

RCM



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AUGUST 1979

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radio control MODELER

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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You've got the desire to be a Champion.



control buttons and servo reverse switching. And serious fliers can also appreciate our water and dust proof, dual ball bearing S121 servos, modular RF boards and direct servo control.

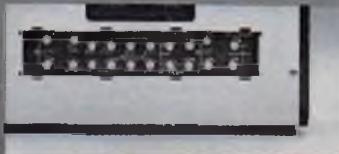
The J-series Futabas are available in 4, 5, 6 and 8 channel systems, plus a



5 channel Helicopter system. Write now for complete technical data, because the sky's not the limit any more.

All J-series systems use quick change RF modules for band and modulation selection.

Dreams of conquering the skies are what makes a winning pattern flier. But even the best contest competitors know that you've also got to have the right equipment. Futaba's J-series radio control systems are just that. Pure, state-of-the-art electronics with high-performance features like full programming capability, dual mixing circuitry, roll and snap roll



Behind the RN's back panel are 20 programming control settings, including 2 dual rates and 3 non-linearity functions.



Model 5JH/\$749.95

Model 8JN/\$799.95

We've got your radio.
Futaba.

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MODELER

EDITORIAL

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**This Month's Cover**

features Diane Suszynski showing off Jack Albrecht's Mirage II fighter. Span is 1220 mm, length 1200 mm, powered by a pumped K & B .40. Radio is a Kraft KP-7C. In the background is Mission San Luis Rey, founded in 1798. Ektachrome transparency by Ed Suszynski.

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From the Shop

DON DEWEY

As you read this, our staff has already done their thing with the trade shows, expo's, etc., for the first half of the year. A little known facet of the various shows involves the clubs which conduct those affairs. I am referring to the club benefits provided by the profit derived from the shows.

The Toledo Weak Signals Radio Control Club, Inc., was able to make the last payment on the purchase of its club flying field from the 1979 Expo. Unfortunately, a high powered microwave transmission tower has been erected adjacent to their property and the radiation from that tower makes R/C operation in the vicinity a bit exciting. The Weak Signals are now involved in negotiations for another parcel of land in a safer locale.

From the Westchester Radio Aero/Modelers we received the following news release:

Wrms Dedicate New R/C Air Park

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



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

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



The parking area has space for about 50 cars and the transmitter impound rack is topped by a windsock. Future plans may include a field house.

The WRAMs welcome spectators. Field hours are 9 a.m. to dusk on weekdays and 11 a.m. to dusk on weekends and

holidays. Patterson is located in the northwest corner of Putnam County.

• • •

While not involved with shows, the Chula Vista Model and Radio Control Club, Imperial Beach, California, has a situation that we find interesting. The following is reprinted from their newsletter, The Aeronut Flyer, Norm Pos, Editor.

OLF/Aeronuts Coordination

Technically, we have always been subject to FAA rules regarding general air traffic in and about the county. This status was largely treated with benign neglect by all parties concerned, but the collision between the PSA craft and a Cessna over Lindbergh Field has changed that.

We were visited at the field by some FAA people, and subsequently a meeting was arranged between representatives of our club, the FAA and OLF-Imperial Beach (formerly known as Ream Field). This is the military airfield to our immediate north from which all those helicopters can be seen flying.

The following Letter of Procedure is a consequence of that meeting. Read it.

OLF Imperial Beach Tower and Chula Vista Radio Controlled Model Airplane Club (Aeronuts)

Letter of Procedure

Effective: April 1, 1979

Subject: Coordination Procedures

- A. **Purpose:** To establish procedures and responsibilities for control of Radio Controlled Model Airplanes within the OLF Imperial Beach Airport Traffic Area.
- B. **Scope:** Area to be used by the Aeronuts is located adjacent to Old Border Field which is located 1.7 nautical miles south of Imperial Beach airport and directly adjacent to the Mexican border.
- C. **Responsibilities:**
 1. Chula Vista Aeronuts SHALL:
 - a. Notify Imperial Beach tower by telephone (424-5713) when flying will commence and terminate.
 - b. Notify Imperial Beach tower if flying terminates early or is expected to continue later than planned.
 - c. Remain well south of the Tia Juana river at all times. (Note: The river is about half way between our field and the south edge of OLF Imperial Beach.)
 - d. Remain below 500 feet above the surface.
 - e. Remain clear of clouds at all times.
 - f. Conduct operations in a manner so as not to become a hazard to piloted aircraft.
 - g. Notify Imperial Beach tower immediately of any conflict with piloted aircraft. (Noting side number, bureau number, type, time and any other particulars).
 2. OLF Imperial Beach Tower SHALL:
 - a. Advise piloted aircraft to remain clear of radio controlled model airplane operating area as defined in paragraph B, when these operations are in progress.
 - b. Advise Border Patrol aircraft when known radio controlled model airplane operations are in progress.

/s/ ACCS John O. Lea

Chief, Imperial Beach Tower

/S/ Troy Allen

President, Chula Vista Model and Radio Control Club (Aeronuts)

There you have it folks! In effect, our activity is officially recognized (actually, as a "hazard"), and the above "letter of procedure" is largely self-explanatory.

What you should do when coming to the field to fly, is to call the tower (424-5713), and simply inform them of your intended flying schedule. On weekends, it probably would suffice to simply say "from now to sundown." But do it.

to page 185

FLASH! ECONOMY BULLETIN!

EVRA 190 is the Economy Champ of Model Airplane Engines!

The price of glow fuel has been radically increased — Missile Mist is now \$24.75 a gallon!

A regular .60 size glow engine will run about 2 hours on a gallon of glow fuel at \$24.75.

An EVRA 190 uses regular gasoline (less than \$1.00 a gallon) and oil and it will run over 4 hours on that \$1.00 gallon.

Here are the comparable running costs of a .60 glow engine and the EVRA 190. Compare (and then order an EVRA!)

Running Cost of a .60 glow plug engine

\$12.38 per hour.

Running Cost of the

EVRA 190 24¢ per hour..

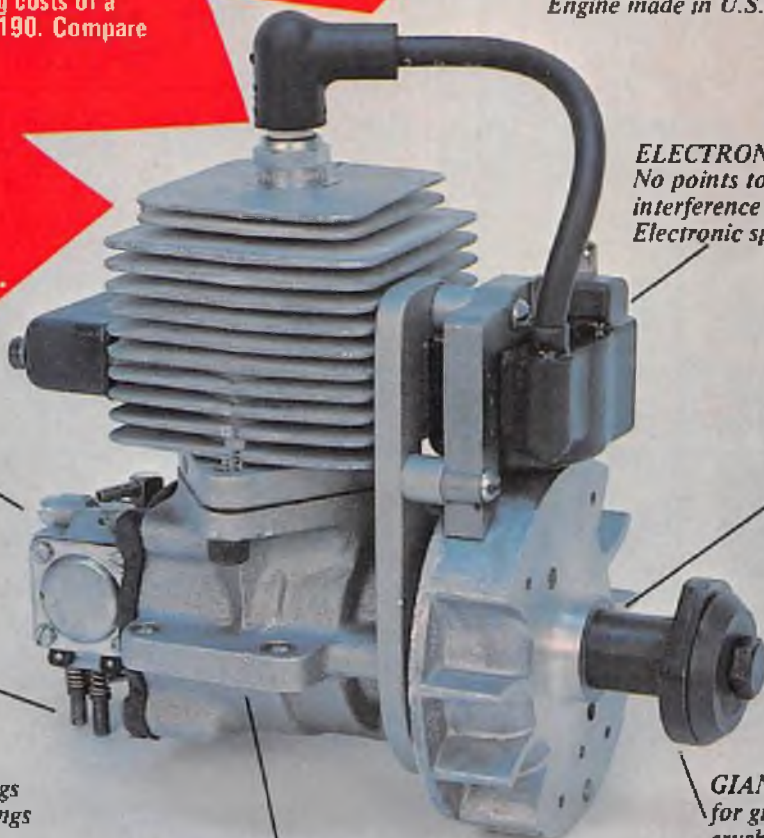
PUMP PRESSURE CARBURETOR — You can put the fuel tank five feet away from the engine and still get proper fuel feed.

CARBURETOR has low speed and high speed mixture adjustments and idle stop screw.

INSIDE: 2 roller bearings on con rod, 2 ball bearings on crankshaft

INSIDE: Loop charging for maximum power and easy starting.

BEAM MOUNTING FLANGES — For easy mounting in aircraft that have wood engine mount rails. **AND,** there is a cast aluminum **FIREWALL ENGINE MOUNT** also available.



Engine made in U.S.A.

ELECTRONIC IGNITION — No points to foul or cause radio interference problems. Electronic spark advance.

CANTILEVERED CRANKSHAFT — No useless shaft sticking through the rear of engine.

GIANT PROP DRIVE UNIT for giant props. No more crushed prop hubs.

The Hobby Lobby-Evra 190 is a 2 stroke cycle ignition engine designed specifically for very large RC aircraft. It is 1.9 cu. in. displacement (31 cc.)—roughly 3 times bigger than a .60 engine. We have run 18 to 22 inch props on it at top RPMs of 7000 to 5000. It idles at 1500 to 2000 RPM depending upon the prop used. It runs very economically on regular leaded gasoline mixed 20 to 1 with 2 cycle oil.

The Hobby Lobby-Evra 190 is a model airplane engine and not a lawn trimmer or chain saw engine: The cantilevered crankshaft does not have a protruding rear shaft; the carburetor is accessibly mounted on

the rear of the engine; the engine has conventional beam mounting flanges. We also have a cast aluminum firewall mount available for it. The Hobby Lobby-Evra 190 was designed to withstand sustained full-power running. It has large cooling fins, 4 ball or needle bearings, and a very strong conrod and crankshaft. Even the extra large prop drive unit and large prop washer were designed with giant RC aircraft in mind.

There is no sensation in RC quite like flying a giant RC plane. Here at last is the engine that was made for these giant aircraft.

Hobby Lobby-EVRA 190

\$97.50

List price \$139.95

Send me ___ Hobby Lobby-EVRA 190 engine(s) at \$97.50 ea.

Send me ___ Firewall Mount(s) for EVRA 190 at \$15.00 ea.

() I enclose check for \$____, plus \$1.80 handling. () Charge to my BankAmericard No. _____ Expires _____

() Charge to my Master Charge No. _____ Expires _____ () Ship C.O.D. \$2.75 handling for C.O.D. and bank card orders.

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BULK PACKAGE Control Horns 75 Control Horns only \$3.35 <small>Compare at \$10.00!</small> 3 sizes 	BULK PACKAGE Polypropylene Hinges 200 Hinges only \$2.99 <small>Compare at \$8.50</small> 	BULK PACKAGE RC Metal Clevises 35 Clevises only \$4.99 <small>Compare at \$13.12</small> 2 .56 threaded plated—can be soldered! 	BULK PACKAGE Nylon Tube Pushrod 25 feet Nylon Outer Tube 25 feet Nylon Inner Tube only \$3.99 	BULK PACKAGE Brass Threaded Couplers 35 Couplers only \$3.99 	BULK PACKAGE Mini Nylon Pop Clevises 35 Clevises only \$3.99 <small>Compare at \$7.25</small> 	BULK PACKAGE Mini Nylon Pin Hinges 66 Hinges only \$3.99 <small>Compare at \$8.58</small> 	BULK PACKAGE 8 Wheels only \$6.99 4 Pairs: 2" thru 2 1/2" <small>Compare at \$10.76</small> 
BULK PACKAGE RC Steel Links with 10" Rods 25 Links only \$4.99 <small>Compare at \$12.25</small> 	BULK PACKAGE Flex Cable Pushrod 20 feet nylon tubing 20 feet 1/16" bronze cable only \$3.99 	BULK PACKAGE Wing Fasteners 20 threaded wood blocks 20 1/4-20 nylon bolts <small>Compare at \$6.50</small> only \$3.99 	7 Fuel Filters only \$3.99 	BULK PACKAGE 10 FEET Surgical Fuel Line Tubing only \$1.99 	BULK PACKAGE Mini Nylon Pop Clevises with 10" Rods 25 Clevises only \$3.99 <small>Compare at \$7.00</small> 	BULK PACKAGE Threaded Ball Links 10 Sets only \$3.99 	BULK PACKAGE Cable-ties 50 Cable-ties only \$1.99 NEW! 

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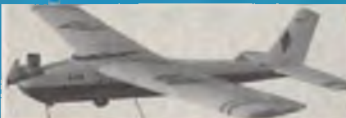
When you phone for your kit, order the KIT ACCESSORY PACK. We've figured out every hardware and covering item that's needed for each kit in this ad. Our ACCESSORY PACKS contain everything you need to complete the plane except for engine, radio and tools. Cost? Usually less than the kit.



Bridi RCM TRAINER 40
 List price \$54.95 **\$39.99**
 54" span for 4 channels, .35-.49 engine. **ADVANCED TRAINER.**



Bridi RCM TRAINER 60
 List price \$62.95 **\$44.99**
 58 1/2" span for 4 channels for .40-.61 engines. **Advanced Trainer—CADILLAC OF BALSA KITS!**



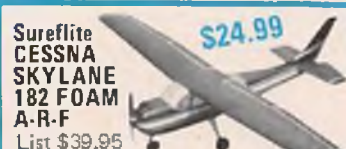
Lanier COMET II
 List price \$62.50 **\$37.99**
 63" span **ADVANCED TRAINER.** For 4 channels and .50-.61 engine. **Almost ready to fly!**



Sig KADET
 List price \$39.95 **\$30.99**
GREAT TRAINER. For 3 channels, .19 to .30 engine. 57" span.



SurefLite PIPER J-3
 List \$39.95 **\$24.99**
 For .15-.19 engine, 52" span, 2 to 4 channels, 2 hour assembly.



SurefLite CESSNA SKYLANE 182 FOAM A-R-F
 List \$39.95 **\$24.99**
 For .15-.19 engine, 53" span, 420 sq. inch area, 2 to 4 channels. **Steerable nose gear, 2 hr. assy.**



Bridi Super Kaos 40
 List price \$55.95 **\$39.99**
 52" span for 4 channels for .35-.49 engines. **Great Looking — GREAT FLYING!**



Lanier CESSNA
 List price \$48.50 **\$29.99**
 48" span. **GOOD BEGINNER'S PLANE.** For 3 channels, .19 engine. **Almost ready to fly!**



Sig COLT
 List price \$22.95 **\$17.99**
 45" span **FOAM WING, 3 channel trainer.** For .09 to .15 engine.



Midwest CESSNA A-R-F
 List price \$32.95 **\$21.99**
ALL-FOAM — ASSEMBLED! Flies best with a .15 and 3 channels.



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 58" span, 4 channels for .40 engines. **MAGNIFICENT FLYER!**



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 List price \$99.95 **\$69.99**
9 FOOT SPAN!



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SCALE KIT. Big 71" span for .19 to .35 engine. 4 channels.



Midwest SUPER CHIPMUNK List \$33.95 **\$21.99**
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 3 channel **BASIC TRAINER.** 65" span for .35-.45 engines. **ALMOST READY TO FLY!**



Bud Nosen P-51 D
 List price \$169.95 **\$119.99**
8 1/2 FOOT SPAN!



Sig KOUGAR
 List price \$47.50 **\$36.99**
SHARP LOOKING 4 CHANNEL plane. 51" span. For .35-.50 eng.



M.E.N. TRAINER
 List price \$31.95 **\$23.99**
 58" span for 3 channels and .15-.25 engines. **SUPER STABLE BEGINNER'S PLANE.**

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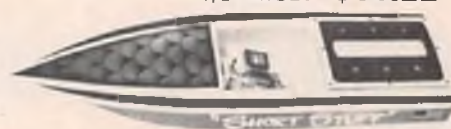
Order quickly—you don't have to shop around for a better starter (there isn't one), nor for a lower price.

SULLIVAN
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DEEP VEE 10
FIBERGLASS BOAT KIT
1/2 PRICE! **\$11.22**



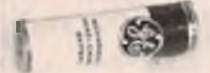
Here's a cheap and easy way to try RC boating. Uses .049 to .09 engines. Order Dumas Running Hardware Kit for \$10.50.

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G.E. Nickel-Cadmium Batteries

1.2 volt 500 mah. Pencil size
4 for \$7.88

Regular \$3.20 each



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List Price Super Sale

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5½" pair . . .	\$13.95	\$8.66
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and
Fox 15 Schneurle RC
and Muffler

\$80.90 worth!

\$54.44

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PAINT SPRAYER

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Includes 110v A.C. piston type compressor, spray gun, shading brush, and hose. Fine for spraying dope, epoxies.

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List price \$29.95

Spend your time building airplanes, not a field box - this is fully assembled.



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HP 40 F-RC
"GOLD CUP"
List price \$126.95
\$83.00

HP 61 F-RC
"GOLD CUP"
List price \$184.95
\$117.00

Spectacular German engines. Black "Thermek" finish to reduce operating temperature. The carburetors are among the best ever put on a model airplane engine.

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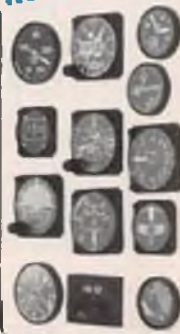
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We don't know of a cheaper way for you
to outfit yourself with a high performance
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F-16A Deluxe	\$129.95	\$94.00	Phoenix 6 - 60	\$ 65.00	\$47.45
M10 21 Deluxe	\$129.95	\$94.00	Nutcracker 80	\$ 65.00	\$47.45
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Comet 60	\$ 69.95	\$52.00	P-47 60	\$ 65.00	\$47.45
E-Z Does It Trainer	\$ 69.95	\$52.00	Troublemaker 60	\$ 65.00	\$47.45
Bearcat 60	\$ 65.00	\$47.45	40 Size Kits		
Sun Fly 4 - 60	\$ 65.00	\$47.45	A-6 Intruder 40	\$ 55.00	\$43.00
Kwik Fly 3 - 60	\$ 65.00	\$47.45	Curtless 40	\$ 55.00	\$43.00
Kwik Fly 4 - 60	\$ 65.00	\$47.45	Phoenix 5 - 40	\$ 55.00	\$43.00
Curtless Supreme 60	\$ 65.00	\$47.45	ME-109 40	\$ 55.00	\$43.00
Phoenix 5 - 60	\$ 65.00	\$47.45	Jap Zero 40	\$ 55.00	\$43.00
Vertigo II	\$ 65.00	\$47.45			

NEW!

Scale Instruments
for 1/4 Scale!



Hobby Lobby
1/4 Scale Cockpit
Instruments
\$9.95

20 Absolutely scale reproductions of full size aircraft instruments. Faces are printed in 4 colors, are die cut, and are on pressure adhesive flat black stock. Instrument housings are accurately molded scale reproductions. And there are clear plastic faces that snap into each housing. A superb product from West Germany.

NEW!

SONICTRONICS CRAZY TAPE

¼" wide, 50' long..... **\$2.99**
¾" wide, 50' long..... **\$5.95**



Thin laminating tape for attaching balsa sheet to foam wings, and for attaching doublers. Use this instead of contact cement.

I ENCLOSE CHECK FOR \$ _____
ADD \$1.80 HANDLING

CHARGE TO MY BankAmericard

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EXPIRES _____
(\$2.75 HANDLING)

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HOBBY LOBBY INTERNATIONAL

(See Hobby Lobby CANADA Ad elsewhere in this magazine)

Rt. 3, Franklin Pike Circle, Brentwood, TN 37027 • 615/373-1444

You won't believe this until you open the box, *but . . .* all these beautiful balsa and Polyflite planes are A-R-F's!

(Almost-Ready-to-Fly)

HERE'S WHAT'S IN THE BOX:



The wings are made of cut foam or injection-molded foam, and are already sheathed with balsa. The tip blocks are in place and then the wing is sanded smooth. You only need to sand the edges and apply the finish. (Try Superkote and your wing will look like it was painted.)

The stab, fin, elevator and rudder are all balsa and are nicely pre-cut. You just sand the edges, finish with Superkote or paint, and install hinges.

The fuselages are fully built with wood bulkheads, and doublers. Originally all the J.L. Modelcraft kits had fiberglass fuselages. But, J.L.M. discovered a better material than fiberglass. They call it Polyflite. You might think that it's fiberglass when you see it (it paints and glues like fiberglass) but it's better. No pin holes to fill, no uneven thicknesses, no brittleness. You just sand the seam (if you like) and spray paint it—it's done.

Just a few hours after you open the box you can have the best looking most durable RC airplane you've ever seen. You can fib to your friends that you built it—we won't tell on you.



HLA 131 Hobby Lobby—J.L. Modelcraft A-R-F
Harpoon Flying Boat \$93.00

List Price \$115.00

Did you ever see a better looking seaplane? Here's the easiest way for you to start flying off the water. 57" span, 540 sq. in. wing area for .35-.40 engines and 4 RC channels. A nice feature is that the pre-built polyflite fuselage is automatically water tight.



HLA 134 Hobby Lobby—J.L. Modelcraft A-R-F
CF-5 Tiger \$105.00

List Price \$135.00

Very, very swift! This is an all-out large pattern plane with a very low drag factor. CF-5 Tiger is 61" wing span, 660 sq. in. wing area. Fuselage is 48" long! For 4 channels and hot .60 engine.



HLA 132 Hobby Lobby—J.L. Modelcraft A-R-F
Easy Flyer \$79.00

List Price \$100.00

This is a 4 CHANNEL beginner's plane—a very gentle flyer that's stable, recovers quickly from unusual attitudes and is very EASY to assemble. 57" span, 540 sq. in. wing area, for .35 to .40 engines. The very clear plans are ideal for a first-time RCer.



HLA 133 Hobby Lobby—J.L. Modelcraft A-R-F
Mini Star \$79.00

List Price \$100.00

A very hot performer! 50" span, 460 sq. in. wing area, for .35-.46 engines. A mid-sized pattern-sport plane in the European style. For 4 channels.



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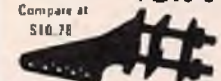
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There are three things wrong with this wood: It still has the sawdust on it; It's a little longer than 36"; It doesn't have anyone's name stamped on it.

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The nylon threaded studs are integral parts of the horn. This design is much more likely to stay attached to the control surface than the conventional type with metal screws. The large horns are side braced to resist bending. The large horns even include a shim wedge for tilting the base. These horns are much easier to line up during installation than the types that are attached by metal screws.

HOBBY LOBBY
INTERNATIONAL



This month we're going to take a brief rest from our RC Design Made Easy series, and try to catch up on some other thoughts and information. Right now we are all in the middle of the summer flying season and, as such, I hope that you are getting more flying in than I have this entire year. Since this is being written in the late spring, it is difficult to forecast just what may be happening in the world this summer, but if the predictions of the spring hold true, all of us are being faced with ever increasing inflation and ever growing gas shortages. This can, does, and will put a crimp in our trips to the flying field and, therefore, it is pretty darned important that we get the maximum enjoyment of each trip out. Nothing is worse than to arrive at the field all set for a day's flying and discover that something vital, like a transmitter, has been left behind. Come on, guys, how many of you biplane fliers have pulled up to the flying field only to find that you have left one of the two wings safely at home? Even if the price of automobile fuel is approaching the cost of model fuel we can still rustle up enough to make a trip now and then to participate in the world's greatest hobby/sport, but there is no sense being a dope about it.

Several times in the past, RCM has printed versions of the flier's check list, but I can't remember just what issues they were in. So, let's take a moment out to build a check list just for you. After all, it's your time, effort and money that's on the line.

Okay, so what do we do first? Let's examine the sequence that you use to get ready to go out to the field, and the items that you need to take. If you're the forgetful type, then set about making your own check list, slip it into an acetate folder and use a marking pencil to check it off. Or, you can do it mentally, but take the time to make out a list; this in itself will help your memory.

First, and most important --- is your aircraft ready to take out to the field? When you brought it home from the last flying session did you give it a good looking over to see if any problems had developed while you were flying. You should. Check over the wings, tail assembly, engine mounting, wing hold-downs (either rubber band dowels or nylon bolts), control surfaces, hinges,

radio installation, landing gear mounting, rips in the covering, or what have you. If you wait to check this out just before the next up-coming trip to the flying field, you just may have waited until too late to fix the problem. How about that prop? Is it knicked, dinged, split, cracked, or otherwise screwed up? People laugh at the number of props that I keep in my field box, but I always try to carry at least one or more of every size prop that I customarily use; this way, no matter whether I'm flying a .15 airplane, or a quarter size, I've always got a spare on hand.

Well, you've checked your aircraft after the last flying session, and all that you found, and fixed, was one loose engine bolt, so, what to do next before going flying? First, let's charge the receiver and transmitter batteries overnight on the night before your flying trip. And, while you're at it, charge your starting battery too. If you're using a wet type motorcycle battery it's a good idea to charge it once or twice each week. After all, when it is in use in a motorcycle, it's continuously charged, just like your car battery. We tend to undercharge our batteries, thus having much more shortened life in them than we should. In the winter, when you're not flying, keep 'em charged at least once each month, and always keep the fluid level up at the top line. If you use a nicad starting battery, give it a charge every now and then, a charge won't hurt it, but a tough discharge really will do it lots of damage. Speaking of charging, it's not a bad idea to charge your lead acid wet cell someplace other than your workshop. After all, the fumes that are given off are pretty corrosive and not too good on some of our more delicate parts.

Once we have safely put the batteries on charge, let us turn our attention to the good old reliable (?) field box. Many, many designs have been both published and killed for field boxes. All have good points, and some have bad points but one thing about it, **any** field box beats **no** field box every time. Most beginners are so anxious to get started that they grab any old shoe box, cardboard box, or metal tool kit to serve the purpose. Into this box they cram a few meger belongings, and trudge to the field, almost always leaving something at home that will have to be borrowed from

some more experienced flier. If you haven't seen someone with his shoe box of goodies, then you don't spend too much time at the flying field.

The best tool box is one that suits you, not too big, not too heavy, not too cumbersome, but one that has enough room to carry the essentials. The essentials being clever little things like extra glow plugs, extra props, rubber bands, or extra nylon wing bolts, a pair of long nose pliers and a couple of small screwdrivers, one with a blade tip and one with a Phillips tip. A modelers knife, a few pins, extra pieces of hardware such as blind nuts, clevises, a prop nut or two, 4-40 screws, nuts, washers, a bit or two of small plywood for shims (in case of misalignment of a wing, or engine), a bit of 5-minute epoxy and a small bottle of super glue, and so on down the line. Try to think of what you need, in case of field repair. How about a 4" or 5" piece of fuel tubing, perhaps a small pair of normal type pliers (to get the lid off of your fuel can if nothing else). The sky is the limit, though in the interest of hernia prevention, a little discretion should be exercised. How about the really basic stuff like fuel and a starting battery. If it is all carried in the same box, it makes it easier not to forget. But . . . and this is just about the most important but that can be butted . . . never put your metal fuel can at the same end of the box as the starting battery. This can, and has, lead to a terrible explosion. Several years ago a friend of mine in Dallas, Charley Viosca, nearly blew himself into kit form because the leads of his starting battery became grounded to the metal fuel can. Charley detailed his experience in all of the model press as a warning to all not to make the same mistake. Just as in every other phase of this hobby, history is hard to find, so read it here, and please understand, never let the battery leads get any place near your fuel container.

How about some more really heavy stuff to include in your field box. A small bottle of aspirin isn't too bad, nor is a small package of band aids and some type of antiseptic. For that matter, a small pencil and pad of note paper can be a big help. You can jot down changes that need to be made to the trim of your aircraft when you get home, or any

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RC COUNTRY

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Hardly a month goes by in which I do not receive several letters or phone calls from fellows looking for parts for the Veco .50 and older Veco .45. The Veco .45, which was a production version of my hand-made Lee .45's, was discontinued from production in 1968 when K & B purchased Veco Products and replaced it with the Veco .50. The Veco .50 was, in turn, dropped from production in 1971. The engines having been out of production for this length of time has pretty well dried up the replacement parts that various hobby shops, etc., may have had in stock. Neither K & B or myself have had any major parts for several years. In fact, when the .50 was discontinued I purchased all of the local hobby shops replacement parts that I could find in order to have parts for repairing the Customs versions of the engines that I had sold. However, these were all gone long ago other than some carburetor and miscellaneous small parts. The most sought after parts are pistons, rings, and con-rods, all of which were used up long ago.

One of these parts — the con-rod — is being made available again by Dave Richardson, operator of Richardson Precision Machining (RPM). Dave has been manufacturing heavy duty replacement con-rods for the K & B 3.5, 6.5 and 7.5, OPS 3.5, .40, and .60, and Rossi .60/.65. As many of you know the above mentioned engines, with the exception of the new K & B 7.5 which has a pretty beefy rod to begin with, have been noted for the rods letting go occasionally when the engines are subjected to high nitro and high stress operation. Dave's RPM rods have helped reduce rod breakage to a minimum.

At my suggestion Dave has added the Veco .45/.50 con-rod to his list of replacement rods and they should be available by the time you read this column. Price for the Veco .45/.50 rod will be \$13.95. Prices for other replacement rods that Dave makes range from \$11.00 for the OPS 3.5 to \$15.00 for the Rossi .60/.65. Write to Dave for individual price quotes. Although the prices are a little higher than the factory manufactured rods, you must remember that the RPM rods are

turned out in small quantities with much tighter tolerances.

You can contact Dave at Richardson Precision Machining, 5070 Golden Drive, San Jose, Calif. 95129.

While on the topic of replacement parts quite a few fellows have wanted to know if the parts for the new K & B 6.5's will interchange with the older 6.5. Generally speaking the answer is no. Although the same castings are used and outside dimensions remain the same, internally the engine is a completely new design. The sleeve has been made thicker which means it has a larger O.D. and will not fit in one of the older 6.5 cases. The wrist pin hole in the piston has been raised to lesson rod angularity which means the con-rod was lengthened and will not fit the older engines. The con-rod was also beefed up considerably in the design change. The diameter of the crankshaft has been increased and will not fit the old front plate housing. A larger diameter rear bearing is also being utilized. However, the complete front plate assembly including the crankshaft, bearings, and housing can be used on the older engines if replaced as a unit.

The new 6.5 also uses a steel rotor rather than the older aluminum one and new rotor pin with oil lubrication slot milled in. The new back plate assembly will fit the older engines. The only remaining part — the head has been changed to a two piece unit. The combustion chamber "button" is a separate piece from the upper finned portion. The new two piece head will fit the older engines but I personally still prefer the one piece head.

Dear Sir:

I have a Speed Webra .61, Webra tuned pipe, Perry pump and carb and 11/7W Zinger prop. The engine is mounted upright with a 16 oz., Kraft tank about 1/4" high (centerline of tank to needle valve). The tank is not pressurized and fuel is 7% nitro with synthetic oil.

My problem is that with the pump adjusting screw turned out 1/4", my engine still runs quite rich in mid-range and, as a result, it loads up when advancing from low to high speed, making it very hard to do any maneuver requiring instant throttle response.

I started with the screw about 1/16" out and in that position it was nearly impossible to get into high speed with the glow plug disconnected. I kept making adjustments of 1/2 turn to the present position which is now better but still not good. I have used several engines with Perry pump and carb and never encounteed this before.

At present, for normal running, the needle is open 1-2/3 turns, 14,100 rpm w/pipe.

At 7,000 rpm it runs rich, with needle as above.

With needle at 2 1/2 turns open it runs rich, but not what I call excesssively so, rpm being 10,000.

Idle and high speed appear normal and I might add that idle disc is set slightly to positive side of mark. What could be wrong, and could it possibly be a fault in the carb? I only have about 1/4 turn left on pump screw due to the mounting arrangement.

Also, is it important to have the filter before the pump as I now do, or is the pump not critical to dirt. I filter twice before the tank.

If a pipe is not tuned to optimum, is it hard on the engine? What are the advantages or disadvantages of using pipe pressure with a Perry pump? Should a gasket be used between the engine and pipe header? Without a gasket there is quite a bit of leakage and I cannot find a gasket that will last more than a few flights, apparently because of such a small mating surface. Should a new engine be run-in before using a pipe? I get the same results with or without the pipe.

Yours truly,
Dave Smith

Dartmouth, N.S. Canada

The pressure adjustment on the Perry pump is more of a fine tuning adjustment than anything else. You can richen or lean the mid-range with the pump adjustment but it will not handle extremes. It sounds as though you may have your fuel tank mounted too high. The center line of the tank should never be higher than the center line of the needle valve and preferably 1/4"-3/8" lower — especially when using a 16 oz. tank. The pump regulator can only handle pressure changes within its

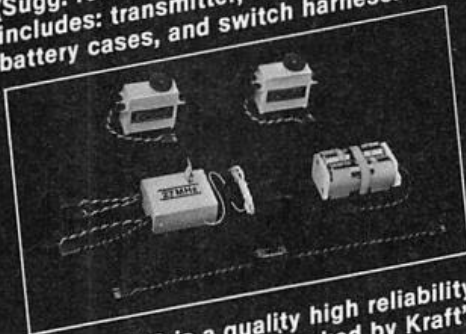
to page 12

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Futaba FP-2G5	109.95	77.	2	no
Futaba FP-2E	140.95	100.	2	no
Futaba FP-2E 518	134.95	91.	2	no
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2 Channel Wheel				
Cox 8021	139.95	93.	2	no
Futaba FP-2F	145.95	100.	2	no
Futaba FP-2F 518	134.95	91.	2	no
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Cox 8031	159.95	104.	2	no
Futaba FP-3S	169.95	113.	2	no
Futaba FP-3S 518	144.95	97.	2	no
Logictrol LRB 3	166.95	105.	2	no
Logictrol Ranger	187.95	119.	2	no
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Futaba FP-3FN	219.95	145.	2	yes
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Cox 8044	279.95	178.	4	yes
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Logictrol Nimbus	324.50	197.	4	yes
MRC 774	279.95	189.	4	yes
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MRC 775	379.95	251.	4	yes
5 Channel Single stick				
Logictrol LRB 1-5	325.50	207.	4	Alx only
6 Channel				
Cox 8060	369.95	230.	4	yes
Cox 8068	479.95	305.	4	yes
Futaba FP-6FN	369.95	234.	4	yes
Futaba FP-6FN 518	339.95	216.	4	yes
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Futaba FP-7G	579.95	385.	4	yes
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Logictrol Super Pro	463.00	284.	4	yes

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ENGINE CLINIC

from page 10

capability. I would imagine your loading problem is considerably better towards the end of the tank as the fuel level and head lowers.

Even though the engine is running rich through the mid-range you should not have to leave the glow plug battery on in order to get from low to high speed. This indicates a cool fuel/plug problem. You did not say the brand of fuel you are using or what make of glow plug. Changing to a fuel with a little more nitro (10% -12%) should help the problem a little. Use either the K & B or Fox idle bar glow plugs. The K & B seems to hold up better with a pipe.

With a loading problem through the mid-range you should have the idle mixture set on the lean side. You say yours is on the plus side, which is rich. You want to set the idle on the lean side as this, in turn, will affect the mid-range as well.

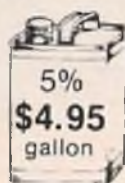
If you can figure a way to lower your tank (which I realize is hard to do with a 16 oz. tank in many of the competition pattern ships due to the retracting nose wheel), lean the idle mixture, and increase the nitro content of your fuel a little in conjunction with the Fox or K & B plug, you should improve your problem considerably. If not, there is always a possibility that the regulator portion of your pump is not working properly and, in this case, you should send the pump to Perry Aeromotive for checking. However, be sure you have checked all other areas that can be causing the problem as I have outlined before sending the pump back. Far too often fellows will send an engine, pump, radio, etc., back to the manufacturer with absolutely nothing wrong with the item which doesn't really make the particular manufacturer concerned jump for joy. I know from my own experience. I will occasionally get an engine back that supposedly will not richen up, idle, etc., and the owner has checked everything. I pull the idle mixture disc out of the carburetor and find the fuel reservoir full of foreign matter. Chances are the fuel tank is the same way but it is easier to send the engine back for checking than to pull the fuel tank out of the aircraft. At least too many fellows think this way.

With a new pump it is best to have the filter between the pump and carburetor. There are a lot of small plastic parts involved in the pump that can have casting flash or fuzz that often breaks loose and can plug up the carburetor. After a pump has been in operation for a while, any casting flash or fuzz that might have been inside has been flushed out. The pump itself is not that critical to dirt or foreign matter and can usually flush itself out even if something

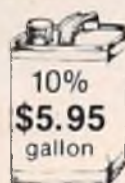
to page 176

Sheldon's

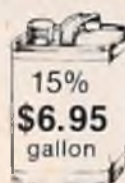
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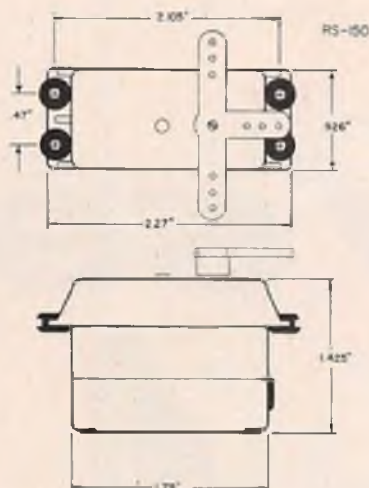
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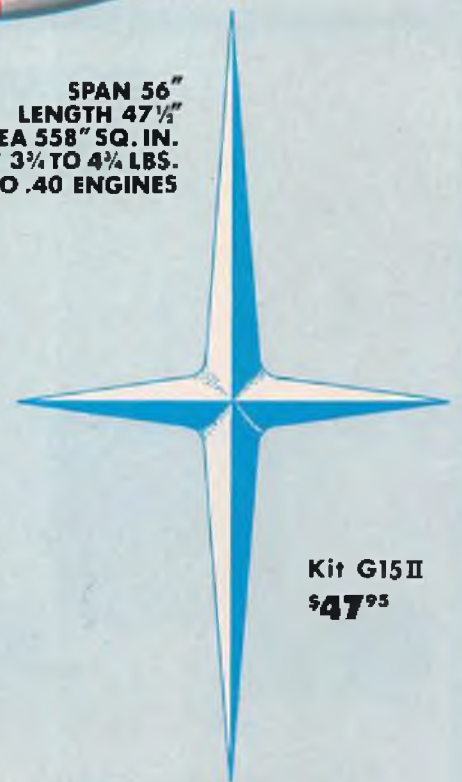
FALCON 56 MARK II



SPAN 56"
LENGTH 47 1/2"
AREA 558" SQ. IN.
WEIGHT 3 3/4 TO 4 1/4 LBS.
FOR .19 TO .40 ENGINES

More people have successfully learned to fly RC on the Falcon 56 than any other trainer in history. Now the MARK II introduces many new features, making the all-time favorite even better! If you're thinking of getting into the great sport of Radio Control Modeling, here's why the MARK II is the one for you!

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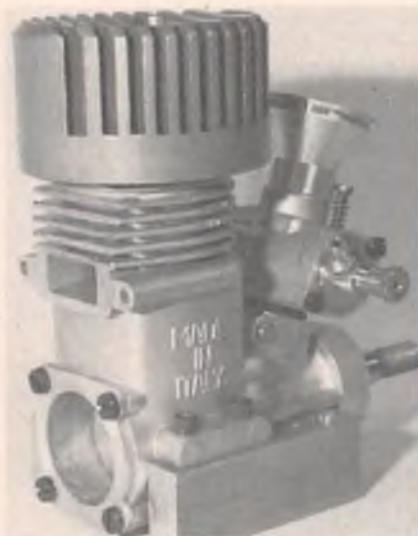


Super Tigre has just released their latest engine for the 1/8 Scale R/C car racer. Designated the Super Tigre X21 R.E. CAR, this is a totally new engine, and definitely not similar to the Super Tigre X21 CAR engine released two years ago. The older X21 engine was Schneurle ported with a side exhaust, similar to the OPS. The newer X21 R.E. is also Schneurle ported but with a rear exhaust, similar to the K & B. Remember, this side and rear exhaust is in reference to the engine. These engines are basically designed for airplanes, so the front of the engine is where the shaft is located to attach the propeller, but we use the shaft to attach our flywheel and clutch. A rear exhaust engine will have the exhaust port exiting above the rear back cover. A side exhaust engine will have the exhaust port on the R.H. side of the engine. When we're talking engine exhaust locations, it will be as I just described. Chassis exhaust locations can be rear, side, front, top, bottom or wherever, and is a totally different terminology.

Before we go any further, I must tell you that I, unfortunately, do not have a test report to give you for comparison purposes with other engines as I normally do. I did run the engine, giving it proper break-in time, with the same fuel, prop and plugs as always, but its performance was so terrible that I knew something must be wrong. I was very disappointed, as you must be. Upon disassembly of the engine, I found the piston was scuffed. This was caused by a section of chrome that was missing inside the sleeve which apparently got chipped off in the honing operation. All the engines I test for you come directly from stock and are not hand picked versions from the factory. This should certainly prove that statement.

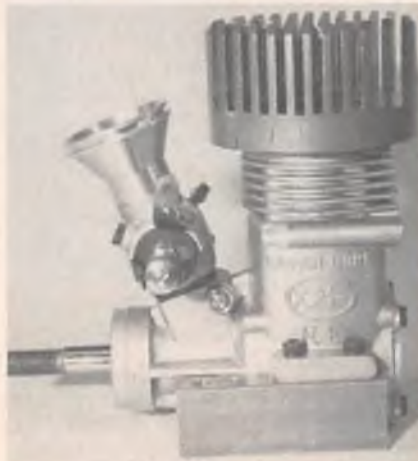
I had two choices. Either to hold up on this article until I could buy another one from the distributor, or go ahead with the article. I chose to go ahead because if I waited, together with the two month delay in printing time, we would be almost finished with the racing season and news of a newly available engine would be too late.

I certainly do not fault Super Tigre for this defect. Not that it couldn't have been caught, but it was a very unusual



Super Tigre's latest R/C car engine features rear exhaust and a deep lined racing head.

condition in a rather hard place to see. But, you might reason, this is what Quality Control Inspectors are for. True, but let me give you another example. I have a K & B .21 engine in our display car, that has only two intake Schneurle ports and **no** bypass transfer ports. As you know, there should be four intake ports in the crankcase, but this one only has two. The other two are solid wall, even though there are four intake ports in the sleeve! Now if you can explain to me how a Quality Control Inspector can



Designated the Super Tigre X21 R.E. CAR engine it has .21 cu. in. displacement with a .60 carb.



S.T. sleeve on the left and K & B on the right showing the 2 PDP ports in the S.T. sleeve which are approx. 1/2 the size of the K & B ports.



Transfer ports in the S.T. sleeve, on the left, are almost twice as big as the K & B ports.

miss two intake ports in the crankcase, I can explain to you how easy it would be to miss that speck of chrome inside the center of the sleeve.

There are a lot of things I like about the new Super Tigre and a few things I question. A big plus certainly, is the one piece crankcase. I would guess that at the very least, 50% of the racers that use the popular K & B .21, have had the nose come loose, dropping them out of the race. The more knowledgeable racers will either safety wire the four nose mounting screws, or use Loctite or some other adhesive to hold the screws in. The one piece crankcase eliminates this hassle, but the one piece crankcase also costs more to manufacture.

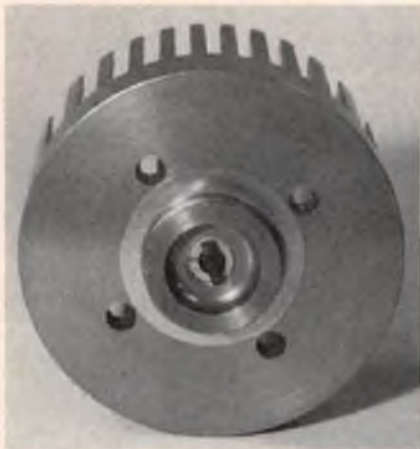
Another very smart move by Super Tigre was in making their brass sleeve thicker. The K & B .21 sleeve is .048 thick and the old Super Tigre sleeve is .055 to .063. The new sleeve is .077 to .085. The major problem with any ABC



S.T. aluminum piston is conventional with 2 clips holding in piston pin. Rod is fully machined from bar stock and appears to be strong enough to do the job. Lower end is bushed.



S.T. crank, on the left, compared to McCoy's full circle crank on the right for K & B 21.



The S.T. head is full Hemi, deep finned and uses a copper gasket.

engine is getting a good piston to sleeve seal. It normally requires a perfectly round sleeve and a perfectly round piston. If you think all your sleeves and pistons are round, you're in for a big surprise. All of the engine manufacturers are well aware of this problem and I'm sure they're doing their best to solve it. The problem with brass is that it's a very soft metal and easily deformed, so naturally a thicker sleeve has a better chance to hold its shape than a thin one.

Somewhere at the Super Tigre factory there is a design engineer who is 100% sold on the PDP — Perry Directional Porting design. In the older Super Tigre engine there was one intake transfer port, two Schneurle ports with two PDP ports adjacent to the exhaust port, and the single transfer port was .290 wide. In the latest Super Tigre there are two huge transfer ports, each .360 wide. And in place of conventional Schneurle ports, there are four PDP ports, two on each

side with different intake timing. There is so much emphasis placed on the two huge transfer ports, with additional PDP ports, that it probably could be effectively argued that this is not a basic Schneurle type engine, but an advanced cross flow scavenged engine. The piston, of course, does not have a baffle, but then neither did the Super Tigre G.21-29 Series, and they certainly were not thought of as Schneurle. But Super Tigre has designated this as an "X" Series engine, which implies Schneurle porting, so we'll call it that. But you can see how interesting it can get!

They have also changed the crankshaft, by lengthening the intake opening (not the timing) from .450 to .555. The crank bore has been increased from .315 to .335 and, together with the new larger supplied 60 size carburetor, this would automatically raise horsepower. One oddity about the crankshaft is they have machined the counterweight in the normal method to help stuff the crankcase, but they have not installed the aluminum sleeve for stuffing.

Super Tigre has now included (with their R/C car engine) a head designed especially for cars. The head features very deep fins which are a must for R/C cars, because we need the added cooling from the larger fin area. In a plane, the engine receives more than enough cooling air from the propeller, but in a car we're running at an average slower speed, without a propeller, so the larger head cooling fins are very important. Try to keep as many of the



McCoy has two new K & B 21 manifolds for his popular can mufflers. This is his new smaller cast manifold which mounts the muffler behind the rear axle.



This McCoy pipe manifold gives more horsepower and mounts the muffler forward in front of the LH rear tire. The exhaust exists out the side of the body.

fins above the body shell as possible. This head is also anodized, uses a long glow plug, and four mounting bolts. Another good point here for Super Tigre is their four mounting bolts go into the crankcase that has a fairly large cross section. Together with the thicker sleeve, which also has a thicker mounting flange on the sleeve, it's possible to remove and replace the sleeve and head, and come close to retaining the same piston-sleeve seal. I can't emphasize too strongly to you the importance of a good piston-sleeve seal. It's the single **most important** part of a good running ABC engine, yet the **most difficult** thing to attain.

I'll give you some examples of the problems. I've built quite a few modified K & B .21's and I know most of the problems **trying** to hop up the K & B .21. After you know some more of the problems, you'll easily realize why I haven't done an article on "How To Hop Up the K & B .21." Knowing the problems is only half the battle. Curing them is a major battle requiring complete machine shop capabilities which only a very few of you would have access to. But I'll have suggestions on the best way to go, for the majority of racers. Before we go any further I want to say the following things are not meant as a criticism towards K & B. I'm a racer who runs what I feel is the best available engine to help me win races. This is the K & B .21. I have many friends at K & B Manufacturing who have helped me on numerous occasions of emergencies, for which I am deeply grateful. But if I only wrote about the good things about

to page 18



Two good products you should know of are Prather Products, "After Run Engine Oil," on the left, and LPS #2. Prevents gumming & rust; longer engine life and easier starts. If you're not going to be running the engine for awhile, remove the glow plug, back cover and air filter and flush engine out with LPS #2 (not #1 or #3 or WD40). Oil the critical parts with Prather oil. Available at your hobby shop and the LPS #2 from your hardware store.

FOX STARTER SETS FOR CONTROL LINE FLYERS

One handy package containing 15 matched accessories for the beginning control line flyer. Each accessory is carefully selected to give your first model the best possible chance for success and priced at a worthwhile savings also. The first chart below shows the contents of each set and the savings you make by buying them complete.



STARTER			
Part	Motor	Price If Bought Separately	Kit Price
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81015	Fox 15 Baffle	\$46.07	\$39.95
81016	Fox 15 Schneurle	51.07	44.95
81019	Fox 19	51.17	44.95
81035	Fox 35 (Profile)	51.17	44.95
81135	Fox 35 (Fuselage)	51.17	44.95

Includes appropriate tank, handles, control lines, wheels, fuel line, line connectors, bell crank, elevator horn, spare glow plug, wrench, fuel filter, wheel collars, spinner nut, motor mount bolts, and landing gear clips.



FOX STRANDED CONTROL LINES

Fox Stranded Control Lines are made from 7 strands of high grade, stainless steel wire. The actual length of the lines are 2 feet less than the labeled length to allow for handle and airplane lead-outs. Lines ends are fitted with exclusive

Fox end fitting and are ready to use. Lines are supplied on a handy reel.

80010	.012x52'	\$3.75
80011	.015x52'	3.75
80012	.015x60'	4.00
80013	.018x60'	4.00



FOX CONTROL LINE HANDLE

The Fox Control Line Handle is sturdy, comfortable, and designed to improve your flying technique. The frame is made of good sturdy steel, with a grip made from Philippine mahogany. The design of the handle is such that the line lengths can be very quickly balanced by merely loosening the wing nut and pulling the lines to the desired position, then retightening the wing nut. Line exit distance can be set at either 3 or 4 inches. 3 inch spacing gives a less sensitive control than most handles and makes it especially easy for the inexperienced or beginner to control his model. The handle is physically strong and

will withstand almost any sort of pull test, which is not true of many plastic handles. For comfort, safety and flying ease, the Fox handle is the best you can buy.

80000 Control Line Handle \$5.00

FOX BELL CRANKS



Fox Bell Cranks are the safest bell cranks you can buy. They not only resist the bending and binding sometimes experienced in light weight bell cranks, but they also have a permanently attached pivot bearing that cannot collapse and bind when you install it. Supplied with mounting screws.

86778 Small Bellcrank \$.75
86779 Large Bellcrank75

FOX ELEVATOR CONTROL HORNS



Fox Elevator Control Horns are made from steel and are sturdy enough for the largest model. They have the advantage over plastic in that they are thinner and can be fitted to the elevator without the big lump so often seen. Also, the thin arm can often go into a cramped space too small for the plastic type.

86783 Solid Control Horn . . \$.55



FOX LANDING GEAR CLIPS

Fox Landing Gear Clips are handy little stamped pieces used to attach the landing gear to control line models. They fit over the side of a profile fuselage, or the firewall of a build-up fuselage and are attached by screws. The easiest solution for what is sometimes a difficult attaching problem.

86773 Clip for 3/32 Wire \$.25
86774 Clip for 1/8" Wire25

FOX CONTROL LINE CONNECTORS

Fox Control Line Connectors are used to connect the control lines to the handle and to the airplane. If you will leave one end connector on the airplane and one on the cable, this will cure the cross line possibility the next time you fly.

80050 Small \$.35
80051 Medium35
80052 Large35





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PIT STOP

from page 16/15

everything, and didn't include things that need improvement. My credibility with you, the reader, would not be too good. I hope everybody understands.

To begin with, if you take the stock K & B .21, with the stock Perry 21 carb, use K & B 100 or 1000 fuel, with castor oil, a good paper element air filter and don't run it too lean, I doubt that you'd be able to wear the engine out. How could anyone ask for more than that? And I think that K & B has done an excellent

job in fulfilling these requirements.

The problem is the avid racer is not satisfied with stock horsepower. He always wants more than anyone else. So he'll open up the engine, do his modifying, for better or worse, and if something happens to the engine, naturally it's the engine's fault — but never his fault. So who does he blame? Why K & B, of course! Their engine should be able to last under any conditions. This is ridiculous of course.

But some good does come out of these would-be engine builders. Whenever you get more horsepower out of an engine than it was designed for, you start having problems with its

weakest part first, whether it be a K & B .21, OPS .21, Super Tigre .21, Novi, Drake, Ford, Cosworth, Porsche, Ferrari, etc.

The first batch of K & B .21's had a tendency on Modified engines, to break the con rod. Boaters were breaking the engine mounting flanges. Car racers were breaking the muffler mounting flanges. Also the sleeves weren't uniformly honed --- ridges could be seen in the bores. All of these things were improved in the next batch for the benefit of everyone.

What do you do when the pistons aren't round, the sleeves aren't round,

to page 171

THE WACO

We chose the Waco F-3 as our biplane flagship because it best represents the "Golden Era" of the 1930's, when flying was an adventure. Add to this, easy, snag-free building and safe, gentle flying—the result of the thorough kit engineering and careful prototype development that are features of all Platt Kits—and you have a satisfying building and flying experience ahead of you. **Kit features:** Top-quality diecut and machined balsa and plywood. Full size plans. Separate instruction book with isometrics. Decals. Injection-moulded (Not vacuum-formed) plastic cowl, cowl blisters, and wheel pants. All required nylon fittings. Formed wire landing gear & struts. Span: 60", Area: 950 Sq. 4 to 6 channel. Engine: good .40 to .60

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WORK OF ART

Like everything else, costs of running a contest have gone up. Some years ago the Chicago Scalemasters came up with an approach that keeps trophy costs down for your annual bash and yet produces attractive and unique mementos of the occasion. The ingredients can be seen in the photo --- a varnished wooden plaque decorated with a name plate and a 3-dimensional scale model. The lettered plates are made on one of those plastic name tag engravers seen around larger companies and also available for custom jobs at printing or speciality shops. My guess is that one of the club members had access to a machine. The model is simply a plastic kit on the half shell. Two trophies can be made from one kit and literally hundreds of subjects are available.

The Scalemasters didn't rush the job on the models. Their efforts were always carefully done with authentic color schemes, decals and markings. The P-47 on the trophy in the photo has been "aged," with the olive drab paint chipped away in spots to show the bare "aluminum" underneath. A hole is drilled in the back of the plaque for the purpose of hanging. This looks like a great project for some "out of the rut" club meetings, building kits and decorating them. Some of the club wives might enjoy a trophy crafting session for a social evening. The payoff comes at the contest --- the lucky winners always appreciate the extra effort involved in this personalized type of award.

If your club has done something similar, let us know about it and we'll

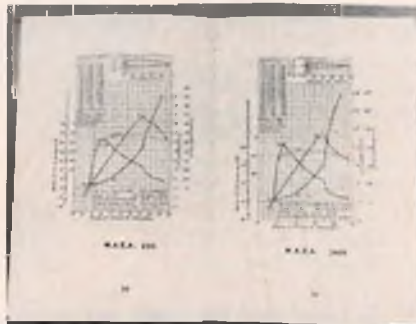
pass along the story in Scale Views.

Mailbag

Art Suhr (W218 N5866 Maclynn Court, Menomonee Falls, WI 53051) wrote to say he enjoyed the column on back issue magazine collecting. He sent along a sample of a collecting aid he worked up called "Index And Guide To The Major U.S. Model Aviation Publications --- Past And Present." Each magazine is shown as a series of dated blank blocks that you can fill out as an inventory of the issues in your hoard and see at a glance which ones you are missing. I'm going to put the sample to use as soon as I can find time to burrow into my basement and once and for all find out how many of what is down there. Art will supply copies of the index for \$2.00.

Col. John deVries (4610 Moffat Lane, Colorado Springs, Colo. 80915) writes:

Been reading your latest series --- 'Where To Find Scale Data' in your RCM column --- with great interest. In the May issue, you note several book sellers as data sources. Of late, I've been dealing with Jim Horne and he has one heck of an inventory. But the book he sells that I'd like to bring to your attention is one called 'Handbook of Airfoil Sections For Light Aircraft' by M.S. Rice. The book has all of the 'old' airfoils in it --- like the M-6, RAF 27 and 34, and a bunch of Goettingens. They're the ones left out of the Denhoff airfoil book --- and, I believe, of great interest to scale modelers. Rice's book is particularly strong in the NACA four-digit series plus the more interesting five-digit shapes (23012,



126 airfoils are covered in the Rice handbook.

015 and 018). Thought you'd be personally interested in the book --- and maybe other scale builders and designers would be, too! It's well worth \$6.95.

I second the Colonel's motion, for I've had the book for several years and have used it frequently. Colonel deVries is himself the author of an excellent book, published by Paul Matt's HAA and obtainable from most of the dealers listed in the May issue, called "Taube --- Dove of War." It's a complete historical document on the World War I bird-like aircraft and has over 200 photos and drawings. Someone should make use of all that data and build a 1/4 Scale version. Those unusual lines would really have an impact at a Giant Model Rally. The book sells for \$7.95.

From Keith L. Eakerer: *In the March issue of RCM you noted that Tom Stark's Brunner-Winkle Bird biplane used polyester dress lining for covering. The question is how is it applied! I have approximately 15 yards and have a Platt Waco UMF-3 to put it on but do not know how. Is it applied as one does silk minus the water? How much heat is used?"*

I sent along the question to Tom, who replied: *The material is applied dry with dope, Sig clear. I dope right through the material. It should be put on as wrinkle free as possible. Once the dope is dry it can be lightened by application of an iron set at about medium heat. From there on, dope until the weave is filled and paint like any other covering material. The only problem I've had was where I used paper over the ribs to simulate rib tape (I think I used newspaper). Apparently the polyester and the paper shrink at different ratios, causing slight wrinkles at the joint of the rib at the trailing edge. This should not be a problem in most installations.*

Though Tom didn't say so, I'm sure he doped the structure prior to application so that the dope soaking through the material melts the dope already in the wood and helps adhesion.

Tom went on to say: *The picture is an aerodynamically scale Northrop N9M. It has a 60" span and weighs about 20 oz. with a 2 channel radio. So far it's a*

to page 162

SOME "NEW" PRODUCTS WE'VE HAD FOR YEARS



8 Brilliant Colors
 White Orange
 Black Yellow
 Red Light Blue
 Green Dark Blue

4 Ounce Jar \$1.49
 8 Ounce Jar \$2.75

PLASTINAMEL

Several companies have recently discovered that modelers like to paint their molded foam airplanes. Sig has taken care of this problem for many years with a time proven and tested product. The most important feature of Plastinamel is that it can be painted directly on molded foam without any protective primer or filler coats being required. Fillers are heavy and the performance of foam airplanes deteriorate rapidly when they are overweight. Weigh and compare!

Plastinamel Thinner

PE-030 4 Oz. Jar \$.75
 PE-031 8 Oz. Can \$1.25
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CORE-BOND



CB-001 Pint \$3.25
 CB-002 Quart \$5.75

These newborn Brand X foam wing adhesives with catchy names and sooper-doooper slogans have reminded us that we've been hiding our light under a barrel when it comes to Core Bond. Over the years it has gained a loyal following among some top notch competition fliers because it is light in weight and sticks down evenly. Best of all, where beginners to foam wing covering are concerned, it is not so likely to dissolve foam during construction as other types of glue might do. Cover your next foam wing with tried and dependable Sig Core Bond.

SILICONE FUEL TUBING



Medium (.062 I.D. - .156 O.D.)
 SH-288 (1 foot pkg.) \$.55
 SH-289 (25 foot roll) \$10.50
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 SH-291 (25 foot roll) \$11.50

Silicone Tubing has been busting out all over as the last word in fuel line. Read some old Sig catalogs, friends! Our Silicone Heat-Proof Tubing has been heading the Fuel Line page for more back issues than we can find. The Sig Factory Fliers haven't tried any of the new competition brands, for how can they be better than a typical local example which, after 5 years of use in a fuel tank, never removed, is still like new and good for another 5 years. Experiences like this prove that our fuel line won't harden in fuel or melt on a hot engine. Try Sig Silicone Heat Proof and see for yourself.



EP-001 4 Oz. Set \$2.95
 EP-002 8 Oz. Set \$4.95

EPOXY PUTTY EPOXOLITE

Hobby Dealers have almost had to add an extra shelf to accommodate all the fillers, putties, pastes and mixes that have been showing up on the market lately. But there is only one Epoxolite by Sig--the standard by which all the rest should be measured. Notice when you read construction articles in back issues of the model magazines, the number of times plans call for Epoxolite fillets or the text tells how to shape a scale landing gear fork with this material. Designers automatically think Epoxolite when putty is called for. Get the one and only original Sig Epoxolite--not an imitation.

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Into each life some rain must fall.

Okay. But whyinell does it have to fall on the first scheduled day of the annual RCM Slope Trophy Races?

It's an ill wind that blows nobody any good. Yeah. So the wind that blew on the second scheduled day of the RCM races, a zephyr of one to two miles an hour, was great for thermalling, but we needed ten miles an hour. Just to tease us into staying around the whole day, it gradually came up to ten --- and just as gradually shifted to a south wind that sheared along the cliff and gave zero lift. Please, Mother Nature, what did we do wrong?

For only the second time in the twelve year history of the RCM races, they had to be postponed, so maybe that's not a bad percentage. It was particularly frustrating this year, though, because Tony Baker, Paul and Dick Gerard, three of England's foremost slope racing experts, came all the way from the United Kingdom just to show us how fast they were flying on the other side of the Atlantic. An eight thousand mile round trip --- and to no avail. Very disappointing, to say the least. However, my wife, Kaye, an English girl that I married while stationed in England in World War II, quickly put it into perspective when I came home all disconsolate Sunday night and told her.

"So what's new?" she asked. "In the past five months, you've flown twelve thousand miles in two round trips to Florida to take part in a couple of events, and been rained out, or blown out!" And she was right. But I still felt badly about having to postpone the races until sometime next October.

However, slope racing enthusiasts are a breed apart. They accept the fact that conditions may prevent a race. They don't like it, but they accept it. Sometimes I wonder if Formula 1 racers would accept it when the rules called for the race sponsors to provide fuel and the fuel didn't make the engines run (like slope racers know that Mother Nature provides their power --- and doesn't provide it) and the races had to be rescheduled. As I said, I wonder --- and ponder --- but don't know.

In anticipation and preparation for the

races, the English contingent arrived early, so at least we did have a chance to exchange ideas and, as luck would have it, we did some practice flying before the races. I took some photos, and here are a few that turned out.



Picture No. 1 shows Tony Baker and his PIK-20 Quarter Scale model. A fast model --- one that Tony contemplated using in the RCM races, but I cautioned him that it would not turn fast enough. Later on, he tended to agree, when he saw some of the American racers practicing.



Picture No. 2 shows Tony flying the PIK-20 while your old Chief Sunday Flier observes the performance. Beautiful scale action --- but not competitive for racing.

Picture No. 3 is Gordon Kruger, an



American racer and glider fan, with his Ridge Rider --- a Tony Baker design that is an excellent slope performer, and a competitive racer when ballasted.

Although we weren't able to race, we all had a great bull session on how great our racers were. And naturally, there was the usual amount of horseplay. Bud McCrary who owns the site where we stage the races, opened his hangar so we could get in out of the rain, and we had an impromptu "show and tell." Ken Kilbourne and Jerry Krainock were extolling the features of their latest creations; meanwhile, I sneaked over to the refreshment table and picked up a styrofoam cup, then surreptitiously put it down alongside Jerry's racing wing. Then, with an obvious "loss of balance," I stepped backward, crushing the cup with a sickening crunch, and cried "Oh! Sorry, Jerry, I stepped on your wing!"

"That's my wing, dammit!" said Ken. "So you better let me fly yours!" The ensuing inspection solved the problem.

Then, a short time later, Johnny Bernauer rushed into the hangar and cried "Hey Bob! (Bob De Mattei, the Contest Manager) Take a look at the windsock!"

So Bob rushed out, looked, and sure enough the windsock was standing almost straight out from a wind out of the west --- except that it was tied that way by John. Bob made a double take, then didn't know whether to laugh, cry, or strangle John. Fortunately for John, Bob chose the first. (Bob is about six feet three, 220 pounds; John, five feet ten, 160.)

It finally became apparent about three in the afternoon on Sunday, that the races would have to be postponed. So, they have been tentatively rescheduled for sometime in October. We did vote on the best new technically improved, or new design, and the results of the voting gave Mick Carlin a resounding First Place for his Bushwhacker III --- the third version of his original design which I previously had facetiously dubbed the "Flying Toothpaste Tube." Mick has some very interesting theories about the design, which he hopes to prove in competition. Such as the fact that the circumference --- or wetted area, if you

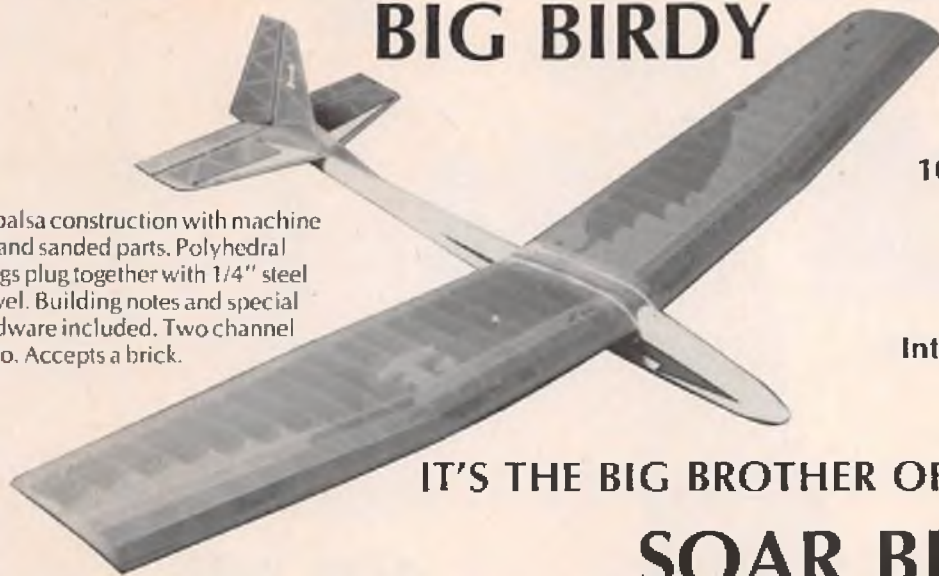
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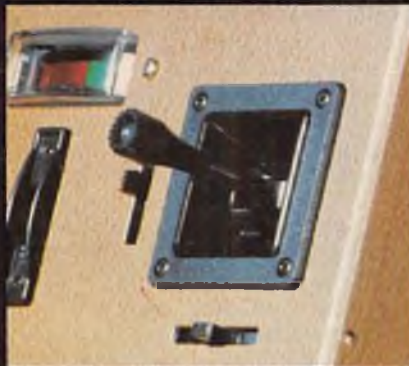
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SUNDAY FLIER

from page 22

prefer --- of the fuselage, is uniform from the leading edge of the wing to the leading edge of the stab, although it becomes more vertically oriented as the fuselage extends back from the wing. In any event, there was no question about the fact that he had the most glasslike finish of any of the racers present. Picture No. 4 is a shot of Mick with the Bushwacker III.



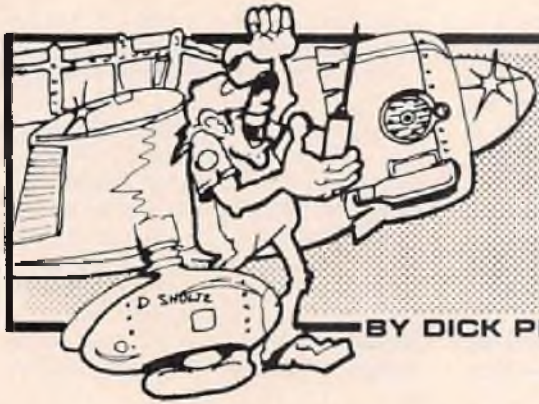
But is that best for racing? Jerry Krainock's wing was glass smooth except for the first thirty per cent of the top of the airfoil back from the leading edge. It had been carefully sanded with worn 440 grit wet-or-dry paper at a 45 degree angle to provide a satin type finish. Jerry believes it improved the boundary performance and gives a higher lift over drag ratio.

We'll never know until the results are in. Next October, Mother Nature willing. Please Mom --- be nice next time!

★

Before we have the rescheduled RCM Slope Races, the English magazine, Radio Control Models and Electronics (RCM & E) has scheduled a slope race in England on September 16. Several of the top racing pilots in the United States have expressed an interest in going there to race under the English rules. I'd like to go too. So let me say this --- the British Airways gave the English contingent a really fabulous deal so they could get here; do I hear any similar offer from American carriers to help an American team go to England to show that we can be competitive? And let me add this --- I flew with the men from Britain in a practice session before the scheduled races and, for what it's worth, I think we are fully competitive with them. So how about it, you American carriers? Are you willing to help an American group go to England, just as the British Airways gave a big assist to their team? Yes, I know; America doesn't send competitors to international events --- Americans do. So how about all you American Carriers; will you have a 100% load factor to London in the middle of September, or could you see your way clear to take an American team of slope

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BIG is Beautiful

BY DICK PHILLIPS



goofed. I try not to do so very often but I sure did in a recent column and it was because I assumed something that I should have checked out. In mentioning the EVRA engine in a recent column, I stated that an on-board battery pack was required and this was an assumption on my part since the engine does not have a magneto ignition. I was wrong, the EVRA engine **does not** require a battery on board for the ignition system. Dick Wengler of Hobby Lobby has advised me that although the EVRA does have a magnet in the flywheel, there are no points and the timing of the spark is automatically advanced and retarded according to engine rpm, very much a plus as Dick indicated in his note. My apologies to Dick, Hobby Lobby and all those with EVRA engines who wondered where the battery went. Is my face red? You can bet on it!

★

I have had a few inquiries over the period this column has appeared here about the use of foam wings in large models. I had not tried foam for large wings until recently and so had not made any comment about them.

I have a foam wing on the way for a large model now and there is one being flown here by another modeler which is performing very well. The advantages of a foam wing are pretty widely recognized by now but perhaps they bear repeating. Construction time is much shorter than would be the case with a conventional built-up wing. Almost any shape can be duplicated (with the exception of elliptical) with a little ingenuity and it is quite simple to build wash-out into the foam core.

The wing I have under construction is for a large model designed to do four things: First, fly (yet to be proven); be tough (it is); easy to build (simple); and inexpensive (like cheap)! I am preparing a picture file on construction and will be submitting an article on the beast in the foreseeable future. Just to whet your appetite, it is a 1.5 times Sig Kadet with a Cessna 185 wing of 8' span with flaps and ailerons on Quadra power. Weight will be about 20 pounds, all up. Cost will be under \$40.00 (probably) and it will be tough enough to drive into the ground



Lectra-Starter system for Quadra includes cast aluminum engine mount. Eastcraft Specialty Products, Inc., P.O. Box 25, Irwin, Penn. 15642. Phone (412) 864-4959.



Sullivan Products, Inc., did a tongue in cheek bit at Toledo with a super big fuel filter and tank.

with a sledge hammer if you need a fence post. It won't be the prettiest thing in the world but it will satisfy the design criteria as outlined above.

The foam wing is a normal hot wire cut foam wing of the correct dimensions. In this case a center section which is actually made in two pieces and constant chord. The two outer panels are double tapered, the whole thing sheeted with 1/32" ply which represents the single largest expense in the model, not counting engine and radio.

The wing will be strutted to the junction of the two panels on each side, although the sheeting is strong enough to get along without this strut if you don't get too violent with the model in the air. The ailerons will be the same as on the full scale Cessna; that is, they will be the full length of the outer panel and, likewise, the flaps, full length of the inner panel. Leading edge is made from cedar stock and shaped with a hand plane and

sanded. Aileron and flap are conventionally moved (wire pushrods inside outer Gold'N-Rod tubing, to bellcranks and wire pushrods made up with clevises.)

There is about 1/2" of wash-out at the tip (that's close to scale although it seemed like a lot at the time the cores were cut!) and, with the flaps, it should fly in a very stable fashion. I have used some rather unconventional materials in the bird in order to keep the costs low enough to appeal to anyone interested in building a first time trainer for big, but more on that at another time.

If you have been considering a foam wing for your big bird, fear not. Properly sheeted, it will work fine, but if you plan aerobatics, better strut the wing. Another plus of the 1/32" ply covering is that it requires almost no preparation, being as smooth as the usual part of the baby.

Where it is necessary to join the sheeting on the wing, I have covered the joint with narrow strips of 1/64" plywood and glass resin, although I suspect a light cloth material and resin would do as well. In the wing that I am completing as this is written, there are two pieces of ply on the top of the wing (one joint) and four on the bottom (three joints) so there is not a great deal of work in covering the joints. Just be careful the resin doesn't get to the foam, it will eat it up.

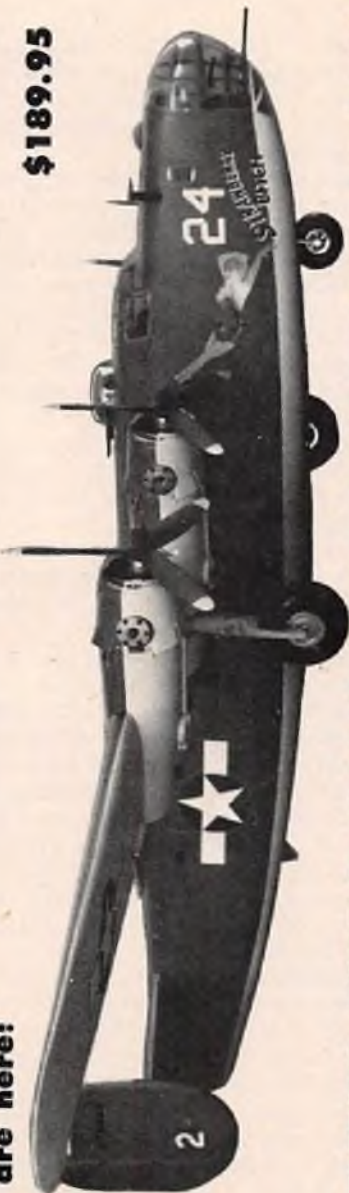
Fastening the sheeting to the cores can be done with a number of products. I use Sig's Foam Bond (don't forget to get some thinner for it) but any water based commercial contact cement will work. The ordinary commercial contact cement used for putting Arborite[®] on counter tops will dissolve the foam, so be sure you get the water based variety which won't eat foam. It takes a little longer to dry than the others, but even this can be speeded up if you use a heat sealing gun or hair dryer on it. (Yeah, I'm too impatient to wait on it too!)

Getting the aileron and flap pushrods out through the skin can be aided by shielding the adhesive coated surfaces from one another with waxed paper until the sheeting is in the proper position. I often use a couple of pieces of waxed paper on top of the foam until I get the sheeting positioned exactly right, then remove one of the pieces of waxed

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paper, seal the sheeting down with gentle pressure, then remove the other piece of waxed paper and seal down the other half. It works well and saves the hassle of accidentally making contact between the two parts and having to wrestle them apart. That usually results in some damage to the foam surface and you have to re-cut the cores again.

The foam wing construction can take as little as one third the time that conventional construction requires and there is nothing I have found to make the foam cored wing less serviceable than the built-up one.

No spars were used in either the wing now flying here or the one I am building and this has not reduced dependability. These wings are surprisingly strong.

Anyway, more later on the model tried out here which will be tough, quick and easy to build, and cheap, plus probably a lot of fun to fly.

★
QSAA (Quarter Scale Association of America) has made some suggestions to AMA regarding regulation of large models in the United States. The crux of the matter seems to be the acceptance (mainly by the AMA) of an upper limit of some kind on the size, or horsepower, or wing loading, or something of the larger models in order to prevent problems in the future. Taking the current boom in large models to its ultimate end, how long will it be before someone wants to fly a full scale, radio controlled aircraft? What happens when control of such models is taken over by the FAA? How big can we go (or how powerful or whatever) before the boom comes down and no more biggies?

★
QSAA has suggested to AMA that the less regulation the better (Amen!) but it is accepted that some sort of parameters will need to be accepted by those of us who want to fly large models or Big Brother will step in, in the form of government, and we'll find ourselves hemmed in on all sides by rules, regulations, limitations, guidelines, and enforcements of every kind. I don't think we need the hassle and I'm darn sure we'll lose a lot of our enjoyment if it comes to pass.

if you have an opinion, I'd like to have a **copy** of your letter to AMA stating your views. (Surely you intend to let them know how you feel?) If you are not an AMA member, join --- one more voice doesn't mean a lot but several thousand more certainly will help. To those of you in Canada, join me in MAAC. The progress we have made in Canada (25 Kilo gram weight limit on our MAAC insurance, among others) has come about due to the efforts of those interested in **big** who are members of the organization.

I can appreciate that there are some problem areas within AMA and there has been some controversy about policy within the organization, but it is, after all,

your organization as members, and the board of directors are responsible to the membership. Let 'em know how **you** feel.

Sorry to get a bit carried away there and off the subject, but our national organizations are best suited to do what we cannot as individuals. Canada's four new frequencies came about through the work of many dedicated people, all of them working through our national organization. We are far fewer in number than those of you in AMA so you should be able to do even better than we can.

★
Speaking of QSAA, the Las Vegas Rally will be October 11 through 14 this year and if you are interested in large models, well, for that weekend, Las Vegas will be the world capital of **big**. Plan to be there if at all possible, you'll be glad you did. My plans include being there and I look forward to meeting even more of those who have written me than were there last year. It was a great four or five days and we really enjoyed ourselves and the company there. Las Vegas is worth the trip and to couple the city with a model aircraft meet of the size of the QSAA Rally makes it worth the time and expense.

If you are not a member of QSAA, drop Secretary Lee Taylor (329 C St., Roseville, Calif 95678) a note and he'll tell you how to join and give you the details of the October Monster Bash in Glitter City. Special hotel rates were available last year and presumably will be again this time. Lee will have all the details.



Wing pattern made from formica or similar material. Sands well and hot wire slides on its surface easily. Patterns are also long lasting.



Cutting the cores. Bars on top of foam billet are steel and hold any movement or warp out of foam billet. Wheel under counter is for car, not large model.



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Nimbus Sport is a new 4 channel radio control system, which LOGICTROL is offering you at a most economical price. And best of all, we didn't compromise on quality to bring this low priced radio to you.

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The highly reliable receivers and servos use the 3 pin Deans gold plated plugs. The Nimbus transmitter is equipped with our unique *adjustable tension* control stick, which allows each control to be independently and easily adjusted. The control stick features a high quality conductive plastic potentiometer for the highest reliability and the lowest wear.

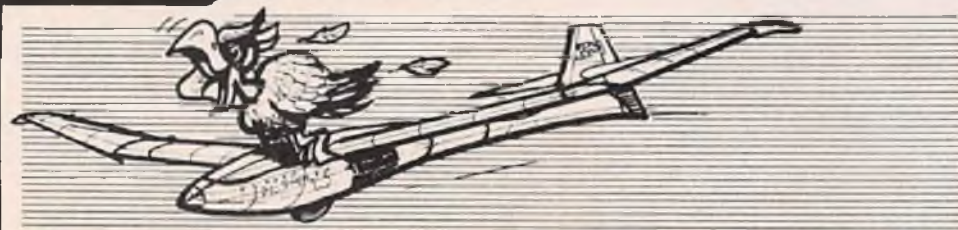
The Nimbus Sport comes equipped with 4-channels, but can be converted to five channels at our many service centers throughout the world.

Logictrol, the most experienced company in digital radio control systems, is proud to offer you this quality package in the new, low priced Nimbus Sport.

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One of the things that I like to write about concerning the subject of soaring is new items on the scene. This time it is hand launch sailplanes and contests. You say what's new about hand launch --- we have been throwing gliders in the air for years! What I am talking about is a whole new breed of sailplane, one that is purposely designed and built for hand launch only.



Dave shows Paul Trist how wing attaches. Super light construction.

Dave Thornburg, designer of the award winning sailplane "Bird Of Time," has designed a clever small sailplane exclusively for hand launch. One grips it just like you would chuck a hand launch glider for free flight. A finger thrust platform is built into the side of the fuselage that mates with the wing trailing



"Innards" of Dave Thornburg's R-C hand launch. Servo's and receiver fit close, see text. Finger rest matches with wing trailing edge. Threaded nylon block is wing hold-down.

edge. The empennage is a "T" tail design to cut down the chances of catching the stabilizer on the back of your head during launch.

Dave uses a two channel Futaba for rudder and elevator controls. The fuselage width is only 1" wide. To achieve this, the receiver case was removed and the two servos were built right in during construction --- not put in after the fuselage was built up. The picture shows how the receiver and the two servos are built in end to end. The battery pack, which is 225 ma is cordwood stacked ahead of the elevator servo. Note how the switch was whittled down to fit to the rear of the receiver.

Not only is the design, construction and covering (transparent red and yellow MonoKote) exciting, so is the airborne weight ready to fly --- a mere 11.75 oz. This makes the wing loading only 4.9 oz./ft.². A launch height of 40 to 50 feet can be achieved with no problem.

Now running a contest is very simple. Depending on frequency conflicts, a heat is a set time in duration (generally 10 minutes). A pilot goes off to the corner of the field where he takes along his rooting section, picks his own air, and records all of his flights in total seconds of flight for each launch.

After five launches, the seconds are added up and that would be his score for round one, and so on for as many rounds as time permits, or how long the "ole" arm holds out.

One thing should be said about throwing a glider of such light weight. If your arm is 'not in shape,' look out, it will



Chris Adams shows his dowel thru fuselage for finger rest. Very high launch heights are achieved. Chris has named his ship "Soar Arm."

feel like a three week old piece of lettuce afterwards. A week prior to this type of contest, throw a tennis ball at the garage door for 15 minutes a day. You'll be glad you did at the close of the contest day. Try this for a change of pace in the art of flying --- a great spectator sport.

Last week I received a letter that made me think twice on how most of the readers of this magazine "have it made." Our problems in regards to building materials, plans, kit and radio availability, are trivial to the problems of Peter Doble of Salisbury, Rhodesia. Space does not permit me to quote the entire letter, but here is the main text:

My name is Peter Doble and I am an avid soarer. I thought I would write and tell you what the soaring scene is like down here in Rhodesia. Unfortunately, due to our small size, modelling here is on a very small scale. We have only one hobby shop that is worth mentioning in the country and, consequently, these people have the entire monopoly. They are fairly reasonable, but like everybody else in the country they are suffering from Sanctions. This means we cannot get any foreign kits or parts.

At present there are two Soaring Clubs in the country. One is run by the local hobby house and the other one, Salisbury Soarers, is just a gliding club situated on the outskirts of the suburbs. Our club is the biggest with just 40 members. We started about 2 years ago, being sponsored by the father of one of our flyers. He is, at present, chairman of the A.R.A. (Association of Rhodesian Aeromodellers). Our clubhouse is just starting to take shape, after many dollars spent.

Our field is magnificent, about 40 square acres of well cut grass, with open fields on either side, and numerous thermals coming through quite regularly. Unfortunately, due to our present situation, we all go to our flying field with guns and rifles. Even though we are only two miles from the center of town, it is still a slight risk. The other flying field which was situated near our airport has been completely shut down since mortar fire fell only about 3 miles away. The terrorists were actually aiming at Salisbury airport but I think they had the wrong runway in their



NEW

Choose the way you train with Top Flite's

Contender 40

Low Wing R/C Trainer

THE BUILDER'S CHOICE. Bent wing or straight wing, Top Flite's all new Contender 40 is a pilot's dream. Kit includes hardware package, many die-cut and precision machined parts plus easy to read plans for minimum building time and maximum flying enjoyment. Listen to how Al Betkey of Col. Betkey's Flying Circus describes this .40 size, low wing trainer. "Top Flite's Contender 40 is the star performer of our Flying Circus. Virtually stall proof, its short field capability

along with its fantastic pattern handling make the Contender the real workhorse of our aerial demonstration. I heartily recommend this great Top Flite kit to anyone who wants to experience the ultimate in performance and stability all in one easy to build package."



Actual photo of model built from kit using straight wing option.



Internationally acclaimed Colonel Betkey and his Flying Circus.



Actual photo of model built from kit using bent wing option.

Length 43¾"
Wing Span ... 47"
Wing Area ... 500 sq. in.
Engine Size40
App. Weight ... 4½ lbs.
Kit No. RC-22

List Price
\$49.95



Top Flite Models, Inc.
1901 N. Narragansett Avenue
Chicago, Illinois 60639

For a 12-page catalog plus a free MonoKote™ sample and prop chart, send request plus 50 cents to Top Flite.

ELECTRA-LITE



It finally came down to the flip of a coin. I had been wanting to design and build an electric sailplane. Not one that just dragged around the sky with the motor running and then gracelessly staggered back to earth when the batteries went flat. No . . . what I wanted was an agile, lightweight model that flew like an airplane . . . fast, capable of simple aerobatics, yet one that would still thermal in light lift. This would have to be a plane that I could use to chase that "sucker" thermal with . . . the one that leads you hopelessly down wind, allowing only inches of altitude gain for each turn, and then dumps you out in a cold down draft. With the right electric powered sailplane I knew I could beat that "sucker" thermal by turning on the power and driving on home, through whatever down drafts Mother Nature chose to throw at me. As a fringe benefit, of course, I knew that any parking lot, schoolyard, park, or outdoor bowling alley, could serve as a flying field.

But, then again, I really wanted to design a new competition sailplane too. I liked the looks of some of the new F.A.I. sailplanes with their faster airfoils and clean, low drag shapes . . . but I wanted something a little smaller than those planes. That nutty Thornburg fellow was making noises about having a "Hand Launched R/C Sailplane contest" and I really didn't have anything to throw into a "thermal hatsucker" to beat him.

Clearly, I had to deal with the problem. I wanted to build a performing electric glider . . . and I wanted to build a performing contest glider . . . and, just to make matters worse, my wife wanted me to build her a new pigeon coop. So, like I said at the start of all this drivel, it

came down to the flip of a coin. Heads . . . I'd build the electric job . . . tails . . . the contest glider . . . and if it landed on its edge . . . well, Charlotte would get her pigeon coop. But I'll be darned if that coin didn't just keep flipping over and over, and back and forth. So along came the Electra-Lite.

With the motor batteries in place, the 93" bird weighs in at a touch over seven ounces per square foot of wing.

Take the battery pack out (the one for the motor!) and the wing loading drops to 5½ ounces per foot. The design utilizes good, clean aerodynamics including a thin, flat bottom airfoil with an aft high point, and a rearward Center of Gravity to give it an excellent speed range. Then I added a pound and a half of lightness, to make sure that the Electra-Lite would thermal with the best of them. (Lightness, incidentally, is one of the few items that is **not** available at your friendly neighborhood hobby dealer.)

Most of you have seen electric powered models that were less than successful. They all tend to be overweight and marginally powered. When my cohort in crime, Tom Yantis, told me that he wanted to fly an electric glider in the upcoming electric championships, I was somewhat less than excited. I reasoned that how could something that weighed a ton thermal? After many gallons of late night coffee at Macdonalds, we discarded most of the available designs as being either too heavy or too flimsy or both. We decided that rather than adapting an existing sailplane to electric power, we would have to start from the ground up.

We weighed the components that we absolutely had to have aboard . . . a three channel radio with light servos and an Astro 05 motor and battery. I knew that a plane with a 7 ounce wing loading would give us the performance that I was looking for. Accordingly, we arrived at a total weight parameter of 40 ounces. This seemed to be as light as we could build a plane without sacrificing too much strength. Naturally, I **never** land on a wing tip . . . but I wanted a plane that I could let my friend fly too! (Note . . . humility is one of my more outstanding traits!) With these figures we were able to come up with the total wing area. The general planform of the airplane was agreed upon, and then we divided up the structural design responsibility.

I gave Tom the Astro 05, the radio, and the batteries and told him not to come back until he had it all in a fuselage that weighed less than thirty ounces total. He mumbled something about minimal frontal area and Vee-tails pick their noses up better when they turn, and he stumbled out the door. He was right, of course. Besides, a Vee-tail stays up out of the weeds, and it weighs less too.

I ordered another Big Mac and started giving some serious thought to the wing design. I was only allowed ten ounces total weight so I knew I'd better do my homework and get it right the first time. I figured I had plenty of time. It would take poor Tom at least a month to complete that fuselage.

Tom arrived at my front door at nine o'clock the next evening with the finished fuselage in his hand . . . ye

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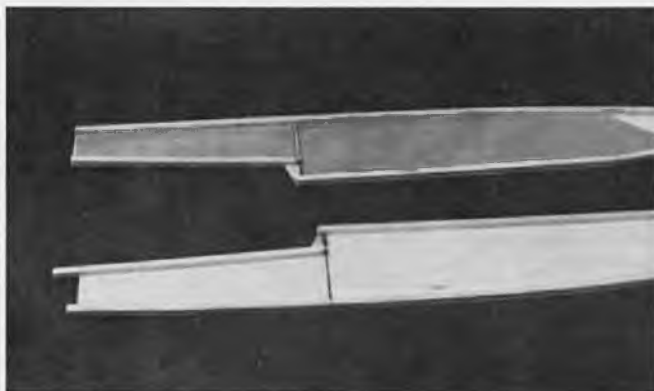
If you want a complete package in a sailplane, this high performance electric powered and contest machine will do the job. A 93 inch span with electric power is a tad over 7 oz. / sq. ft. Remove the motor battery pack and this drops to 5½ oz. / sq. ft. By Larry Jolly.



Electra Lite can be built with either one piece or two piece wing.



Look out Hugh Hefner . . . a nude view of the Electra Lite.



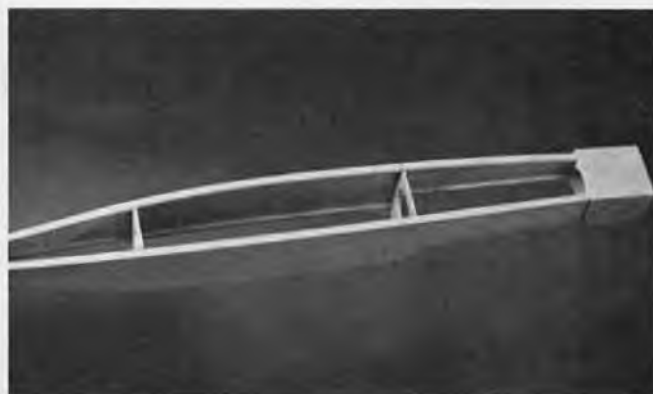
Fuselage sides showing longerons and 1/64 ply doubler (shown on one side only).



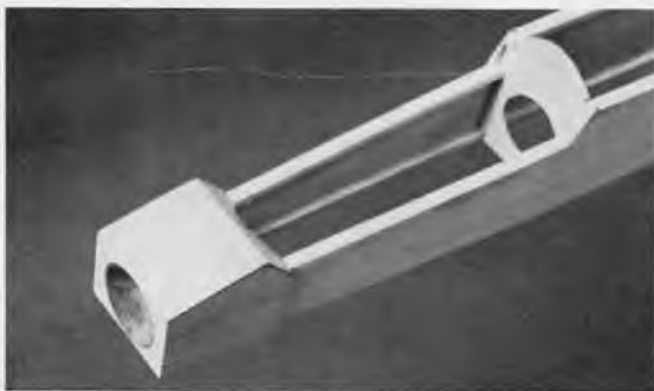
Fuselage tail detail showing longeron installation.



Fuselage detail showing bulkhead and cross brace. Note notch for NyRod tubing.



Fuselage ready for top and bottom sheeting.



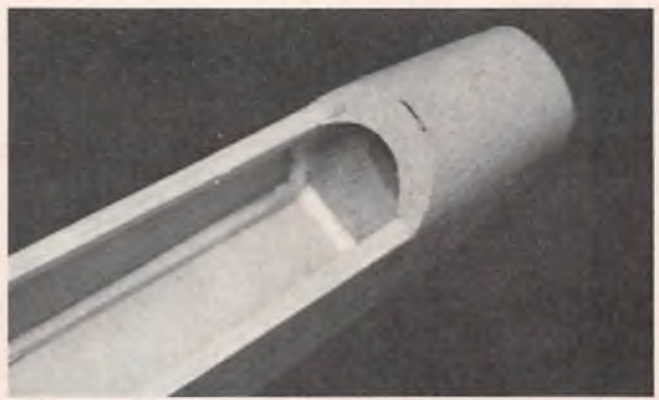
Noseblock detail. 1/64 plywood liner for motor has been installed.



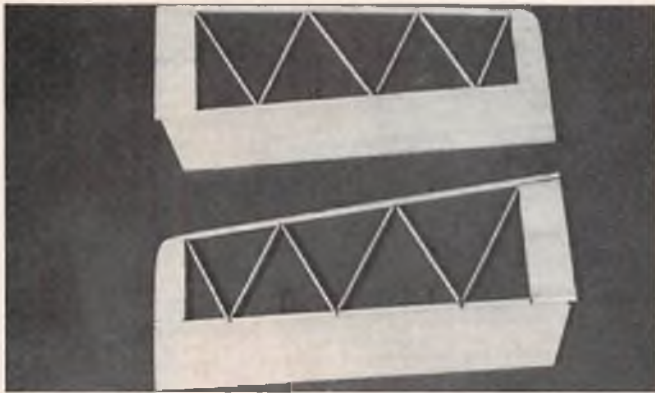
Cross grain bottom sheeting installed.



Sand noseblock to within 1/32" of plywood liner.



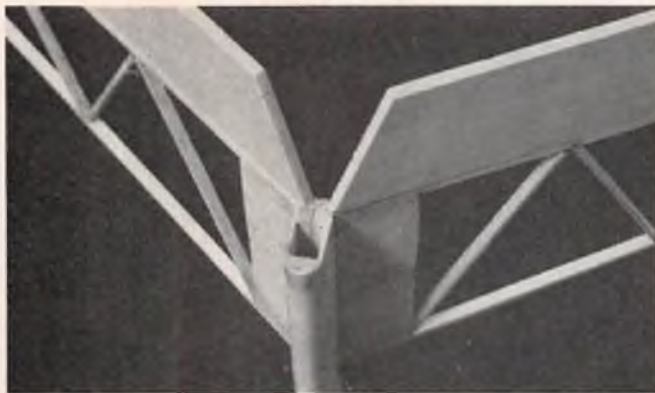
Noseblock after shaping and sanding.



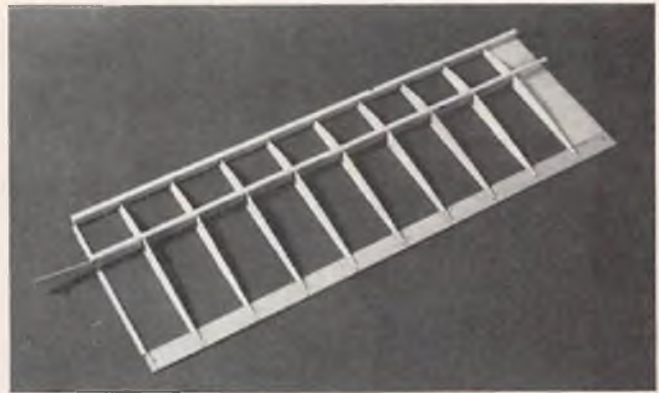
V-tail sections ready for joining.



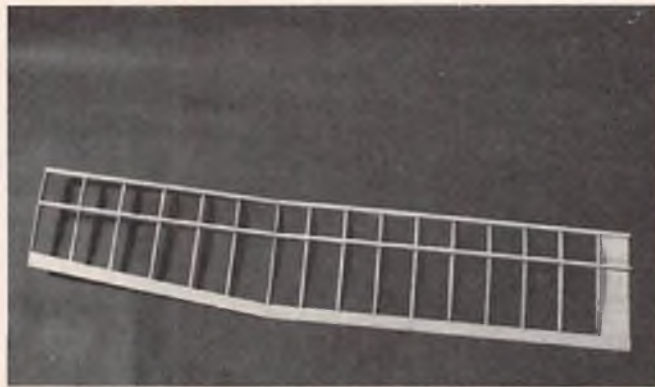
Triangular joiner strip is sanded to concave cross-section.



V-Tail assembly in place on fuselage.



Inboard wing panel with shear webs and plywood polyhedral joiner.



Nearly completed panel ready for top sheeting and root cap.



Center section detail showing brass tube and dihedral shims.



Tip block carved to rough shape, ready for Hoerner upsweep.



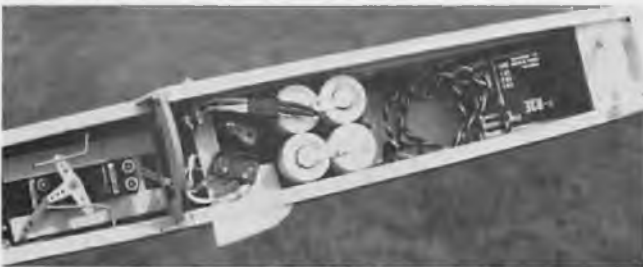
Finished Hoerner tip.



Radio installation. Sliding tray for rudder servo. Wing locating dowel comes thru bulkhead to secure rear of canopy.



Wing joiner detail. Note rear alignment pin and front locating dowel.



Detail showing motor battery installations and micro switch "throttle."



Rear wing hold-down bolt detail.

gads! I hadn't even cleaned the pigeon droppings off my work bench. (Maybe Charlotte really did need that pigeon coop!) With much muttering and swearing on Tom's part I got the wing finished in the next week and the first prototype flew . . . and flew great! Our design parameters worked out perfectly. The low frontal area and bolt-on wing made for a very clean flying bird that the Astro 05 hauled around with little difficulty. The Vee-tail turns the plane like it was on rails, and the very low wing loading makes it thermal with the hawks. So much for the esoteric B.S. The Electra-Lite is a darned honest airplane

that will please even the most critical among you. If you get started now . . . you might have it up in the third thermal to pass through on Sunday morning.

CONSTRUCTION

Remember . . . build it light. Pick strong, straight, lightweight wood. And don't add additional structure. You'll just add weight that destroys performance. Since the prototype was built, there have been a dozen more built. I personally have mangled two Electra-Lites; one when I got a case of dumb-thumbs in a crowded area and managed to come into direct frontal contact with a **very** well built warehouse: total damage was the

elimination of everything forward of the front bulkhead. To date we have never broken a tail boom, empennage, or wing. These crashes showed us that the plane has greater than adequate strength . . . but remember, the Electra-Lite won't knock down an industrial strength building . . . no matter how fast you get her going.

Wing:

Let's build the wing first. If you're like me, this is what will hold you up. I find it easier to cut out all the parts before starting assembly. Speaking of glue, I highly recommend the use of one of the cyanoacrylates for the majority of the

construction. If you find a joint that you don't want to trust to Zap or Hot Stuff, go ahead and use your favorite white glue or model cement.

Make up plywood templates of the rib shapes and cut out the ribs from medium hard 1/16" sheet balsa. Pick some good hard 3/8" x 1/4" for the leading edge. Pin the 1/16" x 1" trailing edge and 3/8" x 1/4" leading edges in place on the plan. Cut and cement in place the 1/16" x 1/4" capstrips and the center sheeting (bottom only). Put the bottom spar in place and cement in position all R2 ribs except the rib at the polyhedral break. Now cement the top spar and top 1/16" x 1" trailing edge in place. I usually put the shear webs in at this point. Note that the grain direction is vertical.

Now is the time to decide if you're going to build a one piece or two piece wing. We've built the Electra-Lite both ways. The one piece is a nuisance to transport but saves three ounces of precious weight. Most of you will elect to build the two piece version as shown on the plans. The one piece wing is built the same way except for substituting two 3/32" plywood dihedral braces for the brass tubes and shims. Cut the dihedral shims from scrap 1/4" balsa; place the brass tubes in place between the shims and epoxy this assembly between the spars. Cut out the 3/32" plywood doublers and epoxy them in place, noting the location shown on the plans.

The tip panels are built in the same way, except that there are no shear webs. When the tip panels are complete they are joined to the center panels by blocking up the tips 3" above the bench and sanding the polyhedral joint to the proper angle. The tip is glued to the center panel with plenty of epoxy. Now the 1/16" ply dihedral braces can be added, as well as the final rib at the dihedral joint.

With the center panel pinned down, glue the 1/16" top sheeting and capstrips in place. When the glue has dried, pin the tip panel flat and repeat the process. At this point the soft balsa wing tip block can be glued onto each wing panel. Block up the center panels 1 1/2" (measured at the polyhedral break) and sand the root to the correct angle.

The 1/4" plywood center rib (R1) should now be drilled for the 3/16" wing rod and the 1/8" positioning dowel. Insert the wing rod and slide the wings onto the rod, checking that there is no gap between the wing root rib and R1. Epoxy the 1/16" root cap ribs (R1A) to the wing roots.

Now sand everything smooth and to the right shape. The tip is very simple. I sand the block to the rough shape, then I take a broken tail boom from a Schluter Heli-Boy helicopter, wrap it with 80 grit sandpaper, and use the resulting tool to shape the concave portion of the wingtips. This technique works quite

easily and the resulting wing tip looks great. (If you don't have any broken Heli-Boy tail booms laying around, contact Craig Hall . . . he's got dozens of them that he'll part with real cheap!)

Right about now, you probably think something is missing . . . so go ahead and build the other wing just like you did this one . . . and make sure you've got one left and one right.

ELECTRA LITE Designed By: Tom Yantis & Larry Jolly

TYPE AIRCRAFT

High Performance Elec. Moto-Glider

WINGSPAN

93 Inches

WING CHORD

9 1/4" root — 7 1/2" tip

TOTAL WING AREA

818 Square Inches

WING LOCATION

High Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord center panel

tapered tips

POLYHEDRAL, EACH TIP

3" center panel — 3" tip

D. A. FUSELAGE LENGTH

45 1/4 Inches

RADIO COMPARTMENT AREA

(L) 10" x (W) 2 3/8" x (H) 2 1/2"

STABILIZER SPAN (V-Tail)

27 1/2 Inches

STABILIZER CHORD (incl. elev.)

5 3/4 Inches

STABILIZER AREA

158 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

STABILIZER DIHEDRAL

22" between tips

REC. ENGINE SIZE

Astro 05 electric

REC. FUEL TANK SIZE

NA

LANDING GEAR

NA

REC. NO. OF CHANNELS

2-3

CONTROL FUNCTIONS

Rud., Elev., (V-tail) motor cut-off

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa, Ply & Spruce
Empennage	Balsa & Spruce
Weight Ready-To-Fly	40-43 Ounces
Wing Loading	7-7.8 Oz./Sq. Ft.

Fuselage:

Okay . . . now we get to the easy part . . . building the body of this bird. Cut the two fuselage sides out of two similar pieces of 1/16" x 3" x 48" medium weight, "C" grain balsa. For the longerons (stringers) use the straightest, moderately soft 3/16" x 3/16" x 48" balsa sticks that you can find. If you use too hard balsa longerons,

you may have problems with the fuselage wanting to warp when you pull the sides in to get that sexy tapered look in the tail boom. Also, if you use 48" sticks, you'll only need four. For former F-1 you'll need a piece of 1/8" ply. For F-2 you'll need a piece of 1/8" balsa 2" x 2-3/16" with the grain cross-wise, not up and down! The fuselage doublers and motor tube are made of 1/64" ply. You can get by with a 12" x 12" sheet for the whole affair.

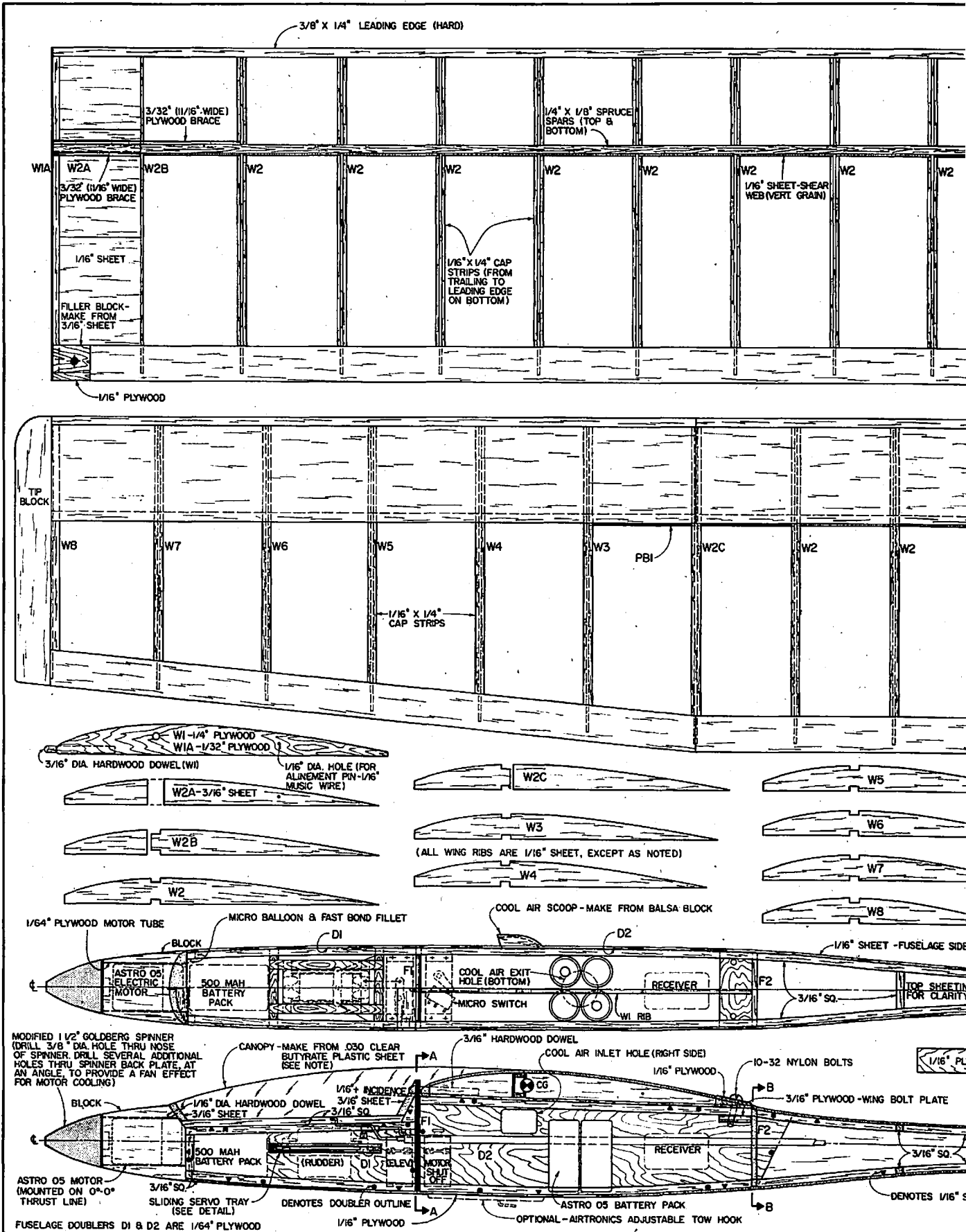
Now we can start gluing all of the pieces together. Cut the fuselage sides as shown on the plan, then begin gluing the longerons on. I seldom do this over the plan, because it hides the pretty pictures, but you can if you want to.

Pin the fuselage sides down and start tack gluing the longerons on at the nose. Work toward the tail, bending and gluing as you go (with one of the super glues, this goes real fast). Mark the location of F-1 on the inside of the fuselage. Glue doublers D-1 and D-2 in place, leaving a 1/8" gap along the line where D-1 goes. Be very careful that the F-1 doubler will go in straight and line up evenly on both sides of the fuselage. An easy way to glue the doublers in with Zap, etc., is to first glue them along the F-1 gap. Peel the doubler back and run some Zap onto the wood ahead of the doubler. Lay the doubler down on the fuselage side and rub it down with a couple of paper towels. Be sure to use wadded paper towels. The towel will soak up any excess glue that comes out around the edges. Do it this way until the whole doubler is glued down and you won't glue your fingers down. You could use a little Titebond for the doublers. It will be a little easier, but will take longer and may cause warps in the fuselage sides.

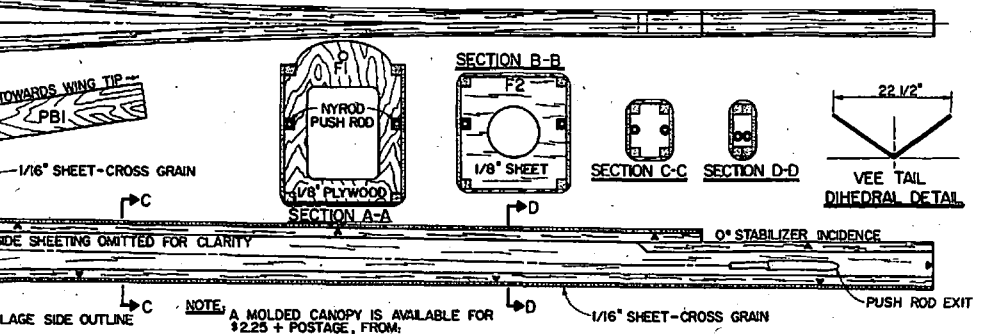
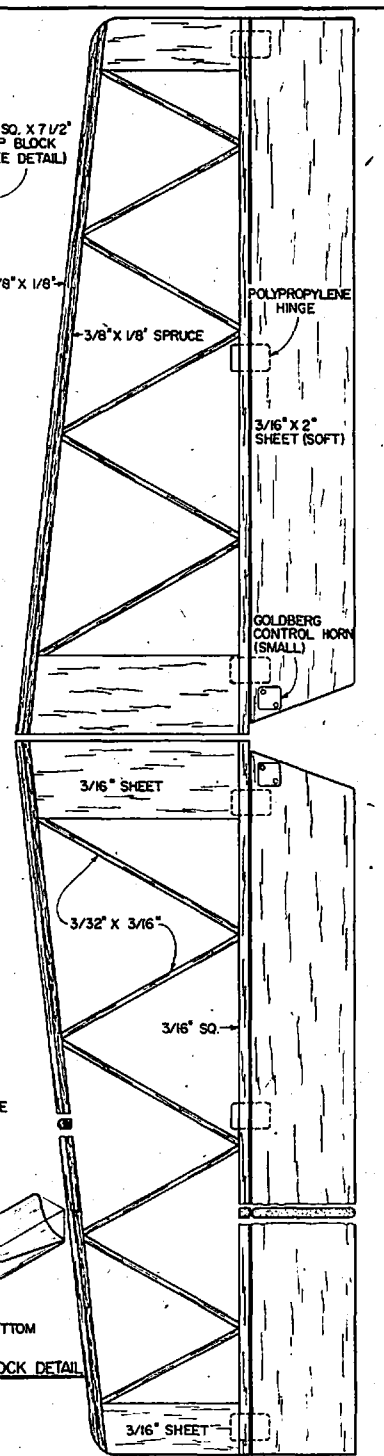
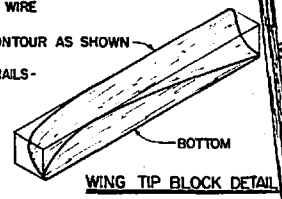
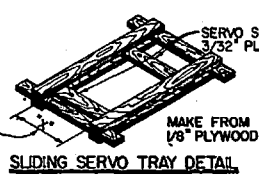
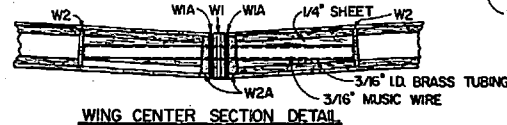
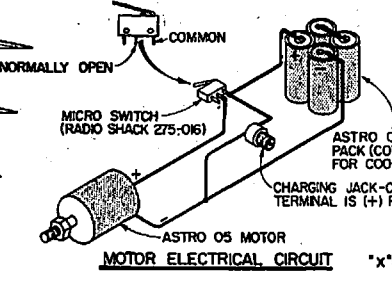
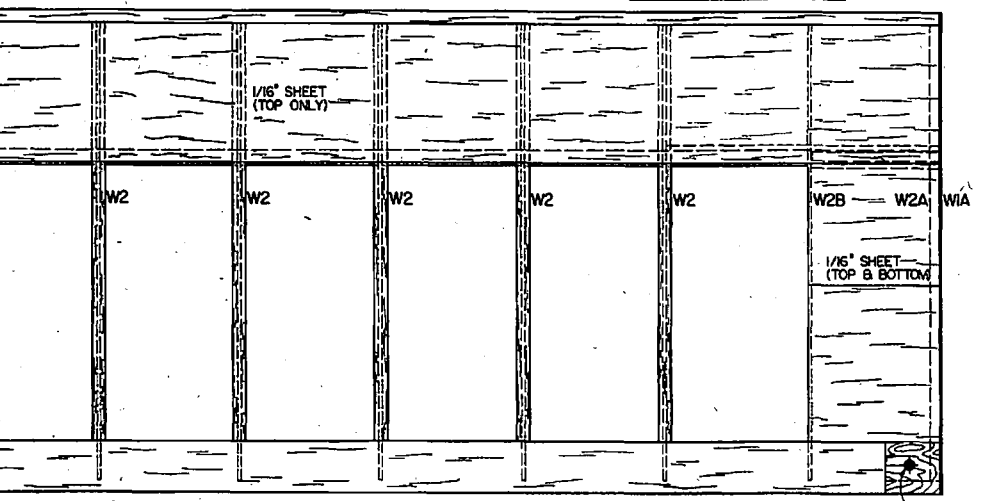
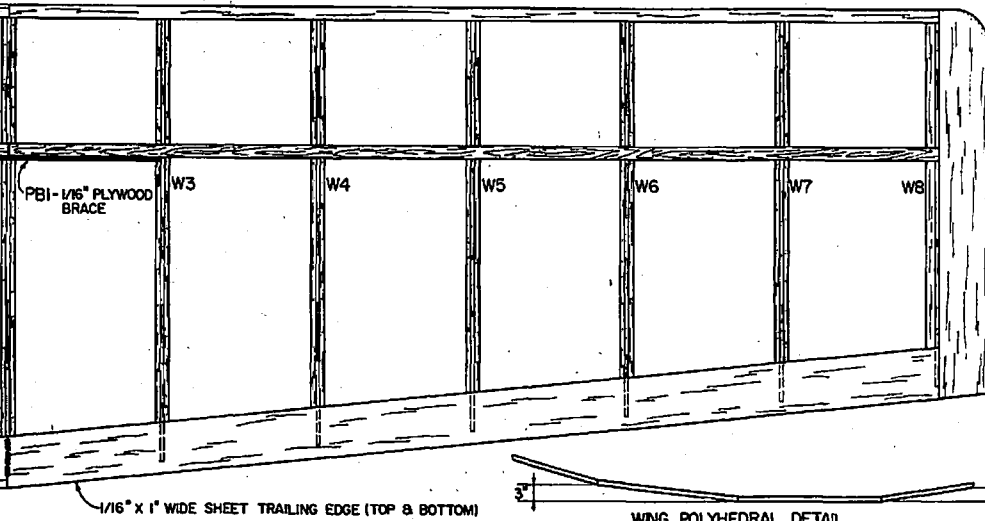
Join the fuselage sides by lining up the F-1 gaps with the fuselage sides upright and facing each other. Rubber band the tail together at the empennage saddle. Spread the fuselage sides apart at the nose and insert F-1 into the F-1 gap. When everything is straight, Zap F-1 into place. Now Zap F-2 into place. Make sure everything still lines up and glue the tail boom sides together at the point indicated on the plan. Using a modelers clamp (Kraft, X-Acto, etc.), pull the fuselage sides together at the point where the 3/16" x 3/16" balsa braces go across the fuselage behind F-2. Lightly epoxy the braces in place.

Now comes the fun part . . . we're gonna make a noseblock. Take the block and drill a 1 1/2" diameter hole through it (before shaping the outer dimensions). You'll probably never find a hole saw that will go all the way through, but most hardware stores carry ones that will go 1 1/2" deep. Drill a pilot hole all the way through the block and cut the hole half way through the block, then turn it over and cut the rest of the hole from the other side. Now make the

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WING— TOP SHEETING AND CAPS STRIPS NOT SHOWN FOR CLARITY



NOTE: A MOLDED CANOPY IS AVAILABLE FOR \$2.25 + POSTAGE, FROM: MIDNIGHT MODEL SUPPLY, 17321 BRENDA LANE, HUNTINGTON BEACH, CA 92649

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A HIGH PERFORMANCE ELECTRICALLY POWERED SAILPLANE

ELECTRA LITE

WING SPAN: 92"
WING AREA: 618 SQ. IN.
FUSELAGE LENGTH: 45.12 IN.
POWERED BY: ASTRO OS MOTOR

DESIGNED BY: TOM YAKITS & LARRY JOLLY
BUILT BY: *Bob Williams*

PLAN NO. 773



TOLEDO



A QUARTER CENTURY OF THE TOLEDO R/C EXPOSITION

Amongst those of us within the modeling industry, there are many horror stories about the many experiences and problems we've had at the show: the truck strikes, the weather, the saturated services and facilities, the airlines, and on and on and on. However, these sad tales really must only amount to minor inconveniences, because in spite of everything we say and hear, most of us return to Toledo year after year.



And this year, 1979, we returned for the 25th time. Not we personally, but we, the model equipment manufacturers and the modeling public. We did so to the tune of over 175 displayers and over 20,000 paid admissions. During the three days of the show, April 6th through the 8th, we were treated to a personal inspection of all the major R/C products produced or imported into the U.S. We met and talked to the people who make and use them, expanded our knowledge of them and their uses and, yes, we even got to voice our dissatisfaction with some of our past purchases. After all, what is perfect? And manufacturers often depend on such input for future improvements.



We were also treated to many examples of the best in modeling craftsmanship, as about 150 modelers from far and near brought in their latest efforts to enter in the static model competitions. There were 18 categories, plus a Best of Show Award. Entries this year leaned heavily towards larger scale airplanes, with even what could easily be the world's smallest Quarter Scale, a Stits Jr., on display. There were airplanes that your eyes just wouldn't believe, such as the all metal Lockheed P-38 "Lightning" by Jim Funduk of Holly Ridge, N.C., that was awarded the Best



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1979

By
Eloy Marez

Photos By
Dick Tichenor





John Maloney received a plaque from Bob Hisey, Expo Co-Director, in honor of being the longest continuous exhibitor.



Special Directors Award for Achievement went to Donald Hickman for his 1/5 Scale Sherman M-4 Tank (home-made engine).



A few of the 1/8 Scale gas powered race cars.



An exceptionally well executed Pitcairn Mailwing.



Lots of ingenuity was shown in the display of 1/2A models.



A small portion of the superb details are seen in this photo of James Funkuk's Best of Show Award winning Lockheed P-38-L.



Glenn Sprague entered staggered wing biplane, Sun Chaser, in Original Design.



Bob Strobel built this Midwest Heinkel 162 with Axiflo ducted fan.



A most imaginative design entered in the Sport Biplane category.



A striking prop version of the Thunbird's T-38.



Steve Sauger captured 2nd Place in Non-Military Scale with a beautiful Lockheed Orion 9-D.



A superb Quarter Scale Fleet Trainer.



Klondike Angel was a colorful Original Design entry by Russ Hughes.



A sailplane display would not be complete without a hang glider.



Jim Messer's Quadra powered Ecoupe is an attractive and practical approach to Quarter Scale.



57" wingspan, .60 ducted fan Mig-15 by Byron Originals. Kit includes fiberglass fuselage, molded wing and tail, fan unit, less engine.



Bob Violett's latest; F-86 7.5cc ducted fan. Now under development, to be available soon. Skyhawk II A4 will continue in production.



F-106 Delta Dart for .40 ducted fan. All balsa, 840 sq. in. area at 7½ to 8½ lbs. R/C Kits, 706 Easton NE, Canton OH 44721.



Latest ducted fan from Jet Hangar Hobbies. F9F Cougar for 7.5cc and Turbax I fan unit. Semi kit with epoxy glass fuse, foam wing.



A-7 Corsair II for 6.5 or 7.5cc and Turbax I ducted fan. 740 sq. in., 6 to 10 lbs., glass/foam. Sterner Engr., 661 Moorestown, Bath, PA 18104.



.40 ducted fan Hawker Siddeley 1182 Hawk. Spans 54", 7½ to 9 lbs. Glass fuse, foam wing, \$140. Bob Dively, 28001 Chagrin, Woodmere, OH 44122.



Cessna 172 Skyhawk from Sig Mfg. Co. Plastic fuselage shells, foam wing core, many hardware and scale details. 65" span, .60 engine.



Scale Laser 200 for .60 with drive unit or .90, 1000 sq. in. area, 10 to 11 lbs., \$170. Mallory Models, P.O. Box 207, Falls Church, VA.



Future Bridkit P-51B Mustang in fiberglass and foam, for .60 power. To be available late '79. Price to be approximately \$125.



House of Balsa's P-51D "Candy Man" now available with either balsa or fiberglass fuselage. For .29 to .40 engines, 49" span.



Royal Products B-17 Flying Fortress for four .20's. Spans 55" with 806 sq. in. at 3/4" to 1" scale. Coming soon, \$150.



Great Lakes for .15 to .25 power and four channel radio. Balsa and spruce, \$34.95. Flyline Models, 2820 Dorr, Fairfax, VA 22031.



Fiberglass fuse for Cessna 182; one of a number of glass or plastic and foam imports. Avionics Int'l., 403 Clagett Dr., Rockville, MD.



Clipped wing version of the popular Taylorcraft, in Quarter Scale. 88" wingspan with a flying weight of 18 to 22 lbs. NAME, Inc.



45" Tiger Moth, for .25 to .35 power and four channel R/C. 4 to 4 1/2 lbs., \$52.50. Gee Bee Products, P.O. Box 18, E. Longmeadow, MA.



Quarter Scale Stagger Wing Beech D-17S from Model Engineering of Norwalk. 96" span, 20 lbs. Aluminum cowling, plywood/balsa, 2700 sq.



Martin Baker 5, for .61 and 5 to 7 channels. Spans 55", 660 sq. in. at 9 to 11 pounds. All balsa, pre-assembled. Model Merchants.



Stinson Voyageur 105, in plywood and softwood. 1/4 Scale; 101" span, length 74". \$67.95. J-5 Enterprises, Box 82, Belmont, Ont., Canada.



One of the many high quality scale fiberglass fuselages and kits available from Bob Holman, Box 741, San Bernardino, Calif.



Warlock .40 for sport and pattern, 52" span. Also available in 1/2A version with 325 sq. in. wing, pylon legal. From Cox/Airtronics.



The Champ: The Livewire Champion Mark III, that is. Redesign of popular DeBoit trainer 55" span, for .15 to .19's. Midwest Products.



It's a "Piece of Cake"; to build and to fly. 6' span, for .049 reed valve engines and two channel system. \$24.95 from Craft-Air Inc.



QB-60 Monster from Hobby Shack. 7', 1069 sq. in. .60 engine, 4 to 6 channels. For glider launch, aerial photos, drops, etc. \$80.00



"Geni" 4 channel sport trainer for .19 to .35 engines, and some variations now under test. Custom Model Products, 27 Fulton St., Brockton, MA.



SB-2 Scout, 1/2A sport trainer for two channel R/C, 19 to 25 oz., 36½" span, 226 sq. in. area. Hoo Inc. 12 Mac Alva Dr., Hampton, VA 23669.



LFX IV, a high performance pattern plane for AMA or FAI maneuvers. 62½" wingspan, fiberglass and foam, ply covering. Johnnie Casburn Mfg. Co.



"Tiporare," .60 powered five channel competition pattern airplane. Epoxy glass and foam. 66". W-K Hobbie, 19 Main St., Centerville, OH 45459.



Bolkow BO 105, scale model of very popular European chopper, uses Hell-Boy mechanics. Gorham Assoc., 23938 Craftsman, Calabasas, Calif.



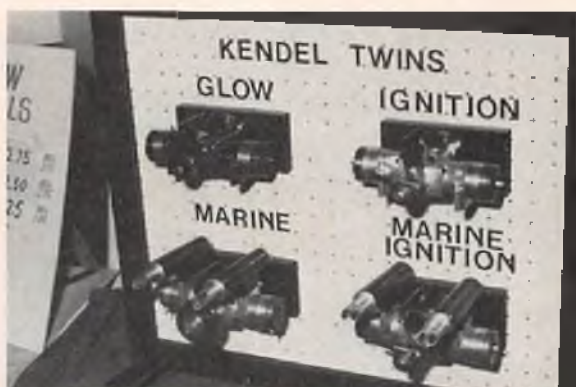
"Commander," one of a number of .40 and .60 powered helicopters available from American R/C, 23811 Via Fabricante, Mission Viejo, Calif.



World's only production 5 and 7 cylinder four cycle engines, \$685 and \$785. Executive Engine, 16650 S. 104th St., Overland, KS



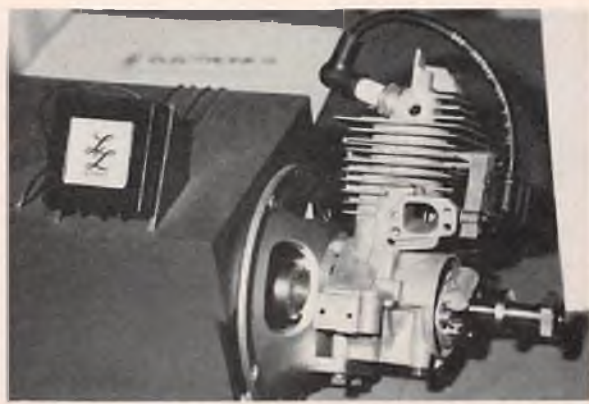
Hustler engine and accessories from large airplane supplier. Catalog from EWH Specialties, 607 East Abram St., Arlington, TX 76010.



KenDel Twin, 1.2 cu. in. displacement available in various versions. KenDel Model Engines, 43443 Telegraph, Elyria, OH



Fox Twin; 1.2 cu. in. displacement, 2½ lbs., with mount. 3 plus horsepower at 14000 RPM, uses 2 ounces fuel per min.



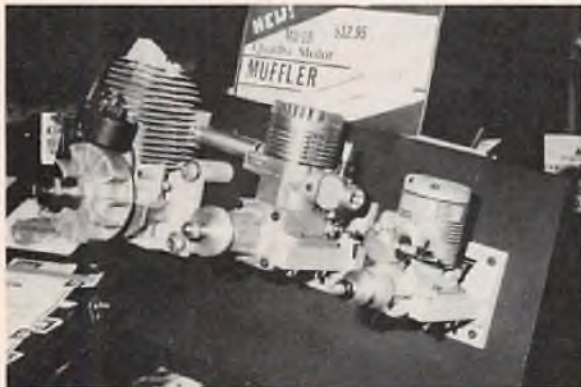
A number of on-board and ground start power systems for ignition and glow, L & L Electronics, Box 13434, Albuquerque, NM.



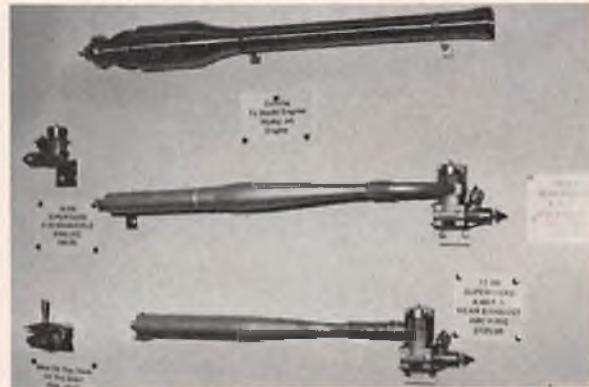
2 + 2 Super Drive, interesting concept for .40 or .60's, \$100.00 and \$110.00 each. Cass Engr., Box 420, Rutherford, NJ 07070.



One of many electric starter units for glow engines, this one on K & B outboard. Eastcraft Specialty, 709 Longboat, Beachwood, NJ 08722.



Adjustable motor mount systems for most classes and sizes of engines. Edson Enterprises, 17 Speer Place, Nutley, NJ 07110.



New Jet Engine, soon to be available from World Engines, along with some of the popular Super Tigres now on hand.



A muffler for everything and anything, all sizes and configurations. Silm Line Mufflers, 8631 E. Roanoke, Scottsdale, AZ.



A complete line of fiberglass filled props in sizes from 7" to 11" are available from Royal Products Corp.



Kelly Products, P.O. Box 38, Western Springs, IL 60558, showed the internal construction of its fibreglass filled props.



Multi use precision balancers, for almost anything that rotates. High Point Products, 3013 Mary Kay Lane, Glenview, IL 60025.



Futaba's new module type R/C systems with many new features, available in a wide choice of highly specialized models.



New Aristocraft import, 8 channel Werner R/C system with many programmable functions including reversing, travel rate . . .



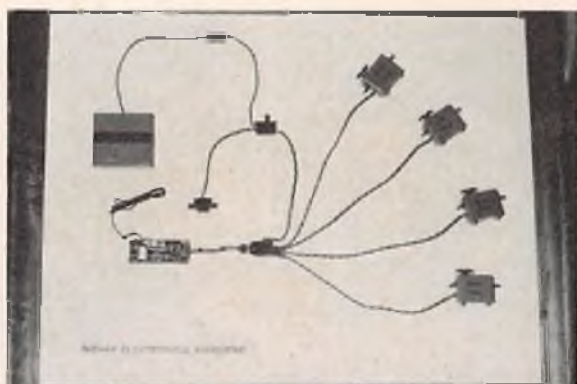
Astro GX202 two channel R/C system suitable for cars, planes, and boats. Pearlless Corp., 3919 M St., Phila., PA



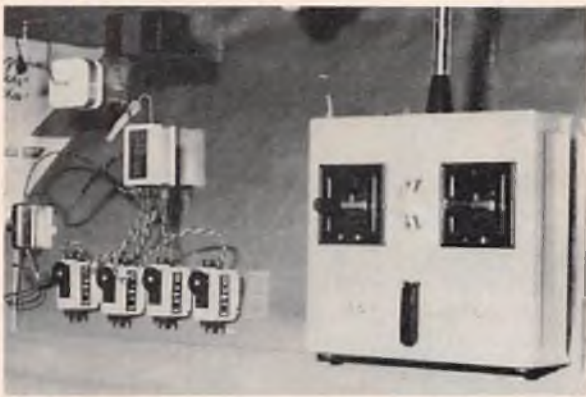
New R/C system introduced this year, in 2, 3 or 5 channels, reasonably priced. Valair, inc., 653 N. Wayne, Cincinnati, OH.



Heathkit showed a complete new system as well as some of its R/C oddies but goodies and other electronic equipment and tools.



New airborne system, available complete or as individual components. Novak Electronics, 1915A S. Evergreen St., Santa Ana, Calif. 92707.



A complete selection of airborne R/C components, either assembled or kits. Litco Systems, Box 90, E. Hanover, NJ 07936.



Cannon's Super-Micro servo is probably the smallest now available, only .47 ounces. Also many other small systems.



New automatic nicad charger from MEN. Adjusts rate from normal to trickle, as required. Claimed to extend cell life.



Scale cockpit interiors by Dave and Al's Scale Products, 1806 E. Market, Akron, OH 44305. Also make bombs, floats, tanks, etc.



New control surface and door hinges in precision molded nylon, for many uses. Delp's Inc., P.O. Box 82, Perkasie, PA 18944.



Goldberg Hold-Downs, available in both flat and angled types. Useful for a large variety of canopy and hatch securing jobs.



Graphics, from Coverite, a new line of pressure sensitive micro-thin vinyl letters and numbers in 1", 2", and 3" sizes.



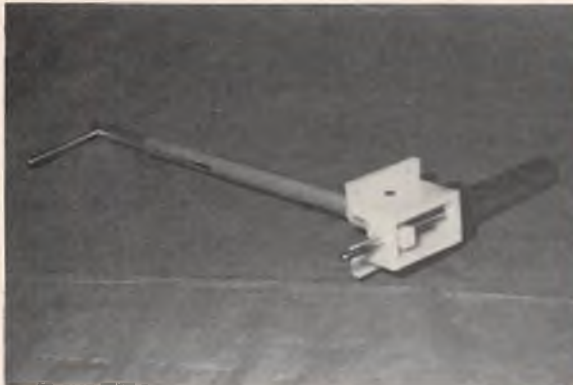
Top Flite Models introduced a new slender tip MonoKote iron for those hard to cover corners and fillets. Available near future.



New retracts, complete system designed for 1/4 or 1/3 scale models. Custom Air Retracts, 16751 Noyes, Irvine, Calif.



Retracts by Robart come in a wide variety of sizes and types for almost any plane. Robart, 310 N. 5th, Charles, IL 60174.



Dave's new retracting landing gear, air operated, for large models up to 1/3 scale, direct only from Platt Models.



Lightweight electric winch for up to 80 ounce sailplanes, \$160.00, less battery. Fab-Tek Inc., 17 Sugar Hollow, Danbury, CT.



License free rate of climb sensor for sailplanes, \$125 including receiver. Soaring Products, Box 117, Kensington, MD.



Logictrol's answer to the glider tow hook problem. Nylon, fail safe and externally adjustable, easy installation. \$4.99.



BoLink Industries has a complete line of R/C cars. Bodies, chassis, and all hardware and accessories for sport and contest.



Tires for 1/8th and 1/12th scale cars, plus many parts and accessories from Twinn-K, P.O. Box 31228, Indianapolis, IN.



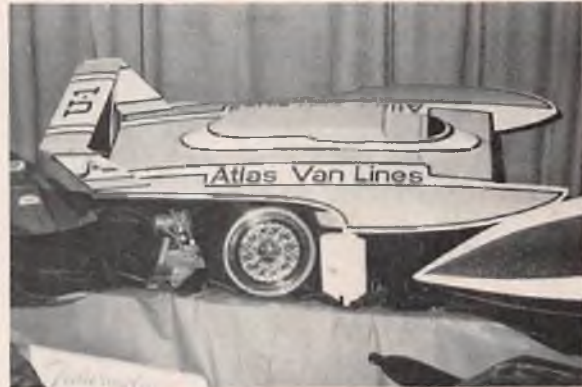
In case you get bored with the usual, try the new Space Squirt, a super Surface Vehicle for 2 channel radio. Sterling.



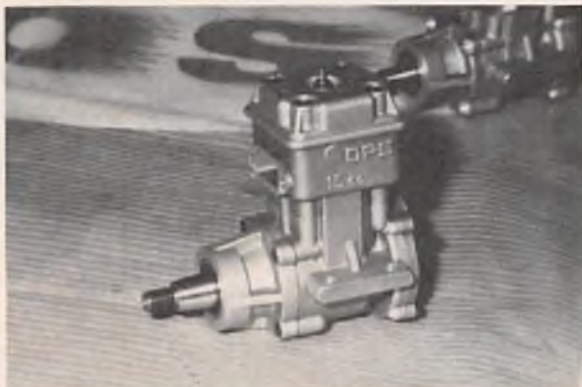
From the Model Boat People, a 33" model of a Coast Guard Lifeboat, for R/C. Hardware kit available. Dumas Products.



R/C boat supplies, everything from hulls and engines to nuts and bolts. G & M Models, P.O. Box 342, Broadview, IL 60153.



Scale hydro, from Futuraglass Design, One Cannon Dr, Nashua, NH 03069. Many other hulls and much hardware available.



15cc OPS Marine, soon to be on hand. No price yet, inquire from Shamrock Competition, Box 16147, New Orleans, LA.



Single Source ground support equipment. Power and Test Panel introduced by DaCa Model, P.O. Box 14078, Omaha, NE 68114.



Cordless Starter Battery Pack, will fit any starter, old or new. From Southern R/C Products, Rt. 3, Nims Lane, Pensacola, FL.



New HI-Tork 24 volt starter for those larger engines that require more starting muscle. From Sullivan Products Co.

Did you ever see a picture of an airplane that really turned you on? Finally, like me, you locate a 3-view only to find the bird just doesn't have good model proportions. This is true for most of the air racers of the 20's and 30's. Almost all of them are not easy projects to build, or fly. What I wanted was an easy to build sport model that I could fly every weekend, and that sort of looked like an air racer. What I did was design a profile R/C model. Using my most aerodynamic tennis shoe I developed an airfoil thick enough to hold an entire 2 or 3 channel radio. A built-up fuselage wasn't necessary, so why go to the trouble? The completed models are compact, strong, and fly just as well as their flat fuselage brothers. In flight the flat fuselage isn't even obvious except in overhead passes. Duplicating the real aircraft's color scheme is easy with the many colors of plastic film available. If you're not crazy about a Gee Bee, Pete or Wedell Williams, just use the wing and build your own fuselage! The list of subjects is endless. Why not a P-26, or a Mister Mulligan? How about a Cessna,

You, too, can be a sporty or racy airplane driver by using this quick and easy construction method.



or a Mono Sport? The thought has crossed my mind that these machines would make a neat pylon racer. Picture a Pete, a Gee Bee, and a Laird mixing it up at pylon #1! I'll list a few suggestions to get you started:

(1) Use the wing as shown, no changes.

(2) Models must resemble early air racers.

(3) Plain bearing sport .15's only.

(4) Winner will climb out and do a victory roll.

Remember if you don't keep it simple, the event will go over like an AT-6 race! The thick wing should make the race a fun for all flying contest.

Now that I've convinced you that you can't live without a profile pylon racer of text to page 54

BILL OF MATERIALS

Fuselage:

- 1 - 3/8 x 4 x 36 - fuselage.
- 1 - 3/8 x 5/8 x 10" - hardwood bearers.
- 2 - 1/16 x 6 x 12" ply - doublers & pants.
- 1 - 5/8" streamline tubing - L.G.
- 1 - 1/16 x 1/2 x 12" T-6 alum. - L.G.

Tail Surfaces:

- 1 - 1/8 x 3 x 36 - stab & rudder.
- 1 - 1/8 x 3" dowel - elevator joiner.

Wing:

- 3 - 3/16 x 3/16 x 36" - L.E., spars.
- 1 - 1/16 x 4 x 48 - 1/16" ribs.
- 1 - 1/8 x 3 x 36 - 1/8" ribs & tip braces.
- 3 - 1/16 x 1/4 x 36 - capstrips.
- 2 - 1/16 x 1 x 36 - T.E.
- 3 - 1/16 x 3 x 36 - planking.
- 1 - 1/8 x 3 x 36 - ailerons & tips.
- 1 - 1/64 x 2 x 12" ply - 1/2 ribs.
- 1 - 1/4 x 1/2 x 10" spruce - L.G. blocks.
- 1 - 1/32 x 3 x 8" ply - hatch
- 1 - 1/8 x 1/4 x 15" spruce - hatch hold-downs

Misc.:

- 1 pr. - 2" to 2 1/2" wheels.
- 1 - 3/32 m.w. - L.G. legs.
- 8 - small wood screws.
- 1 - 1/16 m.w. - pushrods & tailskid.



PROJECT PROFILE
 Designed By : Randy Wisley

TYPE AIRCRAFT
 Sport Profile
WINGSPAN
 36 Inches
WING CHORD
 9 1/4 Inches
TOTAL WING AREA
 312 Square Inches
WING LOCATION
 Mid-Wing
AIRFOIL
 Symmetrical
WING PLANFORM
 Constant Chord
DIHEDRAL, EACH TIP
 None
OVERALL FUSELAGE LENGTH
 22 1/4" - 28 1/2"
RADIO COMPARTMENT AREA
 (L) 7" x (W) 3" x (H) 2"

PROJECT



PROFILE

STABILIZER SPAN
 12"-14"
STABILIZER CHORD (incl. elev.)
 4 1/4" (Avg.)
STABILIZER AREA
 52 Square Inches
STAB AIRFOIL SECTION
 Flat
STABILIZER LOCATION
 Mid-Fuselage
VERTICAL FIN HEIGHT
 4"-7"
VERTICAL FIN WIDTH (Incl. rud.)
 2"-6"
REC. ENGINE SIZE
 .15-.19 Cu. In.
FUEL TANK SIZE
 2 Ounce
LANDING GEAR
 Conventional
REC. NO. OF CHANNELS
 3
CONTROL FUNCTIONS
 Ail., Elev., & Throt.

BASIC MATERIALS USED IN CONSTRUCTION
 Fuselage Balsa & Ply
 Wing Balsa
 Empennage Balsa
 Wt. Ready-To-Fly 25 Ounces
 Wing Loading 11.6 Oz./Sq. Ft.





First step in wing assembly.



Upper and lower trailing edge sheets are added.



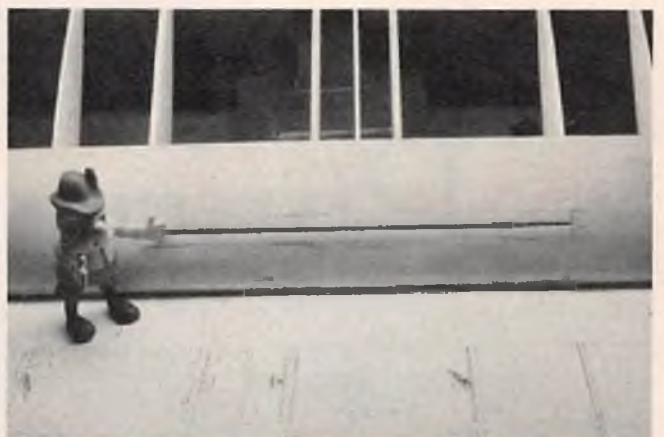
Install 1/64" plywood half ribs as shown.



Radio compartment box details.



Radio compartment side contour piece (req'd.).



Landing gear mount for Gee Bee and similar configurations.

your very own, send off for a set of full size plans, **fast!** I hear Dewey's goldfish ran away from home and he needs the bucks to buy a replacement! If you'll read on, here's how . . .

Wing:

After making the usual template, cut out the ribs. You will need eleven 1/16" ribs, and four 1/8" ribs. If you intend to mount the landing gear in the wing, you'll also need four 1/64" ply half ribs. It is most important to cut a hole in the three

center ribs to pass the wire harnesses back and fourth. With all the parts cut out, pin the 3/16" x 3/16" spar down on the plan. Cement the ribs to it, using a triangle to align them. Install the top spar and leading edge. When all that dries, pin the 1/16" x 1" balsa trailing edge bottom down on the plan. Raise the L.E. up until the ribs rest on the T.E. and cement. Follow by installing the top of the T.E. If the landing gear mounts in the wing, epoxy the 1/64" ply half-ribs into

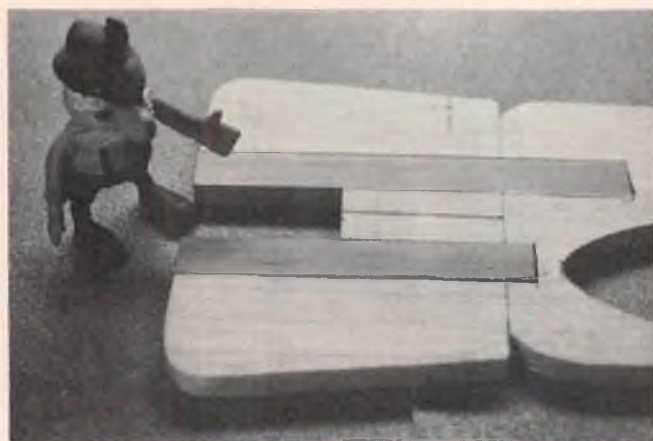
place as shown on the plan. Cut the notches for the long block, and install the short blocks with epoxy. The long block goes in after the wing is sheeted. Begin sheeting the wing by cementing the 1/16" x 3" top and bottom pieces in place from the spar to the L.E. Do both sides at the same time to avoid warps. Next do the bottom center section overlapping the outside 1/8" ribs by 1/16". Install the aft radio compartment walls. You can shift them around to suit



Completed wing tip showing tip braces in place.



1/8" balsa tail surfaces.



Hardwood engine bearers epoxied into fuselage. Make sure spacing is correct for engine used.



Landing gear struts made from 5/8" streamline aluminum tubing. Bottom strut shows 1/16" x 1/2" hard aluminum fitted inside tubing.



Landing gear struts assembled and ends flattened.



Final bends and landing gear is ready to install.

your radio size if necessary. Start the top by sheeting from the T.E to the aft walls. Overlap the outside ribs by 1/8". Finish the top by sheeting the area between the inside 1/8" ribs.

Cement the tip parts together and while they dry you can add the capstrips to the wing. Glue the tips to the wing and put the braces in place. Sand the completed structure to shape, rounding the L.E., T.E., and tips. Install the 1/8" x 1/4" spruce hatch hold-down

blocks fore and aft in each radio compartment 3/64" below the surface. Follow by adding the 1/8" sheet balsa contour pieces to each side. The hatch covers are simply pieces of 1/32" ply held in place with four small wood screws. Make up the ailerons from 1/8" sheet balsa. The horns are standard hardware but both must wind up on the left side of the fuselage. The completed ailerons are not installed until the wing is mounted on the fuselage. You can cover

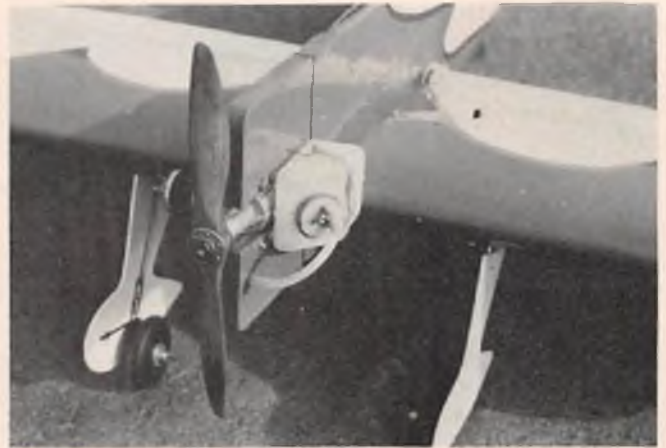
the wing now, or wait as I did until its mounted on the fuselage.

Fuselage:

Cut the outline to shape from medium hard 3/8" balsa. Epoxy any necessary splices for extra strength. Space the 3/8" x 5/8" hardwood bearers to fit your motor and epoxy in place. I found it wise to trial fit the wing before you install the 1/16" ply doublers. Once the wing fits, epoxy the doublers on and taper the aft end of the fuselage down to 1/8". Sand



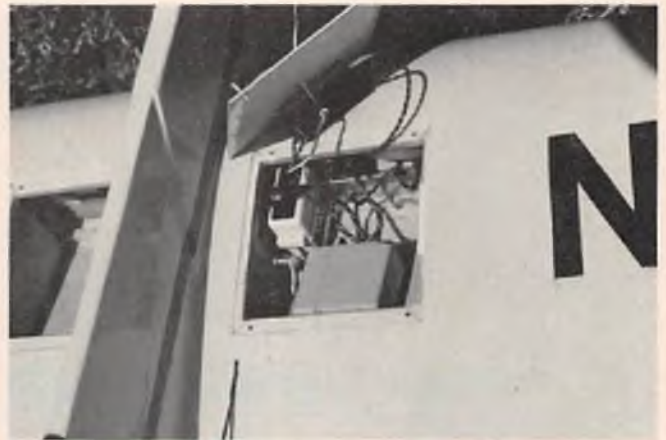
Landing gear installed. Note throttle pushrod at L.E. of wing, left of muffler.



Note wire on landing gear strut to hold simulated wheel pants.



Hatch removed showing aileron servo and linkage.



Right wing compartment houses elevator and throttle servos along with receiver, battery pack and switch.



Switch and antenna wire protrude thru hatch cover. Note throttle pushrod at L.E. of wing.



Wire pushrod guide for elevator epoxied into fuselage side.

the outside edges round. Slop a coat or two of Balsarite on the structure, and cover with your favorite plastic film.

Tail Surfaces:

Simple soft 1/8" sheet structures will suffice here. A length of 1/8" dowel is used to join the elevators. Sand the finished pieces smooth and cover before assembly.

Assembly:

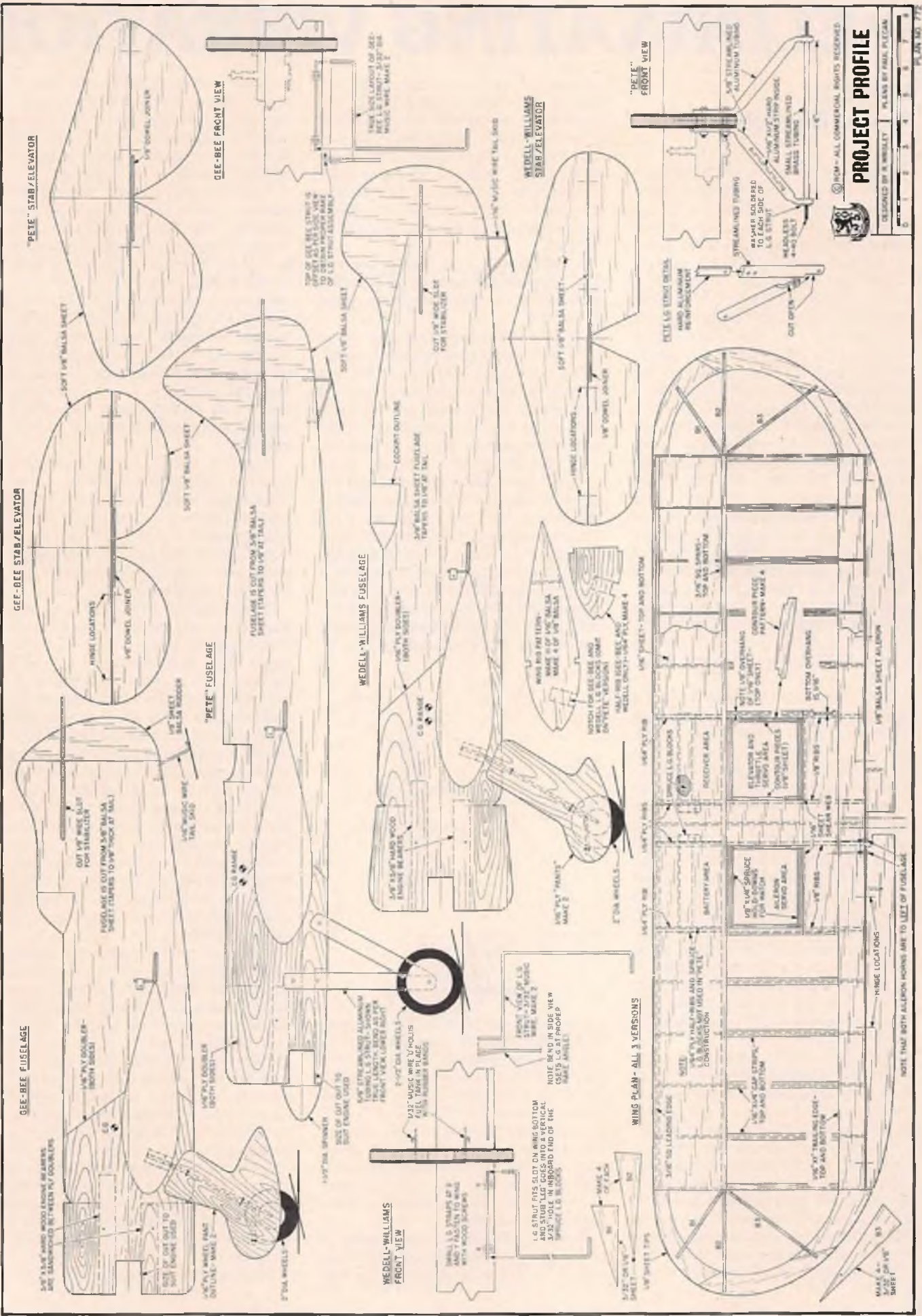
Slide the wing on the fuselage and epoxy well. Use a triangle to align it.

Cover the wing if you haven't done so already and install the ailerons. Cement the stab on, hinging the elevator in place before you install the rudder. Drill holes for blind mounting nuts and bolt the engine in place. The tank goes on the other side. Bend a piece of 1/32" wire into a "U" big enough to fit around the 2 oz. square tank. Center the tank with respect to the engine's center line. Drill a 1/32" hole above and below the tank clear through the fuselage. Push the "U"

through those holes and bend a hook on each end. Now you can rubber band the tank in place. If the fuel line kinks going through the engine cut-out, drill a 1/4" hole below the engine and route the fuel line through it. Set the model some place where you won't step on it till you get some wheels under it.

Landing Gears:

If the gear mounts in the wing, bend up the struts from 3/32" wire. Solder a 3/32" **to page 136**



PROJECT PROFILE

DESIGNED BY R. WHEELBY PLANS BY PAUL PETERSON

PLAN NO. 772

ELIMINATING VIBRATION

PART II

By Ray Hostetler

There are basically four things in the rotor head itself that we're concerned about. These are: the flybar, the coning angle of the blades, the lead lag of the blade axles, and the static lead lag of the main rotors.

The flybar assembly is set up by balancing each paddle or can to within 3/100ths of a gm. Don't cut anything off of a paddle or can. We must keep all surface areas the same. Add brads to the light paddle, or drill holes in the heavy paddle to bring them equal. It doesn't matter if you do this on the inner or outer edge of the paddle, since the paddles are usually very close to the same weight and only small brads are needed to balance them. Install the flybar with care so exactly the same length of rod extends from each side of the head. Check this at a convenient location with a ruler. Now turn on your paddles or cans equal distances, and lock them down with a plastic locknut. Both paddles or cans must be perfectly level with each other, and parallel to the swash plate. Refer to Sept. 1977 RCM or Feb., 1979 MA for more static set-up details.

The coning angle (or dihedral) of the blades is adjusted after the static lead lag and the pitch of the blades is set. Measure from the tail boom to the bottom of one blade, then rotate the blades 180 degrees and check the other distance from the same location on the boom. Again, they should be equal. If you own a Heli-Baby or a Revolution, this is best done by removing the head from the machine, blocking the seesaw level with wood blocks, and then measuring from each blade tip to the table. Bend the blade holders up or down, as necessary, to achieve equal distances from the tips to the table.

Heli-Boys have two screws that hold the axles (#555) in place. These also adjust the coning angle. Loosen and set as necessary.

Jet Rangers don't have a coning angle adjustment. The seesaw is pre-drilled to accept the blade axles. This will be good enough. If it is off a little we can correct for it in the dynamic set-up procedure.

For Heli-Boy owners, lay the side frames of the head on a straight-edge to check them. Remove the aluminum assembly with bearings and axle (part #555), and lay the assembly on the table with the pitch arm hanging out over the table. Obtain a solid object to act as a reference point, move the edge of the

axle tip next to it, and slowly rotate the axle while watching the gap. It's the same thing we did with the main shaft, only the bearings are already in place. If you have a bent axle, you must straighten it, or buy a new one (part #572). If the axles are off, the Heli-Boy may be set-up to be smooth in a hover, but it will have a vibration on descents or ascents.

If axles bend in a Jet Ranger seesaw, it is best to replace them. When installing them, you must be careful to get the lead lag correct.

Place a white triangle or straight-edge on a black sheet of construction paper. Insert both axles and tighten the set screws just enough to let them touch the axle. Place the seesaw on the white triangle as Figure 8 illustrates. Sight down from directly above the seesaw unit and observe the white gaps between the edge of the axles and the black background. You will find it best to use a very thin gap to get the most accurate sighting. Use one axle as a "standard" by lining up its white edge thin and perfectly parallel. Now look at the white gap of the other axle. If it is also perfectly parallel, you are finished. If it is not, you must loosen the set screws and correct this. In the example (Figure 8),

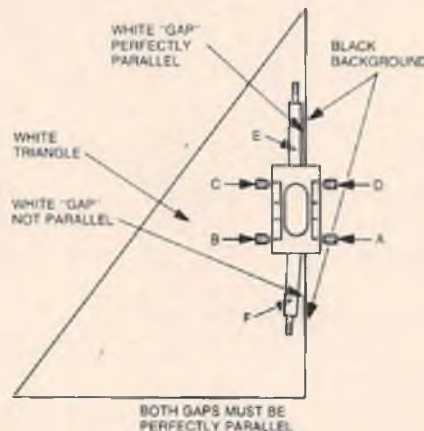


FIGURE 8
ALIGNMENT OF J.R. AXLES

loosen set screw B and turn in set screw A. Axle E is the standard and axle F is the one being adjusted. If you turn set screw A in all of the way and axle F is still not straight with axle E, go ahead and lock set screws A and B in place. Axle F now becomes the standard and axle E is the one we'll adjust. When both white gaps are parallel, the axles are perfectly set for lead lag. You may now lock down all set screws, and install the blade holders on the axles.

Note: If your Jet Ranger seesaw is brand new, the lead lag of the axles should be close. If you've had a few

crashes, and replaced the axles several times, the seesaw's holes tend to become sloppy. It is then imperative to use this method when replacing new axles in those sloppy holes. You will be amazed how far off they can be!

You can check your Heli-Baby seesaw "stubs" in the same way we checked the Jet Ranger axles. To straighten the Heli-Baby stubs, stick the bent stub into a vise and push the body of the seesaw one way or the other, whatever is necessary to straighten it.

Next, we'll set the static lead lag of the blades. For those unfamiliar with lead lag, refer to Figure 9. For all fixed pitch machines, set the lead lag by using a **straight yardstick**, or straight-edge. Place the straight-edge along the seesaw and check each blade for zero lead lag.

If you're flying a collective pitch machine, mark a thin black line on white blades and a thin white line on dark blades. These lines are drawn on the tips, shown in Figure 10. If your blade hub hole is back 17 mm. from the leading edge, this mark must also be 17 mm. back from the leading edge.

Disconnect all ball links from both pitch arms, hold the pitch arm with your thumb and forefinger, and pivot the blade back and forth with a rocking motion from extreme negative to extreme positive pitch. While doing this, watch for the "pivot point" at the blade tip. With a little practice you can tell if it is behind or ahead of your mark. We want it to be exactly on the mark, so the blade can be pitched up and down, but the mark itself remains stationary. Lead or lag your blades to achieve this. See Figures 11A and 11B.

If your blade bows down slightly due to the weight in the tips, the mark will scribe and arc shown in Figure 11C. Only with a straight blade will the pivot mark be exactly stationary.

If you own a Jet Ranger or a machine whose blades can be tongued and adjusted for lead lag by screws in the blade holders, by all means tongue your blades! Use only metal tongues. Some sets of blades will fly okay with no vibration when left free to seek their own lead lag. My experience has been that most won't. When swinging blades, there are other disadvantages besides vibration in flight. A helicopter with free swinging blades is not as crisp on the controls during a descent compared to a chopper that has its blades tongued. **Tongue your blades**, or at least fly with your blade screws turned down tight if your helicopter's blades don't have tongues.

When blades are tongued it allows

IN THE R/C HELICOPTER

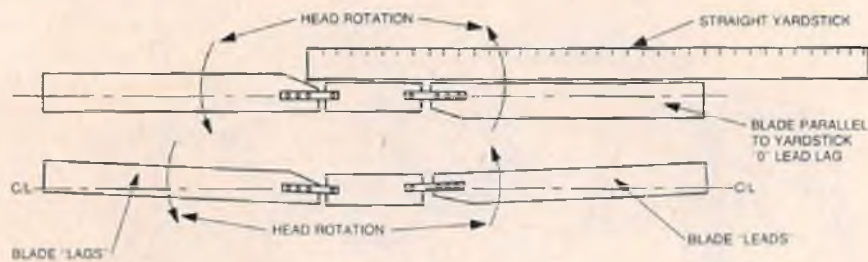


FIGURE 9
LEAD-LAG DETAIL

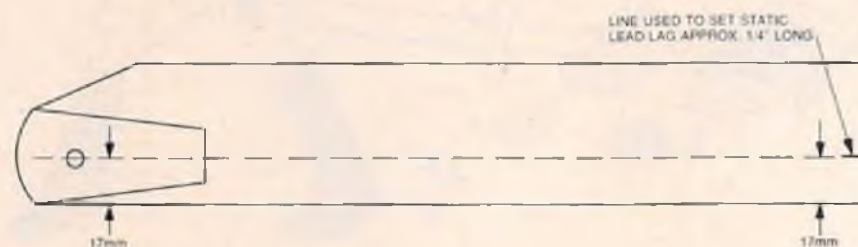


FIGURE 10
PREPARING BLADE FOR STATIC LEAD LAG ADJUSTMENT

infinite precise adjustment of the lead lag of each blade. With a Jet Ranger you can tweak in a little lead or lag, if necessary, by using the tongues and screwing the lead lag screws (that hold the tongue in place) in or out. With a Heli-Boy, you have to loosen the three blade holder screws, grab the blade and push it backward or forward. This isn't too precise, and it is difficult to keep track of where you've been and where you're going as far as lead lag is concerned.

We're leading right into dynamic balancing, the heart of a smooth running machine, and the procedures used to check it.

First, set blade pitch with angleometers and levels as described by Don Chapman in the July, 1978 issue of RCM. This is very accurate, and works well.

All dynamic balancing is done with the rotor blades on the helicopter, with the helicopter running. I know of no other way to do it. Actually, dynamic balancing in this instance is used to describe the trial and error procedures that signify the final step in achieving a perfectly smooth running bird.

We have thoroughly looked at and discussed all other aspects of the R/C helicopter that are absolutely necessary for it to hover without vibration. The main and tail shafts are straight. The tail rotor blades are precisely balanced. We won't get any flex or vibration from the tail rotor drive shaft. The engine and transmission are all secure and set up properly. The pitch axles are straight, the static lead lag is correct, the coning angle is finalized, and the flybar is

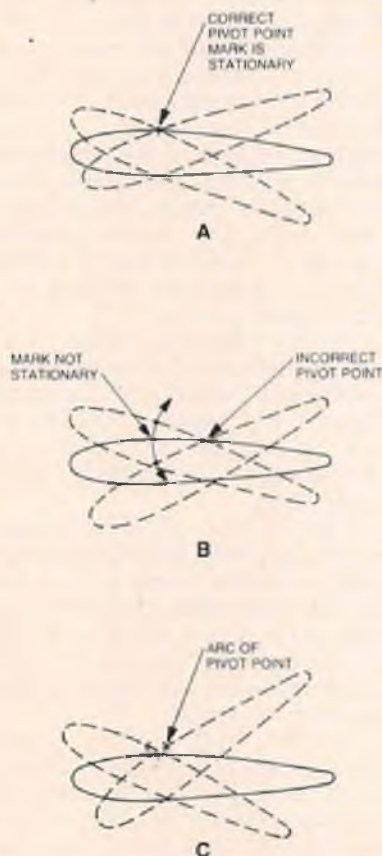


FIGURE 11
SETTING THE STATIC LEAD LAG

balanced. The only variable left to contend with is the dynamic balance of the main rotor blades.

On a smooth grassy area, fire up your chopper. Advance the throttle so the

clutch engages and the blades rotate slowly. One blade tip should have a black strip of sticky MonoKote one half to three quarters of an inch wrapped around it. The other blade should have a white strip of equal size wrapped about its tip also. Eyeball the blades and check to see that they are tracking correctly. If the inclinometers were used, the blades should be close together to begin with. Pull back to idle and adjust as necessary. Increase low blade pitch for a slower r.p.m., decrease the high blade pitch for a faster r.p.m. Run it up faster this time, checking for perfect blade tracking and any signs of vibration. Blade tracking must be "right on" at this point! Lift the helicopter into a hover and take careful notice of the vibration level. The best place to look is at the tip of the tail (if it has one) or the end of the boom. Also observe the right skid on counter-clockwise rotating heads, and the left skid on clockwise rotating heads. (I don't know why the one skid vibrates more than the other for different rotation heads, it just does.)

If you're a beginner who hasn't learned to hover, grab the machine by its tail (with your back to the wind) and advance the throttle until it lifts a foot or so, whatever feels comfortable for you.

At this point, if you're running smooth, great! If you have a Heli-Baby or Revolution, you probably will be. However, on some of the larger machines such as a Graupner, Jet Ranger, or Heli-Boy, you may be experiencing some vibration. Assuming we have some sort of a shake (it can be anywhere from bad to almost non-existent), hover the helicopter again and take careful note of the level of vibration. It is a good idea to have a keen eyed buddy along at this point to help you, but he's not absolutely necessary if you can hover with relative ease. If you have to intensely concentrate to keep the bird in the air, he is necessary.

Return to an idle and pick one blade at random. Mark it so you know which one you're working with. We're going to talk in Jet Ranger terms now, using the screws in the blade holders to modify the static lead lag. Heli-Boys, Revolutions, etc., follow the same procedure, but you won't know exactly "where you're at" as mentioned earlier.

Pick the blade at random, as we said. If, during the static set up, one blade seemed to have a more stationary pivot point, choose the other blade first. Now either lead or lag the chosen blade (at random) by turning one lead lag screw in one quarter turn and the other screw out

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RC FLYING AND THE LAW

Part X

By Arthur J. Sabin
Prof. of Law

OPEN LETTERS TO:

1. All R/C Modelers
And
2. The Academy of Model Aeronautics

(1) If you fly or otherwise operate an R/C model, unless you are a member of the Academy of Model Aeronautics (AMA), your Homeowner's (or Tenant's) insurance policy will most likely not cover your liability in the event of personal injury or property damage arising out of the operation of your model. Therefore, at this point, your safest, wisest course is to join AMA for their liability protection. For the annual dues, \$25.00, you get a \$1,000,000 policy in the event of personal injury to others --- which is your greatest and gravest exposure in operating radio controlled models. Therefore, my advice is --- **run**, do not walk --- with your application and money for AMA membership.

Explanation

As with so many aspects of a complex society, it takes time for the word to get around. In this case the "word" relates to knowledge by homeowners and tenants insurance carriers (insurance companies) to learn about the now famous (to us) Pennsylvania case with its determination that a radio controlled model is "an aircraft" in the sense that the operation of the model is excluded from the aircraft exclusion portion of the homeowner's policy. I have been in touch with modelers from different parts of the country and the feedback that I am getting is loud and clear --- insurance companies have learned about the Pennsylvania decision and are taking the position that that decision is an interpretation which they adopt with the result that they are telling modelers **who ask**, that their insurance policy does not



include any liability for injuries or damage arising out of the operation of their radio controlled models.

A number of modelers, having read this column over the past year or so where this case has been carefully discussed, have taken it upon themselves to write to their insurance agents or directly to the company and find out what the attitude of their carrier is with respect to their insurance coverage in flying radio controlled models. A typical letter directed to a company is as follows:

As your records will indicate, I am the named insured under the above policy and Schedule E (personal liability) was recently increased by me on January 31, 1979 from \$100,000 to \$300,000 for each occurrence.

The reason for my increasing this coverage is that I recently acquired a radio controlled model airplane and wish to have protection in the event that the operation of same (or any subsequently acquired model airplane) causes damage to property or injury to persons.

In the light of the recent Pennsylvania court decision where a radio controlled model (aircraft) caused personal injuries and the primary (homeowners) insurance carrier declined responsibility or liability, prevailing in the trial court and affirmed on appeal by reason of the exclusion contained in the policy regarding "operation of aircraft," I am calling upon you for a written opinion concerning the validity of my own coverage.

I take note of the fact that my policy also contains an exclusion as to "bodily injury or property damage

rising out of the ownership, maintenance, operation, use, loading or unloading of aircraft."

Kindly immediately inform me through the agent whether or not any intended operation of the above model radio controlled airplane will be covered by you or not under the above policy. Thank you.

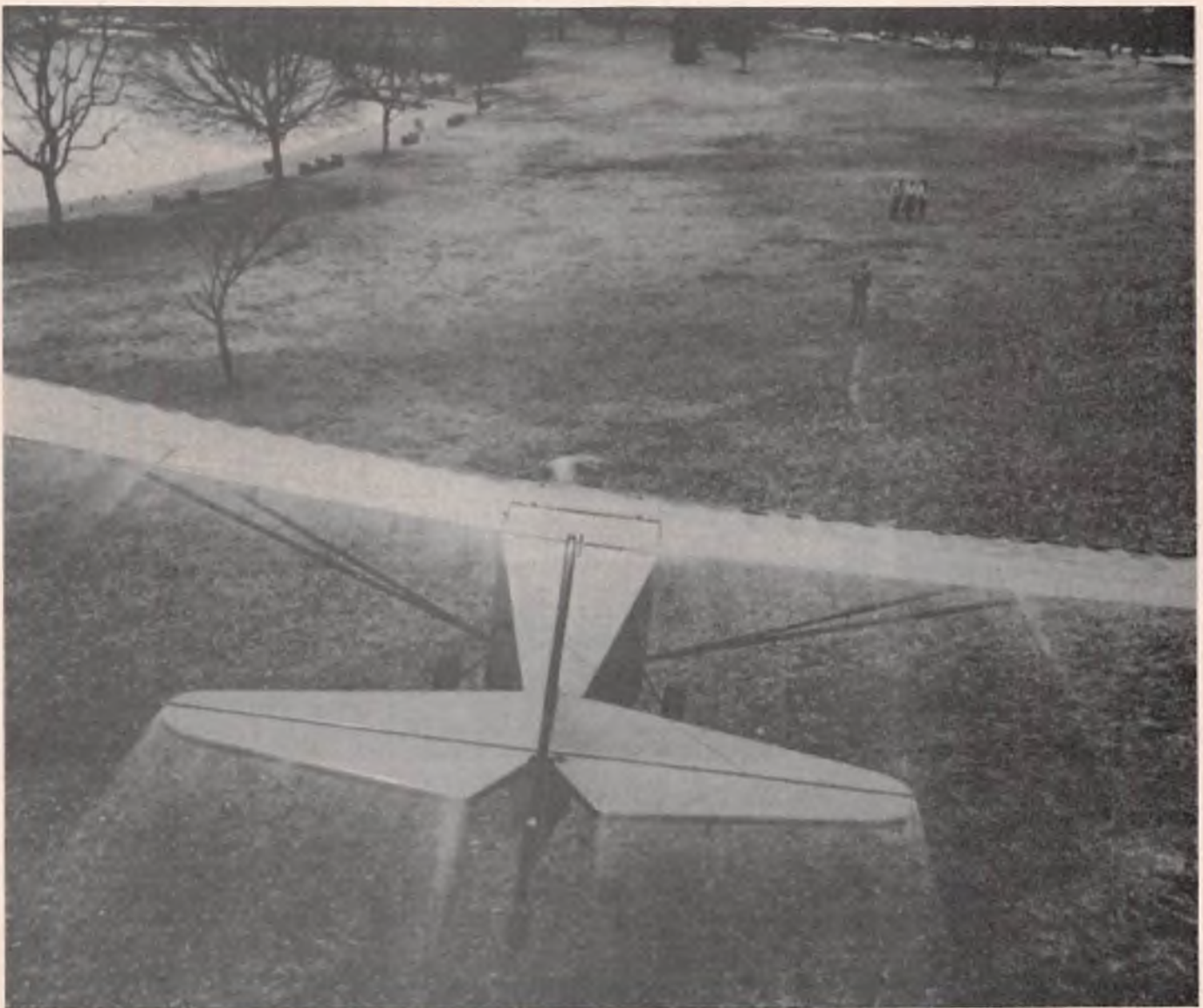
To which the insurance company answered as follows:

After receiving . . . and discussing this file with our Liability Claims Department, we have come to the conclusion that we would also apply the exclusion contained in the policy regarding the operation of aircraft. **Due to the recent Pennsylvania court decision regarding radio control model aircraft, we really do not feel that we are able to offer any coverage for this particular type of exposure.**

I would also state that I checked with my own insurance carrier with whom I not only have a homeowner's policy but also an "umbrella" policy taking my insurance coverage up to a million dollars; I got the same response from them that the letters reproduced above indicate. The "word" is definitely around!

Just so everyone understands the implications involved, you should clearly realize that when you operate a radio controlled model you are responsible for the results of any occurrence in the sense that if you are negligent, that is if you fail to behave as a reasonably careful person in the operation of that model and you injure one or more persons or do property damage with your model, **you are personally liable** for any injury or damages that may result. This is true whenever you are

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This 1/2 size Taylorcraft took Academy Member Bob Fulwider 200 hours to build. It has a 9-foot wing span, cruises at 45 mph and is flown by radio control using 4 channels.

INSURE PLANES THAT TAKE OFF WITHOUT PILOTS? THAT'S WHEN YOU NEED MARKELABILITY*

There are over 70,000 members of the Academy of Model Aeronautics and most of them are weekend fliers, piloting their own meticulously crafted planes by remote control or on the wires. But a plane crash can be dangerous, even if it is a model, and the Academy wanted public liability coverage for all its members against any third party losses.

Markel was called. They put together a program and placed it in the London market. Now each member is insured for \$1,000,000 and that coverage costs only a nominal amount included in the annual Academy membership dues.

When you've got a problem flying around, call Markel. They can do it.

*MARKELABILITY:—The unusually fast, creative, competitive service Markel provides in Excess & Surplus, Marine, Aviation, Trucking and all Specialty Insurance lines.

 **CALL MARKEL. THEY CAN DO IT.**

Markel Service, Inc., 5310 Markel Road, Richmond, Virginia 23230. Telephone (804)262-5423. Telex: 82-7455. WATS Line to Richmond: 800-446-6671. Offices in Atlanta, Boston, Calgary, Chicago, Dallas, Montreal, San Francisco, Tampa, Toronto.

Reprinted from the National Underwriters Magazine Issue of March 9, 1979

If you have any questions or comments regarding this month's column, or want to share your experience, please contact Arthur J. Sabin, 315 S. Plymouth Ct., Chicago, IL 60604.

guilty of any "pilot error" which, as we all know, can range from flying a plane or operating a model that is beyond our capacity, to running out of fuel in the air, or any one of a myriad of potential acts or failure to act involved in the complex business of flying a radio controlled model or operating an R/C car or boat.

You may indeed say, "but what if it's not my fault; what if some aspect of the model went out of control, am I still liable?" The answer is that you may not be if you can prove that under the circumstances you behaved as a reasonably careful person would have with respect to the alleged component or components that failed and in turn caused injury. In any event, **you are going to be sued** and unless you have an insurance company behind you, you will have to defend yourself in court which, at the going rate for hourly legal fees, can run into many thousands of dollars in the defense of a complex case. The bottom line is that in such a case, you can "win" in the sense of not being found liable for any one of a number of reasons including the fault of the injured party, but in that "winning" you will end up as a loser because of the cost of proving your innocence. Our society fortunately recognizes that all of us, from time to time, are guilty of negligence; no one has ever walked for any length through a lifetime without having been negligent in one or more important instances. Therefore our legal institutions reflect human experience and allow us to **insure ourselves** against our negligence. Thus, we pay a premium to an insurance company with the understanding that if we are negligent and injure someone, the insurance company, to the limits of the policy and under the **terms of the policy** will pay any judgment against us as well as defend us and represent us in any litigation that results from that negligence. The "rub" here is that if you have a homeowner's or tenant's policy which insures you against liability for negligence where you are conducting some activity outside of your property it has certain **exclusions**. One of those exclusions is that your homeowner's policy does not cover your activities while driving an automobile; that's why you have to have a separate policy of insurance to cover that exposure. There are a number of other exclusions, such as owning and operating a boat, but the one that we are concerned about is the exclusion arising out of the ownership, maintenance, operation, use, loading or unloading of any **aircraft**.

In the Pennsylvania case, the highest court of the state affirmed a lower court's decision (by refusing to review it and thus letting it stand) to the effect that a radio controlled model was "an aircraft" within that exclusionary language. If you find that conclusion of the court outrageous, keep in mind that the case

arose as a fight between the homeowner's carrier of an R/C modeler who had injured an individual with the plane, and the AMA insurance carrier (who no longer represents AMA), thus, a fight between insurance companies. The pilot was an AMA member and after the accident the homeowner's carrier refused to be liable for any damages or involved in any way in defending the pilot on the grounds of that aircraft exclusion. The AMA carrier retained highly competent attorneys who made every argument (including a great many you might not have thought of) to try to convince the court that the position taken by the homeowner's carrier was wrong. To the surprise of everyone (including the AMA and this author) the trial court ruled in favor of the homeowner's carrier and the position of the trial judge was sustained on appeal to the Appellate Court; in turn the Supreme Court of Pennsylvania having refused to review the Appellate Court's decision means the end of the line in Pennsylvania since the highest court is in effect endorsing the position taken by the trial court on this question. You might also say, while that's one state with perhaps that unusual decision, what about the other 49 and all of the insurance companies operating in those other states. Insurance companies follow these cases pretty carefully and like most businesses, seek to minimize their liability exposures, in effect minimizing those exposures by taking the position that the Pennsylvania decision is the correct decision and excludes their potential liability. In a similar event in your state, and with your insurance carrier, it may be that some insurance carriers will not adopt the position of no coverage for R/C models but it would not seem too judicious to count on that fact. After all it was the highest court of a state that affirmed the determination.

To make matters worse, I have received a recent report in which a modeler's home was broken into and some \$1500 worth of planes and equipment were stolen. Your AMA insurance does **not** cover theft and the homeowner's carrier would not pay because of the same aircraft exclusion! That means that in the event your equipment is stolen or fire destroys it, you are not insured because of that same aircraft exclusion! Therefore, a second important bit of advice is given to you: get a hold of your insurance agent or broker and schedule your R/C equipment on a separate scheduled list of insured items. There will be a small additional premium but the insurance is generally available and for a slight cost you are insured against the perils named. I did this with respect to all of my R/C equipment and found the cost to be nominal.

Finally, remember that you must not

only be a member of the AMA in good standing in order to qualify for their insurance, but you must also obey the AMA Safety Code in order to be eligible for that insurance (see June, 1979 RCM — Part IX of R/C and the Law).

If you have any questions or comments or want to share your experience, write to me at, 315 So. Plymouth Ct., Chicago, Ill. 60604.

(2) Open Letter to the Academy of Model Aeronautics: By virtue of the Pennsylvania case which is now well known for its decision that homeowner's coverage excludes operation of radio controlled models, it would now seem apparent that AMA insurance coverage is **not secondary but primary** since homeowner's carriers are denying any coverage with respect to operating an R/C model based upon the aircraft exclusion.

All of your recent literature has emphasized that the cost of AMA liability insurance is predicted upon the fact that AMA insurance through its carrier is secondary to any underlying insurance, most importantly any homeowner's or tenant's insurance policy. You have warned that members should understand that AMA insurance is "umbrella" insurance, secondary to the primary coverage afforded by homeowner's policies (it was thought) and that if there was no primary insurance carrier, if in effect the AMA insurance coverage was the only insurance coverage for all modelers, the cost would be much higher.

It now appears that that is precisely what has taken place. The purpose of this letter is to respectfully request that this important development be dealt with promptly and that all of the Academy members be kept aware of what transpires including the cost implications of continued AMA coverage.

We who fly or otherwise operate R/C models need liability insurance. It is no secret that there are a number of members of the Academy who belong specifically because they want that liability insurance and now with the apparent decision that homeowner's carriers will not cover liability in the event of injury or damage from an R/C model, AMA insurance is in effect the only insurance available for the R/C modeler. Specifically, R/C modeler members of the Academy need your assurance that the AMA insurance carrier is fully aware of the circumstances surrounding the Pennsylvania case and that the insurance with AMA on behalf of its members will continue. It is also suggested that AMA tackle the problem of encouraging the major homeowner insurance carriers to enter into "buy back" arrangements under which a homeowner's carrier, for an additional premium, would be willing to insure a

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RCM PRODUCT TEST

**Balsa U.S.A.
EXCALIBUR**



What would you expect to receive if you paid \$21.99 for a .40 size, low wing sport airplane kit? Would you expect a limb off one of Ecuador's trees, plans drawn in Crayola, and a design reminiscent of your first ten cent hand launched glider? If that is what you would expect, then I have some good news for you.

Balsa USA is trying to do what seems impossible in today's inflationary world by bringing out a line of kits that carry remarkably low price tags. The above mentioned price is what they are asking for the Excalibur. I had noticed their advertisements in RCM for some time and, while curious as to how they managed to offer kits at those prices, I never reached the point of ordering one. When RCM sent the Excalibur to this reviewer, it offered an opportunity to solve the mystery.

I found five areas that Balsa USA has utilized to lower their kit price. First of all, you don't get a fancy box complete with a color photograph of a completed model or bagged parts inside, or a compartmented box. You do get the basic shipping box with the ingredients rattling around inside. The balsa didn't suffer from this treatment as the only dings were carved away when shaping the blocks. Secondly, I would imagine that selling directly to the consumer makes it possible to lower costs and, in view of their packaging, is a necessity.

The kit is designed to utilize stock balsa and keep the number of shaped parts to a minimum. The Excalibur had fuselage sides, tail surfaces, and ailerons in the shaped parts category. The parts count is very low for a plane of this size. This makes construction fast, easy, and still retains design characteristics that produces a strong airframe. Finally, the plans and instructions are sans frills, yet clearly produced. In fact, this is the first airplane that I could have built by just looking at the plans. So there it is: packaging, selling direct, less shaped parts, less parts, and simplified plans.

The wing is where I usually start construction since that gets a lot of parts used and out of the box. Excalibur uses 1/4" to page 120

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging					●	Pre-Shaped Parts		●			
Plans		●				Parts Match to Plans		●			
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood					●	Ease of Assembly		●			
Quality of Fiberglass			NA			Fidelity to Scale				NA	
Other Materials			●			Flight Performance		●			
Accessories		●				Overall Appeal		●			
Die-Cutting			●								

E = Excellent / G = Good / A = Average / F = Fair / P = Poor

SPECIFICATIONS

Name EXCALIBUR
 Aircraft Type Sport
 Manufactured By Balsa U.S.A.
 P.O. Box 164
 Marinette, Wisconsin 54143

Mfg. Suggested Retail Price \$21.99
 Available From Direct from Mfg.
 Manufacturer's Rec. Usage General Sport Aircraft
 Wingspan 52 Inches
 Wing Chord 9 Inches
 Total Wing Area 460 Square inches
 Fuselage Length 40 Inches
 Radio Compartment Dimensions (L) 9 1/2" x (W) 2 3/4" x (H) 4"
 Wing Location Low Wing
 Airfoil Symmetrical
 Wing Planform Constant Chord
 Dihedral (each tip) 1 Inch
 Stabilizer Span 20 Inches
 Stabilizer Chord (incl. elev.) 5 1/4 Inches
 Total Stab Area 115 Square Inches
 Stab Airfoil Section Flat
 Stabilizer Location Top of Fuselage
 Vertical Fin Height 8 Inches
 Vertical Fin Width (incl. rud.) 4 1/2 Inches
 Mfg. Rec. Engine Range40-.50 Cu. In.
 Recommended Fuel Tank Size 8 Oz.
 Landing Gear Tricycle
 Recommended No. Of Channels 3
 Recommended Control Functions Elev., Throt., Ail.
 Basic Materials Used in Construction:

Fuselage Balsa & Ply
 Wing Balsa & Redwood
 Tail Surfaces Balsa
 Hardware Included in Kit See text
 Plan Size 53" x 30" (1 sheet)
 Building Instructions on Plan Sheets No
 Instruction Manual Yes (2 pages)
 Construction Photos No
 Kit Includes Die-Cut & Shaped Parts
 Mfg. Rec. Flying Weight Unknown
 Wing loading based on rec. flying wt. Unknown

RCM PROTOTYPE

Weight, Ready To Fly 66 Ozs.
 Wing Loading 20.7 Oz./Sq. Ft.
 Covering & finishing materials used See text
 Engine Make & Disp. O.S. Max .40
 Muffler Used O.S.
 Radio Used Futaba FP-6FN
 Tank Size Used 6 Oz.

For an unusual and seldom modeled Stand-Off Scale project, try this superb performing WW II Royal Navy fighter which showed a very impressive record despite its being designed and produced in extreme haste. By Don Williams.



FAIREY FULMAR



As a WW II aircraft enthusiast, I build miniature replicas from all over the world. As far back as I can remember I have loved the sky and all things therein. The first aircraft I can recall seeing (or at least it has stuck in my mind) was an Autogyro. I couldn't have been over four or five years old. As the years rolled by I don't think I missed a single aircraft that flew over our home. I became very good at telling which aircraft was which just by the sound of the engines. At times I would hassle my parents, or anyone who would listen, to go out and look at a plane flying over and, without looking, I would tell them what it was and described it to them --- 99% of the time I was correct. I can't do that these days as most jets sound alike to me.

There is not enough time in my life, I

FAIREY FULMAR

Designed By : Don Williams

TYPE AIRCRAFT

Stand-Off Scale WWII Fighter

WINGSPAN

60 Inches

WING CHORD

14" root — 6½" tip

TOTAL WING AREA

615 Square Inches

WING LOCATION

Low Wing

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

2-7/16" (tip rib)

OVERALL FUSELAGE LENGTH

53¼ Inches

RADIO COMPARTMENT AREA

(L) 10" x (W) 3½" x (H) 2½"

STABILIZER SPAN

23 Inches

STABILIZER CHORD (incl. elev.)

8½" root — 5" tip

STABILIZER AREA

155 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

6 Inches

VERTICAL FIN WIDTH (incl. rud.)

9½" root — 5" tip

REC. ENGINE SIZE

.40-.61 Cu. in.

FUEL TANK SIZE

10 Ounces

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.
(retracts & flaps optional)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply and maple
Wing	Balsa, Ply and maple
Empennage	Balsa
Wt. Ready-To-Fly	96 Ounces
Wing Loading	22 Oz./Sq. Ft.



think, to build all the aircraft I would like to. I do not like building aircraft that are modeled to death though, i.e., Mustang, P-40, FW-190, etc. Granted they have beautiful lines and fly very well but they have become very commonplace. What I try to do is model an unusual aircraft or one that has not been modeled so often. And, so comes the Fairey Fulmar.

The Royal Naval Staff requirements for the Fulmar were that it must be able to remain on patrol for six hours at 138 mph, or three hours at 175 mph, while on escort duty. The maximum speed in level flight to be 265 mph at 10,000 feet and a stalling speed of 65 mph.

Eight, forward firing, machine guns were mounted in the wings with 400 rounds of ammo per gun. The fighter would carry no gun in the rear cockpit --- to be much regretted by the crews of the aircraft. The Fulmar seated two in tandem. A pilot and an observer, wireless operator, and navigator. Shallow dive-bombing was to be a secondary role and provision was made to carry a 250 lb. bomb under each wing.

A major restriction was that the wing span could be a maximum of 46' and had

to fold to 18' or less. The folding and spreading of the wings was to be done in winds up to 30 knots by only four men.

The first Fulmar flew on April 6, 1940. The Ministry pilots gave generally good reports on the Fulmar. It had no vices and was pleasant to fly. Likewise, the model has no vices and is easy and pleasant to fly. The full size plane was maneuverable at all speeds in level flight with light responsive controls. I feel that the model flies very much like the full scale aircraft as the above describes its flight characteristics very well.

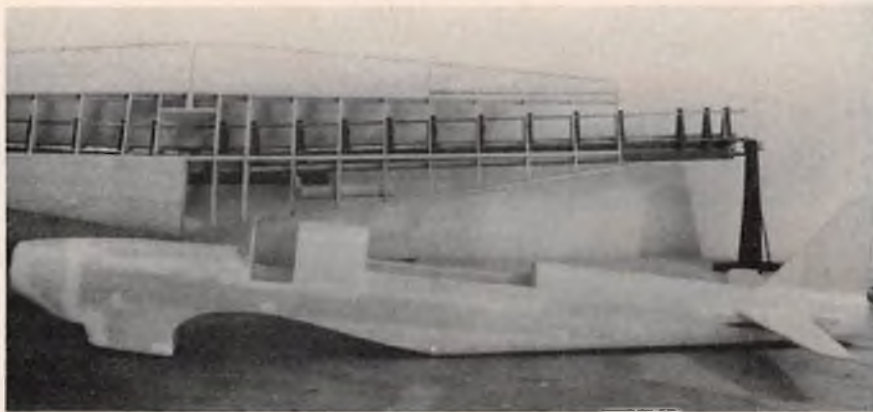
In service it was a different story. The Fulmar became only marginally stable with full equipment, particularly at low speeds, due to an aft Center of Gravity.

The Fulmar would take-off after a 280' run in a 20 knot wind. In an accelerated take-off (catapult) the distance was lowered to a mere 60'.

In service, the Fulmar never reached its expected maximum speed. The two seated fighters maximum speed was 238 mph at sea level and 245 mph at 15,000'. It was not the greatest but it is said to have accounted for nearly 30% of the Royal Navy's victories with no fewer than 112 enemy aircraft destroyed in the air and damage to over 80 more. That's a pretty impressive record for a slow tail heavy aircraft. To make it even more impressive the Fulmar is said to have been an emergency makeshift aircraft --- designed and produced in extreme haste.

There are reasons for building the Fulmar, other than being unusual. It's colorful and it has good aerodynamic moments for our use in R/C. There is also no need to mold a canopy. It can easily be made from flat sheet plastic and the aircraft is aerodynamically clean and streamlined. Another plus in its favor is the thick airfoil. This tells us, immediately, that the stall speed will be very low. And, as a final touch, the long tail moment assures smooth pitch control. If that isn't enough to make you want to build the Fulmar, it also has a wide track landing gear that makes

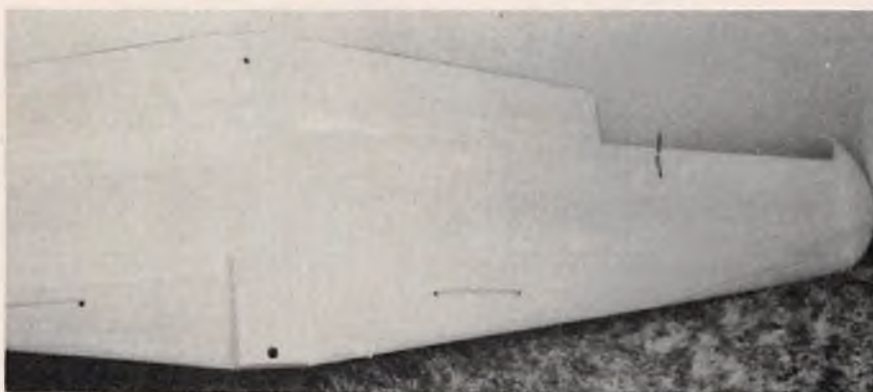




Completed fuselage with wing still on jig.



A-Justo-Jig is sure way of building a straight wing.



Completed wing ready for covering.



View of partial radiator attached to wing.

ground handling easy and a large rudder that should help tracking through maneuvers.

The overall Fairey Fulmar project has been one of fulfillment and fun and that's what this sport is all about. It has met and exceeded all of my demands --- some of which were very strict --- and you can't ask for more than that.

CONSTRUCTION

The construction of the Fulmar is straightforward and should pose no problems if you have built any multi-pattern ships at all. If you are a novice to scale type aircraft, but have had some multi flying experience, this would be a very good place to start.

The fuselage is essentially slab sided with doublers and triplers through the nose and wing section. Cut these pieces from 1/8" medium hard balsa. Contact cement the doublers and triplers to the fuselage sides. Be sure to make a right

and a left. Cut out all the fuselage bulkheads F-1 through F-10. Cut F-1 from 1/4" plywood, F-2, F-3 and F-7 from 1/8" plywood and the rest from 1/8" hard balsa. Mark the insides, where the bulkheads go, and install F-7. Pull the tail together and install F-10. Wrap both stations with masking tape. Check to make sure that the fuselage is in alignment and add F-8 and F-9 and the 1/8" x 1/4" stab doublers. Wrap with masking tape and let dry. When the bulkheads are dry, remove the tape and install the 1/2" bottom block. Wrap with tape as before. Let this dry completely before going on with the fuselage. This is necessary because the aircraft has such a long tail moment and when you pull the nose together it will tend to warp. Of course, if you have a fuselage jig this will not be necessary. Install F-1, wrap with tape, then add the remaining bulkheads F-2 through F-6 wrapping each one with tape to hold firmly to the sides.

Remove the tape and install the 1/8" sheet balsa cockpit floors cross grain. Cut F-4A and two F-7A cockpit formers from 1/8" plywood and glue in place. Locate the servo rails near the bottom of the space between the cockpits then cover the area with soft 1/8" balsa sheet.

If you use the NyRod type pushrods, install them now. Strip plank the rear deck with 1/8" x 3/8" soft balsa from F-8 to F-9. Also strip plank the top of the nose section from F-1 to F-4. Use 1/8" sheet balsa to build up the fuselage sides from the cockpit floors to the bottom of the cockpit windows. Fuel proof the tank compartment and the inside of the bottom radiator block, then install the block, holding it in place with tape. Install the 1/2" balsa block in front of the radiator under F-1.

The cowling is made from 3/4" and 1" balsa blocks. My engine was side mounted to preserve the profile as there is no way, in this aircraft, to get all of the engine under the cowling and the Super Tigre .51 fits with little room to spare. And, so it stands that you will have to cut the cowl someplace to fit the engine. Do it on the side and save that profile. After the hole has been cut, mount the engine. Center the nose ring on the engine crankshaft and epoxy it in place. Remove the engine and carve and sand the nose to shape with the rest of the fuselage.

The tail section is all flat 1/4" sheet balsa and should pose no problem. Cut out the horizontal stab, round off the leading edge and the tips, and install flush against F-9. Check to make sure it is not cocked and is square with the fuselage. Cut out the vertical fin and install flush with the trailing edge of the stab. This will leave a large gap from F-9 aft. This is taken care of with a very soft balsa block. Cut the block to length and slot it to accept the vertical fin. Tack glue and trim the block to shape and sand smooth. Remove the blocks and hollow

out as much as you can and then install them permanently. At the front of the radiator there will be a small gap on each side. Fill these gaps with scrap 3/16" balsa to form the front sides. The rear of the radiator runs out onto the bottom of the wing and will be built after the wing is sheeted and sanded as shown in the isometric drawing.

Cut out the elevators and rudder and sand to shape. The rudder will require a small, soft, balsa block at the bottom on each side to finish out the shape of the fuselage. These blocks will have to be beveled 3/16" to 1/4" at the leading edge to allow the rudder to move. Bury the rudder horn in the block, on the right side, down to the rudder itself, and run the pushrod through F-10.

The wing hold-down blocks are next and are 3/8" x 3/4" hardwood, i.e., maple motor mount stock. Glue in place with epoxy and drill and tap for 1/4-20 nylon bolts in the center of each.

Wing:

The wing is double tapered but is simple and straightforward. The plan shows retracts and fixed landing gear. Decide now which way you are going to go. Don't change horses in the middle of the stream.

The wing should be built on a jig but does not have to be if you are careful. You don't want any built-in twists or warps. If built on a jig such as the Adjusto-Jig, the wing can be 90% finished before removing. This will assure you of a warp-free wing and trouble-free building. The jig can be turned up-side-down for working on the bottom of the wing or anywhere in-between. It's a very good tool to have around the shop.

The ailerons are of the barn door type and should not be built separately. Build in with the wing and cut loose after the wing is sheeted. This will assure you of a good fit. Be sure to cut back far enough to allow a 1/4" sheet balsa facing on the leading edge of the aileron and 1/16" sheeting on the trailing edge of the wing. But, I'm getting ahead of myself. Set the jig for the proper amount of dihedral and slip the ribs on and fasten down. Install the top and bottom spars and the main spar joiner. Next install the 1/4" square leading edge and the bellcrank platform. Locate the bellcrank on the platform and install the aileron pushrods. Sheet the top of the wing and turn it up-side-down. Now take a straight pin and push it through the top sheeting in the forward corner at each end of the ailerons. Turn the wing up-right again and lay a straight-edge against the forward side of the pins. Rule with a ballpoint pen. This is the cutting line when you cut the ailerons loose. Now remove the wing from the jig and sheet the bottom. Then add the soft balsa tip blocks. Carve and sand the wing to shape.

Screw a 1/4-20 nylon bolt into each wing hold-down block from the back side

so that it just clears the wing saddle. Now carefully center the wing in the saddle and press down gently but firmly. Remove the wing and it should be marked, by the bolts, where to drill the holes for the hold-down.

The aircraft has fairly large wing fillets. The base of these is 1/32" plywood. In order to get a perfect fit between wing and wing fillet, re-mount the wing but leave it loose enough to slip the 1/32" plywood fillet base between the wing and wing saddle. Now tighten the wing. The fillet base should conform perfectly to the airfoil. Glue to the side of the fuselage only and let dry. Remove the wing, glue the inside, and build up the fillet with balsa blocks. Contour smoothly into the fuselage with micro-balloons and resin.

There should be at least **some** cockpit detail. An instrument panel would help, along with a couple of pilots. Naturally, the more detail you add, the better the aircraft will look.

The canopy itself is a real snap. No molding is required. Just wrap it around and glue. The templates on the plan should help a great deal. The portion of the canopy that passes aft of F-8 will be painted the same as the fuselage. Tape is used to simulate the canopy frames.

When an aircraft is left to the elements, and with age, the canopy windows will become somewhat smokey --- especially around the edges. If you would like this effect, glue the canopy on with Hot Stuff. The effect is devastatingly real.

Finishing is left up to the technique you like best. Profile Publications #254 will be a big help in this area. Mine was finished in accordance with the centerfold therein.

I also added rivets to my Fulmar and it really adds to the overall appearance of the aircraft. This was done by first drawing the rivet lines on the aircraft. A hypodermic, loaded with slightly watered down white glue, was then used to dot the rivets on. Anyone can do it but practice a little bit on something else before you try it on the aircraft. The rivets will become nearly invisible as they dry but will be prominent when painted over. Try it --- I think you will be glad you did.

Mount the servos, three abreast, in the area between the cockpits. Position the receiver just ahead of the instrument panel and the airborne battery pack inside the radiator below the fuel tank. This is the way I installed mine and the aircraft required a 2 oz. spinner weight to arrive at the correct Center of Gravity.

As you can see from the plans, the aircraft has a very long tail moment. Care **must** be taken not to overdo this area.

In order to keep the weight down, I covered my Fulmar with clear MonoKote. Two coats of color on the top and sides. One coat on the bottom and then the insignia. The whole thing was

then sprayed with clear flat for a matt finish which worked out very well.

The engine chosen for the Fulmar was a Super Tigre .51 mated to an 11/6 Top Flite prop. This worked out very well as the aircraft weighs in at six pounds ready to fly and has a 22 oz. wing loading. Although the aircraft would fly with a .40 size engine, it is highly recommended for this type that you over-power slightly. Power can get you out of a lot of trouble, yet you do not need to use all the available power unless it becomes necessary. If you use an engine with marginal power and get into trouble where more power would get you out and you don't have it --- where do you think you'd be? I'll tell you. Get a rake and a basket because that's what you're going to need to pick up the pieces.

Flying:

Once out at the flying field, turn on your radio and check the controls again and make a range check while you're at it. Do not be afraid of this aircraft because it is a taildragger. It is very easy to handle on the ground as well as in the air. If you have never flown a taildragger before because you've heard, "They'll eat your breakfast," etc., forget it. Some taildraggers exhibit poor ground handling characteristics and this is usually because the landing gear legs are very close together and it has a very short turning radius or the pilot over-controls or fights the controls during take-offs and landings.

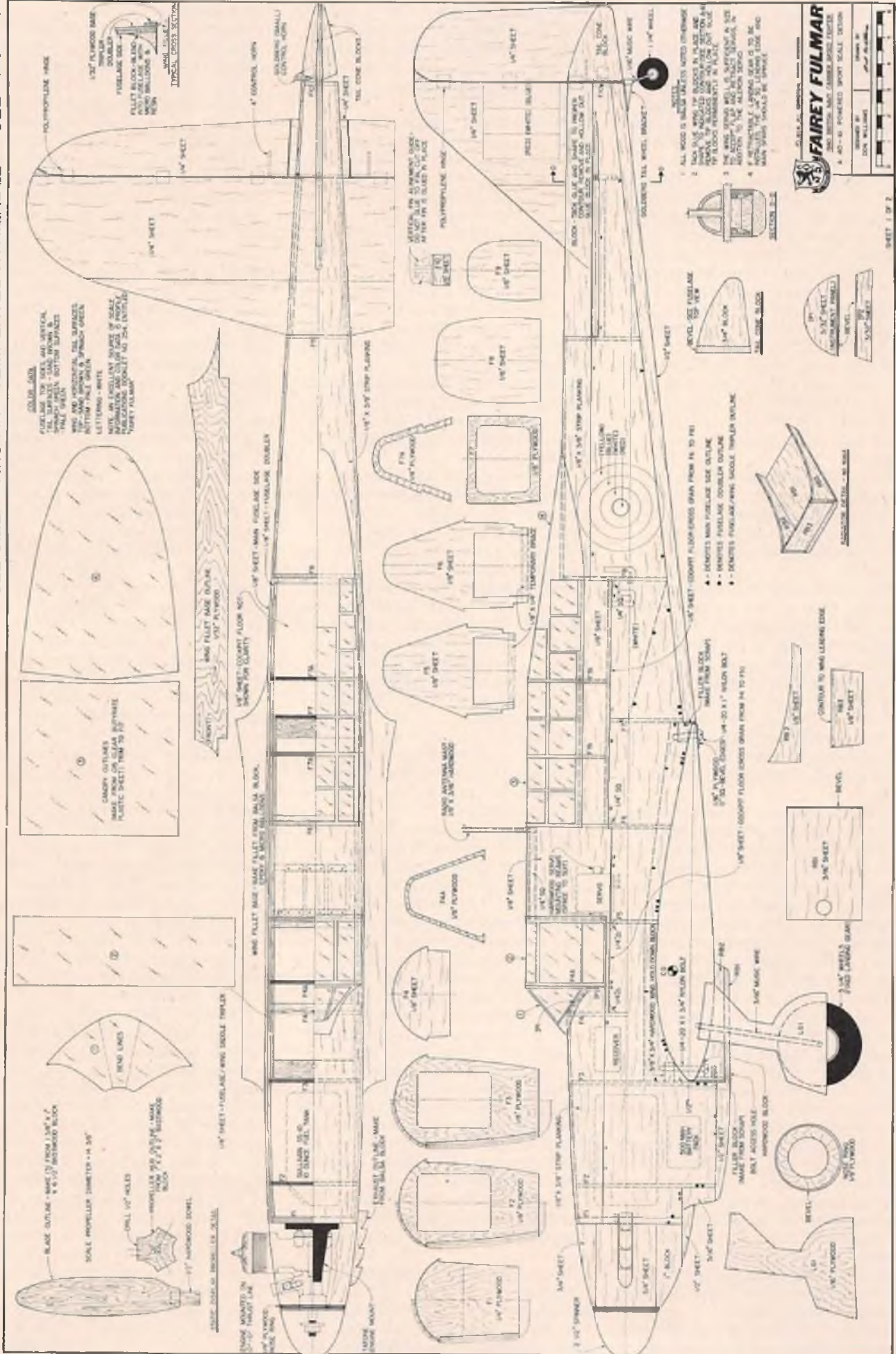
Choose your taildragger well. Choose one such as the Fulmar with a wide track landing gear. The turning radius is much larger and it will track straight and true. Also you can over-control slightly without fear of a ground loop.

Take-off procedure with the Fulmar is this: Neutralize all controls. Advance the throttle slowly but steadily. As the aircraft starts moving, feed in a slight amount of right rudder. In about 10' the tail will lift. Keep adding power. In about 30' you should be at full throttle and really ripping along. You will probably have to ease off the rudder a bit as the speed builds up but this is a thing you will have to see and feel.

Never lift an aircraft off too soon. Let it build up a good head of steam then ease back on the stick very gently. The result is a nice fly off and not a jump off the ground. This aircraft will take a jump off. As a matter of fact it will get off in about 5' but it doesn't look good and it could be dangerous. Don't do it.

Climb out should be shallow and straight ahead followed by a shallow turn of 180 degrees still climbing to about 300'. Trim the aircraft out and land. Do not try any aerobatics on your first flight. Set the controls according to the trim you used for straight and level flight. Now fuel up and go have a ball.

The Fulmar has taken a second and a first place in contests it has flown in,
text to page 118



FAIRYLE FULMAR
 THE MODEL AIRCRAFT COMPANY
 4 40-D FORECAST SPORT SCALE DESIGN
 DRAWN BY
 DON WILLIAMS
 SCALE
 1/4" = 1'-0"

PLAN NO 77-2

SHEET 1 OF 2

HERE'S HOW



Just Plane Lazy. A unique and functional super Flyin' Box with everything except the kitchen sink.



Looking down at the top it looks a might busy. But why for the handle Fred?



Looking into the entrails of Fred's super, want for nothing, Flyin' Box. Almost looks like he can barely close the lid when everything's in.

Many of us have pet projects that fit in with this great hobby/sport of RC'ing. And most of these projects are simply born out of necessity, a better way or a better mousetrap if you will. Some happen because the load gets too excessive causing us to fall off dead center and do something about it. Some of us do. And so it was with Fred Cropsey and his super AeroTrend Flyin' Box.

I can imagine how Fred's flight box started. Probably with the idea of having a simple, neat light box to carry his goodies to the field. Like most RC'ers some of us travel light and others heavy. You don't have to guess after taking a good long look at Fred's masterpiece, that he is the kind who needs a complete workshop at the field. Yes sir, and I mean complete.

Fred's flying field is large and beautiful by most standards, however, with one drawback. It requires a walk of no less than two blocks from the car to the flight line. When you consider carrying two planes, flight box and all the assorted goodies it takes to bring out the best in one's flying, it usually required a minimum of three trips. At least for Fred, it kind of took the fun out of goin' flying.

Fred had recently purchased an

AeroTrend Flyin' Box and after loading all his goodies aboard, grabbed the handle. It was, of course, too heavy and still an unmanageable situation as far as

that two block walk was concerned. Fred is one of those heavy travelers, ya' know.

While watching a give-away show on TV one night, he noticed a golf bag cart



Front view showing thermometer, wind speed indicator and motivating handle. Note aluminum stand that supports Flyin' Box.



On the right side is the all important first aid kit. A great idea. Very few are seen at the flight line.



The left side supports the extra power panel — just in case the one in the front gives up.

— self-propelled, no less. Fred spent the next three days trying to track down the cart only to find the firm was now defunct and no longer made them. But Fred was in luck. He found a former salesman who had last year's model and would sell it. A little rework to both the Flyin' Box and golf bag cart and they became one unit.

At first Fred had the wonderful thought of installing a receiver and servos so that he could leisurely walk out to the site with "it" following behind. Then there was the thought of frequency conflict and shooting someone down. He quickly dispensed with that idea in favor of using the golf cart as it was intended to be used. That is, with the dead man's squeeze handle which only required one to grasp the handle and squeeze. The harder one squeezes, the faster it goes. And, it will go faster than you can walk. It has its own battery power to which Fred has hooked up a back-up power panel in case his other panel should fail. As Fred says, "It holds all of my goodies in a neat, orderly fashion and has made my flying a whole lot simpler in that I want for nothing at the flying site. It is the only thing I can take to the field and be assured of taking home in one piece. I can't say the same of my airplanes."

Here is a partial list of the contents and capabilities of Fred's "Just Plane Lazy."

(A clever name thanks to his wife.) It has or carries: cigarette lighter, quartz digital clock, AM/FM radio, weather radio, fuel supply, two power panels with independent power sources, two field chargers (for Kraft and ProLine), tachometers, propeller supply, wind gauge for wind speed, wind sock, cordless soldering iron, cordless drill, glo plug supply, First Aid Kit, external fuel pump, thermometer, two starters, cleansing aids, crash alarm whooper-siren with panic button activator and flashing red beacon, frequency scanner, volt/ammeter, miscellaneous drawer and tool drawer crammed full plus back-ups for everything. Enough to blow your mind, huh?

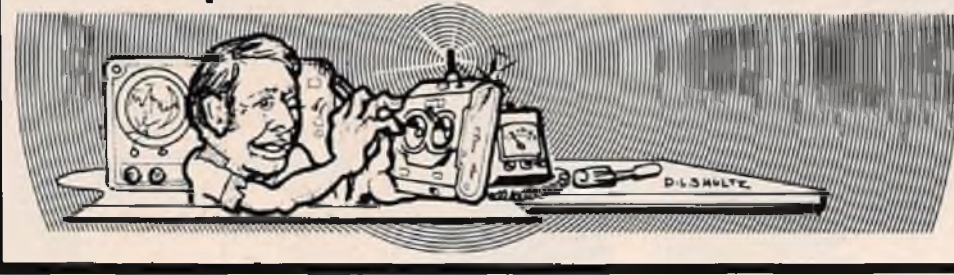
Of course, one of the major reasons why Fred started his unique project was the purchase of an AeroTrend Flyin' Box. Many of you may not be familiar with this fine product sold by the AeroTrend Products people. It is made extensively of fiberglass. One of the major advantages of a fiberglass field box, besides the obvious one of being extremely rugged and durable, is that it is quite easy to keep looking new long after it has been purchased and used extensively. Since there is no paint on the surface to deteriorate from fuel and

dirt, all that is necessary is to apply a coat of auto wax to the outside surfaces once a year. Following this, normal clean-up should be done with soap or detergent.

Another fine feature is that complete replacement parts are available from AeroTrend. This is most important since it is entirely possible for some guy to plant his latest bomb right into your flight box.

The Flyin' Box is shipped completely assembled and is the most unique, sturdy, and durable unit of its kind in use to date. The entire field box body and lid are made of rugged fiberglass in your choice of brilliant red, white, blue or orange, molded right into the glass itself. The size of the field box is 10" wide by 12" high and 20" long. It is designed to hold all your accessories plus a gallon can of fuel and your transmitter. The only part of the Flyin' Box that is not made of fiberglass, plastic or metal, is the internal center divider section of plywood. This section holds three ABS plastic slide-out bins for storing parts and accessories. The fiberglass lid is hinged to the base of the field box with drop chains on both sides allowing a convenient work surface once the box is set up.

The flip-up plane supports (aluminum to page 118



Last month we deviated from our usual stuff to give you a report on the Toledo show. Since then we visited the MAC's show in Long Beach, Calif., but there was little if anything different than Toledo except for a really great facility. So I think we'll get back to servo maintenance inasmuch as that seems to be what is in style these days.

Servo Maintenance Continued

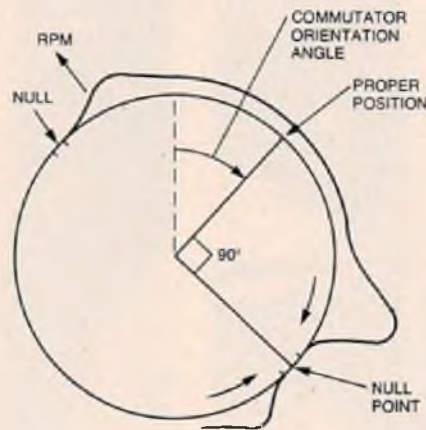
In the April and May issues we discussed motor cleaning which appears to have triggered a lot of interest in many quarters. First a letter commenting on Roger Sanders' April input. Roger had described a disassembly, cleaning and reassembly procedure. He suggested marking the back plate and motor housing so that you know where to align the parts when you put it back together. He then proceeded to describe the realignment as follows "... When the motor is back together, I leave the screws a little loose and connect up my power supply and ammeter. The motor is then run at moderate speed and the back plate is slowly rotated while the ammeter is watched and the motor rpm noted. I usually find that by simply adjusting for minimum current draw which will also be maximum rpm, I can improve the motor timing considerably ..."

Here is the comment:

Dear Jim,

A short time ago you had a letter and discussion in your column about cleaning servo motors. In the letter, the author mentioned setting the commutator position by rotating the brush assembly until he obtained the lowest current, which gave him the highest rpm also. I must take exception to this advice, based upon both theory and practice.

I used to run slot cars. In the motors, we used to advance the commutators to produce more speed and power; it was a very effective method. However, we were using motors in applications where they always ran one way. Servos have to run in both directions. The commutator position that produces the highest back EMF (and therefore the lowest current) for one supply voltage



polarity will not produce the same results when run in the other direction.

I had this effect rather noticeably pointed out to me after using the cleaning and adjusting methods suggested. The servo ran great in one direction, but terrible in the other. As soon as I realized what was going on, I also realized how to correct the situation. May I suggest that you inform your readers that they should set the motors to run the same rpm in both directions. It's fairly simple to do just by listening to the pitch of the motor. For those people whose sense of pitch is not that accurate, fairly good results can be achieved by setting the brush plate 90 degrees from the null point. The null point can be found by turning the plate until the motor stops, then going beyond until the motor starts again, and then backing up until the motor stops again. In other words, you want to approach the null point from each direction. Half way between the two points where the motor stops should be the null point. The proper commutator position should be 90 degrees from that (in either direction; the only difference is in which way the motor turns for a particular supply polarity).

I hope that this information can clear up the problems that could appear from following the instructions in the previous letter.

Cordially,
Tom Gist
Albuquerque, N.M.

When I tried Roger's technique, I marked the motor and then made a slight adjustment for minimum current

and didn't pay any attention to rpm. The results were very satisfactory. After reading Tom's letter I went back and listened for maximum rpm. Sure enough, this was at a significantly different spot. I then went through Tom's null detection scheme and found it quite accurate when compared to the original setting which I had marked. Looks like a good technique to me. Any comments? Hey, we're all going to learn about what's in our systems yet! Next letter, same subject:

Dear Jim,

Your April '79 column was read with interest, particularly the letters dealing with servo and motor maintenance. I have been cleaning and maintaining my Heathkit equivalents to the Kraft KPS-9 and KPS-11 for the past ten years and I agree generally with the opinions expressed except for the following points and for the reasons stated.

(1) Cleaning servo motors in alcohol. I tried this early in the game and had the brush pivot points seize due to corrosion. This was probably caused by the alcohol's affinity for water vapour in the air resulting in water being deposited in the motor after the alcohol's evaporation. The resultant rusting and corrosion between dissimilar metals caused the servo to be intermittent due to insufficient brush contact pressure.

(2) Use no oil on motor bearings. We fly here year round at winter temperatures as low as minus 10°F. An unlubricated motor bearing will often audibly squeal at temperatures below about plus 20°F. I have actually measured decoupled motor current draws of 200-250 ma with the bearings squealing as compared to 60-90 ma for a normal motor. This can rapidly reduce available battery capacity at low temperatures where you have a marginal reserve at best. My solution is to disassemble and clean motors in a varsol bath (an ultrasonic cleaner works great), to remove the oil in the sintered bearings, then re-lubricate bearings, brush holder pivots, and brushes with a light silicone gun oil (Outers). I realize that lubricating electrical contact surfaces goes against all convention but I have been doing this for four years with excellent results. I initially tried a

mineral based household oil with results as described in your column; that is a black greasy crud on the armature after a short period of operation. My motor maintenance period varies from two to three years or as soon as any noticeable slow down in servo speed is evident. To date I have had no known in-flight motor failures in a very much higher than average utilization.

(3) The six-eight hour run-in period I feel is unnecessary. I believe you are using up available motor life with this procedure.

(4) Removal of the pinion gear for motor disassembly. I believe this is the hard way of disassembling the motor. I remove the three screws securing the motor end plate, push up on the pinion gear end of the shaft and tilt the end plate to allow a jeweler's screwdriver to be inserted to push the brushes gently away from the commutator and lift them one at a time over the mylar washers. The end plate and brush assembly can then be removed. A strong table light on your work bench is necessary so you can see where you are probing as the brush assemblies are quite delicate and require a light touch. A five or ten power magnifier is a great help for inspecting the innards after disassembly. A broken jumper wire from the brush carrier to the pivot point is often found if a servo is noticeably slower in one direction of travel. A suitable substitute can be made from a single strand of copper wire from a piece of house lamp cord. Motor cleaning and servo maintenance was covered in the April 1970 issue of RCM in an article entitled "Servo Maintenance or how to simply service a sick servo sooner" by Jerry Smith.

I find it very beneficial to maintain a card file on each servo to record maintenance and troubles. It is interesting to note that only three or four servos constantly give problems, mostly due to pot troubles.

I was also interested in your letters on the Heathkit direction oriented glitch problems. My experience is that the Heathkit GD-19 system is very sensitive to any metal to metal contact in the engine area. A metal fuel filter chafing on the engine produced these directional glitches a number of years ago in my system and nearly drove me nuts until I stumbled on the problem and isolated the filter. I use a flexible metal throttle cable and I believe this effectively transfers any metal to metal generated noise back to the receiver.

I recently encountered a directional glitch problem this winter after installing a formerly trouble-free airborne pack in a rebuilt airplane. In doing so I repackaged the receiver and battery in one package to allow a maximum of foam to be wrapped around the outside. No rubber separated the receiver and battery. The result was a noticeably reduced ground range, still within the

published limits, and repeatable directional glitches in flight. Separating the receiver and battery with 1/2" foam rubber completely eliminated the problem. Apparently the metal mass of the battery detunes the receiver when in close proximity. I would be interested in your comments on this.

I have also noted that three wire servos make my four wire servos jittery when installed together, especially in cold weather. Do you have any reason for this? I still favor my old, slow variable capacitor servos for ultimate reliability even if they do drift with temperature and humidity changes. I have built your fast charger and have been using same with good results for the past three years. Keep up the good work. Your column has provided a wealth of information over the years.

Best regards,
Don Hancock,
Manotick, Ontario

Good letter Don. Seems to me you ought to be able to dry the parts cleaned in alcohol prior to reassembly but we're always willing to find a better way.

We've had others suggest that silicone oil is a winner, and I agree the six to eight hours is more than required. I don't know that I like your disassembly procedure, however. Seems better to get things out in the open.

Thanks for the comments on the Heathkit. Yes, I have seen reduced range when the receiver and battery are not separated, however I haven't seen it cause glitches.

Keeping records of your equipment is something that can save you an awful lot of trouble. I recommend that everyone do it.

I'm surprised that your pot problems are so severe that you would accept drift due to temperature and humidity. Sounds like you need to try something else in this area.

In the May issue Mr. Jack Arnouts described a cleaning method that did not require disassembly. Here's some comments on that approach:

Dear Jim,

In regards to the May '79 issue containing Mr. Jack Arnout's letter about servo motor cleaning, I must say his method of cleaning could be **disastrous** to a servo motor, if not done properly and with the correct type of motor. Jack's method of cleaning motors, such as those used in his trains and in most slot cars of days past, is quite effective. Those motors are usually much larger than a servo motor and are usually exposed to anything from the usual dirt and dust to fake grass bits and metal shavings from the tracks. This being because those motors have large air vents on the motor can, some motors with no motor cans at all. However, most servo motors in use today have no vents on the motor can!

This being the case, should you attempt to clean a motor using Jack's method, the motor will probably inhale the cleaning solution through the bearings as the motor runs, leaving it trapped inside the motor can for some time after being immersed. When the fluid does finally evaporate, which could be days afterwards, it will leave all the dirt and gunk at the bottom of the motor where it has settled. That's not so bad except that most servo motors are mounted commutator side **down**, or at the bottom! That means all the dirt and gunk has settled back on to the commutator, which was what you tried to clean off in the first place. On top of that, should you try to leave the motor running after being immersed in the cleaning fluid to get the fluid out, you will probably damage the bearings because the oil in the bearings was removed by the fluid.

This is not to say you cannot clean your servo by this method, but chances are against you in cleaning the motor successfully. Some people may attempt to vent the motor by prying off the motor bell housing which is held in place by small, bent tabs. Those are made to bend only once and then break, so that idea should be thrown out. Also, should you successfully clean the motor, you must re-oil the bearings and most people will attempt to use 3-In-1 Oil, or a similar type. This oil is too heavy and will gum up a motor quickly. You should use an oil which is similar to watch or timepiece oil. A droplet the size of a pinhead will suffice. Oilite bearings are like sponges. They hold lubricant within the microscopic pores on the face of the bearing and keep the bearing surface nicely supplied with oil.

In reality, a servo motor should last one heck of a long time. They are sealed, they are contained in the servo housing away from foreign matter and an aircraft usually stays away from dirt and junk anyway. However, if you feel you have an ailing servo motor, you would probably be better off to buy a new one. If you have a vented motor, have at it and in the case you cannot find En-1rt, you can use Energine Non-Flammable cleaner. It has the same cleaning and handling properties as En-1rt.

Sincerely yours,
Michael S. Lee
Bellevue, Neb.

Don't know what kind of servo motors Mr. Lee is using, with bent tabs, but his advice sounds good to me. Seems like the disassembly approach is better. However, the use of Energine and the watch oil sounds like a good tip.

Before we leave this subject, I'd like to pass along some comments from Dick Buescher of RC Specialties in Madison, Wisconsin. Dick has been doing a lot of servicing for the local guys and has

to page 100

A Club Pattern Contest For Pilots And Judges Of All Skill Levels

By Stan Clark

Part II

Review:

Last month we covered the contest objectives, and got into details. Quickly reviewing, pilots are classified into four levels, each of which flies a specific maneuver which is a variation of the basic maneuver of the week. Each specific maneuver is broken down into its elements. We ended last time with the elements for week 1.

More Contest Details:

The elements for the specific maneuvers for weeks 2 to 6 are shown in Figures 3 to 7. Figures 1 and 2 were given last month.

Score Sheets:

A separate judging sheet was prepared for each specific maneuver. Two exceptions were: for week No. 1 a common sheet was used for all levels, and for week No. 3 the same one was used for Levels III and IV. As an example, the score sheets for week No. 6, for Levels I and III are shown in Figures 8 and 9. The judges task was to mark either the **yes** or **no** column for each element. Other factors would be included in a normal pattern event, but for this contest, only those elements listed were used in judging. Each element was worth one point, except for Levels II, III, and IV in week No. 2 (landings). Scores were determined by

FIGURE 3
Elements For Specific Maneuvers
Week No. 2
Rectangular Approach And Landing

LEVEL I	
Upwind Leg	1. Over runway 2. Constant altitude 3. Constant heading
First Turn	4. 90°
Crosswind Leg	5. Constant altitude 6. Constant heading 7. 90°
Second Turn	8. Constant altitude 9. Constant heading
Downwind Leg	10. 90°
Third Turn	11. Constant altitude 12. Constant heading
Crosswind Leg	13. 90°
Fourth Turn	14. Over runway
Final Leg	15. Constant altitude 16. Constant heading

Maximum raw score per attempt is 16 points.
Note: Level I pilot does not make a landing.

LEVEL II	
Upwind Leg	1. Over runway 2. Constant altitude and heading 3. 90°
First Turn	4. Constant altitude and heading
Crosswind Leg	5. 90°
Second Turn	6. Constant altitude and heading
Downwind Leg	7. 90°
Third Turn	8. Constant altitude and heading 9. 90°
Crosswind Leg	10. Constant rate of descent
Fourth Turn	11. Constant heading
Final Leg	12. On runway (3 pts.) Off runway (0 pts.)
Touchdown	

Maximum raw score per attempt is 14 points.
Note: Maneuver ends at touchdown.

LEVEL III	
Upwind Leg	1. Over runway 2. Constant altitude and heading 3. 90°
First Turn	4. Constant altitude and heading
Crosswind Leg	5. 90°
Second Turn	6. Constant altitude and heading
Downwind Leg	7. 90°
Third Turn	8. Constant altitude and heading 9. 90°
Crosswind Leg	10. Constant rate of descent
Fourth Turn	11. Constant heading
Final Leg	12. Flares out 13. Wings level at touchdown 14. On runway (spot = 3 pts.) (runway = 1 pt.)
Landing	15. No bounces 16. Ground roll straight 17. Stops upright 18. Stops on runway

Maximum raw score per attempt is 20 points.

Level IV	
1st Rect. Approach	1. Over runway on first leg 2. All legs, except final, constant altitude and heading 3. All turns 90°
Touch and Go	4. Constant heading and rate of descent 5. Flares out with wings level 6. Touchdown (spot = 3 pts.) (runway = 1 pt.)
2nd Rect. Approach	7. All legs, except final, constant altitude and heading 8. All turns 90°
Landing	9. Constant heading and rate of descent 10. Flares out with wings level 11. Touchdown (spot = 3 pts.) (runway = 1 pt.) 12. No bounces and ground roll straight 13. Stops upright on runway

Maximum raw score per attempt is 17 points.

summing the number of **yes** elements (raw score), dividing by the maximum possible raw score, and multiplying by 10. Using Figure 9 as an example:

The pilot received 5, 6, and 7 points for his three attempts, for a total raw score of 18. With a maximum possible raw score of 33, the corrected score was $18/33 \times 10 = 5.45$ rounded to 5.5.

Differences between minor and major

FIGURE 4
Elements For Specific Maneuvers
Week No. 3
Turns

LEVEL I (Figure Eight)	
Entry	1. Constant altitude
1st Half Circle	2. Constant heading 3. Starts in front of judges 4. Smooth and round 5. Constant altitude
2nd Full Circle	6. Smooth and round 7. Constant altitude 8. Completed at same point as finish of 1st half circle
3rd Half Circle	9. Smooth and round 10. Constant altitude 11. Finished in front of judges
Exit	12. Same heading as entry 13. Same altitude as entry 14. Straight and level
General	15. Both circles same size

Maximum raw score per attempt is 15 points.

LEVEL II (Two Figure Eights)	
Entry	1. Constant altitude and heading
1st 8	2. Starts in front of judges 3. Smooth and round 4. Constant altitude 5. Crossover point in center 6. Both circles same size
2nd 8	7. Completed in front of judges 8. Smooth and round 9. Constant altitude 10. Crossover point in center 11. Both circles same size
Exit	12. Completed in front of judges 13. Straight and level
General	14. Both 8's same size

Maximum raw score per attempt is 14 points.

LEVEL III (Stall Turn)	
LEVEL IV (Inverted Stall Turn)	
1. Entry straight and level	
2. Model becomes exactly vertical	
3. Does not turn right or left during climb	
4. Vertical climb in front of judges	
5. Maximum viewing angle 45°	
6. Yaws lightly through 180°	
7. Return path within two wingspans of original	
8. Return path parallel to original	
9. Finish at same altitude as entry	
10. Exit straight and level	

Maximum raw score per attempt is 10 points

errors were not taken into consideration. The actual number of elements was not important since all raw scores were converted to a 0 to 10 scale.

Contest Observations:

We have covered the mechanics, let's see how it worked out (this is the fun part, like the section in the construction article that says, "Make sure the model balances as shown on the plans ---").

First week — The basic maneuver was straight flight; specific maneuvers were based on variations of the standard Novice maneuver. Restating the requirements:

Level I — Straight flight out and back, turn not scored.

Level II — Standard Novice maneuver.

Level III — Inverted flight out and back, turn not scored.

Level IV — Inverted Novice maneuver.

This may not sound like much of an event, but stick with me. Picture the brand-new student pilot who has never made a take-off (to say nothing of a landing) performing a pattern maneuver. He can. Two pilots made their very first flights **ever** in this contest: one of them (Chuck Wickline, with a Sig Kadet) went

FIGURE 5

**Elements For Specific Maneuvers
Week No. 4
Loops**

LEVEL I

(One Inside Loop)

- Entry Loop
- 1 Straight and level
 - 2 Smooth and round
 - 3 Centered in front of judges
 - 4 No right or left deviation
 - 5 Max. viewing angle 45°
 - 6 Wings level at finish
 - 7 Finish at same alt. as entry
 - 8 Finish at same heading as entry
 - 9 Straight and level
- Exit

Maximum raw score per attempt is 9 points

LEVEL II
(Three Inside Loops)

- Entry
- 1 Straight and level
 - 2 Smooth and round
 - 3 Centered in front of judges
 - 4 No right or left deviation
 - 5 Finish at same altitude and heading as entry
- 1st Loop
- 6 Smooth and round
 - 7 Same size as 1st loop
 - 8 No right or left deviation
 - 9 Finish at same altitude and heading as entry
- 2nd Loop
- 10 Smooth and round
 - 11 Same size as 1st and 2nd loops
 - 12 No right or left deviation
 - 13 Finish at same altitude and heading as entry
- 3rd Loop
- 14 Straight and level
- Exit

Maximum raw score per attempt is 14 points

LEVEL III
(One Outside Loop)

- Entry
- 1 Straight and level
 - 2 1/2 roll to inverted
 - 3 Inverted for one second
 - 4 Inverted straight and level
 - 5 Smooth and round
 - 6 Centered in front of judges
 - 7 No right or left deviation
 - 8 Maximum viewing angle 45°
 - 9 Wings level at finish
 - 10 Finish at same altitude and heading as entry
- Loop
- 11 Inverted straight and level
 - 12 Inverted for one second
 - 13 1/2 roll to upright
 - 14 Straight and level
- Exit

Maximum raw score per attempt is 14 points

LEVEL IV
(Three Outside Loops)

- Entry
- 1 Upright straight and level
 - 2 Inverted straight and level and held for one second
- 1st Loop
- 3 Smooth and round
 - 4 Centered in front of judges
 - 5 No right or left deviation
 - 6 Wings level at finish and at same altitude and heading as entry
- 2nd Loop
- 7 Smooth and round
 - 8 Same size as 1st loop
 - 9 No right or left deviation
 - 10 Wings level at finish and at same altitude and heading as entry
- 3rd Loop
- 11 Smooth and round
 - 12 Same size as first two loops
 - 13 No right or left deviation
 - 14 Wings level at finish and at same altitude and heading as entry
- Exit
- 15 Inverted straight and level and held for one second
 - 16 Upright straight and level

Maximum raw score per attempt is 15 points

FIGURE 6

**Elements For Specific Maneuvers
Week No. 5
Rolls**

LEVEL I

(Take-Off)

- 1 Standing start
- 2 Ground roll straight
- 3 Smooth lift off ground
- 4 Not too steep climb angle
- 5 Constant rate of climb
- 6 Constant heading during climb
- 7 Wings level during climb
- 8 Smooth 90° climbing turn

Maximum raw score per attempt is 8 points
Note: Level I pilot not expected to be capable of a roll

LEVEL II
(One Roll)

- Entry
- 1 Straight and level
 - 2 Constant heading
 - 3 Roll rate uniform
 - 4 Rolls exactly one revolution
 - 5 Same heading and altitude as entry
 - 6 Straight and level
- Roll

Maximum raw score per attempt is 6 points
Note: Level II pilot is not expected to hold constant altitude during roll

LEVEL III
(Two-Point Roll)

- Entry
- 1 Straight and level
 - 2 1st half roll 180°
 - 3 Hesitates after 1st half roll
 - 4 2nd half roll 180°
 - 5 Constant altitude
 - 6 Constant heading
 - 7 Same heading and altitude as entry
 - 8 Straight and level
- Roll

Maximum raw score per attempt is 8 points

LEVEL IV
(Slow Roll)

- Entry
- 1 Straight and level
 - 2 Constant altitude
 - 3 Constant heading
 - 4 Roll rate constant
 - 5 Roll is exactly one revolution
 - 6 Same heading and altitude as entry
 - 7 Straight and level
- Roll

Maximum raw score per attempt is 7 points
Note: Duration of slow roll must be a minimum of 4 seconds or entire attempt is scored zero

FIGURE 7

**Elements of Specific Maneuvers
Week No. 6
Combination of Loops and Rolls**

LEVEL I

(Three Inside Loops)

This is the same maneuver done by Level II in Week No. 4. See Figure 5. Note: Level I pilot not expected to make roll

LEVEL II

(Immelman Turn)

- Entry
- 1 Straight and level
 - 2 Starts in front of judges
 - 3 Smooth and round
 - 4 No right or left deviation
 - 5 Starts immediately after half loop (in front of judges)
 - 6 No right or left deviation
 - 7 Constant altitude
 - 8 Opposite heading to entry
 - 9 Straight and level
- Hall Loop
- Roll
- Exit

Maximum raw score per attempt is 9 points

LEVEL III

(Cuban 8)

- Entry
- 1 Straight and level
 - 2 Smooth and round
 - 3 No right or left deviation
 - 4 Model on 45° angle during roll
 - 5 Same altitude as 1st loop
 - 6 Smooth and round
 - 7 No right or left deviation
 - 8 Same diameter as 1st loop
 - 9 Model on 45° angle during roll
 - 10 Same heading and altitude as entry
 - 11 Straight and level
- 1st Loop
- 2nd Loop
- 2nd Half Roll
- Exit

Maximum raw score per attempt is 11 points

LEVEL IV

(Three Cuban Eights)

- Entry
- 1 Straight and level
 - 2 Both loops smooth and round with no right or left deviation
 - 3 Both rolls done on 45° angle
 - 4 2nd loop same altitude and size as first loop
 - 5 Rolls centered on crossover point
 - 6 Loops same size and altitude as 1st 8
 - 7 No right or left deviation
 - 8 Both rolls on 45° angle
 - 9 Crossover point same as 1st 8
 - 10 Loops same size and altitude as 1st and 2nd 8's
 - 11 No right or left deviation
 - 12 Both rolls on 45° angle
 - 13 Crossover point same as other 8's
 - 14 Straight and level with same heading and altitude as entry
- 1st 8
- 2nd 8
- 3rd 8
- Exit

Maximum raw score per attempt is 14 points

new pilot is exposed to the feeling of competition while doing something that he is capable of, and he is also learning the concept of trying to control the plane in a particular piece of air space. RC stands for radio-controlled flying. Straight flight is necessary for every maneuver you will make even if you progress to the World Championships. Think about it when you see a pro make a dead straight entry into a difficult maneuver. One reason the result looks so good is that the entry set it up. The other feature of every well done maneuver is its position in the air space, a concept being instilled in this first very simple maneuver.

During this time the judge is aware of the 5 elements (not too many to keep in your head) and is looking for errors. If he doesn't see any, he must mark the element as being done correctly. After a maneuver is completed and the judges have marked their score sheets they are allowed to compare results. Instead of discussing whether the maneuver was worth a "6" or a "4" (remember that was one of our difficulties), the subject was the elements. Did the flight start in front of the judges? Did it hold constant altitude? This instant feedback resulted in a tightening of the judges results quickly. While not a procedure being advocated for other contests, it was appropriate in this case. Typically the new judge scored his first flight high, but

after three or four flights, and feedback on each, he was usually right in there with the most experienced club judge. A good reason for practice flights.

Back to the action, we are still on week No. 1, now Level II. With the pilots flying the standard Novice maneuver, the judge now applied what he learned from Level I and only added the elements for the procedure turn; therefore, most of the elements were old stuff. To the judge Levels III and IV were the same as Levels I and II, but obviously not to the pilots. I hope I have illustrated how the elements in one maneuver can lead directly to the next in a logical sequence. Everyone was pretty enthusiastic. From the new pilots to guys like Stan Hines and Bryce Petersen (both basically scale flyers) who were impressive with their inverted turns.

Second Week:

Now the basic maneuver was the rectangular approach and landing, with Level I pilots not landing but making the final leg a duplicate of the first leg. This maneuver is just four sections of straight flight separated by 90° constant altitude turns, again a logical transition from the first week. Now we started to combine elements; constant altitude and constant heading became one and the judge was mentally looking at both at the same time. This began the process a

on to finish second for the entire six weeks. Remember there is an instructor present who can take over the controls if needed; in that case the point scoring is just terminated and we have not panicked anyone into a broken plane. Judging was based on 5 elements: starting position, constant altitude, constant heading, parallel runway, and finishing position. After completion was announced (preferably by the pilot, but permitted by the instructor) for the flight out, the pilot negotiated the 180° turn (not scored) and made the flight back with the same 5 elements in effect.

Let's see what we have done so far. This simple maneuver can be done by anyone (with a halfway trimmed plane and a means of getting it up there). The

FIGURE 9
Week No. 5
Club Pattern Contest

Pilot _____

LEVEL III

Judge _____

CUBAN 8

ANNOUNCE MANEUVER BEGINNING		FIRST ATTEMPT		SECOND ATTEMPT		THIRD ATTEMPT	
		YES	NO	YES	NO	YES	NO
Entry	1. Straight and level						
1st Loop	2. Smooth and round						
	3. No right or left deviation						
1st Half Roll	4. Model on 45° during roll						
2nd Loop	5. Same altitude as 1st loop						
	6. Smooth and round						
	7. No right or left deviation						
	8. Same diameter as 1st loop						
2nd Half Roll	9. Model on 45° during roll						
Exit	10. Same heading and altitude as entry						
	11. Straight and level						
TOTALS							

ANNOUNCE MANEUVER COMPLETION

Raw Score = Total of "Yes" Columns = _____

$$\text{Score} = \frac{(\text{Raw Score})}{(11 \times \text{attempts})} \times 10 = \frac{\quad}{11 \times} \times 10 = \quad$$

judge must go through when he sees an entire maneuver and mentally creates one score taking into account all the factors. As the specific maneuvers were being explained, the Level IV pilots remembered the handicapping of the first week and were relieved when they found out they would not have to land inverted! Your author (and Contest Director) carefully positioned two lawn chairs to mark the limits of the spot landing area and --- you guessed it, promptly flew into one. Hazel, you aren't the only one with clipped wings!

Third Week:

Using turns as the basic maneuver, the concepts introduced were smoothness, roundness, and centering the maneuver in front of the judges. Level II pilots had difficulty getting the second Figure 8 in the same place as the first, in fact, throughout the contest that level seemed to have the most trouble. Level IV found the inverted stall turn a bit of a thrill, probably because they had not tried it before. The club's old smoothie, Bob Ray (a former Mint Julep Novice winner) was the star of the day with his pattern ship.

Fourth Week:

The loop is the first aerobatic maneuver the new pilot attempts, and was the basic maneuver this week. Except for Level I flying one inside loop all pilots were performing standard pattern maneuvers. As you can see by studying the elements, a lot of points could be obtained by a good entry and exit, and by keeping the plane in the right air space. This was intentional to reinforce the lessons of the previous week. Of the six weeks in the contest, this week was the best for obtaining balanced competition among the four levels.

Fifth Week:

Next for the intermediate flier is the roll. Level I pilots were not expected to be ready for this, and were asked to perform a take-off instead. One of the best take-offs ever seen at our field was done by Chuck Wickline, one of our new pilots. The Level IV pilots had a mini-contest among themselves with the slow roll, a maneuver they don't work at since it is not part of the Novice pattern. Four seconds can be a long time.

Sixth Week:

For the final week, we combined loops and rolls, except for Level I still not being asked to do a roll. They did three inside loops instead and found numerous ways of getting it tangled up. As in weeks 4 and 5, three levels were doing standard maneuvers. By now the judges were combining "smooth and round" and "no right or left deviation," and making real progress towards seeing the whole maneuver. Stan Hines borrowed my Fledgling after his pattern ship wouldn't cooperate and, after scraping the backs of a couple of cows with his first Cuban 8,

FIGURE 9
Week No. 6
Club Pattern Contest

Pilot Earl Hartgrove

LEVEL III

Judge Jim Creasey

CUBAN 8

ANNOUNCE MANEUVER BEGINNING		FIRST ATTEMPT		SECOND ATTEMPT		THIRD ATTEMPT	
		YES	NO	YES	NO	YES	NO
Entry	1. Straight and level	✓		✓		✓	
1st Loop	2. Smooth and round		✓	✓		✓	
	3. No right or left deviation		✓	✓		✓	
1st Half Roll	4. Model on 45° during roll	✓		✓		✓	
2nd Loop	5. Same altitude as 1st loop	✓		✓			✓
	6. Smooth and round	✓		✓		✓	
	7. No right or left deviation		✓		✓	✓	✓
	8. Same diameter as 1st loop		✓		✓		✓
2nd Half Roll	9. Model on 45° during roll		✓		✓	✓	
Exit	10. Same heading and altitude as entry		✓		✓		✓
	11. Straight and level	✓		✓			✓
TOTALS		5		6		7	

ANNOUNCE MANEUVER COMPLETION

Raw Score = Total of "Yes" Columns = 18

$$\text{Score} = \frac{(\text{Raw Score})}{(11 \times \text{attempts})} \times 10 = \frac{18}{11 \times 3} \times 10 = 5.5$$

MEMORIAL

This manuscript was written as a result of the death of a long-time member of Southern Indiana R/C Modelers, Mr. Dick Fowler. Dick was the kind of friendly, helpful person all too rare in today's world, and his passing affected not only club members but a variety of people from all walks of life. This article is my tribute to Dick, and to the type of person he was.

An interesting note is that the neophyte pilot Dick trusted his plane to was my mother-in-law, a pilot with the Women's Airforce Service Pilots (WASPs) during World War II. She and Dick met at our flying field, swapped a few war stories, and immediately he asked her to try her hand at R/C flying.

Southern Indiana R/C Modelers recently named our flying field Fowler Field in honor of Dick.

I BOUGHT A PLANE TODAY

I bought a plane today. It's not an unusual or exotic airplane, just an attractive little aileron trainer for four channels and a .35 engine. I didn't even need another airplane, but my wife understands.

I remember watching the previous owner grin as it scurried through the air, rolling and looping and laughing at the ground, allowing the owner to escape for a few minutes from the worries and frustrations of ground-bound existence and return to the skies he had known in earlier days. I remember Dick's relaxed attitude after a flight, and his willingness to help a novice like me with suggestions or maybe just some encouragement after another in a series of crashes.

I remember Dick trusting this same airplane to a woman who had never flown radio-controlled models before, because she had seen the skies as he had, many years before, and he wanted to give her the chance for another look.

I remember Dick's dedication to making our club a group of friends who just happened to share a common interest, and his dedication to our activities and events. I remember him working to see that every event went smoothly, regardless of his official responsibility. No chore was too small to warrant his attention.

Dick was a Sunday Flier, not taken with the rigors of competition, other than the competition to have a good time. He didn't pursue rewards from this hobby, other than the rewards that come from knowing a job is well done, whether that job be building the trainer I now own, or planning a static display.

Dick's gone now, but when I look at that little trainer I remember all he meant to our club, and to me. I know that when I fly it at the field Dick helped to build, I'll know he's still there, watching over my shoulder to see his plane fly.

I bought a plane today. I never knew an airplane could make me cry.

BY DON CHILDERS

RCM PRODUCT TEST

**Techni Models
GRYPHON**



The Gryphon is an aerobatic slope soaring glider manufactured and distributed by Techni Models. The most unusual feature of the Gryphon, a Ron Neal design, is the design itself. Although there is a short fuselage and rather large vertical fin, the plane is basically a flying wing. Full length elevons provide flight control. The wing is fully symmetrical and being both tapered and swept back greatly adds to the overall eye appeal.

With the exception of a small dihedral brace and the servo mounting material, construction is entirely of balsa. In the kit I received only a portion of the capstrip material and one piece of 1/16" sheeting were a bit soft. Otherwise all wood quality was excellent. There are no die-cut parts in the kit. All parts are pre-cut including slotted LE and TE. The quality of cutting was found to be very good. The kit contains control horns, clevises, threaded pushrods and hardware for the hatch cover latch. Steel wire and brass tubing for wing tip skids are also included although these were not used on the review model.

The one plan sheet provided with the kit contains written building instructions, construction notes and pictorial views of various construction stages. No full size plans are included. Although the pictorials lack some detail normally found on full size plans, this should present no problem to the average builder.

The Gryphon wing is constructed in one piece, which requires a rather large building surface. Even though fully symmetrical, wing construction does not require a wing jig. The technique uses only a flat surface and minimum blocking. The wing design is unusual in that no spars are used. Strength is obtained through the use of 3" sheeting on top and bottom of both leading and trailing edges. The wing center joint is reinforced with glass tape and resin. Wing construction is not particularly difficult but is somewhat awkward since it is quite large and built in one piece. The wing was framed up using aliphatic resin and sheeting was attached with Wilhold latex contact cement. Overall wing parts fit was very good including the many angle cuts at the center wing joint. The pinning and

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts		●			
Plans			●			Parts Match to Plans			NA		
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood	●					Ease of Assembly			●		
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance		●			
Accessories		●				Overall Appeal		●			
Die-Cutting			NA								

E—Excellent / G—Good / A—Average / F—Fair / P—Poor

SPECIFICATIONS

Name GRYPHON
 Aircraft Type R/C Slope Soaring Glider
 Manufactured By Techni Models
 1300 Yosemite Drive
 Los Angeles, California 90041

Mfg. Suggested Retail Price \$54.95
 Available From Both Mfg. & Retail
 Mfg. Recommended Usage Sport Sailplane
 Wing Span 67 Inches
 Wing Chord 13½ (Avg.) Inches
 Total Wing Area 965 Square Inches
 Fuselage Length 30 Inches
 Radio Compartment Dimensions (L) 6¼" x (W) 2½" x (H) 2½"
 Wing Location Mid Wing
 Airfoil Symmetrical
 Wing Planform Double Taper; Swept Back
 Dihedral (each tip) Slight — not indicated
 Stabilizer Span N/A
 Stabilizer Chord (incl. elev.) N/A
 Total Stab Area N/A
 Stab Airfoil Section N/A
 Stabilizer Location N/A
 Vertical Fin Height 8¼ Inches
 Vertical Fin Width (incl. rud.) 7¼ (Avg.) Inches
 Mfg. Rec. Engine Range N/A
 Recommended Fuel Tank Size N/A
 Landing Gear Skid
 Recommended No. Of Channels 2
 Recommended Control Functions Elevons
 Basic Materials Used In Construction:
 Fuselage Balsa
 Wing Balsa
 Tail Surfaces Balsa
 Hardware Included In Kit See text
 Plan Size 48" x 27" (1 sheet)
 (No full size plans. Pictorial views only)
 Building Instructions on Plan Sheets Yes
 Instruction Manual No
 Construction Photos No
 Kit Includes Shaped Parts
 Mfg. Rec. Flying Weight 40 Ounces
 Wing loading based on rec. flying wt. 6 Oz./Sq. Ft.

RCM PROTOTYPE

Weight, Ready To Fly 39 Ounces
 Wing Loading 5.8 Oz./Sq. Ft.
 Covering & finishing materials used See Text
 Engine Make & Disp. N/A
 Muffler Used N/A
 Radio Used Cirrus
 Tank Size Used N/A

DUKE FOX TALKS ABOUT CARBURETION

A model airplane motor runs on air and fuel. If it gets more air and fuel it runs faster. If it gets less it runs slower. A model airplane motor carburetor is a device to regulate the flow of air and fuel to the motor. It consists of an air valve and a fuel valve.

A model airplane motor is a rather persnickity device in that it wants its fuel and air delivered in proportions to its liking, and not always exactly the same. At full throttle and under load conditions it wants a richer (more fuel) mixture than other times. Give it too much fuel and it responds by losing power, cooling its plug, and quitting. Give it too little fuel and it gets very hot, sometimes to the point of hurting itself.

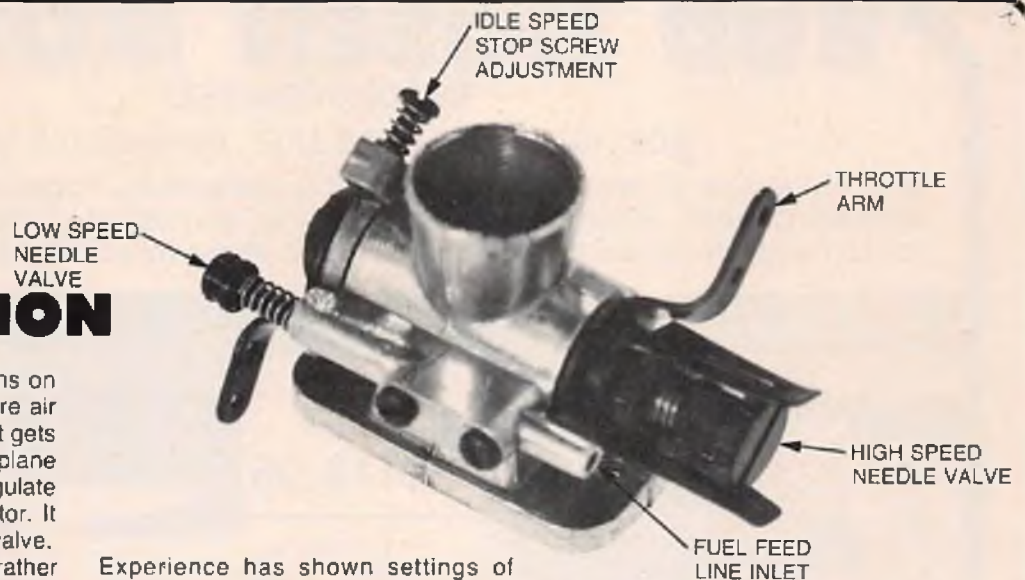
The air valve on Fox carburetors is a round piece with two flats and an angled notch on it. This design was selected in preference to the more usual round hole because engine r.p.m. is more closely related to the transmitter position.

Valving the fuel on Fox motors is accomplished by means of a hole in the rotating body which closes off against the casting as the throttle is closed. To avoid shutting off the fuel faster than the air this hole usually has a little tapered indentation leading away from it, which in effect is a controlled leak. We call this the metering slot.

In order to give us a more precise mixture control at idle, our metering slot is made to give too little fuel at idle. The shortage is made up by a separate jet which is controlled by its own low speed mixture needle.

In order to give a more precise mixture control at high speed, our metering hole is shaped to pass too much fuel. The excess fuel is limited from passing by means of the high speed mixture needle.

The low speed mixture needle should be adjusted first as it will affect the high speed adjustment to some extent. To adjust the low speed needle, start your motor and leaving the glow plug heater on, throttle back as far as you can and still keep the motor running. Next, pinch the fuel line lightly — releasing it only when the motor threatens to quit. If the motor increases r.p.m. very much when you do this, it is too rich and the low speed needle should be turned clockwise (in). If the motor does not increase r.p.m. at all, the needle should be turned counterclockwise (out).



Experience has shown settings of 400-500 r.p.m. gain to give the most reliable idle. Often this adjustment will produce too fast an idle so now back out the idle speed stop screw until the proper speed is obtained and repeat the pinching procedure. Now you can remove the glow plug wire.

To set the high speed mixture, advance your throttle to full open — be sure the glow plug wire is off and again pinch the fuel line to momentarily shut off the fuel. The motor should speed up about 500 r.p.m. before losing power. With these adjustments your carburetor should perform satisfactorily in the air.

Sometimes engines have other types of problems which are blamed on the carburetor:

(1) A hole in the fuel line, not too unusual: Especially susceptible is the plastic fuel line and the whitish semi-transparent silicone fuel line often used. This will cause the engine to act differently every time you fly it. The solution, of course, is to replace the fuel lines. We have had the best success with the black rubber fuel line.

(2) Hole in the tank flopper tube: This is one of the most frustrating of all ailments. Everything will seem to be great until you have been in the air about two minutes when the engine starts running lean. As you change the airplane attitude sometimes the engine will come back and give you power enough to fool you and then fade out when you start any kind of maneuver. The solution, of course, is to replace the flopper tube and smooth the end of the brass tubing so that it doesn't cut the tube.

(3) Dirt in the carburetor: A small grain of sand or sliver of grass can drive you up the wall. If you have trouble with erratic engine settings and have eliminated the possibility of a hole in the fuel line and the flopper tube, it is safe to assume that you have some foreign object in the carburetor. Usually it is necessary to disassemble the carburetor to get it clean.

(4) Plug cooling problems: If your glow plug does not stay up at the temperature you will experience a loss of power sometimes partial, sometimes complete. Various causes for plug cooling are: water in the fuel, too rich of a setting, not enough nitro in the fuel, but sometimes just a bad plug. A glow plug cooling problem can be diagnosed quickly by putting the battery on the plug when it is running. If it picks up r.p.m. you have a plug that is running too cold.

(5) Engine loosing power with symptoms of over lean but not quitting entirely: This almost invariably is a bearing dragging problem. On bushing motors it is caused by a main bearing which is running a little too tight and not passing enough fuel out the front or back end. It will usually cure itself if you can coax the engine along rich for a few flights. On a ball bearing motor this symptom occurs when the shaft touches the crankcase between the ball bearings. This will never clear itself and has to be solved by disassembling the engine and honing the case.

(6) Fuel dried in carburetor: When an engine has set around for more than two or three weeks, the fuel that was remaining in the carburetor passages tends to dry out and coat the walls with dried castor oil. This will make the engine run lean at first when it is fired up. Eventually the dried castor oil is washed out and the engine is back to normal. If you have not been flying your engine regularly and have problems, don't get too excited until you have flown it two or three flights. In extreme cases it may be necessary to disassemble the carburetor and force the passages clear with fuel using a bulb.

(7) It sometimes happens that a tank will shake sufficiently that a partial tank of fuel froths up: The engine then sucks the foam and has a lean run tendency. The only solution to a foaming tank is changing the tank or isolating it from

to page 90

BUD NOSEN MODELS

INCORPORATED

BOX 105, TWO HARBORS, MINNESOTA 55616

All kits feature all wood construction, fast assembly, huge rolled plans, assembly instructions, machine and die cut parts, all necessary hardware and much, much more. Designed for .60 engines on up. Write for our illustrated catalog—50¢.

9' PIPER J-3 CUB



Standoff Scale
Formed ABS
cowl Kit -

\$119.95

3 or 4 Channels
Flies like a
trainer Kit -

\$99.95

9' CHAMPION CITABRIA



9' AERONCA "CHAMP"



1/4 size Standoff
scale 3 or 4
Channels Kit -

\$99.95

3 or 4 Channels
No foam or
plastic Kit -

\$79.95

102" BUD NOSEN TRAINER



8' CURTISS JN-4D JENNY



Standoff scale
4 Channels
required Kit-

\$129.95

1/3 size Standoff
scale 4 Channels
required Kit -

\$129.95

8' 1933 GERE SPORT



9' "MR. MULLIGAN"



1/4 size Standoff
scale 3 or 4
Channels Kit -

\$139.95

1/4 size Standoff
scale Molded
cowls Kit -

\$169.95

10' CESSNA 310 TWIN



AUSTRALIA
EK Logictrol Australia
44 Macquarie Road
Earlwood 2206
Sydney, Australia

SWITZERLAND
Blue Max
Modellflug-Technik AG
Alte Landstrasse 122
CH-8800 Thalwil Switzerland

OVERSEAS DISTRIBUTORS

SOUTH AFRICA
Radio Control World
202/4 Oceana House
Lower Burg St.
Capetown 8001 So. Africa

CANADA
John Klassen Hobby Central
400 Cuyler Street
Thunder Bay, Ontario

Bud Nosen's spectacular

102" P-51 D

KIT \$169⁹⁵

- Stand-off Scale
- 2.75" equals 1'
- 102" Span
- 16.5# flying wt.
- 1800 sq. in. wing
- 26 1/4" chord at root

- 4 channel radios required
- Designed for .60 engines with prop driver
- Very stable flyer
- Proof of scale 3 views
- Kit includes 21" canopy

- No foam or plastic
- 6" spinner is not included available direct only \$16.95
- Huge rolled Plans
- Machine and die-cut parts
- Decals not included



BUD NOSEN MODELS, INC.

Box 105

Two Harbors, MN 55616

catalog 50c



The release mechanism is shown together with one assembled and one "exploded" bomb. Charcoal or chalk dust make a great filler for the "explosion" on impact. The molded nylon bomb is nearly indestructible.



The finished product, ready for combat.

RCM PRODUCT REPORT

By Neal Howard

Vortac Mfg. Co. RELEASE MECHANISM AND EXPLODING BOMB

Imagine picking up your newspaper and reading "mad scale modeler bombs judges." If this were so, it's a fair chance that he used exploding bombs or release mechanism by the Vortac Manufacturing Company, P.O. Box 469, Oak Lawn, Ill. We recently tried a set consisting of the release mechanism (priced at \$4.98) and a 500 pound bomb (price is \$9.98 for two) with pleasing results.

We deviated from scale slightly on our Jemco Hellcat --- opting for a single belly mount which could be used for either a bomb or auxiliary fuel tank. Installation and operation are the same regardless of location. Since a picture is worth a thousand words the installation is best described with a few words along with appropriate photos. □



A small plywood mount provides all the support required for the release mechanism. An inner nyrod serves to route a fish leader or nylon cable to the drop servo.



The release mechanism in place --- very scale like. Vortac also provides additional mounting clamps with the release mechanism in case you want to mount something else. We used one for an auxiliary fuel tank which is attached for static display.



Test for binding before closing in. After testing we removed the unit and cable. After completing the model there was no difficulty in threading the cable and attaching.



Top view of wing shows nyrod route for cable. Groove was later filled with micro-balloons before painting.

RCM PRODUCT TEST

Byron Originals PITTS S-1A



B yron Originals is a new name on the model aircraft scene. The company is part of Midwest Industries which has been in business for years. However, because Midwest Products and Midwest Supply are a couple of well-known companies in this business, Midwest Industries elected to eliminate any confusion or association by initiating the name Byron Originals.

The Byron Pitts Special has been heavily advertised in every model publication and displayed at all major trade shows, in which it has excited much discussion. Thus, it was with a great deal of interest that RCM reviewed the 1/3 scale Pitts.

The impressions and specifications charts will provide you with technical and overall information. It would perhaps be more for your interest and benefit if we attempted to provide answers to what we anticipate must be the foremost questions that arise in one's mind after reading their advertisements and other magazine comments.

One of the most impressive areas about the Byron Pitts is the effort that has been expended in bringing the modeler a quality product that will produce as advertised. To further elaborate on this point, let's start with when your Pitts first shows up at the door. Two large cartons are delivered by UPS, and, upon opening them, you will notice immediately the care with which they were packed. A large foam rubber sheet encapsulates the fuselage, while each wing is covered by a plastic bag and a mountain of packing material. All components are in numbered bags with a complete pictorial reference as to their identity. The owner's manual should be extracted from the sealed literature envelope and thoroughly read. Five minutes into the construction manual will put to rest any doubts that you may have had concerning whether or not this was just another kit. The manual is well written and explicit in every detail.

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts			NA		
Plans			NA			Parts Match to Plans			NA		
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass	●					Fidelity to Scale		●			
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting	●										

E - Excellent / G - Good / A - Average / F - Fair / P - Poor

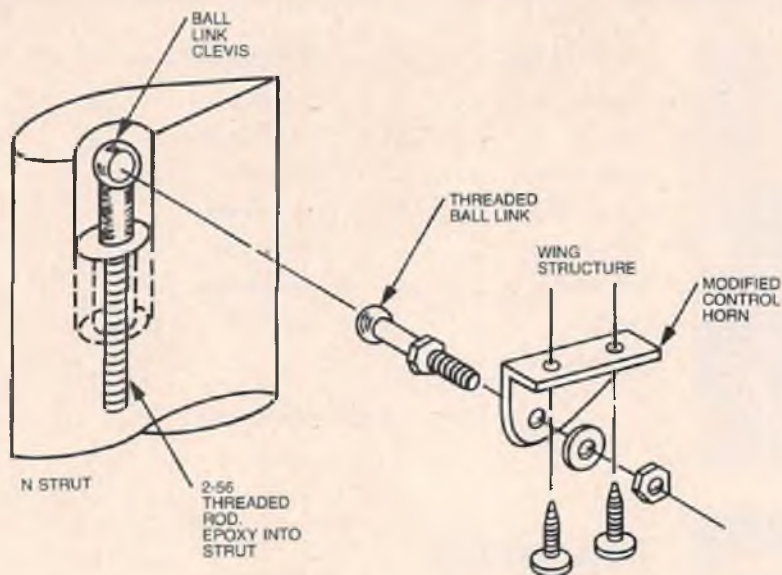
SPECIFICATIONS

Name	PITTS S-1A
Aircraft Type	Stand-Off Scale
Manufactured By	Byron Originals P.O. Box 279 Ida Grove, Iowa 51445
Mfg. Suggested Retail Price	\$188.00 (Byro Drive \$89.95)
Available From	Direct from Mfg.
Mfg. Recommended Usage	Competition S.O.S.
Wing Span	68 Inches
Wing Chord	11.5 Inches
Total Wing Area	1400 Square Inches
Fuselage Length	62 Inches
Radio Compartment Dimensions	(L) 12" x (W) 6" x (H) 7"
Wing Location	Biplane
Airfoil	Semi-Symmetrical
Wing Planform	Constant Chord
Dihedral (each tip)	3 Inches
Stabilizer Span	26 Inches
Stabilizer Chord (incl. elev.)	8.5" (Avg.)
Total Stab Area	221 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Mid-Fuselage
Vertical Fin Height	13.5 Inches
Vertical Fin Width (incl. rud.)	13.5
Mfg. Rec. Engine Range	.60 Cu. In. w/belt drive
Recommended Fuel Tank Size	16 Oz.
Landing Gear	Conventional
Recommended No. of Channels	4
Recommended Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Foam & Fiberglass
Wing	Foam & Ply
Tail Surfaces	Foam
Hardware Incl. In Kit	See Text
Instruction Manual	Yes (28 pages)
Construction Photos	Yes
Kit Includes	Die-Cut Parts
Mfg. Rec. Flying Weight	208-240 Oz.
Wing Loading based on rec. flying wt.	21.3-24.7 Oz./Sq. Ft.

RCM PROTOTYPE

Weight, Ready To Fly	210 Ounces
Wing Loading	21.6 Oz./Sq. Ft.
Covering & finishing materials used	See Text
Engine Make & Disp.	O.S. 60FSR
Muffler Used	O.S.
Radio Used	Futaba Contest 7
Tank Size Used	16 Oz.

FOR WHAT IT'S WORTH

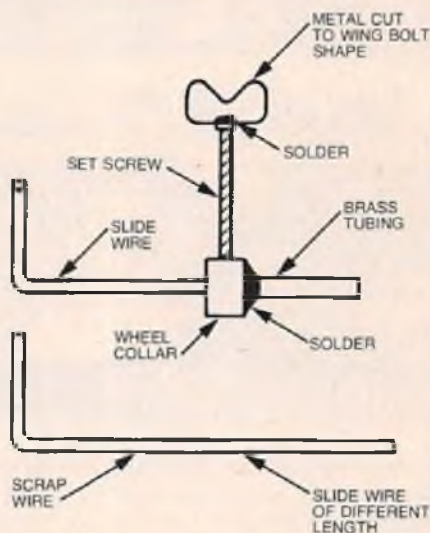


ADJUSTABLE — QUICK REMOVE "N" STRUT DETAIL

piece can be extended so that both ends touch the sides, the set screw is then tightened, the gadget is removed, and the length measured or marked directly on the piece of wood to be used.

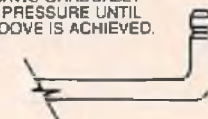
Materials needed are an old wheel collar, a bolt to fit the collar, a short length of brass tubing that fits inside the wheel collar, a piece of wire, and a piece of metal to transform the bolt to a wing bolt.

To make this gadget--- about 1/8" from the end of the brass tubing, file a flat with the edge of a file and make a hole so that the set screw will touch the inside



A TEMPERED GROOVE CAN BE HELPFUL INSERTING 1/16" WIRE INTO SERVO TURNABLES OR ARMS. IT CAN BE DONE WITH WIRE CUTTERS AND LOOK LIKE A LATHE WAS USED.

BEND WIRE 90° AND ROTATE IN CUTTING JAWS GRADUALLY INCREASING PRESSURE UNTIL DESIRED GROOVE IS ACHIEVED.



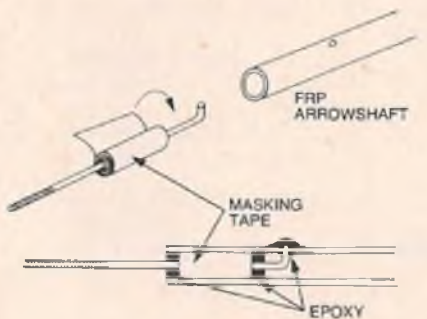
CUT THROUGH LEAVES A BEVELED POINT THAT ALLOWS EASY INSERTION. GRADUAL CUT IS EASIER ON WIRE CUTTER JAWS BECAUSE OF HARDNESS OF PIANO WIRE

While building the Lazy Ace, one problem Hill S. Lalin of Wayne, New Jersey, didn't want to contend with is the assembly and disassembly of the wings at the flying field. Hill feels that this time is more important for flying so, in turn, he has designed a snap fitting for the "N" struts on the big biplane. They can now be snapped on and off quickly and have some adjustments to compensate for crushing of the foam wing saddle. The accompanying sketch tells the complete story.

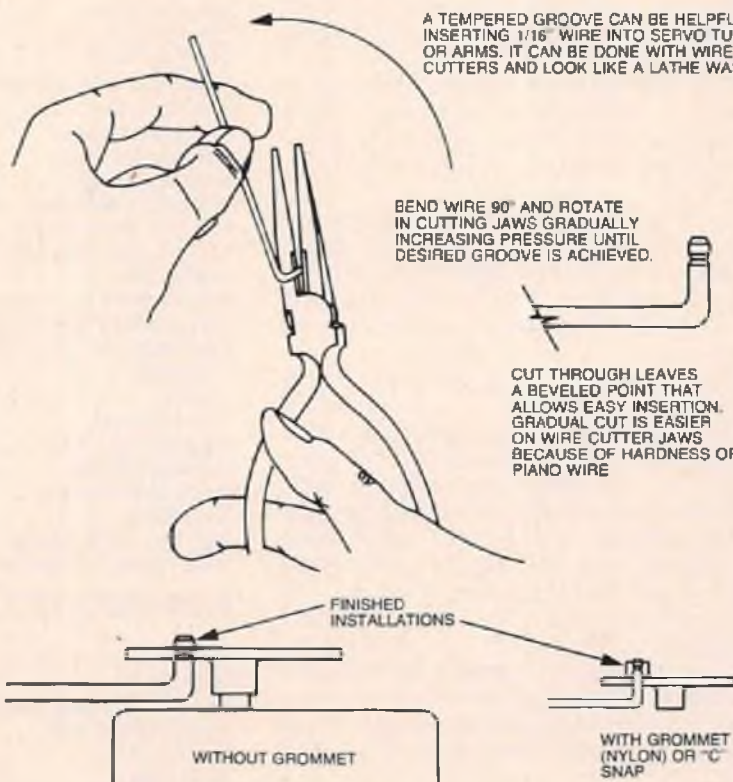
Charlie Rector of Fredericksburg, Virginia, has built a little gadget that modelers will find to be very useful on their work bench.

It is used to take inside measurements, such as between fuselage sides, to obtain the proper length for servo mounting rails. By loosening the set screw, the "L" shaped

The following two ideas were submitted by Mark Carsten of Granada Hills, California. The accompanying sketches are self-explanatory.



MASKING TAPE PUSHROD CONNECTION IT HELPS TO INSERT PLUG TIGHTLY IF END OF MASKING TAPE IS CUT ON A DIAGONAL

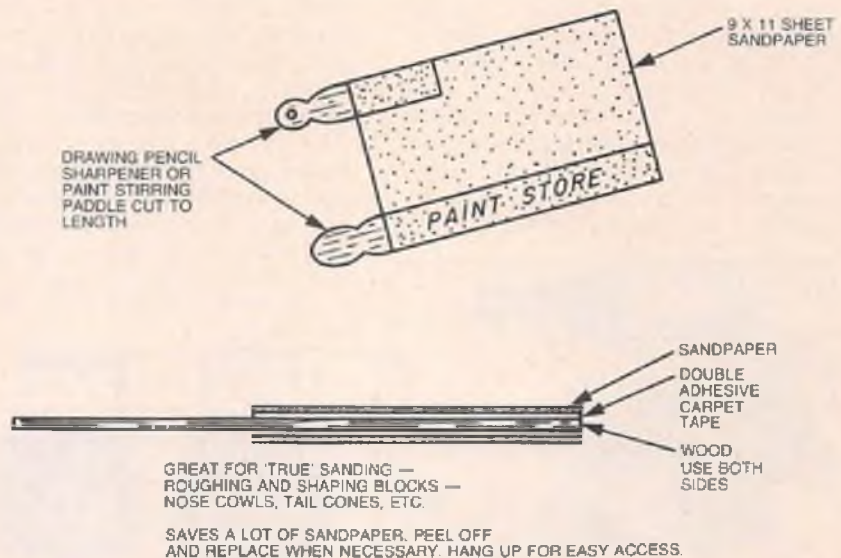
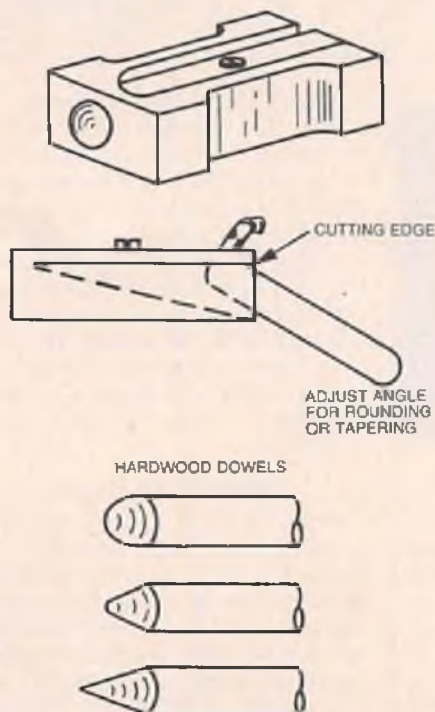


FOR WHAT IT'S WORTH

wire. Put the wheel collar on the tubing, tighten down the set screw and solder the collar in place. Bend an "L" on the end of the slide wire, cut to an appropriate length (2"-2½" probably will be most useful), solder the metal piece into the screw slot and it's all done. One can be made in about 10 minutes, and most of that time is spent finding the parts in the junk box. The wire and tubing can be of any size as long as the wire slides inside the tubing and the wheel collar will fit the outside of the tubing.

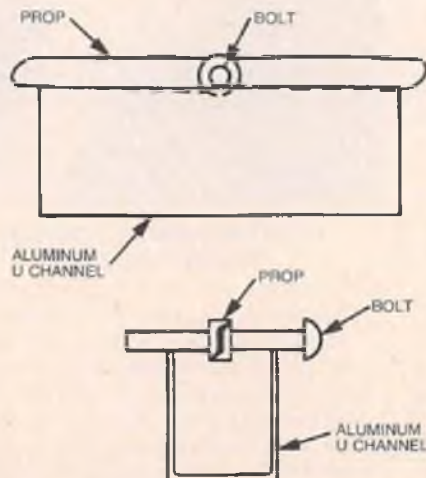
This gadget is most useful for determining the length of crosswise servo rails in fuselages that have doublers at the wing saddle. Before making the gadget, Charlie usually had to cut about 3 times before he got the right length — now he can get it OK in the first try. To make the gadget complete, make up several sets of wires in different lengths to take care of all sizes of models.

Submitted by E.J. (Ted) Cornfield of Burnaby B.C., Canada, are the two following suggestions: The first involves a small hand held pencil sharpener. Ted uses this sharpener constantly, not only for pencils but it also makes an excellent job of rounding or finishing ends of dowels such as those used for wing hold-downs. Sharpening the end of dowels to a point makes a good tool for centering matching holes in hatch covers, wing location dowels, and mounting holes.

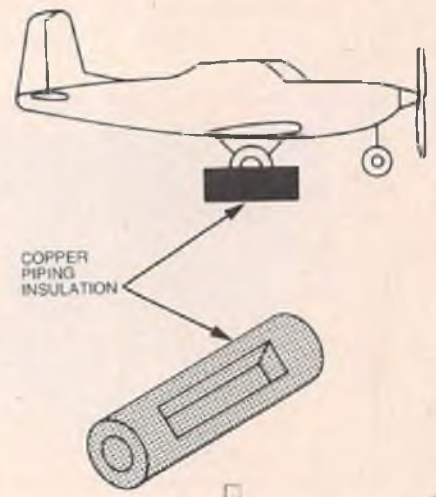


Ted's second suggestion comes in the way of a small sanding board from a child's drawing set. This sanding board is used for sharpening or pointing the leads in various drawing or sketching pencils. By using double sided carpet tape, one side can have rough garnet paper and the other side can have medium or fine. This was also done with wooden paint stir paddles. This gives you a much longer sanding surface.

From J.A. McEndree of Irving, Texas, comes a simple, inexpensive, and easy way to make a prop balancer. Next time you're at the metal scrap yard, pick up a piece of aluminum "U" channel about 1" x 1½" x 6". All you need now is a bolt or piece of rod the size of your prop shaft. Insert the bolt into the prop and set it on the "U" channel as per the sketch. Right away you will know which blade to work on.



If you want to save your airplane from dings while transporting it, you might try this method sent to us by Stuart L. Richmond of Roswell, Georgia. Stu located some foam pipe insulation from a plumber's supply house that is sold in 6' lengths for about \$2.50-\$3.00. Plumbers use it to slide over copper piping to prevent cold water pipes from sweating and dripping in humid climates. As per the sketch, cut short pieces and trim out enough for your wheels to slip in. This keeps your model from rolling around in your car while driving and reduces the dings on rudder, elevator and also saves the servo gears.



Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free 1 year subscription to RCM.

showcase '79

All items appearing in Showcase '79 are press releases supplied by the manufacturer of the product and/or their advertising agency unless otherwise specified. Note: The review or discussion of any product by Radio Control Modeler Magazine does not constitute an endorsement of that product nor any assurance as to its safety or performance by RCM.



HARRY'S SMOKER

No, it won't do fish, but it is claimed to leave a thick easy to see smoke trail in the sky back of your favorite bird. This latest of a long line of fine products from Harry Higley is designed to utilize engine crankcase pressure in the proper amount to feed kerosene or diesel fuel to the muffler, which it will be vaporized by the heat generated within it. A special valve necessary to control these various pressures and fluids is included, as are both engine and muffler fittings as required. Drilling and tapping two holes and the mounting of the valve and controlling servo are the only installation necessary. With complete instructions, Harry's Smoker is now at most dealers, or inquire from Harry B. Higley & Sons, Inc., 433 Arquilla Dr., Glenwood, IL 60425.



FORSTER IGNITION ENGINES

Engine collectors and Old Timer flyers will be happy to learn that one of the best from yesteryear, the Forster engine is once again available. These are true ignition engines, requiring a spark plug, coil, condenser and airborne ignition battery. Designed to run on white gas or Coleman stove fuel, and No. 70 weight

motor oil. They are available in .29 and .35 displacements, and will swing 9 or 10 inch props. The price is \$57.50, in either size, and a glow plug model is also available, at \$39.95. The ignition components are also on hand, at \$14.90 for everything required. Separate ignition parts, as well as all engine spares can be obtained individually. The engines come with complete instructions, wiring diagrams, and spare parts lists, and can be obtained from M-G Engines, P.O. Box 6026, Denver, CO. 80206.



PILOT'S WATCHES

Everybody needs a watch; and while you are looking for a new one, why not make it a true Pilot's Watch. The new Criterion will not only tell you what time it is, with extreme accuracy, but it will do so in two time zones, tell you elapsed time, and includes an automatic alarm accurate down to one second. In all, 15 functions are possible, to include time of day, date, and stop watch mode. An adjustable metal band is included. Now available at a special price for \$48.99 for a silver tone model; \$5 extra for gold tone. Shipping fees are \$2 per watch, UPS or \$3 via air if desired. Now on hand at "Miss America" P-51 Mustang Hq., 13376 Beach Ave., Dept R, Venice, CA 90291.



OTIS ENGRAVING COMPANY TROPHY PLAQUES

Trophies; we are all happy to win one, and trophy plaques are popular with everyone, except the poor guy in the club who is handed the job of coming up with something unique, and nice, and inexpensive, and in time for the day of the big contest. And this is the gentleman who we are going to make life easier for. We recently learned of a

source of plaques; the finest work of this type that we have yet seen. By a happy coincidence, these are also the lowest priced of anything approaching this quality that we were able to find in our area. You furnish the art work, thus you may order a completely personalized plaque with your club logo or insignia, or any drawing or even photograph that you may want. Of course, you can include whatever names and/or dates and/or any text you may wish. These are not printed, silk screened, etc., but actual engravings made on a rather complex optical pickup electronically controlled machine on a metal plate. The metal is then mounted on a beautifully finished walnut base. The photo shown is that of an actual engraving of a color poster. These plaques are available in a wide range of sizes, a complete price list will be sent upon request to the makers. For example, a 5 x 7 metal plate on a 7 x 9 wood base is \$22.95 and an 8 x 10 plate on a 10 x 12 base is \$41.95. Prices are slightly higher if photos are to be reproduced or if typesetting or any art work has to be done. On the other hand, prices are lower as a quantity is ordered. For complete price information, ask for your list from Otis Engraving Co., 3165 Harbor Blvd., Suite D, Costa Mesa, Calif. 92626.



MICRO-X 1/2A TAYLORCRAFT

Who can resist classic lines like these: the Taylorcraft has long been a favorite of light plane flyers and modelers alike. Now Micro-X has one for you in a 38", 200 sq. inch beauty, for .049/.051 and 2 to 3 channel R/C. This all balsa model has the ability to fly extremely slow for small flying fields, but still performs flawlessly at higher speeds. The weight is between 19 to 22 ounces. Only \$26.95, from most dealers, or inquire from Micro-X, P.O. Box 1063, Loraine, OH 44055.

SEAMASTER II A.R.F.

Hobby Shack has newly announced its addition of Aqua Boating's "Sea Master II" A.R.F. boat to its already extensive line of boats and boat kits. This semi-scale Deep Vee Ocean Racer with the cigarette styling of many big race boats is 26½" long by 7½" wide, and requires an .099 to .11 engine and any two channel R/C system. The boat



hull is completely finished, including a built-in radio box. It requires only installation of the engine, drive system, and radio before heading for the nearest lake. A complete hardware kit is furnished, which includes: flywheel, stuffing box, shaft, motor mount, steering arm, prop, U-joint, heat sink, rudder, rudder pipe, strut, front bearing, strut mounting plate, radio box, fuel tank, pushrods, water pickup line, and even a boat stand. Also furnished is a smoked windscreen, engine vents, trim and sponsor decals. The Sea Master Mk II is now in stock, and available at any of Hobby Shack stores or can be mail ordered, at \$69.95. Don't forget postage and tax when applicable.



WATERPROOF RADIO BOXES

An inexpensive line of waterproof radio boxes to protect your expensive R/C system boat installation is now available from RAM., 3631 N. Kedvale Ave., Chicago, IL 60641. They are designed for quick interchange between models and come in four popular sizes, all 2 1/4" deep. The main box is molded from lightweight but adequately strong plastic, and comes complete with clear lid, seals, two Robart waterproof output bushings, and complete instructions and installation tips. The sizes available are 3 x 5, 3 x 6, 4 x 5, and 4 x 6. Now at your favorite R/C model boat supplier, or inquire direct from RAM.

PLANE-ALERT

A solid state audible warning device, called "Plane-Alert" was recently introduced by MPS Products, 279 Jefferson Ave., Buffalo, NY 14204. This lightweight (less than 1 ounce) is plugged into an unused output lead of your R/C receiver, or to a "Y" connector in parallel with any servo. It will then provide a variety of services: frequency monitor, to check range, as an aid in locating a lost model, or as a reminder that your receiver is "On" after a flight or while in



transit to the field. The Plane-Alert uses only 3 milliamps of current when silent, therefore, not seriously affecting the normal operating time available from the airborne battery. Current consumption increases to 15 ma when the audio alert sounds. Full installation and operating instructions are included. It is available for both positive and negative output systems, on request, and will require a plug of the proper type to connect it to your particular system. The price of the Plane-Alert is \$19.95, plus \$1.00 for postage and handling. It is warranted for one full year from date of purchase.



"BOBCAT" OUTBOARD MONO

Bob Hyde's 1978 NAMBA Nats First and Third Place winning outboard mono design, the "Bobcat" is now available as a finished hull, direct from Hyde Engineering in Florida. The Bobcat is 26 1/2" long, 14 1/4" wide, and requires only the installation of radio and power plant. It is vacuum formed of ABS plastic, and is furnished with a built-in radio compartment, cover, gasket, and hood. The formed halves are reinforced at stress points before assembly with a high technology epoxy stronger than the plastic. The Bobcat comes with a four position engine mount and has a double dihedral bottom engineered for easy turning even at high speed. It turns equally well in either direction and runs "M" style courses beautifully. It is sold direct only, and is priced at \$65. It is also available ready to run and tested with a K & B 3.5cc outboard and Futaba FB2GA radio installed and with a Sullivan starter furnished, for \$350. All direct from Hyde Engineering, Rt. 3, Box 236, Crystal River, Florida 32629.

VERNIER CALIPERS

Precise measurements are very important in our hobby, but



unfortunately, the instruments with which to make them are often prohibitively priced. Not so in the case of the Swiss Made SPI 30-410 Verneir Caliper: it is priced at only \$9.25. The secret is that it is made of nylon asbestos, a plastic like material having the qualities of steel. Measurements can be made in both inches and millimeters, up to 5" or 130mm. It will measure inside, outside, and depth with an accuracy to plus or minus .002". Adjustments are made with a no slack thumb roll, and is provided with a lock for repeat measurements. Direct only, from West by Southwest Co., P.O. Box 162, Coronado, CA 92118.



DELTA QUICK FILL TANK KIT

For those who prefer to make their own R/C car fuel tanks, but desire the quick fill feature of the Delta tanks, a kit containing the cap, seal, spring, and tank neck are now available. It is only \$3.25, and can easily be attached to your favorite Hi Johnson or any other tank. Now at your local dealer, or direct from Delta Manufacturing, 27 Race Car Court, Lorimor, IA 50149.

CATALOG & DIESEL HANDBOOK

Bet you think a Zom is an altitude gaining flight maneuver. If so, you'll also believe that a Llam is a camel like animal native to Peru, and a Kingcat is that well known African feline. Super Fury? Why, that is what hell had none of like a woman R/C'er out-pointed. All of these are also the names of currently produced diesel engines, all and many others available from Hobby Hideaway, Delavan, IL 61734. H.H. is probably the country's largest single source of diesels, accessories, and most important, information. Its catalog is also a handbook of diesel lore, from theory to operation, and all manner of helpful hints such as fuel mixture, tank, and prop information. Also, the necessary cautions learned through the years to insure op-

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Quick-Build Exact Scale

Less than one year ago, Byron Originals introduced its Pitts Special with optional Byro-Drive reduction unit. We made some pretty strong product claims and were more than ready to back them up. We have since learned, from actual applications by customers both in this country and overseas, that the Pitts and drive unit have far exceeded our own ratings. Whether it be packaging, overall parts fit, ease of assembly, fidelity to scale, flight performance, materials quality, overall appeal or completeness, these firsts from Byron Originals have firmly established a new standard of excellence for the entire modeling industry.

No one will agree more than the proud and satisfied Pitts and Byro-Drive owner. He'll be the first to recommend a Byron Originals kit for your next project. And you can count on him giving you a long list of reasons why.

We suggest you take his advise and look to Byron Originals for the newest and most intriguing concepts in recent modeling history. You'll agree it's like a breath of fresh air.

The Proven *Pitts* with *ByroDrive*

Order Byro-Drive model number for matching engine.

Model No.	for Engine
MFR-10-	.60 & .65 O.S. Max, frt. & r. valve
RR-11-	.61 & .65 Rossi, rear valve
RF-12-	.61 & .65 Rossi, front valve
WFR-14-	.61 speed Webra, frt. & r. valve
TFR-13-	X.60 Supertigre, frt. valve, r. exhaust
KF-15-	.61 Kraft
HPFR-16-	Silver Star or Gold Cup, frt. & r. valve
OPSR-17-	OPS .60 Speed, rear valve

\$188.00

Factory Direct Price

Unique engine mount offers wide range of positions for locating engine and exhaust equipment beneath cowl.

Precision pulleys designed and matched for peak performance.

Precision 4" driven pulley ensures vibration-free service

Complete Byro-Drive, w/prop & spinner, only 2 1/2 lbs.

20 x 8 maple prop and 3 1/2" spinner included with Byro-Drive

Tensiometer indicates exact recommended belt tension for peak performance and belt longevity.

Poly-Flex V-belts-proven after years of tool shop applications requiring up to 20,000 rpms.

\$89.95

Factory Direct Price

Prop. & Spinner Inc.



Wing Span: 68"
Wing Area: 1400 sq. in.
Length: 62"

- Send me _____ Pitts Kit(s) at \$188.00 ea. plus \$8.00 shipping
 _____ Fiberglassing kit(s) at \$36.00 ea. plus \$2.50 shipping
 _____ Byro-Drive(s) Model No. _____ (See chart at left) at \$89.95 ea. plus \$2.50 shipping.
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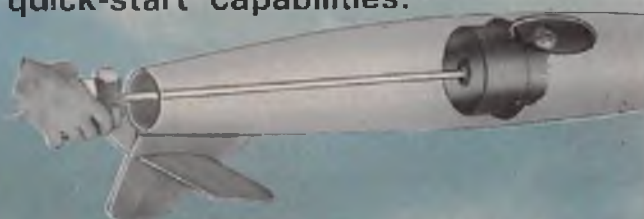
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Fuselage consists of hand-layed fiberglass and arrives with fan unit, thrust tube, radio compartment and push rods already installed. All decals and color scheme templates also included.

All control surfaces utilize center point hinging requiring standard servos. Every last item, except radio, engine and final paint are included in kit. No shaping or carving required. No guesswork involved. Only quick, accurate and enjoyable building.

Optional epoxy/fiberglass kit for glassing wings and tail surfaces available for \$22.50.



Starter extension provided with kit.

Add \$8.00 for shipping to any U.S. address. Items shipped by United Parcel Service.

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Factory Direct Price

from page 87/86

tinum output and maximum life. Those of us not too familiar with diesels are always surprised as to their capabilities. For example, the Llam 2.49cc (.15 cu. in.) is claimed to turn a 9/4 prop for R/C, developing a .48 BPH at a potential 18,000 rpm. If you are contemplating the purchase of a diesel, or are looking for diesel info, we strongly recommend H.H.'s Catalog and Diesel Handbook, postpaid for \$2.00, from the above address.

PITTS S-1A

from page 83

You will come away from this project with no doubt in your mind that Byron Originals have done their homework and have done it well. The kit is superbly engineered. Every piece of hardware required to build the Pitts is included, from hinges, aluminum pushrods, horns, bolts, wheels, clevises, ball links, aluminum torque rods, tubing, and the fuel tank, to actual specialized tools! It should also be pointed out that it is the Byron philosophy to not only include all of these innumerable items, but that each and every one should be of the highest quality obtainable. To expand further on the engineering effort made on the Pitts, it must be noted that the builder will appreciate the attention given to small details, such as the cowl locating pads which go between the cowl and the fuselage to assure that the surface finish is not scratched when removal or installation of the cowl occurs. Another point in case would be the axle bearing mount and attachment hardware that is molded right into the fiberglass wheel fairings, so that the modeler is provided with a full assembly rather than just a wheel fairing. It is precisely this attention to details that makes building enjoyable and the assembly of what could be an annoying problem actually fun.

Foam aircraft are not new. Major complaints have always been lack of durability and the fact that foam airplanes look like . . . well, foam. On the other side of the coin, there are definite advantages to foam aircraft, such as the fact that molded foam allows close production tolerances to be held which enable any builder to produce the same aircraft as everyone else without special jigs, selected wood, or technical equipment. Assembly time is also reduced noticeably. Properly assembled, with stress points considered, a foam airplane can be as solid as anything else. If you doubt that statement, look to the Experimental Aircraft Association and the large

number of successful home-built aircraft employing foam construction. While the Pitts uses primarily foam, stress points are reinforced with plywood and aluminum to eliminate fatigue cracks and to carry loads. The cabanes are molded nylon with none of the usual alignment problems present. The huge cowl is of an excellent quality fiberglass with all details present.

The only recommendation made by RCM to Byron was that clarification be implemented in his manual update concerning the interplane assembly. Understanding how this assembly functions in its final configuration will help the builder alleviate the problem of having to trim the 1/8" aluminum guide tubing after it is epoxied in place in the wing.

Now, if it is engineered and it is durable, it will still look like foam, right? Well, that is true only if you didn't cover it. With the Charlie Hillard Red Devil markings that come with this beauty, however, you probably will want to cover it, which brings us to the finishing. We used Top Flite Econokote on the foam, with K & B Super Pox mixed at a ratio of 1 3/4 parts orange to 1 part red to finish the fiberglass cowl, cabanes, and wheel fairings. The trick here is not to use a large flat iron and impregnate the covering into the foam, but to get, instead, a Top Flite iron and a heat gun. Without these tools, you will definitely have to struggle to produce a top quality finish. If you just follow Byron's instruction manual on covering, you will end up with a model that looks like you spent 400 hours on finishing! If you do go this route, however, it will require a 25' roll of covering material. In addition, if you do the aforementioned Red Devil version, the sunburst design will require seven white trim sheets, two blue sheets, plus the K & B paint. The builder may find it easier to paint the white and blue trim on the cowl and wheel fairings rather than utilize MonoKote trim, due to the curved areas. Covering the landing gear fairing is easier if it is framed with balsa first.

If you are of the "paint is best" fraternity, Byron will supply a glass kit which consists of approximately 55' of glass cloth and epoxy glue. Application is the same as current 3/4 ounce cloth and resin procedures. Full instructions are provided and the end product is equivalent to filling your fiberglass plane with foam. Final finish would then be achieved via the primer and Super Pox method. This will, however, give you a weight increase of about two pounds.

It is now down to the bottom line of **how well** does this kit fly, because they all do. Anyone who has seen the Pitts demonstrated at any of several locations around the country already knows the answer. On a hot engine with a tuned pipe, performance is similar to the real thing, and the record of the full-sized

Pitts speaks for itself. It should be mentioned at this point that, although other belt drives and Quadra type engines may be used, performance evaluation has been made utilizing the matched Byro-Drive unit. This unit has been designed and tested to deliver maximum thrust by matching each unit to a particular type of engine, such as Rossi, O.S., Webra, etc. The RCM Pitts used a Byro-Drive matched to an O.S. 60 FSR engine and incorporated the Robart Super Pumper and Auto Mix. No tuned pipe was employed and the big Pitts performed very well. The Byro-Drive has proven to be reliable with no sign of belt wear or belt problems. Care must be taken to carefully line up engine and drive pulleys. With a rear exhaust, tuned pipe engine, the Pitts is really capable of everything from a 10' to 15' roll-out into near vertical climb-out, to all of the associated pipe maneuvers. It should be noted that flying this aircraft is, as we said before, just like flying the real full-sized Pitts. One thing to be aware of in flying it is that rudder will have to be brought into play in many cases to promote a coordinated turn.

While the Pitts has excellent low speed characteristics, we would not recommend this plane as a trainer. If you are capable of independent flying, then you can handle this plane without difficulty.

If you have stayed with us on this review, you must be asking yourself, "Is it worth \$188?" because nothing is more frustrating than to purchase a kit and discover that pieces do not fit or that you have to guess what the manufacturer had in mind as you endeavor to assemble it. Not only would this tend to remove the enjoyment from building, but also would make one feel that perhaps the money could have been better invested. Our answer to the question of its being worth the price is an unqualified, "yes!" This kit makes construction enjoyable and performance rewarding, and people don't walk by the Pitts without stopping to admire it. In short, it is definitely a winner. □

CARBURETION

from page 79

vibration by wrapping it with foam rubber.

(8) Fuel line slipping off the fittings: This is a problem related to the silicon type fuel lines. If you use the proper size surgical tubing or black rubber line you will not have this problem.

(9) Unsteady idle on an older engine: Often an older engine develops a very unstable idle and a worn carburetor is blamed when, in fact, it is a worn piston skirt that is causing the trouble. This type

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 (HIGH WING)

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 Engine: .15 Radio: 2 - 3 channel

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SPAN: 84 in. (7 ft.)
 AREA: 1,069 sq.in.
 ENGINE: .60
 RADIO: 4 - 6 channel
 WEIGHT: 8.37 lbs.

Q.B. CESSNA 20



SPAN: 53 1/2 in.
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 ENGINE: .20
 RADIO: 3 - 4 channel

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 (SHOULDER WING) (HIGH WING)

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A WIDE ANGLE LENSE SHOT OF THE 140" WING SPAN MAESTRO MEGAN. Photo by TOM CULMSEE



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from page 78

...blocking technique described in the building instructions worked well.

Additional center wing strength is obtained when the fuselage is built directly onto the completed wing structure. The major fuselage parts are pre-cut 1/4" thick balsa. Since these parts are very stiff, I recommend at least partial pre-bending before assembly, particularly the hatch cover piece. Aliphatic resin was used for the basic fuselage construction and 5-minute epoxy was used to attach the large nose block. No difficulty was experienced in building the fuselage, however, care must be exercised to insure proper alignment on the wing.

Probably the most difficult part of building the Gryphon is shaping the fuselage. After construction on the wing, the fuselage must be carved and sanded to achieve the desired shape. This proved quite awkward since it is, at this point, an integral part of the wing. Having a rather confined building area, I found a blanket on the back lawn more suited to this process. When shaping the fuselage, considerable care must be exercised to prevent damage to the wing sheeting.

Set-up and adjustment of the elevon control is a little more difficult than a standard rudder elevator installation. Differential control surface movement was obtained by using a sliding servo tray arrangement. Other types of control mixers could be used since there is ample room for most any control installation.

The only modifications made on the test model were the addition of a 1/8" x 3/8" spruce skid full length on the fuselage bottom and a 1/8" balsa floor in the canopy. I feel that the canopy floor (not shown on the plans) is necessary to provide a good gluing surface and the full length skid is an improvement over the three piece block skid shown. I did use full length tape elevon hinges rather than the MonoKote hinges shown, but this was a matter of builder's choice. To prevent a dangling receiver antenna, a lube, made from drinking straws, was placed inside the wing to accommodate the wire. I recommend that the vertical fin be tightly fitted in the mounting slot and only spot glued. This will allow the fin to pop off rather than break off in case of an inverted landing or other hard knocks.

The wing and vertical fin of the review model were covered with white MonoKote. The fuselage was given two coats of finishig resin, wet sanded and sprayed with white Testors enamel. Black and orange trim tape was added for contrast and the bubble canopy was dyed blue.

to page 98

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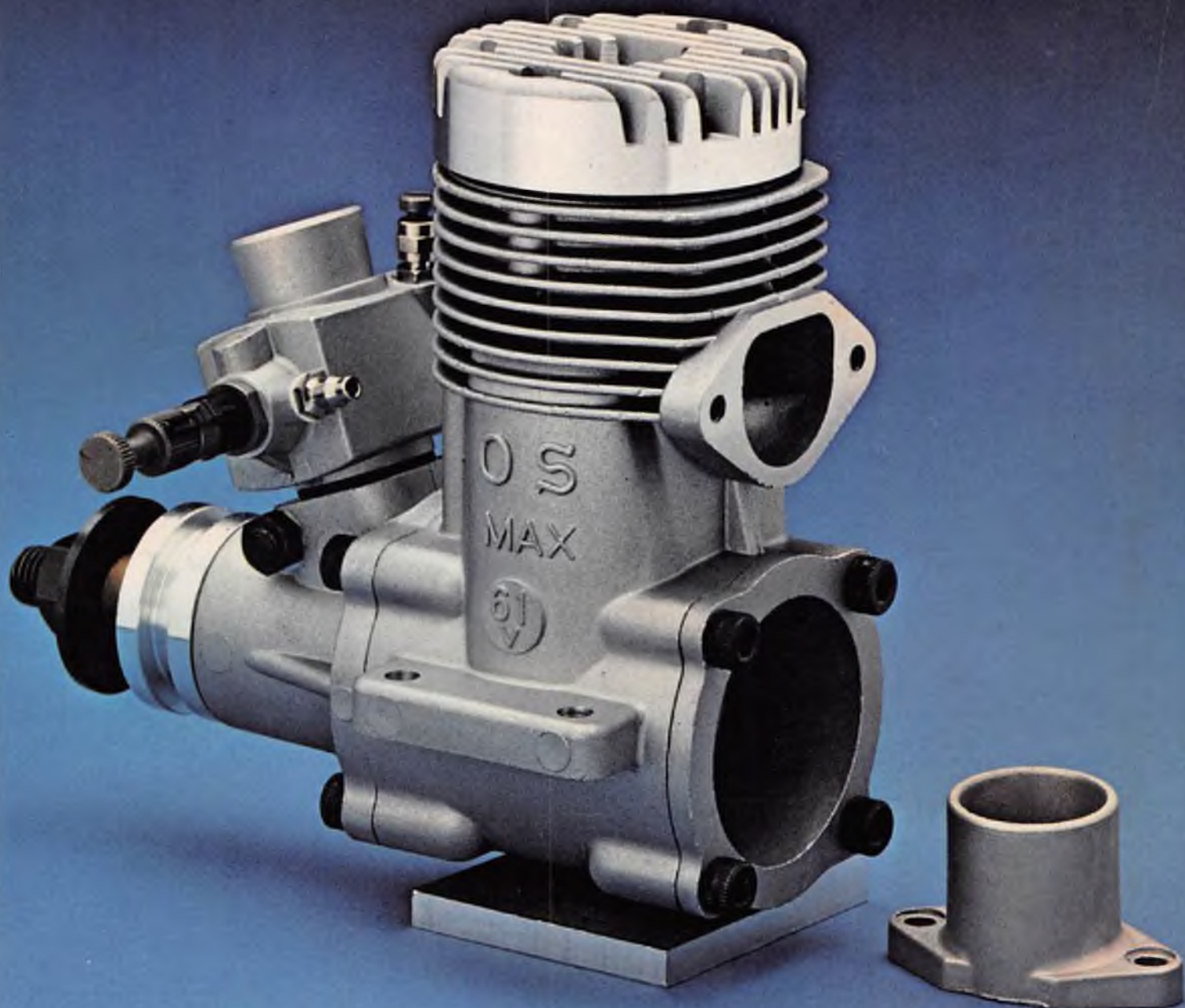
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GRYPHON

from page 94/78

Flying the Gryphon is quite a departure from more conventional models. The fully symmetrical wing provides maneuverability not possible with most gliders. Control response is very quick due to the large control surfaces. Neutral trim was set up as indicated on the plans and seems to be about optimum. The initial control surface travel recommended was found to be a bit severe. Reducing the throws by about 1/8" is advisable for early flights. As indicated, balance of the Gryphon is critical. Although the recommended initial balance point will not produce optimum flight performance, it is much safer. As experience is gained the CG can be shifted back in small steps (1/8" at a time) until the best flight performance is reached. At proper balance, inverted flight is obtained with minimum reverse trim. Maximum lift and stability are achieved when the Gryphon is flown fast. Slower flight is possible, but stability is greatly reduced. A wind speed of 10 mph is about minimum for good flights.

With practice and good slope lift the Gryphon is capable of most any aerobatic maneuver. Just keep the speed up.

While the Gryphon should not present any particular problem to the experienced builder/flyer, I would not recommend it for a novice. □

CLUB PATTERN CONTEST

from page 76/74

began to get the hang of it. The plane didn't have the quickness needed for this maneuver. I was judging him and found my thoughts wandering to whether or not I would need to retrieve my model with a basket; definitely not the best attitude for concentrating on judging.

Wrap-up:

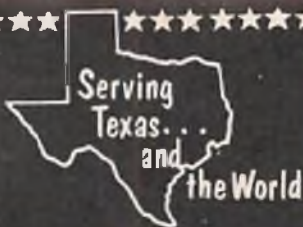
I hope you are still with me and will give this type of contest a try at your club. We believe that our objectives were met, everybody learned something, and we had some fun which is always important. The almost random listing of levels in the final standings indicated that the handicapping philosophy was basically

to page 100



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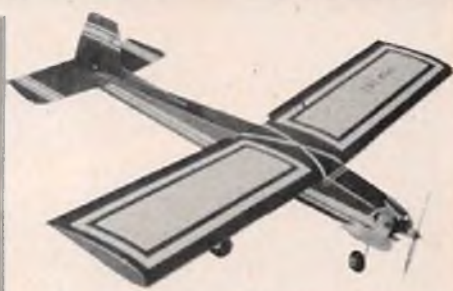
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CLUB PATTERN CONTEST

from page 98/74

sound. Those who participated were enthusiastic, even if I did win the contest, flying in Level III. Look out Rhett Miller, here we come. (Sounds like the duffer who just broke 100 looking around to see if Jack Nicklaus is getting worried.)

Your reactions to this contest and your similar experiences seeking the same objectives are of interest to me. Maybe there is enough interest to merit a club contest column as a regular feature. Keep practicing. □

RADIO SPECTRUM

from page 73/72

some interesting observations. By the way, his comments came by way of tape which was kind of nice. That way he could talk for about a half hour and probably cover more than what he could do in a reasonable length letter.

Dick pointed out that the first thing you need to do is recognize that you have a bad motor. He suggests putting an ammeter in your servo tester to measure the motor current.

A good motor will draw 80 to 100 ma without a load on the servo. If the current is over 120 ma you may have problems. He too, advises replacing, rather than

cleaning, but he has cleaned by submerging. He agrees you need to relube and suggested silicone oil on the tip of a pin. He advises not to try TV tuner cleaner even though it appears to work initially.

Another trick is to run your suspect servo near your TV antenna. A bad commutator usually arcs and causes radio frequency interference (RFI) that shows up on the TV. Use your servo tester when you do this so your transmitter RF doesn't mask the results. He also talked about running in motors for minutes rather than hours.

Dick also had some comments on to page 112

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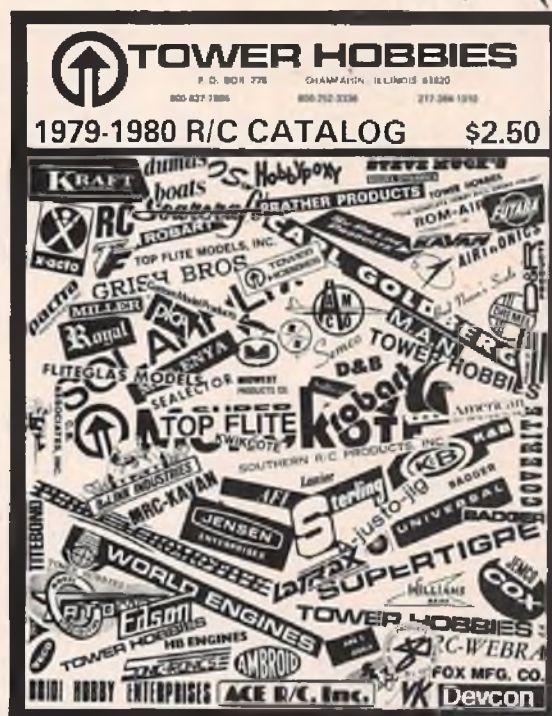
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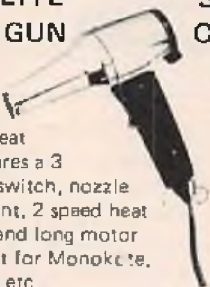


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FP-2GS 2 CHAN. RADIO



This is the least expensive 2 channel available anywhere. It comes with 2 servos and is ideal for cars, boats, small airplanes, or gliders. Works great in the Centurion or Sportavia. Requires 11 pencil batteries. RETAIL NOW ONLY \$71.98 \$109.95 RCM091

DUMAS 35% OFF
HOT SHOT 21



This fiberglass tunnel hull with pickle fork bow is 27" long and is very competitive. Add the K&B .21 outboard engine and a 2 ch. radio and go!

RETAIL NOW ONLY \$45.48
\$70.00 RCM008

K&B .21 38% OFF
OUTBOARD

This water cooled 3.5cc competition engine is the ultimate in outboard engines. It offers the superior control characteristics of outboard drive.



RETAIL NOW ONLY \$65.98
\$107.00 RCM152

COX 32% OFF
READY TO FLY CESSNA CENTURION

32% OFF



Like the Sportavia, this all molded foam scale Centurion with 36" span comes complete with a Cox .049 engine, prop, push rods, horns, and all other fittings already installed. The Sanwa No. 8020 radio drops right into place, but with very slight modification any 2 channel radio will fit easily into this kit. Great for the beginner who wants the most airplane for the least amount of money. Radio not included. RETAIL \$69.95 NOW ONLY \$47.98 RCM001

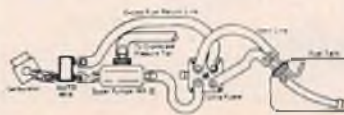
K&B .61 RC 40% OFF
W/MUFFLER No. 6525



Features a new crankshaft that eliminates the necessity of enlarging the hole in propellers. A top performing pattern engine that competes with the best.

RETAIL NOW ONLY \$57.88
\$96.50 RCM012

ROBART 25% OFF
AUTO MIX



This device actually reads fuel pump delivery and engine fuel requirements and routes excess fuel back to the tank via the overflow line. Works on all displacement type fuel pumps.

RETAIL NOW ONLY \$7.48
\$9.95 RCM255

DU-BRO 36% OFF
KWIK FILL FUEL PUMP

36% OFF



RETAIL \$10.95
NOW ONLY \$6.98 RCM010

HOUSE OF BALSA 31% OFF
P.51D (.29-.40)



This outstanding all balsa sport, stand-off scale ship is beautiful. 49" span. Requires a .29-.40 size engine and a 4 channel radio.

RETAIL NOW ONLY \$44.98
\$64.95 RCM011

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<p>TOP FLITE 30% OFF SEALING IRON</p>  <p>This sealing iron is great for covering with Monokote, Solarfilm, etc. It features adjustable temperature, teflon shoe, and a handy shape. Excellent quality.</p> <p>RETAIL NOW ONLY \$13.98 \$19.95 RCM202</p>	<p>DREMEL 38% OFF MODEL 381 MOTO-TOOL WITH FULL ACCESSORIES</p>  <p>The Model 381 is the ultimate in hand grinders. It features variable speed control, ball bearings, and full accessories.</p> <p>RETAIL NOW ONLY \$44.98 \$72.95 RCM015</p>	<p>MILLER No.2017 40% OFF SPRAY SET</p>  <p>Complete set includes a precision built genuine piston type air compressor, 12 ft. air hose, 16G siphon type spray gun & 14G air brush both with open & fine spray nozzles.</p> <p>RETAIL NOW ONLY \$46.78 \$77.95 RCM016</p>	<p>QUADRA 2 CU. IN. 29% OFF ENGINE</p>  <p>Develops 2 horsepower! An engine suitable for large models with its scale-like sound and realistic performance. Comes with muffler, mount, and Tillitson pump/carb.</p> <p>RETAIL NOW ONLY \$99.98 \$139.95 RCM017</p>
<p>DEVCON 36% OFF 5 MINUTE EPOXY IN ECONOMY 9 OZ. SIZE</p>  <p>Now in squeeze bottles for your convenience. Limit of 3 per order.</p> <p>RETAIL NOW ONLY \$4.48 \$6.95 RCM018</p>	<p>DREMEL 572 36% OFF MOTO SHOP</p>  <p>This deluxe saw features a complete accessory set of blades, discs, etc. and flexible shaft.</p> <p>RETAIL NOW ONLY \$60.98 \$94.95 RCM019</p>	<p>GOLDBERG 40% OFF FALCON 56 MK II</p>  <p>This all time best seller is now redesigned with ailerons. 56" span. Uses a .30-.40 engine, all balsa construction. An excellent trainer.</p> <p>RETAIL NOW ONLY \$28.78 \$47.98 RCM020</p>	<p>K&B .40 RC ENGINE 40% OFF No. 8011</p>  <p>THE MOST POPULAR RC ENGINE EVER MADE!!</p> <p>Features a unique design for high power; and a Perry carburetor for excellent throttle response and easy adjustment - from a slow smooth idle to a roaring top speed.</p> <p>RETAIL NOW ONLY \$43.48 \$72.50 RCM009</p>
<p>POWER PACER 22% OFF BATTERY OFF TESTER</p>  <p>A new ni-cad battery tester, cycler, and charger. Works great!</p> <p>RETAIL NOW ONLY \$46.98 \$59.95</p> <p>RCM023 9.6 volt RCM024 6 volt</p>	<p>GOLDBERG 40% OFF SKYLARK 56 OFF MK II</p>  <p>Fun to fly sport airplane with pattern capabilities. 56" span. .30 to .40 size engine, all balsa construction. New improved design!</p> <p>RETAIL NOW ONLY \$29.98 \$49.95 RCM025</p>	<p>SULLIVAN ELECTRIC STARTERS</p>  <p>Hi-torque, hi-rpm 12 v. starters. These heavy duty, long life starters develop more torque and rpm's than any other starters!</p> <p>RETAIL NOW ONLY \$24.98 \$38.95 RCM026</p> <p>Dlx. model has V-groove in drive cone for starter belt. Starts copters, airplanes, boats, and cars.</p> <p>RETAIL NOW ONLY \$27.28 \$41.95 RCM182</p>	<p>BOLINK ELECTRIC CAR</p>  <p>This 2 ch. 1/12 scale electric car comes already assembled with .05 motor, nicads, & charger. Goes over 25 miles per hour!</p> <p>RETAIL NOW ONLY \$79.98 \$99.95 RCM027</p> <p>Bolink kit for above car - must be assembled. BLX-155.</p> <p>RETAIL NOW ONLY \$59.98 \$79.95 RCM280</p>
<p>CRAFT-AIR 33% OFF FIELD BOX OFF</p>  <p>It's ready to use, not a kit, made of lightweight indestructible polyethylene. 22" long & holds everything. A SUPER BUY!</p> <p>RETAIL NOW ONLY \$19.98 \$29.95 RCM028</p>	<p>CRAFT-AIR 38% OFF HI-START OFF HEAVY DUTY</p>  <p>Features reel, tubing, towline, parachute, stake, row ring, and strong construction. For sailplanes of 100" wingspan and larger.</p> <p>RETAIL NOW ONLY \$32.98 \$52.95 RCM029</p>	<p>CRAFT-AIR 30% OFF DRIFTER II OFF</p>  <p>Would you believe? A competition sailplane for only \$13.98! It isn't just a trainer, it's a contest winner! 71 1/2" span. Uses a 2 channel radio.</p> <p>RETAIL NOW ONLY \$13.98 \$19.95 RCM214</p>	<p>S & O BATTERY 33% OFF TESTER OFF</p>  <p>Tests 8 cell transmitter and 4 cell receiver nicad packs under load. Extremely accurate scales. Detects bad cells and/or abnormal current drain.</p> <p>RETAIL NOW ONLY \$19.98 \$29.95 RCM031</p>



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**FOX .40 RC
SCHNEURLE**

**38%
OFF**

No.24000



The economical Fox .40 RC Schneurle features a restyled exterior, steel thrust washer, improved carb section, and lightweight pistons. Very good power!

RETAIL NOW ONLY \$28.48
\$45.95 RCM136

**BRIDI RCM
TRAINER 40**

**32%
OFF**



This popular all balsa trainer has a 52" span. Requires a .35 to .49 size engine and a 4 ch. radio. A high quality kit!

RETAIL NOW ONLY \$37.38
\$54.95 RCM034

**COX TD .049
STD. ENGINE**

**36%
OFF**



A super hot 1/4A engine ideal for free flight, control line, 1/4A RC, and more.

RETAIL NOW ONLY \$15.98
\$24.95 RCM035

**PEERLESS
POP BUGGY**

**37%
OFF**



Designed for a .15-.21 size engine and a 2 ch. radio. 19" length. Body is made of tough ABS plastic. Built-in pull cord starter.

RETAIL NOW ONLY \$87.98
\$140.00 RCM281

**12 VOLT
MOTORCYCLE
BATTERY**

**50%
OFF**



These are high quality, heavy duty motorcycle batteries that are perfect for all electric starters. Brand new.

Electrolyte not included

RETAIL NOW ONLY \$12.98
\$25.95 RCM037

**AFI
6 & 12 VOLT
BATTERY
CHARGER**

This high quality charger is designed to charge 6 or 12 volt wet or gel cell batteries. It works very well with the battery at left. Charges overnight from a 110 volt wall outlet. It's safe and easy to use. These chargers are tested twice before they leave the factory.

RETAIL NOW ONLY \$6.98
\$13.95 RCM038

**SCHLUTER
HELI - BOY**



The best RC helicopter ever made! Requires a .60 size engine and a 4 ch. radio. Collective pitch is standard. Features no-belt starting. Can be started with a Sullivan Electric Starter and a starter extension.

CALL FOR PRICE!

**ANDREWS
AEROMASTER**

**35%
OFF**



The world's most popular RC biplane! This balsa kit has a 52 1/2" span. Uses a .60-.78 size engine and a 4 channel radio.

RETAIL NOW ONLY \$51.98
\$79.95 RCM065

**DA ENTERPRISES
SERIES IV
POWER PANEL**

**36%
OFF**



The all-in-one power panel!

This quality panel distributes power from your 12 v. battery to starters, plugs, pumps, etc. & allows you to fast charge your radio at the field.

RETAIL NOW ONLY \$22.48
\$34.95 RCM033

**K&B .61 RC W/PERRY
PUMP & CARB & MUFF**

40% OFF



Equipped with a Perry Pump/Regulator and a larger Perry Carburetor specifically designed to be used with the Pump/Regulator system. Easy to start. Number 6535

RETAIL NOW ONLY \$74.98
\$125.00 RCM042

**BRIDI RCM
TRAINER 60**

**32%
OFF**



This popular all balsa trainer has a 58" span. Requires a .40 to .60 size engine and a 4 ch. radio. It makes a great trainer.

RETAIL NOW ONLY \$42.78
\$62.95 RCM043

**38% OFF FOX .45 RC
BALL-BEARING
SCHNEURLE
NO.24600**



Tests show this to be one of the most powerful .45's on the market. Puts out over one horse. Starts easily. Idles well- extremely durable.

RETAIL NOW ONLY \$39.98
\$64.95 RCM044

**HB .61 RC PDP
No.6300**

**27%
OFF**



This powerful, high quality ball bearing engine comes with a Perry carb and features Perry Directional Porting for increased power.

RETAIL NOW ONLY \$87.68
\$119.26 RCM143

**SIG KADET
WITH AILERONS**

**28%
OFF**



The Kadet is an excellent trainer! This balsa kit has been improved to include ailerons! 57" span. Requires a 3-4 ch. radio and a .19-.35 size engine. Easy to follow plans and accessories included.

RETAIL NOW ONLY \$28.78
\$39.95 RCM256

**LANIER
COMET II**

**36%
OFF**



This popular trainer comes almost-ready-to-fly. 63" span. Designed for a 4 ch. radio and a .50-.61 engine. The Comet II makes a great trainer!

RETAIL NOW ONLY \$39.98
\$62.50 RCM047

**ASSOCIATED
RC 200 KIT**

**39%
OFF**



See Tower Hobbies Catalog P.118 for available bodies. 22" body length. Features ball bearings for rear axle & clutch, glass chassis, disc brakes. Kit comes complete less engine, body, & radio. Best gas car anywhere!

RETAIL NOW ONLY \$119.98
\$195.00 RCM048

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**K&B .40 RC W/
PERRY PUMP &
CARB NO. 8360** **40%
OFF**



Features Perry Pump/Regulator and a larger Perry Carb specifically designed to be used with the Pump/Regulator system. Adds 1000 RPM's!
RETAIL NOW ONLY \$62.98
\$105.00 RCM049

**ASSOCIATED RC 12E
ELECTRIC CAR KIT** **30%
OFF**



No. 3012

This is the 1/12 scale electric race car that was the winner of the first 4 places at the 1977 ROAR Nationals! Motor and radio (requires a 2 ch. radio) are not included. Fiberglass chassis.
RETAIL NOW ONLY \$69.98
\$102.00 RCM246

**PICA
DUELIST 2/40** **33%
OFF**



This easy to fly, all balsa kit is an ideal twin engine trainer. 67" span. Uses two .23-.40 size engines and a 4 or 5 channel radio.
RETAIL NOW ONLY \$59.98
\$89.95 RCM051

**JENSEN DAS
UGLY STICK** **33%
OFF**



This all balsa kit is the ideal trainer. 60" span. Uses a .45 to .61 size engine and a 4 ch. radio. Very stable.
RETAIL NOW ONLY \$46.98
\$69.50 RCM052

**MRC PORSCHE
934 TURBO** **33%
OFF**



This electric RC favorite is 1/12 scale & 15" long. It features a high output electric motor, 2 forward & 2 reverse speeds, precise scale detailing, & a rugged ABS plastic body. Requires any 2 ch. radio.
RETAIL NOW ONLY \$49.98
\$74.98 RCM074

**MIDWEST
ATTACKER** **35%
OFF**



This all molded styrofoam kit builds fast and flies great. 48" span. Uses a .19-.35 engine. Very popular.
RETAIL NOW ONLY \$27.98
\$42.95 RCM054

A-JUSTO-JIG **30%
OFF**



This complete wing & fuse jig holds alignment within .1%. Allows you to make up to a 6 foot wing. Fuse jig fits on without tearing down your wing jig.
RETAIL NOW ONLY \$41.98
\$59.95 RCM055

**DREMEL 580
TABLE SAW** **38%
OFF**



CUTS
UP TO
1"
THICK-
NESS!

Multi-purpose table saw especially designed for hobbyists. Rips, cross cuts, miters, straight cuts, dadoes.
RETAIL NOW ONLY \$61.98
\$99.95 RCM056

**MIDWEST
CARDINAL
A.R.F.** **35%
OFF**



This all foam trainer has a 46" span. Uses a 2-3 ch. radio, & a .049 to .15 size engine. Rugged and flies great.
RETAIL NOW ONLY \$21.38
\$32.95 RCM057

**STERLING
PUDDLE
JUMPER MK II** **30%
OFF**



This airboat has a plastic hull and cabin with balsa and plywood parts. It uses a 2 channel and a .15 to .35.
RETAIL NOW ONLY \$29.38
\$41.95 RCM058

**LATRAX CORVETTE
W/RADIO** **25%
OFF**

Won a 1st & a 2nd in the ROAR NATS!



Add 8 AA pen cell batteries to the radio, charge the car for 15 minutes, & you're ready to race!

THIS IS A FANTASTIC VALUE! Comes with a powerful 2 ch. radio (w/wheel stick) already installed, 6 cell nicad battery pack, & a quick charger. 16" length. Runs up to 30 mph! Electronic speed control.
RETAIL NOW ONLY \$119.98
\$159.95 RCM244

**O.S. MAX .60 FSR
RC W/ MUFFLER** **30%
OFF**



This is a front rotor, Schnerle ported ball bearing RC engine that comes complete with a muffler. O.S. Max is known for high quality!
RETAIL NOW ONLY \$90.98
\$129.95 RCM243

**MARK'S MODELS
WANDERER** **40%
OFF**



This easy to build and easy to fly glider has a 72" wingspan. So stable it will fly free flight without a radio. Great for the beginner!

RETAIL NOW ONLY \$14.38
\$23.95 RCM041

**STAFFORD TWIN
COMANCHE** **30%
OFF**



This museum scale twin is always in high demand. 72" span. Requires two .40 size engines and a 4-6 ch. radio. This balsa kit includes precision molded fittings.
RETAIL NOW ONLY \$97.98
\$139.95 RCM052

**DUMAS BIG
SWAMP BUGGY** **36%
OFF**



This rugged and stable airboat runs on water, dry grass, or snow. Really moves out with a .40 and speeds with a .60. Lots of fun!

RETAIL NOW ONLY \$22.38
\$35.00 RCM063

**X-ACTO
No. 5087
KNIFE &
TOOL
CHEST** **30% OFF**



Contains Nos. 1, 2, & 5 knives, complete asst. of blades, gouges, routers, plus X-Acto planer, sander, hobby-craft saw, spokeshave, balsa stripper, pin vise, screwdriver, asstd. drill bits. Comes in a large fitted wood chest.
RETAIL NOW ONLY \$20.98
\$29.95 RCM004



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<p>HB .40 RC PDP 27% OFF No. 4200</p>  <p>This powerful, high quality ball bearing engine comes with a Perry Carb and features Perry Directional Porting for increased power (HB .61 RC PDP pictured).</p> <p>RETAIL NOW ONLY \$61.98 \$84.34 RCM142</p>	<p>ZINGER WOOD PROPS 30% OFF</p>  <p>Two popular sizes--Stock up now on these high quality props!</p> <p>10X6 WOOD PROPS(6) RETAIL NOW ONLY \$5.88 \$8.40 RCM021</p> <p>11X7 WOOD PROPS(6) RETAIL NOW ONLY \$6.68 \$9.60 RCM022</p>	<p>FOX 1.2 CU. IN. OPPOSED TWIN 26% OFF</p>  <p>One of the finest 2 cylinder model airplane engines ever produced! Develops over 3 horses! The Fox Twin is a smooth running power plant.</p> <p>RETAIL NOW ONLY \$184.98 \$250.00 RCM234</p>	<p>TOP FLITE F4U-1A CORSAIR 40% OFF</p>  <p>61" span. Requires a 4 ch. radio & a .60 size engine. Balsa sheeting for wings and stabs, hardware, and nylon fittings are included.</p> <p>RETAIL NOW ONLY \$59.98 \$99.95 RCM277</p>
<p>PICA CESSNA 37% OFF</p>  <p>NEW!! This balsa scale ship makes an ideal scale trainer with a .40 size engine, & with a .60, it's great for aerobatics. 72" span. Requires a 4-5 ch. radio. Hardware, molded parts, & plans included.</p> <p>RETAIL NOW ONLY \$62.98 \$99.95 RCM254</p>	<p>MRC RTF HAWK TRAINER 25% OFF</p>  <p>You can be ready to fly this foam trainer within one hour. Comes with an Enya .15 engine already installed with muffler. Uses a 2 or 3 ch. radio.</p> <p>RETAIL NOW ONLY \$74.98 \$99.95 RCM069</p>	<p>MRC FMC COMBAT VEHICLE 25% OFF</p>  <p>This 1/12 scale electric RC vehicle has 2 forward & 2 reverse speed control. Big output electric motor for indoor or outdoor quiet running. Excellent detailed scale! Requires a 2 ch. radio. 15" length.</p> <p>RETAIL NOW ONLY \$63.68 \$84.98 RCM070</p>	<p>ROBERT SUPER PUMPER MKII 33% OFF</p>  <p>This "in-line" fuel pump is a simple, easy, and reliable way to pressurize any engine. Fits into fuel line.</p> <p>RETAIL NOW ONLY \$11.98 \$17.95 RCM277</p>
<p>MRC LEOPARD ELECTRIC TANK 20% OFF</p>  <p>18" length. Takes 40 degree inclines with ease. Movable latches, swiveling periscope, and authentic decals. Operates forward, reverse, left or right. It turns on a dime.</p> <p>RETAIL NOW ONLY \$139.98 \$174.98 RCM072</p>	<p>COX READY TO FLY CUB TRAINER 30% OFF</p>  <p>RADIO ALREADY INSTALLED! Designed for the 1st time RC pilot! Single channel proportional radio system and Cox .020 engine already installed! Rugged foam construction. Has a 28 1/2" wingspan.</p> <p>RETAIL NOW ONLY \$69.98 \$99.95 RCM233</p>	<p>GOLDBERG HANDI TOTE 30% OFF</p>  <p>This flight box is compact yet has room for everything you need.</p> <p>Most popular flight box ever made!</p> <p>RETAIL NOW ONLY \$11.88 \$16.95 RCM006</p>	<p>PICA WACO 39% OFF</p>  <p>This balsa and plywood kit has a 60" span. Uses a 4 - 6 ch. radio and a .40 - .60 size engine. All nylon fittings, wire landing gear, and struts included.</p> <p>RETAIL NOW ONLY \$54.98 \$89.95 RCM165</p>
<p>MRC MARTINI PORSCHE 30% OFF</p>  <p>This 1/12 scale RC electric racer has 2 forward & 2 reverse speed control, high output electric motor, & scale detailing. Requires any 2 ch. radio. Batteries not included. 15" length.</p> <p>RETAIL NOW ONLY \$54.58 \$77.98 RCM073</p>	<p>SOFTGLAS 20% OFF</p>  <p>NEW</p> <p>The new, complete sealer-filler-primer for balsa wood models. Sands as easily as primer! Easy to apply. Dries hard, fast, and flexible.</p> <p>RETAIL NOW ONLY \$7.98 \$9.95 RCM077</p>	<p>MIDWEST SWEET STIK 40% OFF</p>  <p>54" span. Uses a .19 to .45 size engine. Requires a 4 ch. radio. This is a small version of the famous Ugly Stik. It's an excellent, ultra simple trainer.</p> <p>RETAIL NOW ONLY \$25.78 \$42.95 RCM078</p>	<p>GOLDBERG SR. FALCON 40% OFF</p>  <p>The Sr. Falcon is the standard big trainer. 69" span. Uses a 4 ch. radio and a .35 to .60 size engine. Every design element is engineered for simplicity and fast building.</p> <p>RETAIL NOW ONLY \$38.98 \$64.95 RCM079</p>

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Radio
Sale!

MODEL	RETAIL	NOW ONLY	STOCK NUMBER
KRAFT KRAFT KRAFT KRAFT KRAFT KRAFT			
KP-2AW (Wheel) w/14IIA's	\$139.95	\$91.98	RCM080
KP-2AW (Wheel) w/15IIA's	145.95	95.98	RCM267
KP-2A (2 Stick) w/14IIA's	139.95	91.98	RCM081
KP-2A (2 Stick) w/15IIA's	145.95	95.98	RCM268
KP-2AS (1 Stick) w/14IIA's	139.95	91.98	RCM082
KP-2AS (1 Stick) w/15IIA's	145.95	95.98	RCM269
KP-4A w/KPS-14IIA's	309.95	191.98	RCM083
KP-4A w/KPS-15IIA's	321.95	200.98	RCM270
KP-6A w/KPS-14IIA's	339.95	212.98	RCM084
KP-6A w/KPS-15IIA's	351.95	219.98	RCM271
KP-5C w/14II's or 15II's	389.95	274.98	RCM085
KP-5CS w/14II's or 15II's	389.95	274.98	RCM086
KP-7C w/14II's or 15II's	529.95	377.98	RCM087
KP-7CS w/14II's or 15II's	529.95	377.98	RCM088

BUY A KRAFT 7C OR 7CS RADIO NOW AND RECEIVE A COUPON THAT WILL LET YOU BUY A KRAFT 2 CHANNEL FOR ONLY \$29.95. IF YOU DON'T NEED A 2 CHANNEL, SEND THE COUPON & SAVE EVEN MORE!

KPS-14II Servo	44.95	34.88	RCM089
KPS-15II Servo	44.95	34.88	RCM090
KPS-18 Servo (Super Mini)	54.95	43.98	RCM222
KPS-14IIA Servo	39.95	27.98	RCM272
KPS-15IIA Servo	42.95	29.98	RCM273

FUTABA	FUTABA	FUTABA	FUTABA	FUTABA	FUTABA
FP-2GS	109.95	71.98	RCM091		
FP-2F w/S-7's	149.95	98.98	RCM092		
FP-2F w/S-18's or S-22's	134.95	89.98	RCM274		
FP-2E w/S-7's	149.95	98.98	RCM093		
FP-2E w/S-22's	134.95	89.98	RCM275		
FP-3S w/S-18's	144.95	94.98	RCM094		
FP-3S w/S-20's	169.95	109.98	RCM208		
FP-3FN w/S-18's or S-22's	219.95	139.98	RCM095		
FP-4FN w/S-18's	289.95	179.98	RCM096		
FP-4FN w/S-16's	319.95	199.98	RCM097		
FP-5FN w/S-18's	319.95	204.98	RCM276		
FP-5FN w/S-16's	359.95	222.98	RCM098		
FP-6FN w/S-18's	339.95	209.98	RCM099		
FP-6FN w/S-16's	369.95	234.98	RCM100		
S-16 Servo	39.95	29.98	RCM103		
S-7 Servo	39.95	29.98	RCM104		

SANWA SANWA SANWA SANWA SANWA SANWA					
No.8020 2 Channel	99.95	69.98	RCM105		

STOCK NUMBER	DESCRIPTION	RETAIL	NOW ONLY
RCM107	Airtronics Aquila	\$74.95	\$52.48
RCM030	Airtronics Olympic II	49.95	34.98
RCM261	Badger 200-1 Air-Brush Kit	32.95	21.38
RCM286	Bridi Deception	89.95	61.18
RCM209	Bridi Dirty Birdy 40 - wood	59.95	40.78
RCM114	Bridi Dirty Birdy 60 - wood	84.95	57.78
RCM210	Bridi Dirty Birdy 60 - glass	124.95	89.98
RCM115	Bridi Sun Flt 4-20	29.95	20.38
RCM116	Bridi Super Kaos 40	55.95	37.98
RCM118	Bridi Super Kaos 60	69.95	47.58
RCM061	Bridi UFO	129.95	93.58
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RADIO SPECTRUM

from page 100/72

pots. He suggested that many of the problems are the center pad and not the element/wiper interface. He feels that the wipers like the Clarostat that have two fingers that swing an arc are superior to the single wiper that turns on a spot. The difference being that those that swing an arc are self cleaning.

The biggest problems occur when the center pad is plated on and eventually wears through. In the conductive plastic pots, he has seen considerable problems in the interface between the

terminals and the resistive element. Those that don't use conductive epoxy usually have trouble. He seemed to think the CTS was still the best from a reliability standpoint, probably due to greater contact pressure. He prefers to run them dry but has lubricated them sparingly. He essentially wipes the lubricant off with a tissue after wiping on with a finger. He suggests using a ballpoint pen eraser to clean and burnish the center pad, and then clean with alcohol.

He really appreciated Peter Berg's letter and wished that more manufacturers would submit similar observations.

I'd like to thank all who sent letters and especially would like to hear from service Centers.

Intermittent Battery Tester

In February we published a circuit with a slight error. John Britt called in a correction, but I'll pass along his comments from the MacDonald Douglas Carrier Wave:

The article appearing in the February 1979 issue of RCM in Jim Oddino's column, concerning the intermittent battery tester, has a slight error. But slight enough that it won't work. What needs to be done is to reverse the position of the two transistors from that

to page 114

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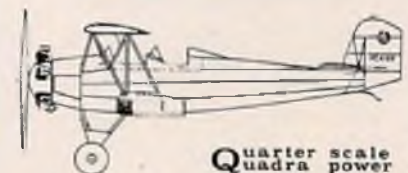
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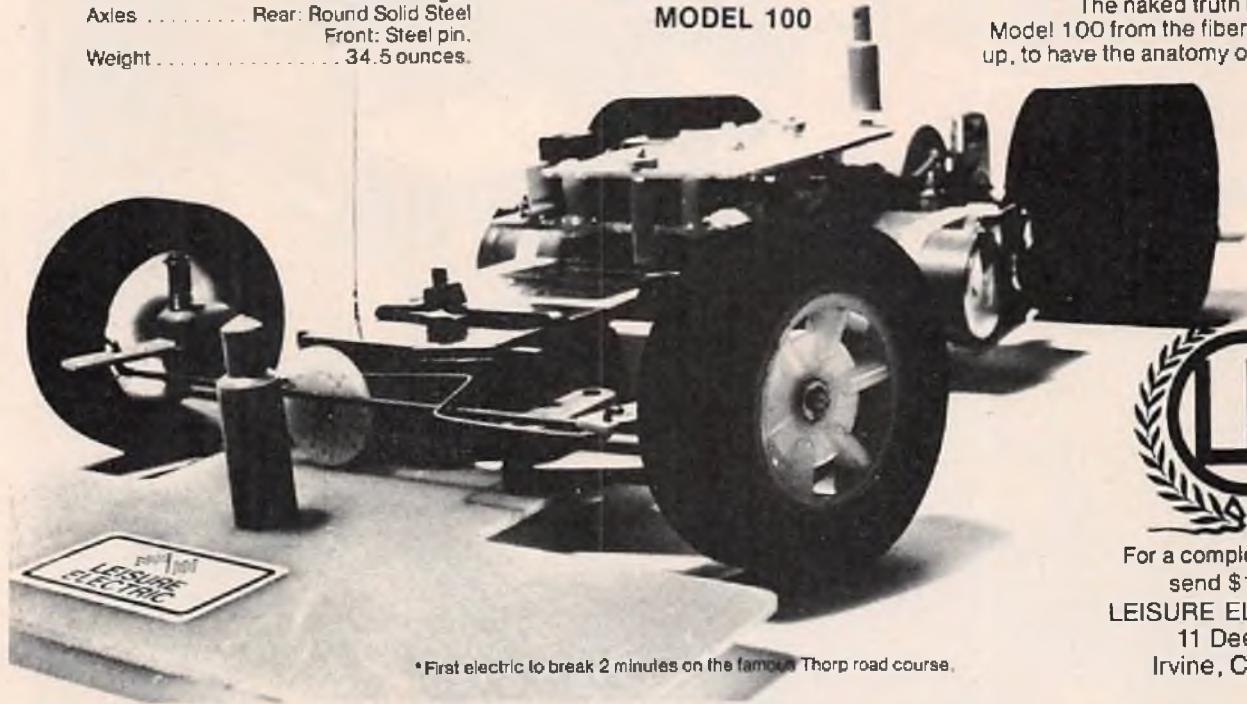
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RADIO SPECTRUM

from page 112/72

shown on the schematic, i.e., substitute the 2N3643 for the 2N3638A and vice versa.

This little gadget has a response time of about 3 milliseconds; fast enough to detect voltage spikes in your airborne battery pack (intermittent).

All parts for this device are available from Gateway Electronics at Page and Midland for about \$2.50. They do not have the specific zener diode that Jim calls out (1N746A), but they do have a 3.6 volt, 1 watt zener that works fine (can't remember the part number). \$2.50 is not a bad investment that might save your plane. Like Jim sez, battery problems have "almost" been solved.

John Britt

I can't find my copy of the February issue, but I'm sure that what happened is that the transistors got labeled wrong. I'm sure the PNP is where it is supposed to be in the circuit and likewise the NPN. So if you use different transistors don't switch the positions of the PNP and NPN. Thanks for the correction, John. I assume that Gateway Electronics is in St. Louis, but just about any electronics store should have the parts. □



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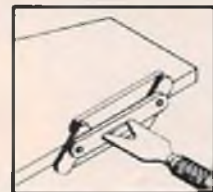
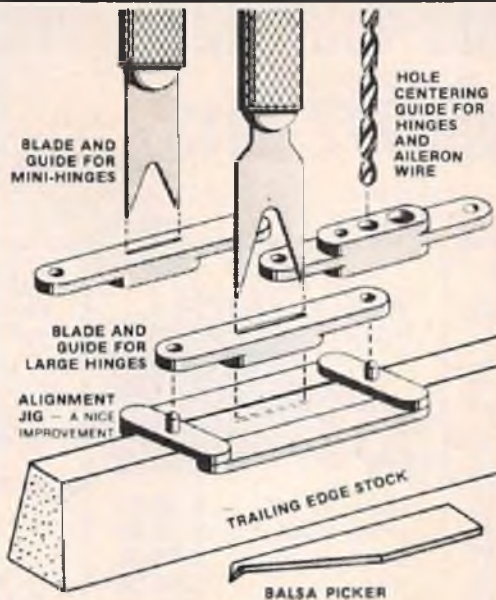
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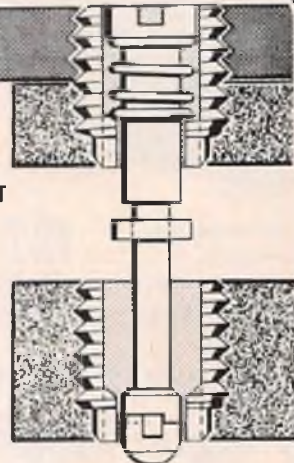


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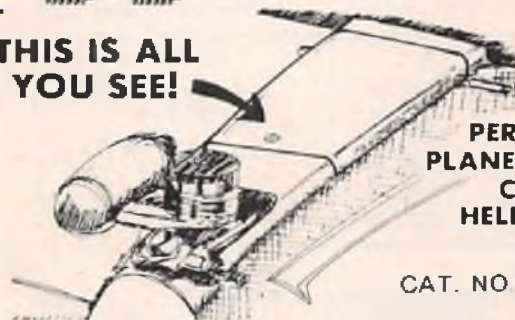
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HERE'S HOW

from page 71/70

optional) are made of PVC plastic with durable plastic "sleeves" to protect your plane. When the flip-up supports are in position, they are easily locked in place by a sliding lock on each unit. The PVC plastic legs (aluminum optional) fold away easily and four large rubber

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FAIREY FULMAR

from page 67/64

during the year I've been flying it. In the first contest it was untried (not even a test flight). It had a new radio in it --- also untried --- and the engine hadn't run in three years. But, it only missed first place by 4 1/2 points. Beat by a hot pilot flying a hotter Mustang. You can't ask for much more than that. Could've been first, I guess.

If you have any questions, write to me care of RCM and I'll be happy to answer them.

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Meanwhile, look at my boy — reading!

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EXCALIBUR

from page 63

... square balsa upper and lower spars, 3/32" sheeting for top and bottom leading and trailing edges, and a combination block with partial ribs to form the wing tip. No capstrips are used and I certainly didn't mind skipping that chore. It is best to carefully sand the edges of the ribs before assembly since there are no caps to cover the die-cut edges. The leading edge sheeting wraps around the 1/4" square balsa leading edge making for a very clean leading edge. Wetting the convex or outer side of the balsa sheeting makes the task relatively easy. A dihedral of 1/2" is suggested and, although not mentioned, I would certainly suggest fiberglassing the wing center section.

The 1/8" fuselage sides are kept apart by 1/8" plywood formers, 1/4" plywood firewall, and 3/16" square balsa. There are 1/8" plywood doublers from the firewall back to the radio area. The bottom is 1/2" sheet forward of the wing and 3/32" aft. A shaped block forms the top from the nose to just aft of the canopy. This block is removable via one bolt so, with the wing and top block off, you have total access to radio, tank, etc. The rear deck is formed from 1/4" and 3/8" balsa sheet. You wind up with a simple and rugged fuselage that can be built in very little time.

Balsa tail surfaces are 1/4" for the horizontal and 1/8" for the vertical with 1/16" dowel used in the ends of the horizontal stabilizer for added rigidity. The dowel is shown on the plan but didn't appear in my box of materials so I simply used 1/16" music wire with no problems. The twin vertical stabilizers really make the design stand out on the flight line.

The builder has the choice of cutting and hinging the vertical stabilizers for rudder control or going yawless. I chose the latter route to make the project that much simpler and to see if Balsa USA was really correct. They stated in their instructions that rudder control wasn't really necessary and, except for a couple of maneuvers, I certainly agree. Unless you have a lot of crosswind problems or are really into stall turns, forget the rudders and save the NyRod for another creation. I should warn you that you won't have quite as much directional control right at touchdown until the wing really quits working, so line it up on short final.

to page 124

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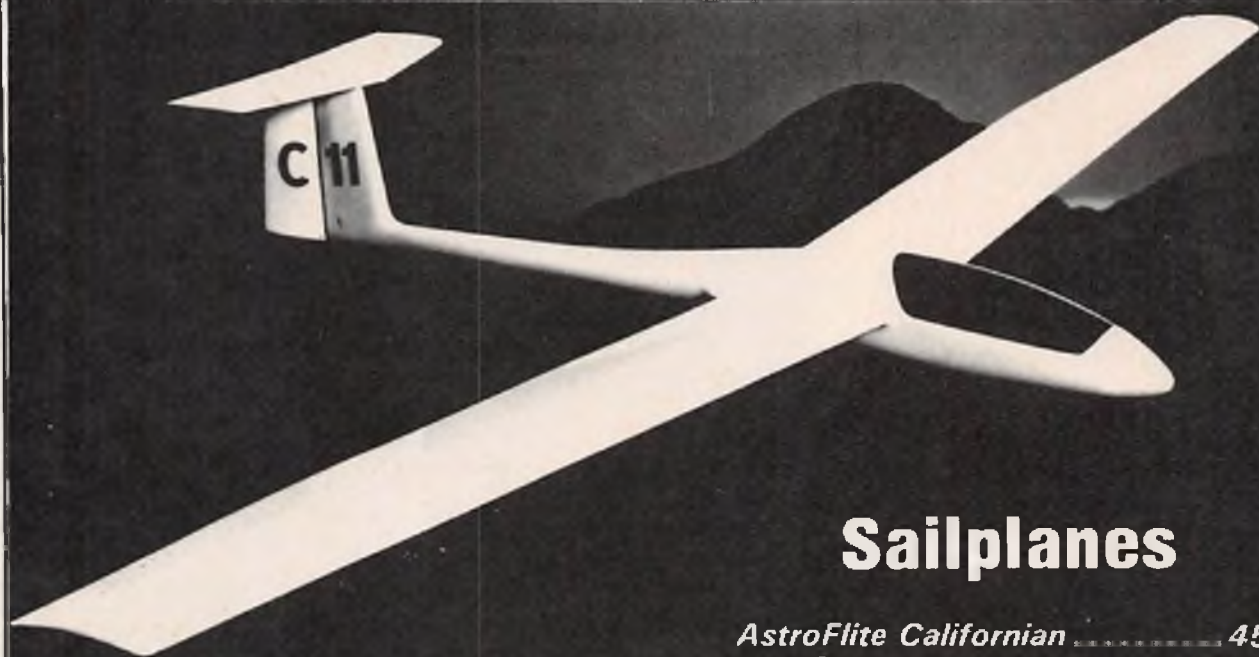
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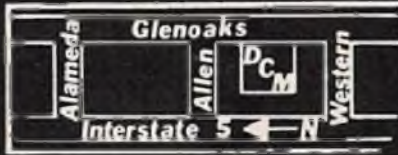
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EXCALIBUR

from page 120/63

A hardware package included landing gear, control horn, aileron hardware, hinges, and assorted bolts and screws. Cheek cowl for the fuselage are of ABS plastic and of excellent quality. I chose to omit the cowls strictly for personal preference. Additional hardware items required to finish the kit are: motor mount, one 2" wheel, two 3" wheels, pushrod materials, and 3 wheel collars.

The Excalibur is very smooth in the air and is capable of all maneuvers that

sport fliers are prone to do. It is so easy to land that it would make an excellent choice as an intermediate low wing trainer. The glide ratio is quite generous and even I have been able to "grease" all of the landings. The fairly mature O.S. .40 is plenty of power for this size craft. Finishing techniques consisted of a simple MonoKote over Balsarite affair.

The only complaint I have with the kit, since I didn't mind the lack of a pretty box, is the quality of some of the wood. The two fuselage sides were of different density and hardness as were the two vertical stabilizers. The stabilizers were of no real consequence but it is necessary to have two fuselage sides of

very similar quality. A couple of die-cut rib sheets were a little on the soft side, but this wasn't much of a problem. The main landing gear blocks were of redwood instead of the usual hardwood. The redwood pieces should definitely be replaced since it will split along the groove much too easily.

In checking with Balsa USA, any defective parts found in their kits will be replaced at no cost. Just write to them and explain your problem.

In spite of the complaints about some of the wood, I still believe it is a good buy since you will wind up with a lot of airplane for the money invested. If you

to page 128



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EXCALIBUR

from page 124/63

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RC FLYING AND THE LAW

from page 62/60

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A further request is that the AMA carrier review their willingness to insure members with respect to such perils as fire and theft since homeowner's insurance carriers are apparently going to deny liability with respect to any losses involving R/C models or equipment.

In a recent article appearing in your

magazine, it was announced that the low number of claims was such that the cost of providing the \$1,000,000 AMA insurance policy would probably go down; this is good news and should help encourage the carrier to accept a primary instead of secondary insurance position.

Finally, I know that your executive committee has under consideration the division of AMA memberships into different classes which would take into consideration the specific liability insurance needs of R/C modelers, as well as the exposures in other avenues of modeling, particularly control line. Perhaps this is the time to consider such separate membership classifications in order to insure the continuity and availability of insurance coverage to those who recognize the need for such insurance and are willing to pay for it,

without burdening those modelers who in effect have no exposure in their modeling activities.

The R/C modeling community who are members of the Academy very definitely need your assistance and answers with respect to this important aspect of their membership and modeling activities.

ELIMINATING VIBRATION

from page 59/58

one quarter of a turn. Make sure you know which way you're going! Turning the leading edge screw in leads that blade, turning it out lags it. It is not necessary to lock the screws down with the lock nuts every time. Just snug up the screws so they pinch the tongue.

to page 134

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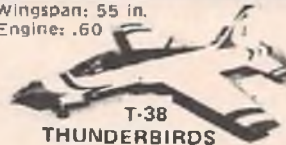
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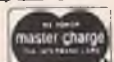
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ELIMINATING VIBRATION

from page 128/58

With one blade lead or lagged one quarter turn, hover the helicopter and observe if the vibration is slightly better or worse. If it is better, go another one quarter turn and check again. If it is better yet, go again. If it is now worse, go back to your last "best" setting. If the chopper shook more from the first one quarter turn of the screws, go back to your neutral setting, and one quarter turn the other way. Hover the helicopter and check vibration. If it is better, go another one quarter turn, and check again. If it's better again, keep going, etc. If it is worse, go back to the last best setting. Once the helicopter is at its smoothest point by adjusting the one

blade, take note of the vibration level. It may shake a little less, a lot less, or maybe leading or lagging the blade didn't help reduce the vibration level at all. If this last instance is what you find, return the blade to the original setting. The static set-up is also the dynamic set-up on this blade.

We now go to the other blade that we haven't adjusted, and go through exactly the same procedures that we went through on the first blade. Randomly choose to lead or lag it, see if it's better or worse, go the other way if necessary, etc. If the helicopter was shaking at the start of this, it is now shaking less, or the vibration is non-existent. Let's say, for example, that the helicopter was shaking at a noticeable level, i.e., the gear was vibrating and the tail was slightly bobbing up and down before we adjusted the blades. Now that both blades are dynamically set, the

machine's tail still quivers a bit, and the skids aren't shaking quite as bad as they were. We have eliminated all variables except the final setting of blade tracking. Go back to adjusting the blade tracking by eye-balling the blades again, at a hover. If one blade now seems higher, adjust it down one half turn at a time, or raise the other blade one half turn at a time. After each adjustment, hover and check the vibration level. If the black blade seemed high, you brought it down one half or one turn (for example), and the vibration was worse, raise the blade by going the opposite way. Keep raising the blade until the machine runs perfectly smooth. The blades may be out of track 1/4" or 1/2" (again, for example), but the machine is running smoothly! I might attribute this to a defective seesaw that gives an incorrect coning angle on a Jet Ranger, but I'm not sure why this

to page 136



THE WING JIG II—PRICE: \$34.50

The original RCM Wing Jig, first published in the August 1967 issue of this magazine made it possible for many modelers to build their airplane wings warp-free and in far less time than it had previously taken. The **WING JIG II** offers many design improvements on the original version that greatly extends both its versatility and the accuracy of the wings produced. It is now used exclusively in the RCM shop for all building projects.

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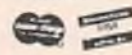
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ELIMINATING VIBRATION

from page 134/58

happens when the coning angle has been checked and found to be correct.

If you completed all prior steps with precision, somewhere along this last step, the machine will go dead smooth. I've had choppers "go dead" after one blade adjustment by one quarter of a turn, or by the time one blade was finished. There have also been times when I've had to do both blades lead lag, and also the final blade tracking. Sometimes, you may find it best to vary the blade tracking **before** adjusting the lead lag of the blades. Then, if the blade tracking didn't help things, adjust the lead lag as described and finish up with the blade tracking procedure again. In any case, the procedure is usually done within one tank of fuel.

In closing, please keep in mind that **all** steps are necessary for the dynamic set up to be effective. Since the dynamic balancing is the least "scientific" procedure, we do it last because we know beforehand that **everything else** is perfect.

If you've given up on your helicopter because it had a vibration in it you couldn't eliminate, set it up as we've described here, and try it again! □

PROJECT PROFILE

from page 56/52

wire "L" to each strut, facing forward. The "pants" are cut from 1/16" ply and held on the struts with a bit of soft copper wire. The finished units are held on the wing with small straps and sheet metal screws. There are two ways to make the gear of a fuselage mount model. I used 5/8" streamline tubing for the legs; a piece of 1/2" x 1/16" hard aluminum was fitted inside the front leg on each side for strength. I then drilled a hole for the axle, and bent the gear units to shape in a small vise. After bolting the units to the fuselage, I made a spreader bar from small brass tubing with a headless 4-40 bolt soldered into each end. You could, however, cut each side from a piece of hard 1/16" aluminum and use a bolt for an axle without any spreader bar. Plastic 2½" wheels are available and look just right. I chose to use Perfect 1½" streamline wheels because they cost less. Sometimes they throw a tire on landing, but since I gave up free-flight I find the resulting chase and hunt brings back fond memories. You could glue the tire to the hub but it wouldn't be as much fun. At any rate, once the gear is on, bend a tail-skid from 1/16" wire to set the tail on and get ready to install the radio.

to page 138

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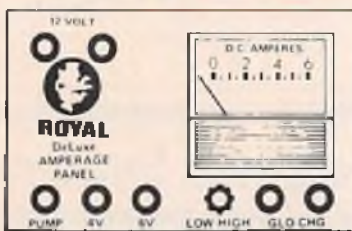
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Weight 28 oz.	
Scale Ratio 87" = 1'	

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Featuring an automatic circuit-breaker, this unit will properly charge 2, 6 or 12-volt wet cells. Charge will taper as wet cell reaches capacity.



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RECHARGEABLE CAREFREE HIGH AMPERE DEPENDABLE

12V 5.5 AMP
Ideal for use with 12V electric engine starters.

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Ideal for use with remote control boats.

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Featuring improved sensitivity, this instrument has three RPM range settings (0-6,000, 0-15,000, 0-30,000). Just point its telescoping probe at a rotating object to obtain RPM reading.

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Here is a complete selection of soft camel's hair brushes for dope or fiberglass resin application. Their exceptionally low price makes them practical for one time use. Yet with normal care, they will last indefinitely. The short bristle length is ideally suited to leave a minimum of brush marks.

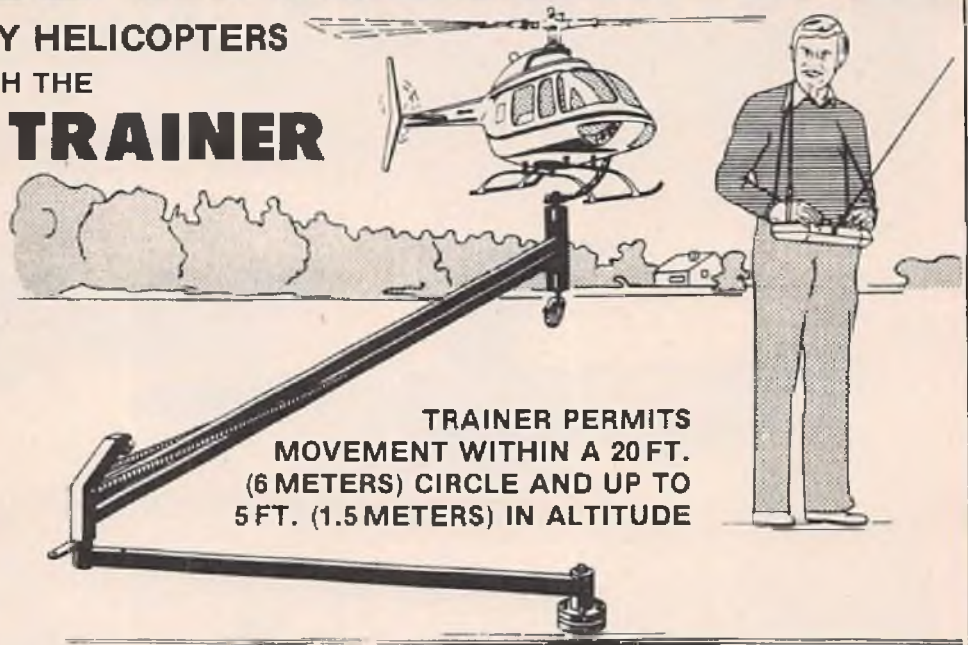
3/8"69 ea. 1 1/8"89 ea.
5/8"75 ea. 1 3/8"99 ea.
7/8"79 ea. 1 5/8" 1.09 ea.

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PROJECT PROFILE

from page 136/52

Radio Installation:

Slip the battery pack under the sheeting on the left side. The receiver fits under the sheeting on the right side. Use pushrod connectors on side mounted servos. Stick the servos in place with 1/8" foam tape. Route the

pushrods from the control horns to the pushrod connectors. Use a small pair of needle nose pliers to tighten the set screw. If you're afraid the connector isn't tight enough, solder a small washer to the pushrod on each side of the connector. Now it ain't gonna move! Check control movement with the hatch covers in place and correct any binding. If the elevator pushrod flexes, make a keeper from a safety pin, slip the pushrod through it, and cement the

keeper to the aft end of the fuselage. The switch fits nicely on a hatch, and the antenna routes out the same place to the rudder. Throw the finished product on charge tonight, and tomorrow I'll tell you how to fly it.

Tomorrow At The Flying Field:

Before attempting flight, balance the model. It is also important not to have a heavy wing. Shift movable components or add tip weight as necessary. Fire up

to page 140

The Prather Deep Vee "A Complete System"

THE KIT

\$99⁹⁵

Engine .40 to .60



Designed by
George Campbell

PRODUCT NO. 1000

The hull and deck are factory joined for ease of assembly and true alignment. The epoxy fiberglass construction provides strength and warp resistance. The advanced hull design combined with a proven running gear package delivers performance and reliability. The kit comes complete with 3/8" hard maple motor mount rails, plywood transom plate and a complete step by step photo instruction booklet.

RUNNING HARDWARE KIT

\$69⁹⁵



PRODUCT NO. 1020

The running hardware kit includes strut with brackets, rudder with brackets, trim plates, drive dog, prop nut, turn fin, shaft log, flex cable with stub shaft, thrust bearing, water pick-up and stainless steel mounting screws with nuts and washers. This hardware has been proven in competition for both reliability and performance.

HATCH COVER

\$18⁹⁵



PRODUCT NO. 1010

The Hatch Cover adds scale appearance. It prevents swamping from other boats' rooster tails or from rough water. The Hatch Cover comes complete with mounting hardware using a druz fastener connector.

RADIO BOX

\$16⁹⁵



PRODUCT NO. 8100

The Radio Box is especially designed for Deep Vee boats such as the Prather Deep Vee. It features epoxy-glass construction, hardwood rails, aluminum nut plates and lexan covers. The low profile design allows clearance for the tuned pipe to stay inside the hull.



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572	Deluxe Moto-Shop	61 95
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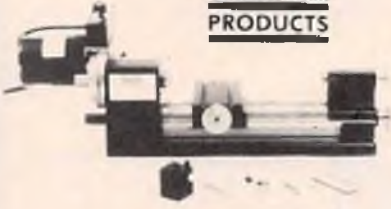
13-C	13 PC SET	7 85
20-C	20 PC SET	11 20
29-C	29 PC SET	45 80

I also have other sets to choose from plus all sizes packed in 12's or 6's or tubes according to type and size. All at discount prices. See my catalog for complete listing.

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This little sturdy lathe will enable you to do work normally considered beyond the capacity of machines this size. This is not a toy, but a versatile miniature of the big ones. So many design features built in for this low price.

SHERLINE PRODUCTS



Sherline Lathe with American threads. Standard equipment included with the Lathe consists of motor and speed control pulleys, belt, accept plate and carrier, two dead centers, two hexagon keys, toolpost and tool bit, three-core cord, instruction booklet and guarantee card.
4000- Sherline Lathe 203 50

4000-A comes complete with the following: Sherline Lathe (4000), Tail Stock Chuck and Key (1072), No. 1 Morse Arbor (1188), 3-Jaw Chuck (1044). Everything needed to get started.
4000-A Sherline Lathe 254 50

SHERLINE ACCESSORIES

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1041*	3-Jaw Chuck	49 50
1044*	4-Jaw Chuck	49 50
1072*	Tailstock Chuck & Key	13 50
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1160*	Collet Set (includes No. 1161)	44 95
1161*	WW Collet Adaptor & Draw Bar	22 45
1185*	Vertical Milling Table	49 50
1187*	Chuck to Tail Stock Adaptor	1 75
1188*	No. 1 Morse Arbor (for No. 1072 chuck)	2 65
1191*	Live Center	12 60
1291*	Spacer Block Kit	22 50
3001*	Power Feed	35 95
3002*	Cut-Off Tool & Holder	17 95
3003*	Two Position Tool Post	7 15
3005*	sq. High Speed Tool Blank	1 60
3006*	Carbide Tool Set	11 70
3007*	High Speed Steel Set	8 95
3012*	Hold Down Set	12 55
3020*	Allen T. Driver (for cap screws on lathe)	2 70
3021*	Center Drill Set	11 70
3050*	Vertical Milling Column	63 00
3051-N*	Milling Vise (new design)	40 50
3052*	Fly Cutter	13 45
3054*	Boring Head	31 50
3055*	Morse No. 1 Blank	8 95
3056*	T. Nut 10-32 (2)	12 60
3057*	Hex Key Tool Post	3 55
3058*	4-Jaw Hold Down Set	17 95
3059*	Slow Speed Attachment	80 95
4004*	Drive Belt (lathes Ser. #4983 & higher)	1 80
4046*	Drive Belt	1 80

*Designates items which come with 4000-A

SHERLINE 5000 VERTICAL MILLING MACHINE

A new concept in compact precision metal working tools. Can be used for milling, drilling, fly cutting and boring complex projects such as steam engines, clocks, instruments, prototypes, etc.

200 to 2000 RPM. Variable speed control with 1.5 H.P. motor.

Capacity 13" x 2 1/2" tee slotted work table with 9" of movement on the X axis and 3" on the Y axis. In its uppermost position the spindle nose is 8" from the table and has 6" of movement on the Z (vertical) axis.

Movements on all axes are controlled by handwheels calibrated in 1/1000" divisions.

This machine has all the features normally found on only the most expensive machine tools, such as precision spindle with adjustable pre-load bearings, anti-backlash lead screws, and table locks. The head may be rotated for machining angles.

Fully dovetailed machine slides with adjustable gibs, solid base with mounting holes. Permanently lubricated ball bearings used with spindle, which has a Morse No. 1 inside taper and .15 TPI male thread. Design also permits inexpensive conversion to metric calibrations. Overall dimensions 12" x 14" x 17" high.

110-115 Volts, 60 Hz A.C., 300 Watts, 230 Volts, 50 Hz available on special order only. Machine is furnished with 8 long 3-wire cord.

SHERLINE PRODUCTS



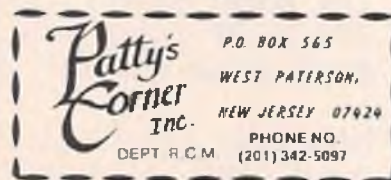
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5000	Vertical Mill	246 50
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3055	Morse No. 1 Blank	8 95
3056	T. Nuts 10-32 (2)	12 60
3057	Hex Key Tool Post	3 55
3058	4-Jaw Hold Down Set	17 95
3059	Slow Speed Attachment	80 95
3060	Set of 3 collars 1-8-3-16-1/4 x Draw Bar	19 95
3072	Drill Chuck & Draw Bar	14 95
4004	Drive Belt	1 80

HELPFUL TIPS FOR MILLING

1. This is a small, light duty mill and shouldn't be used to remove large amounts of stock which could be easily removed with a hacksaw. For efficiency, select a piece of stock as close to finished size as possible.
2. Stresses on a mill are quite high when cutting most materials; therefore, gib and backlash adjustments must be properly maintained.
3. End mills must run true and be sharp. Holding end mills in a drill chuck is a poor practice. Use collets instead.
4. Flycutting is an excellent way of cutting stock from flat surfaces.
5. Normal machine alignment is adequate for most work, but if the work is exceptionally large or requires extreme accuracy, shims may be employed to improve machine alignment.
6. For accurate set-ups, you should have and know how to use a dial indicator.
7. Often, more time will be spent making fixtures to hold work than doing the actual machining.
8. To help save time on many simple set-ups, a good vise is a must.
9. Always try to have one point from which to measure. Don't machine this point off part way through the job. This would leave you with no way of measuring the next operation. Plan ahead.
10. A good rule for machining is: If the tool chatters, reduce speed and increase feed.
11. If it takes a long time to accumulate the knowledge, tools and fixtures required for many different types of milling operations, don't become discouraged by starting with a job that is too complex or by using materials that are extremely difficult to machine.

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PROJECT PROFILE

from page 138/52

the engine, point into the wind and let go! Even with no rudder control, the far forward landing gear placement makes these models track straight and true. The tail should come up of its own accord in about 25'. Add a touch of up to get airborne and climb for altitude. If your model tends to turn and needs lots of aileron trim, you have a warp, or a heavy wing. All my machines are sensitive to elevator. Once you're used to the model's habits, you'll enjoy flying it that way. Loops use up all of 10'. Rolls are best done at full throttle — into the wind. Inverted flight is a snap. Pylon turns are really neat too: When it comes time to land, keep the speed up. The thick wing isn't real good at gliding. Just set up a fast approach and flare gently for landing. That's about it folks --- have fun. Here's wishing you luck racing towards that checkered flag, real or imaginary. □

TOLEDO 1979

from page 40

of Show trophy. And the paint jobs! Many of which make our best efforts look like they were done by a kindergarten dropout using his cereal spoon for a brush . . .

Sure, our feet hurt, and some of us start to lose our voices by Sunday afternoon, and no one has trouble sleeping Sunday night or for a couple of nights after. But we all enjoy it. And we are pleased that we were able to celebrate the 25th Anniversary of the Toledo Annual Radio Control Exposition with our many friends there.

In our May issue, in his column "From the Shop," Don Dewey treated you to a history of what preceded this 25th year. We will not repeat it here, except to mention that for the many known facts mentioned by Don, there must be many times more that amount of problems we never heard about, not to mention the hours and hours of planning and hard work done by many people throughout all those years.

The responsible parties this year, in addition to Co-Chairmen Don Belote and Bob Hisey, are:

Finance	John Root
Security	Roy Hinger
Trophies	Wayne Yeager
Raffle	Ed Grabbenstetter
Model Judging	Dave Leach
Model Displays	Joe Vislay
Trading Post	Bill Rupert
Communications	Rick Lederman

To you named, and to the many un-named box handlers, table puter uppers, and hey-persons, we can only say, "Well Done." and "Thanks."

to page 142

R/C MODELER MAGAZINE'S MODEL OF THE MONTH CONTEST

The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month R/C Modeler Magazine will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

you could win . . .
A NEW
371 VARIABLE SPEED
MOTO-TOOL

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FIRST PLACE

Leon DeLisie
Boyes Hot Springs, CA

Destroyer, an original design, was built 15 years ago and flown with reed radio equipment. The model has 80" wingspan, weighs 13 lbs., and is now powered by a K & B 61 pumper turning a 10/63 blade prop. Finish is Butyrate dope and a Futaba 6 channel radio is used.

AUGUST WINNERS

SECOND PLACE

Barry F. Evans
Stafford Heights, Australia

A scratch built Australian Nomad of 71" wingspan weighing 9 lbs., is powered by two O.S. 25 engines swinging 10/4 props. Balsa covered foam is primary structural material. JR. 6 channel FM 29 MHz radio for usual functions plus brakes, retracts, and flaps integrated with ailerons.



THIRD PLACE

Brian Cleverly
Para Vista, South Australia

This 1/8 scale Westland Whirlwind was built from Radio Modeler plans. It has 65" wingspan, weighs 5 3/4 lbs., and is powered by two OS 30 engines. A 4 channel Skyleader radio provides guidance. Model is lavishly detailed and all trim and insignia is hand painted. Model depicts the aircraft of the C.O. of RAF 263rd Squadron.



RULES

- A. Model Aircraft Origin**
1. Any kit — wood, fiberglass, foam, or ARF kit is eligible. Any scratch-built aircraft built from magazine or original plans is also eligible.
- B. Category**
1. All types of radio controlled airplane models.
a. Scale
b. Pattern
c. Racing
d. Fun-To-Fly
e. Original Design
- C. Entrants to submit:**
1. Color photo or slide, size 35 millimeter or larger.
2. Black and white glossy photos (any size) of both sides, top, rear, front, and bottom views.
3. Close-up photos may be submitted on detail work if desired.
4. A short write-up giving dimensions, weight, power, radio, etc.
5. A statement that:
a. The submitter was the sole builder of the model.
b. Parts and/or accessories used were part of the kit or available to all modelers at retail outlets.
c. All non-available or special parts were built by the hands of the submitter.
- D. Judging will be on:**
1. Workmanship
2. Quality of finish
3. Attention to detail
4. Subject of model or difficulty of the project will count in judging.
- E. Judging will be done by RCM Editors Don Dewey and Pat Crews.**
- F. Persons not eligible:**
1. Members and employees of RCM or any other model airplane publication.
2. Members and direct or indirect employees of Dremel Manufacturing Co.
3. Members and employees of any manufacturer of hobby kits, hardware or supplies.
4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income.
- G. Models not eligible for submittal are:**
1. Models that have been submitted for judging of workmanship at any major AMA sanctioned contest and have placed 1st, 2nd, or 3rd in that judging. Flying points as a final standing do not apply.
2. Models that have been built for display purposes only.
3. Models that have been built for manufacturers demonstration purposes.
4. Models that have won a similar award in another publication.
- H. Entrants who have models that qualify under these conditions are eligible to enter. Included with the entry should be the entrant's AMA and FCC numbers, and also, the name of his club, if any.**
- I. Prize Information**
1. A Dremel 371 Variable Speed Moto-Tool will be awarded to the monthly winner. An illustration and description of the kit will be included each month along with the winner's name, address, club, etc. The second and third place runners-up will be awarded a one year subscription to R/C Modeler Magazine.
2. Dremel Manufacturing Co., of Racine, Wisconsin will be notified of the monthly winner immediately after a decision is reached by the judges so that the kit award can be received by the winner prior to the issue of that month's RCM.
- J. General:**
1. All contest entries must be addressed to RCM Model of the Month Award Program, R/C Modeler Magazine P.O. Box 487, Sierra Madre, California 91024.
2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.

This contest will be null and void in any state or locality where specifically prohibited by law.

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BASIC KIT INCLUDES: Fiberglass fuselage with built-in motor and molded-in fin, foam wing and stab cores, L.G. blocks and screws, wing gear wire, 4" fiberglass tape, plans and instructions.

DELUXE KIT INCLUDES: All above plus all balsa and hardwood, fiberglass wing ribs, hinges, fiberglass push rods, aileron & flap a/c, wing links, L.G. straps and screws, wing bolts, all control horns, nose gear steering arm and Dac-Bra throttle linkage.

TOLEDO '79

from page 140/40

The Toledo R/C Exposition is many things to many people. But first and foremost, it is the model contest, and the products. Thus, on this anniversary year, we are not going to treat you to yet another photo of John Doe, manufacturer, and his latest kit, the Belligerent Blivet which has been burning up the contest circuit back in Grinder Switch. Instead we are going to use the available space to share with you as many of the new products and the oldies but goodies as we were able to spot in the ocean that was the display tables. What we missed, we won't even apologize for; it was an honest mistake made in the deluge of items and information. What we will apologize for is not having enough space to show a photograph of every model entry; we did not see a one that we weren't impressed with. Judging these entries is not an enviable job, but Bob Leach and crew carried it off fair and square.

Now, we'll let your fingers do the walking through Toledo, 1979:

ELECTRA-LITE

from page 37/32

ply motor mount tube. Cut a piece of 1/64" ply 1½" wide and long enough to go around the motor twice. The grain on the outside of the ply should run in the same direction as the motor shaft. To make the tube, wrap a piece of waxpaper around your Astro 05 motor. Now wrap the ply around the motor, gluing it to itself with Zap.

Remove the finished tube from the motor and glue it into the noseblock hole with epoxy or Zap. Now cut the side view profile of the noseblock. Pull the front fuselage sides together around the noseblock and glue. Now install the outer sections of the pushrod tubes. If the tubes cross, you'll have to use a reversed servo for rudder. The forward part of the fuselage floor is 1/16" ply and can be added at this time, as well as the rest of the 1/16" balsa top and bottom crossgrain sheeting. When the sheeting is in place, the whole business can be sanded to a slightly rounded cross section. Oops, I almost forgot. Use micro-balloons and Zap to make fillets around the nose and F-1.

Tail:

With the wing & fuselage constructed, it should almost look like an airplane. If you're not too tired we can still finish the tail before lights out! Start the tail construction by laminating a 3/32" x 3/16" balsa strip to a 3/32" x 3/16" spruce strip. Zap works real well here. Pin down your leading

to page 144



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Super launches for super sailplanes.



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SPECIFICATIONS	
Wing Span:	55 in.
Wing Area:	595 sq. in.
Engines:	.15-.19
Radio:	1, 2 or 3 channel
Kit No.:	146

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ELECTRA-LITE

from page 142/32

edge spruce. Pick some good hard 3/16" square for the trailing edges and pin them down. The rest is easy. Fill in the solid areas with 3/16" sheet, noting the grain direction. The rest is 3/32" x 3/16" balsa strips. When dry, you can sand the leading edge to a rounded cross section, as well as the tips. Block each stab tip up 13" and sand the root to establish the dihedral angle. Pin one side flat and block the other side up until the distance between the tips is 22 1/2". Epoxy the stabs together at this angle. Cut two elevators from the softest 3/16" balsa you can find and sand to shape.

Final Assembly:

Place the wing on the fuselage and carefully align the two. It helps to have two people for the next step. While one person holds the wing and fuselage in proper alignment, the other one drills a 1/8" pilot hole through F-1, into the plywood center joiner. Remove the wing and drill the center joiner to accept the 3/16" alignment dowel. Carefully open up the hole in F-1 to 3/16". Make sure that the 1/32" ply screw hold-down doublers are in place on the wing. Now put the 1/16" trailing edge alignment pin into the center rib, aligning the two panels. Put the wing assembly back on the fuselage and drill for the 10-32 nylon wing hold-down bolts and tap the plywood wing mount.

Next comes the canopy. There are a few ways to attack this problem. You can carve a mold from balsa and pull your own, using the hot oven method, or you can try adapting an existing commercially made canopy. A clear, molded canopy for the Electra-Lite is also available from Midnite Model Supply. See the end of this article for details.

Once you have your canopy, build up the supporting structure as shown on the plans. There are several ways to attach the canopy. The one shown works well. It consists of a pin anchored to the front canopy support and uses the wing hold-down dowel to secure the rear of the canopy, keying the assembly into place.

Prepare the tail assembly for attachment to the fuselage by sanding the bottom of the tail assembly until it aligns properly with the fuselage. It's all downhill from here (thermals excepted!). Carefully sand the entire model. I prefer Super MonoKote for covering and sincerely recommend it. The lower temperature films should not be used, at least not on the wing. They simply don't provide the necessary strength. Once the model is covered, hinge the elevators and epoxy the tail to the fuselage ... careful alignment here ...



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The Electra-Lite will accept most three channel radio systems ... but the smaller the better. With larger servos you'll have to be more careful in planning your radio installation. The sliding servo tray was chosen because of its simplicity and reliability. An added bonus is that it can be built from wing spar scraps. Check the plans and build the tray to fit your servos. There are several commercially available mixers that may also be utilized in place of the tray.

The Vee-tail shouldn't scare you. Remember ... both flippers move up for up elevator, down for down, and both move as rudders to turn. Both go left for a left turn (when viewed from the rear) and right for a right turn. There should be about 1" total deflection (from stop to stop) for any given control input.

Flying:

This is the part I like best, so does the Electra-Lite. Before flight, check the balance point and make sure it matches that shown on the plans. I like to start test flying with a few hand launches. It lets you get a feel for the airplane without getting too high or far away in case of problems. The Astro 05 seems to like a Cox Gray 6/4 prop the best. Charge up your batteries and make sure that the motor shut-off works properly. Also, make sure there is no radio interference with the motor running. When all is well, turn on the motor, take a few steps into the wind and heave her into the air. You'll soon find you have a very versatile airplane. The Electra-Lite will climb to about a thousand feet on a full charge. The 7 ounce wing loading gives a very good glide. She thermals quite well, in fact, Electra-Lite won 1st and 5th place in the 1979 Electric Championships. You'll also find that she's very aerobatic; and if you put the nose down she'll move out. Electra-Lite also took fourth place in the First Ever Electric Pylon race held on March 6, 1979, competing against planes half her size designed specifically for speed. The Electra-Lite will enable you to fly almost anywhere, since you don't need a high-start or winch. Speaking of winches, take the motor batteries out and bolt on an Airtronics adjustable towhook and you've got a darned competitive "regular" glider. In short, if you've thought about electric flight, but never tried it ... this is the plane for you. Special thanks to Craig Hall for turning my chicken scratches into workable plans ... and my apologies to those four brave souls who built Electra-Lites before there were any plans. Canopies for the Electra-Lite are available for \$2.25 plus postage, and a semi-kit consisting of wing ribs, drilled nose block (for the Astro 05), and canopy for \$10.00 plus postage. Both available from Midnite Model Supply, 17321 Breda Lane, Huntington Beach, California 92649. □



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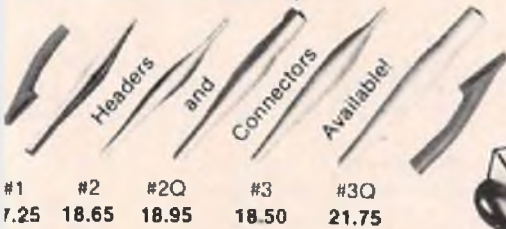
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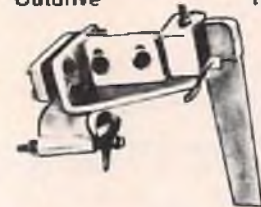
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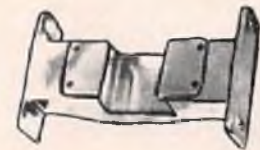
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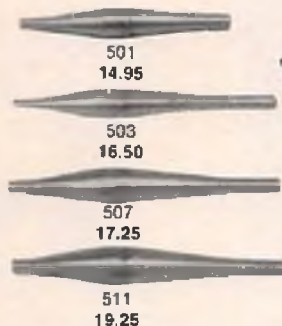
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SOARING

from page 30

sights.

As you can well imagine, there is not very much competition here. We have an average of five major competitions, two of which are team selection trials to which you can only be invited. We manage to have an Annual National Championship which usually attracts about 30 to 40 people.

We have postal competition with our neighbors, South Africa. Do you have this sort of competition in the U.S.A.? When our national team has been chosen, we usually have a test match against South Africa. Over the last three years our team has consisted of basically the same three people who run the hobby shop, but last year our club managed to take the top three places in the team selection trials, thereby giving us the entire team. I actually managed to win the trials, with our chairman coming Second and another junior pilot coming in Third. I was very excited about this — being chosen to fly against people like Nord Gerneke, Friki Roos and Mike Malherbu but, as fate would have it, they were to scared to come down here and, therefore, the test was cancelled. It is dubious now whether we will be able to go to Belgium to fly in the World Champs.

What can you say --- except pure dedication to the sport of soaring.



Two happy pilots — Keith Kindrick and Craig Foxgord just completed their level V LSF goal and return at Taft, Calif.

The thermal gods of Taft, California, have smiled again on Craig Foxgord and Keith Kindrick. During the Easter break from schools, these two achieved their

to page 150

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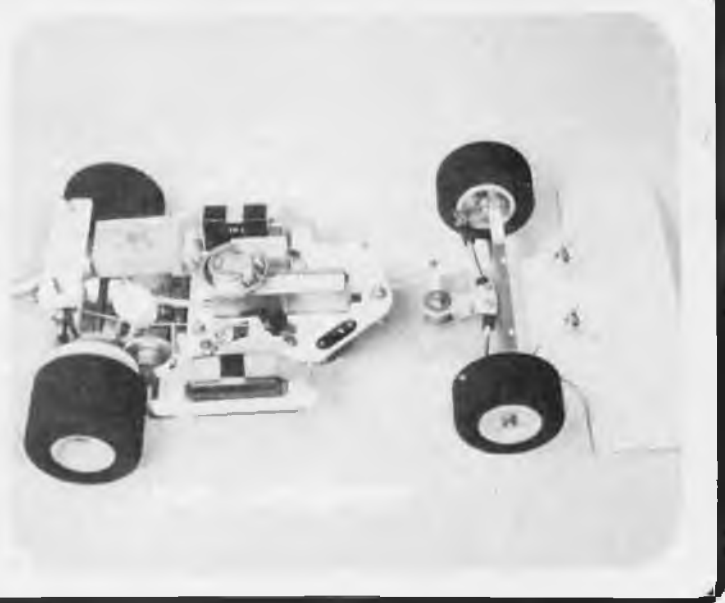
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SOARING

from page 148/30

Level V Goal and Return on their first attempt. Lee Jensen and Paul Trist



Dan Tatum flying, Lee Lowary spotting, tried but couldn't make it. Spotter is very important for this task.

made their Level III Goal and Return and Thermal Duration. Dan Tatum and Lee Lowary came away empty handed, but they both admitted it was fun trying.

In the June issue, I stated that Steve Work started his L.S.F. achievements in 1977. This date is in error and should have stated that Steve started in 1971. Sorry Steve, and again the best of luck to you and the rest of the U.S. soaring team in Belgium.

Good Lift. □

BIG IS BEAUTIFUL

from page 28/27

Some of you may remember a previous comment here about a DeHavilland Beaver flown here in Canada some time ago. The builder, Bill

Jaenicke of Edson, Alberta, is now in the throes of producing another of DeHavilland's aircraft in a model. His



Cutting pushrod channel in foam wing using soldering gun and piano wire cutter shaped to act as a guide. Bag in foreground is filled with shotgun pellets, makes great hold-down.

to page 154

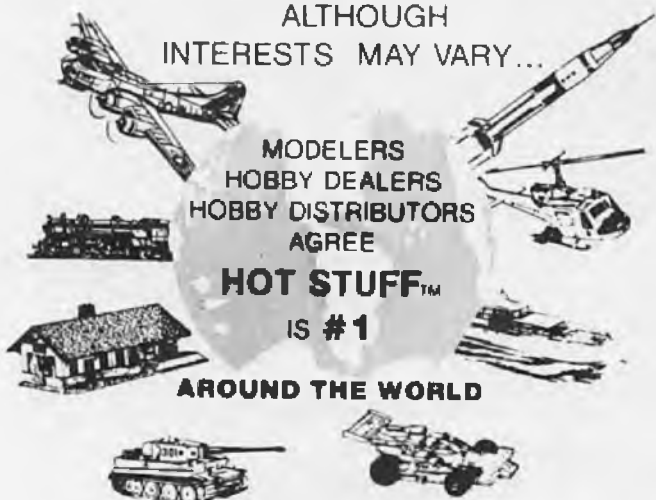
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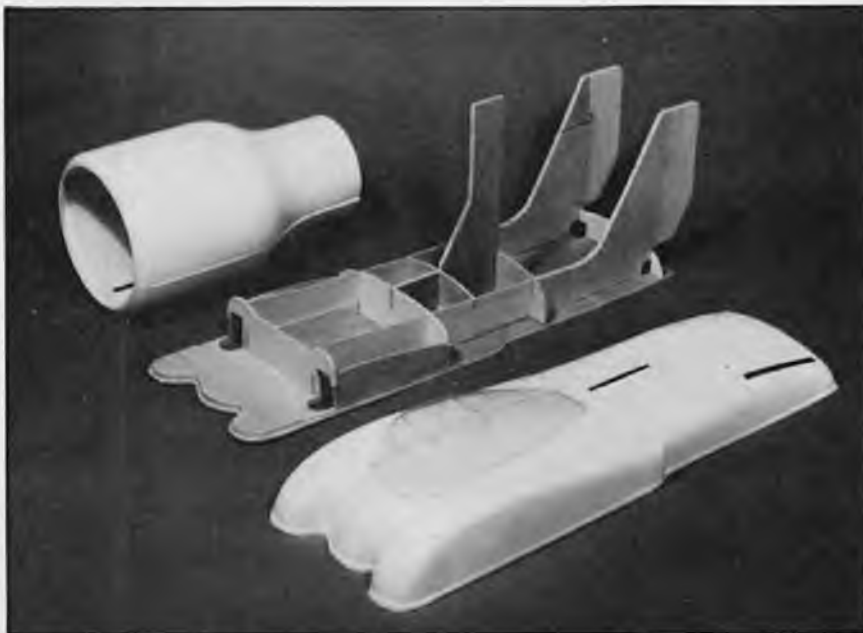
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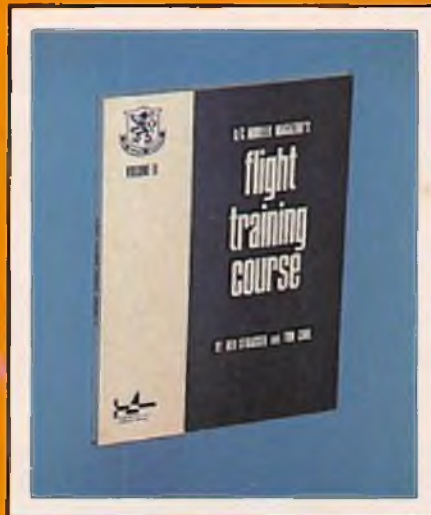
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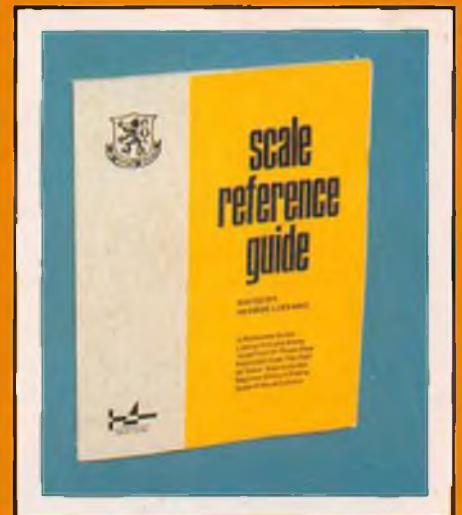
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11920 Santa Fe Trail, Lenexa, KS 66215, Tel: (913) 492-8133

BIG IS BEAUTIFUL

from page 150/27

current project is a Twin Otter (see photos) and the fuselage is glass with a foam wing, plywood sheathed. Tail feathers are foam, ply sheathed. The model will fly on two Quadra engines, and will weigh approximately 55 pounds.

Bill is also making a set of fiberglass floats which will be available about the time you read this. The floats are very close copies of the EDO as used on the Original Beaver. They are 48" long and come complete with a sketch plan of the

spreader bar and mount system to be made up to suit your particular model. The prototype set weighed 3.75 pounds with mount, spreader bars, etc. The cost will be approximately \$65.00 (Canadian). We modelers will find that the exchange on the U.S. dollar will cover the cost of handling and mailing. For further information, write Bill Jaenicke at P.O. Box 1552, Edson, Alberta Canada T0E 0P0, or call (403) 723-6279.

RIGHT: Left wing panel freshly cut from foam. Sections are 32 inches long, total wingspan 128 inches.



to page 156

ENGINEERED DESIGNS FROM MODERN MATERIALS FOR THE DEMANDING SPORT FLYER AND THE DISCERNING BEGINNER THAT ARE EASY TO BUILD, SUPERB TO FLY



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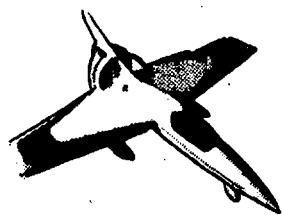
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from page 154/27

Bill is also preparing a plug for production of a fiberglass fuselage for the Beaver which should be ready shortly after you read this. The original Beaver prototype had a built-up wing but this could be made more easily from foam sheet with good results. As this is written, I do not have a cost on the Beaver fuselage but will provide additional details as they become available.



Join between wing panels with excavation for plywood strut plate between pushrod channel and leading edge. Top of wing is sheeted to protect it from workbench scars.



Left wing and Nacelle of Twin Otter. Engines will be on one servo for throttle. Note flap which will operate in prototypical fashion. Model will have ailerons operating as flaperons.



Bill Jaenicke's Twin Otter. Wingspan 12.5 feet, Outer wing panels plug into center section. Fuselage is 9.5 feet in length, all-up weight will be 55 pounds.

★

Wendell Hostetler's "Big Bolt" is now ready and he has completed the
to page 160

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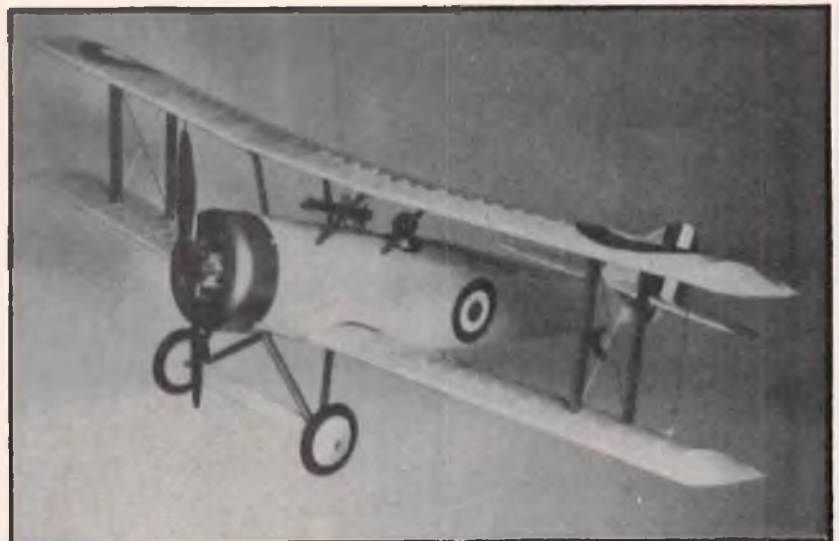
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FOKKER DVII:
Engines .60
Wing span 72"
Wing area 1488 sq. in.
Weight 10 lbs.
4 channel radio required

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Wing span 67½"
Wing area 1586 sq. in.
Weight 10 lbs.
4 channel radio required



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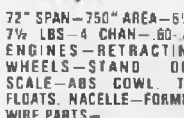
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OS 30 STD	48.00	38.40			
OS 30 R/C	53.00	42.40			
OS 35 STD	52.00	41.60			
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BIG IS BEAUTIFUL

from page 156/27



Wendell Hosteller's Skybolt.
 Engineered from Sig Skybolt kit enlarged to double the size of the kit.
 Plan & Instructions available.

instruction manual which goes with the plans. He has done an excellent job on both the plan and the manual. The model looks great, flies great and should be a winner. Further details can be obtained from Wendell at 1041 Heatherwood Lane, Orrville, Ohio 44667.

That's all for this month, except to offer an apology to those waiting for a reply to a letter, I have been up to here in alligators for about the past month and my usual prompt letter answering has suffered from a bad case of the busy. I'll catch up eventually, so don't despair. See you next month. □

SUNDAY FLIER

from page 26/22

racers over there --- not for free, but for a fee that most of them could afford? The British have offered to provide lodging --- for free. Can we work out something? Call me, either at RCM, (213) 355-1476, where they'll relay the message, or direct to my residence, (415) 967-3828.

Tony Baker, who was the unofficial "leader" of the British team, was very complimentary about the reception he and the Gerard brothers received. Tony stayed with John Lowe, and the Gerards were guest of Willard Smith and his wife. Just so they would feel at home, my wife,

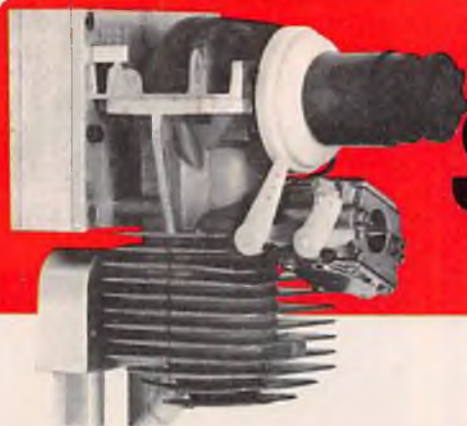
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Kaye, had them all over for an English "high tea" on Friday preceding the races. Picture No. 5 was taken on the patio at our home, and that's Paul Gerard on the left, with Tony Baker, John Lowe, Dick Gerard, Willard Smith and his wife, then Nancy Lowe on the



right. Actually, old boy, it's amazing how convivial you can be just drinking tea! We had a great time exchanging ideas on glider design --- and the ladies were most tolerant of their boys with their toys.

★

Hopefully, I'll have more to report on the RCM Trophy Races next fall, but right now I'd like to close this column with a short note about a most unusual model --- and modeler. Here's the story behind it. As you know --- well, if you don't, then you do now --- I wrote a book about my experiences on Gibraltar as General Eisenhower's staff weather officer who forecasted the state of the sea for the North African invasion in November

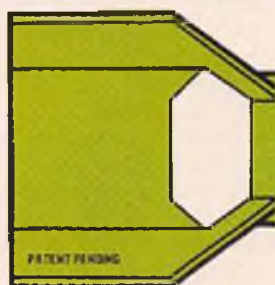
1942. To do so, I made observational sorties out of Gib on a Royal Air Force Hudson Reconnaissance Bomber.

To help promote the book, Mildred Delateur and her husband Lou, who run the Galaxy Books and Model Shop in Sunnyvale, threw an autograph party. About midway through the party, who should come through the door but my friend and fellow modeler, George Popa. George is one of the world's foremost wire sculpture artists. Give him a photo, or a three view, and he can create a wire sculpture of anything from a pair of baby shoes to a dog, or a bird, boat, or whatever you want.

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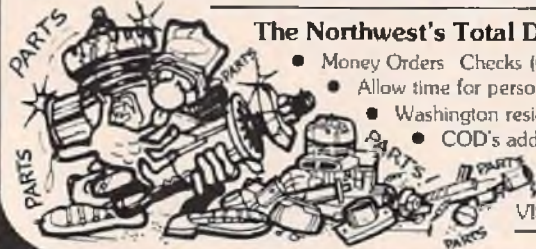
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George had obtained a three view of a Lockheed Hudson from Lou --- and he came to the party bearing the wire sculpture model of a Hudson which he presented to me. I was speechless. And, if you'll take a look at Photo No. 6, you'll understand why. That 28" span wire model now occupies the place of honor on my display mantle; the picture doesn't really do it justice.



George is a Sunday flier --- and a full time artist. And if you'd like a sculpture of one of your favorite objects --- no matter what it is --- just let me know, and I'll pass it on to George. Is this a plug? Yes, it is. For a great artist.

But maybe even more --- for a fellow Sunday flier.

Like you and me. □

SCALE VIEWS

from page 19



glider, but if it proves successful, it's set up for electric power --- Astro 02's.

I note that the model has functional leading edge slots. I tried these on an early RC years ago and they contributed to excellent stability, necessary in those days when the pioneer RC equipment regularly conked out and turned the ship into an instant free-flight.

Back To School

The Milwaukee Flying Electrons are strong supporters of RC Scale. Their well-promoted contest last August, directed by Larry D'Attilio, had a Precision Scale event as well as Sport Scale, something happening infrequently of late, unfortunately. In both events, skilled judges are a

to page 164

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Photo of model by P.T. Potege.

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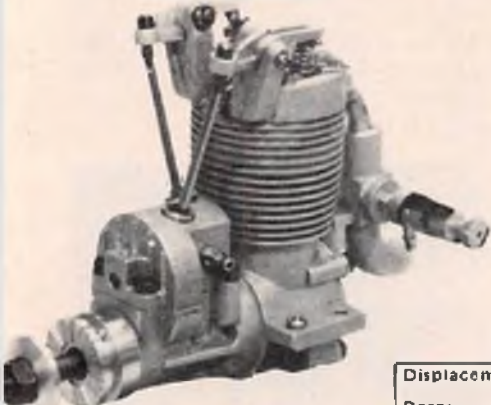
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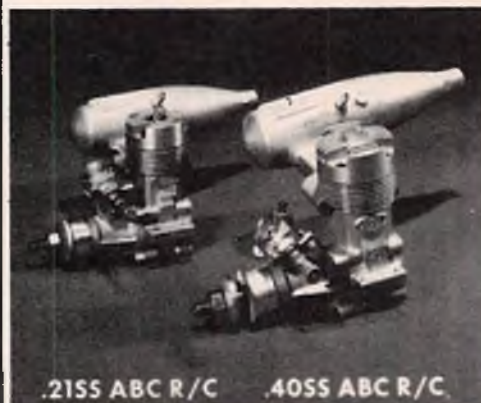
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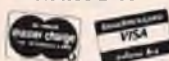
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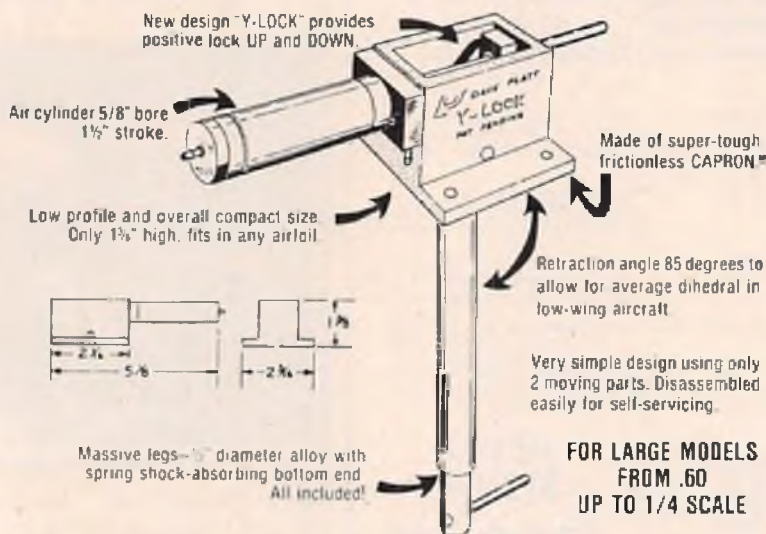
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SCALE VIEWS

from page 164/19

The Flypaper went on to state, "In debating whether judges should act independently or confer with one another, the class agreed on conferring, but then the judge is free to enter his own score." Again, I agree 100%. I am aware that a small minority of contestants get a little paranoid when they see judges conferring over their model, but in the long run it produces the correct result --- and that is only fair.



Dale Arvin places Eric Waterman's Stinson in the judging circle. Dale is the Mint Julep director, will be RC Scale Director at the 1979 Nationals.

The conferences do make general knowledge available to all of the panel, including mistakes by the builder that may have gone unnoticed otherwise. But if the best model is to be scored highest, and so on down the list, then this information is vital. Thoughtful contestants will realize that the "once over lightly" school of thought in judging can never produce consistent results.

It has become popular in the last few years to do piece-meal judging, in the interest of speeding up the process. One judge is assigned the tail surfaces, the second the wings, the third the fuselage, etc. They all operate independently and without any conferences since they are on different parts of the models. Their individual score is the only one the contestant will get for that particular feature. Trouble is, there is no leveling out effect between tough and lenient, competent and incompetent, as happens when they all score all of the features and the total scores are averaged. A major failing of a judge operating alone is that if he fails to see a serious error, there is no one to call his attention to it. But the real pitfall comes, and I've seen it happen, when a lone judge decides something is wrong when it actually isn't. Then a contestant is penalized for trying to do the most accurate job due to the inability of the judge to properly interpret material in the scale presentation. The more people there are looking at the presentations and the model, the less likely there is for a mistake. When judging shortcuts are

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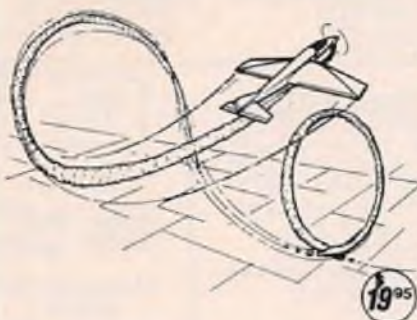
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made. I wonder if we haven't lost sight of the fact that contests should be operated for the benefit of the contestants and not the convenience of the meet officials. Congratulations to the Electrons for getting down to the essence of the matter.

Judging The Judges

I've been a contestant and I've been a judge, and believe me, I'd rather be a contestant. Judging is a thankless task --- someone is always unhappy with your efforts. I salute all those with the patience and fortitude to take on the job. But we are all human and sometimes even skilled judges make mistakes. Because of my Scale Contest Board work, I often get picked by disturbed contestants to look at their carbon copy and try to explain inconsistencies. Maybe it will be of help to all concerned if I mention some of them.

Most common is simply a failure of observation on the part of the judge in awarding accuracy of outline scores. When a popular kit, well known to have been fairly radically altered, gets more points than another design known to be exact scale, it is hard to find an excuse. Careful study of the plans, pictures and model during judging will always reveal when the design is exact scale and when it has been tinkered with. The ruler will tell you in Precision Scale, the eyeball will in Sport Scale.

Next comes the matter of a 3-view in Sport Scale. The only set of Sport Scale rules ever submitted to the Scale Contest Board (by Dave Platt and Clark MacComber) and accepted as the start of the event we have today, specified from the beginning that the contestant could present only pictures to the judges without a 3-view if he desired, though he could also present both 3-view and pictures if he desired. However, the idea of a 3-view for judging was so deeply ingrained in the scale procedures that there were repeated instances of judges down-grading scores because a 3-view was not submitted. So, even though the original rule was perfectly clear, the Scale Contest Board rewrote the book to make it definite that a 3-view was not required if picture coverage was furnished instead. And the pictures need not be exact plan views but should show the subject from several angles. Surprisingly, there are still judges who have not gotten the word. At a major contest last year a judge wrote "No 3-view" in the remarks section of the score sheets of every flier who did not have one, the unmistakable implication being that scores had been down-graded because of this. Judges, please read Paragraph 5.2!

Close on the heels of "No 3-view" notes are ones saying "No color pictures" and "No color chips." Now these are perfectly good proofs of color and markings but there are other

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SCALE VIEWS

from page 167/19

acceptable proofs listed in the rule book. Most importantly, there is no intent, either expressed or implied, in the rule book that you **must** have color shots or paint chips. For one thing there are hundreds of airplanes for which no such thing exists. Even if they do exist for a particular subject, there still is no requirement that they have to be furnished if one or more other types of proof are submitted.

In mentioning these lapses I do not infer that the contestant can use the rules to avoid submitting reasonable proof of accuracy of outline, color and markings. But on the other hand the judge cannot apply his own version of what the rules are. A little common sense, plus careful reading of the rule book, will go a long way toward helping the contestants and judges to co-exist in harmony.

Bookshelf



Mustang and F2G racers --- two of the 146 3-views in "The Air Racer."

The Air Racer. By Charles Mendenhall. Published by Specialty Press, North Branch, MN 55056. 184 pages, 8 1/2" x 11". \$10.95. Material in this book had previously been published in 3 volumes under the titles "The Early Air Racers in Three-Views, 1909-29," "The National Air Racers in Three-Views, 1929-49" and "The Modern Air Racers in Three-Views, 1929-75," which sold for a total of \$14.95. So the new combined edition is a good bargain at something like 7 cents each for the 146 3-views (some are 4 and 5-views) covering 234 aircraft with 14 pages of individual profiles and 12 pages of racing facts thrown in as a bonus. Plentiful notes on color and markings are included. As those who looked up Section 5 of the Sport Scale rules (and Section 4 of the Unified Judging Rules) now know, these are acceptable proof for a scale presentation. More interesting reading material is included than you might imagine, in the form of data, history and specs on each plan. I liked it. So will you. □

and the crankcase bore isn't round? Now I'm not talking about roundness to 1/10,000 rather 1/100,000, something most people don't even have a way of measuring. In a stock engine, it's not too much of a problem. The piston is just given a slightly tighter fit and it wears into whatever shape the sleeve is — theoretically. And I guess it works okay. It even apparently cures the problem of the ridges in the crankcase bore caused by the head bolt holes which are drilled and tapped after the crankcase bore is machined, resulting in six nice ridges right at the upper part of the crankcase where the piston-sleeve fit is most critical.

Anyone who has built a few K & B .21's has run into the following dilemma. You're going to put a new piston and sleeve in your engine. The sleeve bore is made on a taper so that the piston is loose in the bottom of the sleeve, but the piston will wedge up solid somewhere between .150 to .200 from the top, while you're holding it in your hand. You put the piston and rod in the engine, slide the sleeve in and then find out the engine will turn over with no drag between the piston and sleeve! What's happened is the thin brass sleeve was probably slightly distorted. It only takes a few 1/100,000 to do this, which isn't very much at all. Putting the sleeve into the crankcase bore helped to make it round again, instead of oblong, letting the piston slip through easily! And this next example is much more common. You've put the piston and rod in, and then slipped the sleeve in. The piston still wedges .150 to .200 down from the top — great. Next, you put the head on with the six 4/40 screws being careful to tighten each screw in the recommended sequence, and then torquing correctly, without over-tightening. With the glow plug removed, you find the engine will again turn over freely without the piston wedging at top! This is easily understood when you realize the top of the crankcase is not machined flat, the upper and lower mounting surfaces on the sleeve are not machined flat so mounting the head distorts the sleeve enough to free up the piston. Now you can understand more easily why I don't know how to do an article on modifying a K & B .21 without the use of a machine shop, which would only benefit a few.

My suggestion for the majority of you, is to just put a larger carb on and run up to 30% nitro. Don't pull the engine apart and you'll probably go just about as fast as anyone. For you would-be engine builders — Good Luck. □

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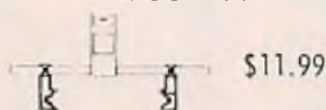
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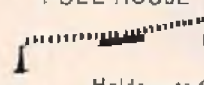
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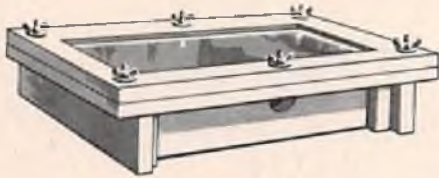


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ENGINE CLINIC

from page 12/10

does pass through, excluding sticks, big rocks, etc. If you filter your fuel when filling your fuel tank then this should be no problem and it is best to have the filter between the pump and carburetor.

A pipe that is too long will not give maximum power increase and just be a good muffler. Being too long will not hurt the engine any more than a conventional muffler. If a pipe is too short it will cause the engine to be hard to adjust, and lean out in maneuvers. This leaning in maneuvers can, in turn, damage the engine the same as running an engine too lean without a pipe. So, when using a tuned pipe for pattern work, it is better to have it a little too long than too short.

You want the whole pipe system to be as leak proof as possible. It is pressure waves that you are working with. Leakage at the exhaust stack will affect the pipe's performance considerably. Sheet asbestos makes a good gasket that shouldn't blow out.

Pipe or muffler pressure, in conjunction with the Perry pump, will prove beneficial. Occasionally, during a tight maneuver, if the pick-up tube is exposed and draws air, it takes a few seconds for the pump to recharge itself. This can result in the engine dying. The use of muffler or pipe pressure helps the pump to recharge immediately and eliminates the problem.

It is always best to break a new engine in without either a muffler or pipe. Both cause back pressure and increase the carbon and varnish formation in an engine. However, if one has to abide with noise restrictions at their particular flying site, then you have no other choice than to use the muffler or pipe during the break-in. In this situation it would be best to give the engine a little bench running break-in time without the pipe or muffler if you can find a place where this can be done. But always be sure that the bench running is up off the ground --- not a test stand on your tool box or in the airplane sitting on the ground. Many engines are broken-in and worn out this way before they ever get into the air due to dirt ingestion.

Dear Mr. Lee,

I purchased one of those K & B 6.5 cc (9000 series) engines and must say I am pleased with the performance it has. But its fuel guzzling ability is something else in that a 12 oz. tank will last 5 to 5½ minutes in a Dirty Birdy 40.

I run off muffler pressure and notice fuel being blown from the front of the engine appearing to be coming from front ball bearing. A K & B representative at the Toledo show said he thought muffler pressure was a superior choice over the Robart Super Pumper. Do you agree with this and do you believe the fuel consumption is

to page 179

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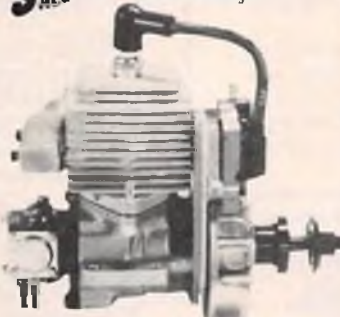
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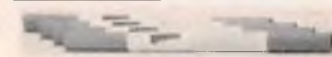
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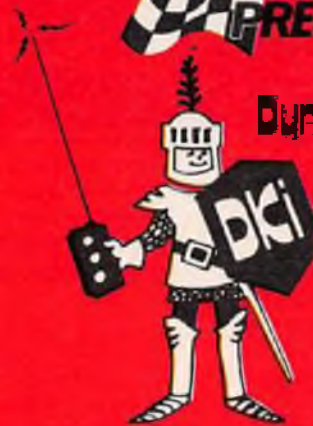
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ENGINE CLINIC

from page 176/10

normal and, if not, what can be done about it?

I am using Red Max 15% fuel. Any help will be much appreciated.

*Yours truly,
 Will Shea
 Woodstock, Ill.*

High fuel consumption is the price you have to pay for a high performance engine. It takes fuel to develop power. I would say, however, that 5 to 5½ minutes with a 12 oz. tank is higher than

normal for the K & B 6.5 front rotor engine. You should be getting closer to 10 minutes. Are you sure that your tank is filling all the way? Also be sure that there is no siphoning effect taking place at the vent tube. If you are using a muffler with muffler pressure there would be no problem with siphoning.

The K & B 6.5 front rotor engines do run pretty "wet nosed." This is due to a pretty short seal area behind the front bearing. Some fuel leakage here is desirable as it assures the front bearing of adequate lubrication. If there were no leakage whatsoever the front bearing would run dry and be very short lived. If leakage out the front bearing is

excessive, as yours seems to be, there is nothing you can do about it other than return the engine to K & B for checking. The crankshaft, front housing or both, will have to be replaced with ones with a closer fit.

As far as muffler pressure versus a Robart pump — muffler pressure is usually sufficient unless your tank is mounted some distance from the engine or too low in the aircraft — then the Robart pump would be beneficial.

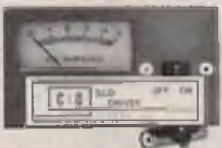
Dear Mr. Lee,

I have a problem with too fast idle on a Webra Speed .61. Following is an outline of the engine and possible solutions I have tried that did not help:

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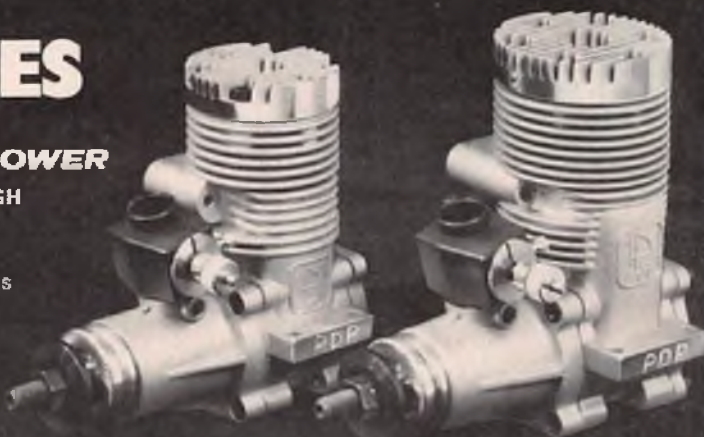
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.61 PDP* Model 6300

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DEALER INQUIRIES INVITED



Engine: Webra .61 - Perry pump and carb - (1976); Fuel: Cool-Power 10%; Prop: Zinger 117 1/2; Plug: Fox Long Reach idle bar.

Problem: Engine idles much too fast - estimated rpm 5 to 6 thousand - I can hold my finger over venturi at idle with barrel completely closed and there is no change in idle rpm and it does not kill the engine - indicates it is getting air from somewhere else other than venturi.

Solutions tried, that did not help:

(1) Replaced original carb with Perry pump and carb; (2) Completely disassembled engine and checked for air leaks, (sandcasting defects, bad gaskets), none found; (3) Checked cylinder liner to see if ports were out of alignment - they were okay; (4) I also sealed the carb and set screws with silicon gasket material - no change.

The rpm on high side is fine. I've run out of ideas except for one, perhaps the

porting is wrong for a reliable slow idle on this particular engine. (I've seen many Webra's run and this one of mine is the only one I've seen with this problem.) Thank you very much

Sincerely,
Tom Weemes
Hereford, Texas

Tom, although you seem to have checked everything out that could be causing your problem one thing is for sure — you have an air leak somewhere that you are overlooking. There is no way the engine could continue to run with the air intake closed off unless it were drawing air from another source. The gasket surface between the carburetor and crankcase casting is usually the place this most often happens. If there is no leakage here then the carburetor barrel may be too loose of a fit in its housing and drawing air through the side. A leaking back cover

could do this but top end and fuel draw would also be affected. A real sloppy fit crankshaft could also cause this but you would also have fuel blowing out the front of the engine like a spray gun. There is no way that port timing, etc., could cause this — only an air leak.

The best way to find the leak is by pressurizing the engine under water. Plug the exhaust and carburetor intake. Drill a hole through a small cork and insert a tube. Insert this into the glow plug hole. With the piston at bottom center, pressurize the engine with a fuel bulb under water. The air leak will have to show up.

For the benefit of other readers who may encounter the same problem, how about writing in and letting us know what you find.

Dear Mr. Lee,
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DEAR BART:
I INSTALLED THE AUTO MIX ON MY K&B LEE 6.5CC ENGINE WITH THE PERRY PUMP SYSTEM FOR MY A-4 SKYHAWK. THE ENGINE WORKED FLAWLESSLY WITH GOOD IDLE, TRANSITION, HIGH SPEED AND DID NOT FLOOD OUT. THE AUTO MIX ELIMINATED THE CRITICAL DIMENSIONS OF PUMP SYSTEMS ON HIGH PERFORMANCE AND SPORT ENGINES SO THAT ANYONE CAN USE A PUMP WITH GREAT SUCCESS. I'M PUTTING AUTO MIXERS ON ALL MY PUMP EQUIPPED ENGINES.

ERIC MEYERS



I AM SURE GLAD THAT YOU GOOD FOR MAKE AN AUTO MIX AND SUPER PUMPER WHEN I RECEIVED MY WEBRA 91 WE COULDN'T GET THE ENGINE TO RUN AT HALF THROTTLE. IT SIMPLY WOULD NOT DRAW FUEL AS THE CARBURATOR DIAMETER WAS TOO LARGE. I THEN INSTALLED A SUPER PUMPER AND AUTO MIX AND THE PROBLEM WAS SOLVED. I PLAN ON USING THE WEBRA 91 CARBURATOR ON MY FUTURE PATTERN AIRPLANE NEXT YEAR BECAUSE THE WEBRA 91 CARBURATOR HAS A GREAT MIXTURE CONTROL. AS THE WEBRA CARBURATOR IS UNPRESSURIZED YOU MUST USE THE SUPER PUMPER / AUTO MIX.

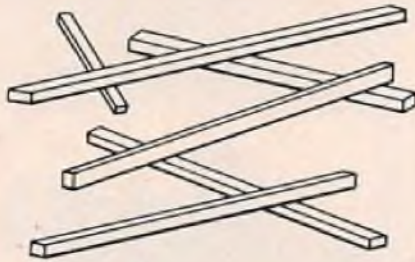
FRED



JUST A NOTE TO LET YOU KNOW HOW THE SUPER PUMPER / AUTO MIX COMBINATION IS WORKING OUT. I HAVE INSTALLED IT IN MY LAS VEGAS TOURNAMENT OF CHAMPIONS AIRPLANE WHICH USES A 91 ENGINE. RESULTS ARE OUTSTANDING. IT WORKS PERFECTLY AT ANY RPM AND IN ANY POSITION AND TRANSITIONS FROM LOW TO HIGH SPEED ARE VERY SMOOTH. I HAVE LOCATED THE FUEL TANK FAILURE POINT BEHIND THE REAR AND BELOW THE ENGINE WHICH IS ENCOUNTERING ANY PROBLEMS. IN SUMMARY I AM VERY PLEASED WITH THE TROUBLE FREE PERFORMANCE OF THE SUPER PUMPER / AUTO MIX.

DEAN KOEHL





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FIRST IN SPRUCE-

engines. In particular I would like to restore some older engines I have that suffer from vibration. It is perfectly obvious that the trouble is bent cranks. Is there any way to straighten a bent crank within reasonable tolerance so that it will run well enough for sport flying?

For instance, a K & B .15 rear intake Schneurle which is out of production. The K & B customer service sent it back to me with the comment that they do not make it anymore. If I cannot straighten the crank, do you know of a place to get a replacement?

Did you ever try having a sleeve chromed with industrial chrome to bring back the compression?

What else can a person do to get one more season of flying out of an engine?

For straightening I have a Unimat lathe and an indicator but not much practice. Have you ever tried doing

something for a bent crank?

Thanks for the wealth of insights and understanding in your column.

Sincerely,
Robert Stempert
Appleton, Wisc.

I straighten crankshafts all the time and over the years have probably straightened several thousand. Brand new crankshafts will warp during the heat treating process. They will be given a finish grind operation that trues the bearing surfaces but the threaded portion can still have a run out much the same as a bent crankshaft. I check the run out and straighten the crankshafts in all the new Custom engines I sell.

In the case of a crankshaft that has been bent due to crash damage — it depends on where the crank is bent whether it can be straightened or not. If ahead of the front bearing they can usually be straightened if not bent too

severely. If in the main portion of the shaft they cannot. Generally, if the crankshaft still spins freely in the bearings, the bend is in the threaded portion and can be straightened. However, this does require the use of a lathe and dial indicator.

Hold the crankcase with the crankshaft in place in your Unimat. Put your dial indicator in the tail stock chuck. Hold a strip of shim stock or metal on the threads at the end of the crankshaft with the dial indicator on top of the shim stock. This cancels any error from thread bouncing. Find the high (or low). Remove the crankshaft from the case and put a prop nut on the end of the crankshaft. Set it on a flat surface with something under the prop nut to make the shaft level. Hit the shaft just ahead of the bearing seat with a hammer and brass rod. Put it back in the case and check again. With a little trial and error

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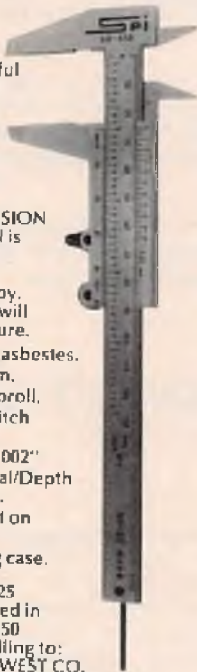
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you should get it straight. A total indicator run out of .001"-.002" is okay.

There is more to restoring compression in an engine than just chroming the sleeve. When an engine has lost its compression other parts will be worn as well --- piston, rings, con-rod, etc. Chroming in the case of a worn out engine is just a means of bringing the worn part back to original dimensions. In the case of a sleeve, it would have to be honed oversize --- chromed undersize --- then re-honed back to standard size. This is a pretty expensive operation. The cost would be too great to justify doing this just for another season of operation. If an engine has a lapped piston/sleeve as did the K & B .15 the piston could be chromed oversize and then ground or lapped round again. Then fit to the old sleeve which would require honing to clean up any out of roundness and taper, scratches, etc. Again cost would be prohibitive and, even then, chances are pretty good that the wrist pin holes in the piston are also worn and you would only be wasting your money. The wrist pin holes could be reamed oversize and a new wrist pin made but, again, unless you can do this yourself the cost would not justify the result.

I am afraid that when an engine is worn out and the manufacturer no longer has replacement parts it is best to retire the engine. As far as the K & B .15 Schnuerle --- I do not know of any source of replacement parts. K & B has been out of most of the major parts for several years. This was a very popular engine and when production was discontinued many fellows hit the hobby shops for available parts at that time just to have replacement parts for the future. It is pretty hard finding any parts any longer.

Dear Clarence,

Being a long time Fox engine fan, I noted with some interest the letter from "A Reader, Australia" in a previous Engine Clinic.

I have had exactly the same problem with the Fox Hawk .60 and so has a friend. Set the thing right on the ground and it would lean and quit in the air. Set it rich on the ground and it would lean and most times quit in the air.

To make a long story short (two weeks of tank, fuel line and carburetor fiddling before I noticed the engine was wet with fuel after running), the head bolts were slightly loose --- not loose enough to affect the compression when turning the engine by hand but it sure did the number on reliable runs. I tightened the head bolts and that was the end of the problem.

I talked to Fox Manufacturing and they attribute the loosening of the bolts to gasket compression. They indicate that, after two or three snuggings of the bolts, they will stay tight. Fox also stated that there is a remote possibility that the same problem could be caused by the

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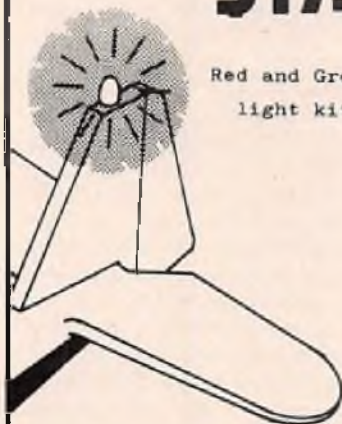
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bearings settling in the case resulting in crank drag.

Sincerely,
Wiley C. Bunn
Ogden, Utah

Checking the head screws for tightness is something that should always be done after the first flight with a new engine. Something that few fellows bother to do, however, until they do start experiencing problems with head leakage. Any time an engine is run lean the head screws should also be checked for tightness. When an engine gets hot, the aluminum parts expand stretching the steel screws. Upon cooling, the aluminum parts retract leaving the screws loose. So checking head screws along with the back cover and mounting screws occasionally is a good habit to get into. □

CUNNINGHAM ON R/C

from page 8

thoughts that you might have had about what you need to practice your flying, or perhaps the name and phone number of a new found flying friend.

One of the points about a field box that you really need to understand is that everything stays in the field box. If you take anything out to use while you're at home, you're going to leave it at home. That's Murphy's First Law of RC. This really doesn't have much to do with a check list yet, but is the basic idea for getting prepared to fly. Now, let's get into the realm of checking what to take with you each bright day that you leap into your gas guzzler and head to the field.

Tool Box: Since we have been talking about it, don't forget to take it with you. While you're picking it up to load into the car, how much fuel do you have with you? If it isn't enough then take some more. Nothing is worse than the "fuel bum" at the flying field. Perhaps the "fuel bum" is closely followed by the "prop bum" and, in turn, followed by the "glow plug bum." Don't be a bum, plan ahead and take what you're going to need with you. Take just a minute to check on your rubber band supply. Rubber bands are cheap. Don't try to stretch them flight after flight. Toss them away. After all, rubber bands are much cheaper than replacing an aircraft. Another item that is good to include with your field box is a roll of paper toweling and some type of spray cleaner. Many things can be used to clean your oil soaked aircraft after a flying session, but whatever you take use it. It will prolong the life and beauty of your aircraft, and your life also. Nothing is worse than to trot across mama's carpet with an aircraft dripping with oil. This alone could end your flying career forever.

Back to loading your automobile. Put

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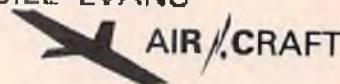
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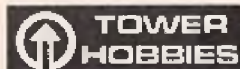
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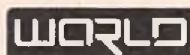


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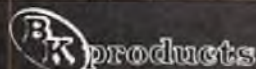
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in the aircraft fuselage, one or two wings, the field box, the transmitter, and of course the small box that contains the cold libation, be it Coke, Dr. Pepper or Coors --- after all, flying is thirsty work. Think you're done? Nope, how about your sunglasses, a hat, (everyone flies in a hat, don't they?) and the most important part, a rag to wipe your hands on. Oil is tough on pants and washing machines.

Of course, if you're taking two airplanes to the flying field this compounds the problem and really makes you stop and think whether you have both transmitters, all of the wings, the correct wings, etc. If you have a simple check list, all of this becomes a little easier to keep track of.

Many parts of the country have a great lack of flying fields, either too many houses, or too many trees, or too many people. This spring our club, the Fort Worth Thunderbirds, have been invaded by the young sun worshippers. As many of you long time readers know, we fly on the shores of a lake which is the property of the Corps of Engineers. The edge of the lake is several hundred yards away, and this area has been pretty much deserted --- but not this spring. We have been overrun with young people out to have a good time, throwing frisbies, flying kites, riding motorcycles and dune buggies back and forth on the paved flying field, ignoring our protests of safety and, in general being one large (several thousand each weekend) pest. Only one redeeming feature can be found in all of this mess, some of the young ladies enjoy lots of sun exposure. I've heard it muttered that some of the troops were going to get a frisbie and join them. But, at least for the spring, our flying field of the past fourteen years is in jeopardy. We hope that the Corp of Engineers can do something to help the situation before someone gets hurt by an out of control airplane. This raises an interesting problem in flying safety; where do you fly to avoid the crowd when the crowd is everywhere that you look?

One last thought before closing this month. I want to thank all of you who have sent pictures of your completed Lazy Ace, Miss Texas, or Sporty Ace. I'm building quite a collection of photographs. Some of the most interesting that I have received have been from Jim Miura who does his flying on the beach at Honolulu. Jim is quite an artist and a builder of beautiful models. Wish that he lived closer, could sure use his talents. The pictures of his Lazy Ace are really super and Jim writes:

Dear Chuck:

Here are some shots of my Lazy Ace with Beverly Leilani Roskopff. Now you can see what it looks like in color as well as black and white. I'm having great fun with the big pipe. I plan to install an OS .90 in it as soon as I get hold of a motor mount. With my OS .60 I've tried 14/4,

14/6, 13/5 1/2. Under calm conditions the 13/5 1/2 seems to be the best. If there's wind, the 14/6 seems to do better. The take-offs and landings are the most delightful, just beautiful and magnificent!

Aloha,
Jim

Nothing makes a model designer happier than to get letters from builders and fliers who are having fun with his brain child. Not only is Jim a builder of beautiful models, but he is also a connoisseur of beautiful models of the female variety. I like to use a 13/5 prop the best on my Webra Speed .61 and find that the 14" props lug it down a bit too much.

Once again, to heck with the gas problems; load up your treasures and go out to fly, but be sure that you take everything with you.

Next month we will take one last look at designing your own RC aircraft, and to investigate some of the thoughts that we may have passed over too rapidly. If you think of something that I have left out of my tool box, be sure to put it in yours, and add a couple of wheel collars to your little hardware box. □

FROM THE SHOP

from page 2

It is true that we have a basic responsibility to stay the hell out of the way of piloted aircraft, with or without a "letter of procedure" such as the above. But now, it becomes multiply important to comply with this letter. Should there ever be an incident (God forbid), compliance or not with this letter will have a tremendous impact on ensuing legal procedures.

You may wonder if the OLF tower telephone will become irritated at upwards of 40 or more calls each Saturday and Sunday morning. The answer is, not all all. Call.

After some time, an agreement may or may not be worked out to cover weekends as a blanket, but this is beside the point. Call. Don't depend on the other guy. Call each and every time you come to the field.

And to close on a happy note, we received this letter:

Dear R/C Modeler,

I just had to mail these pictures to you as Mr. Rogus (Grandpa) has been flying models for 36 years - what a great clean hobby - we have four children and eleven grandchildren. I'm so happy to see we may have another flyer in the family, Jason, age five - also, we do enjoy reading R/C Modeler.

A happy grandma,
Sandra V. Rogus
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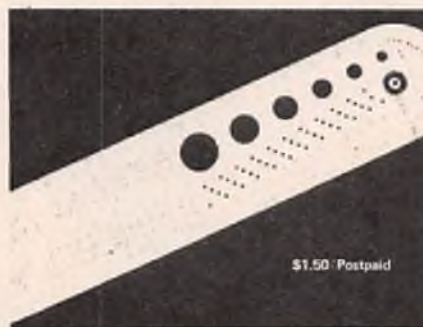
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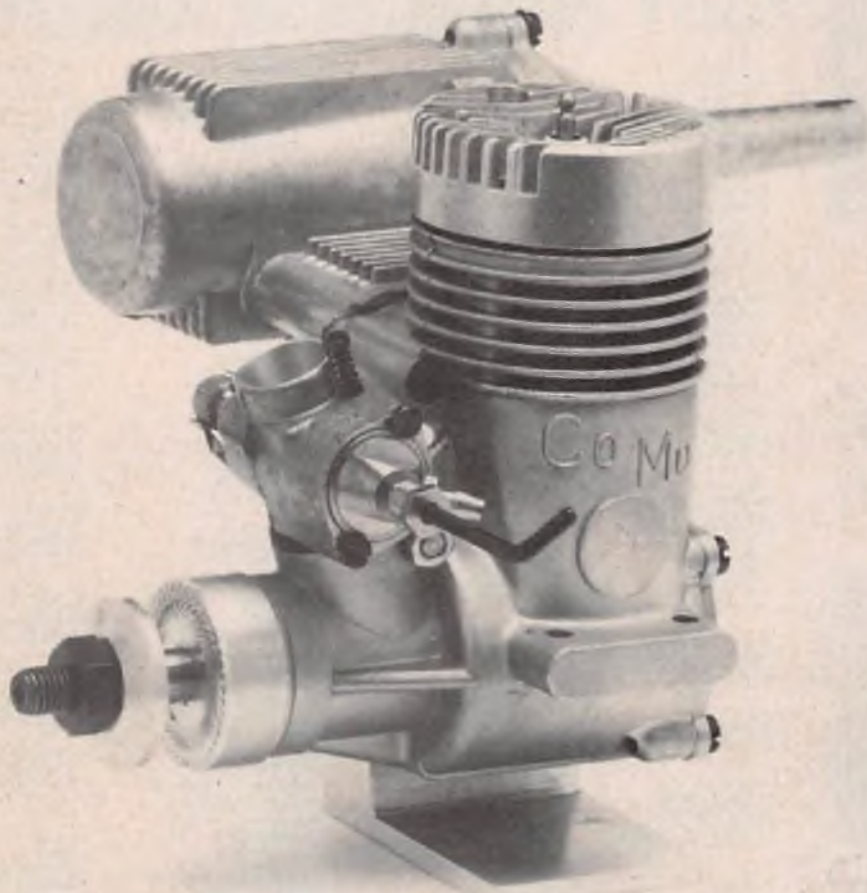
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MOTOR: 18mm Dia.
IC: Signetics 544
CONN: Male and Female 3 pin
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This is a typical sports servo and should be compatible with Kraft, World, Futaba, Sanwa, Cannon, and other recent positive pulse systems. May chatter a little on some older systems (5 years).
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2 Linear pot motor control on left side of the transmitter.

3 Vinyl covered thick sheetmetal case - stronger than plastic - with attractive Indy decal.

4 Receiver in metal case with pigtail connectors to servos. The pigtail connectors make it easier to place the receiver in a tight installation.

5 Battery boxes supplied that will accept either

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6 The servos are color styled the same as the transmitter case. They are small and use a 16mm motor. Conventional amplifier uses Signetics 554 IC.

7 TRADES - We take engine trade-ins on this R/C system same as on engines. (See our Como engine advertisement in this magazine.)



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(We don't recommend you long range test as we did, because it takes an experienced flier to control a plane based on voice instruction and no visual contact.)

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MRC'S R/C GUIDANCE SYSTEMS LONG RANGE TESTING, LAKEHURST NAVAL AIR STATION LAKEHURST, NEW JERSEY. MARCH 1979.

