was published with the plans, but you can identify it by the name of the builder/flier. If you think you know, drop Bill a line c/o **Model Builder**. A nice prize awaits the correct answer with the earliest postmark.

Our February 1978 Mystery Model was one of those few that bring in conflicting answers. It also brought out an interesting sidelight. The model was called the "Starduster", and it was designed by Bob Hunter and John Adikes. John built the model, and it was all a special, quickly done project for the movie "Nogy", which was put together by Paul Gilliam. The model used the wing and stab from a Gilliam-designed "Civy Boy". This, combined with a cabin-type fuselage, brought about some incorrect guesses that it was a "Civy Hearse", as designed by Paul Gilliam for payload events.



Rich Rohrke creeps up on his Coupe at the Fresno Annual, August, 1977. That sure is a pretty fancy winding stooge! This and all other Fresno photos taken by cartoonist Dr. Will Nakashima.

The one and only prototype (plans were in the Aug./Sept. 1960 issue of "Flying Models") was used in the production of the hoped-for-TV movie "Nogy", and was purposely crashed. The movie was never sold to TV, and only had limited showings around Los Angeles, and at one Nats.

John Hemphill, Jacksonville, Florida, had the earliest correct response, even without applying the postal zone handicap. We'd also like to thank Bob Hunter and Mike Schwartz, who filled in some of the extra details.

J.B. Sullivan, of Lexington, Massachusetts, was the first to identify the March/April model as the "Lightening", by the late Paul Del Gatto, from the December 1952 issue of "Air Trails."

We had a few near misses on the May Mystery Model, but Jerry Barnette, Fredericksburg, Virginia, made a direct hit. It was A.R. Collinson's "Near Miss", from Oct. 1959 "Flying Models" . . . No, G.A.K., it wasn't the "Dixielander!"

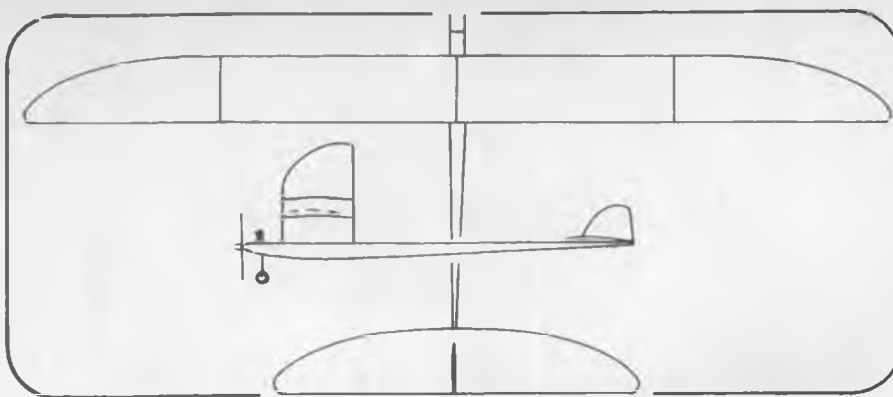
It happened again! Even before getting this July issue to bed, we received simultaneous correct answers for the June M/M. Both Jim O'Reilly of Wichita, Kansas, and Gerald McHale of Maple Ridge, British Columbia, Canada, identified Bill Dean's "Chief", a built-up fuselage-style A/Z glider. Incidentally, Gerald later switched to a typical "stick" type fuselage and the performance improved.

Congratulations to all on winning a free one-year subscription . . . or subscription extension, to **Model Builder**. wcn

THREE-VIEW FOR JULY
Blue Max, F1B,
by Masabumi Shibachi

This month's drawing was sent to us by Australian modeler, P. Van Leuven, who competed in the 1977 Free Flight World Championships, and placed 34th in F1B, his first World Champs. While there, he befriended 4th place winner, Masabumi Shibachi, of Japan, who later sent him the drawing, as prepared by H. Katsuta.

Of special interest are the airfoils, originated by Shibachi himself. He



JULY'S MYSTERY MODEL



Paul Stober, Nats and Fresno Class A winner, picks out the spot he wants in the sky.



And now he goes for it! Paul's "Strong Arm" heads for good air. Note retriever taking off.

claims the wing section does not need turbulators, because of the thick, squared-off trailing edge. His 4th place win, with 5 maxes and a total of 1227 seconds, certainly lends support to his claim.

DARNED GOOD AIRFOIL S.I. (Isaacson) 53507

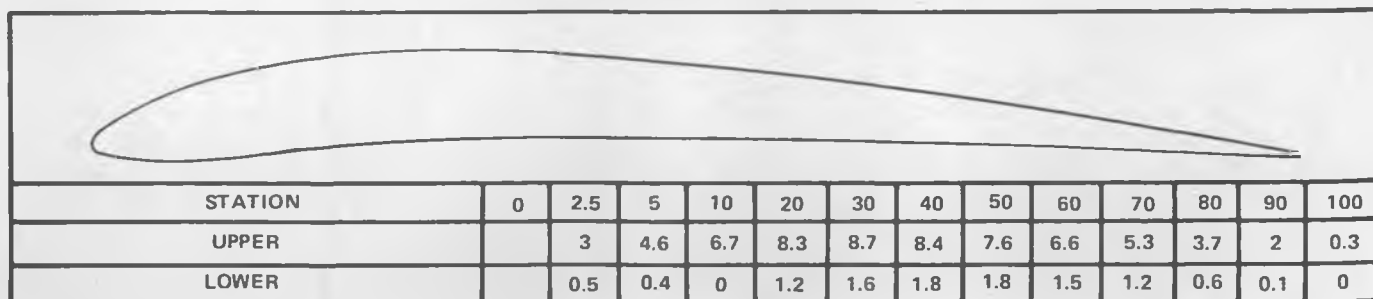
Touted as a very good Wakefield section, this one should be a good choice between the ultra-thin examples such as the B 6405b and the thicker sections, such as the Eiffel (does anyone use this any more?). With the forward high point

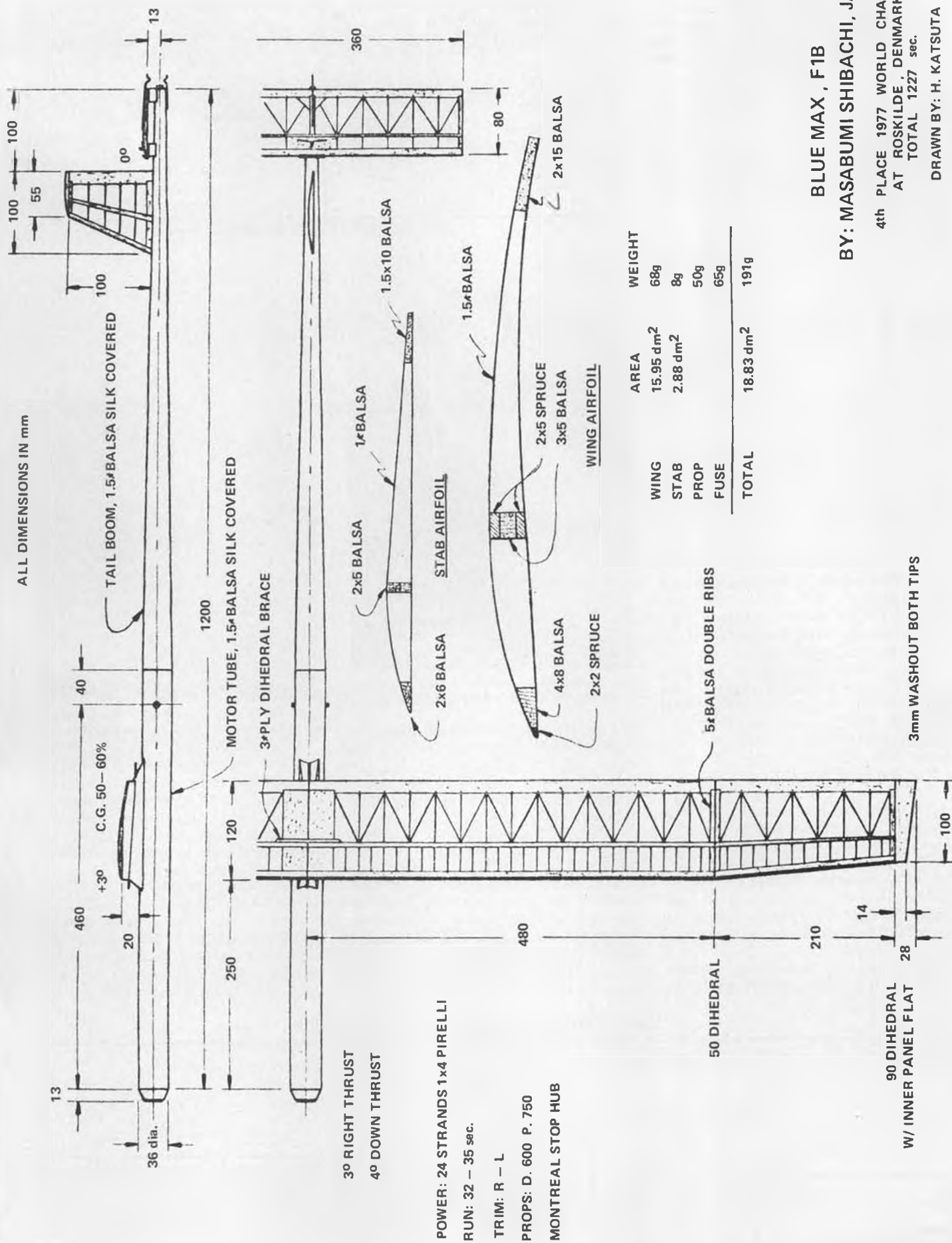
and the rounded leading edge, it should be very forgiving in stall recovery. With the slight under-camber and the modest top camber, the climb should be very good and the glide should be very acceptable. Try it, you might like it.

SURVEY OF DARNED GOOD AIRFOILS

Back in our first issue of **Model Builder**, as writer of this column, we began the Darned Good Airfoils as a feature. Month by month, the airfoils have been presented for your

DARNED GOOD AIRFOIL — S.I. 53507





BLUE MAX, F1B
BY: MASABUMI SHIBACHI, JAPAN

4th PLACE 1977 WORLD CHAMPS
AT ROSKILDE, DENMARK
TOTAL 1227 sec.

DRAWN BY: H. KATSUTA

interest. I have heard from people who tried this or that airfoil and found them to be useful. Since there are a number of back issues of **Model Builder** available, and since you might be looking for an airfoil for the next super model on your building schedule and not know where to find it, I am taking the liberty of providing this survey for your information:

1974

January - Thomann F-4
February - Neelmeyer
March - NACA 4407.5
April - Samann-Bussard II
May - Mountie
June - EJ (Jedelsky)-75
July - B-8353 b 2
August - CH-407 mod
September/October - Gott. 400
November - GF-6
December - G610b (Goldberg)

1975

January - RSG-29
February - Lucky Lindy
March - Clark Y
April - B 6405b
May - Cheesman 20A-08
June - Gott. 359
July - B-7457 d2
August - B-6356b
September - MVA-439
October - Gott. 795 and 796
November - Gott. 801 and 803
December - MVA 123 and Gott. 495

1976

January - Shoaf
February - B-6456f
March - Eiffel 400
April - Lindner Stabilizer
May - Goldberg 9071
June - Pladuska (Uncle Remus)
July - Davis A
August - B-9304b
September - Gott. 602
October - Lindner Wing Section
November - CP-5408
December - Gott. 428

1977

January - Korean Wakefield
February - 4%, 5%, 6% Indoor Arcs
March - NACA 6306
April - 242G (Cargo)



George "Great Speckled Bird" Perryman poses with a couple of his P-30's in front of Lyle Sheldon's Bearcat at Van Nuys Airport. "30-30" and "Red Wing Blackbird". Rieman photo.

May - Hacklinger HA-12
June - Gard G-6509
July - Hacklinger HA-13
August - USA 5
September - MVA 301
October - B-6557b
November - R. St. Genese 28
December - Koster '66 Wakefield
1978
January - Swartzbach C.S. 6356 Wakefield
February - Neistoj Wakefield
March/April - BTS Simplex A-2
May - Eppler E-59
June - Ritz 9-50-7.5 GS
July - S.I. 53507

So there you have it. A review of the Darned Good Airfoils for your research and use.

SIMPLEX A/2 REVISITED

Received a nice card from Harry Grogan, of the Florida Grogans. He sez that he was doing a little research on the A/2 scene and found that the Simplex A/2 featured as a three-view in the March/April issue of our favorite model magazine was approximately a 1/2 sq. inch oversize in total area. This was checked



Steve Geraghty with his unlimited ship at the 1977 Fresno Annual. Tall pylon!

on the originals and found to be very close. On those which were oversize, we adjusted this discrepancy by trimming the stab t.e. to 3.75, which reduced the projected area to 75 sq. in. on the stab and the total to 526.5 sq. in. (.5 under the maximum). Two other modifications can be easily made, and these are: increase the tip dihedral from

Continued on page 97



John Lenderman demonstrates the proper form for launching modern Wakefields.



Close-up of Rich Rohrke's Coupe, which is based on hand launch glider shapes. Also another look at that sturdy stooge!



Another goodie by Bill Noonan. This time it's a one-inch scale Aviatik (Berg) D-1, built for the Flightmaster's Semi-Annual special WW-I rubber event. Span is 26 inches. The scale aileron washout and large tail surfaces should really enhance flight trim.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Finally! Since I've been writing this column, it has been my intention that F/F Scale become an International event. Well, friends, it has become a reality. At this year's R/C and C/L World Championships held in Woodvale, England, there will be an unofficial F/F Scale event, which will also include indoor Peanut Scale.

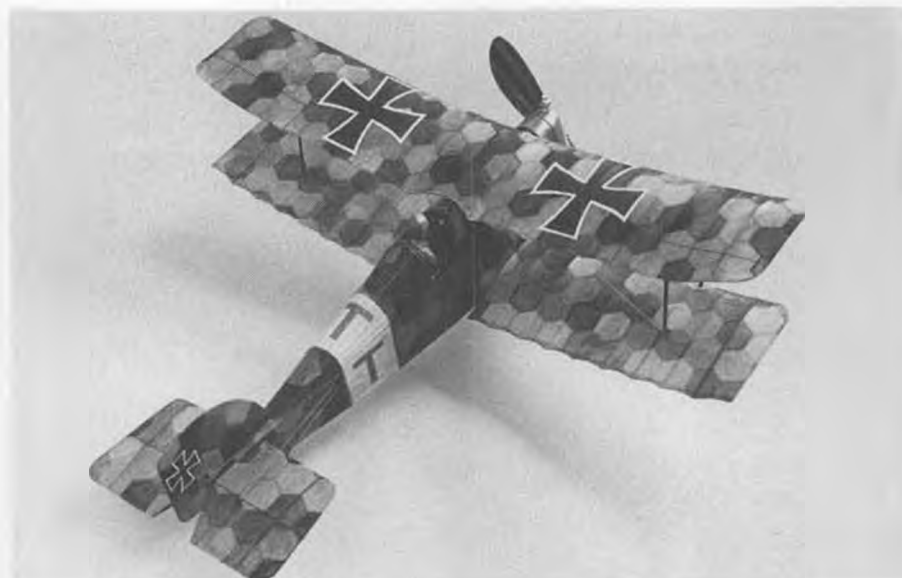
How did this all come about? Through the efforts of Bill Hannan, and an assist from me, with numerous letters to the right people in

England. Who were the right people? Those ardent, loyal modelers who make up a very active F/F organization in that country. These fine people took the bull by the horns and got the wheels in motion. When all the smoke cleared, the event, even though unofficial, became a reality. Fortunately, the World Champs are being held in a country where there is quite a bit of F/F scale activity.

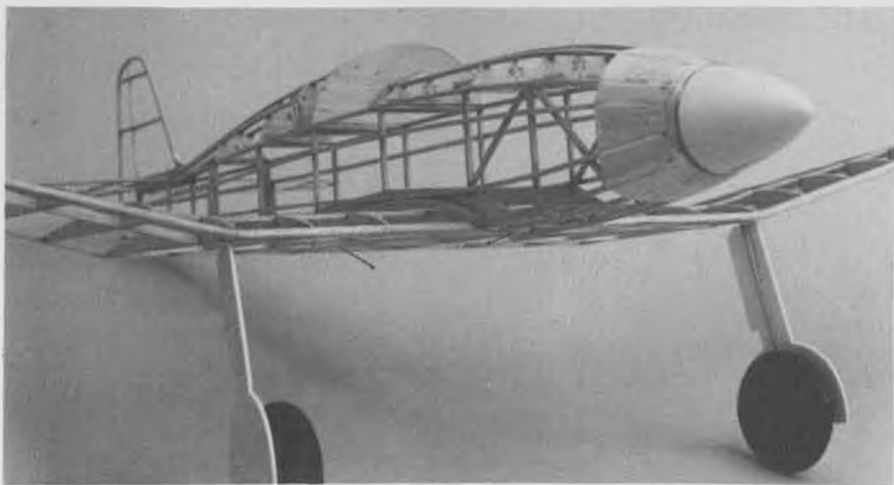
What can we do to help? First, if you are interested, and I certainly

hope you are, you may want further information and a copy of the rules . . . Write to: M. Duce Esq., 22 Houghton St., Southport, England. Include sufficient International coupons for return mail. Mr. Duce will send you all of the necessary details. Please make certain to include the return postage. Don't expect our friends in England to donate the postage out of their own pocket! Since this is not an official event, all expenses come from private funds. If you feel that you are not going to have a model ready by that time, then why don't you send them a few dollars toward the running of the contest? I know that the Flightmasters is taking up donations among its members, strictly for this reason. Maybe other scale clubs will want to do the same.

We need to have a pretty good showing in order to convince the FAI that we F/F Scalers are alive and well. We want to be counted, but cannot do so without your help. The contest will be held on August 5 and 6 (It won't take two days to fly and judge the models, but they have added an extra day in case the weather is bad). It is interesting to note that the F/F fee will be 3 pounds (about \$6.00), whereas the R/C boys have a "scant" \$78.80 entry fee with a \$39.40 fee for a helper. Do you think they will be having 13 times as much fun as the free flight-



Another view of Noonan's Aviatik. How about that camouflage job! Plans were scaled from the Profile series.



Fernando's Heinkel 100D, built from new Flyline Models kit. Original model was Don Srull's, with which he won Outdoor Rubber Scale and placed 3rd in Indoor at the 1977 Nats.

ers? (Probably not, but if they didn't pay 13 times as much, there would be no opportunity for the free fliers to have their fun! wcn)

Flyline Models, since its inception, has been producing a series of scale model kits which have had an appeal to the majority of F/F scale modelers. It has managed to become successful without kitting a P-51 Mustang, a Cessna 150, or any other number of airplanes which have been done and over done in about every size possible. No, they have done it with the likes of Bellanca, General Aristocrat, Inland Sport, and others not too familiar to post-war modelers. These models they have chosen to kit are from an era that not too many of us even remember. Yet, they represent a period of aviation history during which the greatest planes were manufactured . . . a time when aircraft companies were starting up, and others were already closing their doors due to financial difficulties. Maybe all of this can be simply lumped into one word, "nostalgia," but whatever it is, the kits

have appeal!

I want to talk about one of Flyline's new kits, the Heinkel 100d. Even though this does not fall into the same category as the majority of the kits, it is still one that has much appeal. One reason is that it has such clean lines, and another is that it is one aircraft that even the plastic fraternity has seen fit to overlook. By that, I mean there has been only one example ever kitted, and a poor one at that. An example of an aircraft that has not been modeled to excess by any means!

I personally got involved with this particular aircraft about a year ago. I had purchased a set of five-view drawings from Robert Hirsch, and drew up a set of model drawings for a one-inch scale rubber powered aircraft. The fuselage and the rudder were built, but that was as far as I could go with the time I had then. It wasn't until last year's Nats that my interest was rekindled after seeing Don Srull's model of this same aircraft destroy the competition. I was naturally quite pleased when I heard that Flyline was going to

manufacture this kit.

My first inclination, after seeing the Heinkel kit for the first time, was to build it immediately. But I have so many projects going that I just didn't need another one. Well, I weakened . . . I just had to build this delightful model. The next several paragraphs deal with the construction of this beautiful kit, and if you decide to build one, the ongoing comments will make it a bit easier and more enjoyable for you.

The materials furnished with the kit are excellent all the way through, and there is sufficient wood that you will not have to resort to your scrap pile. As with any kit model, study the plans thoroughly regardless of how much of an expert you are. These drawings are very neat and uncomplicated. I decided that I would make the model pretty much as shown, with the exception of laminating the tail and wing outlines. For this, I used a couple of strips of 1/32 x 1/16 basswood.

The two fuselage sides were built one on top of the other for accuracy. The two wing saddle pieces were cut from the printwood, then sanded together for uniformity, and glued in place. If I were to do it again, I would make the cut out portions of the saddles using the main wing ribs as a guide. This would assure a perfect mating between the wing and fuselage. As it turned out, this was not the case with my model.

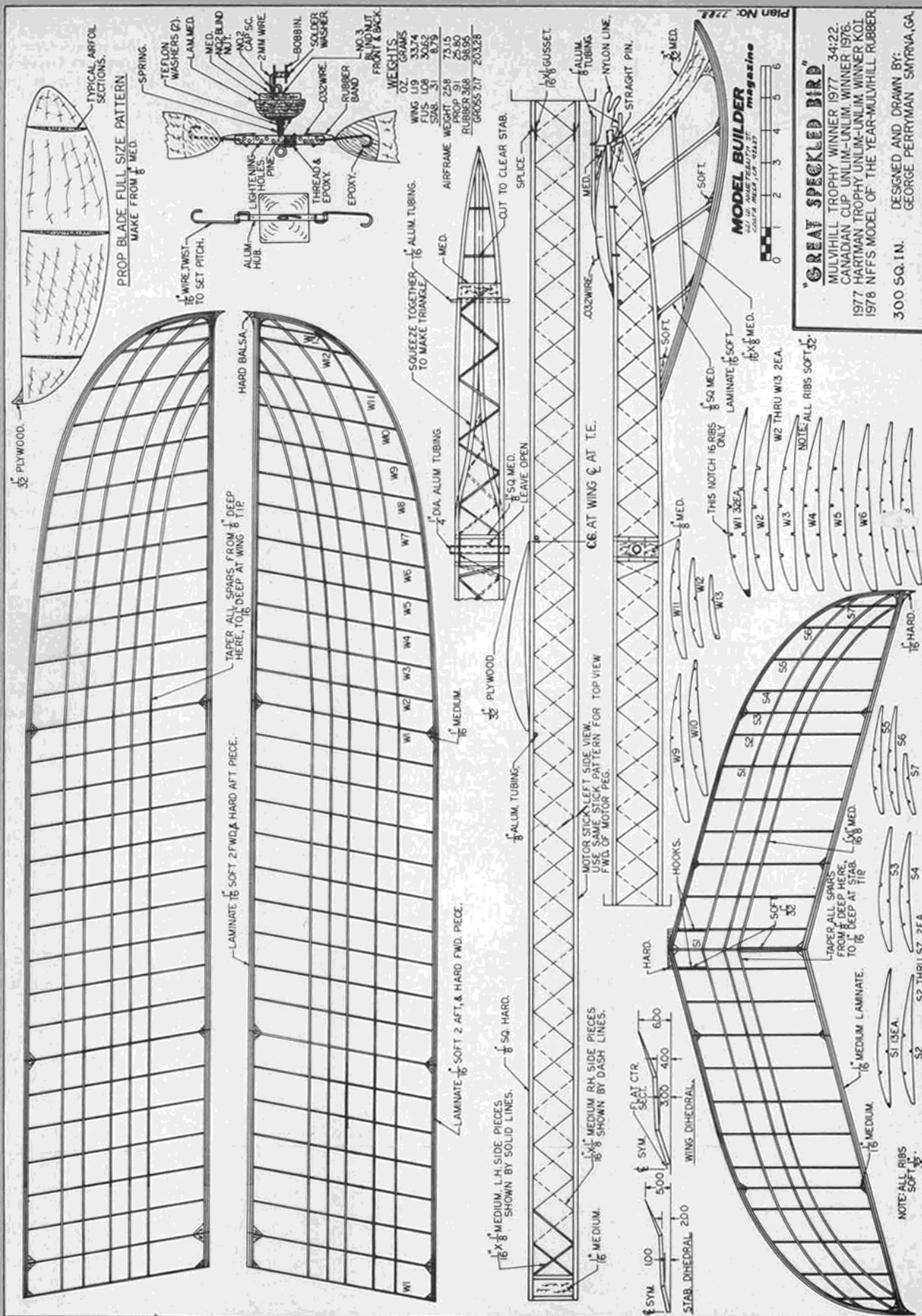
The two fuselage sides were framed in the usual manner, followed by the addition of the bulkheads. After the addition of the stringers, the Heinkel was taking shape. There are two round discs which are laminated and glued onto the very front of the fuselage. When I held them in place, they were too small. I checked the cross-section at that station and everything was done according to the plan. My first thoughts were . . . no big deal, I'll just make the discs a bit larger in diameter. Then the thought struck that I couldn't do that because then the vacuum-formed spinner furnished would no longer fit. Check the sketch to see how I overcame the problem. This was the only serious error with the entire kit, and subsequent kits have already been corrected.

The wings went together very easily. For me that's an accomplishment. Wings are never easy for me, but this one went together without a hitch. Because I laminated the wing outline, I had to cut each rib longer than shown on the drawings. Incidentally, the way the ribs are printed on the sheetwood, the front of each rib can be cut with one pass of the



Fernando's only modification to the original Heinkel was in the use of laminated basswood for the outlines of the tail surfaces and wing.

Continued on page 112



GREAT SPECKLED BIRD

By GEORGE PERRYMAN . . . Any keen observer of rubber powered competition aircraft could tell you this plane's designer without a second glance, but this one has a little more . . . the coveted Mulvihill Trophy!

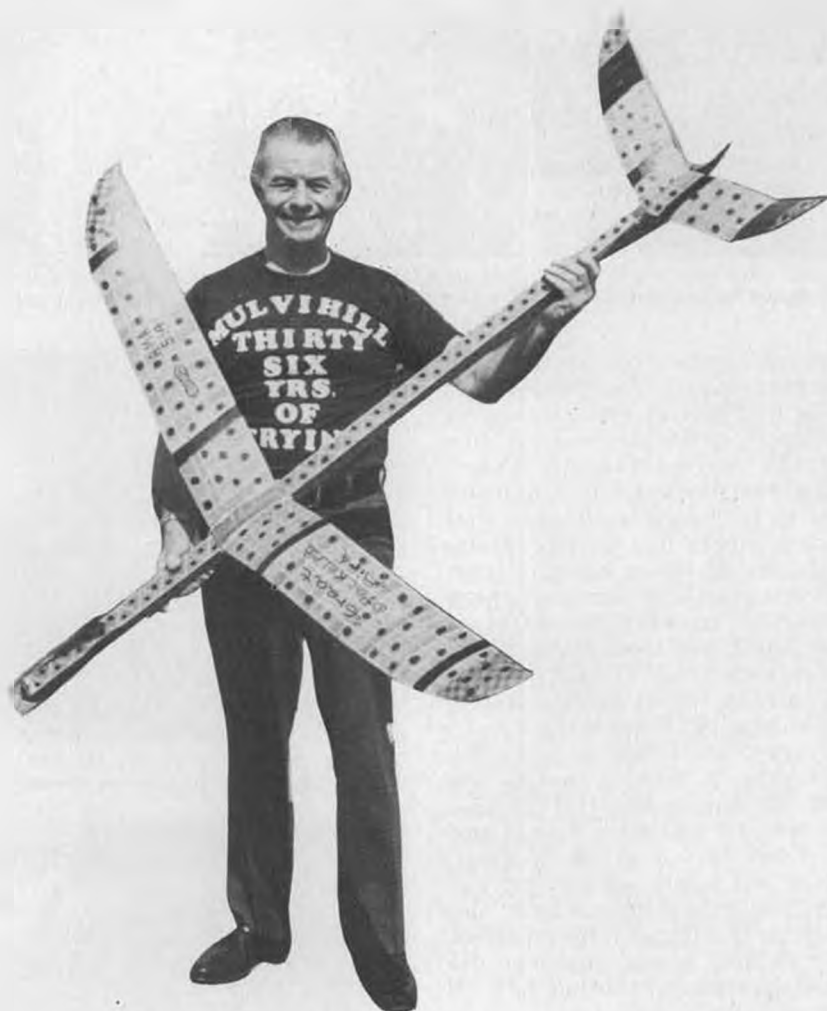
PHOTOS BY JOEL RIEMAN

• The "Great Speckled Bird", with its gull wing, isn't exactly a new idea, since seagulls have flown pretty well with this configuration for several hundred million years. In the contest region where I fly, Unlimited (now Mulvihill), rubber was flown with category II rules, with as many 3 min. flights as one could make, determining the winner. This method was followed at the Nats until recent years, when after making 3 each 3 min. flights, progressive 1 min. increments were added: 4 min., 5 min., etc. With this increased flight time, design philosophy had to change. Now, instead of making a durable and reasonably good model, it put a premium on lighter, large (300 sq. in.) wing ships. Large, light ships fly better and remain in sight longer, so this seems the way to go.

Some designers follow the old saying of a *little* bit is good, so naturally a *whole* heap is better, when deciding how much rubber to use. I have tried both extremes, between too much rubber, and not quite enough. About 20 years ago, I had a big 300 sq. in. job named the "Kluge", which turned out to be aptly named. The fuselage was a full 7 feet long, and carried 24 strands of 1/4 inch rubber, 64 inches long, which weighed over 8 oz. The *one* advantage I found with this great chunk of rubber was that I *never* broke a motor. My winding arm *gave out* long before the rubber expired. If I could have gotten AMA to let me use King Kong as proxy winder for me, I might have won the Mulvihill Trophy long ago!

On the other extreme, I built a lightweight 300 sq. in. ship, "Practically Nothing", with sliced, hollow, 1/32 ribs, condenser paper covering, and an all-up weight of 2-1/2 oz., including rubber. The prop would run about 7 min. and this looked like the way to go for calm air contests. There always seems to be a hooker in all our best laid plans. How do you D.T. one of those things down? Until a few years ago, AMA rules only permitted one model, and when you lost your gum band ship, the contest was over for you, so this effort was not successful either.

Frank Zaic included both these models in his yearbooks, since he was probably hard up for material at the time.



I have tried many design approaches during the past 40 years, and am *still* searching for the "optimum" ship. Due to variability of weather and available rubber, there may not be such a thing as "optimum". The long, skinny, light model is probably best in light wind flying conditions, but in windy weather flying, with perhaps rain (and dust devils) a more durable ship is required. A case in point is my old 1940 Lanzo stick which I've flown for the past 2 contest seasons, as old-timer rubber and in Unlimited events. Some models are just "luckier" than others, this I believe. The Lanzo won 14 straight contests, 8 in O.T. and 6 in Unlimited. This was against some pretty tough competition, including Jim Lewis, and any of you who have flown against Jim, know what I've been up against. Jim is an amazing flier, and when you beat him, you've

usually won the contest. I feel as though he's one of my sons, but we would rather *beat* each other than *anyone*. A shorter fuselage model, with firmer wood all over, is certainly easier to keep intact in rough weather, and bad retrieval terrain. Anyway, I'd rather have a clunker in a *thermal* than the "optimum" ship in a downer.

After all this rambling, I will say a few words about "Great Speckled Bird". In 1976, I built two of them; one for average contest days we have around here, with maybe some wind and rain, and one a bit lighter for fly-off flights, since it would fly longer in so-called "dead air". I took both models to the 1976 Springfield Nats to try *once again* to win the Mulvihill Trophy, which had eluded me for 35 years. Jim Lewis and I were going to fly alternately, so we might help each other chase if things got



The "Bird", the man, and the Trophy! As the T-shirt points out, George has worked a long time for the privilege of putting the Mulvihill Trophy on his mantel for one year. Of course, he'll try for two and more, and the "Bird" might just do it for him!

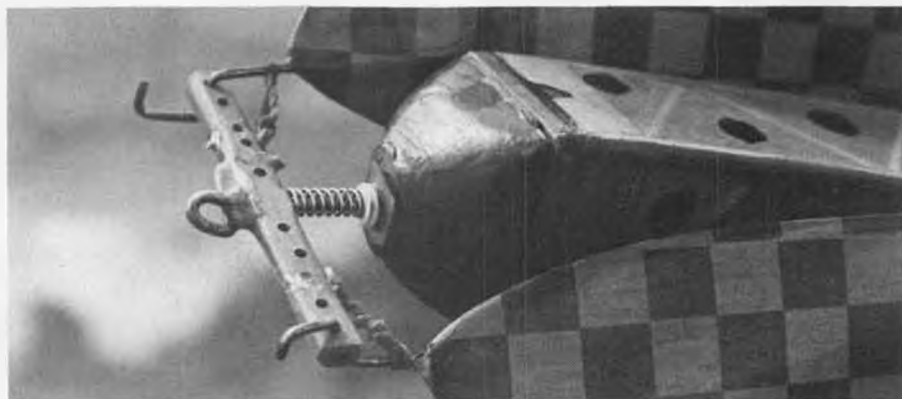
bad.

You remember me saying how some models are luckier than others? On my first official, using the calm-air ship, it promptly maxed, but went into the great beyond. A giant cornfield swallowed it up, and it was never to be heard from again (bet the corn picker had some interesting shades of tissue hanging from the inside gears). Jim's model landed near mine in corn too, but we found it this flight. We were flying Cat II rules and my No. 2 "G.S.B." made its 3 ea. 3 min. flights easily, despite wind increasing. It made the 4 and 5 min. flights, and while flying for the 6 min. max., a "sinking feeling" hit me. A "sinking feeling" hit "G.S.B." also, since I pulled a dumb and launched into a giant downer. Neither Jim Lewis nor I could believe it was sinking so fast. We thought at first it had dethermalized, and 2:39 later, it was sitting on the ground like an old mother hen on her nest.

I had told Jim years before that a 6 min. ship would not make 2-1/2 minutes in a downer and now he was a believer. In fact, the air was coming down so fast, it pushed a Dempster Dumpster straight down 3 ft. deep into the dirt. You may not choose to believe the last sentence, as I may exaggerate occasionally.

Jim went on in his usual fine style to win his second Mulvihill victory and set a new National Record to boot. He had to resort to using his old "Little Daddy" design of mine which he flew to the 1974 Mulvihill win, since his new long job fell again in the cornfield to join my No. 1 "G.S.B.", and was lost forever. At least two Southern models stayed together and wouldn't get so lonesome with all those Yankee models ensconced in the same cornfield.

Mike Bailey, another flying buddy from Smyrna, Georgia, and 1969 Mulvihill winner, flew his gull wing



George prefers to cut and steam his prop blades to shape from 1/8 sheet balsa. His success should encourage others who feel you should really carve them from blocks. Note hub details.



Close-up of stab DT rigging. Note that aft end of fuselage is pulled together into a triangle section which blends neatly into the skid/sub-fin.

"Gully Washer" to second place just behind Jim, I was disappointed that the Mulvihill had slipped away from me again, but was tickled pink that the Georgia boys did great.

The day after the Mulvihill episode, the Canadian boys from Toronto sponsored the unlimited-unlimited rubber event for the Canadian Cup. This event was run the way contests were run back in the 20's and 30's, with a single flight,

and the timer chasing the model by auto, motorcycle, camel, covered wagon, etc. The timers back then were hardy souls.

Those of us who still had a model that wasn't in the corn, gave it a try. We all flew just after dawn, within a 5-minute period, into a breezy drizzle. Kathy (Monts) Learoyd was my timer, and with Rod Schneider, my 18-year-old flying buddy helping

Continued on page 122



"SICKLE" * FAI COMBAT

PHOTOS BY AUTHOR

By STEVE FAUBLE . . . Even if you don't happen to like the design, the techniques which the author has developed for mass production of a somewhat expendable type of aircraft, will probably be of interest.

• What makes a good combat flyer? If you're not one of the very fortunate few who was blessed at birth with nerves of steel, the reflexes of a gunfighter, and the eyesight of an eagle, you must practice. This means flying actual matches with their accompanying whumps, thuds, and sudden silence. All of these sounds mean that you must lock yourself in your room and build more airplanes. These new planes will, in all too short a time, end up in the trash can with their brethren.

In order to make this building as painless a process as possible, I have tried to design a production capabil-

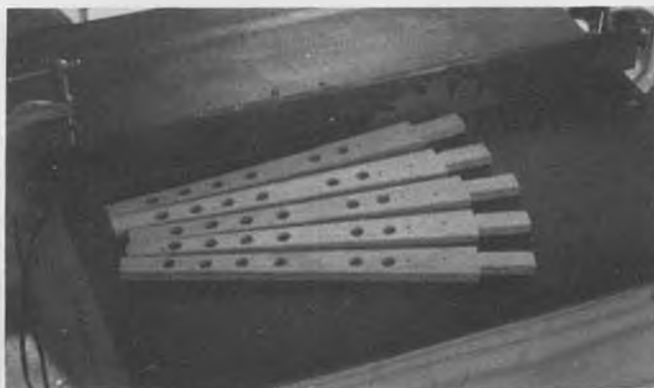
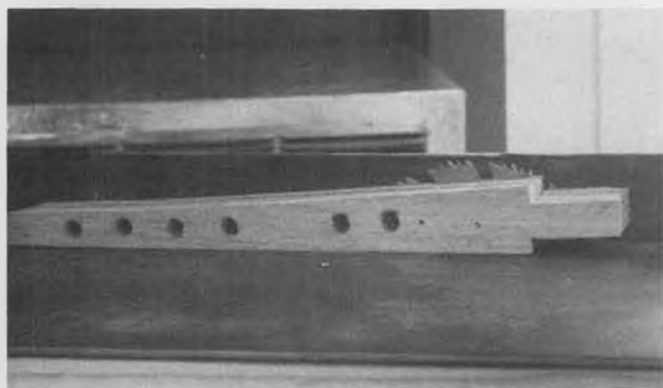
ity into my planes. What you see in this FAI Combat plane, the "Sickle", is the end result of many months of thinking, testing, and actively trying different techniques to reduce building time.

The first thing I decided was that cutting all those ribs then sheeting the leading edges, etc., had to go. This left a foam wing, of one type or another, as the alternative.

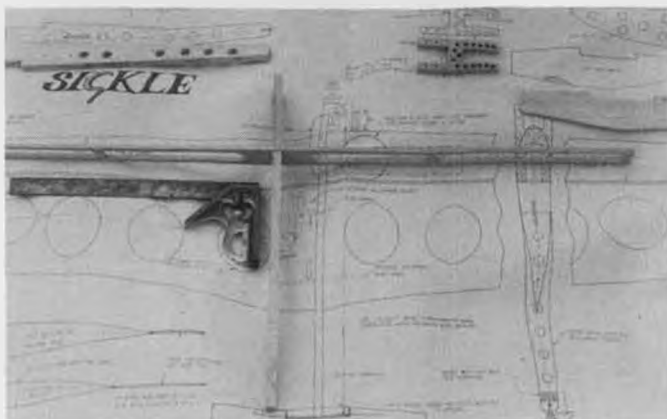
I built a couple of planes using the now standard method of a top and bottom spar set into a groove cut in the foam. I felt that in order to get the spar to fit correctly, too much time was required. I next decided to

cut the foam wing in half, lengthwise, at the high point, and simply sandwich a spar, full depth, in between the two pieces of foam. This worked well, but the spar was heavy, and if balsa was used, expensive.

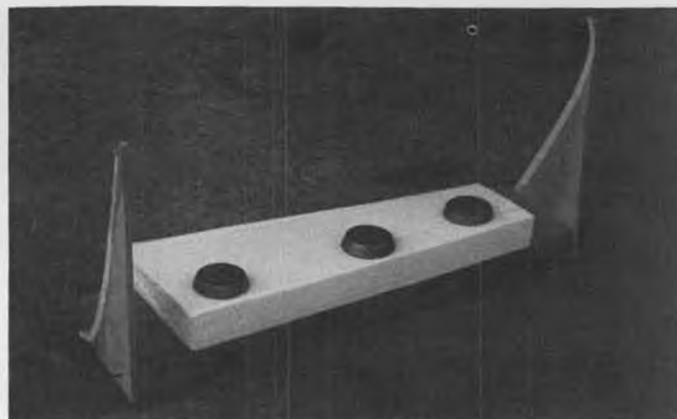
This is when I remembered an article in an old *Model Airplane News*. This article, by Bill Northrop, who is now the editor/publisher of **Model Builder**, had described an interesting technique. He had designed a biplane called the "Spruce Goose", and in this article, he described how he had formed a block of spruce into a rib shape, complete with lightening holes in



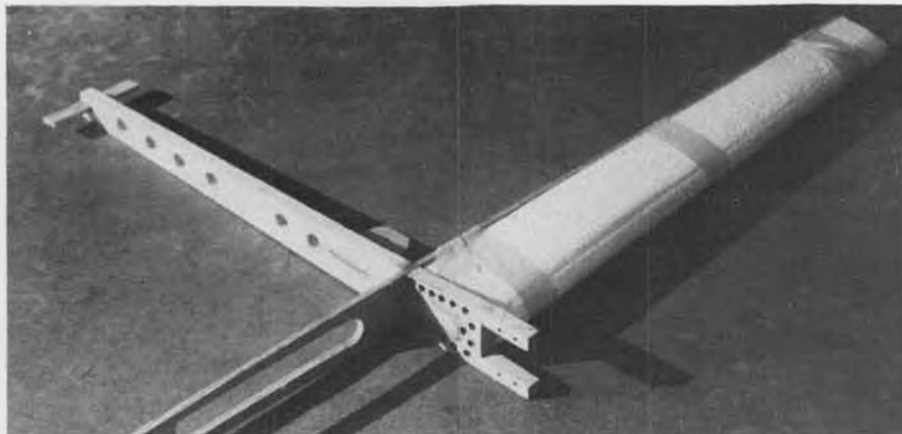
A large block of wood is cut to the profile shape of the mono-boom. After drilling all of the required lightening holes, the table saw is set for the thickness required for the boom, and the block is repeatedly run through, like slicing baloney at the butcher shop.



Important step is assembling mono-boom and wing spar to a precise 90-degree angle. Use a carpenter's try-square to be sure.



Jig for cutting foam wing in half along high point of chord. Aft portion is still in jig, with weights holding it in place for accurate cut.



Partial assembly. Spar is on boom, and the maple motor mount, also cut baloney fashion, has been added. The tiny piece at the rear is the "stab". Leading half of wing held to spar with tape.

the center, and then simply sliced off completed ribs on a table saw. (Whaddya know! Somebody read it! wcn) Using this technique, you could have lightening holes, complicated shapes, and even composite construction. You could thus combine many separate pieces into a few simple parts.

The first component I tackled using this rediscovered technique was the spar. Now, instead of four separate parts I would have only one. As you can see by looking at the plans and pictures, the spar assembly is sliced off a block as a single piece. The material used is mainly white pine that starts out as a 2 x 4 plank. The two long 3/4 inch slots are cut in the middle of a table saw. The balsa web pieces are then glued into this slot to stabilize the long, spindly parts. Next, the taper is cut to conform with the outside edges of the foam wing.

When I got to this point, I ran into the problem of how to mate the now solid center section of the spar to the motor mount and mono boom. The answer is to have these 3 main parts interlock. The center rectangular slot is formed by drilling four 1/8 inch diameter holes in the spar block and then connecting these holes with a jig or coping saw. The

motor mount was the part that I attacked next.

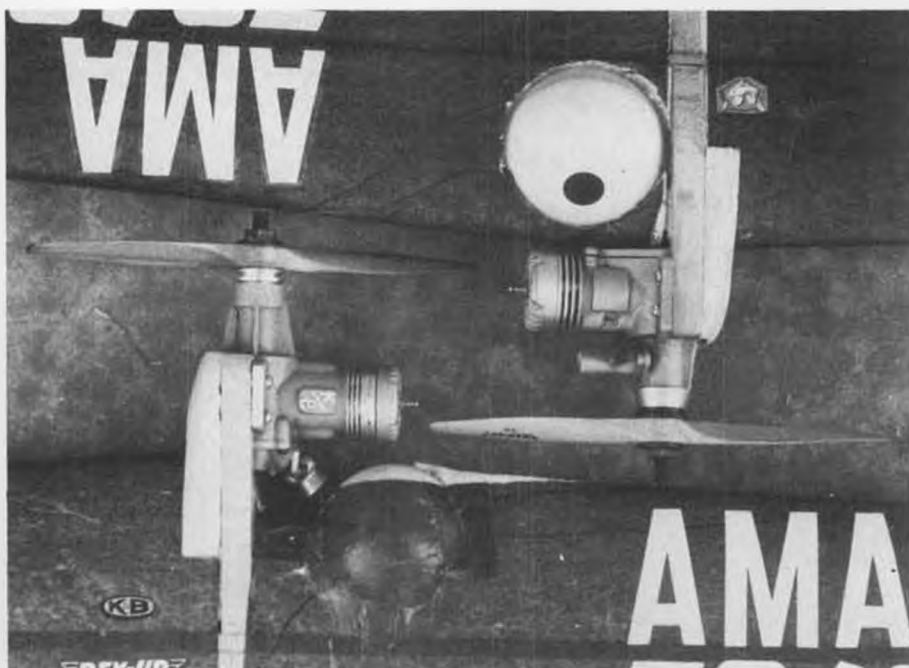
I have long favored a one-piece motor mount for the true surface that it gives the motor. No more warping the motor's case when you tighten the mounting bolts. This

true surface gives you both longer engine life and a few extra rpm. The problem has been that maple is heavy, and if you drilled lightening holes on each piece, it was very tedious. Now I could, using the sliced block idea, drill the lightening holes and the engine mounting holes in 4 or 5 motor mounts all at the same time. This lowered the amount of work required to a level that a solid mount is worthwhile.

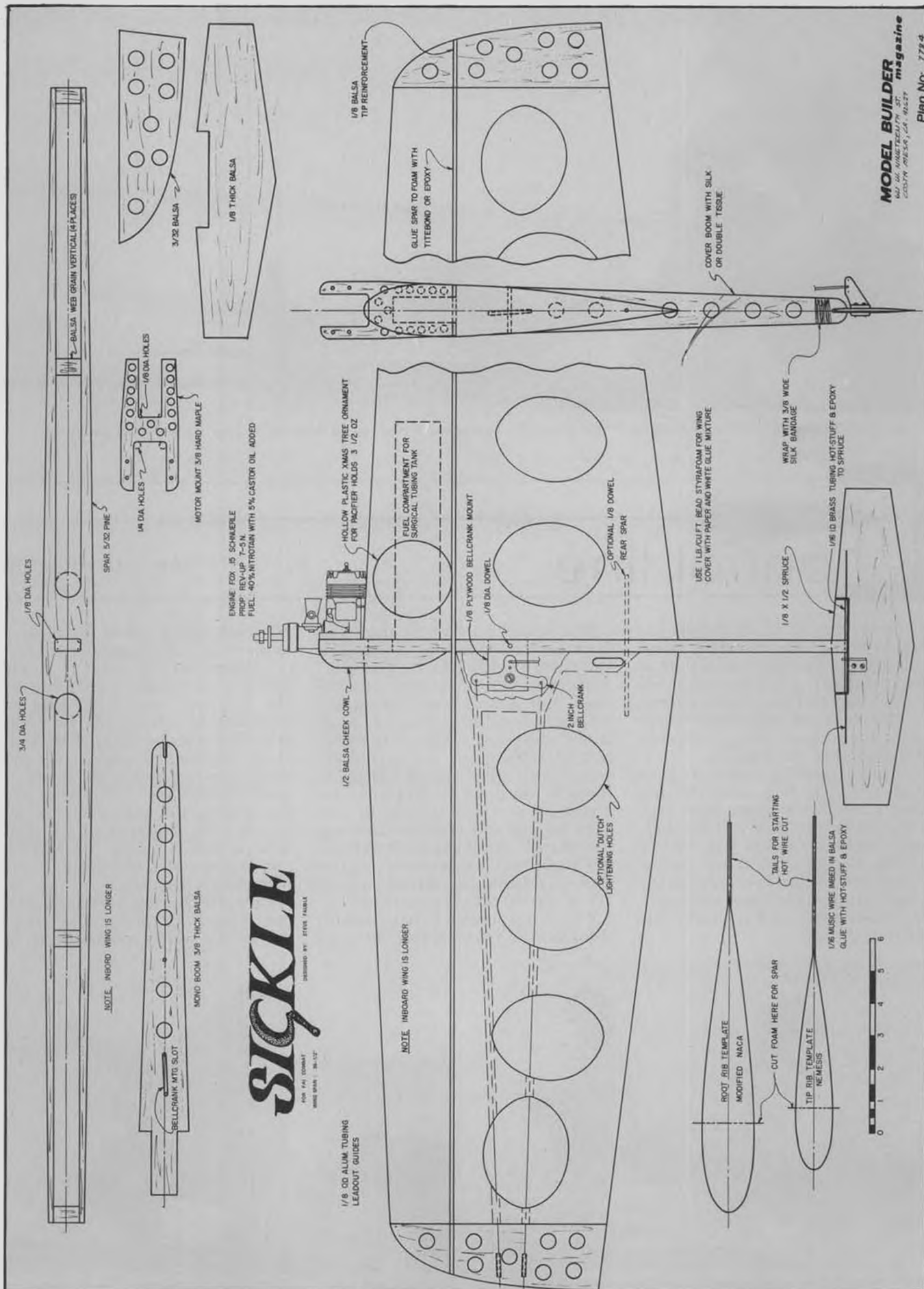
A drill press is required to drill these holes so that they will be true throughout the block. At the same time, I made the mount in the shape of an "H" laid on its side. This was done to reinforce the critical joint between the motor mount, boom, and one-piece spar.

The boom now fell right into place in the design. A block of balsa cut to the shape shown, complete with lightening holes, two 1/8 inch dia. holes at each end of the slot for the bell crank mount, and the slot

Continued on page 115



Two completed "Sickles", showing Fox and K&B Schneurle installations.





Roland Baltes readies his well-known Ju-88 for a flight at the 25th Southwestern Regionals at Buckeye, Arizona. He placed 4th that time.

Control line

By "DIRTY DAN" RUTHERFORD

• Before starting to read this, you looked at the pictures, didn't you? And even in your very own state of unconsciousness you probably noticed an R/C car, or parts thereof, namely the noisy end, which has an oddly unique glow plug sticking out of the head of the K&B 21.

Surprise, surprise, that isn't a glow plug at all, it is a sano starting battery. I think it's a pretty neat thing and it is called Matt's Trick Stick. Matt Vuolo is a fellow I met when getting started in R/C car racing, and he just couldn't put up with the usual starting battery arrangements, so he designed, and is producing, the unit shown.

The lower portion of the Trick Stick appears to be the familiar Du-Bro push-on glow clip. Up on top is a rechargeable nicad battery of some kind, and covering everything is a protective rubber coating. Matt tested different types of batteries before settling on the one used, which will give about 120 starts before needing recharging. Of course, if you take forever to start your engine, you won't get 120 starts per charge, but if you took to heart my writings concerning engine starting techniques, maybe you can crank off 200 starts per charge.

I have a Trick Stick that I use for firing off the 1/8 scale R/C cars, and

although I have yet to use it on an airplane, it ought to work just great.

Imagine, if you will . . . Bobby (Stunt Grunt) Hunt is called to fly. He can win this meet and be crowned Mr. Stunt of the Milky Way. The crowd is still as Super Stunt Hunt confidently approaches the circle carrying his model. A low stir goes through the crowd when it is realized that this Master Grunter has signaled for the start of his flight time without having his garbage can (sometimes referred to as a flight box) close by.

Hunt the Stunt turns and signals to the masses for quiet. The crowd calmed, he slowly removes from his



Martin Martinez gets an assist from Roland Baltes while checking engines on his A-26 at Southwestern Regionals. He placed 3rd.



"Fuel Line" columnist Dale Kirn tunes the engine on son Joe's Piper Cub. Joe at left, with Tom Hunsaker, 1/2A Proto Spd. winner.



Bill Hoover's C/L AMA Scale winning PT-17 passes overhead at the Scalemasters Scale Rally, 1975. Photo by Larry D'Attilio.



Chris (left) and Jeff Schroeder with dad Vern's Volksplane (MB Oct. '77 plan feature).

neck a rather attractive necklace that has a large pendant attached. Hunt the Grunt is wearing a Trick Stick that not only is color-coordinated to his handmade jumpsuit (the one with the FAI Stunt pattern embroidered on it, sequins accenting each intersection, and beginning and end of each maneuver), but lights off his Big-Belch 47 with the first flip of the elegantly gloved hand against the Brakurphingur Custom propeller.

Super Grunt wins, of course, and gives all of the credit for the win to his Trick Stick, the ultra-zootness of which completely awed the judges, ballooning the flight scores out of sight.

Now I don't expect you to believe all of that imagining above, but you must admit that the Trick Stick is one of the neatest starting batteries available. If you would like to have one, they are available from Matco Industries, 12524 N.E. 65th Ct., Kirkland, WA 98033. The TS-1 pictured is \$14.95 and the TS-2, which supplies 60 starts per charge, is \$9.95. A charge adapter is included, and

most any 50 to 100 ma charger handles the recharging chores. Local Hobby has this kind of charger and they go for around \$7.00.

MORE R/C CAR STUFF?

In case you haven't caught on yet, I've been actively racing the R/C cars lately, in fact that is my 1/8 scale MRP car modeling the Trick Stick. I have in no way given up on C/L flying, in case you're wondering, but there are a few things the R/C car guys use that have applications in various C/L events.

The Carrier folk might be interested in the dual slide-valve carb from John Thorp. This is a tricky little widget, all machined and neato looking, designed to, among other things, offer an unrestricted inlet to the fuel/air mix at high speed. Idle speed and idle mixture are easily adjustable. The carb may be used with most any type of fuel feed system (pressure, raw suck, or uni-flo) and is available in three different sizes.

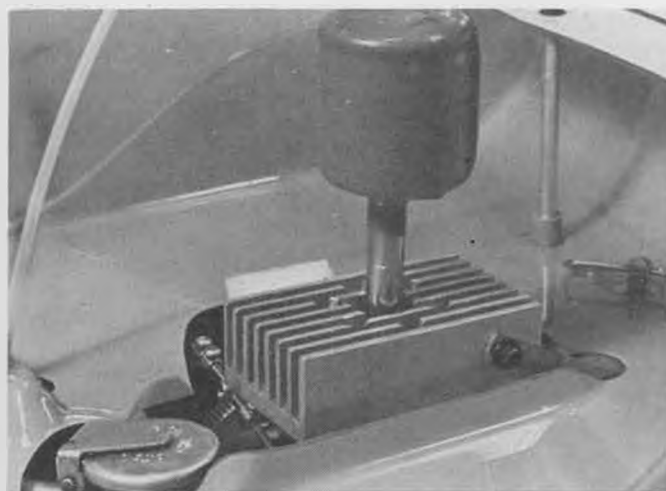
To compliment (although it can be used separately) the slide valve carb, is the remote needle valve

assembly. This unit only adjusts the top end, but being remote, it might quite easily find a home in a Stunter (mount it on the front of the tank and don't bother with cutting gaping holes in the cowling), the Slow Rats fitted with front intake motors and owned by racers used to not having to worry about sticking fingers in props, maybe even in an R/C Formula 1 plane. Write to Thorp Manufacturing, 1655 E. Mission Blvd., Pomona, CA 91766, and the mellow fellow of R/C car racing, J.T. hisself, will fill you in with more information on these and other things.

For a super-slippery engine assembly oil that will carry your new barn-burner through its first few break-in runs, try the "Solution" lube from Model Racing Products (MRP). In the cars, I use this stuff on everything that needs lubing. Especially the clutch bell on the 1/12th scale cars. Only the very best of lubes will cut it here, and the Solution works better than any other oil I've tried. Try some, your engine will love you for it.



Ray Smith, Lawndale, California, wipes off his Me-109E. It has retract gear, flaps, and bomb drop.



Rechargeable glow plug starting battery combined with push-on clip, makes compact starting aid. See text for more information.

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For those of you involved in small-bore C/L racing, Combat, F/F, whatever, you should be aware of the fact that certain Cox engine parts are available from JoMac (Jerobee) and that Local Hobby has them in stock or can get them. Items of interest here are left-hand crankshafts, phenolic washers, venturis, retainer nuts, carb bodies, etc. for the TD's.

The reed valve parts to look for are reed retainers, reeds, venturi gaskets (that little rubber O-ring), and front tank gaskets, all packaged 12 to a bag and priced at \$1.00 a bag. Also available are tank fronts, tank backs, tank screws, crankshafts and a few other odds and ends. The reason for mentioning this stuff is that most of them are not available in standard Cox packaging. For example, if you want new reeds for your engine, Cox would like to have you buy a complete engine overhaul kit. That hurts if you like to run double reeds... especially if you bend one while installing it. All of a sudden you have spent almost \$4.00 and all you wanted to do was replace two 10¢ items.

Even if Local Hobby doesn't have the JoMac/Cox bits 'n pieces, Cox has recently started a Dealer Repair Station program that allows the dealer to buy reeds, retainers, gas-

kets and such in bulk quantities. We have several shops in this area that cater to the car racers and they have drawers full of this stuff. Very handy come rebuild/rework time.

Once again, just goes to show that it doesn't hurt to steal from somebody else's bag of tricks... unless it is the MB Pylon Racing column, of course.

STEP ON A CRACK, BREAK JIM GAGER'S BACK

Did you see what that quacker wrote about me in the May issue? Man, I been stepping on every sidewalk crack I can find ever since, all the while chanting the above. Even had some double-whammy cracks specially installed in the driveway. (You put the cart before the horse, Dirty. Jim spent many weeks in the bone repair yard just after the Nats, getting his back epoxied together, must have been from running into you at Riverside... you know... your favorite Nats Combat site! wcn)

'Course everybody who knows me knew that it was just more quacking going on when the bit about me not accepting the challenge was seen. I may seem a little strange to most people, but I don't recall ever turning down a challenge, especially one like this.

Here is the situation. I never issued a challenge (don't even want to be bored with any Two-bits racing) involving my flying Quarter Midget and Jim flying Combat at the next Nats. And neither has Jim, although he gives strong indications of wanting to do so.

If such a challenge is forthcoming, I most certainly will accept. But first Jim should be aware of the fact that good friend and fellow member of the Jive Combat Team, Gary Stevens, has been flying R/C for just over a year now and presently holds the N.W. record for 1/2A Pylon, has twice broken the N.W. record for Quickie 500, is leading in points for the season-long Quickie 500 championship (Expert class, of course), had no problem in flying his first Formula 1 model, and in general, is just plain smokin' 'em while competing against guys who have been flying R/C for more years than Gary has months.

Gary and I have competed together in a lot of events and have found that anything I can do, so can Gary, and vice versa. So I see no problem at all in fielding a competitive Dirty Quarter Midget. Let's see, Terry owes me a couple of favors, now where did I put his phone number...?

WOW, SOUNDS SERIOUS

Lest you think there is a war going on here in the pages of conservative good ol' MB, fear not. Actually, Jim and I had a great conversation on his nickel, and the two of us could probably team up and strike fear into most anybody, if not with dazzling flying, at least with dazzling B.S. and downright trickery.

Still, a challenge is a challenge, you know. Excuse me while I make a phone call.

"Hi, Terry. Say, I've got a little problem you could help me with... Right, that Gager guy. Now how's about if you..."

TELCO CO₂ MOTORS, FOR ONE LAST TIME... PROBABLY

Remember back in the May issue, how I related Al Kelly's finding that the Telco CO₂ motors performed better after enduring a shaft-run? F/F guy and friend John Bausano actually tried it, and increased his engine runs from the 45 to 50 second range up to the 90 second bracket. Do what you will with this trick that applies primarily to F/F. Just remember that you heard about it in the C/L column. Will Stalewick come back with a C/L Stunt trick and publish it in the F/F column? Fair is fair, after all.

SLOW RAT

Although the '78-'79 rules for Slow Rat have come under severe criticism, most notably by a fellow

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magazine**

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says:

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columnist who himself is on the Racing Advisory Committee and so is in an excellent position to lobby for or against any rules proposals concerning racing... but didn't... the event is still a popular one with many racing fliers. Toward that end, I've got some material coming from Gary James that ought to show you a few tricks about Slow Rat. Gary has run into a team that is pulling down over 120 mph and running in the high 5's for 140 laps. And doing it consistently. With strictly legal equipment.

Description of the tank will have to wait, but one thing they are doing is to run an R/C type of carburetor. The arm on the rotating carb barrel is weighted, such that at rest and during takeoff, the carb is restricted some to allow decent fuel draw. When the model is airborne and accelerating, the weighted arm swings out with centrifugal force and opens the carb up to the high speed position.

They are presently running front intake K&B 5.8cc (.35) engines and as K&B offers a Perry carb for the 6.5cc (.40) R/C version of this engine, the conversion is easy to make and ought to give you a place to start in getting your Slow Rat out of the slow bracket.

THAT'S ALL

Ge... another column without anything directly related to Combat. I must be starting to slip a bit. (No... you're actually improving. wcn) •

F/F Continued from page 85

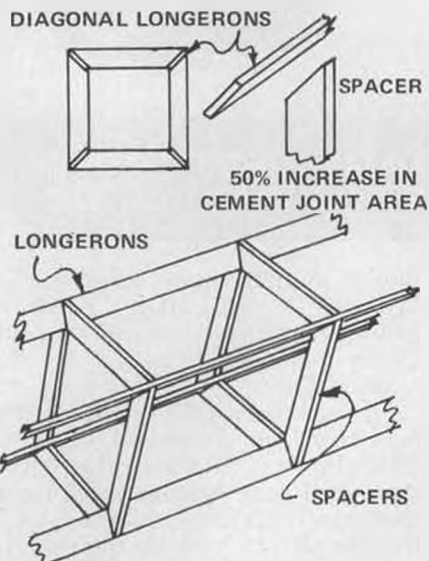
6.1 to 6.25 inches, and/or reduce the size of the block tips from .375 to .25. If you want to be on the safe side, do all three and you'll be approximately 2.5 sq. in. under the max area... plenty safe.

Thanks for the information, Harry. BUILDING DIAMOND-FUSELAGE LIGHTWEIGHT RUBBER MODELS

Last August, I mentioned that I hadn't yet figured out how to build the diamond fuselages on some

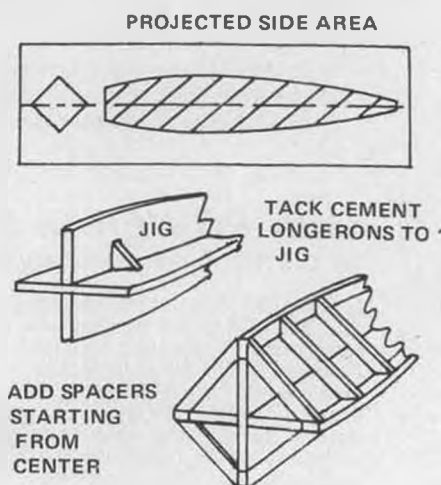
unlimited rubber models (pardon me, on Mulvihill models). Well, time passed, but finally a response. This one came all the way from New Zealand, from none other than Devon Suthcliffe, prominent free flighter from the down under area. Devon not only responded, but sent along a sketch from a copy of the May, 1952 issue of Aeromodeler.

I have taken the liberty of including copies of these sketches for this issue of **Model Builder** Free Flight. The first sketch shows the benefits to be gained from this method of construction. As the text says, "Obviously, building two sides flat on a board and then joining in the usual way is impractical, and so the diagonal longeron fuselage immediately becomes a more complicated project. It is, perhaps, not knowing how best to tackle the construction which has prevented more people from adopting this weight-saving method."



The second sketch shows the most simple and straightforward means for putting this kind of structure together. "We have investigated the methods used by those builders who have gone over to diagonal

longeron construction, and of the four which seem to offer the best approach, the simplest is detailed in the sketch. This is, in fact, the first time that methods detailing "diagonal" construction have appeared in print.



"The most widely used method is that originated by Evans. This takes the form of an internal jig cut from soft 1/16 sheet balsa. It is suitable for square section fuselages, e.g. 'diamond' types, and the two parts of the jig are cut to the exact shape of the inside line of the longerons in projected side elevation. The jig pieces are fastened together at right angles and the four longeron lengths tack cemented to the jig. Spacers are then cut and cemented in place, each of the four spacers at any one station being of identical length and all spacers having the ends chamfered off at 45 degrees. When all the spacers have been added and the cement has set, the light balsa jig is broken up and removed, leaving just the complete fuselage frame."

Thanks, Devon for the sketches and the information. Now, fans, if you have been planning on building that "1/2-Blimp" featured in the August issue of **Model Builder**, you can do it, as there is no reason to step aside because of the diamond

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fuselage. Remember, you read it right here in **Model Builder** Free Flight.

I GUESS IT FINALLY HAD TO HAPPEN DEPARTMENT (humor?)

Al Lidberg sent along a picture of 11-year-old Paul Lidberg returning his brother's A/1 Topkick via the latest mode of pre-teen transportation: the skateboard.

Can it be far behind when the skateboard will be used to tow the glider into the air?

So, what's next?

How about launching a power model from a springboard in order to get that additional 5 to 10 feet of altitude. Kind of a zoom launch for

power models. Same could go for Wakefields and other rubber-powered models. Hand Launch Glider, the same.

What else?

I guess I'm old-fashioned. Monthly, I read the comments in Aero-modeller by Pylonius about the stick-and-tissue rubber model and find myself nodding my head. Must be time to turn it off for this month.

More to come in August. See you all then.

Thermals.



Soaring Continued from page 31

thin wings provide plenty of speed. Scotty uses a steel wing wire to replace the original aluminum, in that this can take up some of the flex load. As a side note, he commented that a thicker stab might be in order, in that it would provide better resolution of pitch control, and the slightly higher drag would also increase the stability.

Cecil Mead of Orange County has come up with a racy modification of the Little Plank. He uses the same fuselage, airfoil, and wing area, but adds sweepback and twin fins. A Kraft brick with directly mounted mixer provides the required elevon control (this in place of the usual sliding tray arrangement). It works well and looks good in the air. As with all other "Planks", this ship doesn't stall. It simply porpoises to show you the need for downstick.

Jimmy Ealy III has been bringing home a lot of trophies. He soloed on a Hobie Hawk when he was five, and during the past season, walked off with a number of awards, though only eight years old. He now has several legs up on LSF Level III and placed 13th in Standard and Unlimited at the last Canadian Nats. Here's wishing success to the coming generation. By the way, his father is also active in our hobby. He offers foam cores for almost all standard ships, or ready-to-cover foam wings, sheeted with 1/64 plywood, equipped with edges and spruce spars. He offers kits for four scale ships... the Monarch "C", the Zoegling 35, the Pioneer II, and the Granau Baby... all at very reasonable prices. Jim can also provide you with three-views and structural details of many foreign full-scale sailplanes, circa 1915-1960. He has limited sets of two, three, four, and five inches-to-the-meter scale planes and sufficient documentation to qualify the plane you build from these in a scale contest. Jim is also offering completely assembled hi-starts, comprised of 100 feet of surgical tubing, 100 yards of monofilament, swivels, stake, and rings. Why not drop him a line to learn more details: Jim Ealy, the Hill School, Pottstown, PA 19464; or give him a jingle (215) 326-8814.

Bill Liscomb believes in getting every bit of performance out of his Hobie Hawk. He does this by placing a one-pound fishing weight on the C.G. That makes the plane really move, increases the Reynolds Number, and thus the efficiency. If you try this, make certain the weight is secure and watch the "smoke" as you land.

Have you heard about the Electric

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Powered Glider and Scale Contest to be held in San Diego, July 16th? It's worth entering, or at least watching. Call the CD for more info . . . Bob Peck, (714) 469-8675, (Box 2498, La Mesa, CA 92041). See ya there! ●

Quickie Continued from page 23
 with a rubber band. You will note that the annular air intake has removed the need for the careful mating of the spinner to the fuselage, always time consuming. At least *SOMETHING* has become easier!

WING CONSTRUCTION

You can use a foam wing if you like, of course, the necessary templates are there. However, you can have a stronger, lighter, and more efficient wing with about the same effort, if you follow the prototype. This wing uses a stressed skin for its strength, similar to foam. As such, even though it is sheet covered, the use of filling resin or stretchable plastic covering is not sufficient. It must be covered with fabric which is tightly adhered to the wood, forming a laminate. The simple way is Siron and dop, it goes on easily and fills quickly. If desired, 3/4 oz. fiberglass cloth and resin is fine also.

The newly developed saddle jigs are used for assembly, and the major

structure is completed before it is removed from the jigs. The jigs are secured in place on a straight building board, automatically forming the correct dihedral and wing taper. Constant vigilance while assembling is not necessary, if the board is true, the resulting wing will also be true.

To begin assembly, the top sheeting is glued up and trimmed to size. This is forced down into the saddles with the spar and appropriate ribs. All remaining structure is stuck in place and the main structure finished off by planking the bottom with 3 inch sheeting. After removing it from the jigs, the leading and trailing edges, etc., are added to complete the assembly.

TAIL

For a tail to do its work, it must develop lift. The greatest lift with the least drag is created by an airfoil. Therefore, airfoils are used in the tail. The tail could be assembled using the saddle jigs if you like, however the "centerline" method shown is even simpler for these smaller structures. This method uses overly wide leading and trailing edges with centerlines on them and the ribs. With the leading and trailing edges in place, the ribs are cemented between them, using the centerlines for alignment. The sheeting is added, when dry, it is

flipped over for the remaining sheeting. Hacking down and shaping the edges completes it.

FUSELAGE

A shape with as many curves as this one can be tedious to reproduce with balsa. In this case, a crutch was used, making it relatively simple. The crutch is laid out first, the LOWER bulkheads erected on it with all of the substructure. Then the 3/32 siding is warped around it. With the bottom portion completed, the top goes on easily. The section at the cabin is planked instead of sheeting as there are so many compound curves in the area.

The maple crutch for the pod may seem formidable, but it actually shapes up quickly if you can get to a jig or saber saw. Even a drill press will do. Drill a million holes around the outline, break away the scrap and finish to size with a straight sided router bit. If you use 5/4 (1-1/8 inch) maple, you can shape two at once and split them on a table saw.

Once you have the crutch, the shear pin holes are drilled in it. The crutch is aligned and clamped to the fuselage mount. Using the crutch as a drill guide, the mount holes are drilled for perfect alignment.

The pod block should have enough internal clearance at the engine to allow the intake air to flow

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past the lower case to the carburetor. The fuel tank section should have sufficient clearance for a 1/4 inch foam cushion, as well as the tank. The layer-built cowl accommodates any of the engines easily. With the pod and engine in place, a hole is hacked into the first inch-thick layer. When this is slipped on over the cylinder, the clearance necessary for the lower cylinder and case can be determined and created.

With the first layer in place, a 1-1/2 inch hole is neatly made in another piece of 1 inch stock. This should be a tight fit when slipped over the cylinder. Additional internal clearance will be necessary for the exhaust pipe and carburetor, if the front rotor engine is used.

The last layer simply caps off the cylinder head and fairings into the fuselage. These layers may be roughed to shape on the outside as they are laid up, or just left. Once the lay-up is completed, there will be a big gob of balsa that can be easily hacked off to rough shape with a carving knife. Some care should be used during final shaping to get the size to minimum and have smoothly flowing curves.

A template is made for the wing cut-out. The upper edge of the crutch is used for incidence reference, when the cut-out is made. With the pod off, the wing saddle is carefully fitted and the mounting installed. Note that the aft Camloc hold-down plate is part of the pod, thus it holds the pod and trailing edge. The pod is carefully fitted to the top of the wing so there is no clearance when the pod mount screws and aft Camloc are tightened.

COVERING AND FINISH

In Formula 1, you need a good finish to obtain handicap points and keep drag down. It helps if it is simple and durable. This method does the job well with the least effort. The wing is covered with Silron fabric, doped in place. Very little filling is required. The pod and fuselage, back to the trailing edge of the wing, is covered with 3/4 oz. fiberglass cloth, applied with finishing resin, for durability and fuel-proofing. The aft fuselage and tail gets Silkspan paper and dope for simplicity. After sealing the covering down with a coat or two of dope, a heavy coat of Super Pox primer is applied. Once sanded out, colored epoxy paint is applied as desired. After all trim is on, the whole bit is sealed with a coat of clear epoxy. The clear can be sanded out and repeated until you have just as super a finish as you desire.

CONCLUSION

Some random ideas and hints can be welcome: While the factories build splendid engines these days, it always helps to check their "set-up" closely. Clarence Lee and Terry Prather do excellent jobs of this with their appropriate brands. The cost is worthwhile. Spinner balancing is something any of us can do, and is often of help. An inverted engine can be accidentally flooded while filling the tank and waiting. This can be prevented if the pressure line is arranged so that it is higher than the fuel, at some point, and the shutoff is kept closed until starting. If a socket wrench is used for plug removal, a tight hole in the cowl will allow plug removal simply. If the Prather-type wheels and pants are used, they will stay in place much better if the aluminum gear is tapped

and threaded for the screw, and a lock nut used. When flying off grass fields, it helps to have the wheels extend a bit further, also. The push-rods used are simple 1/16 wire passing through bulkhead guides. These will not vibrate. If another type is used, be sure to add guides to prevent vibration.

FLYING

There isn't much one can tell about a fine flying airplane. As you will note, control movements are minimum and yet effective. The amount of movement should be just enough to do the job as you personally like it, and no more. Excessive movement only creates over-control at times. Right rudder is used to start the takeoff, and the rudder remains effective even in crosswinds. Mechanical trimming should be used until "neutral transmitter" is straight and level. Then the model will stabilize itself out of turns.

When landing, you will find a very low sink rate, and the capability to be slowed down without problems. Do be sure of enough time to accomplish it. Not much more can be added, except to ask you to treat the "Lil' Quickie" like the thoroughbred that it is . . . and HAVE FUN! •

UNITED PYLON

• The United Pylon Racing Circuit is nearly 10 years old. The circuit was organized with some very worthwhile objectives. The objectives have been accomplished and the circuit continues to grow stronger each year. While the circuit encourages outside participation, it is noteworthy that the growth has come from within the circuit membership. The organization itself has benefited from the service. The circuit is now composed of 7 separate clubs in the western New York and Ontario area. Total membership exceeds 400 members, of these, over 100 participate in the activity as they desire. The number of participants has INCREASED each year since the circuit's inception.

There can be no doubt that the U.P.R.C. has added to the stature of model aviation in this area with its program. There would appear to be no doubt that similar success could be realized in hundreds of other areas throughout the country. In the few other areas where circuits have been organized, success has been had. It does appear that success depends upon the circuit being an entity of its own, with proper organization, sticking religiously to its objectives, and with constant communication. It probably would not happen if approached in a haphazard manner. What are the me-

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chanics of the U.P.R.C.?

The U.P.R.C. is an organization whose member clubs are located within a 75 mile radius of the center of its area. Each club pays dues to its treasury to provide operating funds. The U.P.R.C. staff is composed of 2 representatives from each club, with equal voting rights. From the representatives, a director and a Newsletter editor-record keeper is chosen. The U.P.R.C. establishes all the rules and regulations to be used by the member clubs for racing purposes. Each club is expected to conduct at least one full-program race per year. A UPRC Championship race and banquet is held at the end of the season, conducted by a member club on a voluntary basis. Point standings for each contestant are kept on a yearly basis by category. Points earned are proportional to the number of entrants in each individual race. Yearly championships are awarded in each category, plus an overall U.P.R.C. Champion. Contestants are encouraged to fly in at least two events.

The U.P.R.C. business is conducted at an annual organizational meeting held in November of each year; current business can be brought up at any scheduled race. A resume of all business conducted is included in the following issue of

the Newsletter.

All UPRC business is finalized for the coming season at the annual meeting. The decisions at this meeting are the "law" for the entire season. The annual meeting business includes operating details, the contest program, and the contest schedule for the coming season. All contests are conducted according to AMA rules and regulations, no "special" rules are allowed for official events.

The U.P.R.C. newsletter, "Pylon Cuttings", is issued prior to the annual meeting and immediately (within one week) following any business meeting and/or race, the contents to be the results of any business conducted and/or the results of the race just completed. Race results include details for each winner in each category to 5th place, plus the point standings to 5th place in each category. A supply of the newsletters are provided to each member club, and to a mailing list of interested media people, including the AMA and NMPRA.

The treasury of the U.P.R.C. is used to provide funds for the directors' expenses, newsletter editor's expenses, and publishing costs, plus annual awards. The conducting of all contests and the associated expenses and revenues are the

responsibility of each individual club, as the meets are run. The prizes awarded at each meet are expected to at least equal the value of the entry fees as established by the U.P.R.C.

CONTEST SCHEDULE

The objective of the schedule is to have it include the entire flying season. There is to be racing conducted in the area over the complete season, and as uniformly spread out as possible. The last race of the year is to be the Championship race and banquet.

CONTEST PROGRAM

The contest program, more than anything else, fulfills the objectives of the U.P.R.C. and its member clubs. The objective of the U.P.R.C. is to provide organized R/C Pylon Racing as a means to reach the following goals:

1. An interesting means of exposing the general public and its media to the R/C sport, increasing the public's interest in model aviation.
2. Provide a place where the newcomer and club members can enjoy racing at a relaxed level without the complexities of serious competitive racing.
3. Provide a place where competitive AMA pylon racing is offered in all official categories, both for the experienced contestants, and for

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the newcomers. Serious consideration has to be given to the program to accomplish these objectives as the objectives have been developed from the *desires of the various clubs* and their members.

Objective No. 1 is accomplished rather easily by conducting the races in a first class, well organized manner, by scheduling the most interesting racing in the "prime time" for the public, later in the day, and by announcing the event in advance to the public media.

Objective No. 2 has been the most difficult to fulfill, as the whims and needs of the average club member go quite deep. In addition, what is necessary to entice a newcomer easily into racing has to be understood. The non-racing, non-serious club members are those who provide the workers for the races. By working, they develop a desire to enjoy some of the fun. There has to be an event in which they can easily engage on an occasional basis. It is also an advantage to have an event for the *newcomer* for which a normal, non-special, sport model is eligible. It is from these people that the serious pylon racer evolves, thus it is important.

Objective No. 3 is simple to fulfill. Offer the official AMA racing

events, and the serious competitors and those desiring to become so, will love it. They also provide the most interesting "show" for the public.

The order of the events on a contest day is important also, and must be adhered to at all races. The majority of the newcomers and occasional racers *DO NOT* like to perform in front of spectators, nor do they like to have their performance easily compared to the experts. It is therefore important to conduct the "sport" event in the morning, and the expert events for the spectators in the afternoon.

There is one item in regard to the conducting of the races which AMA rules do not cover. The workers in our races are amateurs, not professional. Equipment can break down. We have no excess time on a race day. It is felt that there is always an element of *luck* in racing. For these reasons, all heats are *prescheduled* before racing starts, it is the *contestant's responsibility* to be on the line when his heat is called. There also are *no reflies*. A heat is called, a heat is flown, and the results are as declared by the officials. That heat is done, it cannot be repeated. The logic is that there is no time. Each heat, no matter what happens,

determines a winner and loser. A refly cannot possibly duplicate *all conditions* for the contestants and the officials. Conditions other than an official discrepancy *often determine a winner or loser*. Leaving the results of a disputed heat to the "luck of the draw", correcting the malfunction before the next heat, is far more fair than trying to duplicate identical conditions for a refly.

The program of the U.P.R.C. has changed several times over the years due to changing official AMA events, and by the need to determine exactly what is best for a "sport event". The 1978 program is exactly the same as 1977; it seems that the best answers have finally been found.

SPORT EVENT

The U.P.R.C. "Sport Event" is conducted according to the AMA "Open Pylon" rules, except for engine classification. The plane may be of any type, as long as it meets the AMA rules minimums. Maximum engine displacement is .40. A commercial sport type muffler and prop are required. The engine must be a stock, mass-produced, sport, front rotor intake type, with carburetor and side exhaust. No modifications allowed. The contest director may determine the *qualification* of any

entry.

OFFICIAL AMA EVENTS

Formula I and Quarter Midget are flown strictly by AMA rules. Five heats of each are mandatory to assure NMPRA points. In Formula I, the AMA handicap judging system is used.

In conclusion, what the U.P.R.C. accomplishes is an organized and scheduled season's activity for model aviation in the area which can be compared to any other sport.

The U.P.R.C. assures the serious R/C competitor that he will have a full season of activity, conducted with predetermined rules and regulations, *within reasonable traveling distance* of his home.

The U.P.R.C. offers the average club member a place where he can find occasional competition on a "fun level".

The U.P.R.C. offers the newcomer a place where he can try racing without a big effort and, if desired, gain experience with the help of expert friends.

The U.P.R.C. organization provides the member clubs with an activity for their agenda which is performed in association with the other major clubs in the area. Thus bringing about an organized closer relationship, creating widespread companionship and mutual cooperation throughout a wide area of modeling for the benefit of all. When you consider that at the inception of the U.P.R.C., there were only 3 modelers racing in the area, very few contests and on a disorganized basis, and modeling was in a general doldrum, the worth of the U.P.R.C. is very apparent for racing, the clubs, and all of model aviation. The activity is **FIRST CLASS** by any judgment. ●

SportsterContinued from page 37

hole" forward. Give everything a good sanding and set the fuselage aside.

Start the wing assembly by shaping a 30 inch strip of 1/8 x 1/2 balsa into a tapered configuration and notch and cut to length per the plans. The carved center section portion of the trailing edge is cut from a piece of 1/8 sheet stock, medium to hard.

Pin the three trailing edge pieces to the plan and cut all ribs from 1/16 sheet. Also, at this point, cut out the eight 1/16 ply dihedral braces and set aside. The spars are 1/4 x 1/8 (fwd.) and 3/16 x 3/32 (aft). These should be pinned to the plan after checking the rib notch locations. Install all ribs and the 3/16 sq. leading edge. The ply gussets should be glued in now, but only to the outer panels.

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After the wings are dry, set the dihedral angle by blocking up each wing 1-1/4 inches. Ensure that the center section is pinned flat to the bench. Use plenty of glue when attaching the dihedral braces to the center section.

When the dihedral braces have set-up, add the wing tips and gives the whole assembly a good sanding. Lightweight yellow tissue was used on my 30's Sportster attached with thinned-out white glue and then water-shrunk. Three to four coats of thinned butyrate dope should provide adequate fuel-proofing. Any more than this may cause wing warping.

Cover the fuselage turtle deck with the same tissue, shrink, and dope. Add the paper headrest and you're ready to install the rudder wire. Bend the rudder actuating wire as shown on the plans (1/32 music wire) and attach to the rudder with a 2-56 nut, screw, and washers. Then bend the torque wire up to slip inside the rudder wire. The torque wire should have a snug fitting plastic sleeve slipped over it. Remember, no metal-to-metal contact.

Now fire up your receiver/actuator to make sure all is well. About 5/16 travel to each side of neutral is right. You can increase or decrease this travel by raising or lowering the rudder wire.

I applied two coats of Hobbypoxy paint to my fuselage, fin, and stabilizer. Cub Yellow, natch, and added a Zip-A-Tone red stripe down the side.

My receiver antenna was strung out and attached on the top of the fin. Perhaps you can find a neater

way. The receiver on-off switch was simply stuffed into the forward cockpit hole along with the receiver. The battery should be placed as far forward as possible to maintain the C.G. Wrap both the receiver and the battery with foam prior to installing.

Balance as shown on the plans, shifting the wing fore and aft to obtain the C.G. shown. Flying trim is optimal when your 30's Sportster will maintain a shallow climb with neutral rudder. It should fly in a reasonably straight line with no turn tendency. If it wants to turn left with neutral rudder, shim in right thrust with washers behind the left side of the engine. Climb can be improved by shimming up the leading edge of the wing in 1/32 increments.

Have a ball with your 30's Sportster. You too can discover the fun and low cost of school yard flying. ●

MammothContinued from page 43

per square foot. It is already keyed on one side for better adhesion to take virtually any kind of glue. Recommended are "Resorcinol" (used in woodworking and full-sized aircraft construction, a 2-part resin), urea formaldehyde adhesives, polyvinyl acetate resin adhesives, as well as contact, hot melt, and epoxy adhesives. It has total resistance to carbon tetrachloride and alcohol of all types, gasoline, etc., yet will take all types of paints known to us. Iron-ons stick like they should with no preparation at all. The outer surface does have a slight pebble which actually helps the iron-ons, as air bubbles are reduced and steam or gassing are totally non-existent. It is available in



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sheets up to 12 feet long and 5 feet wide, with widths of 24 and 30 inches as well, but the most common is 4 x 8 foot sheets. It can be bent with care at a 3 inch radius without problems, and if heated, can be heat formed around a 1/2 inch dowel. It can be sanded or filed to a sharp tapered bevel and being only .020 thick, it is particularly suited to surface patches. It doesn't absorb moisture or, for that matter, glue, but the upper or smooth surface should be roughed up to better key in the glue. It has no grain, but the underside is grooved about a thousandth of an inch lengthwise for glue keying. When it does break, it does so more easily along these grooves, and for that reason, you should run the grooves lengthwise when sheeting a foam wing.

This arborite backing is ideally suited to the construction of large model aircraft. Our drones have a wingspan of 9 feet, with a twenty-inch chord of Clark Y airfoil. Arborite of .020 thickness was contacted over foam cores and covered with Top Flite's Econokote. Dihedral is 5° per panel, and center section is glassed in with reinforced tongue mount at the leading edge and spruce trailing edge hold down block extending out 12 inches at each side (See section drawings). The wing, complete with all hold down attachments, weighs in at 7 lbs. It is 3 inches thick at the high points and the strength exceeds the design specifications by at least twice that which other materials would offer at the same weight.

The stab is foam and is also sheeted with Arborite and uses four layers of Econokote to join to the top hinged elevator. Here's where working with Arborite is pure joy. Unlike balsa, you can obtain the sharpest edge you can imagine (you actually have to blunt sand it slightly) and you have the tightest, free operating, and most durable hinge you have ever produced. The vertical fin and stab are of similar construction, with the rudder hinged on the right side for more right rudder available on extremely short take-offs to minimize torque and "P" effects. Here again it was pure joy working with Arborite. One side of the airfoiled stab was sheeted first and trimmed to a sharp outline, then the second side was contact glued on, resulting in a very sharp leading edge which stayed sharp even when I banged my iron all over it applying the Econokote. I mention this because it should be of interest to other modelers for use on boats of all types, gliders, and sailplanes, using very thin airfoils which are normally easily damaged. (How

about that, Formula Oners!)

Arborite's abrasion resistance makes it ideal for any application such as sheeting foam model aircraft floats and boat hulls which were normally sheeted with balsa or aircraft plywoods. One could even sheet the bottoms of existing floats to harden them up. Let's face it... sheeting float bottoms of these mammoth aircraft with balsa is out! The weight of these aircraft alone sitting on a rough surface will mark them.

The other joy of this material is that you can simulate the construction of full sized metal covered aircraft, even to the overlaying of the panels. It does not, however, like to be stressed without some support over large areas. If allowed to buckle, it will shatter and break.

Here is a list of some of the uses to which you can put Arborite:

1. Wing sheeting over foam.
2. Float sheeting over foam or frames.
3. Fuselage sheeting over foam or built-up formers.
4. For use as doublers, gussets, surface patches on any structure you can glue to, reinforcing or hardening areas such as nose blocks, wing tips, finger holds on hand launch gliders, etc.
5. Making wing spars from foam sheeted with Arborite.
6. Foam ribs capped with Arborite.
7. Canopy frame outlines.
8. Formed turtle decks.
9. Sheetting over foam for very lightweight tool boxes and car top carriers.
10. Sheetting over 1 inch foam inside and out for model boxes which would be lightweight and provide excellent protection during travel.
11. Wing and tail fairings.

The list could go on and on and the nicest part is the price. It shouldn't cost anymore than 25¢ per square foot, and when you consider that you can use every scrap of it, that's cheap. I would suggest that you go out and buy a piece to experiment with, or ask for any scraps or broken bits you could have. You both could stand to gain.

You will probably find that you will have to change your building habits drastically. On the next wing I build for large model or drone use, I will use a built-up foam wing with all ribs and spars of 1 inch Roof Mate, which is a high-density 2 lb. per-cubic-foot styrofoam available in sheets of 24 to 26 inches wide and 8 feet long. (Check your local custom cabinet shops. Arborite is a Canadian product, but formica apparently has a similar material. We found

some at a shop in Anaheim. wcn)

People are doing some pretty fantastic things with large airplanes lately . . . see the following write-up, which definitely gives Gerard and his crew a Quadra Squadron membership and crest. We have crests in stock for those people who have built and flown Quadra powered aircraft or run Quadra powered boats. These will be sold at our cost (\$2 each). It is worthy of note that Gerard first sought permission from the correct authorities and carried out his flight with safety first in mind. If you are going to attempt anything out of the ordinary, check out all implications first. Everyone benefits from good publicity. When it's bad, a little goes a long way.

FLIGHT REPORT OF GEORGIA STRAIT CROSSING, by Gerard McHale

Easter Sunday, March 26, 1978:

7:00 a.m.: The sky was overcast as we loaded the Aeronca into the Great Scot, ready for our trip to the takeoff point . . . Vancouver's inner harbor. Had we forgotten that certain something one always seems to forget on such occasions? Maybe some enterprising manufacturer could market something for just that purpose. Check and double check, for there would be a lot of preparation for nothing if all was not right.


We left the Marina and headed west to our moment of truth. The boat was fueled, the plane assembled, the radio checked. Everything O.K., nothing left to do but fire the engine and go.

8:05 a.m.: The engine started with its usual ease, let it warm up a little, check full power, all O.K., here we go. I went up to the command bridge, while Fred put the plane into the water. Full power, up on step, and after about 300 feet, the plane rose off the water, a large left-hand turn to avoid the shoreline trees in Stanley Park, then head out towards the First Narrows Bridge. Many thoughts going through my mind at this point; would we have enough gas, would the batteries hold out, would the engine load up and quit as I slowed it down later in the flight to conserve fuel?

The chase boat made its way out of the harbor, keeping speed down to harbor limits. The Department of Transport had told us to maintain a maximum of 100 feet altitude until we were beyond the bridge, so as not to conflict with full scale aircraft movements. Keeping this low flight was a little unnerving, as with a full load of fuel, maintaining altitude in the turns was not easy. This meant that the engine had to be running at max rpms, and we had to fly a small circular pattern around the boat.


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At last we were under the bridge and through safely. The worst part of the flight was over and at last some altitude could be gained. The speed of the chase boat was about 30 to 35 knots. This made a circular or weaving pattern of flight the order of the day. The flight progressed quite uneventfully for about an hour, then the mist came down and we were in the middle of Georgia Strait, nothing to be seen around us except a grey wall of mist and rain. The rain was very heavy for the next half hour . . . a look at the wooden propeller afterwards was quite a revelation as to the damage water can do.

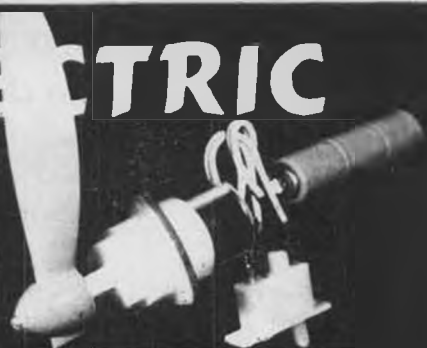
Then it finally happened . . . land!

The wind had been blowing quite strong for the last 15 minutes and it was a relief to come into the lee of the island. Being a landlubber, the motion of the boat in the heavy wind was not exactly agreeable with my tum.

9:50 a.m.: Entering Nanaimo Harbor, we had done it! All that was left was to shoot a couple of low passes in front of the boat to get some photos, and then the landing. As the Aeronca settled down, we all cheered and sighed a sigh of relief that the plane was down safely. The throttle response was just as good now after 1-3/4 hours as it was during any 5 min. flight. Some time

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not travel in a straight, cylindrical streamline; it compresses and expands, forming nodes. The rule applies particularly to subsonic and supersonic aerodynamic bodies, and in a lesser degree, to lower speed aircraft. Unwittingly, Luscombe had chosen the proper area rule for the Monocoupe. It is significant that another high performance aircraft, the Staggerwing Beech, had the same aft fuselage shape.

Monocoupes were finished in every color, all aluminum being the most common. For markings, and a complete history of the Monocoupes, no finer book exists than John Underwood's "Of Monocoupes and Men", from which most of this material was drawn. •

Winders Continued from page 78

back with the 1300 RPM drill (the Rockwell model 4007) is that the counter might not be able to keep up with shaft revolutions. Instructions with one counter we inspected cautioned that the counter had a 1000 stroke-per-minute maximum capacity.

It should be pointed out that after packing in about 1000 turns on 12 strands of 3/16 rubber, when you release the trigger, the rubber torque tries to turn the drill in reverse, and makes it necessary to grab the cam to arrest the unwind. It's not the most convenient arrangement. I think this condition might be even more pronounced with the higher RPM drill. This is where the 300 RPM drill might have the advantage, being lower geared. It would probably resist unwinding.

All cordless electric drills come with chargers. An overnight charge on the Black and Decker proved more than adequate for typical contest demands. The drill has been used at the last three Flightmaster (Los Angeles) Scale and Jumbo Scale annual meets, and never failed to operate reliably. You can expect at least 6000 turns on one charge, maybe more. I've never run down the charge in the drill at the field.

There are advantages and disadvantages to cordless drill conversions. There's one thing you can do with the electric that just isn't possible with the other type . . . wind with one hand. This does come in handy at times; to test rubber tension, brush a fly from your nose, or make winding tube adjustments. On the drawback side, you might run out of electricity, and this can be a crisis at a contest. Nevertheless, cordless electric drill conversions are worth your consideration.

CURRENTLY AVAILABLE RECHARGEABLE
ELECTRIC DRILLS

for more photos and discussion with the Nanaimo Club members on hand to greet us, an interview with the local press, and it was all over. Our warmest thanks to the Nanaimo Club members for making us so welcome.

TECHNICAL DATA:

Airplane: Bud Nosen Aeronca, Super Coverite, Epoxy paint, built by Fred Stephens.

Floats: Designed and built by Gerard McHale.

Engine: Stock Quadra.

Radio: Pro Line, 1000ma flite pack, 500ma left after flight.

Chase boat: 32 foot Fairliner the 'Great Scot', 500 hp twin screws, owned by Gordie Stephens.

Total air time: 1-3/4 hours.

Point to point distance: 40 miles.

Estimated distance covered by plane: 100 miles.

Fuel: 120 ozs. regular gas oil mix, 22 ozs. left at end of flight.

The complete project was a team effort by: Fred Stephens, Gerard McHale, and Gordie Stephens.

Anyone wishing further information please feel free to contact: Gerard McHale, 11526 Burnett St., Maple Ridge, British Columbia, Canada, (604) 463-4435. •



Monocoupe . . . Continued from page 47

Performance of the Monocoupe was just short of sensational. Figures for the 90A with the 90 hp Lambert R-266, as published by the Aeronautical Chamber of Commerce, gave it a top of 130 mph and a cruising speed of 110 at 70% throttle. It consumed only five gallons of gas per hour, which checks out at 22 miles per gallon. Small wonder that so many pilots bought the airplane, not only for fast, economical travel across country, but for racing as well. So many racing pilots flew the airplane that Cy Caldwell, aviation writer and commentator, remarked that the National Air Races should be called the National Monocoupe Races. The clipped wing Monocoupe 110 Special, with a span of 23 feet, diminutive tail surfaces, and powered by a Warner Scarab 145, could do 185 mph.

When asked why the Monocoupe turned in such good performance, Don Luscombe shook his head; he thought it might be because of the rapid reduction of fuselage cross section area behind the wing. He was right. We know now about an aerodynamic phenomenon called the "area rule". Fast moving air does

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Skil also manufactures a 1/4-inch drill which may be less expensive than the 3/8 model. The 3/8 drill is reversible.

JOE CARTER

• The necessity of having a helper to assist in winding Peanut scale, or other small rubber powered models, prompted this pocket flashlight winder. Initially it was just a simple winder, but it soon developed to also include a turn counter.

The basic device consists of an Eveready "Captain" flashlight (\$3.50), although any all-metal flashlight would do, and a 3-volt electric motor with gear train. The motor gear train came from a cheap toy car having a gear ratio of 16 to 1, with an output shaft to which may be attached a hook. I would think any gear ratio 15 to 1 and up to 25 to 1 would serve equally well. Trim away the excess metal frame and solder to the flashlight ring discarding the glass and bulb. Solder 20

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gauge insulated wires of appropriate length to motor terminals. Solder one wire to the reflector and the other to the center contact for the bulb. Test and swap connections if motor rotation is wrong. Use a 1/16 diameter, 3 inch long piece of brass rod bent to a hook on the business end, the other end securely soldered to the output shaft of the gear train. Operation is just like the flashlight, push slide forward or depress the button. Hold model in left hand and winder in right hand to stretch rubber motor while winding.

The turn counter is a useful addition to the basic winder, and consists of the following: a magnetic reed switch (Radio Shack part #275-035), small magnet 1/4 or 3/8 inch long, a cheap electronic computer, and some wire. The magnet is mounted to the hook shaft with the north-south axis perpendicular to the hook shaft. The reed switch is epoxied just below the magnet on the gear box top. Test with an ohmmeter to assure that the magnet actuates the reed switch. Each revolution of the magnet causes the switch to turn "on" once. Two wires connect the reed switch to a NOVUS 650 MATHBOX (\$5.95) computer and make contact with the terminals behind the "ENT+" key. For the

Mathbox, one of the photos shows the correct terminals . . . Nos. 2 and 6 from the right edge, with the wires soldered to the circuit board (On other calculators, the key matrix must be taken apart to find the correct terminals). A 3-foot twisted wire pair connects the Mathbox and the winder with mini phone plugs and jacks. To count turns, press clear "CE/C" key, then "1" key, the reed switch will "enter" and "add" ones (1) each revolution of the hook shaft.

The Mathbox major components, circuit board, L.E.D. readout and the 9V battery, could be mounted permanently on the winder without the keyboard and case, making a compact unit, but this destroys its usefulness as a separate calculator.

Have fun!

1 to 1 Continued from page 25

aircraft for a year, while the judges get only a very short time to absorb the material. Your job is to make your presentation concise and logical. A random scattering of loose sheets of paper clipped together is not impressive. Contrary to some people's thinking, neither is a bundle of construction manuals, flight guides, and the like, that look like the winning troop offering in a Boy Scout paper drive.

One aspect not yet touched on is very critical. Fellows will go to great lengths to do a super-detailed job. As the process wears on, there is a tendency to anticipate the completion when it comes to finish, markings, and little "jobby-dos" such as antenna masts, pitot tubes and the like. It is amazing how often little attention is given to these. While a Sport Scale model should not be overly concerned with the small exterior detail, if the modeler elects to put them on, it is virtually impossible for them to be ignored. Hastily placed tape for panel lines stand out like a sore thumb, as do antenna masts heavy enough to support the tower for a 100,000 watt station.

One valuable asset I have found along this line is to, at various stages of the construction, take the model outside and mark off that 20 ft. circle. Put the model in the center and walk around it and spend a lengthy period looking at all the aspects. Rotate the model so it catches the light differently and check again and again. You'll be amazed at how many little details will suddenly spring up and strike you as you compare the model to your documentation. It is at this point, as well, that you can determine exactly what pictures you wish to use.

I recall several years ago having an

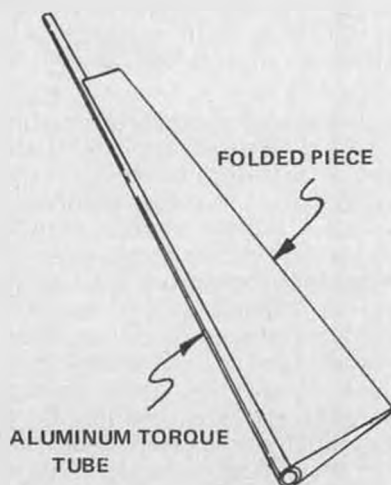
opportunity to judge a Sport Scale contest, and as we circled about the model, we noted that the digit "one" on the fin was of different styles on opposite sides. One side showed a straight bar while the other had the appropriate additions to the top and base. How many times had that model, which was several years old, been judged without the discovery being made?

To close off this section of the article, may I share with you a picture which shows you how to keep from giving away what new project you are working on for next year. As you check out the details of that special project, the headgear shown will prevent fellow modelers from knowing who you are. The one small flaw in the system is that measurements tend to be somewhat inaccurate using this method. In any case, do keep the paper bag, since it is most helpful for bringing home your plane after its maiden flight.

ALUMINUM PARTS

Often, the necessity occurs to duplicate aluminum parts on models utilizing sheets, rather than the more standard items available, such as tubing and strut materials. As suggested in an earlier column, I have found printing sheets most helpful, since they come in various sizes, thickness, and are etched by the printing process, making them more receptive to gluing and painting.

Let me suggest several applications that might fit a project in which you're presently involved. In small pieces, they make very nice hatch covers, louvers, etc. If you are careful, you can inset a metal cooling louver in a balsa or fiberglass cowl so that it is virtually impossible to tell whether the entire cowl is aluminum or not. In this way, those of us who are not versed in working compound curves in aluminum can still retain the best appearance.



On my most recent model being built for the World Champs, I was



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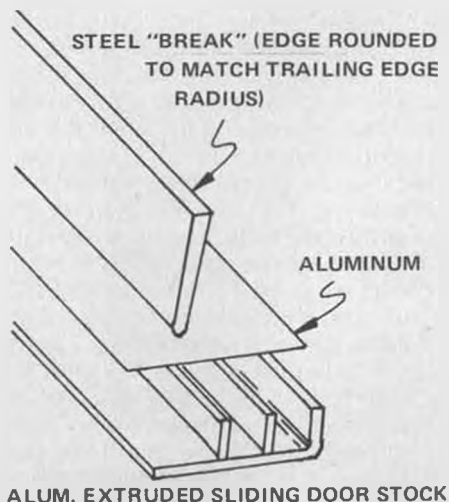
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| 9" | 4-5-6-7 | 7" | 4-5-6-7 |

faced with the fact that the four ailerons on the Hiperbiplane are formed from aluminum sheet, folded at the trailing edge and riveted to a torque tube. A very simple operation in full scale, but one which caused me some trouble on the model. Lacking proper metal working materials, I found it impossible on the first attempts to keep the proper radius in folding the aluminum. A further attempt at faking the ailerons with balsa and metal inserts led me to another try at full metal.



The following procedure proved to work beautifully. I located a piece of the extruded aluminum track used for sliding masonite cabinet doors. The opening slot is just under a 1/4 inch wide, and about 3/8 inches deep. I then located a piece of steel something under 1/8 inch thick. The edge of this steel was filed round to match the radius needed for the aileron trailing edge.

A piece of aluminum was located over the slot in the door track material, utilizing a centerline to provide the location. By placing the steel "brake" over the centerline and applying sharp blows with a hammer, the aluminum was driven into the slot. Care must be taken to keep the steel "brake" absolutely straight in order to prevent bowing of the bent edge. This can be accomplished by placing a section of the track over the top of the steel brake and shimming it to keep it in line.

The aluminum was then removed from the slot, carefully, to check for proper width and formation of the rounded trailing edge. By replacing it in the slot, the aluminum torque tube can then be glued or riveted in place, using the slotted material as a jig to hold the alignment.

In the case of the Hiperbiplane aileron, the weight was only a little heavier than the balsa ailerons, with

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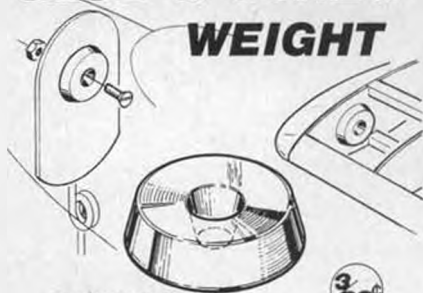
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the total amount less than 1 oz. for the four. The important fact is that they look and feel like they should.

A last thought about aluminum. If you are afraid to try aluminum, you'll find that 1/64 plywood does an excellent job of taking its place. The edge appearance is much like aluminum, and with very little finish it appears metal-like. It, of course, glues easier and is easier to use with finishes such as dope, which is not too fond of sticking to some surfaces.

One thought would be that if you use extensive quantities of metal, caution should be exercised to determine if you have any radio problems. Careful range checking with engine running, as well as not running, is important... if for no other reason than your peace of mind.

NASA NOTES

The National Association of Scale Aeromodelers is in full swing, with the contest season also well underway.

While this is essentially an R/C oriented column, I still want to relate that it is immensely pleasing to the Association that Free Flight scale will be held as an unofficial event at the World Championship Scale competition in Woodvale,

England, in August. Bob Wischer, representing the U.S. at the CIAM meeting in Paris late last year, explored the concept of expanding scale competition to include Free Flight. There appeared to be little interest, and in fact, the provisional rules formally in FAI were dropped.

Through the interest and mail campaign generated by Fernando Ramos and Bill Hannan, both of whom are long time writers in **Model Builder**, it became clear that it was not a dead issue. Let's look forward to the time when we can sell FAI team patches that include the full compliment of initials; F/F-C/L-R/C, and they are all official events.

The Association is presently in the process of working up a list of scale documentation sources. Jamie Gielens, a member from Canada, is compiling the list. We would encourage all readers to send to Jamie any addresses and sources that could be used to develop the list. This could include museums, companies, private sources, etc. Send these to Jamie Gielens, 7883 109A St., Delta, B.C., Canada V4C 4G7. At the risk of encouraging you to read another publication, may I suggest you check with Flying Models one or two months ago to review a tentative judges guide developed by

John Preston, of Falls Church, Virginia. The effort is most inclusive and gives a starting point to develop a complete set of criteria which can be used in much the same manner as the guide used in pattern (If you don't have one, you can borrow our copy. wcn).

Remember, we encourage your membership in the National Association of Scale Aeromodelers. Your five dollar dues will be accepted by Noel Allison, 4174 W. 120th St., Hawthorne, CA 90250.

SHORT SHOTS

Have you ever wanted to duplicate the nice little information panels found in aircraft? "Rare Birds" is providing such panels to match whatever you might need. Providing a photo of the plate is most useful, however, the information on the plate is all that is really needed. Of course, the scale of your model is necessary in order to achieve the proper size. The plates are on thin aluminum with an adhesive backing. The cost depends on what you are able to provide in the way of photos or information. Contact Rare Birds, 791 Nisqually Dr., Sunnyvale, CA 94087.

I apologize for the lack of additional contest dates in this issue, however, your writer has discovered that attempting an article from a hospital bed leaves much to be desired in the way of accumulating information (And you should have seen the handwritten text! wcn). Hopefully, peak form (?) will be regained for next month's shot.

A parting thought: Think ahead, since, for every takeoff there is at least one landing! One to One, Bob.

Hannan Continued from page 51

them at the same time? An awareness of what other model flyers are trying to achieve, and how they do it, can only help the various branches of the sport to be less blinkered in their outlook". To which we can only add, amen!

INDOOR R/C

Speaking of closer cooperation among diverse branches of the hobby, nothing could seem less related than indoor flying and radio control, at least at first glance. However, these opposite poles of the modeling spectrum are drawing nearer. Although indoor R/C models have been demonstrated in the past, most examples were mere technical novelties. Now, though, several factors are contributing to reexamination of the concept. First, the shortage of suitable outdoor flying sites, especially in or near big cities. Second, easy obtainability of CO₂ and electric power plants,

ideally suited for indoor use, and third, increasing accent upon size reduction in electronic control systems.

In reviewing each of these influences, we find disquieting previews of coming attractions, on the outdoor site problem. Even those areas fortunate enough to have suitable outdoor facilities, may likely find their usage more restricted. In addition to environmental influences and political restrictions, Mother Nature herself seems bent upon making life tougher for the aeromodelist. Recent months have seen mountain climbers scaling solidly frozen waterfalls in Scotland, roofs being crushed by the sheer weight of snow in Italy, and Southern California lashed by high winds and floods. And, obviously, you East Coasters need no reminders of your winter conditions! Thus indoor flying may represent the ONLY viable alternative in some locations.

However, model builders are an adaptable lot, and will find ways to circumvent the remaining obstacles. Although indoor cannot boast the fresh-air-bright-sunshine-healthy exercise attractions of outdoor flying, it can counter with such advantages as controlled climate, suitability for nighttime use, etc. Also, those who have already tried indoor R/C proclaim it as great fun, and a fine test of one's reflexes!

When considering suitable power forms, the traditional indoor "fuel", rubber strands, should certainly not be counted out. Rubber still offers the advantages of low cost, simplicity, ease of installation, and total silence of operation. Further free flight indoor records clearly document the duration possibilities.

Airborne electronic packages continue to shrink in size and weight, even without the inducement of potential adaptation to indoor flying needs. Since less range and power would be required for systems intended specifically for indoor use, additional weight and size reductions should be possible. We foresee airborne system weights in the 1/2-ounce ballpark as the ideal target. Probably 3 functions would take care of all but the more sophisticated scale model applications.

Dan Lutz, of Kraft Systems, suggests that a pusher design, fitted with a soft rubber ball in the nose, might be the best way to go, especially during the learning period. Tennis anyone?

AMLA REMEMBERED

The Airplane Model League of America held its first National Model Contest in Detroit, Michigan, during



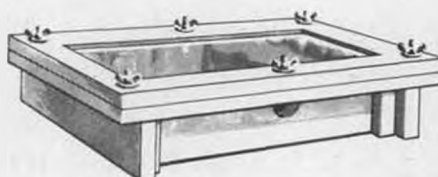
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1928. Sponsored by the National Aeronautic Association, the event was conducted by the American Boy Magazine. Headed by William B. Stout, Richard E. Byrd, and Merrill C. Hamburg, the competition offered truly lavish prizes. Included were two trips to Europe, trips to the National Air Races, trips to summer camps, the Stout Indoor Trophy, the Mulvihill Outdoor Trophy, \$3,000 in prizes, plus scores of medals and certificates.

Also featured in addition to the flying model classes, was a category for static scale models of 24-inch span. Plans were furnished by the AMLA, and proxy entries were per-

mitted. Among the entrants was Cedric E. Galloway, who shipped his model from Minnesota for the competition. Although he did not win a prize, he did receive a handsome watch-fob memento, which he still treasures, some 50 years later. Ced has made some cast reproductions of his watch-fob, which would make novel prizes for 1978 contests, or simply charming additions to anyone's memorabilia collection. A stamped, addressed envelope will bring you ordering information. C.G. Enterprises, P.O. Box 651, Hesperia, CA 92345.

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that Lindbergh's "Spirit of St. Louis" continues to be a top attraction at the Washington, D.C. Air and Space Museum, with the Wright Brothers' "Flyer" a close runner-up in popularity. It was reported that tourists from France have a special fondness for the transatlantic machine.

Meanwhile, in San Diego, funds are being raised for a new "Spirit" reproduction, to replace the one lost in the tragic fire which destroyed the Aerospace Museum. Anyone wishing to contribute to this worthy cause may send contributions directly to: Aerospace Museum Emergency Fund, Room 203, Casa del Prado, Balboa Park, CA 92112.

AVIATION ARCHAEOLOGY

This is a fascinating new book, written by Bruce Robertson, of England. Many model builders will be familiar with Mr. Robertson's work in Harleyford publications, such as "Aircraft Camouflage and Markings, 1907-1954". This new volume examines the growing interest in collecting of aircraft artifacts, ranging from complete machines, parts of same, books, photographs, etc. Although written with the British enthusiast in mind, much of the information will prove equally useful to collectors in other countries.

The term "archaeology" is more appropriate than one might think, since many aircraft enthusiasts are literally digging such remains out of the ground, and raising them from lakes and oceans. In fact, the dust jacket of the book has a dramatic color photograph of a complete Halifax bomber, being resurrected from a Norwegian lake. Such an endeavor is, of course, far beyond the scope of the average enthusiast. However, even the casual collector

will find much of interest in this book. For example, such memorabilia as airmail stamps, airline tickets, aircraft postcards . . . even chewing gum cards featuring aircraft are discussed.

Suggestions for the acquisition of material . . . even guidelines for taking of photographs, are included, as well as time-tested hints for cataloging such a collection. Of course, to American eyes, virtually all of the United Kingdom seems one vast museum, with intriguing possibilities at every corner. In fact, Robertson points out that by comparison, the American continent has much less to offer. He makes this comment: "While the majority of Americans indulging in aeronautica are as enthusiastic as their British counterparts, aeronautica has become far more commercialized than in Britain".

Model building and collecting is given recognition as an important aspect of the movement, and in fact, Robertson goes so far as to say "The most popular of hobbies among air enthusiasts . . . modeling."

This and other aviation publications may be ordered from Haessner Publishing, Inc., Drawer B, Newfoundland, NJ 07435. When writing for their list, please tell them you heard about it in **Model Builder**.
PLASTIC PEANUTS

The cute little "Smiling Supervisors", shown in one of our photos, are really intended to be erasers (with possible political overtones). Approximately the size of edible peanuts, the novelties are marketed by the Atlas Pen & Pencil Corp., Atlas Building, Dept. MB, Hallandale, FL 33009. Called "Nifty Nuts", Order Number 200, the peanuts cost \$3.95 plus 95¢ postage for 36 in

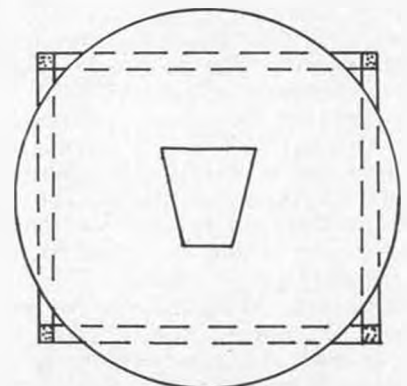
widely assorted colors. We think they might be logical additions to contest trophies. Thanks to Ben Sasnett for bringing them to our attention.

MAMMOTH CLASSIC SCALE

Overheard at Mile Square, during a demonstration of an enormous quarter-scale R/C model: "Sure it's big, but is it art?"

F/F Scale . . . Continued from page 87

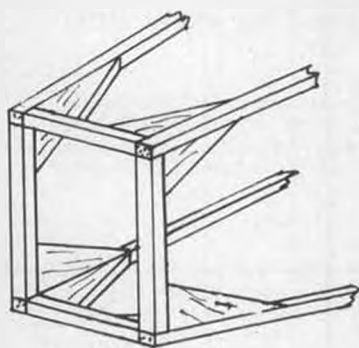
blade. It is a good idea to cut the front of the ribs in a group rather than individually. This assures that the leading edge will fit in a perfectly straight line.



EACH CORNER WILL BE SANDED OFF IN ORDER TO CONFORM TO FRONT DISC.

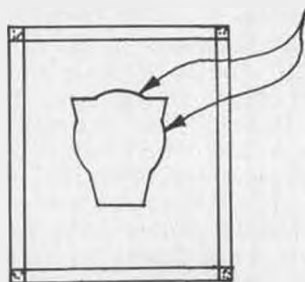
The rest of the construction went without incident, but here are a few changes I'm incorporating on my own model that you may want to try. The exhaust stacks are shown to be made out of one piece of wood. When carved and painted, they are attached directly onto the tissue. On the real aircraft, the exhausts are in a channel-looking fixture. I made a channel shape out of some very light

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OF THE LONGERONS.



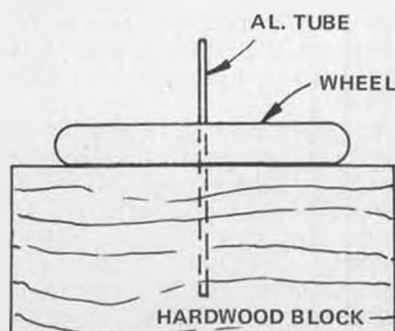
card stock, and painted it black. I cut out individual pieces for the exhaust and carved them to shape. These were then painted and glued onto the channel. I feel that this adds a touch more of realism with no weight penalty.

CUT OUT TO PERMIT TUBE TO SLIDE IN



FUSE. FRONT STATION

The wheels and tires were also changed in favor of more realism. I decided to use Doug McHard's method as outlined in MB's "Flying Scale Models of WW II". One further addition I made was to give the tires a tread, so characteristic of many of the German aircraft. This was done by using a sharp, small triangular file. Make the grooves by looking straight down on the tire. If you do it from the side, you'll invariably get the grooves going at an angle. Then they begin to look as though they do not belong. The wheels were painted with Floquil's engine black and the tires with grimey black. They look pretty good painted this way.





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JIM CROCKET REPLICAS
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Before leaving the wheels, here's one hint that you might be able to use for installing the 1/16 aluminum tubing axle bushing. See illustration. The idea here is to get the tubing in as straight as possible. By drilling a hole in the balsa and pushing the tube into the hole, I find that, due to the softness of the wood, the tubing is permitted to move around so you really don't know when it is true. I drill a 1/16 hole at least one-inch deep in a piece of pine or other hardwood. The aluminum tube is then inserted into this drilled hole. The wheel then is pushed onto the tube and slid right up against the hardwood. Hot Stuff the tube to the wheel while fixed in this jig. When completely dry, the excess tubing was trimmed off.

The landing gear wire was covered with a straw rather than a piece of balsa. I used an Epoxilite plug at either end of the straw to hold it in place. See the sketch for one minor change I made to the shape of the opening in the front end of the fuselage. This was done to permit me to use a winding tube. This of course, has no effect on the nose plug itself, but after putting this much time into a model, I no longer want to wind without the use of the tube. I'll cover the finish and flying of the model next time around. Seems as though I have pneumonia and haven't been able to stir up enough energy to get finished in time.

On July 15 and 16, the first National F.A.C. Free Flight Scale Contest to be held at Johnsville Naval Air Station, just outside of the Philadelphia area. This ought to be some kind of contest. I'll have more on it next month. Plan to attend ... I am!

Pylon Continued from page 27

which would be allowed to compete. Whichever you choose to use in competition, it's imperative you clean the engine prior to turning it over or running it. Invariably,



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minute metal particles will be left in the engine due to manufacturing processes, and the manufacturers don't always get them all out. Not cleaning the engine, and running it even with a small amount of foreign material in it, could ruin the bearings or score the cylinder sleeve, leaving you a long way from being competitive, not to mention the fact that you will have needless expense to repair the engine.

Even a simple wash job, consisting of removing the backplate and cylinder head and sloshing the engine in a CLEAN container containing CLEAN lacquer thinner, is better than nothing. If your club or flying buddies have an ultrasonic cleaner, by all means use it. They do a great job. If you can't afford to own your own cleaner and nobody you know of has one, try a trip to your local dental lab, as they usually have them. One dentist in my town is more than cooperative in letting me use his. Usually, all it costs me is the price of a cup of coffee and a few minutes conversation about R/Cing. Even if they charged you a couple of bucks, it would still be cheaper than replacing ruined parts.

Breaking in an engine is the real secret to having a strong engine. Before starting the breaking-in process, there are several things that you can check to insure you've got a

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good engine. First, there should be end-play in the crankshaft bearings. That is, the crankshaft should be free to move back and forth slightly in the case. The end-play is there to allow for different expansion rates between the different types of metals used in the crankcase casting and the crankshaft. If you don't have some end-play, the crankshaft will bind against the bearings when the engine heats up, causing drag and holding performance down. Not to mention that, as the bearings/crankshaft wear in, small metal particles will be running themselves between your piston/sleeve. If you have an engine without end-play, your best bet is to return it to the manufacturer to be fixed, or if you don't mind spending a few bucks, an engine rework expert will be able to set it up correctly for you. I strongly recommend you do not try to sand the bearing housings to get end-play. If you don't know what you're doing, and don't have the proper "touch", you could do more damage than you're already faced with.

The next thing to check for is crankshaft drag. With the connecting rod disconnected from the crankpin the crankshaft should turn until the counterweight is at the bottom dead center (or the crankpin is at top dead center). If it doesn't repeatedly do this, then the chances are the bearings are dirty and gummed up, or the bearings are bad. Before you discard the bearings as bad, try washing them very thoroughly in clean thinner. Then try holding them between your thumb and forefinger and spin them. They should spin freely and with a smooth sound. If they don't, discard them and replace them with a set that do run properly.

The fit between the piston and sleeve is probably the most important relationship among the various engine parts, and is probably the hardest to get. The fit should be loose enough to eliminate unnecessary drag, yet still allow a good

compression seal. The piston should move freely in the sleeve until the top of the piston approaches the top of the sleeve where it should tighten up. If your piston/sleeve fit is too tight, the engine will overheat and not turn up to its full potential. There are only two ways to get the proper fit; one is by honing the sleeve, and is not recommended unless you know your engine work. It's too easy to remove too much material, thereby losing the compression fit you need. Honing by a knowledgeable person is the fastest way, however. The second way is to just run the engine... following the manufacturer's directions.

The last area to check is deck clearance. This is the amount of space between the piston at the top of its travel and the combustion chamber surface of the head. It is necessary to use micrometers to check this, so locate one of the guys in your club who has them and knows how to use them. If you don't have a machinist in the club, try a local small machine shop and they'll probably be glad to do it for a small charge or nothing at all. Be prepared to talk R/C though.

We've seen engines being run at the same race with clearances running from a low of .006 to a high of .014. If yours falls within that range, it should be alright. Just remember that the determining factor in what deck clearance to run is the air conditions in which you'll be flying. In dry air you can run lower clearances than in heavy, moist air. And air conditions can change from day-to-day and even heat-to-heat. The only way to determine what's best for your engine/prop/plane combo is to pay attention to air conditions and how your craft performs. Head clearances on the Cox can be changed by using gasket shims on the head, and on the Rossi by using Rossi glow plugs with different depths.

Now you're finally ready to begin

the actual breaking-in process. Follow the manufacturers recommendations; he designed the engine, and knows best how to make it perform. One thing we cannot emphasize too greatly is to keep things clean. Whether using a test stand or an airplane to do the initial running... KEEP THINGS CLEAN! Keep the engine up out of the dirt or grass. The turbulence and swirling dirt near the ground could be sucked right into the engine, ruining all the hard work you put into making things right. The other great enemy of an engine is heat. Damaging heat is generated by lean engine runs or improper cooling. Lean runs can only be prevented by your fingers on the needle valve. When making the first runs, the friction generated by the parts mating against each other is great, so it's important to keep the first runs short and allow adequate time for parts to cool off before running again. Don't be impatient to break it in. Break-in time will vary from engine-to-engine, but if you could plot on a graph the actual power curve versus time run under proper operating conditions of several engines, you'd find that the engine would get progressively stronger, then reach its peak for a period of time and then begin a decline. The amount of peak power running time you'll have is again related to keeping the engine clean and avoiding lean runs.

Engines with chromed sleeves seem to take longer to run in, but once there, they seem to hold the fit longer than plain steel sleeve versions.

The other area to help your engine reach its maximum performance is taken care of in the construction of the airplane. It's extremely important to have a straight, rigid, and vibration-free engine mount. The best bet seems to be a machined aluminum mount tied down to the fuselage at the front of the mounting beams as well

as to the firewall. A U-shaped plywood mount epoxied to the fuselage and bolted to the mounting beams seems to be the popular way to go.

The rest of the secret to a strong engine is in learning to set the needle so the engine will be operating at its peak RPMs in the air. This is closely tied in with the prop/plane combination you're using, and since we've covered that recently, we'll not go into it here.

As to the last factor in a winning combination, the AIRPLANE, most any of the kits or magazine plans available will build into a competitive airplane. Just make sure to build it as light as safety allows, as extra weight will sap power from the engine just to make it fly, and that power could be used to go faster. A straightly built airplane will not require any control surface deflections in order to trim the airplane to fly straight. Care in alignment in the building process will prevent you from having control surface trim deflections creating drag, and drag slows you down!

Well, racing season has arrived, even here in the Midwest; so get out and enjoy it. I'll be waiting for your reports, so here's where to send 'em: Jim Gager, 3727 Shepherd Lane, Ft. Wayne, IN 46815. •

Sickle Continued from page 92

for the stabilizer are formed, using a table saw and drill press.

Don't let the lightening holes scare you off. When they are covered with silk and doped, the boom is quite strong in both tension and torsion. Wingtips, complete with lightening holes, and the elevator, can also be formed this same way, in blocks of balsa.

Now that we have all of the blocks cut into the correct shape with the assorted holes and cut outs, we are ready to slice off the parts for 5 to 10 planes all at one time. Simply set a guide on the saw at the correct width and cut away. When you have all of these parts cut, you are ready for the foam wings.

If you don't have any experience in cutting foam wings, RCM has a good book on this subject. Cut the foam part of the wings using the dimensions and airfoil templates given on the plans. The next step is to cut the foam 90° to the chord at the high point. This is where the spar will be sandwiched during assembly. To make this cut, make a simple jig as shown in the photos and cut from the bottom up in one smooth motion.

Now we can start making all of these separate parts look like an airplane. Using a straight edge and



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either a try square or lines drawn on a building board, assemble the motor mount, one piece spar, and mono-boom, using epoxy. When this joint is completely cured, epoxy the bellcrank mount into the slot in the boom, and the stabilizer into the rear of the boom. The stabilizer must be straight and true, or your plane will fly just as crooked as your stab.

You will note that the bellcrank is located completely behind the spar. This is so you can drill or melt two straight holes in the rear portion of the foam for the leadouts. This way, no coring out of the wing is required. Don't worry about this

rearward placement of the bellcrank. It is, contrary to popular belief, not where this bellcrank pivot-point is placed that controls line tension. It is, rather, the position of the leadouts in the wingtip and their relationship to the center of gravity that is the controlling factor. See the July/Aug. 1966 issue of the old *American Modeler* if you have any doubts.

Since the wing was not cored out in the usual manner, I felt this would make the plane too heavy. This prompted me to use what has been called "Dutch lightening holes". As the name might lead you to believe, this method of lightening a foam

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wing was originated by a Dutch FAI flyer. I make them by slightly flattening a tin can, heating it and then using it like a cookie cutter. This removes a plug of material for lighter weight, but since a skin of dense material forms around the inside of the hole that is left, very little, if any, strength is lost.

The foam is covered with paper. Silkspan, tissue or even wrapping paper can be used. The paper is held on with a coat of thinned white glue. This is applied to the raw foam and the paper then smoothed on. A second coat of this thinned glue mixture is brushed on over the

outside of the paper to seal it and to allow a light coat of dope to be applied without melting the foam. As an alternative to the second coat of glue mix and dope, a light coat of polyurethane varnish can be applied. This polyurethane will fuel-proof the plane with no possibility of melting the foam, but it is also very heavy, so keep this coat thin.

If you subscribe to **Model Builder**, a very serviceable decal can be made by cutting out the return address from the envelope and, using white glue, sticking it in place.

I decided to present the FAI version of this plane, the "Sickle", rather than the AMA version, the "Scythe", because I would like to stimulate interest in this now world championship class event. Some of the most inventive (I guess!) design work is now being done in the FAI class of combat. This is primarily happening in Europe, because of the introduction of glow engines by various Americans. This added power and speed has made much of their old equipment out of date, and a lot of searching for new designs has taken place in the last few years. Many of their ideas are excellent, and I have used some of them in formulating this design.

The Europeans made me readjust my thinking on making the change to foam wings. They also made me try an FAI plane with over 300 sq. inches of wing area. This is a size that would have been standard for an AMA plane of only a few years ago. I got the original idea for a full depth spar and no leading edge structural member from an article by Richard Wilkins in *Model Aviation*. I have also subscribed to his philosophy of not making combat planes a showcase of building skill. The plane may very well have a life of only 5 minutes or less, so why take all the extra time to make it pretty. Simply build them straight and don't worry if the edges are sanded perfectly, as long as they are functional.

The tip shape is one that I have used for 10 years. This shape was suggested by an article on the original "Hooptee" rat racer years and years ago. This article, in M.A.N., had three pictures of wingtip samples taken in a wind tunnel. The tip with the shape shown had noticeably smaller vortices, indicating lower drag.

The use of a foam wing allows easy tapering in thickness and chord, and also the use of progressive airfoils.

This would only be possible in a balsa plane by having 5 or 6 different ribs.

I hope that these new design techniques I have developed will lead to new thinking by everyone on how we have been building planes

for years. If you would like a nice flying FAI combat plane, build a "Sickle", put one of the new Fox .15's in the nose, and go flying. You will also note that the lack of a leading edge structural member allows the easy adapting of both rear rotor and rear exhaust engines to this design.

Best of luck in your next match, unless you happen to be flying against me and remember M.A.C.A. is where it's at!

Seaplane Continued from page 41

If sometimes during slow taxiing, the model will not turn the way you want it, try turning in the opposite direction. A little breeze can sometimes make it difficult to turn the way you want. Anticipation is the key to good water taxiing.

Also, during all your taxiing maneuvers, keep the stick back, as this aids in turning and it also keeps the nose up. Again, this is the practice used in all full-scale water flying.

In starting your takeoff run, line your plane directly into the wind, a little back pressure on the stick, and open the throttle. At this point, you have to get on the rudder control and keep the plane straight. If you lose direction, close the throttle and abort, taxi back and try again. Be positive and firm with your rudder control. Make the model go where you want it to go.

The first few feet of the takeoff run are the most critical, and it just takes practice. For your first few attempts, just practice the run, don't take off. After a half a dozen runs to the point where you can maintain your heading and get the model on the step, the actual liftoff is easy. Just ease the stick back and you are in the air. Never try to liftoff, especially with a three-channel ship, while you are in the process of trying to correct your heading. This usually leads to a snap roll on takeoff, and you are in the drink. As long as you can maintain your heading at high speed, the liftoff is easy.

Once in the air, you will find she behaves no different than on wheels. Some maneuvers may be a little slower, but not much.

I might mention at this point, that if you are flying a three-channel ship, she might seem a little sensitive to the rudder control while in the air. This is caused by the addition of the floats to the model's lateral area, and indicates that you should have a small sub-rudder attached at the bottom rear of the fuselage.

I bring this up at this point because all three-channel models do not need this. There are many variables, i.e., dihedral, fin area, C.G., that affect this. If you are in doubt,

put one on before you fly. It won't hurt, and you can always take it off.

If you are in the air and discover this instability, just ease back the power, fly the model slowly to the final approach, and land. I have never seen a three-channel model that has flown well on wheels that became uncontrollable while on floats . . . with proportional radios.

The size of the sub-rudder should be about 1/3 the area of the model's total fin and rudder area. It should be attached at the bottom of the fuselage at the tail. If it is impossible to attach it there, two small ones on the tips of the stab will do the same thing. The addition of the sub-rudder will snub up rudder response and make the model quite docile.

When it comes to landing a model seaplane, there is one thing you're going to learn, if nothing else, and that is how to flair at the touchdown.

With a land plane, you can hit kind of hard on the wheels and usually bounce, maybe at the expense of a broken prop. On water, you will not break a prop, but you can flip and end up on your back. Usually no damage, but you have to retrieve it.

The landings are really quite simple . . . you can either stall the model in and hit in a tail-low altitude, or you can fly in with a high idle and touchdown on the step in a level attitude. Once on the water, the model will decelerate rather quickly.

Four-channel models take off about the same as three-channels, except that the rudder control can be used a little more freely at the high speed end. This is because you have aileron control to correct any banking tendency as you leave the water.

As for flying in high wind conditions, you will have to set your own limitations. Although there is no difference, once in the air, between a land plane and a seaplane, there is a difference while on the water. Upwind taxiing in high winds is no problem, but in crosswind and downwind, you should move a little faster to maintain directional control.

Takeoffs in high winds are a snap, as most models will travel only a few feet and become airborne. However, the real beauty is to watch your model take off mirror-smooth water. The takeoff run is much longer, and the separation from water to air is very smooth. Landings are the same way, as you can make a long power-on approach and just kiss the water as she settles in. Flying boats on single hull seaplanes land and take-off basically the same, with one exception . . . you do not experience any directional control prob-

lem, as you do with a twin-float plane, on takeoff. Just hold the stick back a little during the start of the takeoff run, letting her get up on the step, and then, just ease it off. They are quite responsive to the water rudder while taxiing, and present few problems. Bow wave can sometimes occur if you are flying in waves too high. Water then hits the prop, killing off rpm's or stopping the engine. Spray deflectors can help, or simply fly in a little less wind and waves.

Now you are asking "What do I do with my radio if it does get wet?" It really is no big problem. If you have an out-and-out crash on water, do not panic. Remove the receiver from the model, open it up, and remove any sponge packing that may be inside. Place the opened receiver and sponge in the sun to dry, or dry with a gun-type hair dryer. Prior to this, you may want to spray the printed circuit with WD-40, available at any hardware store. This will force water out and expedite drying. Follow the same procedure with the servos. In a matter of minutes you can have your set working perfectly again. I have sets that have been flying off water for 10 years that have been wet many times, and they are still functioning perfectly today.

As far as the engine goes, merely remove the plug and drain out the water and start it right up again. I would not let an engine that has been wet, set for a month without starting it up before storing.

Some typical problems and answers that might help:

P. I can't hold directional control while on water.

A. Just not enough power to maintain air control. Floats out of line.

P. Model snap rolls on takeoff.
A. Pulling model off too fast. Making rudder correction just as it breaks water. Fin area too small.

P. Model goes over on nose when full power is applied.

A. Not holding enough up elevator at start of run. Floats mounted too far back. Floats too small for model.

P. Model porpoises during take-off.

A. Not holding back pressure on stick during takeoff run.

P. Model will not take off glassy water.

A. Change angle of floats so that models sets a little more positively (nose up) when top of floats are level. Not enough power.

Question: What size floats for my model?

Answer: The length of the floats should be approximately 65 to 80% of the fuselage length . . . again we have to compromise to some extent.

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It is better to have floats that are slightly too large than too small, as long as the model can take the additional weight.

Give float flying a try. Many old "died in the wool" land fliers have tried it and never have had so much fun, and it is a lot easier than they thought. ●

Choppers . . . Continued on page 33

Be careful that the set screws do not interfere with either the gears or the bell crank assembly.

The screws which hold the bearing block to the gear housing are too long when building the Bell 222 version (without the trainer vertical fin) and may need to be shortened. The vertical fin, if used, will absorb the extra length.

STAGE 7 & 8 NOTES

Most any 60 engine will fly the Heli-Boy, but we recommend the higher performance Schneurleported engines for crisper maneuvers. We used the OS Max 60 FSR and the only extra work required was to enlarge the hole of the spacing washer to clear the 3/8 diameter crankshaft. It is very important that the cooling fan assembly be set (or reset) to insure a perfectly true running engine. If the engine mounting holes do not fit your particular engine, you may have to elongate the holes to suit.

Many mufflers may be used with the Heli-Boy, but if it is intended to fit the Bell 222 fuselage, the Semco muffler (Pitts Special model) works perfectly. Whatever muffler is used, make sure it does not touch the fuel tank. The tank may be reversed, if

necessary, to clear the muffler.

STAGE 9 NOTES

When drilling the three holes in the fuel tank, we recommend you use a smaller size drill than the 6mm recommended, for a very tight fit. A 6mm drill is a little too large, and air/fuel could leak out.

STAGE 10 & 11 need no comment.

STAGE 12 NOTES

The control paddles supplied with the kit are now made of lightweight plastic material, and don't really need to be drilled out unless you're shooting for the maximum response and sensitivity of the cyclic control.

STAGE 13 NOTES

The instructions in this stage are in reference to a modification (included in the kit) to the basic control system to increase control response. In short, the main rotor pitch levers may have a single ball installed as indicated in photo No. 20 in the instruction manual. In this event, the control inputs to the blades are from the stabilizer bar and paddles only, and produce minimum control response for the beginner pilot.

The modification removes this single ball and substitutes a mixing lever arrangement in its place, as shown in photo No. 21, and an additional pushrod is connected to the swash-plate. With this arrangement, you now have the same stabilizer/paddle inputs (Hiller system), and at the same time, an additional input directly from the swash-plate (Bell system). This results in increased response and sensitivity for the advanced pilot. Your choice as to which way to go.

When installing the extra mixing levers (566), the longer ends of both

levers point in the same direction simultaneously, so that the two pushrods coming down from the collective mixing bracket (561) are connected to the short end of the levers, and are parallel to each other. The longer pushrods going up from the swash-plate are connected to the long end of the levers and are also parallel to each other. Examine instruction photo No. 21 very closely for details.

STAGE 14 NOTES

When assembling the servo carrier, I would strongly suggest you first arrange your servos and label them to indicate the direction of rotation, before making the servo cut outs. This will help in determining which side of the servo arms to use. It may be necessary to mount them closer together than indicated and use the opposite servo arms in order to avoid the necessity of reversing servo directions.

We also suggest you attach the wood servo plates to the plastic brackets (139-140) with the servos mounted, and carefully adjust the height of the brackets to make the pushrods line up without binding or bending. Have both servo plates attached and all pushrods snapped into place prior to the final bracket installation and cementing the box sides in place. Be especially careful with the lower board . . . we found that with the O.S. Max 60 FSR, the throttle pushrod would need a slight bend if the board was too low. If too high, the rudder and pitch rods would require a bend. Also check for muffler clearance while you're at it. If any pushrod has a remote chance of touching the engine, it should be protected (metal to metal contact) with a sleeve of heat-shrink tubing, for safety.

STAGE 15 NOTES

The one and only fault I found with the kit was the black plastic snap links! Even with the cautions supplied, I found them to be very fragile and often unable to snap together at all. They would not be suitable for repeated snapping operations. Simply substitute Du-Bro nylon quick-links, available at most hobby shops. Even though the quality is good, do not use Goldberg links, as the holes are too large to grip the metric pushrods.

STAGE 16 NOTES

If you plan aerobatics, it is essential to reinforce the main rotor blade roots around the mounting holes with fiberglass cloth and resin. The cloth should reach from the root-end of the blade to just beyond the third hole . . . any longer and you destroy the coning (flexible) action of the blade so necessary for good performance.

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The tail rotor blades are now supplied in plastic, so it is not necessary to cover them unless desired.

A better way of balancing the completed rotor assembly as indicated in photo No. 27, is to mount the rotor on the main rotor shaft, then simply remove the two long screws and drop the damper block (567) down around the rotor shaft. This frees the head (in tetering) and permits fine balancing. After the assembly is balanced, replace the damper block and screws.

FINAL APPROACH

The finish and trim on your new bird will be left up to your discretion. In the next issue of **MB**, we will cover adjustments, trimming out the controls, and flying the Heli-Boy. If completed in time, we will tackle the Bell 222 fuselage assembly, and present a rundown on that project. In the meantime, happy flying and I'll BCNU.

Fuel Lines . . . Continued from page 45

"Well," you say, "this is all very interesting, but what size batteries do you recommend for flying R/C with ignition?" Generally speaking, in contest work where your engine is only required to operate for a couple of minutes each flight, a battery pack consisting of three 250 MAH batteries is ample. This should weigh approximately two ounces, and can be rapid-charged on the field. However, if you are out sport flying, with extended engine runs, a larger battery pack would be more desirable. A three-cell pack made up of 1.2 AH batteries will weigh out at approximately 6-1/2 ounces, and, fully charged, should provide you with over two hours of flying time. These can also be rapid-charged on the field.

In free flight, where the engine running time is usually under one minute, the choice of batteries leans more toward the alkaline type, instead of carbon or Ni Cd. Alkalines are cheaper than Ni Cds, require no charging, have far greater life than carbon cells, and are readily available. In free flight, only two batteries are necessary for an unshielded ignition system, with penlight size batteries being the most popular choices. "C"-size alkaline batteries are sometimes used in the larger free flight models, where weight is not quite so important.

Until next month. . .

DALE KIRN

• As you well know by now, keeping your 1/2A engine running at peak performance all the time can be quite frustrating. So, if you are really serious about this, it is worth your time to write Kustom Kraftsmanship (see ad in **M.B.**) for a list of 1/2A engine accessories. The special needle valve assembly, pressurized backplate and piston/rod reset tool are well worth the money. These items definitely will help to keep your engine in top condition.

Unfortunately, the new AMA rules for 1/2A R/C Pylon Racing do not allow you to use "something a little better" on replacement parts for the engine. Rules state that replacement parts must be as supplied by manufacturer . . . or equivalent. Technically, the piston/rod reset tool use can probably be questioned, as it is not produced by the engine manufacturer (*Oh come now! Neither are screwdrivers and other tools. wcn*). These rules also prohibit the use of a "better glow head" such as shaved Cox 1702 head or the new Glo Bee two-piece replacement head. The rules state that

the engine must be stock. This type of rule was proposed several years ago when 1/2A proto (control line) was new, and was dropped as entirely unenforceable. It will be interesting to see how well this rule works out with the R/C flyers.

Having a good running engine on your bench does not necessarily mean it will operate as well in your plane. A lot of power can quickly be robbed by improper mounting in the plane. The engine mount area must be so designed and constructed that minimum vibration results when the engine is running. The only way you can tell for sure if the engine performance hasn't changed from bench mount to plane is to check the RPM with a reliable tachometer. Be sure to use the same fuel and prop for this comparison. If you don't own a tach, now might be the time to consider buying one. Several different types are available, so check with your fellow flyers for their recommendations.

There are still two more areas that must be discussed before you have the total picture of engine performance. They are the fuel and propeller. Having the hottest engine possible is no guarantee that it will out perform an "average" engine in flight. So let's take a closer look at these two factors.

FUEL

Half-A engines require a higher nitro content than the larger engines. Fifteen percent nitro is considered a mild fuel, and is recommended for break-in and hot weather sport flying. As the nitro is increased, so is the power. But this condition (power increase) becomes less significant once the fuel has reached a fifty percent nitro content. The normal oil content is



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usually between 15 to 20 percent, depending on how much nitro is used. A 50-50 mixture of castor oil and a synthetic (polyoxide) oil is recommended for fuels having 50 percent (or more) of nitro. Most synthetic oils will not provide enough lubrication in hot weather with high nitro content. The first major problem that usually occurs in fuels with all-synthetic oil is galling at the front of the crankshaft. Next area that breaks down is the ball-socket joint. A slightly lean run can easily produce enough heat to turn both the piston and the top end of the connecting rod blue, and lock solid. This situation can also cause the metal around the socket area to chip off and lodge in the piston/cylinder fit, which will stop the engine instantly.

Excess heat also causes premature breakdown of the glow head element. A particle of the element can easily fall onto the top of the piston and in a very short time can work its way down to the bypass area and get lodged between the piston and cylinder.

Moral of the story (use of synthetic oils) is to avoid fuels that contain 100 percent synthetic oils if you are flying in hot weather. In cool weather you can get away with synthetic oil as the total oil content.

PROPELLER

This is where it all comes together. But it seems to be the least understood factor by most modelers, especially when it comes to 1/2A engines. The biggest misconception is centered around the "RPM Game". It is generally thought that a really screaming engine is the

answer to everything. Not necessarily true!! The engine/prop combination that produces the most STATIC THRUST is going to be the winner in free flight and R/C events.

The design elements that have to be considered are the diameter, blade area, pitch angles, airfoil sections, blade thickness and balance. Luckily, most propeller manufacturers have done a pretty good job in these areas. But not all propellers of the same size (by the same manufacturer) will produce the same results every time. Take wooden props for example. The blade shape and pitch angle may be exactly the same, but one blade might have a different grain structure, which will allow it to either increase (or decrease) the pitch angle in flight. It is fairly easy to spot this condition if you know what to look for. Be sure and look the prop over carefully before you buy it.

In the case of plastic injected molded props, a different situation occurs. Two things can (and do) happen. First, the pitch angle may vary slightly on one (or both) blades during the production run. It is usually less than 1/2 inch pitch, but this is significant enough to account for 500-1000 RPM on a 6-3 prop!! To check for variation of pitch distribution, you must make a pitch gauge, or better yet, get a Prather Pitch Gauge from your local hobby shop. Do not become alarmed if the first couple of stations out from the hubs are "under pitched". This is quite common with props that have a fairly thin hub area. Besides, the first couple of stations are not the "work-ing portion" of the blade. The most

efficient part of the blade is approximately 7/10ths of the radius from the hub.

The other problem that sometimes happens is that one blade is slightly ahead of the opposite blade at the tip. This causes the dynamic load to be off. To check for this condition, draw a straight line on a piece of paper with a cross line through the center. Position one prop tip until the leading edge of the tip is directly above the line and the prop mounting hole is DIRECTLY above the cross line. Now observe the opposite tip in relationship to the line. It should also be at the leading edge of the tip.

Check all props for balance before using. Wooden props MUST be fuel-proof. If they aren't, they can swell (from fuel or moisture in the air) and change the pitch angle slightly.

So far, we have discussed some of the major factors that will affect engine performance. But surely, some of you readers will come up with a few not covered. When you have a question to ask, be sure to furnish as much data as possible, such as prop size, fuel, weather, or anything else that will aid in identifying the problem and our suggesting a possible solution. ●

Instructor . . . Continued from page 38

SLOW/FAST PYLON: This event is interesting, as it becomes a tactical race. Four airplanes takeoff and fly around a set of pylons. At the end of one minute the airplane in the lead must land. At the end of the second minute, whichever airplane is leading must land. This continues until the last airplane has flown solo around the pylons for one minute. The catch is that the winner is the airplane completing the most laps! The tactics come in when you must figure when to make your break to finish with more laps than your competitors. Think about it!

If any of our readers have any good ideas for fun-fly type events, send them to me so we can share the wealth with the rest of the modelers.

Speaking of contests, I have been asked this question a blue-million times: "How do I get started in contest flying?" My answer is invariably, "Dive in and enter as many contests as you can." Once you have learned to fly well enough to be confident that you can safely control the airplane, start entering some contests. Don't enter expecting to win or even place, but rather, go to learn and to gain experience in flying in front of judges, on the stopwatch, or whatever. Ask questions of the better fliers and review all score sheets, etc., looking for

ways to improve. Don't be afraid of being laughed at. I've never seen a beginner or novice competitor being laughed at in competition. As many dumb things as I've seen new competitors do, they are invariably met at the pits by one of the more experienced types with advice as to how to avoid making this mistake again. The biggest advantage to flying contests early in your flying career is that when you do acquire the flying skills necessary to win, you will have already gotten over the worst of the "contest nerves", which defeats more potential champions than any other factor.

The most common mistake I've seen made by new contest fliers is to practice at home until they think they have a chance of winning, then, going to their first contest and falling victim of "contest nerves". Then they go home and practice for another six months before entering another contest.

* * *

DEAR DAVE: I've noticed at contests that the expert fliers are almost always able to start their engines on one or two flips, while we novices seem to need to beat the engines to death trying to start them. What's the trick? JGS

DEAR JGS: The trick I've been using is fairly simple, but effective. One-half hour or less before your flight-time, fuel your airplane in the pits and start your engine (at idle). Allow it to warm-up slightly (30 seconds or less) and pinch the fuel line with your finger until it starts to sputter out of fuel. Before it quits, release the fuel line and allow the engine to recover to a normal idle. Immediately after it recovers, stop the engine by grabbing the spinner (carefully). Now clamp the fuel line with a pair of hemostats (surgical clamps) or anything which will pinch the fuel line (Typist, otherwise known as Sal, note: Be very careful that in clamping the line you don't cut that line!). This prevents the fuel from flowing either way. Now bring the piston up onto compression, which keeps the fuel charge in the engine from evaporating. When you are called to fly, remove the clamp, hook up the battery, and the engine will start on the first flip 9 out of 10 times . . . or better.

DEAR DAVE: I have a new airplane which has me baffled. It is extremely sensitive to up elevator, but full down will hardly turn it tight enough to do an outside loop. I checked the servo for equal travel in both directions and it is fine. What's wrong and how can I correct this. The airplane flies great otherwise. VEV

DEAR VEV: This problem is common, and is usually caused by the

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elevator horn being placed too far back from the hinge line. It should be placed with the holes approximately in line with the hinge line. (See drawing A.) If this is not the problem, then you should try offsetting the servo neutral to provide "differential" throws as in drawing B. I'll show you how to offset the servo and adjust the linkage to provide more down and less up.

Refer to your radio system manual for instructions on how to adjust servo neutral (usually a fine screwdriver or Allen wrench inserted down through the output arm screw hole). Keep in mind that the greater

the offset (angle X) the more differential. A typical good starting point for most situations is 10° or 15°, but this may have to be adjusted a few times to get it just right.

The same trick can be used to adjust roll rate or rudder throw by keeping in mind that if you offset the servo in the direction of a control, it will decrease that control and increase the opposite control. Example: If clockwise rotation of the servo gives you left aileron then if you offset the servo clockwise you will slow the roll rate to the left but increase the roll rate to the right. The above is a method of obtaining

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differential throws in the control surfaces, but is not the same animal as "differential ailerons" which involves moving one aileron more than the other. I'll cover this aspect in a future column (perhaps next month).

Now, if you fully understand the above procedure, you will probably never become a competition flier, as you possess a mentality which would prohibit standing around a contest site in the rain waiting for a flight in front of a set of totally drenched judges who are obviously not in the best of moods. It's a lot of fun, but you've got to be at least a little crazy!

Until next time, Dave. . .

Send all questions to Dave Brown,
8534 Huddleston Dr., Cincinnati,
OH 45236. •

G.S.B. Continued from page 90

me, we set off cross-country by auto, just after launch. "Great Speckled Bird" won with 6:02, with Jim Lewis only 12 sec. behind, flying his "Little Daddy". Jim would have won easily, but had bad luck of landing in the top of an 80 ft. tree, and the only one in a 100 acre field. Mike Bailey, with his "Gully Washer" made 4th, not far behind.

At the 1977 Riverside Nats, the weather was great, and I set about to once again try to win the Mulvihill Trophy. I had only been trying for 36 years, so fully expected to be bridesmaid again, since this had been my fortune many times before. Lady Luck smiled on me, finally, and with help from my friends, won this elusive prize with a 34:22. Bud Romak was barely a minute shorter, with Jim Quinn, Bob White, and

Andy Faykun close behind. I was very thrilled until that night at the Old Timers banquet, when John Pond and Carl Hatrak "framed-up" on me and announced that they had planned to present the Mulvihill Trophy to me, but AMA had decided to retire it. After my having a couple of "fits", they went ahead and gave it to me (I'm giving them both a gift certificate for a 20-year stay on Devils Island). At the 1977 King Orange Internats, "G.S.B." barely beat Jim Lewis and Phil Hartman, among others, in unlim.-unlim. on a foggy, misty morning. "G.S.B." landed in a tree at 5:31, with Jim only 7 sec. down and Phil 7 sec. below Jim. After watching a couple of models, that flew just ahead of me, climb nearly out of sight in the fog, I decided to wind only about 75% max. turns and this proved to be barely enough.

I felt honored indeed that the NFFS selected "G.S.B." as Model Of The Year for 1978 in the Mulvihill rubber category, even though the design hasn't been around but a couple of years.

Mulvihill rubber models require a bit more care in handling and flying than any other outdoor type, due to their relatively fragile nature and size. With caution and luck they will outfly most any F/F type, however.

Since "G.S.B." is intended to be a competition model, and not designed for a beginner, I won't go into how to glue stick A to stick B; most experienced fliers can build as well as me, anyway. I will give the method I have used for 32 years to make prop blades. I've tried many different kinds of props over the

years; some have done O.K. and some not so good.

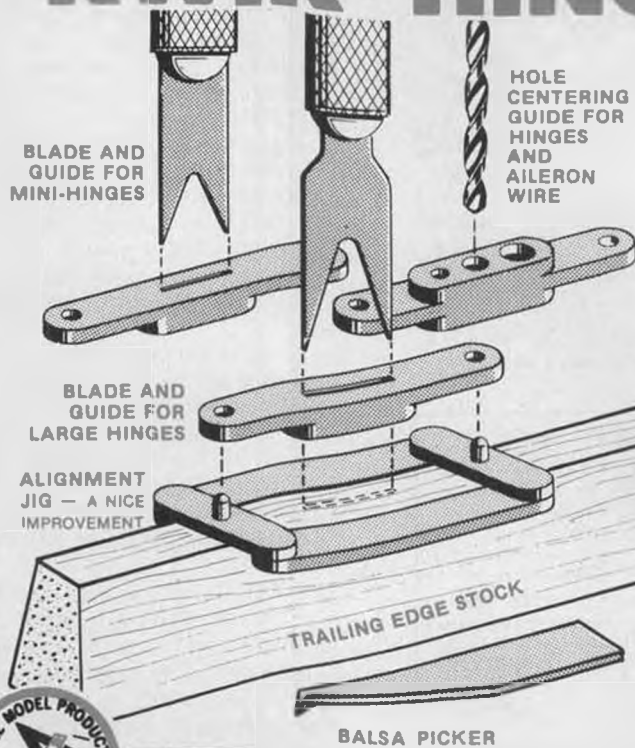
Use the plan to mark for cutting full size blades from 1/8 inch sheet balsa. Sand airfoil shape just like a H.L.G. wing. Hold under hot water faucet a couple of minutes. Hold blade over electric stove eye, set on medium heat, and twist prop about 15° from root to tip until it feels dry. Let blade finish drying overnight at normal room temperature. Sand a bit, and give it a couple of coats of thin dope, then cover with Japanese tissue. Dope tissue 4 or 5 thin coats. This method is easy, and you can get both blades exactly alike in airfoil, shape and twist. I haven't carved a prop in so long that I doubt if I could, since using this easy method.

One word on construction of "G.S.B.", is to choose your wood carefully, since with "all them sticks" it is easy to end up with a model heavier than need be. The glide won't suffer much, but climb will be reduced. Weights shown on plans were made after 2 contest seasons of flying, and "G.S.B." was a bit lighter when first built (Models and Modelers both seem to pick up a little weight with time). If your "G.S.B." should end up heavier, it should still do O.K., maybe better, by adding a couple more strands of rubber than shown on plans.

Building is important, but flying is what makes or breaks a model. Balance at wing T.E., complete with motor, before gluing in wing dowels. Hand glide over grass and if model stalls, cut a bit off top of fuselage under the stab T.E. If it has a nose-down attitude, shim under stab. T.E. Adjust rudder for gentle right turn in glide. Wind exactly 35 winder turns for the first flight. I'm superstitious and 35 is a lucky number. G.S.B. should nose up slightly and into a right turn on this many. If it tries to stall in the climb, add a bit of downthrust. I build in about 1° down and 3° right thrust in the nose block, and this is usually pretty close. Increase winder turns when climb and glide looks O.K. I increase winder turns to 65, and if all looks well, 100, 150, and 200. I have never flown "G.S.B." on more than 900 prop turns, which is 85% of max. Have never flown full power in so-called "Dead Air", so don't know exactly what it will do, maybe 8 or 9 minutes. I remember many times laying on the crank and laying little pieces of rubber and tissue-covered sticks all over the landscape. Since I don't use a winding tube, I can't get "rank with a crank" as "G.S.B." with a blown motor would be about like the Hindenburg at Lakehurst.

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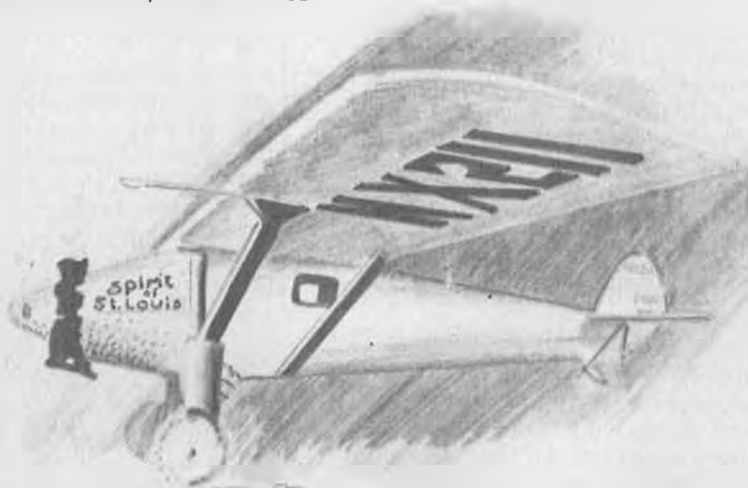
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Peanut Continued from page 79

from black crosses or blue, white, and red circles.

This model follows the structure of the original airplane fairly closely. Sheet balsa is used wherever there was plywood sheet on the original. All ribs, spars, fuselage uprights and crosspieces are in the proper position. The tail is solid, however, and the ribs are not built up, but are simply cut from sheet. The rigid landing gear structure is made from model airplane basswood, which hopefully won't have to take up any of the landing impact loads. The wheels are carried on a wire landing gear that extends parallel to the front struts and is not attached to them. It is therefore free to flex somewhat and will not break even under an impact that might completely remove the rigid structure.

One benefit of such a landing

gear concept is that in the event of a hard impact that destroys the other structure, you are not eliminated from the competition. Your model can still be operated from the wire landing gear because the wheels are still in place. Another advantage is that with the wire in place, it's easy to locate the rest of the landing gear structure and hold it in the proper position while the cement is drying.

The wing bracing on this model is made from two-pound test monofilament fishing leader. This material is available from sporting goods stores, Thrifty Drug, and many other places. A roll is fairly inexpensive, and will last for a lot of models. It makes nice smooth wires and can be tightened by holding over a source of heat. It can also be retightened, which makes wing warp adjustments fairly simple if you find they are needed during flight testing.

The fuselage bracing is simulated by inking fine black lines on the tissue covering after it is shrunk and doped. If you want more authenticity, use monofilament line to brace the fuselage before covering.

The wheels are by Fulton Hungerford, and although they should be tissue covered to match Karlstrom's 3-view, it just seems a shame to cover up those beautiful spokes.

The engine on the model is a true rotary. It rotates with the propeller. It was obtained from a 1/32 scale Fokker Triplane plastic model airplane kit, and modified to go on the propeller shaft. It looks great spinning around, but if you are interested in maximum duration I would suggest that you make it fixed and only rotate the propeller. The cylinders pump quite a bit of air as they spin around, and that takes energy which could be driving the propeller. Almost surely you'll pick up more flight points with the energy than scale points with the "rotary" engine.

The 3-view shows a pilot, and the pilot adds a lot to the airplane. The head was carved from styrofoam, as was the fur collar on his coat and the fur rim on his hat. The top of his hat was made from half of a medicine capsule (The medicine tasted awful, but a cap for the pilot was worth the sacrifice).

Tail skid structure was built up using model railroad basswood. Most other details were drawn in with black pen. The movable surface outlines and hinges as well as the step and baggage hatch are so depicted. The surface hinges are painted silver inside the small rectangles to simulate metal. The engine cowl is painted aluminum.

The fuselage is a simple box structure made four longerons and uprights and cross braces. Build the two sides over the plans. When dry, remove from the plan, separate the sides and add the cross braces to the sizes shown in the top view. Then add the top and the side formers at the forward end, and the sheet balsa forward panels.

The tail surfaces on the model in the photos were made from 3/32 sheet. Shape them to the proper airfoil section. The flag that is painted on the vertical is light blue with a yellow cross.

The wing surfaces are built directly over the plans. Ribs are cemented in place between the leading and trailing edges. Cement the spars in the notches after all the ribs are in place. Bend the landing gear wire to shape and install it in place on the fuselage.

Sand all the structure to remove any roughness and sharp edges. Shape the wing leading and trailing edge to give the proper airfoil shape.

Cover the fuselage and the wings with condenser paper. It will have to be attached to the lower surface of all the ribs. When the tissue is securely attached, water shrink the tissue by fogging on a light spray. When it is dry, give the tissue two or three light coats of clear dope.

Assemble the wings to the fuselage. Make sure that they are at the same angle of incidence and at the proper dihedral angle. This may require a little cutting and trimming at the wing root, or even a little fill in with a thin shim of balsa.

The horizontal tail is installed in the last bay of the fuselage. Cement it only to the last cross sticks. The front of the horizontal tail should be left free for future flight trimming. The vertical tail is cemented in place. When the tail is dry, turn the assembly on its back and build the tail skid assembly in place on the fuselage. Then build the main landing gear structure in place between the wires of the landing gear. There are a lot of small sticks in the landing gear structure, so be patient with the effort, and cut and fit them accurately.

Build your dummy engine (or buy a plastic kit with a suitable one, to save the time). Set up the cowl and firewall so that the entire firewall, cowl, and engine assembly can be used as a removable nose block.

Add cabane struts in front of the cockpit and then install the wire braces. Note that the brace wires are attached to the landing gear legs about halfway up.

Windshield, cockpit combing, fuel and oil tank caps, and side access panels on the fuselage sides, including the carburetor air intake, complete the details.

This model, with all its wires and braces, to say nothing of its revolving engine is rather high on drag. Flight times are not likely to be high unless you've been very careful to keep the weight as low as possible. Flight times with the original have been around 20 seconds. Flight weight with a loop of 3/32 rubber, 10 inches long, is half-an-ounce. If you are flying indoors and the flying site is small, a drag flap on the left wing, about 3/16 by 1-1/2 inches long can help to get a tighter but safe circle.

Have fun with your Swedish Peanut. ●

Mark's Continued from page 54

until recently was being farmed out. It was impressive to see machinery, in seconds, cut and shape a piece of 5/32 inch wire; the sort of job that takes an hour, and three trial pieces, back in the home workshop. Wire is being cut and formed for all the in-house kits, as well as for some outside manufacturers. In fact, except for buying and printing boxes, Mark's Models is completely self sufficient.

The heart of the business, and the kits . . . the balsa itself . . . is purchased in bulk, and comes mostly in



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two to four-inch widths, varying in lengths to about five feet. The shipments are not graded, and you take what you get, which can run from too soft to too hard. Fortunately, because of the various requirements in our airplanes, a high percentage of the wood can go into usable stock.

Working the wood is done primarily on two types of machines . . . bandsaws, and various types of sanders . . . which at first glance look rather like some of the equipment many of us have in the garage, but is really capable of much more precision and speed. The blocks are first graded, and then sawn into rough,

oversized sheets, then sanded to size. For example, a piece that is to be a 1/4 inch sheet comes out of the saw at .300 inches, after which it is fed into an automatic sander that removes .025 off each side, on 120 grit paper, for a perfect .250 thickness.

I asked about loss; how much of a block becomes finished stock. Of course, it varies with finished thickness, and in the worst case, that of 1/16 inch wood, less than 50% of the original piece is transformed into building stock.

Some of the sheet leaves the plant in that exact shape, as dealer's stock and to kit manufacturers who

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process their own wood. Other sheets are formed into finished kit pieces right there, in pretty much the same manner as most of us work. A rough cut, then final sanding on a belt sander, though while we do it one-at-a-time, at Mark's they do a stack. The exact quantity depends on the thickness of the basic sheets.

Afterwards, these pieces are individually and visually inspected for the possible split or wormy piece that got through. The parts then go into bins for later kitting if they are part of a Mark's Models kit, or directly to the shipping department if part of another manufacturer's order.

Some of this wood goes to the die cutter . . . another in-house operation, which includes everything from designing and making the dies, down to the actual cutting operations. This simple sounding part of kit manufacturing is apparently beset with problems, as many of us well know from the kits that have earned a reputation as being "die-crunched". Not so at Mark's Models; Mark calmly, but with definite pride, showed me the drying racks full of die-cut sheets, from which he picked some at random and easily and cleanly removed every piece.

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used, as the actual die-cutting is done while the wood is wet. This apparently softens the wood fibers and lets the wood compress the amount necessary for a clean cut. I asked what the wood is soaked in, expecting to hear some exotic sounding seven-part chemical name, but no, it turns out to be plain Escondido water.

I kept looking for that great big computer-operated kit packing machine that is able to fill that little box with all those parts that refuse to fit back in once you have removed them. But it doesn't exist, except as a number of nice ladies who set up rows of boxes, and in short order have them filled with the proper pieces in just the right places so the lid will go on.

The Balsa Shortage? I asked Mark Smith about that. His answer was that he had not seen any signs of it; that since he has been in business, all the wood that you could pay for was available, and that there had not been any price increases in the last couple of years. I realize that there are some things you just don't ask, so I did not inquire as to the exact amount of wood that is used monthly. But it is obvious, from the stacks, and the activity in progress, and knowing some of the companies for which wood is processed and the popularity of their kits, that it is safe that Mark's Models accounts for more than just a couple of Ecuadorian balsa saplings every month.

The future? Mark Smith is fully optimistic about the future of modeling, and that of Mark's Models. In fact, plans are already in

the works for a newer and more modern facility in nearby San Marcos (Translated: San Marcos). And a number of new glider and powered designs are in the works, however, Mark was reluctant to discuss when they may be on the dealer's shelves. It is a long way from a successful prototype to in-quantity production, especially if you insist on every little piece being just right, including the excellent plans and detailed construction manual that is part of every Mark's Models kit.

I found it all very interesting and instructive, and surely you would too. So if you are in Escondido, or San Marcos in a few months, stop by and ask for the nickel tour. And please . . . if you find out what that girl is doing under the desk, be sure and let me know!

Half-A Continued from page 59

starting diesels; you get a really sharp snap through compression compared to the relatively slow flip most "Yanks" give a glow engine.

Second engine is also an .047 diesel; this one is the Mills .75 replica. Imported from India by Indy R/C, the replica is not quite an exact duplicate of the original. An aluminum crankcase is used in place of the original magnesium alloy, and the external finish is not quite as nice. However, the engine works just fine. Mine turns a 7 x 3-1/2 Cox gray prop at 9000 rpm, a very respectable figure. I have seen these engines turn a 10 inch prop very comfortably in use on large scale free flights. Stroke is about 1-1/2 times the bore, so the low end torque is terrific. By the way, this engine should not be propped to run faster than 10,000 rpm. You get the power by adding more prop diameter or pitch, as needed.

Third engine for the month is probably the most readily available of the .09 and .10 size. Also, it happens to be one of the most powerful engines in this class too. The Tee Dee .09 represents the best of the Tee Dee series of engines. Its power to displacement is the best of the bunch, and its power to weight is downright remarkable! Also, the engine is relatively stronger than the smaller engines of this design. As far as power in the .09 class goes, the Tee Dee .09 is in the top three, along with the Max .10 FSR and Webra Speed .10. I don't have performance figures on the other two yet, but my Tee Dee will turn that standard Cox Gray 7 x 3-1/2 at 17,000 rpm. I am putting it on a GMC Corsair . . . Pappy Boynton watch out, here I come! All those little speed tricks we have come to know and love on the .049 apply to the bigger Tee Dee too.

Drill the venturi, run tank pressure, and hit it with high nitro fuel to wring out all those extra R's. I don't know yet what the ultimate prop will be; the 7 x 3-1/2 is sort of equivalent to a 6 x 3 on the .049, and may be too big for maximum power in a re-worked engine on nitro. I'll keep you posted.

First airplane for the month is the Baby Banshee from Cathedral Models. This 1/2A pattern model spans 40 inches; with you-know-who's molded foam wings. Construction looks very simple, and the clean lines should give you a fast, smooth airplane. Cathedral models is run by Bill LaRue, P.O. Box 783, McComb, MS 39648. There are other 1/2A kits in the line too!

Next up is the Tiny Ace, an ARF model by Pilot. Hobby Shack imports this bird. It features molded ABS fuselage, and pre-built and covered flying surfaces. The model and the young lady both belong to Bill Sestito of Lakewood, California. Bill writes:

"The plane is powered by a Tee Dee with a QRC top end. I use a car heat sink for nose weight. (It does help cooling too! lhr) The radio is a Cannon Two-channel transmitter with a Royal (Dorffler designed) receiver, Sanwa servos and Eveready nicad batteries. The plan is fast and maneuverable and not for a novice like me. The aileron setting called for in the plane is slow.

"Last Sunday, I finally flew it myself. I had a bouncy landing that must have fractured the servo support frame. On the second flight I lost elevator control. The plane took a nose dive into the dirt. Wing damage was minimal, no fuselage damage, but the plywood frames broke. I'm rebuilding now and hope to be flying this weekend. The plane is durable. I was surprised how little damage there was. The nose dive was with power on.

"P.S. This ARF only took me 4 hours to build."

Third model for the month is a trainer from ACE R/C. The Wizard is derived from the old Whiz Kid design, but updated to use the ACE foam wings. Power ranges from the Golden Bee reed valve engine to a Tee Dee .049, depending on the number of channels of control and the skill level you have. With the ACE Stomper pulse system and a Golden Bee or QRC, it is a docile beginner's model. As you add more controls and power, it can get downright sporty. Design is very similar to the .020 size Dick's Dream, also by ACE.

Final model for this month is a sporty profile trainer control line type from Hobby Hideaway. It is a



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profile version of the P-51 B, the Paul Mantz Bendix race winner. This little gem flies with a medium power .049 and is just the right size to do all the round maneuvers and inverted stuff. It should even do inside and outside squares. Engines may be either beam or radial mounted. Hobby Hideaway recommends that D.C. Wasp and 28 foot lines as the best combination.

I received a letter from Ed Huffman, Spokane, Washington. He liked the suggestion of using the eye of a needle to dispense cyanoacrylate glue, but after about a 1/2-hour of work, there was glue build-up on the needle, which plugged the eye. His solution: "I have been using a cellulose sponge on my workbench for months to pick up excess or spilled Cyano glue. After using the needle to apply the glue and before laying it down, just jab it into the sponge, twist and pull out a clean, dry needle." Thanks, Ed, for a good idea! •

R/C Auto *Continued from page 67*
cold, whatever).

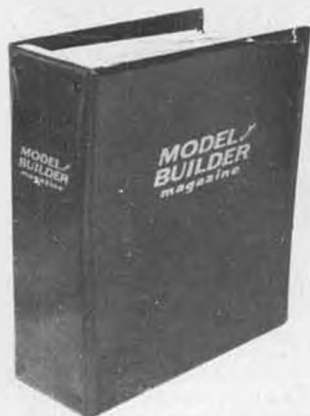
While on the subject of the Nats, I'd like to throw out a couple of other things. The 1/8 scale schedule of events of G.T., Sports, then Indy (formula) cars seems to be great. But what has happened to the Grand

National (Stock) car class? It's still a ROAR car class, but it has never been promoted at the Nationals. Personally, I know there are lots of interested drivers in the south, and I like the class too. Would it create too many types of car races at the Nats? If so, I still think Indy should be the ROAR recognized oval car championships. An oval Grand National car race at the Nats (with super stock or restricted engines?), would be a ball. Another group of racers could do their thing, and some of the guys who dislike the destructiveness of the open wheel cars may be very interested.

Here in Southern California, the Super Stock engine class has bitten the dust. The Southern California Council (R/C car clubs) has voted in a series format of A, B, C, etc. mains for sports cars only. I can't explain the points and trophy awards at the series end, because it would take pages, and is really quite unbelievable. If you want to be in "the" main event, you've got to go all-out. The big problem last year was too many classes . . . four open driver classes and three super stock driver classes . . . and time was a problem. The council solved some of those problems, but now there's no place for the guy who can't handle the ultimate power or the guy who

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enjoys racing different kinds of cars. Super stockers could have been run right in with the open class cars... then some racers could have said they were first, second or third best Super Stock driver and gotten trophies. Maybe the council should consider holding Mini-series races (two or three dates) for other classes, with interested clubs participating and being recognized by the council. Two Southern California clubs are doing it on their own now (G.T. and Formula races), and there may be more bitter feelings in the future, unless everybody is willing to negotiate and give a little. Everyone should be willing to stick their neck out a little to do some things that may be good for the sport in the long run, even if half the council participants are not interested.

My racing season has started. Getting ready for that first race was very difficult. As it was my first race since the 1977 Nationals, all my equipment had to be located and sorted out. I had the most trouble with batteries and engines. Couldn't remember what parts were in which engines, and which were the best batteries. I charged and discharged the batteries to see what shape they were in, and just dropped in one of the old standby engines. The car was all new, with numerous minor

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changes to shift the lateral and axial C.G. a little.

When I did the article on car painting, I guess I got jazzed a little and decided to come out with a new paint scheme for my competition cars. The body mounting method is a little different too, and adds some compliance at the front and more firmness at the rear. I got to run the car one Saturday for awhile, after the rain here in sunny Southern California. It took about five tanks of fuel to really get the engine set about right, but the track was a little slick from the rain so I couldn't really evaluate the car set-up. Saturday night I cranked in a little more front wheel caster and put in lighter clutch shoes for more slip, because the car appeared to have a little too much power oversteer and my throttle finger was a little heavy. Sunday, after some tire juggling, the car was running great and there were only about two or three cars that were quicker with their super-strong engines. In the main event, I got up to second place before pulling several boo-boos and then having a part fail. The part that caused the failure was an obsolete, unmodified part that is not used any longer, but that I did not change. It's them little things that get you! I'll let you know about the results of the car changes after they're evaluated further.

Well, good luck to all for your 1978 racing season. See you next month. ●

"MARA" Continued from page 65

and the line must then lead from the cleat up through the block and down again to the sail. Tie one end of the lines to the top of the foresail and mizzen and to two locations on the gaff. Pass the lines through their respective blocks and down to the cleats. Raise the sails and secure lines to the cleats. The lines serving the mainsail gaff should be adjusted by pulling and slacking until the gaff

forms the proper angle to hold the mainsail without wrinkles. Then, knot the lines together where shown on the sail plan and cut away the excess of one line. The remaining line is secured to the cleat. Adjust as required.

Sheet lines are 20 lb. fish line, and are firmly tied to the booms through the holes in the location shown on the sail plan. Pass the lines through the copper tubing guides to the control arm of the Probar sail control unit. With the control arm in the athwartship position (across the hull from side-to-side) the booms should form a 30 degree angle measured to the centerline of the hull. In this way, moving the Probar arm to a fore and aft position in one direction will play out the sheets and increase the angle, while moving the arm to the opposite fore and aft position will haul in the sheets for a close hauled rig. Tie the lines securely to the correct side of the Probar arm.

Sailing should not be attempted before all equipment is checked out and found to be in working order. Before the initial run, place the completed model in a bathtub or some other still body of water, and check to see if the water level meets the waterline painted on the model. Depending on the weight of the equipment installed, it may be necessary to install additional lead ballast to the hull interior at the very bottom on each side of the keel. We installed the lead weights that are used to balance automobile wheels. These can be found on the floor of most tire installation shops. Place the weights in the hull, replace the cabin, and check the waterline. Shift, add, or remove weights as necessary, and when the craft floats properly, apply cement around the weights with a long strip of balsa. Needless to say, a day with moderate breezes affords the best sailing pleasure, although "Mara" can operate in any weather from the lightest breeze to fairly heavy spring winds.

Begin operation with the Probar arm in the athwartship position and sails at the 30 degree angle. The novice should familiarize himself with the sailing chart on the plans, which will provide some basic sailing information regarding sail and rudder angles for various wind directions. It will be found that most of the controlling will be done with the rudder. The sail angles are modified only to change the direction of the boat with respect to the wind. After a bit of practice, "Mara" will be maneuvering as freely as the R/C powerboats on the lake.

Happy Sailing! ●

Eaglet Continued from page 57
Washington State, it was only a matter of deciding whether or not I wanted to wait until it stopped raining to try out the Eaglet. Since my wife, Maren, was going to be my helper and drive the boat while I took pictures, it was decided to wait for the rain to stop. We received a lucky break in the weather on the very first day the boat was ready to run. The rain abated about 3:00 on a Sunday afternoon. We all piled into the station wagon and headed for the pond.

A tight fitting piston/sleeve set-up in my K&B .21 caused some initial starting problems. I found it necessary to use the battery in the station wagon to obtain the necessary amperage strength for my electric starter. With the added cranking power of my Diehard, the engine was started and we were ready for the launching. A J.G. Products G-20 propeller was used during the first test runs.

Considering that the engine was brand new and box stock, and that we were using the stock muffler and a 15% nitro break-in fuel, the Eaglet performed most adequately during its initial runnings. The handling characteristics were very good. The ride was stable without any of the bounce often associated with flat-bottom boats. Cornering was smooth and flat with no evidence of hooking or spinning out while cornering. The boat will make a much tighter right turn than left turn due to rudder location and propeller torque. However, left turns are acceptable. It should be remembered that model boats make right turns when they are racing. Maren had no problems driving the Eaglet while I was taking the running photos. She commented that the boat was very easy to drive.

To take full advantage of the Eaglet's performance potential, it will be necessary to use a tuned pipe and higher nitro fuel in order to get the most out of the engine. As set-up for this review, the Eaglet makes an excellent boat for the modeler seeking an easy-to-build, very stable flatbottom design. With the addition of some speed accessories to the engine, the Eaglet has the capability of being a very competitive .21 flatbottom racing model.

Boats in the .21 engine category make excellent choices for new model boaters. Both initial investment and continued operating costs are lower in this class. It is my opinion that the Norco Eaglet deserves serious consideration by anyone contemplating the purchase of a .21 size flatbottom. •

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Power Boats . . Continued from page 59

5. The sides are set on a flat surface to compare the stand surface. Use the wood files as necessary.

6. Cut the middle pieces according to the height on the stand (approximately 4 inches) and the width according to the boat's tunnel. The width of the stand should be a 1/2 inch less than the boat's tunnel to allow for paint and padding clearance. Depending on the length of the stand, it will be necessary to use 3 or 4 middle pieces. Be sure to radius the top of the last middle piece for the driveshaft, if necessary.

7. Next, Bill and Joe add the custom treatment. The two sides are nailed together so that lightning holes can be evenly cut in each piece. Depending on the stand, you will use a 1-3/4 to 2-1/2 inch hole saw. This cutout treatment as shown in the photos, also adds to the overall appearance.

8. All parts are now assembled with countersunk wood screws and Hobbypoxy Formula II. This glue is slow drying and soaks into the grain to make the stand strong.

9. Before painting, sand well and seal all the ends with the Formula II. It is also recommended to seal the inside area of all cutouts. Let dry and sand the glue surfaces.

10. Each stand has 3 coats of Elliott's Vitra-Thane (clear polyurethane) applied 24 hours apart with sanding between coats. To get the super finish, the urethane is applied with a sponge over flat areas and a tiny modeler's roller on corners and holes. Do not use varnish as it is not fuel-proof.

11. Finally, attach the self-adhesive foam strip (weather-stripping). The kind used by Bill and Joe is metal reinforced and is stapled in place so that it is mounted securely to the stand. The rubber legs help protect your wife's dining room table when

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you show off your boat to guests, and keeps your boat from sliding away when you set it on the car trunk. Lastly, attach the aluminum prop protection plate with the short chrome trim screws.

The result is a good looking and lightweight natural stand. Happy Building! •

R/C POWER BOAT NEWS

by Jerry Dunlap

• The Puget Sound Model Boat Club has experienced a doubling of its membership during December and January. We are really excited by all the new members and interest. However, such rapid growth does present challenges to a club. With so many novice model boat racers in need of learning the rudiments of the sport, a special "Learn to Race Model Boats" day was held on Sunday, January 29, in hopes of filling this void of racing knowledge. The P.S.M.B.C.'s regular running site, Lake Waughop, at Ft. Steila-coom Park, was selected since it provided more than adequate room for such an event. The weatherman cooperated to the fullest by providing a rainless, windless, and pleasantly warm afternoon.

Jerry Dunlap, who teaches 5th graders Monday through Friday, was the day's head instructor. Club members with racing experience provided additional comments and hints. Employing that traditional backbone of the educational process, the chalkboard, Jerry drew diagrams on his daughter's portable board to illustrate his presentation. Prior to the first presentation, the participants had time to tune en-

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gines and practice running around the buoys.

Topics covered during the first session included; getting started on time, launching techniques, milling procedures, timing starts, and perils encountered in the first turn. Following a questions-and-answer period, the boats were divided into heats based on frequency availability and the participants were given the opportunity to practice the items discussed on the beach. Many of the new model boaters soon discovered that putting theory into practice wasn't all that easy to do. There were lots of missed buoys in the mill, early and very late starts, and cut buoys during the running of the race laps. No results were kept, since the purpose of the event wasn't to find a winner, but to prepare our club members to be winners.

After everyone had an opportunity to make some practice starts and race a few laps, all the drivers were again called together and Jerry evaluated what he saw people doing during the practice sessions. This gave immediate feedback to those in need of additional coaching. After this review and critique-session, the participants were again divided into practice groups to continue working on making good starts and racing. There were a few

collisions during the day's activities. However, all damage was repairable on the beach, and boats involved in the accidents were soon racing again.

The event would have to be labeled a success. A half-dozen model boaters without previous race experience received valuable training. And at the end of the day, our club had seven brand new members with the good possibility that another six would be joining very soon. The P.S.M.B.C. strongly believes in helping its members become better model boaters... even if it means listening to Jerry.

R/C OUTBOARDS — THE NEW CLASS IN TOWN

What is the quickest, easiest and least expensive way to get into model boating? I think the answer has to be the new outboard class. In August of 1976, K&B Manufacturing presented the model boating enthusiasts with a whole new way to go model boat racing, or just messing around. Mating their highly successful .21 cubic inch powerhead to a specially designed model marine lower unit, the folks at K&B Manufacturing brought out the first truly competitive model racing outboard for R/C model boating. There had been other model outboards prior to the K&B, however, none of them matched the power of the K&B .21.

What are the advantages of the model outboard for the beginner? Let us examine why the outboard offers the easiest entry into R/C model boating at this time. One of the biggest problems confronting the beginner to model boating is the installation of the model marine engine and running hardware. Motor mounts, engine bearers, stuffing boxes, driveshafts, flywheels, universals, prop struts, rudders, thrust bearings, drive dogs, set screws and alignment problems are part of the components confronting the novice model boater as he/she attempts to get the power from the

engine to the prop. The model outboard eliminates all of those bothersome items from the "must be done before boat goes in water" routine. The outboard has all those items built into the unit. With the drilling of four holes in the transom of a boat, the K&B .21 outboard is ready for control linkages and fuel line. The outboard unit can be used on a variety of hull types very successfully.

The two most popular types of model outboard hulls in the Northwest have been deep vee and tunnel designs. Most hobby shops now carry a number of different hulls that are well suited for the K&B .21. At this time, K&B Manufacturing is only offering a .21 size outboard. The K&B .21 Outboard retails for just under \$100. Popular boats for the engine range from \$23.00 for the Dumas Hotshot, all wood kit, to \$70.00 for the all fiberglass R/C Glass Excalibur II. About \$20.00 in hardware and paint is required to complete the boats. A two-channel radio is all that's necessary and there are a number of good radio systems available for around \$100.00. Starting the K&B .21 Outboard requires an electric starter, and they go for around \$35.00 (without the battery). However, it should be possible to get started in this class with good equipment for around \$300.

Model outboard racing in the Northwest has taken on a semi-scale appearance. The boats must be tunnel type hulls and there are at least four good designs available to the beginner; the Dumas Hotshot, the Midwest Klampon-Kai, the Steve Muck Li'l Lightning, and the R/C Glass Excalibur II. The Excalibur II is the only preassembled hull using fiberglass construction. The other three are wooden kits. To be eligible for competition at the District level, the boats must be painted (paint scheme to reflect full-scale tunnel boats), display a racing number, and a scale dummy driver must be in the cockpit. The engine must remain in stock condition. No "hopping-up" is allowed in this class. Even with this stock engine rule, these mini air-trappers can reach speeds of 40 mph.

Outboard tunnel racing, mini size, usually takes place in two types of events. The first is enduro racing for a specific period of time, usually five or ten minutes. In the ten minute event, a required pitstop is often part of the action. The boat and driver accumulating the most laps after a certain amount of time is the winner. Reliability, as well as all-out speed, is important in enduro racing. The other event is heat racing. This event calls for the boats

to race around the course for a certain number of laps, usually five or six. In enduro racing, the starts are normally modified LeMans starts, with the engines not running until the starting signal is given. Once the starting signal is given, the engines are started and there is a mad dash to get the boats in the water. Heat racing uses a clock-start format. Here the boats are allowed to start prior to the beginning of the heat. They enter the course during a two-minute starting period. At the conclusion of the starting period, there remains thirty seconds of mill time. The boats make a flying start, trying to hit the starting line just as the clock signals the start. The current record for a tunnel boat in a .9 mile heat race is 1:57, held by a modeler from the San Francisco area.

Interest seems to be growing in the model tunnel racing class. It is offered as a separate class at many races around the Northwest. The Northwest currently leads the nation in developing a special racing class just for outboard tunnel hulls. There is a good possibility that the class will soon become the most popular form of model boat racing in the Northwest. More information can be obtained about model outboard racing by contacting the District 8 Director, Jerry Dunlap, 6702 Mt. Tacoma Dr. S.W., Tacoma, WA 98499, (206) 584-7131. •

Judge Continued from page 50

maneuvers call for downgrade if the stall turns are not in the opposite direction relative to the ground (same direction on the rudder), this always has been reason for a rather serious downgrade. The exception is the Figure M with 1/4 rolls. If the stall turns are not done in the same direction relative to the ground (opposite directions on the rudder), the maneuver would become unrecognizable or incomplete, and would be zeroed.

The Expert schedule, though new to the Expert class flier, is not new to anyone who judged in 1977 or earlier. It is the previous FAI schedule, which had been in use by Masters and World Champs fliers for several years (with occasional confusing variations, of course).

Now we come to the 1978 Masters/FAI schedules. First of all, with a few exceptions, it's laughable to hear someone say that the judges have a whole bunch of new maneuvers to learn. With the exception of stall turns, snaps, and spins, all maneuvers are rolls and loops, or combinations of the two. If a judge knows how to properly score Three Inside Loops, he can also judge

Three Reverse Inside Loops, Three Outside Loops, a Rolling Eight, a Horizontal Eight, Reverse and regular Cuban Eights, etc. And if they can properly judge Three Rolls, they can also judge Four and Eight-Point Rolls, Reverse Point Rolls, Two Rolls in Opposite Directions, a Slow Roll, etc.; likewise, the combination maneuvers, where loops and rolls are put together to form a Double Immelman, Square Loop with Half-Rolls, Triangle Rolling Loop, Top Hat, etc.

And, having judged these, we can add the stall turns to score the various Figure M's.

The toughest maneuver to properly judge in the past, in our opinion has been the spin. Sorting out a shabby spiral dive from a very slow rotating spin can really get touchy. By the same token, the new Snap maneuvers (Avalanche, and Two Snap Rolls in Opposite Directions) are going to be tough at times. It's going to take some experience to differentiate between slow rotating snaps and tight barrel rolls. We'd suggest that serious judges (and that better be every member of the USPJA!) get out and try the maneuvers and/or watch others as they practice these snaps. (Our "Spruce Goose" biplane [January 1973; MB] could perform as many as three Avalanches consecutively without losing very much concentricity. The main trick was to stop each snap at exactly one rotation!)

We note with some concern that the Top Hat description and downgrades still conflict with regard to the overall shape of the maneuver. For the last two World Champs, and at our Team Trials, we had to clarify this conflict by eliminating the requirement that the top and vertical legs be the same length. The description still says that you "pull over to inverted flight for a short period." The maneuver has always been flown as a "Stove Pipe Top Hat", but one thing sure . . . the Reverse Top Hat won't get the same treatment! Actually, its description and downgrades are quite clear. Should be interesting to see how it's flown.

The Finals, or Fly-Off schedule should actually be a help to judging.

The resulting variety of maneuver schedules will keep everyone on their toes, and should add spice to the Pattern event. Each pilot will develop his own favorite schedule, modifying it from time-to-time (nothing says you can't change it between rounds, if you want to!) in order to improve his chances. It is even logical for some pilots to make up a schedule that totals less than 450 points. It's certainly better to

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Plug Sparks . . . Continued from page 74

stroke of .724 inches. Their weight was set at 7-1/2 ounces. Not too much to choose from!

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the crankshaft and connecting rods. the con rod was aluminum alloy, with a bronze wrist pin. The cases were die-cast aluminum alloys.

Here was an excellent example of competition forcing one company to give up its motor manufacturing because of the efforts of the dynamic duo, Kading and Brodbeck. The twosome was smart enough to cater directly to the modeler and his wants. An excellent example of this was the K&B booth at the Nationals every year, starting in 1946. They would repair or replace every motor broken at the Nationals. This was a terrific deal for the contestant whose model had just crashed, and found the only thing keeping him from flying was the lack of a complete engine.

Of course, the wise guys always took advantage of this deal, as many modelers used to take their motors, ruined over the regular season, and pawn them off on John Brodbeck as broken at the Nationals. Despite this, the offer still goes on. Starting in 1973, the booth was moved into the well-known orange and purple van, which visits all of the event sites.

MODELS

Generally, the first thing the neophyte asks is, "What kind of model should I build?" The answer

to that depends on your personality. If you are fairly easy going, don't really care much for competition, then the Texaco type model should appeal to you.

If, on the other hand, you have a little bit of the "hot dog" in you, and want to see the model perform more in O/T contest style, then the Limited Engine Run type of contest should be your bag.

Before getting on too far, maybe we should back up a bit and explain what we are talking about when we say Texaco, Antique, or things like that. The old-timer styles of events, have proliferated quite a bit over a period of 15 years.

Originally when gas models first came out in the early Thirties, you could use all the gasoline you wanted to fly your model. It doesn't take any brains to figure out that if you wanted to win, you just put more gas in your model. Of course, in those days of free flight, a considerable number of models were lost on extremely long flights.

In 1934, the first fuel limitation came out in the form of a 1/4 ounce of fuel per pound of model weight. To keep the boys from getting exorbitant amounts of fuel, the limit on fuel was set at seven pounds maximum weight (1-3/4 oz. of fuel if plane weighs seven pounds or over). These early events were sponsored by the Texas Oil Co. (Texaco), from which the event or type model has drawn its name.

Strangely enough, when the Texaco Co. was approached about sponsoring this type of meet, all knowledge of past activities was disclaimed. Truly a shame, as this shortsighted policy has cost the company in public relations, as the revived event by the SCAMPS did take off and become extremely popular. (Why give Texaco any more free publicity? Maybe there's an old-timer modeler out there who has connections with some other oil company that might be interested. wcn)

The big thing that appeals to most of the modelers in the Texaco Event is the slow majestic climb of the big old models. In addition, the magnificent glides are something to behold, particularly when in a thermal. The other side of the coin in the event is the tinkering with gas engines. With a premium on gas engine economy, the modeler has a considerable number of options at his fingertips. These options include fuel types, lubrications, spark ignition versus glow operation, propeller sizes versus wingspan, and most important of all, operating speeds.

The Limited Engine Run Events are exactly what the event says: Limited Engine Run. Historically, this is the event that replaced the Texaco Event, as the modelers were still losing models despite the fact that the amount of fuel was being reduced every year. Sponsors of the new event claimed this would reduce model losses, but as it turned out, a thermal has no respect for any size model.

The motor run limit was finally set at 20 seconds, with a limit on the flights of five or ten minutes, depending on the windy weather. This immediately indicates that you must build a smaller model (those eight and nine foot models would never climb in comparison to a five or six footer), with the hottest engine allowable under the rules.

These type events became extremely popular on the East Coast, as flying fields of any size were at a premium. It was actually amazing the response of modelers to this event, particularly when introduced with radio control in the early Seventies. Here was a chance to fly your favorite free flight model with little fear of losing it. Actually, most of the thrills of free flight have been perpetuated by this event, but some of the diehards look with disfavor on this method of flying. What must be realized in these days of urban sprawl is that there simply aren't the fields of the Thirties and Forties. After all, the population growth is now passed 218 million!

In discussing model types, the latest fad is the Cox .020 powered old-timers, called the .020 Replica Event. Here the models are scaled to approximately thirty-six inches of wingspan and powered only by the Cox .020 glow motor. In free flight, this has turned out to be the most popular event of all at the Old Timer Nationals, showing entries of 87, against 30 in the standard events.

Lately, with the new miniature radio sets being made available, single and two-channel .020 Replica models have been built. These small models show startling performances, even with the added weight

of radio control gear and batteries. Originally started as a Limited Engine Run Event, it was found the added weight of shutoff timers did cut down performance. In its place, a Texaco type of fuel allotment has been adopted: 1-1/2 cubic centimeters of glow fuel per flight. The interesting angle on this is that the Contest Director supplies the fuel; hence, everyone is on an equal basis as far as engine performance goes. Your model design and flying ability count here!

Looking strictly at the free flight side of things, the events have proliferated to such an extent that no less than 12 events are offered at the Annual SAM Championships (O/T Nats). Here, a greater variety of model sizes are offered, with Classes of A, B, and C being offered in both pylon and cabin type models. If you like to build and fly models, here is an excellent way to spend your time getting ready for no less than six events.

Other old-timer free flight events include the very popular .020 Replica, the lesser known Flying Scale events (both rubber and gas), Soaring glider, a 30 Second Antique event, and an Unlimited Event which is very similar to the Texaco type.

In short, what you need is the Official SAM Rulebook, available with your SAM membership, or by writing the columnist.

KITS

Most of us have a lazy streak or two in us; hence, it is no surprise to find a few old-timer kits commercially produced. Even the most meticulous scratch builder will admit some of the pre-cut kits are excellent. The following complete kits are available:

Playboy Senior (Tyro Models)
Buzzard Bombshell (4 K's Mfg. Co.)

Buzzard Bombshell (M.E.N.)
Dallaire Sportster (M&P)
Flying Quaker (M&P)
Quaker Flash (M&P)

The above are all nationally advertised and should present no problem to obtain. In the line of reduced scale old-time models, the following companies manufacture kits as listed:

Powerhouse 50 (Cal Aero)
A.T. Sportster 50 (Cal Aero)
Miss America 50 (Micro Models)
Mercury 50 (Micro Models)
Panther (Micro Models)

In addition, the extremely popular .020 Replica models are manufactured by Micro Models and J&R of Arizona. The former has an excellent line of .020 Replica models while J&R features the four fine flyers formerly produced by Cal Aero.

In the line of partial kits (which

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has turned out to be extremely popular), P&W Model Products produces 15 old-time partial kits, consisting of Comet Clipper, Zipper, Sailplane, Powerhouse, Buccaneer, Miss America, Ranger, Playboy Jr. and Sr., Korda rubber, and a few others. These are stocked and are available for immediate delivery from Gene Wallock (the W of P&W).

Parts are band sawed and disc sanded to careful tolerances. These kits allow you the option of picking out your own strip stock at the local hobby shop. After all, how many kits have you seen spoiled by lousy wood?

The only other partial kit manufacturer is Schmidt Custom Kits, featuring over 75 different designs available to the modeler. These custom kits are what is indicated: custom. They are only made to order and some delay is to be experienced. However, all work is good and a fantastic selection is offered. In addition, Schmidt will make a custom kit for you, providing the plans available show ribs and formers. Best idea is to check first.

Late item: Just received the latest kit manufactured by Danny Sheilds of Baltimore (7 Cinnamon Cir., Apt. 1C, Randallstown, MD 21133). In

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• HARKER HURRICANE I
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• SPERRY GLOUCESTER 40-100
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• GILL P-38 AIRACORRA
• CURTIS P-40C
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partnership with Gene Crim, they
are now producing a complete kit of
the old Burd Co. Kingbird for
\$27.00. As more become available,
we will keep you advised in this
column. Always the latest news!
PLANS

For the true scratch builder, plans
for building old-time models are
available from several sources. First
and foremost is the columnist's
business, Old Time Plan Service,
which features over 3,000 plans of all
types of models. As an old slogan
goes, "If we don't have it, it isn't
worth having."

Several magazines issue old-timer
plans, notably **Model Builder**, which
has been featuring an Old Timer
every month for the past four years.
"Stick-em" templates of ribs and
formers are offered with part of the
selection of plans, eliminating the
tedious job of tracing and/or gluing
the templates to the balsa sheet.
Plans are available at the **Model
Builder** editorial offices.

Model Aviation has featured
several old-timer models, primarily
radio control oriented. These in-
clude the Dennyplane, Miss Ameri-
ca, and several projects by Dee B.
Mathews. Flying Models has started
issuing an old plan a month, based
on the old Flying Aces issues of 1937
to 1942. Hopefully, they will be able

to continue this practice, as only
three have been issued so far.

There are several other plan pro-
ducers, but these are specialty type
models; i.e., .020 Replica, rubber,
etc. The best one of these is Jim
Noonan's "Old Timer Supplies,"
Box 18002, Milwaukee, WI 53218
who sells plans and produces kits of
old famous rubber models. Very
good selection of old famous
models. Four 13¢ stamps will get you
a catalog.

Others who sell plans on a small
scale are Bockman, Tyson, and a few
others the columnist fails to recall. If
we missed you, drop us a line and we
will carry your name as a source in
subsequent issues.

ENGINES

This is getting to be more and
more of a problem every year as the
number of motors available to the
average O/T modeler suffer a re-
duction by wearing out, loss, dam-
age, and to the engine collectors
themselves, who are growing every
year. Regardless of what this col-
umnist has been told, the supply of
good engines has suffered a marked
reduction, with resulting higher
prices on the available engines.

Recently, the SAM membership
voted to allow glow engines con-
verted to ignition engines on a
limited basis. This appears to be the

way out, as several people are
manufacturing "converted" igni-
tion engines. The most active are:

77 Products, Gardena, California
(see ad in MB)

Chandler Engineering, Canoga
Park, California

Fechner Mfg. Co., Salt Lake City,
Utah

New ignition engines based on
the old dies and molds are being
produced by the following:

Brown Jr., Wahl Mfg. Co., PA

Hurleman, Wahl Mfg. Co., PA

Forster 29, M&G, Denver, CO

Forster 99, M&G, Denver, CO

Original design motors which
have been accepted as the same as
the old ignition motors, include the
Golden Eagle and Spielmaker 60 as
produced by Spielmaker Works,
Wyoming, Michigan.

In this same line, there are others
scheduled to be started; the most
outstanding of these is Karl Carlson
Machine Works, San Jose, Cali-
fornia, who is hoping to produce the
Hetherington Meteor, Super Cy-
clone, and Anderson Spitfire.
There's lotsa action but things take
time. Eventually, the demand will be
eased somewhat.

That should about do it. We can't
offer solutions to everything, but we
do try in this column to keep every-
one updated on the latest develop-
ments in old-timer activities. Better
subscribe to this magazine so you
don't miss a thing! Now let's get on
with the regular portion of the
column. (As John has left out quite a
few complete addresses, we suggest
you contact him at HIS complete
address, per his ad in this issue. wcn)

LATEST SAM CHAMPS ANNOUNCEMENTS

Woody Woodman, Contest Man-
ager, is now circulating a sheet
indicating the latest changes to the
R/C ignition events to be run at the
SAM Champs.

Although the models are radio
controlled and therefore do not fall
under the free flight engine restric-
tions, Woodman has decided to
adopt Section 3, Item 7 of the 1978
SAM Rulebook. Here's how the
engine restrictions will be for the
ignition limited engine run events:

| Class | Original Ignition | Converted Glow |
|-------|----------------------|-------------------|
| Class | Engine Displ. | Engine Displ. |
| A | .000 to .200 | .000 to .150 |
| B | .201 to .300 | .151 to .250 |
| C | .301 to 1.20 | .251 to .400 |

Woody also sez the engine run
and maximum flight times will be
decided by the Contest Director on
the day of the events. This, of course,
will take into account the number of
contestants and the weather con-
ditions.

One note is that ignition engine
powered models will not be per-

mitted to cross-enter the glow powered events.

STRAWS IN THE WIND

If this gets published, the columnist will probably be burned at the stake for a heretic, but after reading the latest "Satellite" newsletter, as edited by Ralph Prey of the San Valeers, there is hope the free flighters may yet avail themselves of that handy black box known as radio control.

To quote Ralph Prey, "We discussed the feasibility of using R/C in large free flight models, like Dave Prey's 2000 sq. in. Class D ship, or 1300 sq. in. Satellites, as an extra insurance during test flying. It is a darn shame to put all that time and effort into that large a model and then crack it up because of some malfunction of say . . . a stuck timer or engine shutoff mechanism, or bad transition. With radio control to cut off the motor, it could save the model. If the timer stuck, or if the model is gliding toward a car, motorhome, or tent, the radio operated DT could also save the model.

"The idea of R/C in free flight is not new (note: the last guy who did this was literally burned at the stake in Phoenix as a warlock!), but it is one way out of a traumatic experience while test flying. As for its use in a contest, this is a long way off, but it does have its positive points. I'm looking into different types of R/C gear and will keep you posted as to my progress.

"Meanwhile, the Free Flight Association was approached on the subject, and a rule change is being sent by the Association to permit R/C in free flight under very special conditions that primarily concern safety. I am sure that every modeler, whether he be a controliner, or a dyed-in-the-wool indoor flyer, or an all-out, competition-minded FAI flyer, will admit he would hate to see a 2000 square inch free flight model glide into a Winnebago motorhome when it is possible to save the model with R/C DT."

How about that? Just what the columnist has been preaching for years, only to see it fall on deaf ears. Perhaps the FFMAASC will be able to alleviate this ostrich type, head-in-the-sand attitude on radio control. We've been doing this for years with old-timers!

(Sal Taibi helped us fly our R/C'ed Starduster 900 during the National F/F Championships at Taft in 1976 . . . see photo on page 6 of the July 1976 **Model Builder**. Only exterior change was widening of fuselage to take 2-channel Kraft for trim tab and pivoting elevator. K&B 40 used tatone cutoff. Funniest thing was Sal's natural reaction to take off on a dead run until we hollered, "Come

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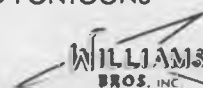
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back, Sal! Remember? I've got the transmitter!" We flew it into his hands at the end of a thermal-less 2-minute glide on a 10 second engine run . . . Perhaps we should detail the mods and the R/C installation:

In our February 1966 R/C column for M.A.N., we suggested the use of R/C for testing larger free flights in small fields. The idea was to use rudder-only, for bringing the ship back safely during trim flights. Leave the R/C gear in the plane during actual competition so as not to mess up balance. wcn)

Counter Continued from page 10

My reader (I have one, I just got a letter from him) will remember that I was chastised because I once mentioned that I didn't like the NAME of a certain model because it brought back unpleasant memories. I guess I'll catch it again from someone, somewhere, for the reverse this time, because, as New Zealand is one of my favorite countries in the whole wild world, I really like the name of Sig's new "Kiwi", which the New Zealander is called by everyone, including himself. The name, of course, refers to the nearly extinct, tailless, almost wingless, fuzzy little bird native to that country.

Sig's "Kiwi" is neither wingless, tailless, nor fuzzy. Quite the contrary, it is a slick looking Sport and Pattern model that you'll be proud to unload at the local field. It spans 54 inches, for four-channel radios and .35 to .45 engines.

All balsa and hardwood, it features a built-up wing, and die-cut balsa and plywood parts. The kit

includes a bubble canopy, pre-bent landing gear with hardware, hinges, horns, torque tubes, R/C links, wing bolts, and even an aluminum motor mount. Full-size plans and an illustrated instruction book and decals are included.

The Kiwi is only \$37.50 at your dealers or direct; a catalog listing the hundreds of items available from this large manufacturer/distributor is available for \$1.50. Sig Manufacturing Co., Montezuma, Iowa 50171.

No, the picture of the Top Flite propeller was not reversed during the printing process (The printing is right, correct?). And it is not April! It is an honest-to-goodness Top Flite reverse pitch prop, for pusher or reverse rotation engines for twins.

The one shown is an 11x7 Maple . . . only maple is being used for all Top Flite propellers now. At this writing, we don't know just what sizes will be available, and when, in this type of prop, but you can get that information from Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

The Damo 4-Cycle Twin, about which we first told you in our January "Over the Counter", at that time available only from Sweden, can now be obtained from Midwest Model Products, 6929 W. 59th St., Chicago, IL 60638.

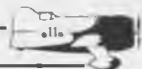
The Damo Twin is not made to be a collector's item; it is made to fly. It is claimed to turn a Top Flite 16-6 propeller at over 8000 rpm, and will idle down to 1200. It is only 6-3/8



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inches wide, and 3-3/4 inches long, to the rear of the prop. The weight is 19 ounces, less mufflers, which are not required, due to the quieter, four-cycle operation.

This engine has a total displacement of 1.10 cubic inches, at a bore of .9449 and stroke of .7874. The compression ratio is 8.5 to 1, with a calculated output of 1.25 horsepower. It uses a specially designed Perry carburetor, and operates on straight methanol, with 10% nitro being recommended. Due to the extensive use of bearings, no oil is required in the fuel, except in the case of tightly cowled installations, when 5% oil is recommended.

The crankshaft is supported by 4 ball bearings, the camshaft by 2 needle bearings. Even the connecting rods are bearing equipped, having a needle type at either end.

Write direct for further information, tell Midwest where you read about the Damo Twin.

* * *

Being right here in the heart of model manufacturing land, we can keep current about a lot of things. And we can assure you that if you are having some delay getting that new K&B product that you want, it isn't because they have all gone fishing. Quite the contrary, they have two shifts going and are working days, nights, and weekends just to keep us supplied. But even so, they are still finding time to develop and test new products and accessories.

For example, for you many outboard R/C boat fans, a new Exhaust Throttle Linkage Kit, for the K&B 3.5cc outboard engine, has become available. It includes all the parts necessary to make the connection

from the servo to the throttle arm. The kit includes a waterproof bushing, flexible cable, solder links, both fixed and adjustable, and all necessary hardware. The instructions include a list of parts, and an illustration showing a typical installation.

This new K&B Exhaust Throttle Linkage Kit should now be on hand at your closest boat center. For information, write K&B Manufacturing Co., 12152 Woodruff Ave., Downey, CA 90241.

* * *

Did you ever try to thread music wire? It can be done . . . you have the proper size dies and a way to hold it and drive it, plus a torch to remove and replace the temper, plus patience, and time. It isn't worth it, especially since the introduction of Du-Bro Spring-Thread Couplers, for .047 and .0625 (1/16th) wire. These little spring-like devices are simply soldered onto the end of the wire, and form a thread onto which any Du-Bro self-threading nylon link or ball link can be screwed.

The smaller one is No. 232, larger is No. 233; 10 for 39¢.

The .047 wire size should be just the thing to go with the new Mini-Kwik Links, only 3/4 inches long, for 2-56 threads, No. 228, 2 for 39¢.

And in the same vein, 1/2A's, is a 1/2A Control Horn, 3/4 inch long, with four connection holes for fine adjustment. It mounts with two 2-56 machine screws, included in the set. This one comes as left or right types, so you can place the screws in the thickest part of the control surface.

Pushrods? Sure enough! There is a Mini-Ny-Steel Pushrod Assembly, of the plastic tube and wire rod type, 20 inches long and complete with

Spring-Thread Couplers and Mini-Kwik Links, No. 113, two for \$1.49.

For other pushrod uses, a Mini-Kwik Link is recommended; available on 12-inch threaded rods. As No. 230, they come 5 on a card, at \$1.39. As No. 229, they are packaged in tubes, 18 for \$5.22.

And for models of all sizes, Du-Bro has a new fuel filter, No. 162, known as the "Final Filter". It houses a 130 micron polyester screen filter that should keep out the smallest particles, without impeding fuel flow. It can be installed in either direction, and is cleaned by back flushing. For fuel can or vehicle installation. Du-Bro Products Inc., 480 Bonner Rd., Wauconda, IL 60084.

* * *

Carl Goldberg Models, which needs no further introduction, has just announced its new Skylark 56 Mark II, an updated version of the well-known Skylark. The design has undergone extensive changes to bring it up to current requirements, as was recently done to the ever-popular Falcon 56.

The new Skylark is designed for four-channel radios, and comes complete with ailerons and aileron hardware. It has a wider and longer front end, to take larger engines and tanks. The kit includes heavy-duty landing gear, and steerable nose-gear. The fuselage construction has been strengthened and simplified, and the wing is also new, stronger, and features a symmetrical airfoil. The plans and instructions are of the traditional Goldberg quality, clear, concise, and complete.

This new old favorite still spans 56 inches, is 47 inches in length, at a flying weight of five pounds. It has an area of 558 square inches, and

requires a .30 to .40 engine up front. Kit No. C 21 IIm at \$44.95.

Not all Goldberg products are redesigns. For instance, the new Hold-downs, in flat or angle types, are the perfect solution to the old problem of how to hold down hatches, cowls, glider canopies and anything that has to be made removable. They weigh next to nothing, are easy to install, have more than ample holding power, and are only 69¢ for a package of four.

In the landing gear department, there is a 3/32 inch model for 1/2A's, complete with strut, bracket, steering arm and hardware, No. 167 at \$2.50. There is a 5/32 inch adjustable axle nosegear strut, in nickel-plated steel wire, that fits the Goldberg bearing and others made for that diameter wire. And there is an 1/8 inch nosegear strut, for Goldberg 1/8 inch bearings, also in nickel-plated wire.

Those of you who have used the Goldberg Hinge Slotting Tool Kit already know what a time and temper saver it is. A new Slotting Fork for this kit has been introduced, that will make the proper size slot for the smaller Klett RK-2 hinge; No. 276, at 50¢.

And for 1/2A and other small hardware requirements, Goldberg now has number 2-56 pan head machine screws, in lengths of from 1/4 to 1 inch, in 1/4 inch increments. They are packaged in sets of eight, and include nuts and washers. Lengths of 1/4 and 1/2 inch are 40¢ the set; 3/4 and 1 inch are 49¢ for the set.

Everything should now be at your neighborhood model store, look for it there. For complete information about the full line of products, contact Carl Goldberg Models, Inc., 4734 W. Chicago Ave., Chicago, IL 60651.

Following in the jetwash of its successful Axi-flo RK-40 Ducted Fan kit, Midwest Products has introduced its RK-049, designed for the Cox .049-.051 Tee Dee engines. This one too, is in kit form, which comes complete with all molded or machine-cut pieces, jigs, motor mount, and a tail cone that serves as a 1-1/2 ounce fuel tank. Full size drawings and an instruction booklet are enclosed.

Performance tests, using a Tee Dee on 25% nitro, at 20,000 rpm, show a thrust of 16 ounces. The RK-049 is priced at \$38.95.

And not being one to leave you hanging, Midwest Products has available an airplane kit for this interesting powerplant... Nick Ziroti's A4D-1 Skyhawk, in a polystyrene foam ARF version.

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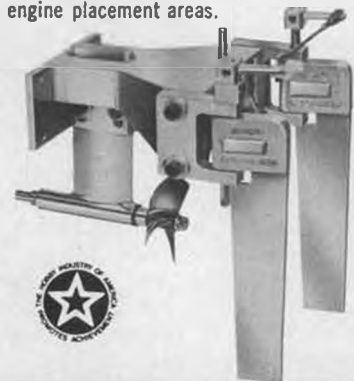


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Die cast aluminum, complete with 5" Master Mount, Screws and Washers, and Insert Adapter for .40 or .60 engine. Inserts can be rail mounted in boats with confined engine placement areas.



RUDDER ASSEMBLY

Aluminum die cast. Available for both .40 and .60 boats. Easy to assemble. Comes complete with Mounting Plate and Screws, Pivot Bracket, Rudder Blade, Pivot Pin — with Nylon Bushings, and Water Pick-up — threaded and adjustable. The .40 and .60 Rudder are identical, except the .60 Rudder Blade is 1/2" longer.

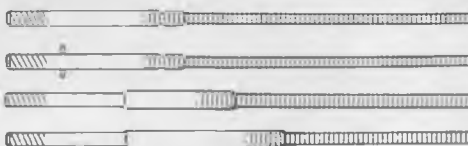


DOUBLE RUDDER OUTDRIVE ASSEMBLY For .40 or .60 boats. Aluminum die cast. Complete with Master Bracket (designed with twin ribs for individual modification), 2 Rudder Pivot Brackets, 2 Retainer Plates and all necessary Mounting Screws and Washers. Also includes Adjustable Strut — with installed Olite Bushings, Pivot Pins — with Nylon Bushings, 3 Control Arms — with set screws and 2 Rudder Blades (2 ARB for .40, 3 ARB for .60).

The **SINGLE RUDDER OUTDRIVE ASSEMBLY** is the same as the above, except it only includes 1 Rudder Blade, Rudder Pivot Bracket, Pivot Pin and Control Arm.



FLEX CABLE AND STUB SHAFT ASSEMBLIES

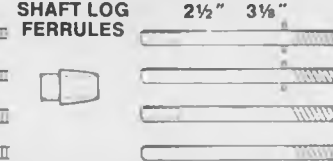


FLEX CABLE DRIVE LINE AND COMPONENTS

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STUB SHAFTS 2 1/2" 3 1/2"



Other Model Boating Hardware includes: Rudder Blades, Pivot Pins, Strut and Tee Bracket Assemblies, Struts, Stub Shafts, Olite Bushings, Solid Shafting, Flywheel Nut & Cable Adapter Assemblies, Tuned Pipe Couplers, Clamping Water Pick-ups, Skegs, Control Arms, Drive Dogs, Folding Scissors, etc.

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Model Boating
Hardware Catalog



K&B MANUFACTURING

DIVISION OF AURORA PRODUCTS CORP.

12152 WOODRUFF AVE., DOWNEY, CA. 90241

any ducted fan project depends in large on the design and construction of the duct itself, Midwest obviously spent considerable time and effort in the design and molding of this critical part. The benefit to the builder is twofold... it'll be correct, and it will be done in minimum time on your part. It has all been very well thought out, to include even molded compartments for the radio components.

Look for both these new and interesting items at your local shop, or write Midwest Products Co., 400 S. Indiana St., Hobart, IN 46342, for more information.

Another P-51 Mustang? Not hardly! Neither the House of Balsa "Candy Man" version, nor the kit itself can be described in that fashion.

This "D" version of the perennial WW-II favorite is designed for .29 to .40 power, though a sport .35 to .40 is recommended. It has a 49 inch wing, for 425 square inch area, and fuselage length of 39 inches. The flying weight is 23 ounces to the square foot.

The kit is all balsa and plywood, machine-cut and preformed in the high quality manner that has been synonymous with the name "House of Balsa" from its beginning. A

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| Sanja Barbara | \$30.00 | 10-Rater | \$30.00 |
| East Coast 12-Meter | \$30.00 | 50/800 (M-class) | \$30.00 |
| 36/600 | \$25.00 | Internat. A-class | \$35.00 |
| West Coast 12-Meter | \$30.00 | Star 45 | \$30.00 |
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molded canopy and deck assembly, and scale exhaust manifolds are included, as is a molded steerable tail wheel and door assembly. A full set of hardware is included: torque tubes, landing gear, control horns, hinges, machine and self-tapping screws. Two complete sets of decals are included, one for the "Candy Man", and one for the military version of the Mustang, and an accurate three-view drawing, for you to show the judges, comes neatly rolled.

And you will certainly be impressed, as we were, by the 31-page instruction booklet, which covers it all, from laying down the first piece of wood, to painting the completed model. Even if you are the hero-type of builder who never reads the instructions, read this one, you'll find it full of ideas that will save you building time... a benefit which you won't be able to deny. Even a shopping list is included, listing in detail the material needed but not included; wheels, pilot, fuel tank, etc.

At \$49.95, you'll find this kit the equal in workmanship and completeness of some priced considerably higher. Take a look at it on your next trip to your favorite hobby shop.

And to ease the strain and pain of at least a few of the building chores, House of Balsa has a couple of nice one-of-a-kind workbench aids.

First, called an "Up-Right", is a 90-degree alignment jig that will absolutely do away with slanted ribs in built-up wings. It is slotted for 1/16; 3/32; and 1/8 inch ribs. In use, it is slipped over the rib, and placed perpendicular to the building surface resulting in perfect 90-degree alignment.

It can also be used to align bulkheads, tail assemblies, fuselage sides... in fact most anything during the building process that requires one piece to be at 90° to another. And there are many of those.

Being a perfect 1/16 inch thick, the "Up-Right" can also be used as a thickness gauge whenever clearances or dimensions of that size are required. (It also makes a dandy giant paper clip! wcn)

The other item is a reinforced 1-inch diameter grinding wheel, of the thin type also referred to as a cutoff wheel. This has a woven fiber base, and is strong enough to cut and grind just about anything; steel, fiberglass, plastics, even that difficult-to-work landing gear wire. It is claimed to last considerably longer than non-reinforced wheels, and will fit all standard mandrels as furnished with all motor tools. It is called the toughest grinding wheel available. And it should be the toughest, but even so, House of Balsa reminds you on its label, we will remind you, and hopefully your mother will remind you: "WARNING: WEAR SAFETY GLASSES WHEN USING THIS TOOL". Which is excellent advice with whatever type of power tool you are using. Remember, the eyes you save may be those of one of our readers. From House of Balsa, 2814 E. 56th Way, Long Beach, CA 90805.

A new scale model of the "Daunt-

less", an aluminum "commuter" boat originally powered by high-performance Packard gas engines, has just become available from "The Model Boat People", Dumas Products, Inc. This 3/4 inch scale model comes out to a length of 49-1/2 inches, with a beam of 14.

The kit is of wood construction, includes deck hardware, and it can be powered by twin gas or electric power. The hull is a high speed design, with full rough-water capabilities.

Look for the "Dauntless" at all shops handling model boat supplies; Kit No. 1211, at \$59.95.

Dumas Products Inc., 909 E. 17th St., Tucson, AZ 85719.

Kustom Kraftsmanship, designers and manufacturers of many "go better" accessories, has once again added to its already extensive line. Latest offerings are a Custom Needle Valve, featuring a special thread and taper that enables the flyer to obtain very fine needle adjustments, even with high pressure fuel systems. It will fit the Cox and Rossi 15's; Super Tigre 15, 16, 21, all 35's and the 46; Enya and OS Max 35's, and many others. This latest version features a collet type holding nut to absolutely prevent the needle from drifting after being set.

Installation requires only a simple "remove and replace" procedure; full instructions for both installation and use are enclosed. Item No. 510, at only \$4.75.

And for all of you running (or floating) in events requiring rapid refueling, including pressure tanks, "K.K." has a Fuel Tank Quick Fill, of the type designed to slip over 1/2 inch I.D. tubing. It is molded from completely fuel-resistant material, and will cleanly close and reseal immediately upon withdrawal of the fueling probe. Item No. 700, 95¢ each.

All "K.K." products, and a catalog, are available directly from P.O. Box 2699, Laguna Hills, CA 92653, and at most larger hobby shops. Dealers may contact Joe Klause direct (714) 830-5162 or Ace R/C, A & L, or Midwest Products.

Sonic-Tronics, Inc., manufacturer of high quality accessories and support equipment has recently introduced its Mark V Super Electric Fuel Pump, a high-volume device designed to operate on D.C. voltages from 7-1/2 to 12. This pump should be an immediate hit, especially with those flying Mammoth scale, with their larger tanks. And of course, many of the pattern flyers are going to larger tanks, to keep up with the demands of the super

engines now being used for that event.

The Mark V pump is encased in a durable, easy to clean, white plastic case, consisting of motor, pump, and IN-OFF-OUT switch. Connections to the power source are made with small alligator clips, which come already attached to the 15-inch leads. Connections to the fuel can and the output to the airplane are made to sub-mounted fittings. The pump can be attached to the fuel can or tool box with a piece of two-sided mounting tape, also furnished.

Due to the high volume, the use of large inside diameter tubing is recommended, and is available complete with probe, as Kit No. 251, for \$1.79 each. Normal size fuel tubing should only be used when the pump is operated on less than 9 volts.

Guarantee? Two years . . . which, to us, means that it is so well made that Sonic-Tronics backs it up all the way. Look for it on your next model shopping trip, it is only \$13.95, or write to Sonic-Tronics Inc., 518 Ryers Ave., Cheltenham, PA 19012.

* * *

If it is data on World War II airplanes that you are looking for, Superscale, Box 201, Arlington, TX 76010, is probably your best bet. It has many-view . . . as different from 3-view . . . drawings of a number of the favorites from those days. These are not plans, with formers and longerons as we use them, but detailed drawings, including cut-aways and photos from which plans can be developed to any scale. Included are wing airfoils, fuselage cross-sections, landing gear close-ups; in short, all of the information needed except a color photo.

Included in the \$1 catalog are 1/16th size drawings of the FW-190, Rf-109, Mk-1 Spitfire, Corsair, Mustang, and Curtiss P-40, and a 1/20th scale P-38. The Corsair is \$7; the others only \$5. Special orders will be accepted for the A6M5 Zero, P-47, AT-6 and TBF drawings, also at \$7.

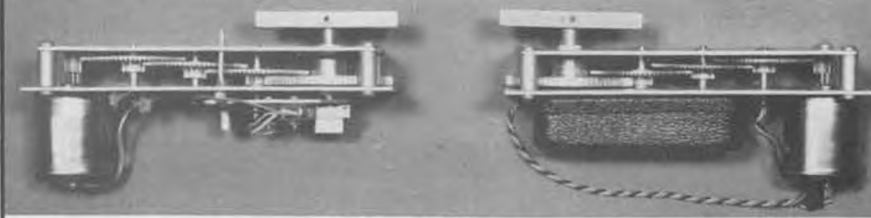
The illustrated catalog shows greatly reduced copies of these drawings, and should certainly be investigated by anyone considering construction of one of these machines.

* * *

As better ducted fan units become available, more and more airplane designs and kits are becoming available. Among them being the beautiful North American F-86A Sabre, for the Midwest RK-40 fan unit and four-channel radios.

The manufacturer, Air-Forms, Inc., has strived to provide us with a

SAIL CONTROL WINCHES



W-1 . . . \$59.00

W-2 . . . \$119.00

• Custom R/C design for all boat sizes • Power - 40 in. lbs. • Travel time - 5 seconds • Voltage - 4.8-6 (W-1) • Size - 2 x 2 x 5 inches.

The Probar W-1 is mechanically operated by a separate, neutralizing servo. The Probar Propo W-2 is designed to plug directly into the receiver, and requires no extra batteries. Specify Kraft, Futaba, or no connector. Both winches are fully assembled and tested, ready to install. All mounting hardware, switch pushrod (W-1 only), and winch arm blank are supplied.

STAINLESS STEEL HARDWARE:

Turnbuckles, Chainplates, Goosenecks, Boom vang pivots, Pad eyes, Tangs, Deck cleats, Boom cleats, Rigging wire.

MISCELLANEOUS ITEMS:

Sheet exit guides, Bowsie, Rudder posts, Mast head fitting, Dacron sheet line.

Dealer inquiries invited

PROBAR DESIGN

P.O. BOX 639 ESCONDIDO, CA. 92025

reliable design that can serve as a Sunday flyer, or, with the full building treatment, as a serious contender in any Sport Scale competition. It is basically an epoxy-glass, foam and balsa kit, which also includes pre-bent landing gear, scale canopy, plans and instructions, and authentic decals.

The F-86 spans 49 inches, for a 616 square inch area. It weighs 6 pounds ready to fly, for a wing loading of 22.8 ounces per square foot. Flight response is described as excellent.

See your local dealer first; if not yet on hand, order direct. The price is \$134.95; New Mexico residents are reminded of the 4% sales tax, and foreign buyers are asked for U.S. fund check or money orders on U.S. banks only.

Air-Forms, Inc., is located at 201 W. Yucca, Clovis, NM 88101. Tell them **MB** sent you.

* * *

A new 1/12-scale electric car chassis, known as its Model E-45, has been introduced by Electro Craft Systems, 924 Ferngrove Dr., San Jose, CA 95129.

It is made of laminated fiberglass, and is claimed to have a number of advantages over a chassis made of metal. In addition to not bending or permanently deforming, it minimizes electrical (RF) interference to the radio system. It is easily assembled, and is predrilled for standard MRP 1/12th scale components. It also can be easily adapted to other front and rear end parts, such as Marker. A built-in battery pan, for either 4- or 6-cell packs, simplifies battery installation.

The E-45 chassis is priced at \$11.95, and is only one of the many 1/12th-scale electric R/C car conversion parts, as well as complete cars available from Electro-Craft. Its competition speed control, the PSC-9FR, is the winner of numerous Class D electric car races, including West Coast, and National Championships.

Complete information is yours for 25¢; and all items are to be found in some R/C car oriented hobby shops or can be ordered direct. Dealer inquiries will be promptly answered.

* * *

Being the sort who will do anything to avoid working up a sweat, we can't tell you anything about sweat socks, but if it is protection for your sailplane wings that you are interested in, we have good news about "Wing Sox".

As the names implies, these are protective coverings for your wings during transport and storage, and will also provide equal protection for removable stabs on those ships so equipped.

"Wing Sox" are made of absorbent washable polyester, with a handle placed at the balance point. The handle is large enough to allow slipping it over your shoulder, leaving your hands free to carry a fuselage and all the other paraphernalia.

"Wing Sox" are individually patterned for each model sailplane, and are available for the Windrifter SD-100, Cirrus, ASW-15, Aquila, Olympic II, ASW-17, Super Monterrey, Centurion II, Libelle, Midwest Hawk 8, Hobie Hawk 10, Paragon, Wanderer, SB-10, and Sallaire. And you have your choice of colors, in red, yellow, orange, royal blue, or

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SAVE: We have 20 oz. spools of 1/4" only, 25% more rubber, only \$10.10 postage paid.

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Phoenix, Arizona 85068

black. They are priced at \$19.95, except for the Sailaire type, which is \$24.95. Direct orders please, with checks, Master Charge, or B-of-A being accepted. Available only from G.B.S. Enterprises, P.O. Box 1701, Burbank, CA 91507.

There is joy in Cellatica tonight... which in case you didn't know, is the home of the Rossi engine. The cause of said joy is the recent release of the latest model of the well-known Rossi 61, that has proven so successful for pattern and sport R/C flying.

This one bears some external resemblance to the older model, in that it is a front-intake model, and the general shape of the case and head are the same. Externally, the two main differences are the rear exhaust, round, as used in so many of the higher power engines; and reversible front and rear covers. The latter is necessary, in order to make it adaptable to marine use, which requires that the crankshaft end and exhaust face the same way.

It comes complete with tuned pipe muffler, as did the older model. Two engine-to-pipe adapters are

available, one straight, and the other with a slight dog-leg to place the piper higher, allowing room under it for the tank installation in retract gear-equipped ships. A very clever spring and ring is used to hold the adapter to the engine. Muffler pressure is available from a nipple properly placed on the adapter. More power and RPM... to the tune of 750 to 1000.

The price, with one adapter and pipe, is \$175. Distributed by Bill's Miniature Engines, 1325 Carol Dr., Memphis, TN 38116, and available on the West Coast from Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, CA 92653.

DJ's Multi-Stripe is back! Actually, it hasn't been anywhere, though it has been in short supply in some colors. All availability problems should now be over, according to its new supplier, Techni-Models.

And to make the news even better, some new colors have been added to the already extensive line; orange, green, and silver. The original colors are: yellow, red, white, black, gold, and blue.

DJ's is individually and hermetically packaged in 36 foot rolls, and is available in 1/16 widths at \$1.98; 3/32 and 1/8 at \$2.69; and 1/4 at \$3.69. New widths, 3/8 and 1/2 inch, for Mammoth Scale and similar uses, is currently being processed and should be available by the time you are reading this.

Look for DJ's Multi-Stripe in your favorite color and width at your neighborhood hobby store. If he doesn't yet know it, tell him it is now on hand at Techni-Models, P.O. Box 9382, Glendale, CA 91206.

Wanna start something? Call Bob Davis, at Davis Diesel Development, he'll be glad to provide you with one of his new spring starters, designed

for the Cox Tee Dee or Medallion engines. It will work on either the normal glow engine, or the Davis conversion to diesel, with enough quick snap for even the most stubborn of engines. It is \$2.95 at your dealers, or direct, for which you should include 50¢ for postage and handling.

DDD also announces its new R/C throttle version of the proven .049 and .051 diesel conversion. Driving a 7 x 3-1/2 prop, the range of this servo-operated throttle is from 13,000 to 5000 rpm. It is priced at \$12.95, plus \$1 for direct orders.

A kit to add the throttle feature to older diesel conversions is also available, at \$3, plus 50¢ postage and handling.

From Davis Diesel Development, Inc., Box 141, Milford, CT 06460.

Those of you who dislike the non-scale speed with which the pneumatic retract gear systems operate, will be happy to learn of a new restrictor now available from Fliteglas Models, that slows them down to a realistic speed. They are simple to install, requiring only that the lines be cut, and the restrictor installed; no adjustments, no calibration, no fuss, no muss.

In common with so many other model products, this one looks like you can do it at home for practically no cost, until you look down into that three-thousandths-of-an-inch hole. Try drilling THAT with your hand drill and a dull nail!

The restrictors are six, enough for a three-wheel system, for \$5.95.

And we have just discovered another clever use of Fliteglas Models' "Liquid Mask" (see MB Dec. 77, article "Finishing Techniques"). It can be used as a protective coating for canopies, after installation, to prevent those scratches that sometimes occur during the rest of the building process. In this case, since trimming for numbers or designs is not to be done, even the sloppiest of brush applications will suffice. And once you are done and ready to fly, it'll peel off nice and clean, leaving you with an unmarred canopy.

The "Liquid Mask" is at many hobby shops. As the "Pneumatic Restrictors" are new, you may have to write direct to Fliteglas Models, RR 1, Box 324, Neoga, IL 62447. Tell them who sent you.

No, no, D.I.C.E., Inc. is not a new Las Vegas company which is producing model products out of old "galloping dominoes". It is an acronym for Diversified Industries for Competitive Employment, a company formed primarily to train and pro-

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All but one of the winners used Octura Props, most all used Octura Struts, Rudders, Etc.

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Plus! New NAMBA Oval Record
of 1 min., 13.4 sec.

vide jobs for the handicapped and others finding it difficult to obtain steady employment. Which we think is a commendable idea!

D.I.C.E. makes many products for the automotive industry, and has just recently turned its expertise to model items. It has two power panels, of the type that we see so many at the flying fields. Model ALS I, at \$39.98, not only provides all the proper voltages for your fuel pump, glow plug, and starter from a single 12-volt source, it also includes a fast field charger, and an amp meter to monitor proper operation.

Model ALS II, is a basic panel, with voltage distribution only as above, but no charger or meter.

A distinct difference in these power panels is that they are custom made, for you and only you. You can pick your choice of colors; wood grain, yellow, red, black, or green; and you can select a symbol for the type of modeling activity you most enjoy; Pattern, vintage, helicopter, boat, or car. And if that isn't enough, it'll come to you with your name and AMA number engraved on it.

D.I.C.E. also has molded wheelwells, also in your choice of colors; black, red, green, white, and yellow. Extremely lightweight, and for sizes from 3 to 3-3/4 inches, in 1/4 inch increments. They are only \$1.89 per pair; Half-A sizes will be available soon.

And to solve those perpetual storage problems, you can order 38 and 48 inch storage tubes, useful for plans, balsa, pushrods, piano wire, etc. They are \$1.59 for the 38 inchers, \$1.98 for the 48's.

All from D.I.C.E., Inc., 701 Beta Dr., Cleveland, OH 44143.

In my travels "down under", I was once told about a boomerang that weighs "ten stone or so" (about 140 pounds) guaranteed to ALWAYS come back at a high rate of speed. It is supposedly made in limited quantities, and only for persons who want one for their mother-in-law.

I think the teller was pulling my

leg, 'cause I don't see such a listing in the latest catalog from "The Boomerang Man", and every other type of these fascinating flyers is included. Actually, 27 types of boomerangs, from simple ones for beginners, at \$3.25, to \$40 "kylies", or hunting sticks, are on hand. The catalog is fully illustrated, and includes descriptions and recommendations.

Apparently this is a larger sport than is generally known, as there is even an Annual Smithsonian Boomerang Competition held in Washington, D.C. every year.

Drop a line and ask for a catalog, and a copy of the latest "News-O-Rang" newsletter, both of which are interesting reading. The Boomerang Man, 311 Park Ave., Monroe, LA 71201.

We don't really have too much information on the new kits from Flight Dynamics, but we couldn't resist sharing such nice photos of such nice models with you.

They are all small R/C; the '51 shown is for an .049 to .10, spans 36 inches, and will weigh from 22 to 28 ounces, depending on engine and radio used. It sells for \$31.95.

The Ryan uses a Tarno throttled TD, as shown, weighs 22 ounces, and spans 36 inches. It is priced at \$39.95.

The SNJ-6, as indicated on the rudder, or "Terrible Six", as it was called in Korea, uses a .10 to .20, at 34 ounces, and 42 inches. It costs \$39.95.

And last, but not least, the J-3 Cub for an .049 with Ace throttle, at 20 ounces, using KPS-18's and a 42 inch wing. This one is \$31.95.

For complete information, contact Flight Dynamics, Inc., 7036 SE 52nd St., Portland, OR 97206.

What's your bag? Well, considering how much you paid for that R/C system, it should be a "Trans-Bag" from Custom Model Products. It is a 100% cotton flannel carrying bag that will protect your transmitter

from dust, dirt, and moisture, and is especially recommended for open-gimbal sets. It is available in red, blue, or gold.

CMP also has a selection of quality adhesives, of various types, to handle any and all model gluing requirements. You can choose from Quick Cure 5-Minute Epoxy, that dries clear, sands easily, and is compatible with most polyester resins... a good point to test for with all epoxies, if you also plan to use a resin. For one-part gluing requirements, there is "Fast Tak", a resin glue claimed to outperform the aliphatic glues in many ways, one being that it sands cleanly. And for you cyanoacrylate fans, there is "Fast Bond"; cures in seconds and is recommended for balsa, hardwood, nylon, and most model construction materials. It comes with a unique applicator designed for best application. And for foam applications, such as wing covering with balsa or plywood, CMP has "Foam-Tak" contact cement, light, waterproof, and non-harmful to foam. Except for the "Foam-Tak", which is available only in 8-ounce jars, all the others come in small sizes for Peanutters, and larger more economical containers for Mammoth Scale builders.

A really interesting product from CMP is its "Geni" Sport Trainer for .19 to .35 engines, in balsa, Flite Ply, and hardwood. The prefabrication of this kit has to be seen to be appreciated, and the instructions, full and concise and including a fully detailed isometric drawing, guarantee that even the most novice builder will be able to get this one in the air. Once there, the shoulder wing design and semi-symmetrical wing should keep it there through those important learning days.

The "Geni" spans 52 inches, at 530 squares. With a four-channel radio, it should weigh between 52 and 56 ounces.

Drop Custom Model Products a line at 27 Fulton St., Brockton, MA 02401, and tell them we asked you to send for a catalog... you'll enjoy it.

YES-SIR, YES-SIR, THREE BAGS FULL!



WALT MOONEY NOW OFFERS 3 BAGS OF PEANUT SCALE PLANS
ALL WELL TESTED DESIGNS, AT ONLY \$5.00 EACH

EACH BAG FEATURES FOURTEEN PEANUT PLANS,
ONE OTHER, PLUS PHOTOS AND INFORMATION

SEND \$1.00 FOR COMPLETE LISTING AND SAMPLE PLAN TO:

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SAN DIEGO, CALIFORNIA 92123

VINTAGE R-C PLANS



PIPER J-3 CUB - 1/4 SCALE
9 FT. Wing Span — DESIGNED BY - R.C. SWEITZER
(IDEAL FOR QUADRA GAS ENGINE)
MAKE LARGER COUL FOR QUADRA ENGINE

Plans: \$13.95 PLANS-ADD \$1.50 POSTAGE
3 SHEETS 36"x72"

Plastic Cowl: \$8.75 \$1.50 POSTAGE

Edo float plans: \$4.00 \$1.00 POSTAGE
FLOATS-47" LONG

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13157 Ormond, Belleville, Mich. 48111

A combination audio Speedometer/Tachometer, utilizing the Doppler principle to measure speed, has just been introduced by Wings Engineering, 19 Sea Beach Dr., Stamford, CT 06902.

It is called a "Sonotrack", and it can be used to measure RPM up to 30,000 and speeds up to 200 mph. It is a lightweight device, at 12 ounces, and measuring only 4 x 3-5/8 x 2 inches. A 9-volt transistor battery is required for operation; the alkaline types will last for up to 10 hours of continuous operation.

It is simple to use, requiring only that you match the engine type sound emitted by the "Sonotrack" to the sound of the engine, and read the RPM directly off the calibrated dial. To read MPH, you match the sound as the airplane approaches, and as it passes, and then read the dial. It is stated that only a few minutes of familiarization are necessary to obtain consistently accurate readings.

The "Sonotrack" is priced at \$69.95; for complete specs, write Wings Engineering and mention who told you about it.



R/C World . . . Continued from page 19

tional Modeler Show, which took place on April 28, 29, and 30. Next year, this show will be moved back to January 6 and 7, in Pasadena, and all future IMS shows will be in January, the most popular time for Easterners to visit California. Why not plan now to come to California for New Years, and take in the Rose Parade, the Rose Bowl, and the IMS Trade Show! We are investigating the possibility of putting together a package deal.

We'll keep you posted. . .

Workbench . . . Continued from page 6

smashed, but managed to get back to the airport in one piece. That scene was in "It's a Mad, Mad, Mad, Mad World."

Frank joined forces with another stunt pilot, Paul Mantz, in 1964, and established the famed Movieland of the Air aircraft museum at Orange County Airport. Paul Mantz was killed in 1965 while trying to land the freak aircraft that was "built" by the actors, headed by Jimmy Stewart, in the movie "Flight of the Phoenix." If

you recall, that was the movie with the great sneaky switch, where the "aircraft designer" who engineered the construction of a weird airplane from the pieced-together parts of a crashed Fairchild C-119, turned out to be a model builder, not an aeronautical engineer!

Our personal contact with Frank Tallman began when Col. Bob Thacker met us at the airport to photograph his Sopwith Camel. While we were shooting out on the ramp, Tallman taxied up in his Aztec and came over to chat . . . with good reason . . . he was building a full-size Sopwith Camel in one of the nearby hangars. After taking us over to see it, and giving us carte blanche to come back any time to watch the progress, he volunteered to hold the Camel for several more shots, one of which became the September 1973 cover of our magazine.

In closing, we can only say that we are extremely proud to have been an acquaintance of one of the greats in aviation history.

THINGS TO DO

The San Francisco Model Yacht Club will host the "Mercury Marine California Outboard Classic" for R/C Class A stock engine outboard tunnel hulls, sponsored by Mercury Marine, Fond du Lac, Wisconsin, on Saturday, June 24, 1978, from 10 a.m. to 4 p.m., at Spreckles Lake, Golden Gate Park, San Francisco. Scheduled events include a timed single boat lap, a Concourse d'Elegance, several six-minute enduros, and heat racing involving five or six boats negotiating a course for six laps. Mercury Marine is sponsoring the trophies, and a Grand Champion will be crowned. For further information, contact Jay Selby, 682 Emerald Hill Rd., Redwood City, CA 94061, (415) 366-9831.

A thousand dollars in cash prizes features the 6th Annual Fort Wayne Air Races for QM and Formula 1 on

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CASH & WILL TRADE, new R/C engines for old engines and built-up R/C model airplanes — any type. Hobby Capital R/C, 46 North Oak Street, P.O. Box 2002, Ventura, CA 93003. Ph. (805) 643-7616.

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PLASTIC AIRCRAFT MODELS, a superb 32-page magazine from England packed with in-depth kit reviews, detailed modeling articles, accurate drawings, and clear sharp photos. Send \$1.50 for sample or \$9.00 for six-issue subscription (checks payable to "J.J. Daile-da") to USA/Canada PAMAG Agent, 4314 West 238th St., Torrance, CA 90505.

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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.

Saturday and Sunday, July 8 and 9, in conjunction with the City of Fort Wayne's Three Rivers Festival. Sponsored by the Fort Wayne Flying Circuits, Inc., each event will have cash prizes of \$250 for 1st, \$150 for 2nd, and \$100 for 3rd. The first three place winning engines will be inspected. Flying site is Jefferson Township Community Park (grass), located five miles east of New Haven, Indiana. For more information, contact **MB's** pylon man, Jim Gager, 3727 Shepherd Lane, Fort Wayne, IN 46815, (219) 485-3467.

The Milwaukee Flying Electronics, Inc., will hold its 7th Annual R/C Contest for Aerobatics, Sport Scale, and Precision Scale. All four skill classes of aerobatics will be contested. The contest will be held at the Electronics' Aero Park Airport, west of Milwaukee, on August 19 and 20, 1978. For further information, contact Larry D'Attilio, 4112 N.

Downer Ave., Shorewood, WI 53211, (414) 332-7702.

It may surprise some modelers to know that the Toledo Weak Signals does something other than put on the largest R/C Consumer's Trade Show in the country. For one thing, the club is holding a sailplane contest on September 3, 1978, starting time 9:30 a.m. Held at the club's own flying field, the events include Open, Standard, and 2-Meter Precision and Duration. Entries are limited to the first 100 entry forms received. Get yours from C.D. Dave Leach, 5506 Douglas Rd., Toledo, OH 43613, (419) 475-8351.

OVERSIZE PEANUTS?

One of the changes resulting from **Model Builder's** recent expansion, was the relocation of our regular monthly full-size Peanut plan. Realizing that the plan could no longer run through the gutter (the center

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portion of the magazine) and maintain accuracy, we cut the plan down the middle and moved each half about a 1/4-inch away from the center. Now, each half could be machine-copied, the two halves matched up, and construction could proceed.

However, we have just received a letter from charter subscriber Bill Kincheloe, Los Gatos, California, who warned us of a possible problem that we should pass onto other MB Peanut builders. Check your Xerox (or whatever) copier for accuracy to make sure you don't end up with an oversize (and illegal) Peanut. Bill drew a 6-inch line on a piece of paper, ran it through his company's Xerox machine, and came up with a 6-1/8 inch line. This could give you a 13-1/4 inch Peanut, and lots of trouble at a contest!

We promptly ran the test sheet through our office machine (a Toshiba 255) and it came out exactly 6 inches on the button. The obvious

conclusion is that you had better check your copies after running them, to make sure your particular reproducer doesn't make undesired modification to the plans!

SHULMAN SYSTEM

A few years ago, Leon Shulman, along with Keith Finkenbiner and Herb Foster, developed a new procedures system for managing pattern contests. The system has worked so well, providing plenty of flying time for large numbers of contestants within the normal daylight hours, that other clubs have begun to adopt the system.

Known as the "Shulman System", a complete set of instructions is now available, reprinted from an article published in RCM in 1971. You can't beat the price . . . send a stamped, self-addressed, business-size envelope to Leon Shulman, 173 Essex Ave., Metuchen, NJ 08840, and the 6-page set of instructions is yours.

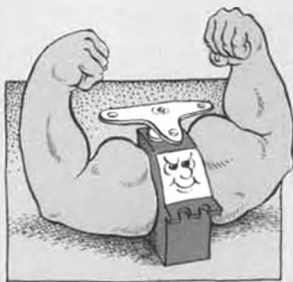
TURNER FOR LT. GOVERNOR

Received a newspaper clipping

from Roy W. Turner, Oklahoma City, Oklahoma, a frequent competitor in Old-Timer Free Flight contests, and whom we met on several occasions at the Free Flight Mecca, Taft, California. We were never aware of the fact that he is the son of Roy J. Turner, Governor of Oklahoma from 1947 through 1950.

The clipping from the Oklahoma Journal clarified this fact, and also announced that Roy W. is seeking election as Lieutenant Governor. Roy is 46, a petroleum landman, and is making his first attempt at public office.

All we can say, is that if Roy can handle the office of Lieutenant Governor with the same neatness and precision with which he builds and flies those beautiful Old-Timers, he's the man for the job. Fellow Okies can contact him at Kilgore-Turner Petroleum Corp., Suite 106, Ciudad Bldg., Oklahoma City, OK 73112.

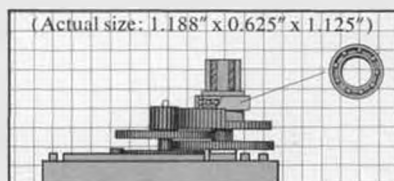


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