

# RcM



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# MODELER

**EDITORIAL**

From The Shop 2

**FEATURE ARTICLES**

The Sting	32
Silent Power	37
RC Flying And The Law Part XII	38
Take A Sailplane Out To Launch Today	42
Lou Proctor And His Magnificent Flying Machines	44
RCM Visits The Air Force Museum	46
Vaireze	49
CG Or Not CG --- That Is The Question	53
Trans Mitt	54
Semperfi	56
King Rat And His Pietenpol Fighter Bomber	65
Get Your Pants On!	70
RCM's Model Of The Month Contest	170
A Better Way To Clean Engines	178
Aileron Servo Connection	178

**DEPARTMENTS**

Cunningham on R/C	8
Engine Clinic	10
Sunday Flier	15
Soaring	22
Scale Views	27
Radio Spectrum	61
Big Is Beautiful	63
Pit Stop	66
Here's How	68
For What It's Worth	74

**PRODUCT REVIEWS**

Micro-X Products: Taylorcraft	19
Prather Products: Prather 40 Deep Vee	40
Craft-Air Inc.: Drifter II	41
Royal Products Corp: Pitts S-2	64

**MERCHANDISING SERVICES**

Showcase '79	76
Readers Exchange	188
Advertisers Index	189
Readers Service	189

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Eloy Marez

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**This Month's Cover**

features internationally known model, Debbie Zullo, surrounded by products that will bring Christmas cheer to any modeler. Photo by Dick Tichenor.

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# From the Shop

DON DEWEY



John Elliot gave a little extra coaching to Miss Debbie Zullo, Race Queen. Dick Tichenor photos.



Dick Kidd took a turn for the press drivers. The press beat the pro drivers by only 1 second for fastest time.

They call it fringe benefits. They, in this case, are our Rover Boys, Dick Kidd and Dick Tichenor. B.F. Goodrich extended an invitation to RCM to attend a press preview of the 7th Annual B.F. Goodrich SCORE Off Road Vehicle Races at Riverside (California) Raceway. Our guys justified attending the press party because Goodrich had set up a scale model of the race course and Cox Hobbies was supplying R/C cars and support personnel for races between the professional drivers and members of the press.



The two Dicks came back the following day with a few tales of their adventure and they smiled a lot. The Cox R/C cars were the hit of the party and B.F. Goodrich was a superb host with an out-of-sight catered luncheon. There was also some reference to four open bars at the party and demo rides in the four wheel drive machines.

Our compliments to John Elliot and Don Hatcher of Cox Hobbies for a first class public relations job in promoting R/C to the press and racing fraternity. Thanks to B.F. Goodrich for the Blimp Pilot Certificates given to our guys and the change of pace for the RCM staff.



We received the new issue (Vol. II, No. 3) of the Quarter Scale Association of America Monster News. As usual it is one dandy newsletter and in this issue the editor, Lee Taylor, bears down in his editorial column on a subject that should concern

everyone involved with large models. The following is a part of Lee's editorial.

*Quite a few of you out there still haven't fully realized just yet that we are dealing with miniature aircraft, not the usual model planes, and a couple of our members are now paying dearly for that attitude. What I am getting at are propellers. And the power of the engines that are swinging those props. Since we all started modeling, the standard starting procedure has been to grab the model with one hand, kneel down in front of the model, and flip the prop with the other hand. That was all well and good as long as we were still playing with the little birds with toothpick props and small engines. Even the .60's could be restrained this way, albeit with some difficulty.*

*Now, however, an entirely different situation has come into being, but almost all of you are still starting the planes the same way. The planes are so powerful that an anchorman has to really strain to hold onto these birds at full throttle, and the props are so big that they are darned hard to reach around. It hasn't affected our starting procedures, though, we still kneel down in front (no chance of getting away from a charging plane), reach around the prop to hold the plane (no thought to those prop tips 1/2" from the forearm), and start the birds without an anchorman holding on (don't worry, it's on low throttle).*

*Guys, we gotta break that habit, and I'll tell you why. These planes aren't gentle --- they are big and they are powerful. Those props are big, they have quite a bit of inertia and, if you get tangled up in one of them, **they are mean!** Several of our long-time members are sporting scarred forearms where those prop tips got a little too close. One member is even*

to page 185



Don Hatcher and John Elliot, Cox Hobbies, got 'em started and kept 'em running. Dick Kidd tries to learn how.



Dee Robson, representing B.F. Goodrich, gets Dick Kidd suited up for a demo ride.



Miss Vikki Carr handled the R/C buggies as well as she handled her full size jeep.



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HERE'S YOUR CHRISTMAS PRESENT!

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**BEGINNERS! SAVE \$12.90**  
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Combo!



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Hobby Lobby Papillon  
Motor Glider & Cox .049  
Engine Total list price \$35.90

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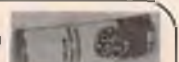


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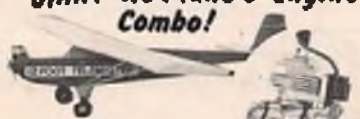
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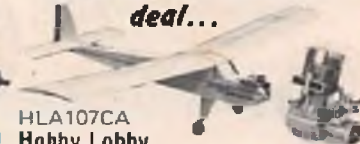
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Fantastic combination  
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**SALE! SENSATIONAL KIT PRICES!**  
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When you phone for your kit, order the **KIT ACCESSORY PACK**. We've figured out every 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.



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**DUM110 TAKE YOUR CHOICE ...**  
**1/2 PRICE WOOD KIT** ..... \$6.25  
—OR— List price \$12.50  
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List price \$22.50



Here's a cheap and easy way to try RC boating. Order either the easy-to-assemble wood kit, or the fully assembled fiberglass kit. Use an .049 to .09 or .10 engine.

Order one of the following Running Hardware Kits:  
**DUM209 Running Hdw. for Cox .049** ..... \$10.50  
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**SALE! SENSATIONAL KIT PRICES! PHONE your order in quickly!**

Prices in effect only to December 30, 1979, COD or CREDIT CARDS only!

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.



**Midwest CESSNA A-R-F** MID125  
List price \$34.95  
**ALL-FOAM—ASSEMBLED!**  
Flies best with a .15 and 3 channels.

**SALE!**  
\$21.99



**Bud Nosen AERONCA CHAMP**  
List price \$99.95  
**9 FOOT SPAN!**

**SALE!**  
\$69.99



**Midwest SUPER CHIPMUNK** MID126  
List \$36.95  
**ALL-FOAM ASSEMBLED!**  
46" span for 3 channels and .10 to .19 engine.

**SALE!**  
\$22.99



**Sig COLT** SIG043  
List price \$25.95  
45" span **FOAM WING**.  
3 channel trainer. For .09 to .15 engine.

**SALE!**  
\$17.99

**SALE! SENSATIONAL KIT PRICES!**  
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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.



**Sig KOUGAR** SIG035  
List price \$52.50  
**SHARP LOOKING 4 CHANNEL** plane. 51" span for .35-.50 engine.

**SALE!**  
\$36.99



**Sig PIPER J-3** SIG003  
List price \$49.95  
**SCALE KIT**. Big 7" span for .19 to .35 engine. 4 channels.

**SALE!**  
\$34.99



**Sig BEECHCRAFT BONANZA** SIG041  
List price \$77.50  
**SCALE!** with easy-to-build ABS plastic cabin. 64" span for .60 engine.

**SALE!**  
\$53.99



**SUR116 Sureflite PIPER J-3**  
List \$39.95  
For .15-.19 engine, 52" span, 2 to 4 channels, 2 hour assembly.

**SALE!**  
\$23.99



**SUR109 Sureflite CESSNA SKYLANE 182 FOAM A-R-F**  
List \$39.95  
For .15-.19 engine, 53" span, 420 sq. inch area, 2 to 4 channels. Steerable nose gear, 2 hr. assy.

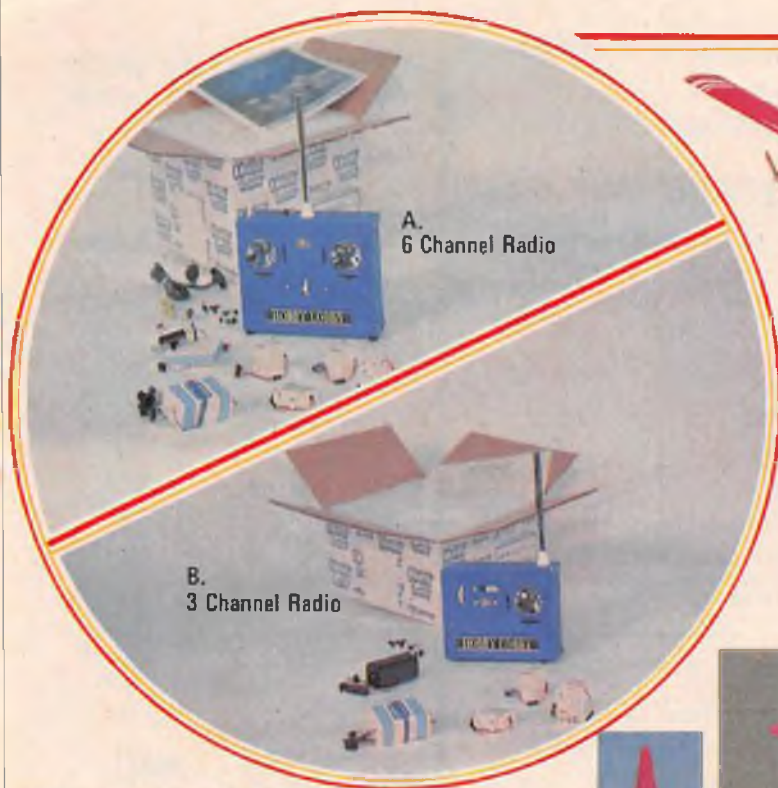
**SALE!**  
\$23.99



**Top Flite F4U CORSAIR** TOP121  
List price \$99.95  
61" span for .60 engines, 4 channels. Pre-formed balsa fuselage shells to simplify construction!

**SALE!**  
\$59.80





A. 6 Channel Radio

B. 3 Channel Radio



C. Papillon



D. Senior Telemaster



E. Junior Telemaster



F. Power Center



J. Mini Star



G. Z-10



H. 12 Foot Telemaster



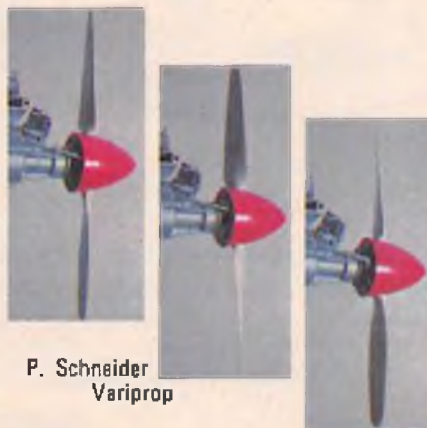
I. Evra 190 Engine



L. CF-5 Tiger



M. Cessna Skyhawk



P. Schneider Variprop



Q. Cessna .09



R. Superkote



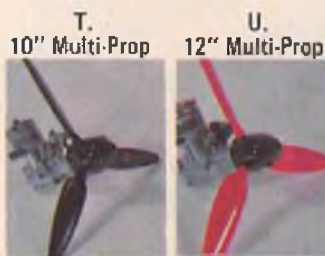
N. Gemini Bipe



O. Easy Flyer



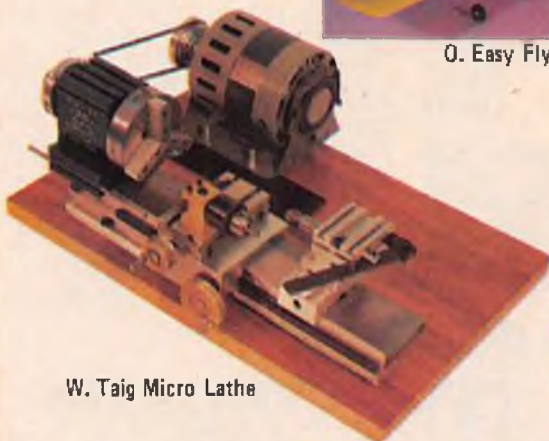
S. Tiger



T. 10" Multi-Prop

U. 12" Multi-Prop

V. Delta 40



W. Taig Micro Lathe

**615 373-1444**

*Hobby Lobby gives you the best phone and mail-order service in the RC hobby!*

Phone in your order and have it shipped the same day. We can ship COD or you can charge it to your VISA or MASTER CHARGE card, (\$3.00 handling on COD or Credit Card). On mail orders add \$1.90 for handling.

**HOBBY LOBBY**  
INTERNATIONAL

Route 3, Franklin Pike Circle  
Brentwood, TN 37027



# Hobby Lobby INTERNATIONAL

## A. HL 6 CHANNEL RADIO HLR004

The Hobby Lobby 6 Radio System is your best buy! Spare servos for the main flight functions covered only \$14 each; There is no radio made that is more reliable than a Hobby Lobby radio; Hobby Lobby radios are so redesigned electronically that many can be flown with transmitter antennas partially collapsed; The Hobby Lobby Radio will still work even if one cell goes dead in its airborne battery pack; You can move the direction of rudders of a Hobby Lobby servo in less than a minute; Control stick tension is adjustable; The servos are in a box strong enough for the largest 1/4 scale RC planes; Hobby Lobby radios are so precise that the servos center within 1/2 degree the same center every time; Hobby Lobby radios use very low current drain—they'll fly longer and serve on a charge; Service on HL radios is performed by the same people who sell them—US!

HLR200 Our Price \$219.00  
Flight Control Servo for HL6 and HL3 —\$14.00

## B. HL 3 CHANNEL RADIO HLR010

3 channel Transmitter; 3 channel Receiver, 3 servos, airborne battery box and switch harness, servo mounting grommets and extra output arms and wheels, Instructions, 3 month limited warranty and your choice of any 72-75 mhz. band frequency. The system requires 4 alkaline pen cells for the receiver and a 9 volt battery for the transmitter and is ready to install in your RC plane, boat, or car.

Our Price \$129.00

## C. PAPILLON HLA116

45% span, for 2 channels and .049 engine. Beautiful trainer, slope-soarer, schoolyard flyer, thermal soarer. Its slow, gentle flight is perfect for a beginner.

List Price \$24.95 ..... Our Price \$17.96

## D. SENIOR TELEMMASTER HLA107

The easiest flying RC airplane ever! Huge wing area (95" span, 1330 sq. in. area) and ultra light weight allow SENIOR TELEMMASTER to do things that other planes can't: Like 2 foot takeoff rolls; like 7 mph landings. For 4 channels and .40-.60 engines.

Regular Price \$99.50

Christmas Sale \$86.66

## E. JUNIOR TELEMMASTER HLA110

50" span, 409 sq. inch wing area for 2 to 4 channels (ailerons are included) and for .10 to .25 size engines. Machine cut balsa. Nice stable flight for the beginner who gets to start right off with "full-house" (4 channel) flight.

List Price \$42.95

Christmas Sale \$29.99

## F. POWER CENTER HLH302

6" x 3 5/8" power panel at a super LOW PRICE. Has connections for 1 1/2 and 2 volt glow plugs, 12 volt electric starter, electric fuel pump. Has "fuel" and "de-fuel" switch for pump. Has meter that indicates glow plug condition and current flow during last charging of your radio pack.

List Price \$29.95

Christmas Sale \$15.44

## G. HOBBY LOBBY Z-10 ADHESIVE HLH301

14 gram bottle. Why pay more than this for a cyano glue? Regular Price \$2.44

Christmas Sale \$1.99

## H. 12 FOOT TELEMMASTER HLA112

Gigantic 12 foot span RC plane with unique features like air-boosted ailerons (so one small servo can easily move both huge ailerons), 2-piece wing for easy transporting. Designed to accept our Evra 190 engine with its aluminum shock mount. Flying the 12 FOOT TELEMMASTER is as close as an RC'er can get to the sensation of flying a full scale plane.

List Price \$199.00

Christmas Sale \$139.00

Christmas Sale prices in this ad are good to December 30, 1979. Other prices are subject to change.

# Hobby Lobby INTERNATIONAL

## Christmas Sale HLE001

### I. EVRA 190 ENGINE

Hobby Lobby's EVRA 190 is a 2 stroke cycle ignition engine designed for very large RC aircraft, like most 1/4 scale planes and our 12 Foot Telemaster. It is 1.9 cu. in. displacement (31 cc.) roughly 3 times bigger than a .60 Runs very economically on regular gasoline mixed with 2 cycle oil.

List Price \$139.95 ..... Christmas Sale \$79.00

### Aluminum Firewall Mount with 4 Lord Shock Mounts HLE006 ..... \$19.00

Muffler HLE005 ..... \$ 9.00

## J, K, L, M, N, O—Hobby Lobby/JLM A-R-F Kits

All these fabulous "kits" are really "A-R-F's" (Almost-Ready-to-Fly). Wings are foam and are already sheeted with balsa and tips are in place. Fuselages come fully built plastic with fiberglass reinforcement. The fuselages are so smooth you can fly them "as is" if you want. Control surfaces are balsa. Just a few hours after you open the box you can have the best looking, most durable RC airplane you've ever seen.

## J. MINI STAR SAVE \$2000 HLA133

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.

List Price \$100.00 ..... SALE \$5900

## K. HARPOON FLYING BOAT HLA131

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 polyfite fuselage is automatically water tight.

List Price \$115.00 ..... Our Price \$93.00

## L. CF-5 TIGER SAVE \$3600 HLA134

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.

List Price \$135.00 ..... SALE \$6900

## M. CESSNA SKYHAWK HLA136

BIG—the fuselage is 6" wide at cabin! Near scale model that makes a great beginner's plane or beautiful expert model. 66" wing span, 680 sq. in. wing area, for 4 RC channels and .40-.60 engine.

List Price \$120.00 ..... Our Price \$95.00

## N. GEMINI BIPE SAVE \$2800 HLA135

Designed by Jim Newman, Gemini is a spectacular performer. J.L.M.'s clever engineering solves a host of biplane building problems: Fuselage and cabane strut—completed; wings—4 panels all sheeted with tip blocks in place; wheel pants mounting plates—soldered in place! 46" span, 740 sq. in. area. For .60 size engines and 4 channels.

List Price \$150.00 ..... SALE \$8900

## O. EASY FLYER HLA132

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 RC'er.

List Price \$100.00 ..... Our Price \$79.00

## P. SCHNEIDER VARIPROP VPP001

In-flight variable pitch propeller. 1 1/2" diameter, spinner size 2" diameter. For .40-.60 engines. A standard RC servo is sufficient to operate the pitch-change mechanism. Reverse pitch for very short landing roll—Low pitch for landing pattern and final approach—High pitch for fast entry to maneuvers such as 8 point roll.

List Price \$149.95 Christmas Sale \$99.00

HLA122

## Q. HOBBY LOBBY CESSNA .09 TRAINER

42% span, for .049-.09-.15 engines and 2 or 3 channels. All balsa—very easy to build. A great beginner's plane!

List Price \$38.95 ..... \$28.97

## R. HOBBY LOBBY SUPERKOTE HLC601-615

Sensational plastic heat-shrink model covering! Each roll is 27" wide, 6 feet long. Easiest to apply, tremendous shrinkability, strong, no air bubbles, requires low heat, invisible joints, great for foam airplanes, resists sagging.

601 Cessna White	606 Aero (R.) Blue	611 Terra Green
602 Beechcraft Red	609 Metallic Gold	612 Taylorcraft Cream
603 Piper Yellow	608 U.S.A.F. Aluminum	613 Metallic Blue
604 Waco (old) Blue	609 Midnight Black	614 Metallic Green
605 Ryan Orange	610 Campaign Brown	615 Metallic Plum

(NEW PRICES) ..... List Price \$8.69 per roll

HOBBY LOBBY PRICE \$4.99 per roll

## S. HOBBY LOBBY/TRUELINE TIGER

The 52" span foam wing comes READY SHEETED with Obuchi wood veneer—just epoxy the two panels together and cover with Superkote. The fuselage and tail are very simple balsa sheet structures. Construction is a snap! And does it ever FLY... ours holds knife-edge attitudes almost without the flyer having to hold control pressures. It does victory rolls straight up until it's almost out of sight, and it slows down like a trainer for easy landings. For .40 engines and 4 channels. A beautifully crafted English import.

List Price \$89.95 HLA115 Our Price \$66.00

## T. HOBBY LOBBY/SLEC 10" MULTI-PROP HLH201

List Price \$14.50... Our Price \$ 9.99

## U. HOBBY LOBBY/SLEC 12" MULTI-PROP HLH202

List Price \$15.95... Our Price \$11.99

Props can be adjusted on the ground to any pitch you want! Each prop comes with 3 blades, but can be used as a 2, 3, or 6 blade prop. HLH203 Spare 10" Blade — 99¢

HLH204 Spare 12" Blade — \$1.49

## V. DELTA 40 HLA123

DELTA 40 is a double-delta RC plane for 3 channels, (Aileron, Elevator, Throttle) and .20 to .45 size engines. It's big (53" long, 744 sq. inch wing area) and lightweight (only 3 pounds, 6 oz. with radio) so... it gets up and goes! Delta 40 flight characteristics are remarkable: Slow flight and landings are normally at a 20% nose up attitude with excellent handling characteristics. And high speed performance is about what you'd expect... WILD! Delta 40 will do axial rolls that'll blow your mind.

List Price \$74.95 ..... Our Price \$59.50

## W. TAIG MICRO LATHE TAI001

About half the price of competitive precision metal-working lathes! Taig Lathe is a heavily overbuilt machine that was originally designed for light industrial use. 4 1/2" turning diameter, 7 1/2" length capacity. Cross slide travel 1 1/2". Accuracy 5/10,000". Included are Taig 1 1/2" bed lathe, 1/10 HP Dayton motor, mounting board, 3 jaw chuck, 1/4" Jacobs drill chuck, 7 piece tool set, tailstock, stepped pulley & belt set, self-adjusting motor bracket. Many other accessories are also available.

Christmas Sale \$215.00

FREE! \$36.80 Milling Tool included with Lathe until December 30, 1979!

## NEW! "HOW TO RUN A LATHE" ... \$2.00

128 pages, 1000's of good illustrations. Covers all facets of lathe operation, from the simplest lathe to the most complex giant industrial machines. First published in 1907, the book has been revised and updated 55 times. A must for owners of our Taig Micro Lathe.



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Prices in this ad expire November 30, 1979!



**W**ith the October 1979 issue, RCM celebrated the Seventeenth Anniversary of its beginning. With the January 1980 issue, I will be celebrating my seventeenth year of being included among the pages of RCM. This column began December 1965, but prior to that time a number of articles were presented to you, beginning with January 1964. During all of that time many things have changed in the world of radio control modelers, and radio controlled models. Actually, the aircraft really haven't changed all that much, but the real advances have been in radios, engines, and the types of models flown. The one continuing thread running through RCM these past years is, however, the ever constant beginner. Seems that this will never change. RC is not the easiest sport in the world. Sure, it may be easier than sky diving, drag racing, etc., but it is a heck of a lot harder than most other sports, and it's one that is not easy to get started in correctly.

Several months ago I wound up another series on RC Design Made Easy which, over the years, has made the entry into the world of do-it-yourself RC design much less hectic and, now, for the fourth or fifth time, we are going to try to take a long, helpful look at the problems of the person really wanting to get into this great hobby/sport. Hardly a trip to the flying field goes by that I don't get asked, "How do I get started in RC and where do I go for help and advice? Where do I go to buy equipment, and what should I buy?"

Now, here is an interesting fact --- most beginners, or would-be beginners, have never heard of RCM or any of the other publications in the modeling field. They are exposed to RC by happening upon a flying field, seeing a mall show, watching a feature on TV, or in some other manner. But they are hardly ever exposed to RC by picking up a magazine on a newstand. This, then, creates a real problem --- how to help a beginner, if he never sees the pages of RCM until after he has made a number of mistakes. Since I don't have the answer to this problem, I have to make the assumption that those who are interested in learning about RC will be exposed at some reasonably early date to this publication, and that they will avail themselves of the



opportunity of gaining some information and knowledge from the very vast input that we all contribute each month. So, you want to start --- how do you do it?

The first question that you need to answer is one that you must ask yourself, "Am I interested in really becoming active, or am I interested in just sticking a bit of toe into the water?" Not everyone is suited to building and flying RC aircraft. It takes a dedicated person to overcome the trials and hardships of building the first aircraft, learning how to fly, and learning how to pick up the pieces of a demolished pride and joy, and starting over again. A lot of people simply cannot accept this disappointment, and will drop out (making some awfully good buys in slightly used equipment available). If you can answer in the affirmative, then stick with it, you're going to really get a thrill out of RC.

The second question, now that you've decided that you can stick with it, is how to get started and where to go for help. The best place for help is the flying field, the second best place is your local hobby shop. **You** have to be selective, both in who you ask, and what you ask. There really is no primer for beginners that you can purchase, and almost nowhere are there paid instructors, so, when you go to the flying field, observe for a bit. You will soon be able to pick out



the fliers who are helpful to others, and the fliers who really go out of their way to help and to teach. Sure, these men may be a bit overworked, but it's better to get advice from one who is sincere, than from one who may toss you any off-handed answer to your question. You also have to be selective in picking out a hobby shop. Lots of RC equipment is sold by toy stores, or stores whose real business is trains, or plastic shelf models. You need to find the hobby shop in your area that really speaks the language of RC. Look around, it may take some time, but chances are that in your city or town there is a hobby shop that will understand your needs.

Next question, "What do you buy now that you've found a hobby shop?" This is where the answers get a bit tough, and this is where this series is going to be of some help to you. Let's examine the options open to you as a beginner, not knowing just what your main interest may be sometime in the futures. Radios. Lots of choices here, not only what brand, but what stick configuration, how many channels, etc. Let's start with the brand. Your best bet is to purchase the brand of radio that you see most at the flying field in your area. In this way those who want to help you will be familiar with the operation of this radio, and problems that may crop up with it. If everyone in your area is flying a red box, then go out and buy a red box. If everyone is flying a gold box, go out and buy a gold box. Don't buy a black box just so that you can be different. Stick with what has been proven to those fliers in your area.

Next, stick configuration. The number of channels that you decide to purchase has some bearing upon the stick configuration, but not really very much. The vast majority of fliers in this country fly with the right stick controlling the elevator and the aileron, and the left stick controlling the throttle and the rudder. Again, if most people at the local flying field fly this mode, then do likewise, it makes it much easier to find a helping hand when you need one. Some modelers like to fly with the elevator and rudder on the left stick and throttle and aileron on the right stick, thus separating the primary functions of aileron and elevator between two hands. You can also purchase a single stick transmitter.





Hallo Clarence!

I am a Norwegian model airplane enthusiast, and my main interest is pattern.

Your column is very helpful, and the only reason I subscribe to RCM is for your and Jim Oddino's columns. The rest of the magazine is too full of "Sunday pilot stuff."

Well, I have a few problems I would like to have your comments on. The first is about my O.S. .60 FSR. Some pilots in our club are now using Rossi's, and they seem to beat my O.S. It could be interesting to try to get as much power out of it as possible. If it fails, I will not need it anyway. As I understand, the most important thing to do is raising the exhaust port, but how far can I go? Some boat racers I talked with said they used 170° on their hottest engines. On a pattern plane you have to have a fair idle too, so that is probably too much. I have a Webra Dynamix carb and a Rossi tuned pipe on my .60 FSR, and I use straight 80/20 fuel, as nitro is very hard to get here in Norway. As I can understand it, raising the exhaust port will cause lower compression. Should I do anything with that?

The other question is about carbon and varnish build-up in our engines. I thought this was a thing we have to live with, but I was very surprised one day when the following happened: My brother disassembled two of his engines, and found a big difference in carbon build-up. Both the engines are run on fuel from the same can, and they have nearly the same running time. Both are used on typical pattern planes and both are run with tuned pipes. One of them, an O.S. .40 FSR, had normal carbon build-up, but the other, a K & B 3.5, had nearly no carbon build-up. Can you explain this? I get carbon and varnish in all my engines.

Yours sincerely,  
Per Ole Simenstad  
Oslo, Norway

Publishing a magazine that will appeal to all facets of the R/C hobby is not an easy chore. You have to have a little something for everyone. The scale builders would like to see more on scale, the pattern fliers more on pattern ships, etc. However, the majority of the readers

are the Sunday Fliers. Judging by the letters I receive, most fellows reading the magazine are beginners looking for help. So a considerable amount of material is aimed in their direction. Competition pattern is a very small part of the overall R/C scene. For every fellow who enters a contest (pattern) there are hundreds who have no interest in contest flying whatsoever. Don't get me wrong here — I flew competition pattern myself for about ten years before becoming interested in other areas, pylon racing, etc. At any rate, I am glad you enjoy Engine Clinic and Jim's Radio Spectrum.

If you are going to run a tuned pipe on an engine you will get more of an rpm increase by raising the exhaust port. This is true only on engines not designed for pipe use. If the engine is designed for pipe use then you naturally would not want to raise the exhaust ports any higher. 170° of exhaust duration is in line with good pipe timing. Some fellows have run even longer duration but the higher you raise the exhaust the more "peaky" the engine becomes. The range where the pipe "comes on" becomes narrower and narrower. 170° is getting just about maximum for a pattern engine. The higher you raise the exhaust the more critical needle setting becomes, pipe length becomes more critical, and idle characteristics deteriorate. So for a pattern engine, you have to hit a happy medium. I would hold duration down to about 160° myself.

Raising the exhaust port will lower compression slightly but this is exactly what is normally desired. Tuned pipes are actually "supercharging" the engine, i.e., packing in a denser charge of air/fuel mixture. This results in higher combustion pressure and resultant power. When supercharging an engine, it is always necessary to lower compression. This is one of the reasons "Turbocharging" is going to be the coming thing with automobile engines. Low lead gas and smog requirements have brought about our present day low compression "smog" engines. They respond very well to supercharging or turbocharging.

Normally, if you were using nitro in your fuel, it is desirable to lower the

compression slightly although very few fellows do so. Since you are using FAI fuel, which does require higher compression, you may have to raise the compression slightly.

Carbon in an engine is going to run in direct relation to the amount of fuel used. If an engine is run rich there is going to be more carbon than if it is run lean. This is due to more fuel going through it in a given period of time. A .40 is going to use almost twice as much fuel as a 3.5 (.21) in the same period of time so you can expect more carbon build-up. Some fellows always run their engines on the rich side and others always on the lean side. Engines should always be run on the rich side but there will be a little more carbon build-up. Your brother may be running his engine somewhat richer than you run yours.

Clarence.

Just sitting here reading your column (September RCM) — your answer to Doug Dahike. I cringe every time you mention 3-in-1 oil. I wouldn't even have any in the house, much less use it on an airplane engine! The darn stuff just oxidizes and evaporates too fast and its about the consistency of warm ---

Thanks but no thanks. All of my engines are treated to a good oiling with 50W racing grade mineral oil (Oilzum, Kendall, castrol, etc). The oil has to be marked racing. Why? Well the racing oils have little or preferably no, detergent. It's the detergents in the oils that will attract moisture which is great for cleaning while you drive, but lousy for storage. And after the 50W lube job, a short spray (from a spray can — not aerosol — a pump type can is available from Cudahy for \$1.00) to keep exterior and interior a bit more rust free.

I would almost think that to keep an airplane engine working at peak efficiency, you (besides running an air intake filter) would make the last run of the day a short one or two minute just a bit over idle speed-type run with a good 3-1 mix #50 racing. Oh — a lot — well I know Oilzum 40 & 50 racing mineral oil has a percentage of castor though small — and white no lead gas. This would be a sure way to cleanse the innards of the

to page 12

# ATTENTION ELECTRIC FLYERS!!!!!!

Get your electric propulsion systems from the source. Only Astro Flight offers a complete line of the best electric systems at sensible prices. We have a decade of experience in the design, development, production and flight testing of electric propulsion systems for military and commercial applications. We guarantee our products for **one year**, and since we manufacture our products here in California, spare parts are always available. Isn't it silly to pay more for toy-like imitations when you can get the real thing right here at home in the good old U.S.A.? (And for a lot less!)

We know what we are talking about. After all, we wrote the book on this subject.

**Coming Soon! NEW MECHANICAL SPEED REDUCERS FOR THE Astro 020 and 05 flight systems.** The Astro 020 unit swings a 9 X 4 prop, and the 05 system swings a 12 X 6 prop. Perfect for that oldtimer powered sailplane.

Send \$5.95 for our electric manual, **QUIET REVOLUTION**, or a self addressed, stamped envelope for our catalog.

## NEW VOLTAGE BOOSTER

ATTENTION ALL ELECTRIC FLYERS!!!!!! NOW YOU CAN CHARGE ALL ASTRO FLIGHT ELECTRIC SYSTEMS FROM YOUR CAR BATTERY. THIS NEW ELECTRONIC VOLTAGE BOOSTER MAKES 24 AND 30 VOLTS FROM THE 12 VOLTS AVAILABLE FROM YOUR CAR BATTERY. SIMPLY PLUG RAPID CHARGER INTO BOOSTER FOR HIGH VOLTS.



- Charges Astro 10, 15, 25 and 40 systems.
- Uses regular rapid charger.
- Eliminates need for extra gel cell.
- Light and compact.
- Both lighter receptacle and banana plug output terminals.

Available Dec. 1      Stock No. 4025      List price \$29.95  
See your dealer or order direct.

## NEW 12 VOLT POWER SUPPLY

ATTENTION ALL ELECTRIC AUTO FANS. ASTRO FLIGHT BRINGS YOU A POWERFUL TWELVE VOLT POWER SUPPLY FOR INDOOR RACING. JUST PLUG INTO NEARBY 110 VOLT OUTLET AND GET 12 VOLTS AT 4 AMPS FOR YOUR AUTO CHARGER. THIS FIRST CLASS HEAVY DUTY POWER SUPPLY WILL LAST FOR YEARS AND YET IT WEIGHS ONLY 4 POUNDS AND REPLACES HEAVY LEAD ACID BATTERIES.



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## ENGINE CLINIC

from page 10

alky, nitro mix. And leave a good mineral base oil for long time protection.

Being a gunsmith, I have a lot of gun oil around. I buy it by the quart (which lasts a heck of a long time) and my WD40 by the gallon and I'm still a bit leary of using the gun oils in any engine. They most all have a fairly good silicone content, but most are still too darn thin for model use. To my thoughts, anyway. You wouldn't mix fuel using 3-in-1 oil, would you?

As for WD40. Well, my educated chemical guess is kerosene or one step lighter bodied, and synthetic oil of wintergreen. The kero/whatever evaporates and leaves the ersatz oil of wintergreen to do the rust protecting. It's too light and sparse to use without supplemental lubrication (50 racing mineral).

Now as far as dislodged rust damaging an engine. I think the thing would have to be awfully darn rusty! Wasn't that jewelers rouge that Fox used to put inside the venturi on the old .35's? Used to help the break-in shorten, without seemingly doing much damage to the crank and rod.

Even on an aircraft engine, I think you could double or triple engine life if you

did like the car boys are doing — fit an air cleaner! That air up there is dirty too! And how about the dust devils and the wind blowing the grit in your eye while you're standing up. Your plane flies the same air and aspirates the same dust, much to its engines detriment.

Sincerely,

Phil Mahoney

Lime Rock, Connecticut

Phil, I'll grant you that 3-in-1 certainly leaves a lot to be desired in the way of lubrication and, in general, as an oil. However, as an after-run oil where it is injected into an engine along with the oil/fuel left in an engine, it does the job fine. There are other oils of better quality but 3-in-1 is easily obtainable in any hardware, grocery store, etc. Others are not. I personally prefer a good gun oil such as Browning or Hoppe's but these are not always easily obtainable. The small amount of silicone if any, in these oils is not going to cause any problem if they are used as an after-run oil. Marvel Mystery oil is an excellent after-run oil. Terry Prather makes this available through the hobby shops as his Prather after-run oil. Howard Reed's Hobby Products "Oil'R" is a high grade machine oil and also excellent. All of these, like 3-in-1, should be used only as an after-run oil. You would never want to use them in your fuel for lubrication.

As for using 50W racing oil — about the only time you would want to do this

would be for an engine that was going to be put in long time storage. If an engine were disassembled and cleaned with acetone, lacquer thinner, etc., lubed with 50W mineral oil and then put in storage this would be okay. However, this would not be very practical for the guy returning from the flying field every week who just needs to use an additive to keep the oil already in the engine from turning gummy, hold down rust, etc. Adding 50W racing oil down the venturi and through the exhaust certainly would not be the answer in this application. You want a penetrating oil which 50W is not. Flushing the engine out with mineral oil and white gas is not going to work very well with a glow engine. I don't believe you have tried to run a glow engine on white gas, let alone get it to idle down. Then, too, you would not want to use dissimilar or non-compatible oils in the engine, i.e., mixing mineral oil with castor oil (vegetable) or a synthetic is not a good idea.

In regards to dislodged rust damaging an engine — you should see some of the engines I get in for repair — you might become a believer — rust on the counter-balance and bearing thick enough to be scraped off with a knife. Bear one thing in mind — I repair hundreds of engines a year. I also sold many thousands so I am not just blowing smoke when I tell you the damage that

to page 171

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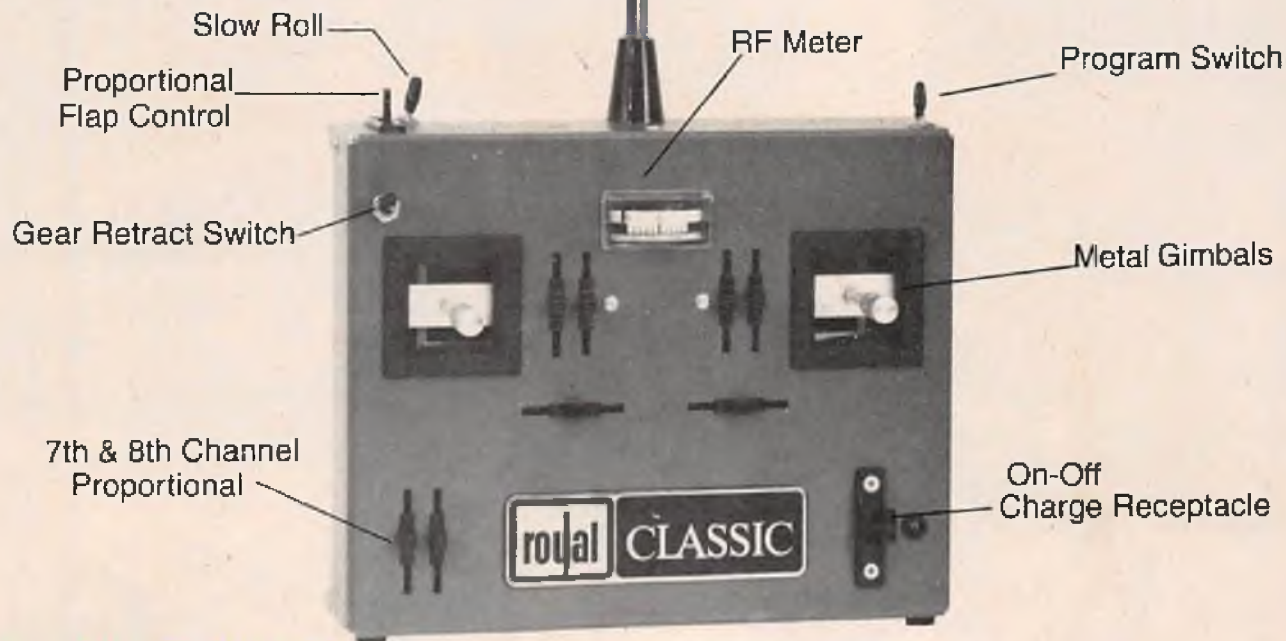
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## \*OPTIONAL FEATURES:

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1/8 x 2	[10 PK]	3.65	—
1/8 x 2	[18 PK]	4.55	—
1 1/8 x 3	[10 PK]	3.05	4.10
3/32 x 3	[10 PK]	3.05	4.91
1/8 x 3	[10 PK]	4.55	5.13
3/16 x 3	[5 PK]	2.55	3.43
1/4 x 3	[5 PK]	2.85	3.83
3/8 x 3	[5 PK]	3.64	4.90
1/2 x 3	[5 PK]	4.54	6.11

1 1/8 x 4	[10 PK]	4.85	6.53
3/32 x 4	[5 PK]	2.94	3.95
1/8 x 4	[5 PK]	3.18	4.55
3/16 x 4	[5 PK]	3.68	5.22
1/4 x 4	[5 PK]	4.27	5.75

BALSA STICKS		36"
1 1/8 x 1/4	[30 PK]	2.21
3/32 x 1/4	[30 PK]	2.58
1/8 x 1/4	[30 PK]	2.39
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1/4 x 3/8	[30 PK]	3.99
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WING SHEETING		36"
1 1/8 x 3	[10 PK]	2.55
3/32 x 3	[10 PK]	3.05
1/8 x 3	[10 PK]	3.65
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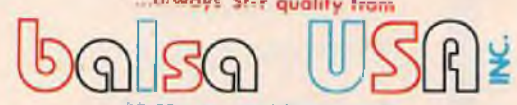
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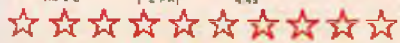
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**S**unday fliers come in all shapes and sizes --- big and small, fat and thin, young and old, and everywhere in-between. So do their airplanes --- and this past month has been an adventure in contrasts for me that I'd like to share with you.

Nowadays the great trend is towards the monster machines. I'd say Quarter Scale, but so many of them are getting to be 1/3 Scale (like the Byron Pitts Special) that the term monster scale seems more appropriate.



Wally Rinker and Dick Hershey with their Supermarine S-5.

"Big is beautiful!" That's the claim. And I don't dispute it one bit. Take a look at Photo No. 1 and you'll see why I agree that big is beautiful. All sixty pounds of it!

But wait a minute. Let's not go overboard. "Good things come in small packages," is an old saying. So, if big is beautiful, let me tell you that small is exquisite. You want proof? Look at Photo No. 2. All 15 ounces of it!



Courtney Bryant's 1/2A scale Citabria.

Here's the story behind these two beautiful and exquisite scale models.

### The Citabria Caper

A few weeks ago, Courtney Bryant, a schoolteacher and avid modeler, showed up at the Pioneers/P.A.L. R/C Skyport with his just completed scale model of the Citabria, powered with a Cox .051 with a sleeve throttle, and

guided by a Cannon super-mini brick with rudder, elevator, and engine control. Courtney had carefully matched the sleeve throttle to the barrel, getting one that was a little too tight, and then lapping it to fit. It is one of the finest operating sleeve throttles I've seen, since the leakage was minimal and the low end of the speed range was quite reliable as a result.

As you can see from the photo, there is little dihedral in the wing, which led to some question as to the turning ability, since there are no ailerons. Well, that question was answered in a very positive way on the first test flight. To watch that little Citabria make turns would convince anyone who didn't know better that it must have ailerons. And the slow rolls were equally impressive. Snap rolls were just that --- snappy! And the spin rate was almost a blur, but just neutralizing the rudder brought the plane out of the spin in less than a turn.

It was my great pleasure to put the first test flight on Courtney's Citabria, and several more after that. And I'll tell you this: I've had some very exciting test flights --- from a 7½ oz. peanut scale SE-5 to a 340 pound RPV for Lockheed --- and I'll rank the first flight of Courtney's little Citabria right up there with the others when it came to thrills and satisfaction.

So all of you Sunday fliers who are a bit awed by the giant scale jobs that are appearing, take a look at Photo No. 3.



Courtney Bryant admires his creation, as well he should.

There's a Sunday flier who likes them small, and is rightfully proud of his little creation. You can be too, if you like them small. I do.

### The Clear Lake Caper

At a recent 1/4 Scale fly-in at Morgan Hill, there were some truly beautiful scale models. One attractive example of "personalizing" a kit was Stan Powell's Navy trainer version of the Consolidated Fleet Biplane. Stan took a Concept kit, modified the fin and rudder, added a speed ring, and there was the Navy primary trainer, sitting on the line with student and instructor, ready for the day's flying lesson. Take a look at Photo No. 4 --- a great example of individualizing a kit.



Stan Powell's Consolidated Fleet Husky Navy Trainer.

But now look at Photo No. 5. You're looking at the winner for best pilot in the fly-in. No, not the lady --- she's Mrs. Ralph Walker, and she's smiling because the pilot's in Ralph's Stearman were outfitted by her, and they won First Place for best scale pilots. What with the big monster scale models being judged for scale appearance, it makes sense to judge the pilots as well. Nothing looks more unrealistic than to see a nice scale job flying along with an empty cockpit.



Mrs. Ralph Walker and her prize winning scale pilots.

There were other excellent models there, but the one that drew the most attention didn't fly, it was only on display. One reason it didn't fly was that it is a

seaplane; another was that it wasn't quite finished. And a third reason was that it exceeds the AMA weight limit of 40 pounds and, therefore, could not fly in an AMA sanctioned event.

The model I'm referring to is, of course, the fantastic Supermarine S-5 Schneider Cup racer. It was built by a team of Sunday fliers who live in Lakeport, California, on the shores of Clear Lake. Wally Rinker, who lives at 320 17th St., Lakeport, Calif. 95453, says he sort of headed up the team; Dick Hershey did most of the structural design, and Lee Jackson was called upon to do the welding of the fittings.

Just seeing the model on display was so intriguing that I decided I had to see the first test flight, and learn more about it. So, I conned Wally into delaying the test flight until I could get up to Clear Lake. He agreed to do so --- although I did learn that he cheated just a teeny bit and did a high speed taxi before the official test flight, and during the taxi it did lift off about 6". "Shucks," he said when I talked with him, "I didn't want all those people showing up without at least knowing that it would taxi!"

The Clear Lake caper began on Friday, September 7. Together with my friend, and student R/C pilot, Ken Wathen, we drove up and arrived around three in the afternoon. Wally came over and picked us up at the motel, then drove us over to Moe Curry's house. Moe's another Sunday flier who likes seaplanes, and has the facilities to fly them --- landing dock, launch platform, and three retrieval boats. He loaned one --- a Kayot --- to us, and we went fishing for the rest of the afternoon. Don't ask.

In the evening we talked about the upcoming test flight of the S-5. Here's some of the background.

Wally, and his friends Dick and Lee, started the model a little before Christmas 1978. They got the plans from a small three-view which was published some time ago in RCM, and Dick enlarged them to yield a wing span of 9'1" --- about a few inches less than one third scale.

The structural design presented many problems, but Dick Hershey had designed several full scale aircraft, and put his expertise to good use. The S-5



Ken Willard with Wally Rinker and the Supermarine S-5

has fully functional rigging, and the float structure uses aluminum weldings which virtually duplicate the full scale plane. Take a look at Photo No. 6; note rigging and welds, and you'll see what I mean. And inside, all surfaces are cable controlled --- no pushrods. For maximum efficiency, the servos are mounted in front of the surfaces, and long leads go to the receiver. Chokes are installed in the leads to avoid reduction in range. Wally uses a Litco receiver, with EWH heavy duty servos, and a Kraft transmitter.

The engine is a twelve horsepower Huska-Varna chainsaw engine. Wally picked it up from a guy who accidentally dropped a tree on it; paid forty bucks for it, and hoped it would work. It did, so Wally thought he might get another for a spare. He went to a dealer, and the dealer said, "Sure, I can get you just the engine for \$610.00! How many do you want?"

"Think I'll make do with what I got," said Wally. And he did, and it works perfectly. One thing --- in order to start it, they rigged up a Ford starter. No way you could start it by hand.

When the model was all finished and ready to fly, it weighed 58 pounds. But in talking to Wally, I found that he had a balance point at 33% of the chord. For safety, I suggested he ballast it to put the CG at 30%. He did; it took three pounds of lead in the nose of the floats!

So at 61 pounds, the wing loading is just about four pounds per square foot. The power loading about five pounds per horsepower.



Battered tip of Supermarine's propeller at end of test flight.

The props are hand carved from laminated alder, then fiberglassed. Even so, the water spray really chewed them up. Take a look at Photo No. 7. That's the forward edge of the prop tip following the test flight. Next time Wally plans to have either brass or stainless steel plates on the tips. Even with spray rails on the inside chine of the floats, water gets up to the prop.

So there's most of the particulars about this most unusual model. Interesting sidelight; after shooting the breeze, my friend Ken Wathen and I went over to the Rainbow Lodge for dinner --- recommended to us by all the modelers as the best in town --- and I can believe it, the food was great. We were sitting there and Bill Bentley, the host, gave us his welcome spiel, corny but good corn, and I mentioned that we were there to observe the test flight of a

model. Without hesitation he said "Wally Rinker's?"

"Yes," I replied. "how did you know?"

"Heck. The whole town has seen it in the window of his shop!" Talk about a community enterprise. It seems that all Lakeport was giving Wally moral support.

So, after a fine dinner, we went back and sacked out, and the next morning we got up and went over to Moe Curry's landing to watch the test flight. Everybody and his kid brother was there.

It took about an hour for Wally, Dick and Lee to put the S-5 together. Meanwhile, Chuck Connors, a retired helicopter pilot, put in a flight with his half size Wavemaster, and Moe Curry put his PBV Catalina together --- that's Moe and his pride in Photo No. 8. It is one of the most popular designs we've had in RCM.



Moe Curry and his Catalina PBV from RCM plans.

At last the S-5 was ready. Dick started the Huska-Varna with the Ford Starter. Wally checked the surface actions and engine control, and everything was in order. Carefully, they lifted the model from the dock and placed it alongside in the water. The engine was ticking over smoothly, and Wally guided the model out away from the shore. We got into the Kayot and slowly cruised out into the take-off area.

The model was a bit touchy on water control. The water rudder is hinged so it comes up out of the water when the speed picks up, so taxi speed has to be slow. But Wally got it lined up and started a take-off. About half way along the line, a wave caused by a passing water skier hit the floats and made the model do a slight waterloop. (Why, when a lake is twenty miles long, do water skiers have to do their thing in front of the only model seaplane dock on the lake?) So, Wally throttled back, taxied back to the take-off run spot, and started over.

This time the take-off was right out of the textbook. About twenty yards at displacement speed, then up on the step, gathering speed and, after about a hundred yard run, lift-off! It was like a scene from the Schneider Cup Races. As the plane flew around, traffic stopped on the lakeside road to watch.

to page 171



THE 18-WHEELER

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## A WORD ABOUT PAINTING

Some guys like to have numbers that are a different color than the 3 basic Graphics colors (red, white or black). Graphics can be painted. But not with butyrate dopes, lacquers or epoxies. We recommend Aerogloss, R&S, or

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polyurethane's like Formula U. Be sure and do a test, anyway. And keep in mind that when you paint, the resiliency of Graphics will be only as great as the paint itself. Without paint, Graphics will stand up to almost anything, including all but the worst types of scuffing.

## GREAT FOR PLANES, BOATS & CARS

Graphics add a professional touch to any model, including older ones. You'll be quite pleased to see the reaction at the field when you show up with an old plane that's been dressed up with crisp, new Graphics on it. Graphics stick to just about anything: fabric, painted surfaces, plastics, metal, wood, etc. Naturally, they look great on Coverite (Permagloss, Super & Silkspun) as well as all the other iron-ons. Since they're water and weather resistant, they're now being used on full sized boats (hulls & sails) and full sized planes (3" letters are FAA approved for tails). Not to mention signs, doors, windows, trucks, vans, etc.

## STICK TO ANY CURVE

Once again, unlike traditional decals, Graphics remain pliable. Not only will they conform to any curve or angle... they will stay that way! Just press them on and forget about them. They'll stay in place for years, indoors or out, in all sorts of weather.

## BIG ECONOMICAL SHEETS

Some modelers have asked us why we packaged sheets instead of individual numbers. The reason is that it is cheaper to produce a full sheet than individually packaged numbers. Each Graphics package contains 28 characters: two full sets of numbers and AMA letters, plus N&C. Also a little extra blank space for you to cut out your own. Packaged in sheets, 1" Graphics cost less than 5¢ per number; 2" Graphics cost less than 11¢ per number; 3" Graphics cost less than 20¢ per number.

**THE COVERITE LINE—Permagloss Coverite.** 100% polyester iron-on covering. Preprinted. 38" x 43" / 43" x 15 feet / 5" x 36". Red, white, blue, yellow, orange, aluminum, olive, dayglo orange, dayglo yellow, black. **Super Coverite.** Same material as Permagloss, but not painted. 38" x 47" / 47" x 15 feet. Red, white, blue, yellow, orange, hi viz red and antique fabric. **Quickstik.** 1/2 pint & pint cans of iron-on adhesive. **Silkspun Coverite.** 100% spun polyester that looks like tissue. Unprinted. 38" x 54" / 38" x 25 feet. Red, white, blue, yellow, orange. **Balsarite.** 1/2 pint & full pint cans of wood conditioner. **Glaskote.** 1/2 pint cans of clear, fuelproof, finish coat. Pint cans of thinner. **Trimit.** Micro sharp knives for cutting all coverings. **Graphics.** The only letters & numbers made of micro-thin vinyl. Die cut. pressure sensitive, totally fuelproof. 1", 2" or 3". Red, white or black.

# COVERITE

420 BABYLON ROAD, HORSHAM, PENNSYLVANIA 19044

Coverite products are distributed world wide: Australia, Belgium, Canada, Denmark, England, Finland, France, Germany, Holland, Italy, Japan, New Zealand, Norway, South Africa, Sweden, Switzerland, United States.

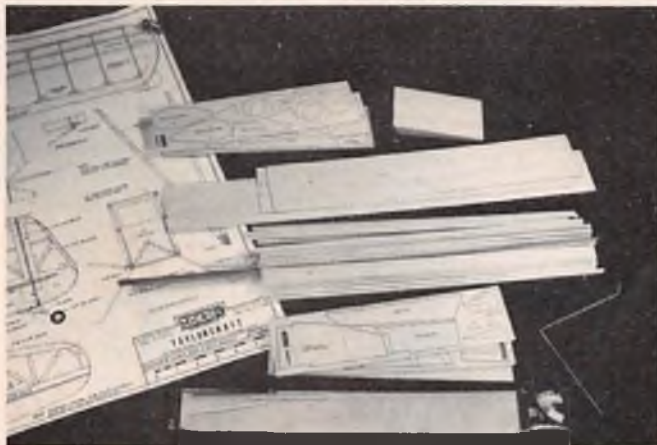


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1980:  
Full Alphabet  
From A to Z

Send a stamped envelope for your copy of the Black Baron's latest tip sheet 21 Ways to Make Finishing Easier.

# RCM PRODUCT REVIEW

## Micro-X TAYLORCRAFT



**A** sport scale Taylorcraft is the latest kit offering from Micro-X Products, P.O. Box 1063-D, Lorain, Ohio 44055. It is designed to be powered by 1/2A size engines and is priced at \$26.95.

Contained in a sturdy 30" x 6 1/2" x 3" box that is adorned with a full color label showing the actual finish model, the contents are packaged in a neat and orderly fashion. The Micro-X Taylorcraft is a kit that will, upon inspection, "bring back fond memories" to all older modelers. Primarily of the built-up "stick type" construction, this kit even features "printwood" balsa parts, although the wing ribs are die-cut in the conventional fashion. The thoughts of O.F.F. club members (that's Over Forty Flyers . . . sonny!) will drift back to the by-gone era of LePages glue, nitrate dope, balky ignition engines, and razor blade mutilated fingers, when viewing this kit. The Micro-X Taylorcraft is pure nostalgia!

### Construction:

The 25" x 38" plan sheet is well drawn and the wood quality is good, although we felt the top fuselage cowl block was very hard. It is a kit that can be built with as much (or as little) detail as the builder wishes to put into it. All assembly instructions are contained upon the plan sheet and, while construction is relatively simple, some aspects of assembly are rather vague. For example, the wheel pants which are of several balsa laminations are flared into the balsa landing gear leg fairings. The wheels are shown encased within the pants. Yet no information is provided pertinent to this assembly sequence. This is, perhaps, a small point that will not present a problem for the experienced builder. The relative newcomer will find an informational void such as this to be rather perplexing. No radio system installation information is provided. Any builder with a few kits to his credit will not have any difficulty in assembling this kit. The builder who is expecting highly detailed, step-by-step assembly instructions will be

## SPECIFICATIONS

Name	TAYLORCRAFT
Aircraft Type	Stand-Off Scale
Manufactured By	Micro X P.O. Box 1063-D Lorain, Ohio 44055
Mfg. Suggested Retail Price	\$26.95
Available From	Both Mfg. & Retail Outlets
Wing Span	38 Inches
Wing Chord	5 3/4 Inches
Total Wing Area	200 Square Inches
Fuselage Length	24 1/2 Inches
Stabilizer Span	15 Inches
Total Stab Area	50 Square Inches
Mfg. Rec. Engine Range	.049
Recommended Fuel Tank Size	2 Ounce
Recommended No. of Channels	2 or 3
Recommended Control Functions	Rud., Elev., optional Throt.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No

## RCM PROTOTYPE

Radio Used	Westport Int'l Variant
Engine Make & Disp.	Cox TD .049
Tank Size Used	2 Oz.
Weight, Ready To Fly	20 Ounces
Wing Loading	14.4 Oz./Sq. Ft.

## SUMMARY

### WE LIKED THE:

Overall finished appearance.

### WE DIDN'T LIKE THE:

All plywood parts were missing. Balsa die-cutting only average. Nose block (balsa) extremely hard. Assembly information lacking on plan sheet.

disappointed. The die-cutting of the wing ribs was average as some ribs had to be lightly cut to remove them from the sheet blanks. The balsa "printwood" is clear and sharp and the wood quality is excellent. The wing is of conventional spar and rib construction and the fuselage sides and tail surfaces are built directly over the plan sheet in the traditional manner. The parts fit is very good and the hardware package we would rate as being average. Custom Model Products "Fast Bond" cyanoacrylate glue was used for assembly of our test model. This greatly hastened the construction process and kept adhesive weight build-up to an absolute minimum. We also elected to mount the wing to the fuselage with nylon bolts, as it seemed a shame to use rubber bands and dowels on a scale aircraft. This was a personal preference only.

### Covering:

Our test model was covered with Hobby Lobby's Superkote film type covering, over the open structures. This was lightly wet sanded to remove the gloss and provide for better adhesion for the K & B Super Poxyl enamel which was then sprayed onto the aircraft. The model may be finished with just film covering, however, we prefer the look of a satin enamel finish to a glossy one, on this type of scale type aircraft. This method keeps the additional weight, associated with a painted finish, to a minimum.

to page 169

# FOUR FABULOUS FOAM-WING FUN FLIERS

COMBINING THE CONVENIENCE OF A READY-TO-USE MOLDED FOAM WING WITH THE STRENGTH AND RESILIENCE OF A Balsa FUSELAGE AND TAIL

## SCAMP

*New!*



**SIG**  
KIT RC-45

2 OR 3 CHANNEL

Designed by MIKE GRETZ

**\$24.50**



- FLAT-BOTTOMED MOLDED FOAM WING
- BUILT-UP Balsa FUSELAGE
- SHEET Balsa TAIL SURFACES
- ROOM FOR STANDARD SIZE RADIOS

For .09 to .15 Engines  
45" Wing Span  
290 Sq. In. Wing Area

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Build Directly on the Wood
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RC-37 SUPER SPORT . . . \$24.50



RC-36 KLIPPER . . . . . \$25.95



RC-43 COLT . . . . . \$25.95

COMPACT PERFORMERS — IDEAL FOR SMALL FIELDS

# LEARN TO FLY RC THE SIG WAY

## STEP 1 - BASIC : START WITH A STABLE HIGH-WING MODEL

Modelers often want to start in RC with a good-looking pattern or scale model that is complicated to build, has a high wing loading and flies fast. This is a mistake and never works out. First attempts with radio control should be with an inherently stable design having a flat-bottomed airfoil that gives the student pilot time to think and develop automatic reactions. The Kadet, which will fly hands off, is ideal for this purpose. Many club instructors and hobby dealers have told us that two or three check-out flights on a Kadet are sufficient to allow a student to practice fly and learn without constant attention from an instructor. And we know of modelers in isolated areas, with no one to help them, who have taught themselves to fly with the Kadet.

We recommend that the novice begin his training program by using rudder control for first flights and later on switch to aileron control. Ailerons are supplied in the kit for 4 channel use but the model can also be flown on 2 or 3 channels and rudder control if the builder does not have 4 channel radio equipment. A special booklet is included in the kit to help the student pilot make his first radio flights.

Before you can accomplish your dream of darting around the sky with a sleek P-51, you must have some RC flying time on your log book. The word on the modeling grapevine is that our boxy buddy, the dependable Kadet, is the best choice. It's THE standard trainer--nationwide!



BALSA RIB WING

# KADET

Designed by CLAUDE McCULLOUGH

LENGTH: 42 In.  
WING SPAN: 57 In.  
WEIGHT: 4 Lbs.  
ENGINES: 19 - 40 Cu. In.  
FOR 3 CHANNEL RC EQUIPMENT

**\$43.95**



KIT NOW INCLUDES MATERIALS AND INSTRUCTIONS FORAILERONS

## STEP 2 - INTERMEDIATE: PROGRESS TO FASTER SHOULDER WING DESIGNS

BALSA RIB CONSTRUCTION WING FEATURING BUILT-IN WASHOUT



WING SPAN: 55-1/2"  
ENGINES: 29-40

# KAVALIER

**\$49.95**

Designed by CLAUDE McCULLOUGH

When the student pilot feels secure flying the Kadet and can handle it capably, he is ready to take the next step. The Kavalier has a special wing design, calculated to make this transition easier. The precise amount of incidence change required to help eliminate tip stall is automatically incorporated as the wing is built in the usual way on a flat surface. In addition to this aid to stability, differential movement aileron horns are furnished in the kit, providing less down and more up travel on the ailerons. Adverse yaw in turns is reduced by this simple method and controllability of the model is greatly improved. Find out what smooth flying really is with the Kavalier.

LARGER SIZED MODEL - FOAM CORE WING WITH BUILT-IN WASHOUT



WING SPAN: 62 In.  
LENGTH: 44 In.  
WEIGHT: 5-1/2 Lbs.  
ENGINES: 40 - 50 Cu. In.

# KOMANDER

**\$49.95**

Designed by CLAUDE McCULLOUGH

Specially designed for novice RCers who want to move up from simpler models or prefer to start with an aileron controlled airplane. The built-in stability, coupled with good maneuvering and aerobatic ability, allows rank amateurs and low-time fliers to do a creditable job. Piloting boners that would clobber other airplanes are readily forgiven by the Komander. It will fly right down to the full stalling point without snap rolling or falling off on a wing. This enables slowed down, nose-high landings to be made. Coupled with the shock absorbing qualities of the wing mounted gear, the superior ground handling characteristics make this a fine performer from rough or grass fields.

## STEP 3 - ADVANCED: MOVE UP TO LOW WING AEROBATICS



FOAM CORE WING WITH WASHOUT

**\$52.50**

# KOUGAR

Designed by CLAUDE McCULLOUGH

After some flying time on the Kadet, Kavalier and Komander, the student will be ready for this sleek stunter. The Kougar is a carefully tailored design that will do every stunt in the book--even the lomcevak - and yet is not difficult for low-time pilots to handle. The wash-out incorporated into the foam wing allows the model to be slowed down to a walk for the landing approach and flared onto the runway in a main-gear first touchdown without undue stalling or snap rolling tendencies. The large amount of wing area for the 51" span keeps the wing loading low and aids handling characteristics. The Kougar is highly recommended as an introduction to low-wing flying and AMA pattern competition.

## STEP 4 - EXPERT: GRADUATE TO COMPETITION FLYING



FOAM CORE WING

Balsa Skin Plywood Skin  
**\$57.50 \$62.95**

WEIGHT: 6-1/2 - 7 Lbs.  
ENGINES: 45 - 60 Cu. In.  
WING SPAN: 67 In.

# KOMET

Designed by MAXEY HESTER

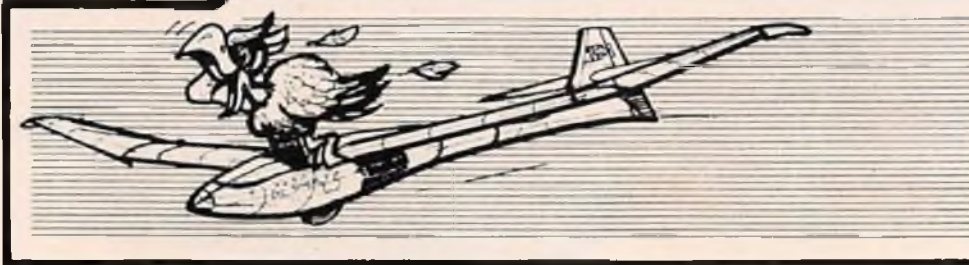
In the Komet, Maxey Hester has created a pattern ship that meets the requirements of the most demanding competition flying, yet is equally at home at a Sunday afternoon sport flying session. As in the Kougar, construction is speeded and appearance improved by a formed plastic top made from ABS plastic that is easy to glue and easy to paint. It carries no load and serves only as a streamlined fairing on top of the rugged balsa box fuselage. Featuring a foam core wing, this big kit takes only a short time longer to build than one of the so-called ARF (almost ready-to-fly) types and results in a durable aircraft with lower wing loading and higher flight performance, at a lower cost.

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**A**s most of us are gradually progressing up the LSF ladder, we begin to think about those long slope, distance and thermal flights. Fliers who have achieved these tasks say they have done so by using larger batteries, however, they never say why and what cells to use.

Dave Register who is a personal flying friend, scientist, leader member of the Pasadena Soaring Society, editor of their fine newsletter, contest director, is an all around learned gentleman when it comes to aeronautics and electronics. Dave has put some words together that tells us the why's, and what's of using alkaline cells for extended flights.

"Ah, springtime --- and a young man's fancy goes to thoughts of Level V slope flights? Well, if you're either that old, or that young, then this review may help. Personally I'd rather go out and ogle a bit but for now we'll try to get 'a charge' out of this little battery article.

"The problem you've got with either the Level IV or Level V slope flights (or any long duration attempt) is that a standard .5 ah nicad pack isn't good for much over 3.5 hours. If you're going for 4 hours you can get awfully antsy sweating out that last 1/2 hour. What most pilots do is switch over to alkaline batteries for the attempt. The question then is, which battery size is enough and how much insurance have you got?

"The first thing is to determine how much current your flight pack requires. (You can always clip your transmitter to any old humungous batteries and park them on the ground.) It turns out that both my Kraft and Futaba 3 channel draws about 250 ma with all three servos in continuous motion (installed in a sailplane). Obviously you don't fly like that so a safe upper limit to the average current draw of a 2 or 3 channel flight pack is probably 125 ma.

"Next question: When do you consider an alkaline cell to be dead? The discharge curve for these batteries is long and flat without the characteristic sharp turn down of a nicad battery. The criterion one might best apply in this case is that many receivers use TTL IC's which don't like to run much below 4 1/2 volts. That gives 1.1 volt per cell cut-off for the alkalines which is, coincidentally, the same as for the nicads.

"The project is now well defined.



*Dave Register launches his American Eagle with flaps. Extensive flight characteristics testing with the use of flaps have been a long time project of Dave's.*

Simply take an assortment of alkaline cell sizes, slap a 10 ohm resistor on each (this gives an average current drain of 125 ma during the discharge time) and see how long it takes the battery to drop to 1.1 volt. Although this isn't exactly the same as the momentary current surges provided by your servos, it will give a reasonable approximation to the time you may expect from this type of cell.

"The results are summarized in Table 1 and a few obvious conclusions can be drawn. First, using D cells is a tremendous over-kill unless you plan on flying for two days straight or plan on stalling your servos a lot. AA cells may be fine for fun flying but for the 8 hours slope flying they're calling it a bit close. If you're the daring type and want to use them, don't do any flying with them before your attempt. C cells seem to be just right or, if you can't get these monsters in your ship, use two parallel AA packs to get the extra capacity. Unlike nicads, alkalines don't mind being paralleled. The last entry in the table is the measured volume of these batteries. It's interesting to note that capacity scales almost exactly with volume.

"Another important consideration in strapping up your alkaline pack for duration is soldering wires to the batteries. Spring clips aren't very high in my book as they tend to develop contact

resistance at the most embarrassing times. However, soldering to alkalines can be a bit tricky, but it can be done with a few simple precautions.

First, don't use a soldering gun, the wattage is much too high. A soldering pencil of about 40-60 watts seems just right. The lower wattage (15-25) units don't quite have the capacity, while anything over 75 watts will probably fry the cell. Next, take a jeweler's file and scrape off a small area on each end of the battery for the solder joint. File firmly enough to remove the surface plating but not enough to remove the entire surface. Dab these areas with a small amount of resin flux (available at any hardware or electronic's store). Do not use acid flux. Quickly heat these areas with the pencil iron while simultaneously holding the solder to the battery contact. Do not use silver solder. Any good resin core solder recommended for electronics work will be fine. Within a second or two a small shiny blob of solder will adhere to the battery. Preparing the surfaces in this way is called 'tinning.' Tin all the battery contacts and the ends of the wires. Then, without using any additional solder or flux, solder the wires to the batteries, but don't leave the soldering iron on the batteries for more than a few seconds. Practice on some old batteries until you can reliably produce a good tight joint.

"And there you have it, a beautifully soldered-up pack that will safely get you through your Level V flight. I personally prefer the C cell set-up as it's easier to damage the AA cells because of their smaller size. And whatever you do, don't economize and use non-alkaline batteries. Today's IC servos require short but heavy current drains and only alkaline and nicad cells have low enough internal resistance to meet this requirement."

**Table 1**

Battery Size	Discharge Time	Volume
D cell	57 hours	2.16 in <sup>3</sup>
C cell	30.5 hours	1.08 in <sup>3</sup>
AA cell	6.5 hours	.29 in <sup>3</sup>

Thank you Dave for a job well done, I hope it will help you, the pilot, on those long flights.

to page 168



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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.

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

Precision pulleys designed and matched for peak performance.

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



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Factory Direct Price

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Order Byro-Drive model number for matching engine.

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TFR-13	X.60 Supertigre, frt. valve, r. exhaust
KF-15	.61 Kraft
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DPSR-17	OPS .60 Speed, rear valve

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78-79 SCALE KIT OF THE YEAR

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

- Send me \_\_\_\_\_ Pitts Kit(s) at \$212.95 ea. plus \$12.00 shipping & handling.
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Weight: ready-to-fly, 1 lb. fuel.  
★ Under 15 lbs. with Econokote finish.  
★ Under 17 lbs. with Epoxy/Fiberglass finish.



# Kits... Includes ALL ITEMS to complete models as shown!

Engine, radio, and final paint not included



## MiG-15

Wing Span - 57"  
 Length - 55"  
 Ready-to-fly wt. - 8 1/2 lbs.  
 Wing area - 600 sq. inches  
 For .60 size engines and 4 channel radio

### The First Practical Approach to Realistic Jet Performance That:

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- Produces up to 8 1/2 lbs. of static thrust with Schnuerle .60 and low nitro fuel.

**Quick Assembly**  
**Scale Accuracy**  
**Easy Access to Radio and Engine**



Unlike other quick-build kits that often sacrifice authentic detail for fast assembly, Byron Originals has kept both authenticity and simplicity high on the priority list. All die-cut wood parts and 11 foam components needed for completion are designed with quick assembly, scale accuracy and minimized weight in mind. All foam modules consist of light-weight yet impact resistant injection molded polystyrene.

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.

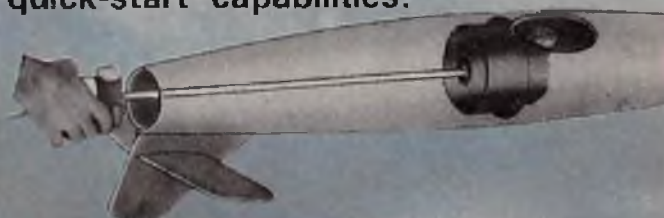
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The ducted fan with exclusive quick-start capabilities.



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## 1/2-A, SPORT, STAND-OFF SCALE, FOR 2 CHANNEL RADIO



**P-39 AIRACOBRA** • Span 36 in. • Area 216 sq. in. • Length 28.5 in.  
• Weight 22-28 oz. • Engine TD .049  
• Wing loading 14.6-18.6 oz./sq. ft. 34.95



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**ME-109E** • Span 36 in. • Area 216 sq. in. • Length 28.5 in.  
• Weight 22-28 oz. • Engine TD .049  
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**P-51D MUSTANG** • Span 36 in. • Area 216 sq. in. • Length 28.5 in.  
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**CHIPMUNK** • Span 36 in. • Area 216 sq. in. • Length 28.5 in.  
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## NEW SCALE RULES FOR 1980-81

**T**he Scale Contest Board has completed the two year cycle of receiving, modifying and voting on rule proposals made by AMA members. On the Final Vote, the following main features were incorporated into the regulations:

(1) Accepting the proposal made by Dave Plahn, a new event for Giant Scale models was established. Several competing proposals to increase the weight and engine size limits and include large models in the regular Sport Scale event were defeated. The new Giant class is not restricted to 1/4 Scale but will be for all types of models too large to be entered in Sport Scale. Entries in Giant must fit one or more of these categories: (a) Powered by an engine of more than 1.25 cu. in. displacement; (b) Made to a scale of  $2\frac{3}{8}'' = 1'$  or larger; and (c) Weigh more than 15 lbs., less fuel. (20 lbs. for multi-engine).

These requirements were adopted to avoid having "orphan" models, too large for one event and too small for the other. There will be a few airplanes that will be eligible for both the Sport Scale and Giant events. (Example: 3" scale, powered by a .60 prop driver and weighing 14 $\frac{3}{4}$  lbs.). But a better definition that would allow full development of the Giant idea without some overlap between the two classes could not be found. To prevent this dual eligibility from causing operational problems at contests, the owner of a borderline model must decide which of the events he will enter. He may not enter both Sport and Giant events at any one meet with the same model. However, different models could be entered in Sport Scale and Giant, as well as a third in Precision Scale, as long as they meet the requirements of the individual events. Incidentally, if a Contest Director so specifies on his sanction application and all contest pre-publicity, he may hold an event limited to 1/4 Scale models only, just as he may do the same for multi-engine models, military models, civilian models of a certain period, etc.

After considerable discussion, the



*Ted White's Martin-Baker MB-5. One of the fastest designs of WW II but didn't go into production.*

Board decided to adopt the 40 lb. maximum weight recommended by the Quarter Scale Association of America and previously established by the Executive Council as the top weight for AMA insurance coverage. The QSAA had also recommended that 4 horsepower be established as a limit on engine size. But since the Board saw no practical way of measuring horsepower, providing an agency for the job and keeping information current, for the present a maximum limit of 3.66 cu. in. was passed. 40 pound airplanes must have adequate power to fly safely but anyone planning to undertake the expensive development of a huge Schneurle ported nitro-fueled beast, with horsepower far in excess of 4, should pause and consider that at anytime, under the Safety and Emergency provisions of the Contest Board Procedures, restrictions other than the stated cubic inch limit can be put in force at once if necessary, to keep extreme examples of excess power out of the competition picture. The large limit



*Dan Parsons, designer of the Model Merchant kit, flew this MB-5, also got hit by the judges for fast flying.*

is intended to encourage use of gas or no-nitro alcohol fueled power of lower sophistication and reasonable cost, perhaps modifications of engines already in production for other uses.

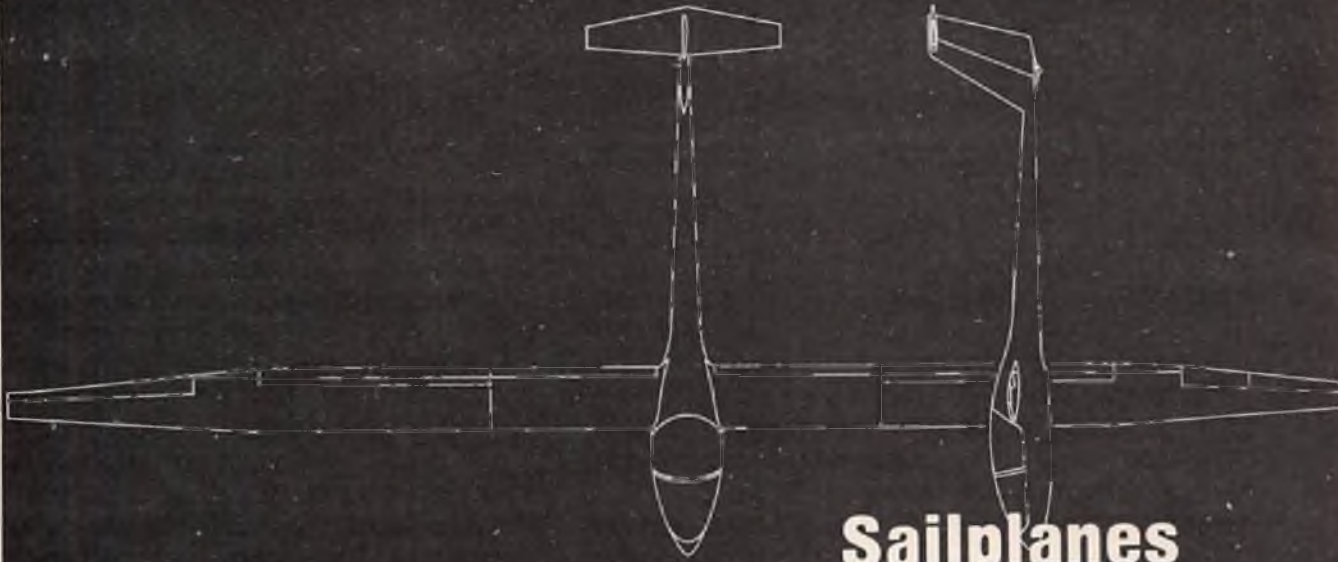
One interesting feature of the Giant event proposed by Plahn is the increase in static score (as compared to Sport Scale) to 40-40-40 or 120 total and the flight score to 120 by addition of two maneuvers. The Sport Scale event has too many ties and .1 point edges so perhaps this increase in point span will work out a little better. It will be an interesting experiment at any rate. Otherwise the procedures in the Giant event are the same as the present Sport Scale event.

(2) The Sport Scale event (but not Giant) will be divided into Sportsman and Expert classes, as proposed by Art Johnson. A system much like that in Pattern or the 78-79 Precision Scale rules will be applied to move fliers up into Expert after they have become winners in Sportsman. At the same time, the classification system for Precision Scale will be dropped due to lack of use. There really are only experts left in the Precision anyway and aspirants to join the ranks can be recruited from the Expert Sport Scale fliers.

(3) The matter of the importance or non-importance of "small details" that have been the cause of some discontent, pro and con, in scale ranks has been dealt with in two ways. First, the radius of the judging circle has been increased to 15' (John Preston proposal) for both Sport and Giant. This puts fine stuff farther away from the judges where they can't see it, which should please those who are anti-detail. Second, since the detailing is not so noticeable a factor, the arguments about just exactly what "deemed not visible in flight" means can stop, for most of this problem passage has been dropped. (Proposed by John Preston and Art Johnson.) And that should please those who like to put an extra finishing touch or two on their models and, in fact, have been doing it all along. As is the case with most compromises, nobody may be satisfied, but among competition fliers, what else is new?

to page 30

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## DCM

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from page 27

(4) Brian Crossley's proposal to change the ratio of the scoring and make flying 2/3 of the points and static 1/3 of the points did not receive support and was defeated. My own opinion is that Sport Scale is already strongly flight-oriented under the present 50-50 split. There is nothing wrong with that, but also nothing there to indicate a need for further change in favor of flight points. It is already very difficult for a biplane or high wing monoplane to get anywhere against the heavy artillery that can be delivered by WW II and other low wing types. Scale would become another pattern event with a few highly aerobatic types predominating under a 2/3-1/3 set-up.

(5) John Preston's Judges Guide for Sport and Precision Scale Flying has been adopted for the rule book. As we have seen from arguments over judging at the Nats and other meets, there probably never will be any complete uniformity in this complicated job. But at least there will now be a standard that can be revised if experience shows this is indicated.

(6) An event for Sport Scale Sailplanes has been established on the original proposal of Gordon Pearson which, subsequently, was considerably modified by acceptance of cross-proposals from John Preston and Bob Karlsson.

A number of other proposals were also passed. Favorable votes were given to the mandatory use of scale pilot figures (by Bill Northrop and McCullough), though a waiver will be granted to any models built prior to 1980 that would have to be damaged to gain access to the cabin or cockpit. Two mechanical options changes (from Dale Arvin) won. They will be limited to three, not including the multi-engine option. Those mechanical options difficult to see in the air will be demonstrated to the judges on the ground, after which they will be used during the flight in a scale-like manner and at appropriate times in the pattern but need not be operated on the regular or special fly-by. Presumably the flier can do a special fly-by if he feels that this will be of help to the judges, but he will not be required to.

**MORE NATIONALS PROTESTS**

I noted last month the Builder of The Model rule protest against the Byron Originals Pitts. Since then, two more protests have been filed, both mainly concerned with the emphasis that Nats Scale Contest Director Dale Arvin and the flight judges put on scale speed impression.

Ted White says in his protest that judging scale speed by direct proportion to the size is incorrect. "... a P-51

Mustang which weighs about 10,000 lbs. loaded, would have to weigh 1675 lbs as a 1/6 scale model. Now that would make my Martin-Baker (about 1/6 scale) have to weigh 2,000 lbs ... a model airplane weighing a ton! It is ridiculous to expect a 55" model airplane to fly exactly 1/6 the speed of the real airplane." He went on to make other comparisons of size, including the Cub. "Following the criteria established by the Nationals officials, you would have to figure that because the real J-3 stalls at around 40 mph and flies at 65-70 mph, then 1/6 scale model (according to direct proportion speed) has to take-off at under 7 mph and fly at 10-12 mph. This is far out of line, but this is the figuring method used by the officials at the Nats." He asked that the U.S. Team selection at the Nats be voided and a new competition be scheduled to pick teams.

Larry Jensen, who flew a Beechcraft Bonanza at the Nats, also protested the scale speed impression idea, stating that smaller models must fly faster than larger versions because the air in which they fly cannot be scaled down, a model flying at low speed just above a stall looks bad and is hazardous. "It is impossible to scale down the air in which these airplanes must fly. To judge a scale airplane's 'realism in flight' more than 2 points off for too much scale impression speed is wrong per the rule book. There are 5 different things to be considered. That would be 2 points per each item adding to a total of 10." He objected to use of USPJA pattern judges (as did White), to the wide difference in some scores (his example: 9-8-4), the direct interference of the C.D. in marking scores and the static judges being shown the bottoms of the models.

I am inclined to agree that the scale speed matter may have been over-emphasized at the Nats. The problem here is that this is a matter of judgment that is not spelled out in the rule book and, thus, can be interpreted differently by different judges. You may not agree with the approach, but is not really forbidden by the rules. And can we state every judgment decision in the rule book?

In general, I also agree with many of the comments made by Larry and Ted about the practical considerations involved in fast and slow flying. If we are to have a scale event that encourages wide diversity in choices of subjects, then narrow approaches of any kind must be avoided.

But I have to part company with them in several areas. First, there is no expressed or implied idea in the Sport Scale rules that the bottoms of the models are "off limits" to judges. The bottom is the most visible in flight and is subject to the same requirements for scale as the side and top views. The Scale Board has previously allowed the

use of elevated tables and the 1980 book will eliminate ambiguity about this --- it will be stated that the judges may look at the bottoms of the models. Last, but not least, I'm the first to wish that there was an organization called the U.S. Scale Judges Association, but there is none. Someone had to do the task and the USPJA volunteers undertook it --- a hard and thankless assignment. They are probably used to unhappy contestants but it is a little much to expect them to also be faulted as "incompetent." Remember that they were briefed and directed by Scale people.

**THE OTHER SIDE OF THE COIN**

The modeling grapevine, an extensive communications network, having spread the reports of the protests and disagreements, many who weren't there have gotten the idea that Scale at Lincoln was a catastrophe. "I hear it was a really nasty Nats," said one call. Hardly. You couldn't have asked for a much better flying site and efficient contest operation. To balance the protests about scale speed, there were others who thought it was high time for a crackdown. One contestant (who did not place) said it was the best Nationals he has ever attended. A letter the other day remarked, "Nats were fun and Dale Arvin did a terrific job." One thing should be kept in mind. The Nats are not really operated by "the AMA." The Nats are possible because the local modeling club and anybody they can shanghai, plus enthusiastic model builders from all over the country (this year, even Hawaii), used their vacation time to work long hours in the sun. It's "us" that's doing it, not "them." So if you think improvements can be made, volunteer to help with them or bring some friends. And maybe just a little understanding for those who are doing their best to cope with a complicated event.



**SCALE BOOKSHELF**

**Air Force Colors, Vol. 1, 1926-1942**  
by Dana Bell. 96 pages. Squadron/Signal Publications, 1115 Crowley Drive, Carrollton, TX 75006. \$7.95 plus 50 cents postage. There are a lot of aviation history books out that are nothing but rehashes of worn out material. This certainly cannot be said of this well-done collection of color and markings during a fascinating period of

to page 167



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# THE STING



By Vince Micchia

Photos By Ron Harris

## **A GENTLE AEROBATIC SPORT SHIP THAT WILL DO THE PATTERN, THE STING TIED FOR SECOND PLACE IN THE RCM 1979 DESIGN CONTEST**

**Q**uick and easy is the name of the game today. Quick to build and easy to fly. Well, if that's what you're looking for, search no more, as The Sting is here at last.

This design has been bugging me for about a year now, so the decision was made to put it on paper and try it out. I hope you like it enough to try it yourself.

After spending some time on the drawing board, the pencil lines were completed at last. The purpose in mind was to keep The Sting as simple as

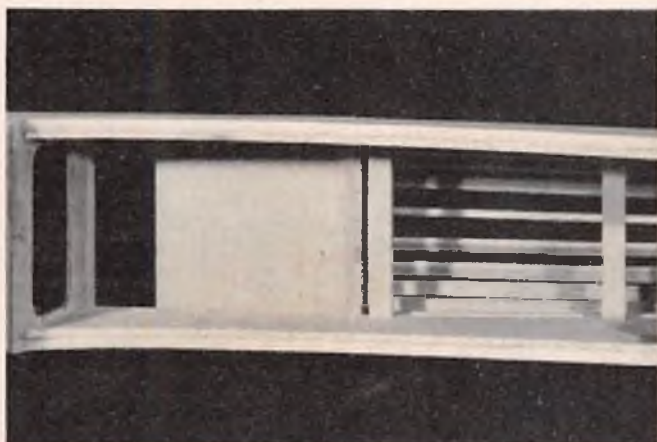
possible and still maintain semi-modern lines.

The airfoil used is the same that was used on the SST 40 which is kitted by Hobby Shack. The control surfaces of The Sting are generous enough to have full control of the model even at very low speeds. The overall construction of The Sting has been kept simple with no difficult planking or carving. The Sting tips the scales at five pounds and, for a .40 powered model with the wing area of over 600 square inches, leaves the

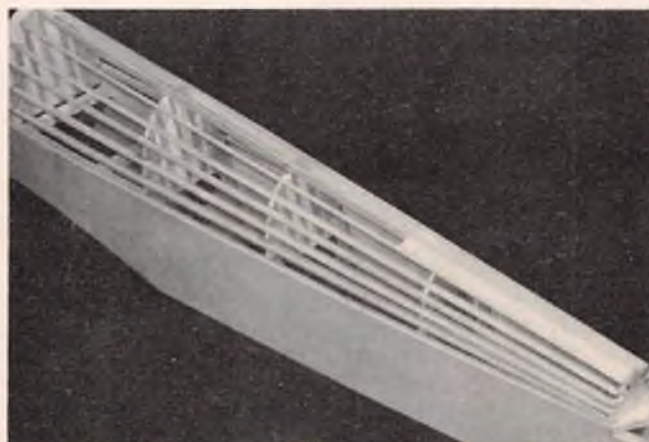
power loading in the low numbers.

After spending some time at the local hobby shop, buying up some of the materials needed to start construction, I couldn't wait to get back to the shop to start The Sting. I'm sure many builders have felt the same when starting a new model.

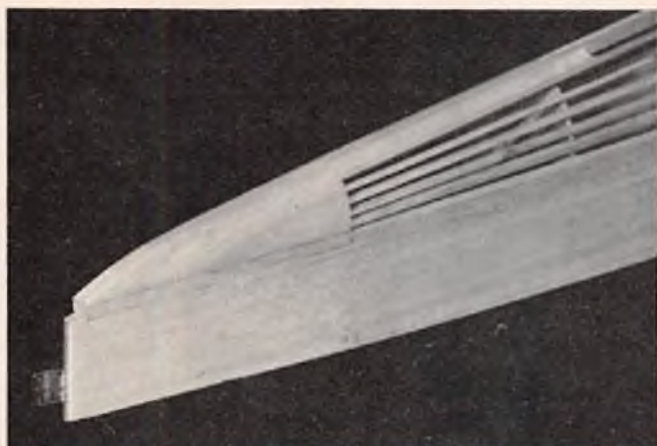
That evening much to my surprise the fuselage was practically finished. I find one of the best methods of cutting out parts, when building from plans, is to trace the parts on tracing paper or



Bottom of The Sting showing 1/8" balsa doublers, top stringers, and hardwood servo rails. Note 3/8" triangular strip shown just forward of servo rail, shown on plan but not described in text.



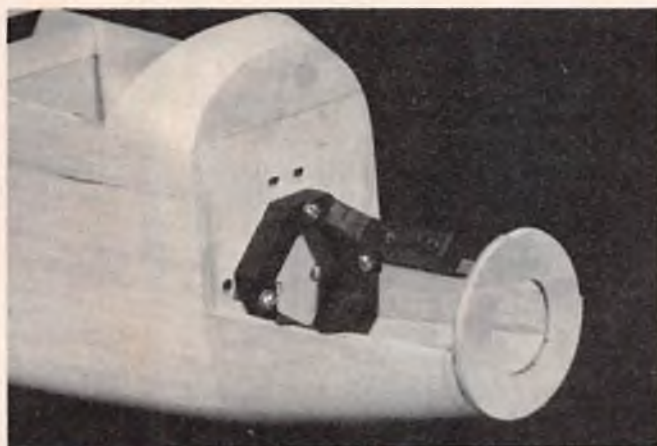
1/8" x 1/4" stringers cemented in place. Bevel sand two 1/8" balsa strips and cement them to the three top stringers to support the dorsal fin. Cement the stringer to the center marks on F-8.



Tail blocks sanded to shape to conform with fuselage and stringers. Note offset on tail block to clear 1/4" dia. dowel elevator joiner.



Bottom view showing rear wing-hold down blocks and 1/8" x 1/4" bottom stringer.



Front end of The Sting showing the dash block. Motor mount set at 45 degree angle bolted in place with 4-40 machine screws. Note cut out area on nose ring for top cowl.



Tank compartment showing Goldberg nylon bearing block and groove to clear steering arm.

velum. Cut the part from the paper leaving 1/8" to 1/4" margin from the part. Cement the paper to the wood with rubber cement. Cut the part out, remove the paper, and wipe the part clean. The rubber cement will peel right off easily.

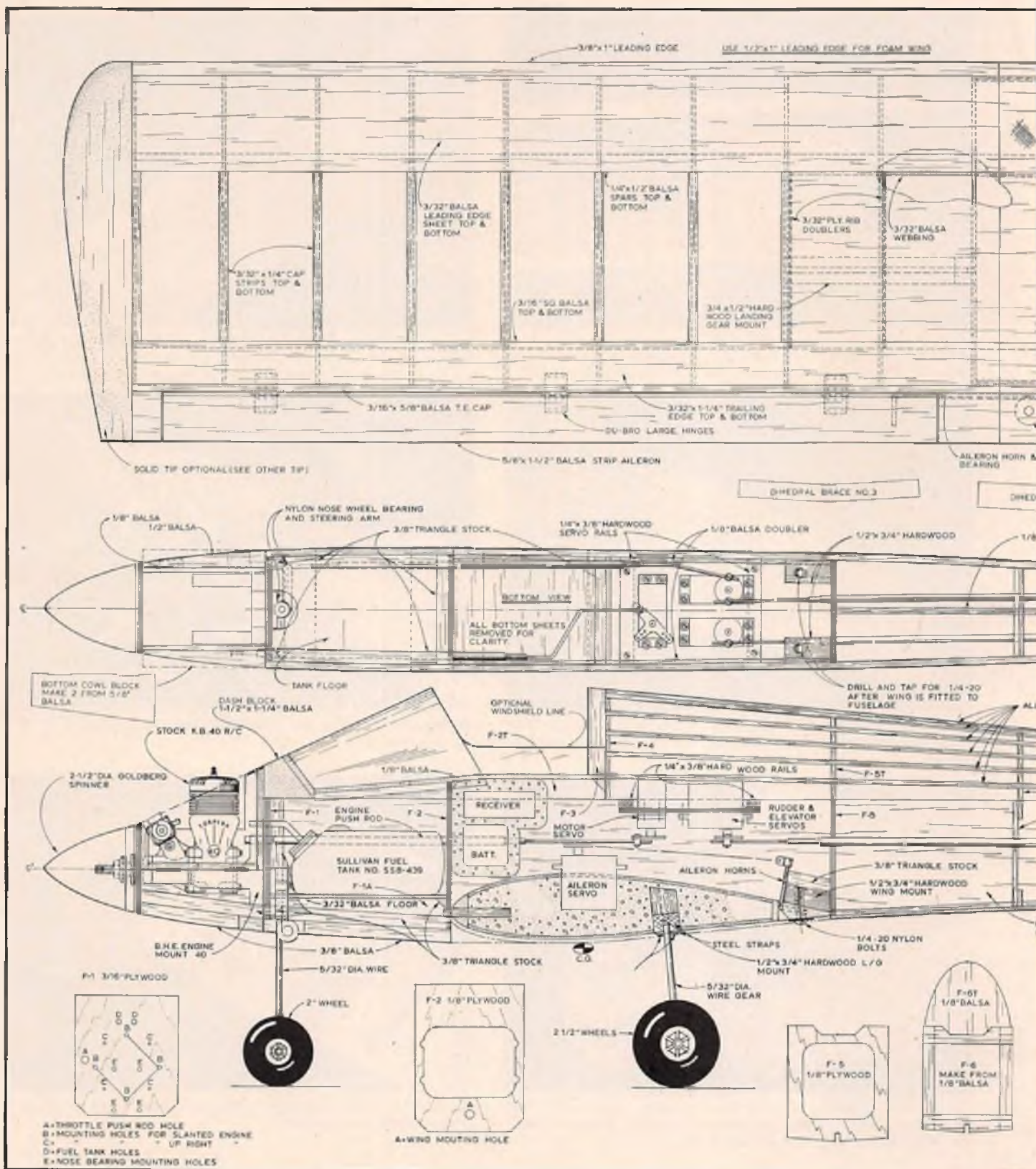
Two weeks later, working two or three hours an evening, The Sting was finished. So here we sit writing an article of the events that took place, and how The Sting goes together. As of this writing The Sting has been test flown

and a few photos taken of it.

The first day we tested The Sting, there was no wind blowing, so the time was ideal. We did a distance check which really wasn't necessary since the receiver had been used before. The K & B .40, with a Top Flite 10/6 prop up front, was started. First off, to get rid of the jitters, The Sting and I did some ground handling. I got it to the far end of the field and made ready for take-off.

I was again surprised in what little time

it took for The Sting to get airborne. I would say 25 to 30 feet and The Sting was up and away. After flying it at moderate speed for the usual two or three laps around the flying site, the time had come to put it to work. First a very large loop was tried at full power all the way around. If the wing was going to go, I'll know at the bottom. I also checked for flutter — there was none. Next we did a roll. It rolls well, but you will have to use a little rudder when the wing is vertical on



both ends of the roll. Cuban Eights were done with no problems at all. Inside and outside loops --- no problems. I went up for spins and got a spiral dive, so more throw was added to the rudder after the first flight. There is no problem in spinning now.

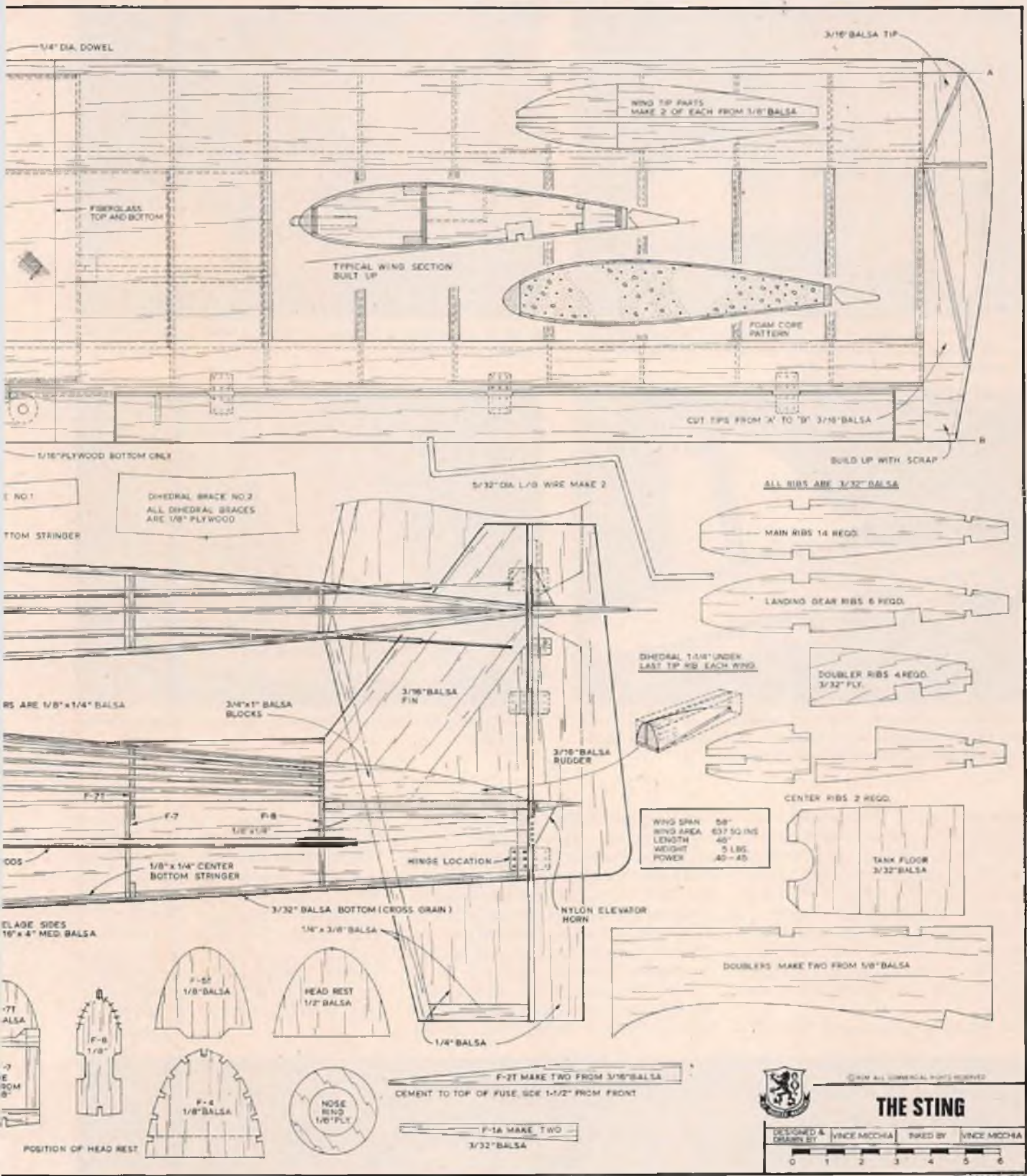
In inverted flight, The Sting hangs right in there. Now that the fuel must be getting low, The Sting was made ready for landing. I throttled back but not quick

enough, as I over-shot the field and had to go around again. This time the landing was just about as good as can be seen anywhere. The Sting was flown a few more hours, with no dings or broken props. As far as I'm concerned that was the end of a perfect day. I am very proud of The Sting and I know if you decide to build it, you will be too. So all you guys and gals out there in the modeler's world, let's get to the shop and build this

thing called The Sting. This model is intended for the modeler who has flown four channel high wing trainers, and has some experience flying. The Sting is an advanced trainer. Now that we have come this far, read on, as the instructions are next.

**Fuselage Construction:**

Shown above the side view on the plan is the bottom view of The Sting. For those who have never built a low wing



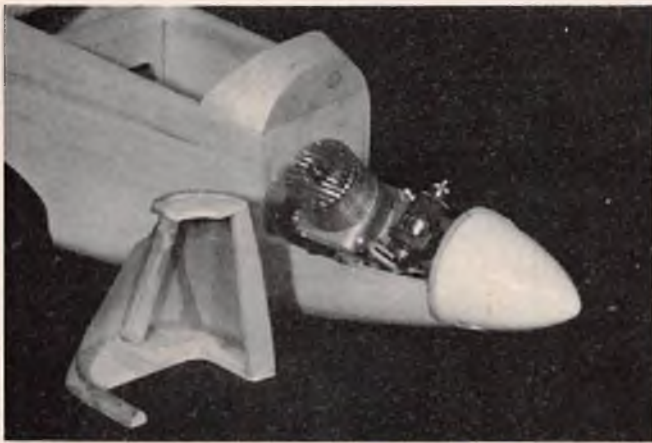
before, this view will assist you when the time comes for servo installation.

Begin by cutting the fuselage sides out of 3/16" x 4" x 42" balsa. (Save the scrap for rudder and fin later.) Mark the location of the bulkheads with a soft lead pencil or ballpoint pen. From 3/16" balsa make two F-2T and cement them to the top front edge of the fuselage, and allow room for the dash block to be cemented there later. Cut the firewall (F-1) from

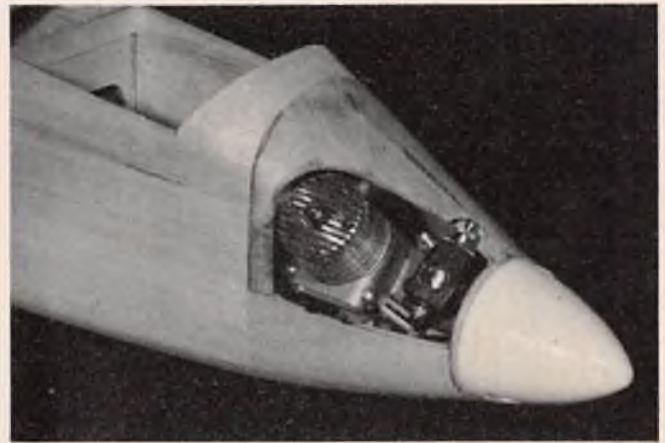
3/16" plywood. The drilling instructions are just below it on the plans. You may choose the method here as to upright engine or 45 degree slanted. If slanted engine is to be used, the bottom blind nut on the back side of the firewall will have to be inset so as not to interfere with the front landing gear bearing block. After drilling all necessary holes in the firewall, cut F-2 and F-3 from 1/8" plywood. Tape the rear end of the fuselage sides

together, making sure that they won't slip, and that they are square and even with each other. So keep your eye on that as you cement parts between the fuselage halves.

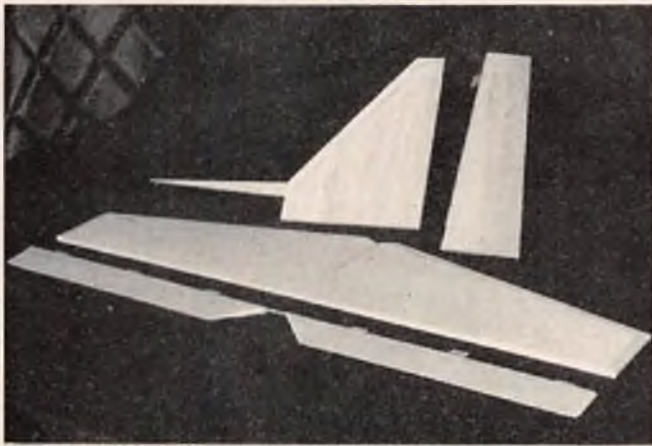
Cement the firewall in place with 5-minute epoxy and wipe the inside corners of excess cement since 3/8" triangular strips are to be cemented in later. Cement F-2 and F-3 in place next. Cut 3/8" triangular strips and cut a



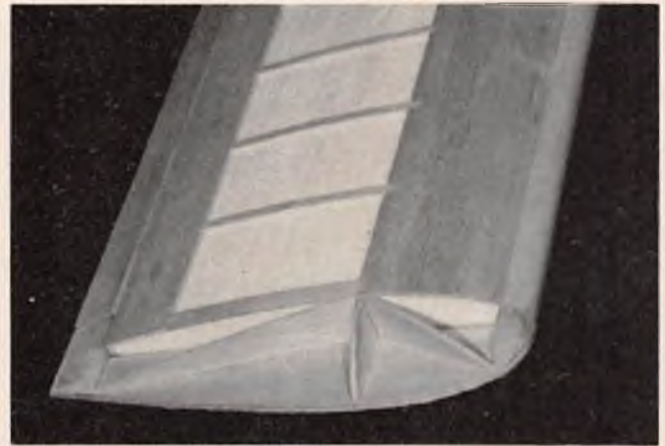
*K & B .40 engine in place. And an inside shot of the cowl. Note two grooves cut on top edge of the bottom cowl block for screwdriver, to remove engine mounting screws.*



*Cowl in place and is hinged on the left side. Cowl has to be opened for refueling.*



*Completed tail assembly. The fin is cemented into the top of the tail block after the spacer has been removed. The "V" cut on the front of the stab is cemented to stab mount.*



*Built up wing tip is optional. Prototype used solid lips and foam core wing.*

groove for steering arm clearance on one of the triangular strips and cement them in place. Cut two 3/8" triangular strips to fit along both sides of the fuselage bottom and to fit from F-1 to F-2 as shown on the side view. Cut two F-1A parts from 3/32 or 1/8" balsa and cement them to each side of the fuselage's interior, just to the top edge of the 3/8" triangular strips. This is the base for the tank floor.

Cut the rest of the bulkheads from 1/8"

balsa. Cement F-6 and F-7 together and forget the top pieces for now. F-4 is cemented in place next. The fuselage sides may have to be pulled together at this point. I used masking tape here and it worked fine. Cut and cement tank floor as per plan. The tank floor will slip into the tank compartment from the top and is cemented to the top edges of F-1A.

Take the tape off the rear of the fuselage and sand to shape as per bottom view, or so that both of the

fuselage sides (when cemented together) are 3/16" thick. See bottom view at rudder hinge point. Cement the rear of the fuselage together evenly at the back edge and squarely across the top. Cement F-8 in place. Cement F-5T, F-6T, and F-7T in place. Cut F-3 from 1/2" balsa. If you don't have 1/2" balsa, laminate two 1/4" sheets together. Plank the flat portion of F-2T as shown on the plan. This is planked half way so you can

to page 158

## THE STING

Designed By : Vince Micchia

### TYPE AIRCRAFT

Sport & Advanced Trainer

### WINGSPAN

58 Inches

### WING CHORD

11 Inches

### TOTAL WING AREA

637 Square Inches

### WING LOCATION

Low Wing

### AIRFOIL

Semi-Symmetrical

### WING PLANFORM

Constant Chord

### DIHEDRAL, EACH TIP

1 1/4 Inches

### O.A. FUSELAGE LENGTH

48 Inches

### RADIO COMPARTMENT AREA

(L) 10" x (W) 2 3/4" x (H) 3"

### STABILIZER SPAN

23 1/2 Inches

### STABILIZER CHORD (Incl. elev.)

6 1/2" Average

### STABILIZER AREA

140 Square Inches

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Mid-Fuselage

### VERTICAL FIN HEIGHT

8 Inches

### VERTICAL FIN WIDTH (inc. rudder)

6 1/4" Average

### REC. ENGINE SIZE

40 Cu. In.

### FUEL TANK SIZE

8 Ounces

### LANDING GEAR

Tricycle

### REC. NO. OF CHANNELS

4

### CONTROL FUNCTIONS

Rud., Elev., Ail., Throt.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa and Ply

Wing ..... Balsa and Ply (or Foam)

Empennage ..... Balsa

Weight Ready-To-Fly ..... 80 Ounces

Wing Loading ..... 18 Oz./Sq. Ft.

# SILENT POWER

BY JIM ZAREMSKI

Every RC'er has fond memories of past successes in building and flying his or her miniature aircraft. I personally have a clear picture etched in my mind of the maiden flight of my first multi motor electric powered aircraft. This bird was called Wren. It had a wing span of 44" and sported a Twin Astro 020 power system with a Cannon Tini Twin providing the control response.

On a dead calm balmy summer evening I tested the radio with the 020's humming and gave the Wren a toss when everything was checked out. I was estatic as the Wren climbed to cruising altitude. At 200' I turned the Wren 180° and flew back over the flight line. The sound of an electric twin is just phenomenal. You hear the motors screaming in the background but what really stands out is the whirl of the twin propellers carrying the model across the sky.

Since that time I have built three additional twins — all powered by the Astro 05 twin system. These included a Partenavia P68 from the Astro Flight kit and two of my own designs — Sweepstake I and Sweepstake II. Truly the electric twin is a sight to behold in the air and, yet, in addition to flight aesthetics, these models are extremely practical.

One of the major drawbacks of glow powered multi engine models is failure of one engine on take-off which leads to an abrupt end of the flight. This is obviously remedied in an electric multi system since both motors are wired parallel to the same power source. They start and stop together. Another benefit is instant starting of all motors with the flick of a switch. Finally, the noise compared to glow engines is so negligible that schoolyard flying of these models is practical.

So why haven't more twin electrics been built and why have some of the ones that have been built been only marginally successful?

The answer to the first question is simple. Modelers feel that an electric twin system such as the Astro 05 Twin is too heavy and not powerful enough. After all, a fellow in a club two cities over the mountain tried to fly a Partenavia (P-68) and it didn't perform! Bunk!

Every unsuccessful attempt I have seen in twin motored electrics has occurred because of the builder and/or flyer's selection of wrong propellers or extreme lengthening of power wires to the motors.

For the Astro 05 Twin, a Cox Gray 6/4 prop is by far the best choice for a sport model. For a twin powered sailplane, the Cox 7/3½ prop is good. However, the 7/3½ propeller has been dropped from



Stand-Off Scale Twin 020 powered Aero Commander.



Twin 020 powered Aero Commander.



John Scrary's P-68 from Astro Flight kit. 5 channel, rudder, elevator, aileron, motor and flaps.



Stand way back ME 262 Twin 05's.



Bob Miller with P-68 and Super Monterey. Note fairing behind canopy on Monterey.

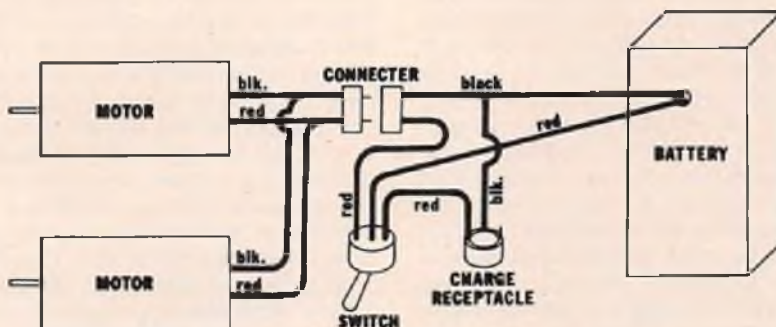


Jim Zaremski's Sweepstake twin 05. 54 oz., 74" wingspan, 580 sq. inches of wing area. A Floater.

the Cox line. A Rev-Up 7/4 has proven to be a good replacement.

Rick Witte, a fellow member of the Toledo Weak Signals, had only limited success in the 1978 flying season with an Astro Flight P68 with twin 05's. He was flying with 5/4 propellers. The mere switch to 6/4's took the P-68 from a dog to a real crowd pleaser. Rolls, loops, and

to page 152



Typical wiring schematic — twin motors.



# RC FLYING AND THE LAW

## Part XII

### WARNINGS AND SAFETY INSTRUCTIONS...WHAT ARE THEY ALL ABOUT?

Read And Follow These Instructions and Warnings Before Using This Device  
...

Don't Attempt to Operate Without Reading and Following Instructions and Warnings ...

Failure to Obey These Safety Instructions and Warnings May Result In Fire, Explosion or Other Casualty, Causing Serious Personal Harm and Property Damage to Yourself and Others ...

For Your Own Safety and That of Others  
...

You might think that this language is taken from the instruction sheet or manual for a buzz-saw or perhaps even a radioactive device. In fact these are all quotations from instruction sheets and manuals that come with or are attached to popular radio control devices and components. You might well ask, "But I thought this was a hobby, a fun thing. Why all these dire warnings and cautions?" The answer is simply, because they are **needed**.

That need can be broken down into two aspects. The first is the need to properly instruct and warn the user of the R/C component or device about the safety hazards that are potentially there; the manufacturer or distributor wants its customers to know how to properly use the component, build the kit or device or operate the model. After all, it is satisfied customers who build a business and spread the word of something worth owning. The other aspect is the necessity of warning the modeler that an abuse, a misuse or a failure to follow the instructions and directions may result in serious personal injury to the modeler, to others or property damage (including the loss of the model). At the same time they know that if they fail to properly instruct, warn and direct with respect to



By Arthur J. Sabin  
Prof. of Law

the use of their product, there is a potential legal exposure.

We all know that there has been a significant increase in consumer actions against manufacturers for alleged defects in their products, leading to serious personal injury. Not only is the user or consumer protected by product liability case law as it has developed in most states of our nation, but bystanders as well. It is for that reason, for example, that the woman in Pennsylvania who was struck by an R/C model as she was watching a swimming meet sued a number of component makers of the R/C aircraft, and not only the R/C pilot.

Therefore, because R/C manufacturers and distributors want their products to be used safely and properly, they have given considerable attention to stating proper safety warnings, instructions and directions concerning their products: at the same time they are telling the modeling public that if you fail to abide by reasonable instructions, warnings and directions concerning the use of the product, you cannot hold the manufacturer responsible for any injury or damage suffered from such misuse or abuse of the product. As the law has described this situation, such a user or consumer has **assumed the risk of his own injury or loss**. If a bystander, such as described in the Pennsylvania case, sues the manufacturers or distributors of R/C components along with the R/C pilot and the manufacturers or distributors prove that the pilot assumed the risk of a defective product (assuming that there was a defective product and not simply pilot error) then all of the fault and liability may ultimately lie with that R/C pilot.

It is apparent that there is a twofold burden; the first is on the manufacturer or distributor to make certain that there are adequate warnings, directions and instructions so that the modeler can safely use the component. Indeed a product may be considered "defective" if there is the failure to reasonably and adequately warn, direct and instruct. On the other hand, the R/C modeler has the

obligation of reading and obeying those safety instructions and warnings in order to avoid the fault of being negligent or having assumed the risk of any defect or deficiency in the product.

But what about the attitude of the average modeler? Has the average modeler come to the point where he takes seriously the warnings, safety instructions and directions that are contained in that kit, with that radio, with that engine and propeller?

Having viewed the R/C scene for a number of years, I don't think anyone could count the number of minor injuries that have occurred as a result of operating R/C models; for example, can anyone who has operated an R/C engine for any length of time really say that they haven't had their fingers "smacked" or much worse, as the number of stitches on the hands and other parts of the bodies of R/C modelers frequently testify?

The manufacturer, as indicated in this series, has a legal responsibility to properly warn, instruct and direct as to the safe use, operation and maintenance of its product, but does the modeler accept his responsibility? The modeler's failure to abide by safety instructions, warnings and directions may result in his assuming the risk of injury to himself and liability for injury to others, where the manufacturer did warn, instruct and direct and the modeler failed to abide by what had been supplied with the product.

Let's start by taking a look at what typical manufacturers are saying about their kits in terms of safety instructions, warnings and directions. You will immediately note that what is recommended is apropos to the building of any R/C model so the words are worth considering regardless of what you might undertake building. Here are a few samples drawn from the safety instructions and warnings of different manufacturers of R/C kits:

#### WARNING

*A Radio Controlled Model is not a "toy." Care and caution must be taken in*

properly building the model as well as in the installation and use of the Radio Control device. It is important to follow all directions as to construction of this kit as well as installation and use of the engine and radio gear. The advice and assistance of a well experienced builder and pilot is highly recommended. Don't take chances. Improper building, operation or flying of this model could result in serious bodily injury to others, yourself, or property damage.

#### IMPORTANT NOTE TO THE BUILDER

Every model built from a kit is different, reflecting the level of skill as well as the favored building techniques of the modeler. Ultimately thus, each model is essentially the individual creation of that builder.

Changes and variations take place in building so that while . . . (kit manufacturer) supplies most essential building materials, the end product is the creation of the modeler.

Therefore (kit manufacturer) assumes no responsibility for the performance of the model, nor does (kit manufacturer) assume any responsibility of any nature whatsoever for the loss of, or property damage resulting from the operation of this model when it is completed.

I think their message is straightforward and honest; the modeler is the basic creator of the model and there is no way that the manufacturer can really control what the modeler does with that model. Most manufacturers spend a great deal of time and make an enormous effort to insure that a reasonably well built model will perform safely. But ultimately they can't control the innumerable variables involved in the building and so can only delineate some basic safety factors and remind the modeler that the building is essentially a matter of the creativity of the modeler for which he alone is responsible.

Beyond the building of the model itself, there are the concerns with the safety factors involved in the installation of the radio gear and the testing of that gear. Most R/C manufacturers and distributors of radio equipment have now moved to specific instructions, warnings and directions with respect to the installation of their radio gear in an R/C model. All carefully instruct on testing the radio in the model before its operation and call upon the modeler to get assistance from a proficient pilot before operating that model. The field testing of the radio gear is so important that it has moved into the Academy of Model Aeronautics Safety Code for R/C models; it is incumbent upon all of us to make certain that the radio is range checked and operating properly before we use the model on every occasion.

At first glance or thought it seems absurd; of course everyone knows how

to mount a propeller and to be careful with the use of props on models. But the record speaks differently. Using the wrong size prop; mounting the prop backward; failure to properly tighten the prop to the engine; using props that have been dented, nicked or even split ("I'm sure I can get another flight out of it") are just some of the problems that have plagued the use of propellers by modelers, resulting in injuries, most of which, happily, are of minor dimension, but unfortunately a few have resulted in serious consequences that maim and injure in a way that time alone does not heal.

A few years ago, recognizing the need to act, a number of manufacturers and distributors of propellers attended a meeting at the same time they were involved with the Toledo show. As a result of that meeting, proposals for safety instructions and warnings to be placed on a sheet of paper going with each propeller or box of propellers was circulated. Ultimately there was general agreement as to the contents of what the instruction and warning sheet should contain and it was adopted first by Top Flite Models, Inc., for their propeller line; they specifically did not copyright the material so that other propeller manufacturers and distributors could adopt any or all the language involved.

Because this area is of significance to most R/C modelers, the instruction and warning sheet is reproduced here with the hope that every reader will take the time to examine what is said and think about their own method of handling propellers.

#### ADDITIONAL PRECAUTIONS

(A) Use safety glasses when starting or running engine.

(B) Don't run engine in area of loose gravel or sand; prop may throw such material in face or eyes.

(C) **Keep away from prop:** Loose clothing, shirt sleeves, ties, scarfs or loose objects (pencils, screwdrivers) that may fall out of shirt or jacket pockets into prop.

(D) Make certain glow plug clip or connector is secure so that it will not pop off or otherwise get into running prop.

(E) If a spinner is used be certain its edges do not touch the prop blades.

#### ADDITIONAL SPECIAL WARNINGS AND INSTRUCTIONS FOR NYLON PROPELLERS

Nylon props are affected by amount of moisture in the air and will become brittle and break if too dry. Since amount of moisture may vary greatly from time of manufacture, do as follows:

(1) Boil each propeller in water for **30 minutes before first use.** Water should cover the entire prop. Do not cover pot. Let prop stay in water until cool.

(2) You can add dye (Rit, etc.) in the water to identify boiled props as against unboiled.

(3) After use of prop, remove from engine, wrap in **moist** cloth, paper towel or rag and store in water tight plastic bag.

#### INSTRUCTION AND WARNING SHEET — HOW TO USE PROPELLERS SAFELY & PROPERLY

The failure to read and follow instructions, abuse or misuse, may result in serious personal injury!

(1) For correct propeller size and pitch, follow advice of engine manufacturer or prop chart available free from dealer or Top Flite.

(2) Install prop with Curved side facing you. Securely tighten propeller nut; use correct wrench for this purpose.

(3) When starting engine, keep spectators away (20 feet or more) and out of path of rotating prop.

(4) Keep hands away from prop as much as possible; use "chicken stick" device or electric starter; follow instructions supplied with device.

(5) Keep face and body away from path of prop as you start and run engine.

(6) Make all engine adjustments from behind rotating prop.

(7) To stop engine, cut off fuel supply or follow engine manufacturer's directions. **Don't** use hands, fingers or any part of body. **Don't** throw anything into a running engine.

(8) Discard any props with nicks, scratches, splits or cracks or **any** sign of wear or damage. **Never** repair, alter, shave or bend a prop! Normal engine vibration can loosen a prop; inspect and retighten if necessary!

The message is loud and clear; from the warnings contained with the kit, the safety instructions that go along with the engine to the requirements with respect to radio installation, operation and testing, the aim is consistent; Make all involvement with every aspect of radio controlled modeling **safe**; avoid turning the fun and excitement of R/C modeling into injury, tragedy and loss for yourself and others.

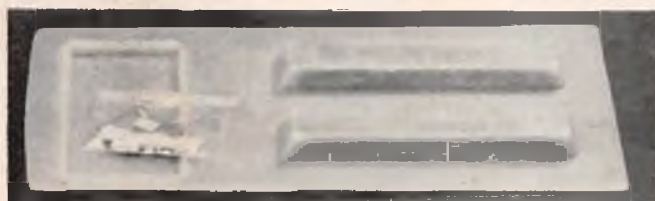
I close with that which must be labeled as pretty obvious --- but then a lot of truths are pretty obvious. Those safety instructions and warnings are **there for the modeler's protection**, for the safe and proper use of the component involved in the functioning model. To ignore, avoid or disregard a warning, instruction or direction opens the modeler up to the potential of injury with or to his model or others or their property, potentially turning the most challenging and exciting avocation into grief and heartache.

Now will you **please** read and follow those safety instructions, warnings and directions!

Your comments and suggestions are always welcome: write to me at 315 South Plymouth Court, Chicago, Illinois 60604. □

# RCM PRODUCT REVIEW

## Prather Products .40 DEEP VEE



### SPECIFICATIONS

Name .....	PRATHER 40 DEEP VEE
Boat Type .....	Sport or Competition
Manufactured By .....	Prather Products 1660 Ravenna Ave. Wilmington, Calif. 90744
Mfg. Suggested Retail Price .....	\$99.95
Available From .....	Both Mfg. & Retail Outlets
Hull Length .....	40 Inches
Beam .....	12 Inches
Mfg. Rec. Engine Range .....	.40-.65
Rec. Fuel Tank Size .....	(2) 16 oz., (1) 6 oz.
Recommended No. of Channels .....	2
Recommended Control Functions .....	Rudder & Throttle
Basic Materials Used In Construction:	
Hull .....	Fiberglass & Maple
Building Instructions on Plan Sheets .....	Yes
Instruction Manual .....	Yes (28 Pages)
Construction Photos .....	Yes

### RCM PROTOTYPE

Radio Used .....	Futaba & Kraft
Engine Make & Disp. ....	K & B 7.5cc Marine
Tank Size Used .....	3 Tanks (38 Oz.)

### SUMMARY

#### WE LIKED THE:

Superb fiberglass components. Completely detailed instruction book. Stability and ease of handling. Competitive performance.

#### WE DIDN'T LIKE THE:

Slightly flimsy joint between hull and deck in engine compartment area. (Manufacturer has corrected this on current production.)

Our first step was to obtain all the items required for the project. From Prather we picked up the optional hatch cover set, running hardware kit, and several accessory items, all listed in the instruction book.

While handling the hull we felt that the deck around the engine compartment was not sturdy enough for rough treatment and we epoxied a strip of glass cloth tape along the inside overlapping the deck to hull seam. This stiffened the deck considerably. Prather was notified of this modification, and the reinforcement is now installed during the manufacturing process at the factory.

to page 151

**A** new name to the R/C boating activity is Prather Products, 1660 Ravenna Ave., Wilmington, California 90744. Terry Prather has unmatched credentials in Formula I R/C aircraft racing and is now devoting his efforts to R/C boats. His first offering is the Prather Deep Vee Sport or Racing Boat for .40 to .65 cu. in. engines. Prather commissioned George Campbell, a prominent West Coast boat designer to design the boat that could be highly competitive in racing and would be stable and easy to handle for the sport boat enthusiast.

After watching the Prather boat perform in several races and practice sessions, we were so favorably impressed that we decided to build up a matched pair to race in the NAMBA Enduro Event (100 lap team relay race).

When you open the box, you really don't find a whole lot of stuff in it. You get your first warm feeling when you examine the epoxy fiberglass hull that has the deck installed at the factory. We have seen many fiberglass products and Prather's work is second to none. After considerable time was spent in fondling the sleek hull, the engine mount rails were examined. The absolutely clear 3/8" thick hard maple mounts has a bevel pre-cut to match the hull bottom. All of the goodies are strictly first cabin. Incidentally, the box size is 10" x 16" x 20".

#### Construction:

Probably the most valuable item in the box, particularly for we neophytes, is the instruction book. Since Terry and Al Prather are new to the R/C boat scene and had to learn an awful lot the hard way, they have documented everything that a newcomer needs to build and operate their boat. Explicit step-by-step instructions are illustrated with 46 photographs and 2 drawings. Also included are running and maintenance instructions.

# RCM PRODUCT REVIEW

**Craft-Air Inc.**  
**DRIFTER II**



## SPECIFICATIONS

Name .....	DRIFTER II
Aircraft Type .....	Competition Sailplane
Manufactured By .....	Craft-Air Inc. 20115 Nordhoff St., Chatsworth, CA 91311
Mfg. Suggested Retail Price .....	\$19.95
Available From .....	Both Mfg. & Retail Outlets
Wing Span .....	2M/72 Inches
Wing Chord .....	18½ Inches
Total Wing Area .....	573/635 Square Inches
Fuselage Length .....	38 Inches
Stabilizer Span .....	20 Inches
Total Stab Area .....	80 Square Inches
Mfg. Rec. Engine Range .....	.049
Recommended Fuel Tank Size .....	w/engine
Recommended No. of Channels .....	2
Recommended Control Functions .....	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage .....	Balsa & Ply
Wing .....	Balsa, Spruce & Ply
Tail Surfaces .....	Balsa
Building Instructions on Plan Sheets .....	Yes
Instruction Manual .....	No
Construction Photos .....	Yes

## RCM PROTOTYPE

Radio Used .....	Kraft 3 ch. KPS 12 servos
Engine Make & Disp. ....	Cox
Tank Size Used .....	N/A
Weight, Ready To Fly .....	18.5 Ounces
Wing Loading .....	4.26 Oz./Sq. Ft.

## SUMMARY

### WE LIKED THE:

Two kits in one — 72" wing & 2 meter wing. Excellent plans with full instructions. Quality of wood very good.

### WE DIDN'T LIKE THE:

Die-cutting was not so good.

appreciate the turbulator spars forward of the main spar. At slow speeds it is necessary to use either turbulators or increase the angle of attack to keep the plane in the air. Birds with their movable wings can increase the angle of attack but it is rather difficult to do that with a model in flight. This turbulated air over the top of the wing seems to give more lift to the wing at slow speeds and has relatively little effect at high speeds.

### Covering:

The covering applied was transparent and opaque MonoKote.

### Engine:

The Drifter II may be flown with a power pod which is well detailed on the plans. It uses a Cox tank mount engine such as the Baby Bee or Golden Bee .049.

### Radio:

The radio used was a Kraft 3 channel with KPS 12 servos. For this particular radio no difficulty was encountered space-wise. The battery and receiver were located in the forward compartment and the servos were located at the Center of Gravity under the wing.

### Flying:

Drifter II is advertised as being easy to fly and we concur. On the second flight from a high start, we were snared by a grand daddy type thermal and finally chickened out before it became

to page 151

**T**he Drifter II kit immediately attracts your attention because of the two choices you are given upon reading the label on top of the attractive box. You have the option of building your next sailplane with a 6' wing or with the optional two meter wing. As you open the box you are introduced to a set of surprises, the first of which is the sheet of rolled plans. Not only are they rolled but they are rolled with the printing out. Unroll them on your building board and they stay there smooth and flat, no need looking for a set of lead weights to keep the four corners from exploding back into the original roll. Second, the quality of the wood was excellent and, as the front of the box indicated, "absolutely nothing needed except glue, covering, and radio."

The kit is set up for the 72" wing; the two meter wing may be attained by expanding each center section 3½". The materials for the two meter wing must be purchased additionally, they are not included in the kit. Sizes and dimensions of the extra wood are given on the plans.

### Construction:

All of the instructions are written across the top of the plans which are 45" long by 35" wide. As you build the wing sections, just elevate your eyes slightly and there it is, the easily followed step-by-step details. When the wings were finished and the plans pushed up on the workbench to start the fuselage and empennage, it was disconcerting to see the instructions disappear over the top edge of the workbench. At this point, the instructions were neatly removed from the top of the plans, folded in half and construction with complete directions was continued.

The next surprise came when we discovered the manufacturer really meant it when they said nothing else was needed. In addition to the standard sheets of balsa wood, sticks of spruce and balsa and pieces of plywood, the ever present little plastic bags of goodies which contained pushrod wires, clevises, hinges, horns, towhook, and servo mounting materials were also included. It is really a complete kit. Not only is the kit easy to build, they did not sacrifice good technique for ease of building.

We are prejudiced by building old timers and really do



# TAKE A SAILPLANE OUT TO LAUNCH TODAY

By Al Doig

In every sailplane club there are flyers who consistently get higher launch altitudes than the rest. It is no coincidence that these same flyers are the contest winners in the club. The ability to get consistently high releases certainly does not guarantee wins, but consistently poor launches will guarantee poor average performance.

This article explores the dynamics of the sailplane launch and tries to identify problems in technique or adjustment that prevent adequate performance. Most remarks are directed toward the use of an electric winch as the motive power.

There are five symptoms that point to faults in technique or adjustment: (1) A violent yaw which may occur anytime but is more often seen during the steep climbing segment of the trajectory; (2) Yaw oscillation or weaving back and forth; (3) Inability to achieve a steep climb and hence a low release altitude; (4) An immediate sag in flight path that takes several seconds to recover normal climb, and (5) The glider pops off the tow line during the steep part of the ascent.

In a free-glide mode, the forces acting on a sailplane are due to lift, drag and gravity (Figure 1).

In a launching mode, one more force, towing force ( $F_t$  of Figure 2) is present, but the sailplane is gliding in the same way as it was in the free-glide mode of Figure 1 with two exceptions. The constant force of gravity has been replaced by the controlled towing force  $F_t$ , and the force of gravity  $F_g$  is now a

variable vector acting like drag during initial ascent. The ship goes up on tow because the forward component of  $F_t$  is greater than  $F_g + F_d$ .

The glide angle of the ship in Figure 1 is represented by the ratio of lift to drag, or the L/D we have heard about before. As the angle of attack is increased, the glide angle, L/D improves until it reaches

a maximum. Further increase in angle of attack results in a worsening glide angle until the stall angle is reached and lift deteriorates rapidly. Increases in sailplane weight raise the wing loading which increases the forward speed but, within bounds, does not affect the glide angle. The glide angle or glide ratio is represented by the distance traveled divided by the distance descended.

The sailplane shown in Figure 2 also has a glide ratio which is represented by the distance traveled divided by the distance descended. In this case, the distance of the trajectory traveled is roughly on a circular involute or distorted ellipse. The distance descended is the amount of the line on the reel. To get the most height from a launch, we want the least line on the reel. Therefore, we conclude that to get the best height, we should fly a maximum L/D trajectory for the particular sailplane. One thing to be

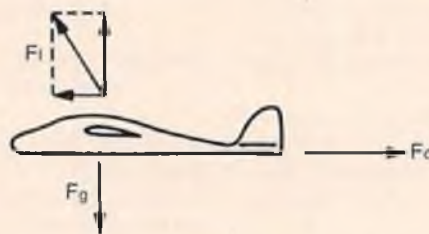


FIGURE 1

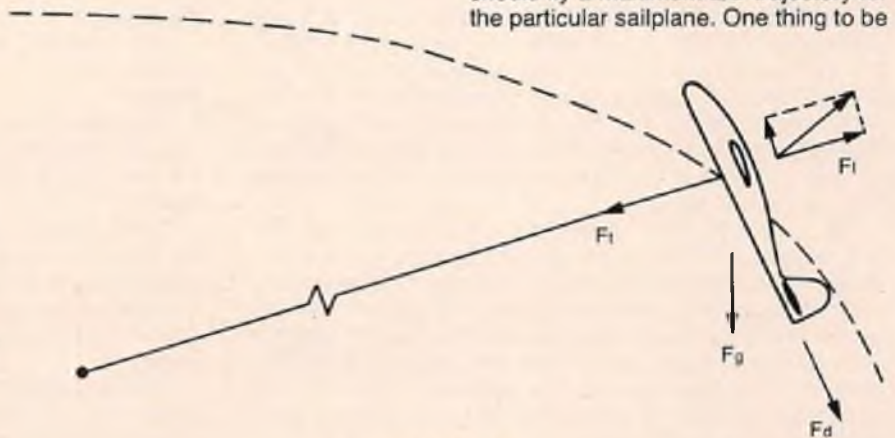


FIGURE 2

realized is that during launch the maximum L/D varies.

We previously noted that during ascent the force of gravity,  $F_g$ , was a variable vector which acted like drag, increasing D, thereby worsening the L/D ratio. We also noted that as the angle of attack is increased, L/D increases until a maximum is reached. This peak in L/D is caused by the induced drag increasing faster than lift. Further increases in attack angle have the effect of decreasing both the rate at which the sailplane is descending, as well as forward speed and glide angle. Finally, the wing reaches the stall angle. The best L/D on tow probably occurs at an angle of attack just before stall. This is because the best L/D occurs when induced drag equals the remainder of the drag and on tow there is an additional drag due to the tow line, a major effect, and "drag" due to gravity. Consequently, the best L/D on tow occurs at a higher induced drag (higher angle of attack) than the best L/D in free flight. Since the best free flight L/D occurs not too far from stall anyhow, a sailplane on tow should be flown as close to stall as controllability and stability permit.

Minimum sink rate does not have much meaning on tow. The sink rate in this case is the speed that the line is taken onto the winch reel. The point to consider is that at an angle of attack greater than that which produces maximum L/D, induced drag and the resultant lower L/D not only results in less launch altitude but the ship is very close to stalling. We are really treading a very narrow line. A stall on tow results in the undesirable yawing which varies from violent to gentle depending on the stall characteristics and stall mode.

A most common potential disaster on tow is tip stall. Most gliders will not tip stall unless considerably yawed — often beyond the maximum yaw that can be commanded by the rudder. Initial yaw, which many times will start a tip stall, can come from launching with one wing low. It pays to check for level wings at each launch. Once a tip stall starts, it is important to quickly get the nose down and the glider back on heading.

A further complication to the launch glide angle is the effect of gravity. In Figure 2 we noted that during a launch, the force of gravity opposes the forward component of the lifting force. This appears as drag in the force diagram. The magnitude of this gravity drag which acts in opposition to the forward lifting force is proportional to the cosine of the angle of ascent. A 90° or vertical launch, if this were possible, would have the full force of gravity acting like drag. To a point, the higher the angle of attack, the greater the lift and the steeper the climb. However, in addition to the rise in induced drag with greater attack angles, another non-linear drag function,



gravity, comes into play. All this tells us that the steepest initial climb does not necessarily result in the highest launch. Also, since the drag-like force of gravity is directly proportional to weight, the better launch can be achieved with a lighter sailplane — all other things being equal — which comes as no surprise.

Even though the steepest climb may not be optimum, the best climb is pretty steep. Assuming the glide angle of a sailplane is degraded during a steep launch to 5:1 to 8:1, the optimum initial climb is still from 79 to 83 degrees. The flyer should apply sufficient up-trim to achieve a steep, fast climb that is far enough from stall that pitch transients, such as winch pulsing do not drive the angle of attack into a stalled condition.

Let's now consider launching speed and technique. It is very possible to launch a sailplane in a fully-stalled condition. Two good ways to do this are to point the ship up and then throw it straight out or, second, let the line jerk the ship out of your hand. In the first instance, the ship may have good airspeed, but the angle of attack is above the stall angle. At this point the flying field tips up and the ship runs right into the side of it. The results of the second case are the same, but the reason is different. The towing force is generally applied to the glider through a hook on the bottom of the fuselage. This force may act on the center of inertia of the ship through a "couple" (Figure 3)

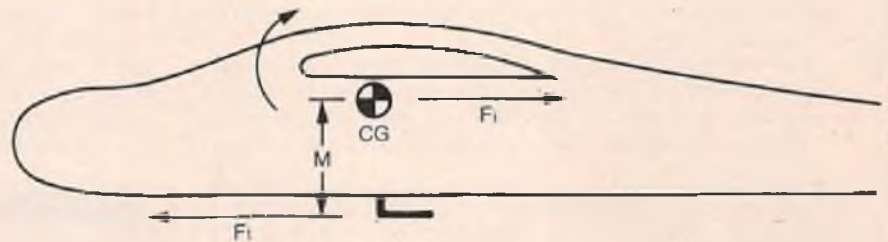


FIGURE 3



The inertia of the ship opposes the towing force. The forces are, however, applied at points displaced by a distance, M. This causes upward rotation. As there is initially little forward speed, the stabilizer is not effective and the wing is rotated into a stalled angle of attack. This condition is evident in the ship that almost does a tail slide on launch which is finally recovered when the stab gets the angle of attack sorted out. This can be avoided by: (1) Launching with sufficient airspeed so the stab is effective; (2) Launching at an angle high enough that the towing force vector passes through the Center of Gravity: therefore,  $M = 0$  (Figure 3); or (3) On heavy sailplanes, or ones with insufficient elevator authority, the problem is sometimes solved by towing with a yoke attached at the C.G. point instead of the bottom of the fuselage. It must also be stated that solution #2 must be accompanied by a heave to establish a viable angle of attack, otherwise the tow line will pull the ship forward at an angle of attack which may be above stall.

All this discussion concludes that a sailplane should be given sufficient initial airspeed to generate enough lift to support itself. In his "Challenger" article, Otto Heithecker gives us some launching guidance: "Hold onto the glider until the winch builds up plenty of pull then heave. That's right, heave, don't just let go." It's difficult to launch too hard if done smoothly.

Next we come to launch angle. Ideally the ship should be launched at 80° and 20 mph. There are a couple of things wrong with this. First, there is no way I can heave my 5½ pound Challenger straight up. Even my 47 ounce Aquila presents a challenge in this department. Second, I have shortened the nose moment on two sailplanes when the tow

to page 142



# LOU PROCTOR MAGNIFICENT



A young Lou Proctor, far left, with a very young Charles Lindberg and some other model contest winners; about 1929.



A Lt. Ferguson, USN, Lou's father in the center, and Lou in the latest space garb. Photo taken in Butte, Montana, 1930's.

I have been opening kits for more years than I care to admit, some have impressed me greatly, some have just impressed me and then there have been others . . .

It comes right down to, "What you buy is what you get," — quality and price usually go hand in hand. Don't expect matched sheet balsa, balanced wing spars, full hardware, hand picked sawn and sanded wing ribs, for bargain basement prices.

Some of the kit manufacturers have had to make the decision that if they want to meet or beat the market, shortcuts have to be taken and you, the modeler are expected to do a bit of trimming and sanding.

Then there are a few who, no matter what, will not allow their quality to deteriorate. One of these is known to practically everyone who has been building models for any length of time. He answers to the name of Lou Proctor. Lou is a person who really does give a darn how the buyer of the kit is impressed and someone like that should have his kits praised to the sky. I have built three kits that, to my way of thinking, are the epitome of model aviation; they are the Proctor Antic, the Proctor Biplane and the Mini Antic. These kits have one thing . . . QUALITY . . . you just can't emphasize that word enough when it comes to products that bear Lou Proctor's name.

I have had the pleasure of spending many hours in Lou's plant over the past 5 or 6 years. It is clean, there isn't a speck of dust anywhere, the tools and machines in his machine shop are immaculate. Everything has its place and is there; I

am not sure whether it is Lou or his lovely wife who insists that it be that way, but I wouldn't be far wrong if I bet it was both of them. They work side by side in the plant with one or two employees who make up the whole work force of Proctor Enterprises. Lou runs the production line making sure the inventory of every kit part is up to date, Elsa packs the boxes and, with Lou's help, gets them ready for delivery.

Every part of the kit fits and fits exactly when the time comes to install it in the plane. Sanding a little bit off or having to make a new piece because it was too small just isn't a part of Lou's quality control. Recently, I had to rebuild the fuselage of my Antic. Due to pilot error, it had a hard landing which others might be tempted to insist was a crash. All I had left was the engine mount and the empennage, everything in-between was totally destroyed. Knowing that Lou keeps a full stock of fuselage parts on hand at all times, I paid him a visit to collect the parts I needed. Remarkably, they looked exactly like the same parts that were in the kit when I purchased it six years ago. When the rebuilding was all finished I proceeded to the next step, attaching the engine mount to the firewall. The firewall has four little indentations in it where the holes should be drilled for blind mounting nuts. Without first thinking of matching them up with the engine mount, I drilled the holes, inserted the blind mounting nuts and then it dawned upon me — will they match? After all it had been a long time since I built the engine mount. With great trepidation, I put the engine mount up against the firewall and inserted the first machine screw. It fit! Well of course it fit, idiot, that was only the first one. Then



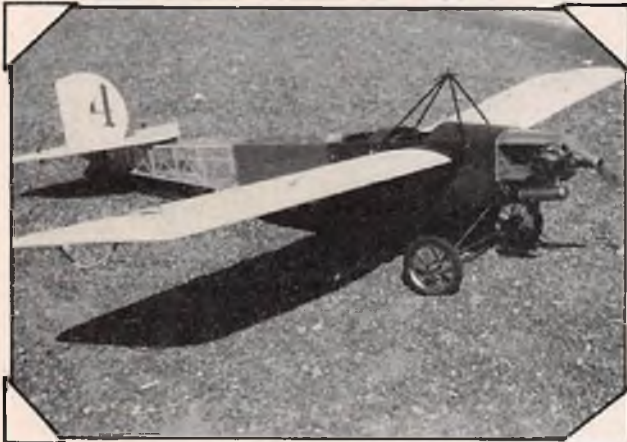
Just like 1911 on an early morning in France, on the way out to meet the hun. Jack Paul's Proctor biplane on a take-off.



Prototype Parasol Antic, with upright engine and Williams Brothers wheels. Wide well placed gear makes ground handling easy.

# AND HIS FLYING MACHINES

By Paul Denson



Paul Denson's first Antic. Clear transparent MonoKote is used on the open framework to keep out dirt and grease.



The man today — Lou Proctor in front of his San Diego, California shop, with a Proctor Parasol prototype model.

*I inserted the second, the third and the fourth. Miracle of miracles they all fit with absolutely no binding. With that fantastic bit of information I approached Lou the next day expecting to inflate his ego to the rafters and what did I get, "Of course it fit, how could you expect it to be otherwise?" Then I remembered that it was Lou Proctor I was talking to. He tools his jigs and templates so that every part that goes into one of his kits is identical to the same part that has been going into every one of his kits for years.*

*If you have looked at some of the kits now available you kinda wonder how you can build a plane with so few parts. Take a look at one of Lou's kits; there are so many parts there that it looks like one of those jigsaw puzzles that used to cover the whole card table. And every one of those parts is just as precisely made as was my firewall. Every part is legibly numbered to simplify construction and not only that, but you will find it identically marked on the plans.*

*Another friend who makes kits among other things, once helped me to get my head on straight regarding the hobby when I complained about how hard it was to build a certain section of his plane. He asked me why I was in the hobby, if not for the challenge? If you really want a challenge and want to build a plane you will be proud to own, then accept the challenge of one of Lou's kits. I have yet to talk to anyone who didn't finish one of the kits once started, nor who didn't enjoy it from the first glue joint to flying.*

*According to pictorial evidence, Lou first showed his skill at model airplane building at age twelve. We are sure it wasn't glow engines, radio control or MonoKote that*

*attracted his attention, they hadn't been invented yet. It was strictly the product of rubber power, tissue, bamboo, balsa wood and chew it off your fingers type of glue that appealed to the creativity in Lou.*

*During the next five years, at the urging of his very good friend Jim Walker, he was he was actively engaged in model building and also worked part time at Bacon Aircraft in Vancouver, Washington, making drawings for, and helping repair, airplanes. In 1927, while working at Bacon, Lou earned his pilot's license.*

*Barely two years after Lindberg made his historic flight, Lou had his first contact with fame. In 1929 he entered a local "Lindy" model plane contest and placed Second. He was awarded his prize by the Lone Eagle, Charles A. Lindberg himself. Within weeks following this contest, working 16-18 hours a day 6 days a week, Lou built a scale model of a Vought-Corsair biplane destined for entry in the forthcoming NATS. The plane was very well detailed with individually cast cylinders, pushrods, and connectors, with controls that worked flying surfaces from both cockpits. This plane qualified for entry by winning the local contests then went on to win the scale competition at the NATS. First prize was an all expense paid six weeks tour of Europe.*

*Enroute overseas on the passenger ship "Dutchess of Athol," he was accompanied by the indoor rubber champ Joseph Culver of Oakland, California, and Donald Burnham, the outdoor rubber champ, from West Lafayette, Indiana. During their spare time aboard ship, the boys built airplanes.*

to page 139



The Antic on floats — also available as a Proctor kit. This one has oak stained fuselage front end and floats.



Another view of the Mini-Antic, with a G.I. Joe pilot giving you a "Clear" just before engine start. .19 engine required.



Since the beginning of time,  
 There have been those men  
 Who looked to the sky, who envied birds  
 Their graceful soaring flight,  
 Who said to themselves,  
 "If I could but fly . . ."  
 This is the story of those men,  
 And how they learned to fly,  
 And the remarkable things  
 That have happened since.

**W**ith this greeting, you are welcomed to the display area of the United States Air Force Museum, the world's oldest and largest military aviation museum. First opened in 1923, it is appropriately located on the outskirts of Wright Patterson Air Force Base, near where the Wright Brothers developed the first airplane and learned to fly it.

"This is the story of those men"; from the beginning of recorded history, as far back as Kenshu, the Egyptian Navigator of the skies of about 1000 B.C. and Ashur, the mythical Assyrian Winged Diety, up to and including some of our recent space achievements, men and hardware.

The Air Force Museum is part of our USAF, but is neither the story nor a tribute to man's efforts to discover more efficient ways in which to destroy his brothers. It does, however, depict faithfully and without prejudice the various wars in which the flying machines played an ever increasing role. The Museum is more a moving story and a tribute to man's efforts first to challenge an environment for which he was not designed and is ill suited, and later to improve his knowledge and machines to the point which we now know, and so often take for granted. On our visit to the Museum, we learn, or are reminded of all the pioneers, from the early Montgolfier balloon, and DaVinci man powered helicopter which didn't work, to the Wright's airplane which did, and which is generally accepted as the beginning of man's true flight. There are no names skipped; there is Lilienthal and Chanute, there is Lindberg and Rickenbacker, there is Billy Mitchell and Colin Kelly. There are relative newcomers, like Chuck Yeager,

and Gordon Cooper. And there are relative unknowns, such as some World War II Prisoners of War, and Rosie The Riveter, of fame during the same era.

There is simply not enough room here to tell you all that there is. It took the Museum staff a 216 page book to do so, and we will tell you about that later. I will stress one thing: if there is one ounce of patriotism or pride for our country and its achievements in you, if you are deeply interested in aviation and airplanes, if you were ever a crew member in any Air Force airplane, or if you have ever flown simply for the love of flying, **don't go to the Air Force Museum.** It is guaranteed to cause you more than one case of blurred eyesight or runny nose.

It may be when you once again see that old fabric covered trainer in which you first soloed, or maybe that bomber or fighter in which you flew all those missions. Or it may even be an airplane which you yourself never flew, such as the P-38 Lightning so beloved by the long range bomber crews that they praised it in song and poem. Or your attack of emotion might come at a completely different and unexpected time. Remember Saturday morning parade in San Antonio during Army Air Corps basic training, when it was 110° in the shade, and no shade. The "Off we go" of what was then the Army Air Corps song did not do much for most of us then, but I can guarantee a completely different feeling at this point in life, upon hearing it sung by Robert McArthur Crawford, just as he wrote it back in 1939.

Yes, I will admit to having to fumble for a handkerchief on more than one occasion, but then after 24 years of flying with the USAF, I feel I own stock in that particular company. And once again, sitting in the radio operator's position in a B-17 after some 30 years have elapsed does tend to bring back memories. In the years after, I logged a lot of hours and a lot of miles in Uncle's transport airplanes, and what brought back the strongest memories was the Douglas C-124 Globemaster in which I flew more hours and to more places than in any other bird. "Ole Shaky" as she was cal-

led, first produced in 1950, is not your modern airplane, though it was the first of the biggies, and I'm sure provided much data for the ones that came later. The C-14 spanned 174 feet, 130 feet long, with a maximum operating gross of 180,000 pounds. It was powered by Pratt and Whitney R-4360 engines of 2800 horsepower each, the largest and most advanced piston engine ever made. The 4360 is the displacement, in 28 cylinders, in four banks of seven each. The C-124 wasn't fast, cruising at only 180 knots, but it was steady. We went to such exotic places as Rio, Pango Pango, Hong Kong, Moscow, and the South Pole together. We hauled relief supplies to the Brazilian floods, and to Chilean and Moroccan earthquakes, and brought out refugees from Hungary and Lebanon. We hauled Belgian troops into the Congo, and families out. We carried Ambassadors complete with household furniture and automobiles to their new stations, and once a badly burned little girl to the AF burn clinic in Texas. We parachuted a drug needed to cure a rare disease into St. Helena, down in the South and later hauled penguins from the Antarctic to the Portland Oregon Zoo. And she always brought us home! Now, I ask you, how can you see a friend with whom you shared such adventures and not get sentimental?

Because as we all know, airplanes have a character and personality of their own. Some come from the designers and builders, some is inherited from the people who maintain and fly them. In this respect, the airplanes at the Air Force Museum must consider themselves lucky. They must know that they have had their part in aviation history, and that they will never fly again. They are old, yes, but as in the case of people, old age is better than the other alternate. These airplanes have escaped the junk pile and the cutting torch, and are at rest with a new family that loves and respects them, and cares for them.

A museum cannot, and is not, only a collection of inanimate objects. It, in turn, is enriched by the personalities of those

By Eloy Marez

**RCM VISITS**

Photos By Dick Tichenor

## THE AIR FORCE MUSEUM



Aerial view of the museum and grounds. The main building opened in 1971, contains over 230,000 feet of space.



Dick Tichenor's favorite, the B-70, one of the many projects he was involved with during his years in the aerospace industry.



Kathy Arnold, one of the museum's volunteer guide ladies. Special tours for school classes and other groups are available.



The Wrights did not only make bicycles and invent airplanes, they also designed a wind tunnel, which worked up to 160 mph.



F-80C now under restoration, being worked on by John Lyons in the nose, and Charlie Smith in cockpit. Walter Olsen supervises.



Tom Campbell (L) and Gerald Rittinger working on a Boeing P12 restoration. Approximate completion date is in about two years.



Eloy Marez browsing in the aviation book buyers paradise, the AF Museum's bookstore. Catalog is now available, they accept mail orders.



Dick Tichenor, minus his Instamatic, and Museum Director Col. Richard Upstrom discuss the F-107 undergoing restoration.

(Detach and mail this part.)

**Shaded Areas for Office Use Only**

**Friends of the U.S. Air Force Museum  
Membership Application (Please type or print.)**

Identification Number

Name Code

**A 4 0 9** Enter Name Code From Letter If Not Already Entered.

Address

Category  Renewal Code

Address

City  State  Country

Zip Code

Please enroll me as a \_\_\_\_\_ member. Enclosed is a check, payable to The Air Force Museum, Inc., in the amount of \$\_\_\_\_\_ (Foreign membership \$12.00 by International Money Order payable in U.S. funds)

Check one:  New Membership  
 Renewal  
 Gift Membership (Complete donor form on reverse side.)

Please allow up to four weeks for processing.



The famous Curtiss P-40 Warhawk, in the colors of China's Flying Tigers. Many famous aircraft, often one of a kind, are on display.

whose duty it is to establish and operate it. And if ever the military placed a man in the best possible position for both him and for the job, they did so with the assignment of Col. Richard L. Upstrom as Museum Director back in November 1977. To start with, Col. Upstrom is an RC'er, a scale builder as you might expect. He has some 5100 hours of flying time, including about 1200 combat hours, and 396 combat missions. He has flown the old Martin Marauder, some of the jet fighters, and flew C-47's in night illumination and psychological



And there we were . . . Eloy Marez and Col. Upstrom swap flying stories while sitting in the B-17. Some were even true!!!

warfare roles in Vietnam. To this job of Museum Director, Col. Uppstrom is completely dedicated and, very frankly, admits to loving the job. We commented upon the fact that he gave the impression of a "kid in a candy store" to which he answered by showing us a caricature some friend had done, depicting him as a exactly that, a kid in a candy store.

Col. Uppstrom is surrounded by a staff of experts, all of whom share his love for airplanes and dedication to their particular jobs. And it takes all kinds, from typists and telephone operators down to the guys in the back room, the craftsmen who maintain and restore, and in some cases build, the display airplanes. Now these are guys that we modelers can relate to, the type that spends hours over one rather insignificant looking piece, but which has to be just right before they are satisfied. In one case, we saw the remains of four different attempts to duplicate the fuselage side panels for an aircraft undergoing restoration. The results of their efforts and appreciation for what they are doing is evident in the finished products throughout the museum. Even though the general public doesn't get to see these fine gentlemen, we all know that you exist someplace, and we thank you for your efforts on our behalf and on behalf of our mutual friends, the planes that we all love.

Also important to the operation of the USAF Museum is another dedicated group, all ladies, in this case. The Officer's Wives Club of Wright-Patterson AFB gives tours for school classes of Grades 4-9, on advance reservations. We followed a couple of groups of youngsters through part of their tour, and were impressed. First, with the fact that these lady guides enjoy what they are doing, and are dead serious about it. Secondly, they displayed a great amount of knowledge about the individual subjects, and about aviation in general and enjoyed sharing it with their audience. We are sure that because of their efforts, the kids come away with a greater understanding of what they saw, and a better appreciation of aviation's efforts before we arrived at canned stereo music and in-flight movies. Recently, this tour service has been extended to adult groups, on a space available basis.

There is another group of ladies who we modelers will be happy to learn about, the ones who operate the Museum's Research Division. They maintain a document collection of an estimated 200,000 photos, tech manuals, test reports, books, magazine articles, and other materials on USAF aircraft and other aspects of USAF history. Anyone is welcome to visit the Research Center in the main building, weekdays between 9 and 4. Though they don't have facilities to reproduce photos, you can use an available Xerox machine to copy anything there that is of interest to you. Mail

requests are honored, however, the staff and time is limited and research projects that require an extremely long time cannot be undertaken.

They do recommend another source of information for USAF aircraft, another Wright-Patterson office which maintains a micro-film file of information and drawings. You may query them reference to availability and cost of film duplicates about any obsolete or non-classified Air Force Aircraft, by writing to ASD/DAD, Wright Patterson AFB, OH 45433.

The museum occupies a 400 acre site; the main building is 800 feet long, 240 feet wide, with a ceiling that soars to 80 feet. In addition, there is an annex, and shop and storage areas. The aircraft display starts with a reproduction of the Wrights 1909 military flyer and ends with the X-24B, one of the lifting body NASA research aircraft. In-between you'll see Scouts and Camels, Texans and Marauders, Liberators and Flying Fortresses, and on the jet age with the P-59, and the Century Series, the F-100 and above numbered fighters. You'll enter the space age, with satellites, Mercury and Apollo capsules. Outside, on the Museum grounds, you'll see a number of famous missiles, the Titans and the Minutemen. The list is too long, but the chances are that the one you are looking for is there someplace.

At the AF Museum, you'll see famous aircraft. There is a C-118, but not just a C-118, rather President Truman's "Independence." In fact, there are three presidential aircraft on display, and the present "Air Force One" is already promised when it is retired. Amongst the famous, there is our modeling friend Bob Thacker's F-82 Betty Jo, in which he set a Hawaii to New York distant record back in 1947. There is the B-29 that dropped the A-bomb at Nagasaki, and a C-54 of the type that dropped candy to the children of Berlin during the airlift that kept that city alive for so many months back in 1948. Along with the individually famous, equal space is granted the more humble but certainly reknowned C-47 Gooney Bird.

The Museum also plans and operates a number of special events throughout the year. Some may be in commemoration of some historical aviation event, or possibly the opening of a new display. Aviation movies are shown on previously announced schedules, and a gift shop and book store are also operated on the premises both chock full of items of interest to aviation buffs.

As stated in the beginning, the Story of the Air Force Museum has already been done, in much more detail. The book so entitled is 8½ x 11, has over 200 pages, and 450 illustrations. Also available is an aircraft photo book of over 100 pages, which includes data of all the aircraft on display except for late additions. Where can you get them? From the bookstore, of course. But there is a better way. In

early 1978, a program called Friends of the Air Force Museum was initiated by the Air Force Museum Foundation. This philanthropic, non-profit nationally recognized organization lists amongst its accomplishments the raising of the seven million dollars for the new building which now houses the museum, all at no expense to the taxpayer.

Basic membership in this group brings to you the pleasure of knowing that you are helping to preserve some of our heritage, both that of aviation and of the United States. In addition, you get such material things the aircraft photo book mentioned, a Museum aircraft calendar, discounts at the gift and book store, and a newsletter. This membership fee is \$10.00. There are progressively higher category memberships, such as a \$25.00 Sustaining Membership, which brings you the basic benefits, plus the Air Force Museum book described above. There are also Contributing Memberships at \$100.00 per year, and Supporting Memberships, at \$500.00, both with increasing benefits. All memberships will soon receive a gift shop catalog now being prepared. For your convenience, we have reproduced the basic membership application, or write directly to the museum for membership information.

The Museum is always looking for additional aviation artifacts, and includes a shopping list in its "Friends" newsletter. They would like such things as any WWI aircraft or some of those that came a bit later, such as the P-1, O-1, A-12, etc. Later than that even, they'd appreciate a P-66 or an A-17A. But they don't need only complete aircraft, they are also looking for F-80C ammo cans, and 200-300 square yards of unused astro-turf or similar material. In fact, any article of equipment or wear that came out of dad's old overseas footlocker could easily be the only one left in existence and much sought after by the Museum. You are invited to write and tell them about any such items in your possession and they will arrange for a possible inspection and eventual donation or loan for display.

The actual location of the Museum is six miles east of Dayton, on Springfield Street, with easy access from all major freeways. Though located on the base, it has an easy, no guard, no control entrance of its own. Admission is free, and it is open 9 to 5 weekdays, 10 to 6 weekends, every day, except Christmas Day. This might seem like a too tight schedule for its workers, until you remember that the Air Force itself is open 24 hours a day, every day, including Christmas day.

The United States Air Force Museum thus makes it possible for you to stroll in air conditioned/heated comfort through the pages of aviation history, civilian and military, its people and its machines.

to page 139



# V A R I E Z E



Frank Baker's trial and errors have resulted in this eye catching Stand-Off Scale version of Burt Rutan's popular home-built canard.



One of the most spectacular airplanes to appear on the homebuilt scene has been Burt Rutan's Varienze. The aircraft is unusual for both its composite structure (fiberglass over foam) and its canard planform. In addition, the Varienze has unusually high performance relative to its modest power. Since I live close to Oshkosh, Wisconsin, where the E.A.A. annual convention is held, I have been able to inspect the plane and watch it fly. It is every bit as spectacular in the air as it is on the ground. Last year there were four or five Varienze's at Oshkosh and the workmanship on all of them matched the usual pattern R/C model. Also a forthcoming space epic movie will use a small fleet of the Varienze as space style fighter aircraft.

When the Varienze first appeared, I looked at it from the point of view of an R/C model but decided that there were too many unknowns. About a year later, I read an article in the E.A.A. magazine *Sport Aviation* mentioning that Mr. Rutan had been an R/C modeler for many years. Being rather quick to recognize a truth, I decided that he had probably built and flown a lot of canard R/C models. Armed with this knowledge, I proceeded to build a quick approximation to a Varienze. True to the original Varienze, I put a Vector Director on the front canard to give both ailerons and elevators via the canard surfaces. When launched, this model would initiate a slight bank and never recover from the turn. I promptly shelved the model.

The next flying season, I noticed that Mr. Rutan had added ailerons to the main wings and turned the canard surfaces into elevators, so I did likewise. On the next test flight, I launched from the top of a hill. The plane went out straight as an arrow. Application of ailerons yielded the fastest roll I had ever seen. However, it still wouldn't turn and once the nose dipped below the horizon, there was no recovery. Knowing that I was making progress, I re-read the articles on the Varienze and noticed that the wing tip rudders only moved outboard to create drag for turning purposes. I also decided my canard was too small and increased its area by a third. The next test flight took me by surprise --- the plane flew perfectly! It would turn right and left, loop, would not stall, still rolled like mad, and had a smooth stable glide. After a few flights, I decided to disable the "kick-out" rudders and fly a pylon race. On the first turn, I discovered again that, without the rudders, it wouldn't turn --- and scratch one model. Although the "Schoolyard Canard" (RCM, May 1978) would fly without these rudders, the present model will not, for reasons that escape my limited knowledge of things aeronautical. However, it does fly. Now that the concept had been proven, all



## VARIENZE

Designed By : Frank B. Baker

### TYPE AIRCRAFT

Stand-Off Scale Canard

### WINGSPAN

37 Inches

### WING CHORD

6 1/2 Inches

### TOTAL WING AREA

221 Square Inches

### WING LOCATION

Shoulder Wing

### AIRFOIL

Semi-Symmetrical

### WING PLANFORM

Swept and Tapered

### DIHEDRAL, EACH TIP

1 1/2 Inches

### OVERALL FUSELAGE LENGTH

29 Inches

### RADIO COMPARTMENT AREA

(L) 12" x (W) 2 3/8" x (H) 2 1/2"

### CANARD SPAN

23 Inches

### CANARD CHORD (incl. elev.)

4 Inches

### CANARD AREA

78 Square Inches

### CANARD AIRFOIL SECTION

Flat Bottom

### CANARD LOCATION

Shoulder Position

### VERTICAL FIN HEIGHT

6 1/2 Inches

### VERTICAL FIN WIDTH (incl. rud.)

3 1/2" Average

### REC. ENGINE SIZE

.049 - .051 Cu. In.

### FUEL TANK SIZE

1 Ounce

### LANDING GEAR

Tricycle

### REC. NO. OF CHANNELS

2

### CONTROL FUNCTIONS

All., Elev., & Kick-Out Rud.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	.....	Foam, Ply & Balsa
Wing	.....	Foam & Balsa (Ace wings)
Empennage	.....	Balsa
Wt. Ready-To-Fly	.....	28 Ounces
Wing Loading	.....	18 Oz./Sq. Ft.



that remained was to build a pretty, Stand-Off Scale version to replace the balsa box prototype. The resulting Stand-Off Scale version is the subject of this article.

## CONSTRUCTION

Due to the use of foam wings and rather simple framework, the construction of this model is straightforward. First, let me justify the rather sturdy fuselage. With the long span canard out in front, its tips tend to hit the ground if one makes a bad landing and they snag doorways. As a result, considerable stress is placed on the fuselage. My prototype fuselage of 3/32" sheet proved to be very fragile. The 3/16" sides on the present version are quite rugged and eliminated the breakage problem.

The fuselage is basically a box which is built upside down on the work bench as the top is flat. When installing the firewall, check to insure there are 2° built-in down thrust. Also, glue in the triangular plywood wing hold-down plates so they clear the fuel line holes and the motor mount bolt holes. You may need to do a bit of carving to insure the proper clearance. The main landing gear is 3/32" music wire held in a plywood sandwich. Install the landing gear before gluing on the 1/4" sheet that goes from the nose block to the firewall. Glue on the nose block and carve it to rough shape. It will be final shaped after the canard is mounted. The canard is built from one piece of hard 3/8" balsa sheet and the elevators are 1" trailing edge stock. I made the elevator horn out of 3/32" music wire and brazed a brass strip at the center. A Veco U/C elevator horn could be used; the important thing is that it be as long as shown on the plans to minimize the throw. Carve and sand the canard airfoil to a Clark Y with the rounded front about 1/8" above the bottom line. This provides the necessary front canard incidence. Mount the canard and use a level to insure the bottom surface is at 0°, also check to see that it is horizontal and perpendicular to the center line of the fuselage. Install the top balsa block and do the final shaping and sanding of it and the nose block. Use a razor saw to cut off the nose block where shown on the plans. Cut a 7/8" square 9/32" deep recess into the block. Make the nose gear out of 3/32" music wire and glue it into the 3/32" plywood sandwich. Glue this plate in the nose block recess and then glue on the tip of the nose block. A bit of final sanding will be needed. Now set the fuselage aside.

The wing is constructed of a 6" straight section of Ace 1/2A foam wing and two taper sections. Cut the taper sections as shown on the plans and place all three sections together on a table. Use a pencil to draw in the spar line on the top and bottom. Also be sure to check that the outboard ends are parallel to the center line of the wing. Cut



Landing gear sandwiched between two pieces of plywood.



Nose blocks rough carved. Needs additional tip block and final filling and sanding.



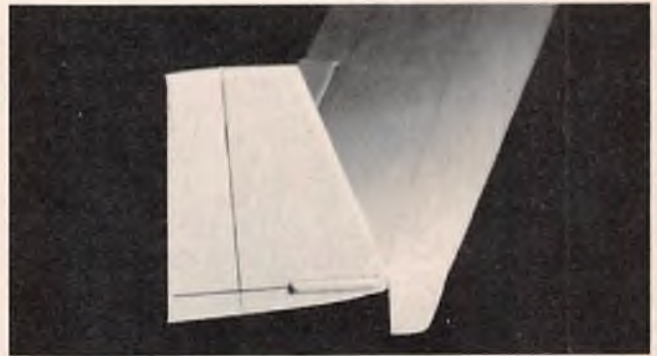
Six inch center section of Ace constant chord wing shows spar, trailing edge and Sullivan Gold'N-Rod and cable installed.



Aileron horn and rudder "kick-out" linkage. Linkage on both tips on bottom side.



Rudder "kick-out" linkage shown with aileron cable hooked up.



Rudder with .025" music wire to hold tension on rudder.

the grooves for the 1/8" square spruce spars on top and bottom. I used three brass gears in a mandrel and my Dremel saw power take-off cable. It will cut a smooth notch. Block up the tips of the outer wing panels 1 5/8" and sand the inboard edge until it is perpendicular. Glue the 1/4" square trailing edge spar and then the 1" trailing edge stock to the center and two outer wing panels. Now use epoxy to glue the wing panels together. Before the glue sets, check the dihedral and the match of the panels to prevent twist. The 1/8" square spruce spars are glued in using white glue. Do not crack or cut them at the dihedral break; they will bend around these points easily. Now use two gears in your Dremel tool to cut the 1/16" slot for the aileron control cables. Install the ailerons and the 1/16" plywood

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#### ABOUT THE AUTHOR

Frank B. Baker, age 50, has been flying models for 43 years and has been in R/C since 1954. He is a member of the Madison Area Radio Control Society (MARCS) that also includes well known designers Owen Kampan and Romey Bukholt on its roster. Two previous articles authored by Frank were published by RCM, a rudder only B-24 and a Stand-Off Scale P-51 presently kitted by Filteglass. His major interest in R/C is multi-engined 1/2A scale and a B-29, B-25, B-26 and a P38 are currently flying. When not engaged in R/C, Frank is a professor of Educational Psychology at the University of Wisconsin. In 1968, he rebuilt a full-size Piper J-3 and is well known locally for his numerous cross country adventures in his Cub.

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reinforcing plate on the top and bottom of the wing tips. Build the rudders out of 1/8" sheet and install the return springs. These springs should be very light and have just enough pressure to return the rudder to neutral. Then glue the rudders onto the ends of the wing.

The only sneaky part of the whole airplane is the rudder "kick-out" mechanism. The basic principle is that up aileron actuates a wire lever that forces the rudder outboard while down aileron moves the lever away from the rudder which is held in neutral by the return spring. The slot in the nylon aileron horn allows the other end of the lever to move freely in the proper directions. The wire lever is built as follows: clamp a piece of 3/32" music wire in a vise and then wrap a section of

text to page 135



**T**he paint's dried, the radio installed and the engine runs just right --- we're ready to take our latest "pride and joy" out to the club airfield and see if it flies as good as it looks. In our pre-departure checklist appears the item, "Check the CG." Nine out of ten modelers will wait until they get out to the field to check the final balance of their models. It usually takes two people --- hanging the model from both wing tips --- to see if the balance point is "on the front spar" as the kit plans indicated.

The two-finger balancing act is as old as R/C and gives a rough idea of nose or tail heaviness. But, it isn't the most accurate system in the world! It's kinda like cutting out balsa wing ribs with an axe! Wide fingers give the false impression that the model is "right on." And --- balance positions can vary more than the 1/4" to 1/2" range indicated on the plans! Of course, the conscientious R/C modeler will try to balance his bird **laterally**, too --- to make sure that the wings are of equal weight. No sense having to hold full aileron during the first flight, just to keep the wings level!

For the expenditure of about ten minutes time and very little cash, you can build a duplicate of our "CG Finder." It takes a 10" piece of 1 x 2 pine and a couple of 3/8" or 1/2" dowels. Cut the dowels to the same length and trim them to the round pointed wedge shown in our photos. Draw a centerline on the 1 x 2 and drill a couple of holes (square and straight!) about 6" apart. Stick the dowels in the holes, line up the wedge points with the centerline and you're ready to balance your model! Dimensions of the device aren't critical --- only **alignment** is. The dowels should be long enough to allow a high wing model to hang free during the balancing procedure (6"-8"), and to clear the fixed gear on a low winger. The holes in the 1 x 2 will hold the dowels in a friction fit, but you can epoxy things together, if you wish.

To use the CG Finder, simply hang the bird across the dowels until it balances. You can do the job all by yourself --- to a much greater degree of accuracy than the old "two finger" method.

While we're at it, let's consider fourteen "truisms" about R/C model balancing. Read 'em, apply 'em --- and your model will fly better!

(1) If a model is out of balance, longitudinally, the farther from the point of ultimate balance that weight is added, the lesser that weight may be. In other words, a **small** weight on the propeller shaft or under the engine will balance the bird if it's tail heavy --- rather than a **heavier** weight in the tank or radio compartment. A nose-heavy model can be balanced, with a **minimum** of added weight, the further toward the tail you place the weight.

(2) Once the proper balance of a

# CG OR NOT CG ... THAT IS THE QUESTION



By Col. John A. deVries

model is achieved (by adding weights) the weight should be bolted, screwed or epoxied in place to make sure it doesn't come loose in flight! And --- consider the weight that is added by the bolt, screw or epoxy!

(3) When the model is properly balanced, **mark** the balance point somewhere on the fuselage or wing --- with a piece of tape, contrasting covering material, pencil, pen or "magic marker." Then if the model requires repairs at a later date, you can re-balance it at the proper point without having to dig out the plans. The balancing line can be drawn on a fuselage wing saddle or **inside** the fuselage --- to mark the point, unobtrusively.

(4) A good way to balance a model, **laterally**, is to balance the **uncovered** wing or wings. Covering materials, particularly the heat-shrink films, add weight to a wing rather evenly. Balancing with the wing uncovered allows you to **hide** the balance weight. Of course, a final lateral balancing of the R/C model should be done with the model ready for flight.

(5) Balance any model **without** fuel in the tank. This will result in a bird that is a tad noseheavy at take-off. But --- the balance will represent the best possible condition for the model --- on landing --- when the fuel is low.

(6) Most kits and scratch-built model instructions advise the builder to balance the model, using components of the radio. A couple of factors make this a difficult task. First, the servos must be mounted on fixed bearers (or the servo tray must be) so using the radio to balance the bird will give you only a rough approximation. Second, many model designs don't provide the space at the right places for a radio installation that'll **really** balance the model. There are big and little battery packs, miniature and full-sized servos and a host of receivers of varying weight and size.

Stick 'em where they'll contribute to the balance of the model but add weight when it's needed!

(7) Changing a prop may affect the balance of an R/C model. It's kinda "nit-picky," but going from nylon to wood, or vice versa, can goof-up a well balanced model. Using the CG Finder, it's easy to re-balance. As a corollary to this "truism," it's only smart to re-balance a model that has undergone major repairs!

(8) Retracts affect both the longitudinal and lateral balance of a model having them. Check the CG with the gear **extended** and **retracted** to make sure it stays in the designed range. If you're faced with the problem of having to choose a balance point for a retract equipped model, favor the **gear down** CG. A model's balance is most critical at low airspeeds --- which are "seen" at **take-off** and **landing**.

(9) Ninety-nine percent of the plans for R/C models, from all sources, show a **balance point**. And, just as often, the balance point **isn't** the model's Center of Gravity! The CG is somewhere up or down a line drawn through the balance point but its exact location is seldom shown on model plans. Modelers would be surprised if the real, physical CG was shown because, sometimes, it's **outside** the physical structure of the model! From a **practical** viewpoint, balancing the model as indicated on the plans will result (usually) in a bird that will fly properly.

(10) All of us know that aft CG's usually produce "twitchy" models so --- particularly for first flights of new models, balance the bird in the **forward** part of the balance range (nose-heavy). Pattern fliers know that it takes a **slightly** aft CG to permit their models to snap and spin properly. But, a snap on the final **is not** something a beginner or new model driver really needs!

(11) We've all seen the odd model at

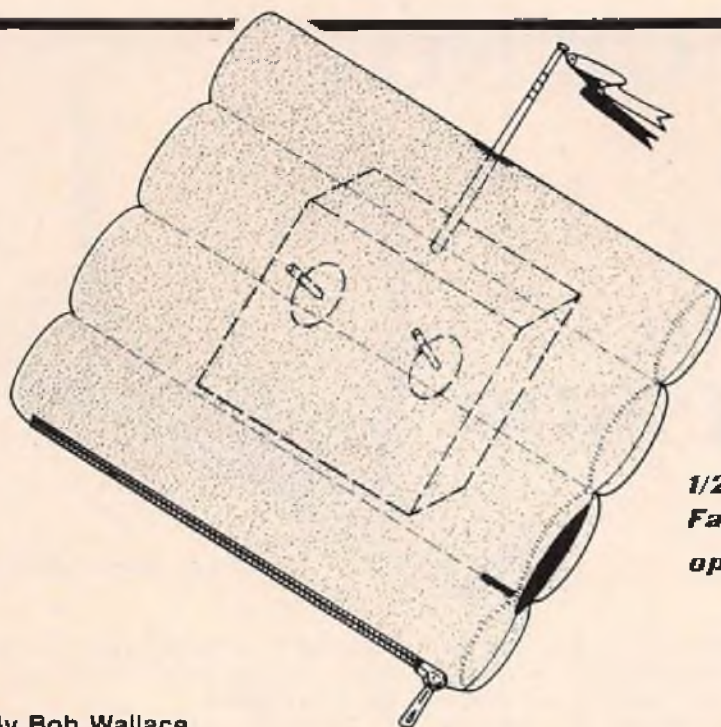
to page 134



# TRANS MITT

AN INSULATED FLIGHT BAG

"takes out the NUMB  
and puts back the FUN  
in cold weather flying!"



By Bob Wallace

## BASIC MATERIALS REQUIRED

1/2 yard Parka (quilted snowmobile)  
Fabric and a 16" Zipper.

optional: 1 pair of Knitted Cuffs



## ASSEMBLY SEQUENCE



### **step 1**

CUT PIECE OF PARKA MATERIAL  
18" X 36"



### **step 3**

STITCH BUTTON HOLE (CENTERED  
IN BAG MATERIAL) FOR ANTENNA  
EXIT. CUT SLIT IN CENTER OF  
BUTTON HOLE.

STITCH BUTTON HOLE FOR TRAINER  
CORD EXIT (IF DESIRED). CUT SLIT  
IN CENTER OF BUTTON HOLE.



### **step 2**

FOLD EDGES OVER 1/2" AND  
STITCH.



### **step 4**

FOLD BAG MATERIAL IN HALF WITH  
STITCH EDGES OUTWARD. MARK HAND  
OPENINGS (3" FROM BOTTOM OF BAG).  
STITCH SIDES UP TO AND BEYOND  
HAND OPENINGS. TRIPLE STITCH  
HAND OPENING EDGE.



### **step 5**

TURN BAG FINISH SIDE OUTWARD  
AND INSTALL ZIPPER IN BOTTOM  
OPENING.

PUT ON YOUR "LONG JOHNS" AND  
GO FLYING. *Bob Wallace*

I am an ardent R/C enthusiast who has not been blessed with the good fortune (some would call it wisdom) to live in an area that is conducive to year round flying. The cold, snowy winter months have long been a period of limited flying; a time spent primarily in building new aircraft for the

coming season. While one can dress in a sufficiently warm fashion to ward off the winter cold, keeping your hands from becoming numb while flying has always presented a perplexing problem. What is a 10 or 12 minute flight in the summer is cut short to 2 or 3 minutes, due to hands that rapidly lose all feeling due to the

cold. No matter how good your circulation may be, clutching a metal encased transmitter in sub-freezing temperatures is guaranteed to quickly take the joy out of flying.

Flying with mittens or gloves on is very restrictive. If the gloves or mittens are warm they also destroy all "feeling" for



an excellent padded storage bag for your transmitter when not in use and keeps it dry and free of dirt and snow at the flying field.

The only materials needed to fabricate a Trans-Mitt bag are a 1/2 yard piece of parka material, a 16" heavy duty non-separating zipper and nylon thread. Knitted cuffs can be added if desired. I personally believe slit openings are superior as they make hand entry into the bag much easier. The total cost of materials is approximately \$3.50. If your sewing talents are as limited as mine are, an ideal method of acquiring a Trans-Mitt bag would be to take your wife, girl friend, mother, sister, daughter, etc., out to dinner and just "happen to stop by" the local fabric store on the way home. (For dinner and a movie you may get your name or initials embroidered on your bag!)

In constructing a Trans-Mitt bag, velcro (hook and loop) type closing strips can be used in place of a zipper. The use of a clear vinyl window in the face of the bag (to view the transmitter) should be avoided as it greatly reduces the insulating value of the bag.

The only use limitation of a Trans-Mitt bag is in regard to instructing a beginner without the benefit of a trainer cord. Obviously, passing the transmitter to another flyer is all but impossible when it is inside such a bag.

Winter flying sessions that were formerly comprised of 2 or 3 abbreviated flights due to "numb thumbs" can now be as lengthy as you choose to make them. If you are an RC'er who lives in a part of the country where the temperature dips below the freezing mark, the Trans-Mitt is an accessory item you won't want to be without. Use it once and you'll be convinced. □

the sticks with their bulkiness.

The answer to this dilemma was provided by the creation of the Trans-Mitt, an insulated muff type bag into which the radio transmitter is placed and the hands inserted via cuffs or slit openings. The transmitter bag concept was originated in 1976, by Pete Reed of Plainville, Connecticut. Pete is a nationally recognized pylon racer and when it comes to building, flying, and R/C knowledge — Pete Reed is one of the best.

Pete's original bag was fashioned from nylon windbreaker material. This bag worked very well and led to the type shown in this article, which is constructed from nylon parka material.

Nylon parka material, which is sometimes called quilted snow mobile cloth, is readily available in most fabric

stores. It is nylon on both sides with a polyester insulating filler in the middle. It is stitched in either a lateral or quilted pattern, comes in a larger variety of colors, and is washable.

This material comes on a 42" wide roll and sells for \$4.95 per running yard. The Trans-Mitt is light in weight, very warm, and does not restrict hand-transmitter stick movements in any way. In extremely cold weather a pocket type hand warmer can be inserted in the Trans-Mitt for additional warmth. Either the fuel stick or fluid type work equally well.

I have flown in below zero weather and can assure you that when using a Trans-Mitt bag your hands will come out of the bag at the conclusion of the flight even warmer than when you inserted them. The Trans-Mitt bag also serves as



# SEMPERFI



A .15-.25 powered semi-tween-the-wars fun type R/C model that even those with aging reflexes can handle.

**B**etween the wars was a romantic period in aviation for modelers and, although I have never been a scale buff, some of that romance has rubbed off. Memories of the thirties, when military aircraft participated in airshows along with the "stunt flyers," are still fresh. Of course, I was Very Young then and most of my information came from the pulp magazines that littered the shelves at the drug store. Semperfi is an attempt to capture some of the yellow-winged military mystique of that time in an easy to build and fun to fly airplane.

Since most airplanes of that period had conventional landing gears, so does Semperfi and it is a compromise between scale looks and practical operation. The result is an airplane that these aging reflexes are able to keep on the runway, even in a crosswind. In fact, after a bunch of flying the only prop damage has been slightly round tips from nose-low landings.

In the air it is a solid airplane and not given to bad habits. It will snap and spin but these are controlled maneuvers and not accidental ones. Although inverted passes and loops are comfortable, outside snaps and spins are not its bag. The roll rate is good and makes even the most uncoordinated of us look good. A rolling break to an overhead 360° approach, like the airshow boys did it, is

easy and impresses the Sunday onlookers. Wheel landings are just as easy as stall landings and look great as the tail comes down to three point position.

When building Semperfi, or any airplane, think light. There is no way a brick can perform like an airplane, and this is an airplane not a brick.

## CONSTRUCTION

### Wing:

Cut the wing ribs from medium 1/16" sheet balsa (all wood is balsa unless otherwise stated); pin them together and gang sand them to the same outline. Select six from the batch and cut the main spar notches 1/8" wider on each side to accept the dihedral braces and trim 1/16" from the top and bottom of them for the center section sheeting. Call these ribs R1. Cut the webs for the main spars and the trailing edge from 1/16" sheet; the grain should run vertically. The trailing edge sheeting is 1/16" sheet and the trailing edge is 1/8" square.

Cover the plan with plastic sheeting or waxpaper to keep the glue from sticking and assemble the wing right over the plan by laying the trailing edge sheeting and the bottom main spar in position on the plan. Glue the trailing edge on the back edge of the trailing edge sheeting. Start the assembly with the second R1 from the center, install it and the

webbing next to it (on both spar and trailing edge); install the next rib followed by the webbing, another rib, etc., out to the tip. The webs help with the spacing as well as keeping the ribs perpendicular to the spars. The ribs should be glued in as you go. Glue in the two top spars and the leading edge, then remove the wing half from the plans and glue in the other bottom spar. Do not add the top trailing edge sheeting at this time.

The other wing half is built just as the first by turning the plan over and building it on the back side. The plan can be rubbed with cooking oil or sprayed with spray-wax to make it transparent.

When both halves are complete, bevel the ends of the spars, leading and trailing edges to fit together at the dihedral joint in the center, and join them with the plywood dihedral braces. Cut two R1's apart at the aft side of the main spar notch and install them on either side of the dihedral joint, as shown, to form the servo box. The leading edge of these ribs are cut in front of the spar notch and joined together at the center. The trailing edge sheeting is now added and the center section sheeted with 1/16" sheet. Do not sheet the top of the servo box. The brass tube aileron torque bearings, with their torque rods, are epoxied to the trailing edge on either side of the center section and faired with pieces of 1/4" square soft balsa that

## SEMPERFI

Designed By : L.F. (Randy) Randolph

### TYPE AIRCRAFT

Sport

### WINGSPAN

48½ Inches

### WING CHORD

Root 7¼" — Tip 7½"

### TOTAL WING AREA

366 Square Inches

### WING LOCATION

Low Wing

### AIRFOIL

Flat Bottom

### WING PLANFORM

Swept T.E. (slight)

### DIHEDRAL, EACH TIP

1 Inch

### OVERALL FUSELAGE LENGTH

35¼ Inches

### RADIO COMPARTMENT AREA

(L) 8¼" x (W) 2½" x (H) 4"

### STABILIZER SPAN

18 Inches

### STABILIZER CHORD (Incl. elev.)

5¾" Average

### STABILIZER AREA

96 Square Inches

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Mid-Fuselage

### VERTICAL FIN HEIGHT

5 Inches

### VERTICAL FIN WIDTH (Incl. rud.)

5" Average

### REC. ENGINE SIZE

15-25 Cu. In.

### FUEL TANK SIZE

4 Ounces

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

4

### CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa and Ply
Wt. Ready-To-Fly	36-40 Oz.
Wing Loading	16 Oz./Sq. Ft.

have been hollowed to receive the bearings. The ailerons are 1/4" aileron stock that has been tapered at the tip. Make them full length and cut 2" from the outboard tip of each and glue these pieces to the trailing edge of the wing at each tip. The ailerons themselves will be installed when the airplane is covered. Cut the wing tips from 1/4" soft balsa, glue them to the tip ribs, and sand them to shape. Round the leading edge and sand the whole wing with 150 grit sandpaper.

### Fuselage:

The fuselage sides are cut from two pieces of 3/32" x 6" x 36" medium balsa. These can be purchased or made by edge gluing four sheets of 3" stock to form two pieces 6" wide.

Cut out the two sides, pin them

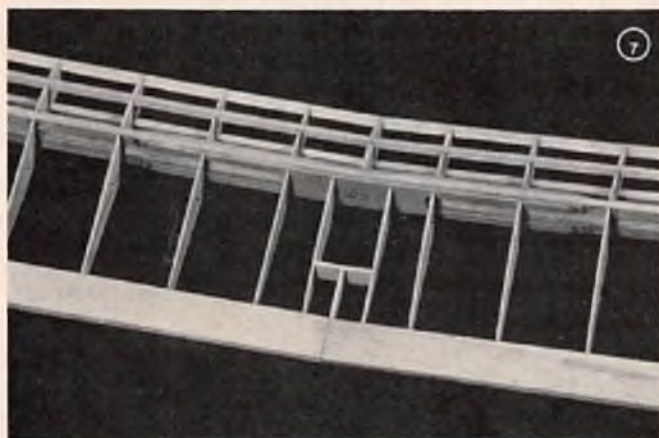
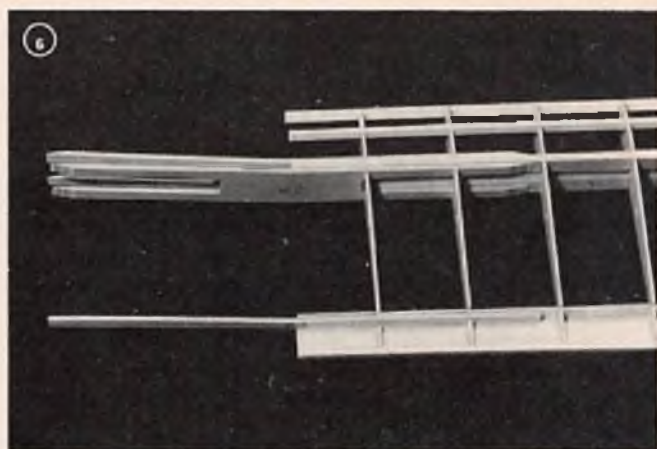
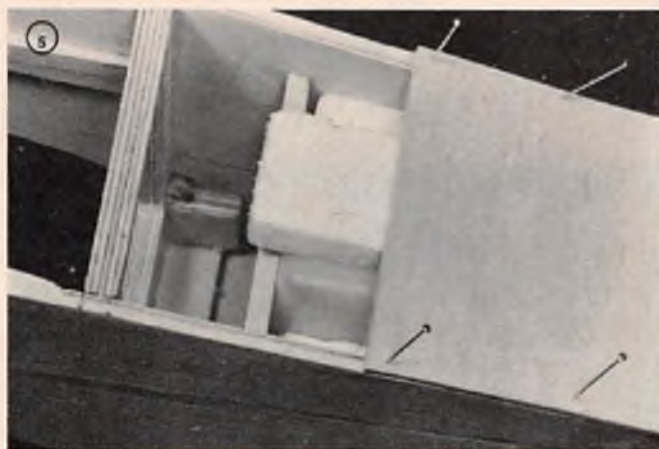
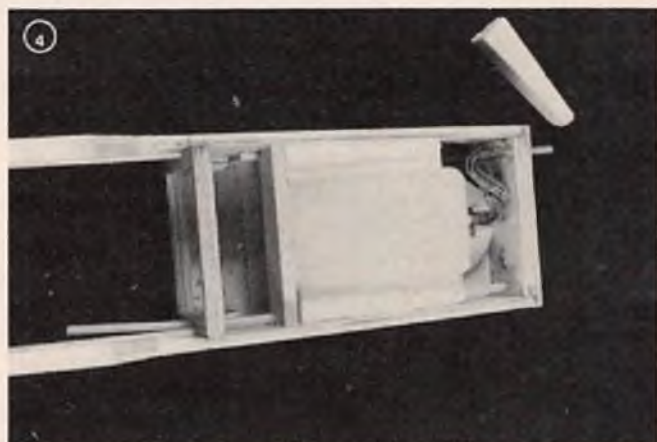
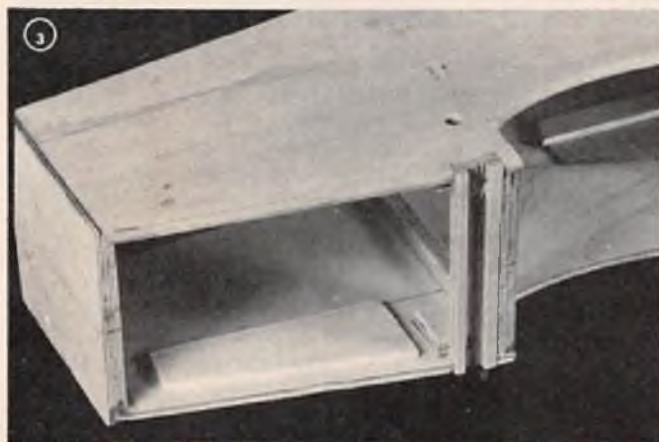
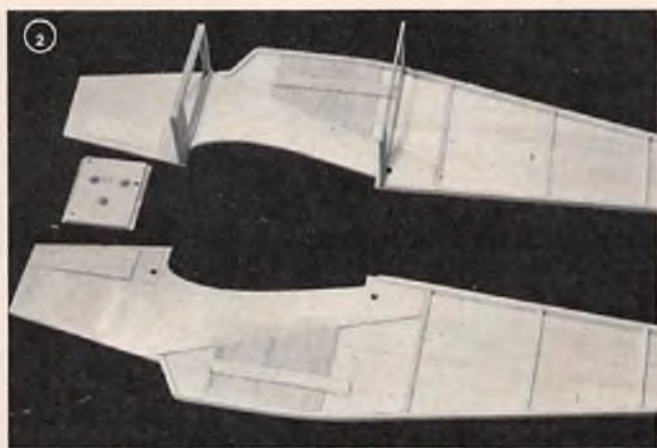
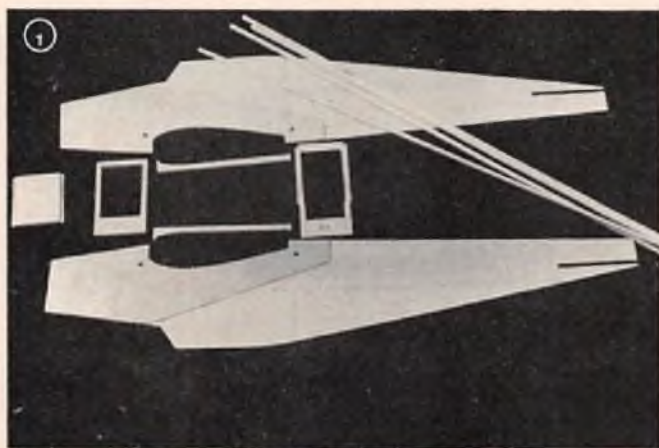
together and sand them to the same outline with a sanding block. Use the finished sanded side as a template to cut the two 1/16" plywood doublers. Epoxy the doublers in place, one left and one right, and again pin the sides together with the doublers on the outside and sand the edges square. While the sides are still pinned together, drill the 1/4" holes for the wing hold-down dowels and make the cut-outs for the stabilizer and wing. Save the bottom of the wing cut-out as it will be glued to the bottom center of the wing to form that fairing. Cut the notch just forward of the wing to receive the landing gear mounting block. Separate the sides and add the 3/16" square balsa uprights and longerons, the 1/16" balsa cabin doublers, and the servo and tank mounting rails.

The firewall and first bulkhead are cut from 1/4" plywood and the aft bulkhead is 1/8" plywood. Drill the firewall for the throttle line, fuel lines and engine mounting bolts. Install T-nuts for the engine mount and epoxy them in place. Glue the two bulkheads in place on one of the fuselage sides; make sure they are square and glue the other side directly over the first. Use a square and make sure that both sides are exactly in line. Glue the sides together at the tail and install the firewall and check that the fuselage is true with no bends or twists. Glue the landing gear mounting block in place and add the two pieces of 1/4" plywood above it on each side. These pieces are glued to the fuselage sides as well as to the 1/4" plywood bulkhead.

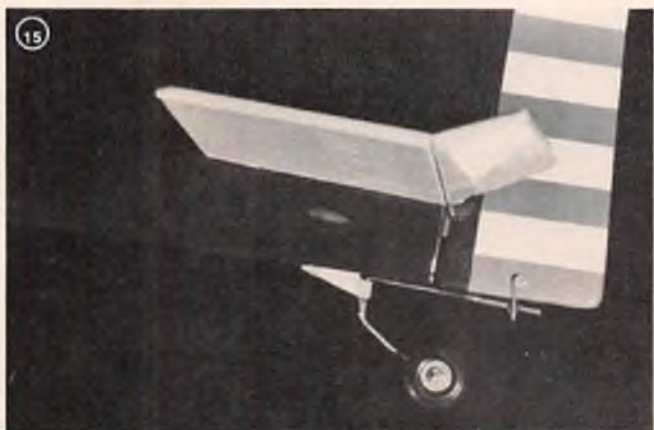
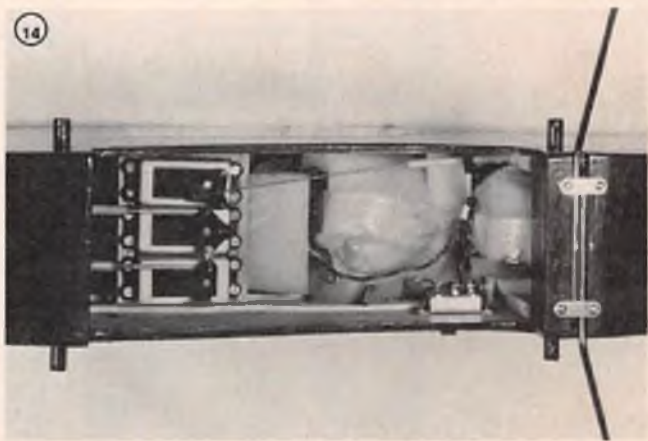
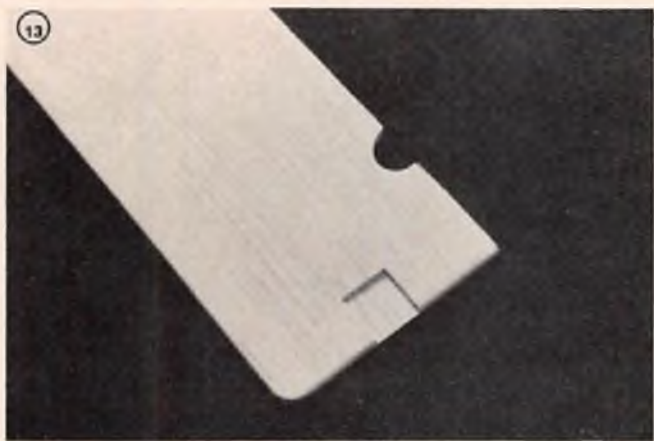
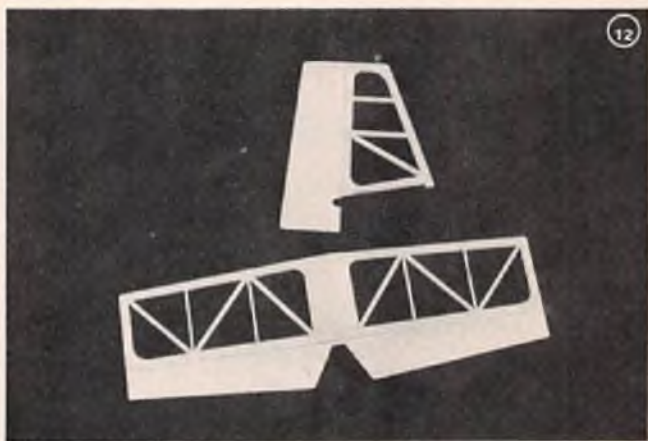
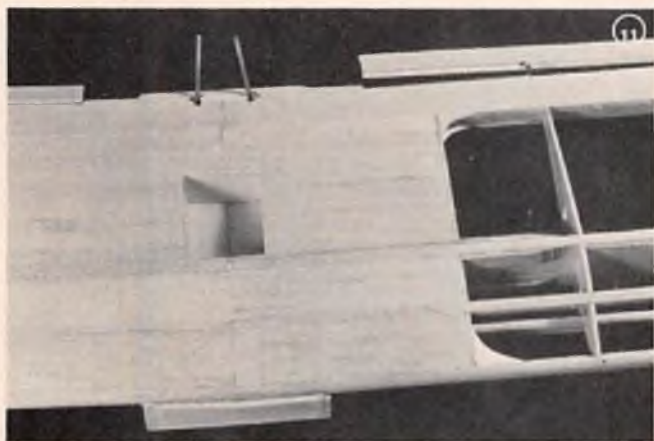
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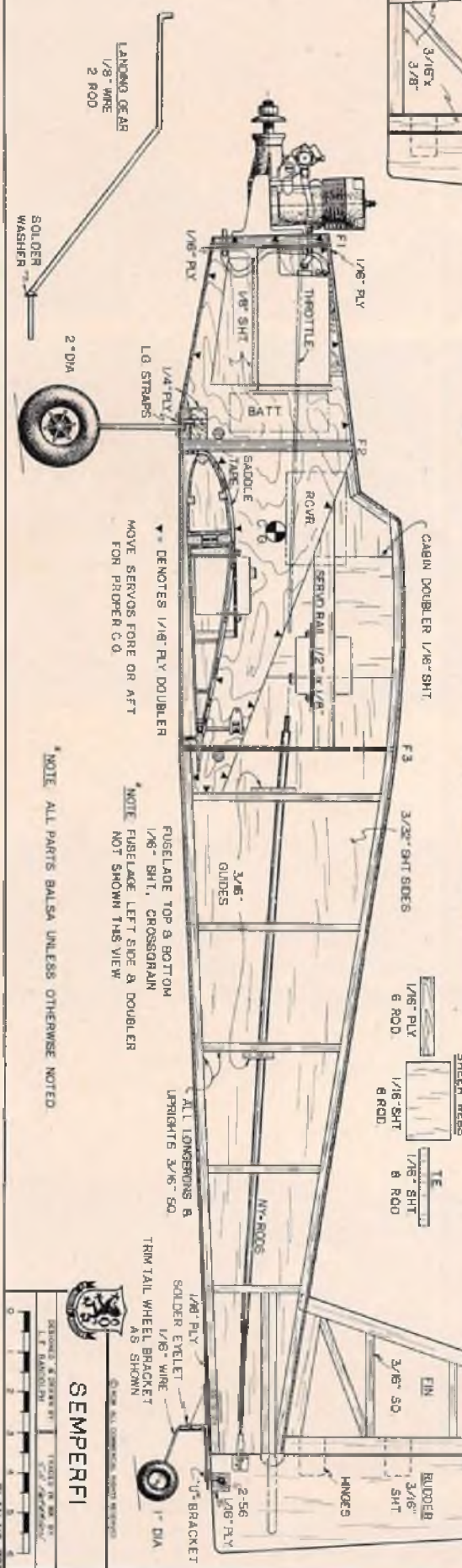
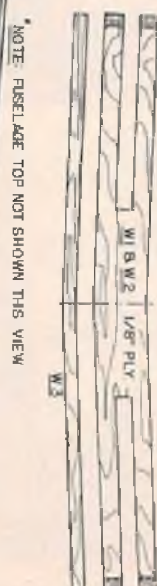
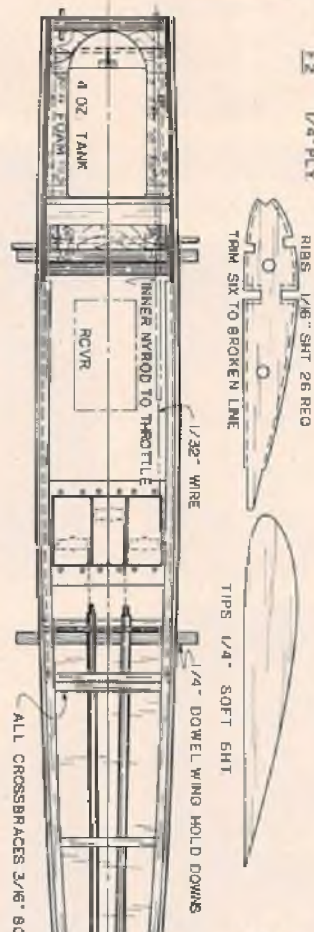
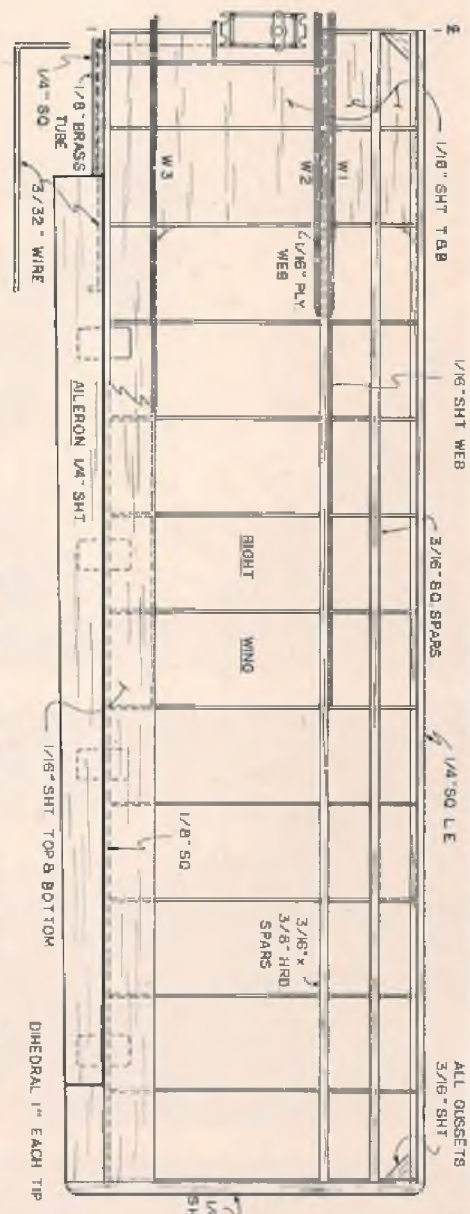
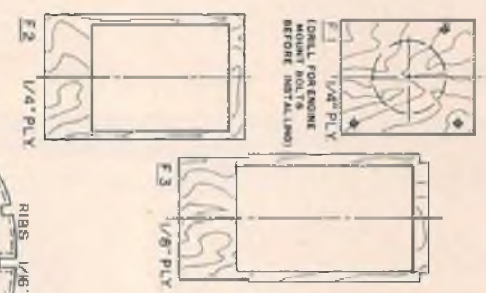
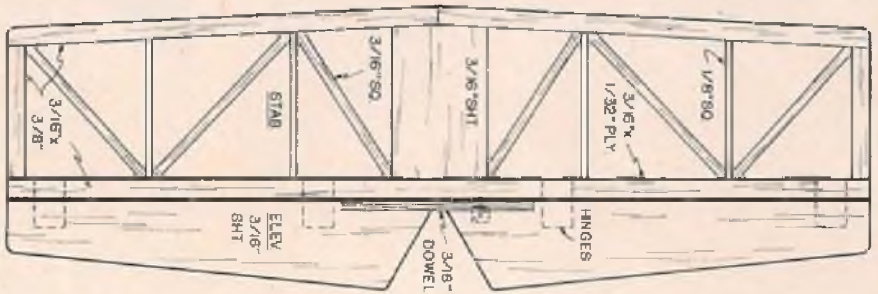
-BY RANDY RANDOLPH



(1) The fuselage "kit" ready for assembly. (2) Fuselage sides with cabin doublers, tank and servo rails added. Cabin bulkheads are first glued to one side in preparation for assembly. (3) Firewall installation. The sides are notched to receive the landing gear mount, torque anchors are added above the mount and the mount and anchors drilled to receive the landing gear. (4) Fuel tank is installed with foam wedges after throttle line is epoxied through firewall and into cabin. (5) Foam wedge above tank completes installation and final sheeting can be done. (6) The two ribs on both side of the center section are notched at the main spars to allow installation of the dihedral braces. (7) The completed center section ready for sheeting, trailing edge top sheet has now been installed. (8) Wrap bond paper around part of sanding block to form tips, the paper keeps the sandpaper from changing the airflow at the tip.



(9) Temporarily hold wing in position on fuselage to build bottom fairing on wing. Fairing is formed from the bottom sections of the sides which were cut out to make the wing saddle. (10) Complete wing to fuselage fairing. Aileron hardware can now be installed. (11) Aileron hardware installed and ailerons notched and drilled to receive aileron torque rods. Do not install ailerons until they are covered. (12) Elevator, stab and rudder, fin ready for cover. (13) Detail of bottom of rudder, notched to receive plywood insert for tail wheel tiller anchor. (14) Radio installation, battery and receiver forward, servos aft. (15) Tail wheel installation. (16) SEMPERFI.



NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.

NOTE: DENOTES 1/16\"/>

NOTE: FUSELAGE TOP & BOTTOM 1/16\"/>

NOTE: FUSELAGE LEFT SIDE & DOUBLER NOT SHOWN THIS VIEW.

SEMPERFI

PLAN NO. 795



**B**efore we get into this month's subjects, I'd like to say a few words about some things we published in the last few months. The bridge circuit that was recommended to provide protection, against connecting circuits with the wrong polarity, will protect the circuit as claimed but could prevent the circuit from operating as originally designed. This is due to the fact that diodes have a forward voltage drop as opposed to being ideal devices. For instance, if you put a bridge between your receiver and your airborne battery you could expect to have a lower voltage on the receiver and possibly a reduced sensitivity. In addition you would have all kinds of noise on the power line due to the servo current fluctuations causing the voltage across the diodes to fluctuate. Not a thing you want in your airplane. In other circuits, the bridge can also cause troubles. If you put a bridge between your Astro-Flight or S & O fast charger and your battery for example, you wouldn't get much of a charge. So a word to the wise. Understand the circuit you are trying to protect before adding diode protection.

The other subject that requires clarification is that of curing big airplane problems by using FM equipment. Most big airplane problems are caused by ignition noise and/or noise caused by lots of metal to metal contacts. The FM will take care of the problems very nicely. There is another "big airplane" problem associated with flying wires, metal struts, and long servo leads that affect the system. It is not obvious that FM will overcome a situation where the antenna system is being fouled up. We'd appreciate hearing from anyone who has any experience in this area. The subject of antennas seems to be coming up more and more these days so I thought we might discuss them this month, not so much to offer any cures but to spur a little more experimentation and reports from our readers. Most of us have become complacent because the 30" piece of hook-up wire works fine and fits in our pattern and sport airplanes with no difficulty. However, we are now seeing tiny airplanes with .02 and .049 engines as well as monsters with the aforementioned "bird cages" surrounding the antenna. At Las Vegas we saw an interesting antenna on a

pattern plane in order to avoid any problems due to the internal tuned pipe. We asked for a write up on it and hope to present it in a future article.

### Antennas

Dear Jim:

*One subject that has received little (or no) comment in your column is receiver antennas. To jog you into writing something, I'll ask a few questions:*

*The obvious one is, what do I do with the antenna in an O20 powered mini-model? If I chop it off and return the antenna coil, what am I losing in range? What else could I do?*

*Back in the September 1966 R/C Modeler, Jack Wiershauser wrote what appears to be a good article on this subject (copy enclosed). He suggested a central loading coil. I note that Kraft is selling a gimmick like this. What approach are they using?*

*There are lots of similar questions (i.e., antenna in the wing?) that need a good up to date discussion. How about writing one?*

Sincerely,  
Ted Off  
Ventura, Calif.

First of all I'd like to say we have talked about antennas before and recommended that you go to a vertical whip on your plane if you are having trouble. This is probably more important as you start shortening your antenna. But let's look at what we are trying to accomplish with a receiver antenna before we come to any conclusions.

Most of the following was lifted from a paper submitted to RCM by G.B. Herzog of Princeton, N.J. who many will remember as an early pioneer in R/C and particularly in proportional. The paper, as written, applied to 27 MHz and Mr. Herzog offered to update it for 72 MHz. I'm not sure what happened but I

for one would love to see it. So if this magazine makes it all the way to New Jersey, maybe we'll entice Mr. Herzog to get out his typewriter.

The transmitter antenna is designed to establish a strong radiated field in the vicinity of the receiver. The receiving antenna must extract enough energy to provide adequate signal for the receiver. Most receiving antennas take the form of a wire from the forward part of the fuselage up to the vertical fin. When the plane is flying directly away or directly toward us this antenna can be oriented along the pointing vector from the transmitter antenna. The radiated wave has voltage and current components that are at right angles to the pointing vector. No signal lies on this vector and therefore no signal can be induced in a receiving antenna parallel to this vector. Now don't quit flying, because, fortunately the plane is never exactly oriented this way and all parts of the antenna are not in a straight line. Furthermore the metal in the plane distorts the field which helps induce a signal into the receiver.

Mr. Herzog ran field tests with a telemetering system to establish antenna performance and the results indicated that the wire to the fin was grossly inferior to the vertical whip for most flying conditions. With the vertical whip on the plane and at a range of 400 feet he had to collapse the transmitter antenna to find any appreciable nulls. With a horizontal antenna on the plane he could find nulls where the received

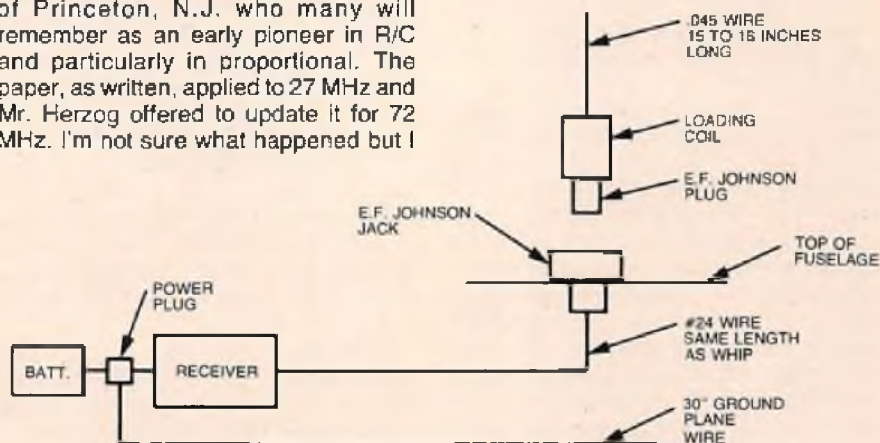


FIGURE 1



signal was essentially zero with the transmitter antenna fully extended.

The 1966 RCM article by Mr. Weirhauser recommended a tuned antenna, and a ground plane wire. Again he was working on 27 MHz and a quarter wave antenna would be 9' long. A short antenna (less than quarter wave) can be made to look like a quarter wave antenna by tuning it with a loading coil. He recommended a center loaded antenna with the loading coil mounted on top of the fuselage and vertical wire extending from it with a flexible wire of the same length inside the fuselage. See Figure 1.

The loading coil must have enough inductive reactance to cancel the capacitive reactance of the short antenna. At 72 MHz, a quarter wave antenna must be 3.4 feet long. So the usual hook-up wire isn't too far off, nor is the antenna illustrated in Figure 1 with no loading coil. However, if you wanted to cut it down, the loading coil might be the solution. You could do a lot of calculations but the best way to go about tuning an antenna is with a grid dip meter. The author suggests that no mods are required to the receiver but this is probably dependent on the receiver design. He suggests the best match can be achieved by adding a 2-3 turn link at the cold end of the input tuning coil as shown in Figure 2, if your receiver doesn't already have this configuration.

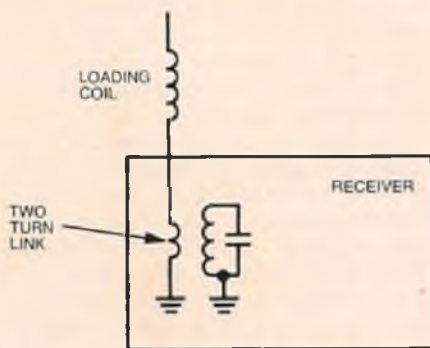


FIGURE 2

Before you get too excited, read what Mr. Herzog says. "We can improve the receiving antenna by providing a ground plane and by appropriately tuning with loading coils. This would make the receiving system more sensitive and might be used as a means for reducing the required transmitter power. It would, however, at the same time, make the receiving system more sensitive to interfering signals on the same or nearby frequencies." He recommends improving the transmitter antenna efficiency and leaving the receiver antenna somewhat inefficient, providing that it doesn't have any serious nulls. We've previously discussed that the place you can expect to have problems is down low and far out and that in most cases you will be flying level in that case.

Therefore the vertical whip, even though it is short, is the way to go vs. a longer antenna in the wing. What we are saying is that polarization is more important than having the proper electrical length.

Now the problem with cutting part of the antenna off is that the antenna capacitance will change and therefore affect the front end tuning. In fact it may not tune at all. Again, it depends on the front end design.

I recently received the complete series of articles on Terry Platt's FM system that appeared in RCM & E in England, courtesy of Mr. N.R. Chippendale of Ottawa, Ont. Terry has an interesting solution in the form of an FET RF amplifier that acts as a buffer between the antenna and the first tuned stage. See Figure 3.

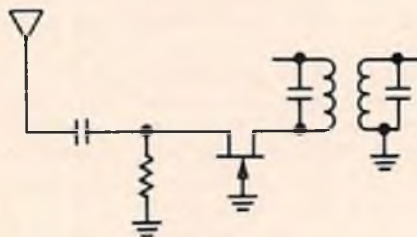


FIGURE 3

Terry says it provides amplification and allows any length of antenna to be connected. He was concerned about not having any tuned circuits before the amplifier which could lead to cross modulation with strong signals but experiments have shown no such effects. Note that this is with his receiver; you might experience different results.

The bottom line is that short antennas will work but they will be less efficient so you must take steps to make up for this loss. You must also make sure your front end is still tuned when you get done. I'm sure there is someone out there who has been through this exercise and maybe a few more will do some experimenting. Let's hear from you.

By the way, I hope to have more to say about Terry Platt's FM system soon.

#### Super Battery?

The following news release from "Spotlight" was sent in by Ken Kern of Bedford, Indiana. I haven't been doing any "hamming" Ken. Hope your new Kraft FM system works as well as mine.

#### Super Battery Developed By "Ma Bell"

*A sensational new electric storage battery destined to power the automobiles of the 1980's - and to drastically slash the energy requirements of our transportation system - has suddenly appeared on the scene.*

*The new battery has a very high specific energy (or energy density): 200 watt-hours per kilogram (wh/kg) - eight times as great as the lead-acid batteries currently used to power electric cars. It also has very high specific power: 2.5*

*volts per cell, or twice that of the nickel cadmium battery which powered the vehicles used in exploration of the moon - plus four times the energy density.*

*Also, like the nickel cadmium and lead-acid batteries, it is "cold" - that is, it works at existing temperature.*

*This breakthrough was developed by Bell Telephone Co. at its laboratories in New Jersey.*

*The negative electrode, or anode, of this super battery is lithium, the lightest of all metals, and possessing a very high electric potential. The positive electrode, or cathode, is vanadium disulfide, a mica-like substance that has a maximum capacity to store electric ions on either side of its razor-thin layers. Used as the power-pack in an automobile it represents only 20 percent of the overall weight - as opposed to 40 percent for current battery-powered cars.*

*It will enable the electric vehicle to travel more than 400 miles between rechargings. Preliminary indications are that this battery is very durable, with an efficiency greater than 80 percent.*

*To date, "Ma Bell" is keeping mum about commercial development possibilities - perhaps waiting for offers from the giant auto-makers.*

The lithium batteries with which I am familiar are great from a weight and volume standpoint and have great shelf life but are not rechargeable. They also can be a little unsafe. This one sounds like a real winner. Hope they can put them in small packages. Sounds like a pack of two cells of the same weight as our present cells will last twice as long on a charge as a four cell nicad pack.

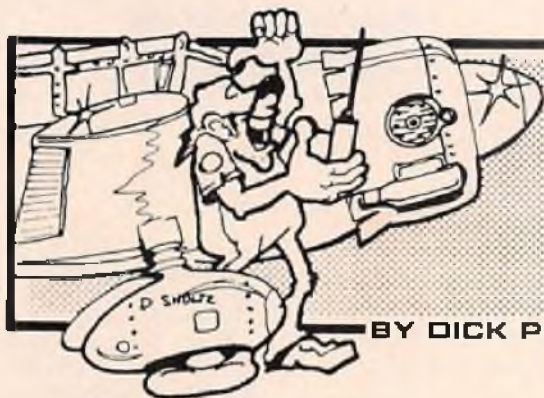
Dear Sir,

*I'm thinking about purchasing an Ace 3 channel radio system. I am planning to convert it to 7 channels later, if I get it. I don't know a lot about radios but when the advertisement says that the transmitter's battery pack is a dry pack. I think that this means that the battery pack takes alkaline batteries, I would like to use nickel cadmium batteries. Is there a manufacturer that makes a nickel cadmium battery pack that will work in the Ace radio. What I would like to do is replace the alkaline batteries in the original battery pack with G.E. nickel cadmium batteries. Since the G.E. batteries are 1.2 volts and the alkaline are 1.5 volts will this drop in voltage cause any problems? What would you do, I am lost. Thank you for your time and help.*

*Yours truly,  
Lanzy Baker  
Springfield, Ill.*

Ace has a mod kit for their transmitters that includes the batteries and I believe the charger at a very reasonable price. Surprised you haven't seen it advertised. By the way, that is the only

to page 122



# BIG is Beautiful

BY DICK PHILLIPS



I have been a little concerned lately at some of the kits coming on the market, and even some of the ones which have been around for a while. My concern is that we are using some of these models in a way they were never intended to be used. That is, we are putting 2 HP gas engines in place of smaller glow engines.

One of the problems with doing this is that we are applying significantly more power than these models were designed for, adding much more weight in the nose than was intended by the designer, and producing lower vibration frequencies than would be the case with glow engines. The mass moving is greater in the larger displacement engines and the load on the airframe, wing mounts and control surfaces is much greater than was originally intended.

All of these items added to the 'model' designed airframe can produce a potentially dangerous combination which could fail at just exactly the wrong time (Murphy's Law!) and create a problem for us.

When I first built Sid Morgan's J-3 Cub, I selected woods other than those specified in order to get around some of the problems I could see in the use of the Quadra engine. This made for a much stronger model that would have been the case had I used the balsa specified. As with any building project, especially in a new area, I learned a good deal from that model and it is still teaching me things. It has had a lot of flights on it since it was built in 1976 and it is presently in such a shaky condition that I have recently decided not to fly it any more as being just too darn chancy.

This is not to suggest that the plan is at fault, it was originally designed for a .60 or a .80 and I have seen a number of them fly and they fly as the full scale prototype did. It's not a pattern airplane and it won't fly like one. Adding the gas fired engine to it makes it a little more capable than it could ever have been with glow power aboard, but it still isn't a P-51 or anything like it!

As I have mentioned before, building strongly will add weight but, at the wing loadings of these big birds, the addition of a pound or so won't make any



*The Squadron concept again. The shot was taken at the STARS Fun Fly at Olean, New York, looks as if the STARS have their D VIII's almost ready for the air.*



*STARS Bristol Scouts were present and awed the onlookers with their realistic flight. Four were flown together and much impressed those who were unfamiliar with models. Unfinished Fokker D VIII in the background.*



*Three of four Super Stearman (plan by Godfrey) present at STARS event. The one in the foreground is Don's and is patterned after Joe Hughes' aircraft. Files just great.*

noticeable difference. The J-3 weighs 16 pounds ready for the air and it could easily maintain its admittedly low-level performance at a weight 8 to 10 pounds heavier, surprising as that may sound.

So, for the next few minutes, let's take a look at building big models with an eye toward building a solid, safe and long lasting model which can be flown with no safety reservations.

Even in the more temperate parts of the country, we are pretty well at the height of the building season as you read this with Christmas not too far off. For that reason, I'd like to do a little

review of building techniques for the benefit of those going into the larger model for the first time.

Basic materials are first on the list and these can be so varied depending on local conditions and availability. Those of you who have been following "Big Is Beautiful" for any length of time know that I have recommended the so-called soft woods for some time now. By soft woods, I mean easily worked woods like spruce, white pine, cedar and poplar, to name just a few. Take a look around your area and determine what woods are readily available to you. Use as your criteria woods which are straight grained without knots or severe deformation of the grain. The closer the grain, the harder the wood, generally speaking.

Once the wood has been chosen, then it is simply a matter of deciding what sizes are required and how to go about cutting them. Generally, I use the same size as recommended on the plan. The transition from balsa to one of the soft woods is enough to provide more than adequate strength for the engines we will be using in Quarter Scale and larger models.

Working from a plan, such as the Morgan J-3, I changed all of the strip wood to western white spruce, which I buy at the local lumber yard. Naturally, I choose the straight grained pieces which are clear of any knots or checks. I use spruce because it is readily available to me here and there is enough around that I don't have too many problems finding good stuff.

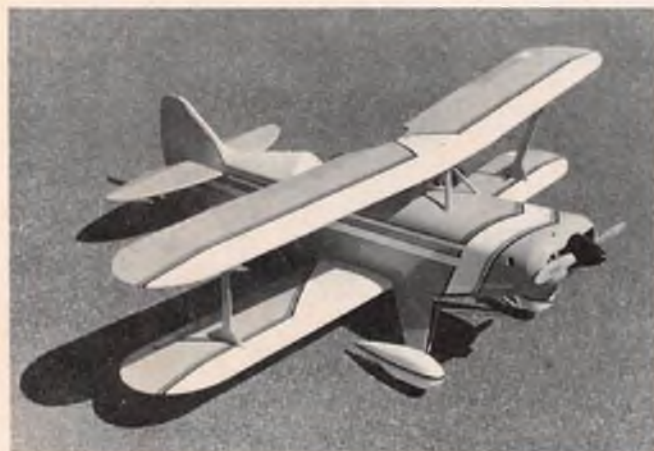
If you are going to paw through a sling of 2 x 4's to find good wood, make sure you pile it all back neatly again, you may want some more at some time in the future and you won't be very welcome if you destroy the lumber yard's stock on hand!

Another good source of really fine wood is the homebuilt supplier. If you read through Sport Aviation (EAA Magazine) you'll find suppliers listed there. They stock Sitka Spruce for the homebuilder and it is just the best you can get. My last batch of 50 lineal feet of Sitka Spruce 1 x 6 cost me about \$30.00 That's a bit over a dollar a board foot. If you figure your balsa stick stock out at

to page 92

# RCM PRODUCT REVIEW

## Royal Products PITTS S-2



### SPECIFICATIONS

Name	PITTS S-2
Aircraft Type	Sport Scale
Manufactured By	Royal Products Corp. 790 West Tennessee Ave. Denver, Colorado 80223
Mfg. Suggested Retail Price	\$89.95
Available From	Both Mfg. & Retail Outlets
Wing Span	52 Inches
Wing Chord	8 1/4 Inches
Total Wing Area	830 Square Inches
Fuselage Length	46-9/16 Inches
Stabilizer Span	20 Inches
Total Stab Area	190 Square Inches
Mfg. Rec. Engine Range	.50-.80
Recommended Fuel Tank Size	Not specified
Recommended No. of Channels	4
Recommended Control Functions	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes
Construction Photos	No

### RCM PROTOTYPE

Radio Used	Kraft
Engine Make & Disp.	Kraft 61
Tank Size Used	12 Oz.
Weight, Ready To Fly	128 Ounces
Wing Loading	22 1/4 Oz./Sq. Ft.

### SUMMARY

#### WE LIKED THE:

Clean die-cutting; sturdy landing gear; good parts fit; good flight performance.

#### WE DIDN'T LIKE THE:

No fault noted, but it is not a beginner's project.

cabane struts are easy to install and key into the fuselage, assuring proper alignment. Two bolts hold the upper wing on the assembly.

On to the wings. I was amazed at how quick they went together. All the parts fit and I enjoyed building them. Not an excessive amount of work considering **two** sets of wings. They seemed quite strong and with the addition of the "N" struts, which are functional, made the overall wing/fuselage structure seem unbreakable.

Mating of the wings to the fuselage was a snap. I used a Robart incidence meter to double check all of the incidence angles and thrust line. No major changes were necessary. Be assured that things are right with this tool, something everyone should have around the shop.

Check all of the controls at this point. Make sure all of the surfaces move free with no binding. Du-Bro bolt on ball links were used on the aileron inter-connects rather than the system shown on the plans. No special reason, just wanted to do something a little different. The elevator pushrod length must be determined and installed permanently at the horn, prior to covering. The rudder pushrod can be snaked through after the airplane is finished.

#### Covering:

The framework got a few coats of sanding sealer, followed

to page 90

**A**nother Pitts kit! Seems like just about everyone has a Pitts, but Royal Products has a one and two holer. No, not an outdoor "thing," but a Pitts S-2! The extra 5" or so in the fuselage length for the extra cockpit makes a difference in the performance, for a model, that is!

#### Construction:

The plans are quite good and I could find no fault with the balsa and plywood selection. One feature noteworthy was the die-cutting — crisp, sharp and accurate. A joy compared to other brands.

I elected to start with the fuselage. Who wants two wings on the work bench? The fuselage construction is straightforward model building, going together quite fast with the use of Hot Stuff. The basic frame-up of the plywood formers and balsa stringers took less than an evening following the manufacturer's instructions. All of the sheeting, blocks and miscellaneous parts fit with little or no modifications. The cowl and engine mount assembly is practical and easy with the pre-shaped and cut balsa blocks.

The horizontal stab and vertical fin are a piece of cake. Glue them up, a little sanding and install. I used a C & B tail wheel assembly in place of that which was supplied (most of the hardware is in the kit). It looks a little more realistic with the springs, etc., on the tail wheel assembly.

Step back and look it over — nice! The heavy dural gear will help those not-so-soft landings. Don't tell anyone that the 5/32 wire, which is a part of the gear, takes most of the load.

I was quite impressed with the foam wheel pants but only after working with them. They sand and finish like balsa with an added plus of being lighter overall. Kraft wheels were installed in the pants as I did not want to bottom out on landings. The



## KING RAT AND HIS PIETENPOL FIGHTER BOMBER

**W**ith three cat victories already to his credit, King Rat will soon become an ace. Flying the most sophisticated and heavily armed aircraft known to mouse and man, King Rat seeks out and delivers devastation to his enemies. A House of Balsa Pietenpol has been specially modified for his death dealing purpose. The roar of the powerful O.S. Max .35 engine strikes fear in the feline population as they scurry for cover but there is little they can do to evade this flying machine which is controlled by a 5 channel Avionics guidance package by Kraft Systems.

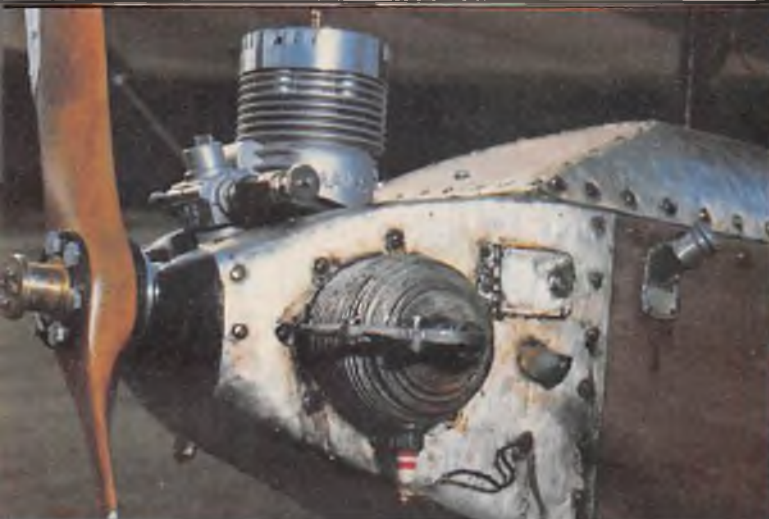
As for the House of Balsa Pietenpol modifications, I discarded the solid balsa tailfeathers in favor of the built-up rib structure as on the full scale ship. The wing tips were flared out similar to the WW I Fokker aircraft. A head rest fairing was added but the front cockpit was sheeted over. The wire rigging, turnbuckles (Proctor), and hardware fittings were researched through two tech manuals concerning the Pietenpol. These were bought at the EAA museum in Hales Corner, Wisconsin. The Gnome dummy cylinders and Spandau machine are Williams Brothers products. The feed/eject scoops are scrap built as is the working bomb.

The pilot, "King Rat," started out as a Williams Brothers pilot. It was filed (the face) flat as possible. Scrap balsa used to build up the rodent's features. More scrap balsa was added to the bottom of the pilot for proper height. The head was also cut and rejoined to get away from the static "mummy" pose. The head is covered with mole fur.

The whole plane is covered with antique Coverite except for the front walnut veneered areas. Sig dope was used for sealing and colored areas, insignias, etc. The side and top cowling was made from very thin aluminum sheet, attached with epoxy and RC 56 glue.

And now, dear reader, if your pet cat suddenly goes bananas for no apparent reason, it might be that its super sensitive hearing has picked up the sound of King Rat on patrol and all that you can do is to hope for the best.

**By Brad Kaste**





The 1979 ROAR Nationals were sponsored by the MORCAR Club of Columbus, Ohio and were held at the new Eastland Shopping Mall parking lot.



That super fast racer, Arturo Carbonell, was Top Qualifier in the 1/8 Super Stock and Oval events and won the Super Stock class.

## 1979 ROAR NATIONALS

**T**he 1979 ROAR Nationals was held in Columbus, Ohio, and was sponsored by the MORCAR Club of Columbus. The Eastland Mall Shopping Center parking lot was an ideal location and provided more than enough area for the track and competitors. The Nationals was a two week event with the first week devoted to 1/8 Scale and the next week to 1/12 Scale. Having just spent two weeks in Geneva at the World's Championships, many of the 1/8 Expert Class racers had used up their vacation time and could not participate in the Nationals, myself included. So I'll not be able to give you a first hand report on the 1/8 Nationals, but I did get to talk to many of the racers at the ROAR banquet following the 1/8 Nationals, and I'll give you their consensus on the races.

To begin with, they all praised the rather inexperienced MORCAR club for doing an excellent job in running the 1/8 Nationals. The 1/8 program consisted of GT Super Stock, Can Am and Oval racing with three driver classes; Expert, Amateur and Novice classes. Due to limited spaced availability here, we'll have to limit our reporting to the Expert classes. Amateur and Novice results will be published in ROAR's Rev-Up newspaper for interested readers.

### 1/8 GT SUPER STOCK

The 1/8 track layout was described as a "typical short Mid-West type track" by the racers. There appeared to be about 4 or 5 racers who had a good chance of winning, including Top Qualifier Art Carbonell.



Gary Kyes was Top Qualifier and won the 1/8 Can Am class and also won the 1/8 Oval class.



Rick Davis could only take time off work to compete in one event, so he chose the 1/12 6 cell Modified class and easily won it.

Jack Jacobs, Dana Smeltzer, and Bill Steele were all running extremely fast and had a real tight race going, but Arturo Carbonell put it all together for the win with Hank Smith, 2nd, and Bill Steele who led part of the race taking 3rd.

### 1/8 GT SUPER STOCK

- |                     |        |
|---------------------|--------|
| 1. Arturo Carbonell | Delta  |
| 2. Hank Smith       | Delta  |
| 3. Bill Steele      | Assoc. |
| 4. Rod Galloway     | Delta  |

- |                 |        |
|-----------------|--------|
| 5. Ken Campbell | Delta  |
| 6. Jack Jacobs  | Assoc. |
| 7. Mike Queller | Delta  |
| 8. Bob Yelle    | Delta  |
| 9. Bruce Oakley | Delta  |
| 10. Don Shrieve | —      |

### 1/8 CAN AM

This is the premier event of the 1/8 program and a few surprises surfaced here. Along with the guys who went fast in the GT event, Mark Majors looked super good, but the one who had everyone talking during qualifying was Gary Kyes. Gary didn't run the GT event, and with a limited amount of practice was Top Qualifier. Arturo Carbonell, Jack Jacobs, and Gary Kyes made a real race of it, but at the finish it was Gary Kyes winning. Hank Smith finished 2nd again, with John Thorp taking 3rd.

### 1/8 CAN AM

- |                |        |
|----------------|--------|
| 1. Gary Kyes   | MRP    |
| 2. Hank Smith  | Delta  |
| 3. John Thorp  | Thorp  |
| 4. Bill Steele | Assoc. |



Curtis Husting won the most competitive class, the 1/12 6 cell Production, where the top 5 finishers were all on the same lap.



17 year old Mike Lavacot is already a super driver. Mike was Top Qualifier in the 1/12 6 cell Modified class and won the 1/12 6 cell Stock class.

- |                      |        |
|----------------------|--------|
| 5. Jack Mueller      | Delta  |
| 6. Mark Major        | Assoc. |
| 7. Jack Jacobs       | Assoc. |
| 8. Bill Klingbell    | —      |
| 9. Dana Smeltzer     | Assoc. |
| 10. Arturo Carbonell | Delta  |

### 1/8 OVAL

Arturo Carbonell was Top Qualifier, yet Gary Kyes added another win in the Oval race, but not until a tough race was run between Gary and Art Carbonell who had to make a long pit stop dropping him too far back.

### 1/8 OVAL

- |                  |        |
|------------------|--------|
| 1. Gary Kyes     | MRP    |
| 2. Don Shrieve   | —      |
| 3. Art Carbonell | Delta  |
| 4. Bill Clemens  | Delta  |
| 5. Ken Campbell  | Delta  |
| 6. Paulo Catucci | SG     |
| 7. Mike Queller  | Delta  |
| 8. Dana Smeltzer | Assoc. |
| 9. Hank Smith    | Delta  |
| 10. Jack Mueller | Delta  |

### 1/12 ROAR NATIONALS

The 6 cell outdoor events were run first, on the 1/8 track with a shortened straightaway. When we first saw the track, it did seem to be a "typical short Mid-West 1/8 track," especially since we had just come back from the 1,000 foot long Geneva track. Although all the 1/8 racers liked the track, we thought it also made an excellent 1/12 track. Sunday was open practice, with the weather at 90° with 90% humidity and it remained that way all week. We got familiar with the course and dialed in the cars with the correct gearing, wings, etc. The practice sessions were 9 minutes long, so battery



Don McKay made his prediction come true by winning the 1/12 Gas class. Don will be able to retire undefeated because the 1/12 Gas class is being discontinued at the Nationals.



This is the 1/12 indoor track. That's right — it was run outdoors. The track sure looked small outdoors, but it was a great indoor track.



Kent Clausen was one of the best of the Experts by being Top Qualifier in both the 1/12 6 cell Production and Stock classes and winning the 1/12 4 cell Stock class.



Curtis Hustung's TOJ bodied Sports Car was typical of the Associated team cars. Traction was good enough that wings weren't required.



Curtis' Associated RC12E Production car featured the lightweight conversion parts and the new super fast Bantam Midget servos from Novac Electronics.



Gary Kyes entered this beautiful 1/12 917 Porsche and won Concours. 1/8 Concours was won by Paul Punter.

life could be checked, with all the qualifying heats and Mains 8 minutes long.

### 1/12 6 CELL MODIFIED CLASS

This is the 6 cell (battery) outdoor

class using Can Am bodies and Modified motors — re-wound, ball bearings, etc. 17 year old Mike Lavacot, from So. Calif. was Top Qualifier turning 32 laps with his Reedy modified motor. The next five qualifiers turned 31 laps, showing just how close electric R/C racing is.

Gary Kyes got the jump at the start with Kent Clausen right behind. Kent twice came up to pass Gary, but both times Kent tried passing on the outside and Gary spun him out. Meanwhile, Rick Davis, who got off to a bad start, worked his way up to Gary, followed him for a couple of laps, picked the right spot and passed Gary taking the lead. Kent had worked his way back up to Gary again, tried to pass a third time, but didn't make it again. Davis went on to win with Kyes 2nd, and Clausen 3rd. Top Qualifier Mike Lavacot, had broken the spring in his transmitter which made it impossible to drive.

### 1/12 6 CELL MODIFIED

- |                   |         |
|-------------------|---------|
| 1. Rick Davis     | Assoc.  |
| 2. Gary Kyes      | MRP     |
| 3. Kent Clausen   | Assoc.  |
| 4. Jeff Rold      | Assoc.  |
| 5. Curtis Hustung | Assoc.  |
| 6. Gene Hustung   | Assoc.  |
| 7. Roger Curtis   | Assoc.  |
| 8. Mike Lavacot   | Assoc.  |
| 9. Mike Rowland   | Assoc.  |
| 10. Kevin Orton   | Leisure |

### 1/12 6 CELL PRODUCTION

This is the 6 cell outdoor class with Can Am bodies. Chassis are all stock kit manufactured cars, such as sold in "Ready To Run" cars with completely stock ROAR legal motors. No modification allowed to cars or motors.

Now comes the incredibly strange part. 20 year old Kent Clausen from Monterey, Calif., was Top Qualifier turning 32 laps. Using a stock kit car with a stock motor, Kent turned the same laps as the modified cars with modified motors did the day before! Not only Kent, but the whole field turned the same laps with the kit cars, including myself. After much discussion, we all agreed the stock motors were slower on the straightaway, but much easier to drive in the corners. Even so, none of us expected this outcome. Jeff Rold, Curtis Hustung, and I turned 31 laps.

In the Main Event, Curtis Hustung just simply ran away with the race --- Curtis got out in the lead and was long gone. Top Qualifier, Kent Clausen got a bad start, but worked his way up to that man, Gary Kyes, again, but when Kent tried to pass Gary he got knocked upside down and dropped to 4th Place. Curtis went on to win with Kyes 2nd and that smooth, fast driver, Eric Hahn, 3rd.

### 1/12 CELL PRODUCTION CLASS

- |                   |         |
|-------------------|---------|
| 1. Curtis Hustung | Assoc.  |
| 2. Gary Kyes      | Leisure |
| 3. Eric Hahn      | Jerobee |
| 4. Kent Clausen   | Assoc.  |
| 5. Gene Hustung   | Assoc.  |
| 6. Mike Rowland   | Assoc.  |

to page 87

# HERE'S HOW



*A fleet in a tree — forty feet up — and how to rescue it? That is, in one piece.*



*A rope thrown over a limb and looped around the tail enabled the big bird to be lowered gently down through the branches.*

It happened one Saturday afternoon. Al Rockhill brought his scratch-built, Quadra powered, Fleet biplane to the flying field for some test flights. All of the boys on the flight line stopped flying and settled down in a good spot to watch as Al began to assemble the big bird. When all was in readiness, and the Quadra was idling smoothly, Al slowly advanced the throttle and soon the big Fleet was off into the blue. What a beautiful sight! The climb-out was near perfect and then, at approximately 100' altitude, it went into a gentle left bank. Suddenly Al realized that the gentle left turn was there to stay. Trying all the controls, he discovered he had only the throttle. By this time the Fleet had made several large circles and the wind had carried it well over the woods located on the southeastern portion of our flying field. At that time of year the woods was an absolute impenetrable jungle of nettles, vines, poison ivy, and undergrowth. We stood transfixed and watched the Fleet circle out of sight over the woods and waited for the inevitable --- that is, the impending crash with parts dropping through the tree limbs. There was absolute silence. No sound of crashing

parts falling through the tree limbs — just a complete nothing. What had happened to the Fleet?

A good friend (and field owner) Cliff Bennett came to our rescue by driving his Ford tractor with rotary mower, well into the woods, carving a path for us. It wasn't long before the Fleet was spotted — in the top of a tree, 40' up and hanging by its tail from a limb (Photo No. 1). After talking over many possible ways of retrieving the Fleet, without causing her to fall, we decided to climb the tree. (which was loaded with poison ivy) loop a rope over the tail section, throw the rope over a limb, jar the airplane loose, and lower it gently to the ground (Photo No. 2). During the process of lowering the Fleet, it was necessary to pry it away from the limbs in order to lower it without damage. As it neared the ground, several pairs of hands reached up and retrieved it (Photo No. 3).

Later, with the Fleet setting safely on the flight line we assessed the damage caused by the crash (Photo No. 4). Would you believe only one broken interplane strut? Twenty-four pounds of airplane in a tree and that was all. Thank the Lord for the limb that caught it by the tail — because that's what saved it!

What an exciting Saturday afternoon! Especially for Al, who must have died a thousand deaths. As for me? I shot the rescue sequence photos and tried to stay away from the poison ivy!

Once in a while I get a chance to do some building. That is, when Dick Kidd doesn't know when I have a set of his plans completed. And, recently, I have been doing some covering with Coverite Permagloss. Not a new product but one certainly worth mentioning. This is great stuff! Especially for the large aircraft that are popular today. I found it very easy to work with, once the correct temperature of 375°F was set on the heating iron.

Coverite puts out an excellent instruction booklet to help you along the road to a successful covering job. One of the things mentioned under "Preparation of wood surfaces" was ventilating the wood to dry it out. This is done by inserting pins in a block of wood (5/8" sq. in.) and gently puncturing the surface of the solid sheeted areas with this tool. The purpose of this is to get rid of the moisture and dry out the balsa. Place the framework under a heat lamp or out in the direct sun for about 3 hours. Then apply a coat of Balsarite (Coverite)

to page 86



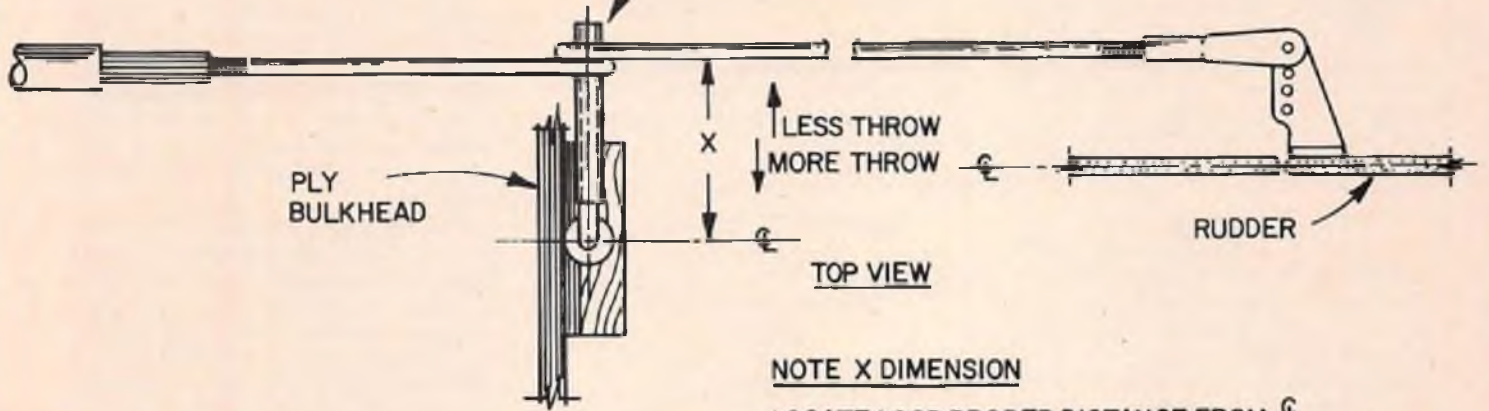
*Eager hands assist in the final moment of triumph! It was finally rescued. All 24 pounds of it.*



*Al Rockhill's magnificent scratch-built Fleet. Quadra powered, 24 pounds, covered with Coverite Permagloss. Doesn't it look real?*

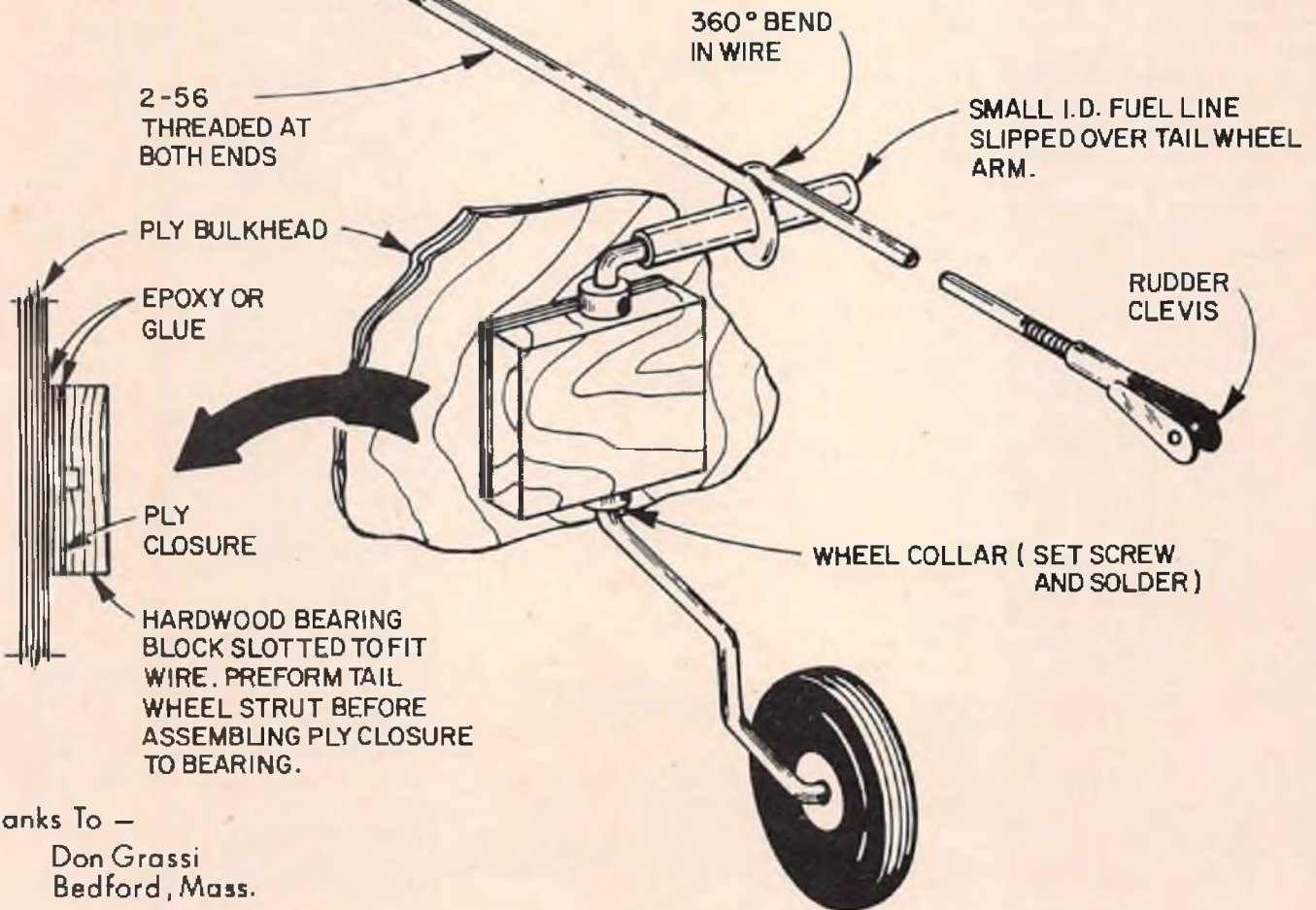
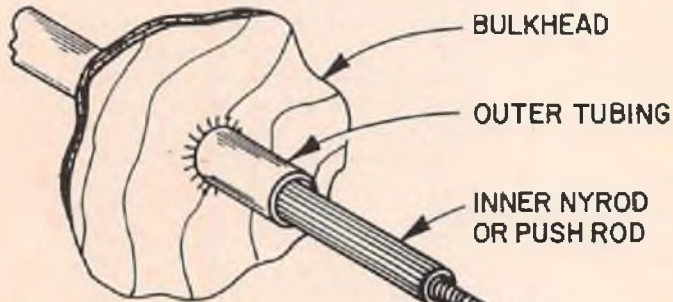
STEERABLE TAIL WHEEL

LOCATE 360° LOOP BEND  
IN WIRE SO THAT TAIL WHEEL  
ARM AND RUDDER ARE "NEUTRAL".



NOTE X DIMENSION

LOCATE LOOP PROPER DISTANCE FROM  $\epsilon$   
OF TAIL WHEEL SO THAT RUDDER AND  
TAIL WHEEL THROW ARE APPROX. THE  
SAME.



Thanks To —  
Don Grassi  
Bedford, Mass.



# GET YOUR PANTS ON!

**T**itles are intended to capture your attention. If this one did, why not read a couple of paragraphs? This project is easier than it looks, allows for creativity, and is enjoyable. While making your pants, you can continue to fly your "bottomless" bird, so there is no pressure to be in a hurry.

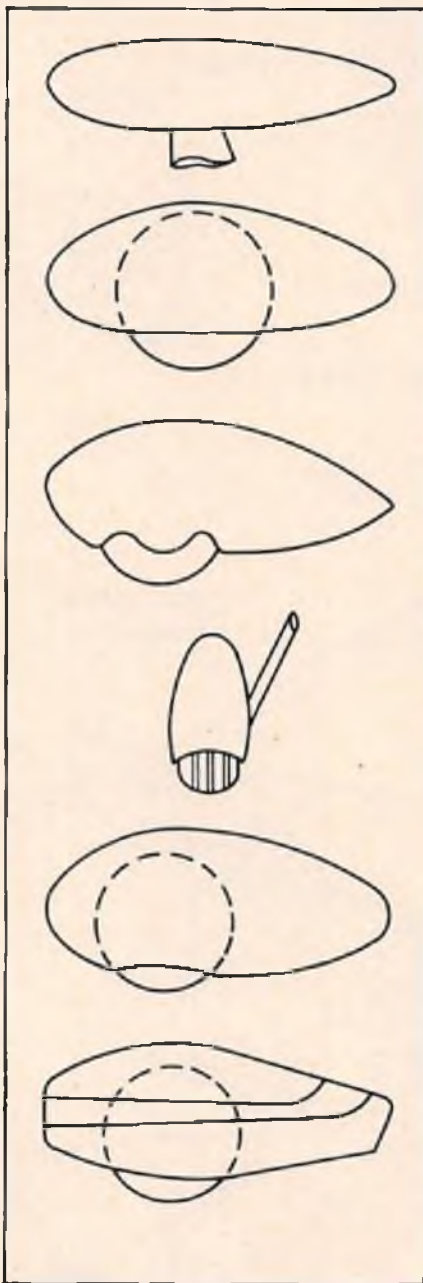
A statement-question that I hear frequently is, "I like your plane, where did you get the wheel pants?" It seems there is a considerable market for pants. And why not? Wheel pants on model size aircraft may or may not do much for aerodynamics but they make the plane look prettier and meaner. You can individualize your bird, even though it was built stock from a kit by adding wheel pants of your own design.

If you are still with me, I better explain "where I am coming from." I am not an expert in any part of the RC hobby, merely an enthusiastic participant. I have been in the hobby long enough to know some of the basics and to realize the wide range of skills and techniques employed. We are adding RC hobbyists each day and, as a result, we keep "re-inventing the wheel" on an individual basis. After working out the details for making fiberglass wheel pants, I discovered that even though all of my "original ideas" had been done before, a lot of RC'ers had never heard of the basic techniques. Ideas and methods that really work are worth repeating, so for all modelers who haven't tried this method, this workshop is in session.

The basic process entails using a male mold which is somewhat easier to construct than a female mold. The fiberglass parts are built up on the outside of the mold rather than the more common method of lay-up inside a mold. The key to obtaining a satisfactory external surface on the finished product is the use of a common toy balloon to force the resin and cloth to conform to the contour of the mold. This process can be used to form many items that have a simple basic convex shape. Engine cowls, wing tips, tip tanks, and bombs are some items that are readily made in this manner. We will make a male mold and use it to form fiberglass wheel pants. The pants shown are for use with sheet metal struts. Pants for wire gear can be made in a similar fashion but will require specialized mounting hardware (such as the flanged wheel collars made by Fox) and will not be covered here. If you haven't worked with resin before, please be very careful

By Dawes H. Reyburn

with the catalyst and always provide good ventilation for the work area. See your hobby dealer about the hazards involved.



TYPICAL WHEEL PANTS

You will need: resin, fiberglass cloth, party balloons (about 8" diameter), plastic food wrap, scrap softwood, and assorted hardware as noted in text (see Photo #1).

The necessity of making molds seems to stop a lot of people from making fiberglass parts, so we will make one mold which, in effect, becomes four molds. Keep in mind that this mold is not a throwaway item. It can be used over and over to make duplicate parts or can be reshaped if a smaller product is acceptable.

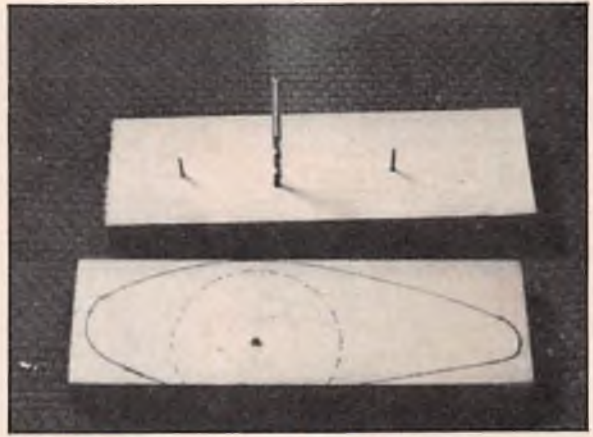
Determine the size wheel that you wish to cover since the pants must be bigger than the wheels. Find two pieces of scrap white pine (or any other workable softwood) that, when placed back to back, will be at least as thick, high, and long as the desired interior size of one complete wheel pant(?). Sketch a profile side view of the desired shape right on one piece of board. Use a right or left view, it doesn't matter (see Photo #2). Remember to allow sufficient angles on the bottom of the pants to keep them above the runway when tail dragging or nosing over. If you fly from a grass strip, keep the pants fairly high at the bottom.

Next determine wheel position within the outline, clamp the boards together and drill a 3/16" hole through both pieces of wood right where the wheel axle will be. (The hole should be drilled as near a 90° angle as possible as it will be used to bolt the boards together and later it will mark the wheel pants for axle location.) Cut two pins from nails or wire (see Photo #2) and press the boards together against the pins and bolt them through the hole. The bolt and the pins will hold the boards in alignment for the next steps. (Do not use glue since you will separate the boards later and have two molds.) You may remove the bolt for some steps as the pins will hold for all but very rough handling. Saw through both boards to achieve a rough shape of the profile sketch (see Photo #3).

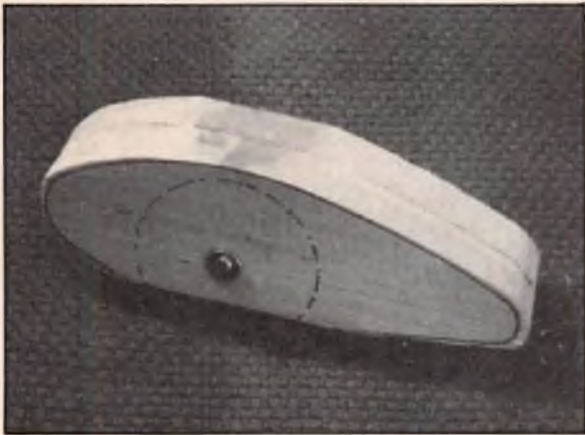
Now you are well along, so use your disk sander, grinding wheel, knife, rasp, or what you have, to achieve a pleasing functional shape for the pants. Just cut away everything that doesn't look like wheel pants. Shape both sides a little at a time to keep the two halves symmetrical. Use templates for accuracy if you desire. Always work in reference to the joint between the boards and maintain the joint as the centerline (see Photo #4). If your lumber is soft, shaping the mold is easy and pleasant so develop a shape that pleases you. You are the designer/sculptor and you can make a lot of duplicate pants with the mold. Tip: If you haven't tried "Dragon Skin" for fast



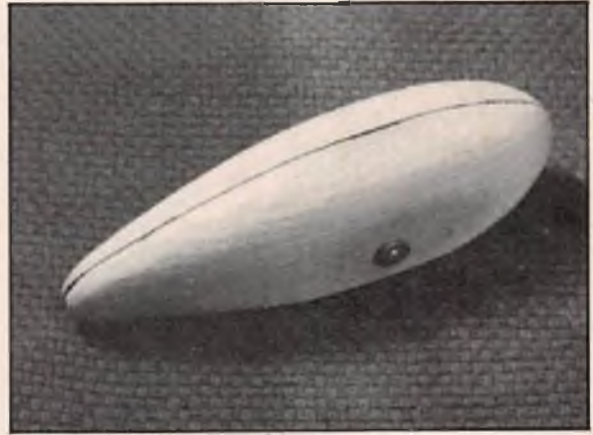
1.) Materials needed. See text.



2.) Pant outline and position of pins.



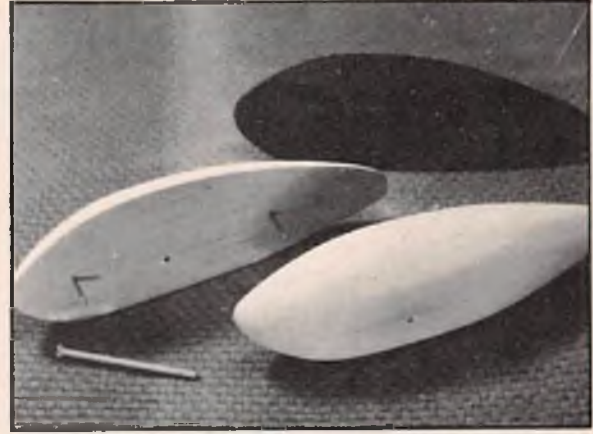
3.) Cut to rough shape of outline.



4.) Rough contour of mold.



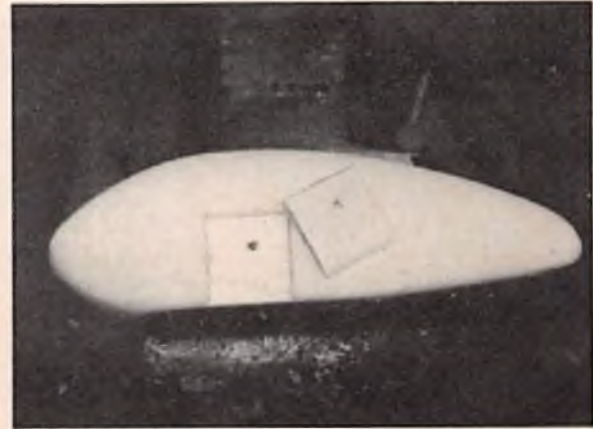
5.) Sanded smooth, ready to separate.



6.) Mold halves separated.



7.) Holding blocks attached. Note shape.



8.) Plug cut and removed.

rough shaping of any softwood, run to your neighborhood hardware store and buy a sheet or two. It is a metal substitute for sandpaper. While it won't replace power equipment, it is cheaper and it will eat balsa like you won't believe.

When you have the shape and size about right, sand the mold to a smooth surface (see Photo #5). Note: That highly visible line between the boards is black art paper that was placed there for photographic emphasis of the joint.

Remove the bolt and separate the two halves. You should now have two identical but opposite molds (see Photo #6). Since the two molds were shaped to a common centerline, the pant halves will fit together perfectly. Firmly attach a piece of scrap lumber to the back of each mold. This provides a surface for clamping the mold in place while you work. The use of wood screws is recommended, to allow easy removal in case you wish to reshape the mold at a later date (see Photo #7).

To use the same molds to make both right and left pants, we must make some modifications to allow for mounting at the strut. Center your strut over the axle hole and mark a rectangle (or follow strut shape) about 1/8" to 1/4" larger than the gear strut end. The excess size will allow for some later adjustments, if necessary. Use a razor saw to cut about 1/8" deep on this outline. After saw cuts are made, use an X-Acto knife to undercut. Try to keep the undercut parallel to the centerline (back) surface of the mold. This will determine the mounting accuracy. Gently remove the cut-out plug, in one piece if possible (see Photo #8). Do not destroy the plug. Repeat the operation on the opposite mold. (If you followed the gear shape, instead of a rectangle, be sure to cut for a left and right pant.) You will remove or replace these plugs to make left and right pants.

Clamp the mold in a vise or nail to a box or workbench. Place scrap paper underneath to catch any excess resin. Remove the plug and save it for later. Now cut a **balsa wood** plug and sand it to shape. Make this plug about 1/8" shorter and 1/16" narrower and thinner than the original to allow for the thickness of the resin and cloth. Wrap this plug with one or two thicknesses of thin plastic food wrap (Saran Wrap is a common brand name). Place the plug where you can find it. To keep the resin from sticking to the mold, drape two thicknesses of plastic food wrap over the mold and work it down, especially into the area where the plug was removed. (Note: A few wrinkles are inevitable and will cause no problems.) Dimple the plastic at the bolt hole to cause a locator mark on the pant. Do not pierce the plastic!

Cut fiberglass cloth into sizes and shapes that will cover the mold with about 1/2" or more overhang all around. Plan about four thicknesses if you use 3/4 ounce cloth, less if heavier cloth is used. I use one layer of heavy cloth overlaid with one layer of 3/4 ounce cloth.

Now a short discussion of the first potential problems. Wheel pants are much longer than they are high. When we put the balloon over the resin and cloth, the contracting balloon will try to wrinkle the cloth parallel to the longest dimension. To minimize this, place masking tape on the long sides of the cloth overhang, stretch the cloth snug and fasten to the back of the mold with thumb tacks. (Depending on which side you are making, use the balsa plug to assure enough slack is in the cloth to allow the plug to be inserted after resin is applied, see Photo #9.)

If everything has gone all right this far, mix the resin (about 1 1/2 oz.) using about one-fourth again as much catalyst as recommended. Thoroughly saturate the cloth with resin. Work out all visible air bubbles. (I use a small piece of packing foam folded over and clamped in a clothespin (see Photo #1). Put the plastic wrapped balsa plug in place and you are ready for the balloon. Blow the balloon up once and let the air out to pre-stretch it. Blow up again and now force the balloon over the mold while slowly letting the air escape as the balloon settles in place (see Photo #10). (You probably should practice this on a bare plug to get the hang of it before applying resin and glass.) You will have two thicknesses of balloon to form the resin and glass to the shape of the mold (see Photo #11). Lay finished part aside for a minimum of 24 hours as the resin hardens very slowly under the balloon.

Now make the other half of your pant, this time leaving the original plug in place under the plastic wrap to form a contoured outside half. Lay aside to harden.

Be sure to change the molds that use the plugs when making the second pant. Remember, you want left and right pants.

When resin is hard, peel the balloon away. Trim the overhanging fiberglass flush with the back of the mold (see Photo #12). Sand the edge, if necessary, to achieve a straight centerline. Remove the pant half from the mold and remove the Saran Wrap from the inside (see Photo #13) of the pant. At this point if you decide the pant is not thick enough, don't panic. Simply rewrap the mold with new plastic wrap, replace the pant half and add more cloth, resin, and a new balloon. Allow time to harden.

When you have two halves that you are satisfied with, cut the wheel opening in the bottom of the halves. Maybe make the opening a little smaller than you will actually need. Wash the halves with alcohol, especially around the seam area, and allow to dry.

We know the halves are the same size but they are flexible and keep bending around, so place the halves together and align one spot that you know is correct, then Hot Stuff that spot. Make four or five more Hot Stuff points around the seam as you align the joint. Use 5-minute epoxy to seal the seam all the way around inside the pant.

Now reinforce the seam in front of and just behind the wheel opening. These are the weakest areas. This can be messy, so cut a 1" square of plastic film (backing from MonoKote or Solarfilm is fine). Place a 1/2" square of glass cloth on the plastic and smear on some epoxy. Place the whole mess inside the pant and position it with the one finger that you can get through the wheel opening, squeeze in place and leave plastic, cloth, and all in place until the epoxy hardens, then remove the plastic. Smear extra epoxy around inside of wheel opening and around the offsets for the gear strut as extra reinforcing. Allow to harden. Finish cut the wheel opening and drill the axle hole.

Test your method of mounting. Since I do not use pants on high performance birds, I have had good luck without attaching the pants at the outside end of the axle. I clamp the pants to the sheet metal gear struts with the axle nuts. Usually I use threaded nails for axles (see For What It's Worth, Oct. '78, RCM) and the nail head guarantees that the wheel won't fall off the axle, so if the axle nuts are tight, no problem. If you desire to try this type of axle, that big old nail head allows for many types of attachments at the outside end of the axle. Soldered metal tabs, bolts, silicone, or key slots, are some areas to consider. It all depends on the size and shape of your wheel pants.

Check the outside surface. Sand the high spots, if necessary, and fill any porous areas and low spots with resin and micro-balloons. When cured, sand to your satisfaction and the pant is ready to paint.

The foregoing sounds complicated but it isn't once you have tried it. You may spend an hour or so on the mold but the rest is fast and easy. Waiting for the resin to harden is about the hardest part.

Now that you have made wheel pants, making a cowl or wing tips won't be any problem at all. Fiberglass parts are much more durable than most molded parts as furnished in kits.

Fly neat, keep your pants on! □



9.) Glass in place ready for resin.



10.) Pressing balloon over mold.



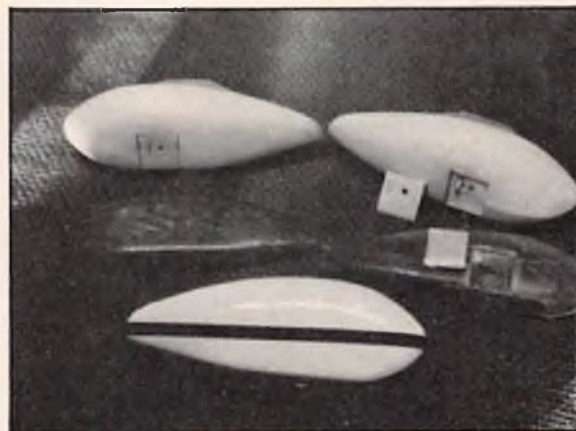
11.) Balloon in place.



12.) Trim and sand flush with mold.



13.) Remove plastic wrap from inside.



14.) Molds, halves, and a finished product.



15.) Two views of pants.



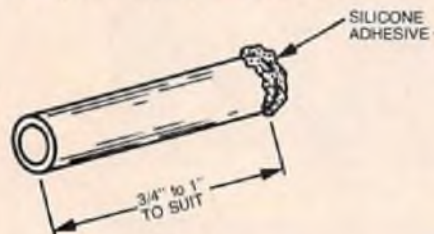
16.) They don't look bad.

# FOR WHAT IT'S WORTH

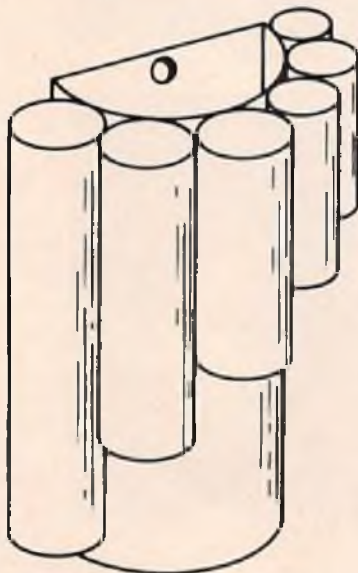
The following idea was submitted by Richard R. Smith of Waynesboro, Virginia. It is an idea that Richard has been putting into use for some time and has found it most useful not only for its original intention but for other uses as well.

During construction many people plug or wrap those brass fuel tank lines to prevent them from becoming dirty or clogged with dust, wood chips, paint, etc. An easy way to do this at any time is to cut off a piece of silicon fuel tubing and apply a little silicon adhesive to one end and let dry/cure. After this is done you have a neat slip on cap that can be used over and over. Making up a number of such caps will assure a ready supply at all times.

Generally, lengths of 3/4" to 1" are adequate. The silicon adhesive may be any brand such as found in stores (GE or Dow). A sketch of this idea is shown.

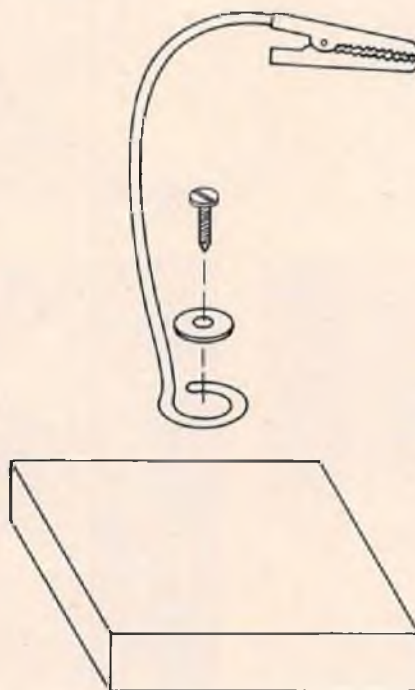


In an attempt to store dowel, wire, & tubing in an orderly yet handy container, William Bitautas of Chicago, Illinois, collected several paper tubes and assembled them as shown in the sketch. The large center tube was about 4" in diameter and was cut in half. The back of this tube was covered with stiff cardboard as were the bottoms of all the tubes. Short lengths of tubing, wire, & dowel (about 3"-6") are stored in the shortest tube and longer pieces are put



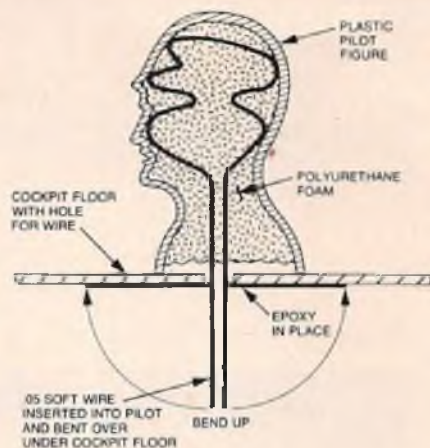
in the longer tubes. The center section is useful for storing heavier pieces of hardwood and straightedge. This holder fits handily on the side of Bill's work bench.

Fred T. Strauss of Washington Township, New Jersey, made up a simple third hand which any modeler can always use. Take a scrap of wood about 4" square and a piece of 1/8" solder. Form a loop on one end and secure to block with a screw and washer, as shown in sketch. Slide an alligator clip on the other end, touch it with a soldering iron to secure and you're all set. Two or more arms can be placed on the same block if needed. (Ed. Note: for heavier objects, silver solder wire might work better due to its greater stiffness.)



Plastic pilot figures that have broken loose inside of a sealed canopy are unsightly and troublesome to repair. To prevent this from happening, try the following method submitted by Ralph Akens of Warren, Michigan, during the construction of your next project.

Prior to painting the plastic pilot figure, insert a 6" loop of soft .05 wire into its hollow base. Reach inside the hollow base with long-nose pliers and bend and twist the wire until it is completely hung up on the interior cavity of the pilot figure. Support the pilot figure in clay, with its hollow base upright and fill the cavity with a small amount (about 1/8 oz.) of Sig Expandable Polyurethane liquid foam. (See accompanying sketch.)



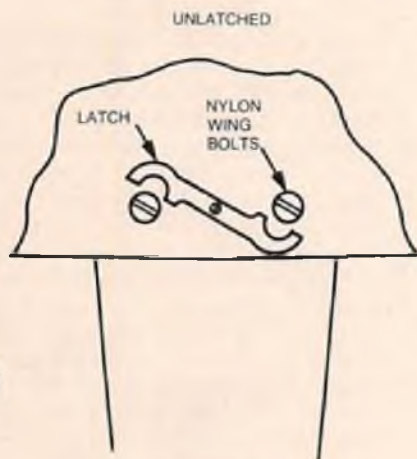
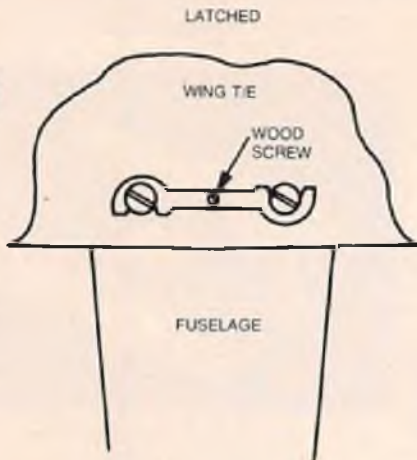
When the foam has hardened, the wire is securely bonded into the pilot figure. Prior to installation, this wire provides a convenient handle to hold the pilot figure during detail painting. After painting, the pilot is permanently attached to the plane by pulling the wire through a small hole in the cockpit floor, bending the wire over and epoxying it in place.



A clever idea by Ron McDaniels of Terre Haute, Indiana, as the sketch shows, is to take a wine bottle stopper and drill out to fit over some of your small screwdriver handles. It makes them easier to work with, but also can be located on your work bench much faster. (Ed. note: The process to get an unneeded stopper isn't all bad either.)

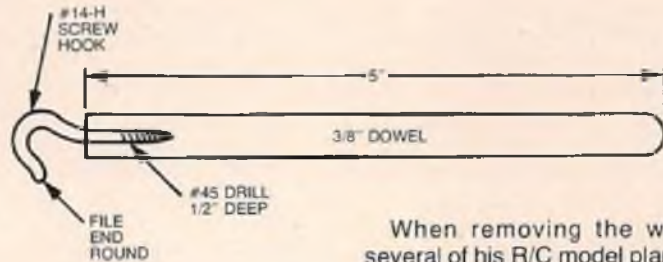
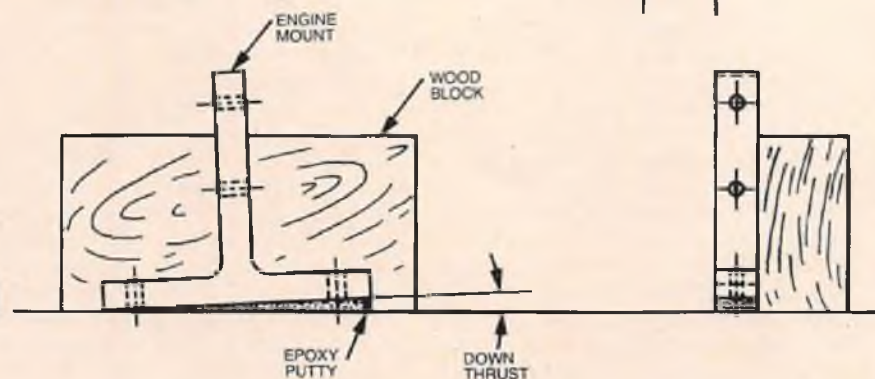
Sam F. DiNoto of Methuen, Massachusetts, sent along his method of attaching the wing to his "Skylark 56." Sam claims it has solved his problems of losing nylon wing bolts, trying to get them started into the threaded block etc. First, enlarge what holes you may have on your wing to allow the heads of the bolts to pass through. Use 1/16"

# FOR WHAT IT'S WORTH



aluminum and cut a latch as shown in the sketch. Sam uses a wood screw for the pivot in the center of the latch and also cement on the threads of the screw. It's a pleasure to loosen the nylon screws about two turns, rotate the latch and remove the wing. A few words of caution: Be sure and tighten the screws before flying.

To achieve the proper amount of downthrust on your engine mount — being individual mounts or round base — the following suggestion was sent in



by Charles L. DeCap of East Moline, Illinois. Per the sketch, first mark the angle of downthrust on a block of wood and wax lower portion. Next clamp engine mount to reference line and follow up with wax paper or Saran Wrap taped to flat surface. Apply epoxy putty to mount and place on wax paper or Saran Wrap to harden. After putty has set up, trim off excess epoxy and drill out mounting holes. Details are shown in sketch.

Bob Zimmerman of Neola, Iowa, found an inexpensive, simple way to fabricate a "long reach" screwdriver for hard to get at places. Simply flatten one end of a length of brass tubing and epoxy the other end into a drilled out handle. Brass tubing comes in various lengths to suit your needs. Also, it comes in various diameters to suit different size screws. See sketch.



When removing the wings from several of his R/C model planes, Denny DeLaroche of Cape Coral, Florida, finds the rubber bands covered with oil and very slippery. Upon taking them off, occasionally the edge of the bands are cut by fingernails or they slip and fly off into space. To alleviate this problem Denny designed this little gadget, as shown in the sketch, to remove the rubber bands. It sure works 100%.

Some clean words from Nelson Chong of Los Angeles, California, who has found that a product called "Wet Ones" (a moist soft cloth towlette), works very well for cleaning your hands and planes at the flying field. They only cost about \$1.30 for a bottle of 70 sheets and are obtainable at most drug stores. They are much easier to carry than large rolls of paper towels and spray bottles of cleaner in our already space-tight flight boxes.

Larry Latowski of Battle Creek, Michigan, tells you how to clean up your act. The best de-greaser and cleaning material for paint and plastic films is sold at the local auto-body supply houses. It is called Dupont's Prep-Sol. A light wiping with this solution leaves a model exceptionally grease-free. Especially useful when patching the plastic films. Larry has never known it to harm a surface finish.

An inexpensive method of weighting down a wing, fuselage, or most anything for that matter, during the building process, is to get some empty milk or water, quart, half-gallon, and gallon size plastic containers. By pouring water in or out, you can vary the weight up to 2, 4¼, or 8½ pounds respectively. Be sure to cap and wipe dry the outside of the container, to prevent water from getting onto the wood surface. This idea was submitted by Roland Chow of Monterey Park, California.

An inexpensive small fuel pump, primer, oiler or glue gun can be made from disposable hypodermic syringes available in assorted sizes at most drug stores. They may be used as is, without needle, or with a piece of fuel line slipped over the end. This idea came from Walter Farmer, Holbrook, Arizona. □

# 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.



## CHANGE OF ADDRESS NOTICE

Bob Violet Models a business primarily oriented towards the development and production of R/C Fan Jet aircraft and accessories, has relocated in Orlando, Florida. The technical nature of these products demands extensive flight testing before release and this is best accomplished on a year round basis. Currently available is the well proven Skyhawk, Skyhawk Fans, various decal markings, retracts, a new "Power Plus" exhaust system. Flight testing of the F-86 F Sabre Jet and its systems is in progress and scheduled for release in the spring. Bob invites your correspondence to: Bob Violet Models, P.O. Box 822, Casselberry, Florida 32707. (305) 677-5044.



## MRC/WEBRA SPEED .61 REAR EXHAUST ENGINE

The new .61 front rotor, rear exhaust pattern engine, Model No. 1030RC is described as the most powerful engine of that size ever developed by MRC/Webra. It is reported to develop 1.85 HP at 16,000 rpm. This new powerplant utilized a Dykes ring, and a massive 17mm crankshaft, large ball bearings, and a thick crankcase. All of which add up to many, many hours of reliable operation, even under the mechanical and thermal stresses of high performance operation. It comes equipped with the new Dynamix slide valve carburetor, which provides

excellent throttle control throughout the entire operating range with none of the usual mid-range sagging problems. For the ultimate combination, the companion 1100/20 tuned pipe is recommended. For further information, see your dealer, or inquire from Frank Ritota, at Model Rectifier Corp. (MRC), 2500 Woodbridge Ave., Edison, NJ 08817.



## BALSA USA SOPWITH PUP

Another great one from that prolific gang out at Balsa USA — this one is an old favorite, the Sopwith Pup, in Stand-Off Scale, for Quadra or similar power plants. It spans 9 feet, with a 21" chord. The height is 34", and the total flying weight is around 27 pounds. The kit includes full sized rolled plans and complete instructions, with 3-views and photos. All parts are die-cut from quality balsa and plywood. A 190 piece hardware kit is included, which contains everything required including cable and brass tunbuckles. A 1 3/2" diameter cowl is included, as are redwood spars, cabanes, struts, landing gear and longeron. The "Pup" is priced at \$119.95, direct only from Balsa USA, P.O. Box 164, Marinette, WI 54143. It is also offered complete with Quadra engine, at \$199.59.



## CHARLIE'S R/C GOODIES MIDGET SERVO

Small in size, but large in quality and features — Charlie's R/C Goodies new Midget Servo is now available. As far as we know, this is presently the smallest servo in production, being only 11/16 x 1 1/8 x 1-13/32" in size, and weighing only .885 ounce. In spite of the small size and dimensions, it develops 5 pounds of thrust, and has a 100 degree operating time of .3 second. The electronics are designed around the proven Signetics NE 544N integrated circuit, with external drive transistors. It is available both

assembled at \$27.95, and in kit form for \$22.95. Order yours from Charlie's R/C Goodies, P.O. Box 192, Van Nuys, CA 91408.



## PRATHER PRODUCTS R/C BOAT RADIO BOX

Prather Products, well known manufacturer of R/C model plane kits, and recently, R/C boat kits, has announced its new epoxy-fiberglass radio box, designed for the new Prather 40" Dee Vee, as well as many other boats. It features tinted Lexan cover, plywood bulkhead, pine rails, and aluminum nut plates. It is especially shaped to safely and securely hold all the radio components, while still providing the necessary clearance for the engine tuned pipe when one is installed. The box is 6 3/4" high, and 5" wide. The highest point, the servo side, is 2 1/2", and the low side tapers from 1 1/4" down to 1/4". Designated as No. 8100, Prather's radio box sells for \$16.95, at your favorite R/C boat supplier. Or contact Prather Products, 1660 Ravenna Ave, Wilmington, CA 90744.



## GIEZENDANNER STAB MECHANISMS

Two interesting items, designed and tested by the internationally famous Bruno Giezendanner are now available here in the US. Both are for improving and simplifying horizontal stabilizer installations. Part No. GMP-900 is a Flying Stab Mechanism, recommended for Don Lowe's Phoenix 8 and similar designs. It is extremely light in weight; less than 1 ounce, uses precision bearings and an aluminum crossbar. Precision nylon crossbar sockets and all instructions and parts are included. Price is \$14.95. Part No. GMP-901 is a

Removable Stab Mechanism, which allows removing the entire stab for easier model transport or storing. It too, is light in weight; less than 1/2 ounce, and is also constructed of precision nylon and aluminum parts. With instructions, only \$8.95. From Giezendanner USA Modeling Products Inc., P.O. Box 818, Pottstown, Pennsylvania 19464.



### "AEROBATIC AIRPLANES" BY REPLA-TECH INT'L

Bob Morrison of Repla-Tech International, has many talents we appreciate; he picks great airplanes to work with, and his drawings and plans are guaranteed to make you wish the workbench was clean so you could start cutting out pieces. Bob has recently put a lot of his material together into a 48 page publication, entitled "Aerobatic Airplanes, Participants at the IX World Aerobatic Championships," which is now available both from retail outlets and direct. This book contains detailed drawings, photos, and descriptive data of the airplanes as mentioned in the name. The price is \$3.95, plus 50¢ postage, if ordered direct, from Repla-Tech Int'l, Inc., 48500 McKenzie Hwy., Vida, Oregon 97588.



### CANNON R/C SYSTEMS G-MARK .061 ENGINES

Cannon Electronics, well known manufacturers of some of the smallest

and lightest R/C systems available, recently announced that it has been appointed US agent for the Japanese manufactured G-Mark glow plug engines. These engines are to be available in both R/C and non-R/C versions, and in displacements of .03, .061, and a twin .061 simultaneous firing twin. The .061 is on hand now. It is claimed to offer good idle, down to 4800, smooth speed transition with up to 16,500 rpm — with a muffler attached. The recommended prop is 6/3, 15% nitro fuel, and a short reach plug. The mounting dimensions are basically those of the Cox .049/.051 Tee Dee's. The G-Mark .061 is priced at \$39.95; the Twin is tentatively set at \$109.95. Dealer and distributor inquiries are invited. For further information send a self addressed stamped envelope, to Cannon R/C Systems, 134200-26 Salicoy St., North Hollywood, California 91605.



### BOLINK'S R/C CAR WHEELS

"If we don't have them, you don't need them," might well be the motto of BoLink/Champion, when it comes to wheels and tires for R/C cars, sport or competition. It offers what is claimed to be the industry's most complete selection of wheels, tires, and donuts; eight different wheel and six different compounds. An illustrated catalog is available, which lists all the dimensions, both in inches and in millimeters. For your copy, send \$1.00 to BoLink Industries, P.O. Box 80653, Atlanta, Georgia 30366.



### BYRON ORIGINAL'S MIG-15

Following the success of its well known Pitts Bipe, Byron Originals is offering a new Mig-15 Ducted Fan model, for .60 power and its own fan unit, the Byrojet. The kit includes everything required to get in the air, with the exception of radio and engine. It

features a hand laid fiberglass fuselage, die-cut wooden parts, and impact resistant injection molded polystyrene foam components which require no shaping. Fan unit, pushrod, radio compartment and thrust tube are factory installed. All control surfaces utilize center hinging, requiring only standard servo power for proper operation.

The fan unit is lightweight, yet rugged, made from glass filled nylon, and mates perfectly with most Schnuerle .60's and requires only low nitro fuel. A special starter extension is required to crank the mid-fuselage fan installation — it, too, is furnished. The Mig-15 is scheduled to be available in the fall; look for it at your favorite shop, or inquire from Byron Originals, P.O. Box 279, Ida Grove, IA 51445.



### PARMA INT'L 1/12 SCALE R/C CAR BODIES

More goodies for the R/C car fan, these from Parma Int'l, 13927 Progress Parkway, North Royalton, Ohio 44133. Pictured are the Thunderbird stock car, and the Toyota, both in crystal clear lexan. As with most Parma bodies, they are available clear, or painted, in various Parma paint colors. Now at your dealers, or inquire direct.

### MIDWEST MODELS 1/4 SCALE INSTRUMENTS

From all indications, the big birds are definitely here to stay, and we are seeing more and more designs and accessories made especially for them. A recently realized item which fills a definite need is a set of scale instruments imported and distributed by Midwest Model Supply Co., 1354 Naperville Dr., Romeoville, IL 60441. The instruments are manufactured by the well known Modellbau Wanitschek in Germany, and are made in three pieces, a bezel, appropriately colored faces and





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### SHOWCASE '79

from page 77/76

clear plastic lens. To assemble, the adhesive backed face is applied to the bezel, the lens is snapped in, and the entire instrument is then glued on the panel. Simplicity itself, and extremely realistic, with very little time or effort consumed. To simplify things for those of us not that familiar with aircraft instruments, a printed guide is included, which shows which type of face goes with each instrument. Various square and round bezels are furnished, to be



used as required. A total of 21

instruments are included in the package, everything from altimeters to oil gauges. Even sailplane instruments are included, as is a nice little radio complete with tuning knobs and frequency window. The complete set is \$9.95, available now. Look for them at your favorite hobby shop, or order direct from Midwest Model.

### DAVIS DIESEL'S OS .60 CONVERSION

Bob Davis, long time proponent of diesel power, and manufacturer of numerous diesel conversion kit for glow engines announces the availability of his

to page 82

## Help Wanted! Join the Friendly Team

Live and work in beautiful North San Diego County, the garden spot in the USA, only minutes to the beaches and 1-1/2 hours to the mountains and skiing. Enjoy year around outdoor activity. Work with a dedicated group of radio control enthusiasts. Our rapid growth has created openings for machinists, plastic injection moldmakers, mechanical design engineers, and engineering electronic technicians and electronic technician assistants.

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	<u>LIST</u>	<u>SALE</u>
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ALOUETTE 2, fixed pitch, RIGID CONVERSION KIT, no. 2000 R	54.75	<b>42.95</b>
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**HOW TO ORDER:**  
Postage and Handling for USA only: Alouette kit \$5.00 shipping and handling; Jet Ranger kit \$15.00 shipping and handling; all modification kits \$3.50 ea., insurance included. For C.O.D.'s add \$1.00 extra. Visa and M/C orders include: card number, expiration date, and interbank number on M/C cards. Allow time for personal checks to clear. California residents, add 6% sales tax. For faster service call (213) 506-7564 or stop by. For foreign orders write for shipping information.



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Standoff Scale  
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- 16.5# flying wt.
- 1800 sq. in. wing
- 26 1/4" chord at root

- 4 channel radios required
- Designed for .60 engines  
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- Very stable flyer
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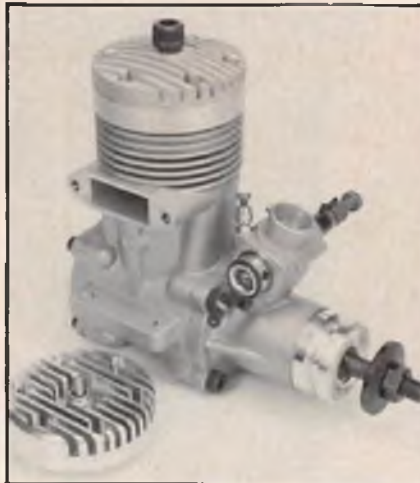
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Twinn-K, Inc.  
P.O. Box 31228 Dept. 1200  
Indianapolis, IN 46231

SHOWCASE '79

from page 78/76



latest conversion. After two years development and field testing, a complete conversion kit for the OS .60 is under production. This conversion is claimed to transform your OS into a power plant free of glow plugs, spark plugs, mags, points, etc., into a true diesel capable of swinging a 16/4" prop at 10,000 rpm, with an idle as low as 1800. It does so with extremely low vibration, and at a flying weight of 1½ pounds, including 8 ounces of fuel. Conversions are also available for the Fox .15 Schneurle; K & B .21; ST. 35; OS .40 FSR; as well as the Cox .020, .049/.051, and .09. For further information and prices, send 40 cents to Davis Diesel Development, Box 141, Milford, CT 06460.



GRANGER WILLIAM'S  
GEE BEE DECALS

Who among us has not at one time or another gazed at drawings or plans of one or more of the Gee Bee and said "Gee, if only ..." add your favorite excuse ... Well, at least one of these excuses has now fallen by the wayside — the markings! Granger Williams now has them for you, on high quality decals, for both the Gee Bee R-1, and the Z. Both are in 2" scale, and each includes all the markings as on the original aircraft. \$4.95 each, postpaid, direct from Granger Williams, 181 Pawnee St., San Marcus, CA 92069.

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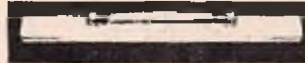
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Build accurate wings  
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**SIG**




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- 45" wingspan
- .09-.15 engine
- 2-3 channel radio

Small sport flyer for fun events! Kit features the convenience of ready-to-use molded foam wing with the strength of a balsa fuse & tail. Build internal fuse sides directly on wood. All quality parts in every kit with step-by-step instructions. Why wait? Order now & get started.

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Saturdays, November 17 & December 8, 1979

### CONTEST:

Entry fee is \$1.00. Models must be on display no later than 11:00 a.m. to qualify. Judging: 1-10 pts., total appearance; 1-10 pts., presentation; 1-10 pts., quality of work. Prizes will be awarded in three classes: R/C, U-control, rubber band. Judging over at 1:00 p.m., results announced at 2:00 p.m.

### SWAP MEET:

Any model builders who have models or merchandise they wish to buy, sell, trade or swap can get a table for the day for \$2.00. Advance tickets can be purchased for \$1.00 from Big Bash or your model airplane club. Clubs can return any unsold tickets for full refund. Clubs can buy tickets for 50 cents each.

For Further Information, Contact:

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## HERE'S HOW

from page 68

to the entire framework. This will seal the wood, inhibit the return of the moisture, and reduce the bubbling and wrinkling later on. Incidentally, the pin holes will not show through the covering. Permagloss also hides wood grain and slight imperfections much better than the plastic films. And, it's ten times stronger!

Another neat wrinkle I ran across was to cover the seams with a strip of Permagloss with pinked edges. Normally the seams are placed on the underside where they cannot be seen from the top. However, if you look at a full size aircraft, covered with fabric, you will find pinking tape used all over it, mainly to reinforce the seams and cover the rib stitching on the wings and tail surfaces. What I generally do is lay the Permagloss on a table dull side up (glue side), strike off a series of parallel guide lines about 1/4" to 5/16" wide using a soft pencil and cut along each line with pinking shears. Pinking shears are not generally very long so, after each cut, line up the pattern with the preceding cut. Do a neat job and cut the strips long enough to take care of the application. Iron on these strips where all seams occur, covering the seams, especially wing tips, leading and trailing edges of flying surfaces, and fuselage seam joints. You'll be amazed at how much more professional your covering job will appear. Maybe, someday, we can talk the Coverite people into providing pre-cut rolls of pinking tape of Permagloss and Super Coverite. For now, we'll have to cut our own. Drop them a line and ask for their instruction booklet. Better yet, buy a roll of Super Coverite or Permagloss and you'll find one inside. It certainly is super covering material.

The idea presented on the sketch page was sent to us by our good friend Don Grassi of Bedford, Massachusetts. You may remember Don's fine advanced sport pattern design called the Avatar presented in the June 1979 issue of RCM. I had the privilege of doing the plans. Don has designed many other airplanes and sent us this simple method for steering a tail wheel that is **forward of the rudder post**. Don's idea has the distinct advantage of having no internal connections to lose adjustment. Once set up, it stays that way. A simple 360° bend in a threaded (at both ends) rod that fits loosely over the tail wheel arm is all that is required. Of course, the 360° bend must be located so that the

tail wheel arm and rudder are set in "neutral" position. It must also be noted that the amount of throw in the tail wheel can be controlled by the location of the loop with respect to the centerline of the tail wheel. The fuel line slipped over the arm is there to eliminate the metal to metal aspect. Give it a try on your next ship. It eliminates the tail wheel adjustment once installed. □

### PIT STOP

from page 67/66

- |                   |         |
|-------------------|---------|
| 7. Roger Curtis   | Assoc.  |
| 8. Kevin Orton    | Leisure |
| 9. Jeff Rold      | Assoc.  |
| 10. Paulo Catucci | Leisure |

All of the Main event motors were opened up by the Tech Committee consisting of ROAR President Rick Perry, Gary Kyes and Mike Reedy. Motors were checked visually for compliance to ROAR rules and the 1st Place motor was unwound and the turns counted on each pole.

### 1/12 6 CELL STOCK CLASS

This is also a 6 cell Can Am Outdoor class using stock motors but allowing modified chassis, ball bearing axles, wheels, etc. That man, Kent Clausen, continued his fast ways by being Top Qualifier again and increasing the lap total to 33 laps, again, with a **stock** motor!! What's so amazing about Kent is that he's only been racing less than a year, but he has the perfect line and just doesn't make mistakes when he's out in front. Jeff Rold was 2nd qualifier with 32 laps and I was in the same heat with Jeff, also turning 32 laps and 8 seconds behind Jeff. But I was only 5th qualifier. Qualifying was so close, that between Jeff and I came Roger Curtis, 3rd, and Mike Lavacot, 4th. These electric races are really close. Gary Kyes got a 5' jump start to begin the Main Event and with that much head start you're guaranteed getting through the first corner untouched, and Gary put the advantage to good use. After the cars got sorted out going through the first corner, 17 year old Mike Lavacot was in hot pursuit of Kyes. It took Lavacot a few laps to catch Kyes and then he just sat on Kyes tail waiting for the right moment to pass. It took a few laps, but Gary went a little too wide in a corner. Lavacot slipped by to take the lead. In another couple laps Kyes was passed again, this time by Curtis Husting. But one of the most amazing performances was going on by Kent Clausen. At the start of the race nine cars went forward and one went backwards!! Kent uses special connectors (no more) and he plugged his motor in backwards. By the time Mike Reedy realized what was happening, and plugged the motor in correctly, Kent was almost one lap down. But then he drove so well he worked his way all the way up to 4th Place behind Kyes.

## A letter to you from Dave Platt...

**dave platt models inc**  
 6940 NW 15 ST PLANTATION FLORIDA 33313 305/587-4861  
 July 1979

Dear Modeler

Attending many shows and contests, I am frequently asked questions which indicate there remains some confusion about Dave Platt Models Inc. and its products. To clarify the matter, preserve my reputation, and help my customers receive a genuine Dave Platt kit, let me state the following:

- My company is Dave Platt Models Inc. and it has no other name. I own and operate this company totally, and no other person or company has any interest, financially or otherwise. I have no connection with any other company in the model trade.
- I no longer produce my early kits of the Spitfire, T-28, PW-190 and Waco; I do make kits for the DUELLIST Mk. 2 (a pretty twin for newcomers), the SOLOIST (a single-.60 version of the Duellist Mk. 2), the JUNCOPISTER (a 1/4-scale biplane for .60 to .90's), the Y-LOCK BIZ SYSTEM for 1/6 to 1/4-scale models, and the NO 1000 1/5-scale for .90's or geared .60's. I also have a couple more new designs in development.
- My reputation for the finest models in RC scale has been founded upon careful and innovative work over a period of twenty years. I take pains to protect the good name that you've given me, but any reputable producer's items are subject to the ultimate flattery of imitation. If one of my models is copied by another manufacturer, make an educated choice.
- Since I will not sell any of my products through the trade, a current kit offered by any trade outlet cannot be a Dave Platt kit.

Fortunately, there's one infallible way to be sure of getting one of my kits - get it directly from me! In fact, this is the only way to get one. I make each kit, sign it, and am personally responsible to you for it. Only a genuine Dave Platt kit is your guarantee of expert design and certain success.

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Lavacot continued on for the win with Curtis 2nd, and Kyes 3rd.

### 1/12 6 CELL STOCK CLASS

- |                   |         |
|-------------------|---------|
| 1. Mike Lavacot   | Assoc.  |
| 2. Curtis Husting | Assoc.  |
| 3. Gary Kyes      | MRP     |
| 4. Kent Clausen   | Assoc.  |
| 5. Jim Aguirre    | Parma   |
| 6. Jeff Rold      | Assoc.  |
| 7. Mike Rowland   | Assoc.  |
| 8. Gene Husting   | Assoc.  |
| 9. Eric Hahn      | Jerobee |
| 10. Roger Curtis  | Assoc.  |

### 1/12 4 CELL STOCK CLASS

The 4 cell cars are normally run indoors and they were scheduled to run indoors at the Hylton Hotel, until when, at the last minute, the Hylton decided to charge rent for the hall which was supposed to be free. The rental fee was impossible, so the indoor races were held outdoors.

The MORCAR club set up the indoor track which really looked small after running on the modified 1/8 track. It was only 60' long, which is the same size it would have been indoors, but it looked so small outdoors. Roger Curtis, Mike Rowland and I had made all the Mains so far, but we all agreed we weren't any competition for these younger racers who were dominating the winner's circle. When we saw this small track we thought we had it made. We figured the reason we weren't competitive enough was the outdoor track was too big for us to see as easily as the younger drivers. Standing on top of the drivers' stand we could see every last square inch of this small track, so now we'd show them some real driving!

I was up among the first group and really did fantastic, or so I thought! I cut all the corners within 6" to 10", never got stuck in the boards, passed cars left and right without touching them and easily won my heat, turning 33 laps. I was pleased with my performance. Roger turned 32 laps in his heat and Mike had 31 laps. Our logic certainly was working — until Curtis Husting ran, that is. I'm not absolutely certain about this, but I think that small track must have looked small to Curtis too. Otherwise, how could he have possibly turned 36 laps? Just because he cut all the corners within 1" never making a mistake, making it look so easy. On top of that, Kent Clausen turned 35 laps and Jeff Rold turned 34 laps and Mike Rowland didn't even make the Main. So much for our logic!

We were getting ready to start the Main and it started to cloud up. Rick Perry was hurrying everyone up to the starting line to beat the rain while explaining if we got half the race in it would be official, otherwise we'd go by qualifying times.

The race started and Curtis took off in the lead with Kent Clausen in second. There was quite a bit of talking going on among the drivers, but I would hear Curtis chanting, "C'mon rain, C'mon

to page 90

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### PIT STOP

from page 88/66

rain," over and over again. The wind picked up and 3 minutes into the race it started to rain. I yelled out "It's raining up here," but Rick was below the driver's stand and still dry and he said, "Keep racing, there's only 45 seconds left to the halfway mark." So we kept running. By the halfway mark, there was a torrential downpour going and Rick called the race official. Incredible!! The first time in history an indoor race was rained out! Curtis was in first, Clausen 2nd, and Joe Alves in 3rd.

This was a stock motor class and Curtis' motor was unwound and found to have 34 turns of wire on 2 poles and 35 turns on the 3rd pole. The rules call for a minimum of 35 turns. The Igarashi factory has obviously made a mistake in winding this motor. In our local races we would have declared this motor within tolerance, knowing one turn more or less will not make a noticeable difference in a motor's performance. But for a National event it must be 35 turns, so Curtis' motor was disqualified. It's a tough way to get disqualified on someone else's mistake, and after such a fantastic driving performance, but it had to be done this way. This moved Clausen into First Place and his motor was unwound and was okay.

#### 4 CELL STOCK CLASS

- |                    |              |
|--------------------|--------------|
| 1. Kent Clausen    | Assoc.       |
| 2. Joe Alves       | Speed Design |
| 3. Gene Husting    | Assoc.       |
| 4. Mike Lavacot    | Assoc.       |
| 5. Jim Welch       | MRP          |
| 6. Eric Hahn       | Jerobee      |
| 7. Jeff Rold       | Assoc.       |
| 8. Roger Curtis    | Assoc.       |
| 9. Gary Kyes       | MRP          |
| 10. Curtis Husting | Assoc.       |

Would you believe two more indoor races got rained out? We were

supposed to run the final two indoor races — outdoors, on Saturday, but it rained all day Saturday, so the two races were cancelled.

I believe all the racers would like to thank all the MORCAR members, and especially Tim Wilson, for doing an impressive job in staging the Nationals. □

### PITTS S-2

from page 64

... by sanding, then back to the basics of silk and dope for the final covering. I did not feel that the plastic type finish would do the airplane justice. Besides, I wanted to peel dope off the fingers once again. My choice was Royal Siron and Aero Gloss clear dope followed by acrylic lacquer for the color. Black fuel line was split and used for cockpit and windscreen. Much thinking went into the paint scheme. Who wants an everyday Pitts type finish! The result was as the pictures show (yellow, white with black pin stripe tape), quite impressive! Overall weight at this time with no gear was 6 lbs.

#### Engine:

I went with a Kraft .61 plus a Tatone Manifold #EM-3 which allowed a scale type exhaust system out the bottom of the cowl. A 12 oz. round fuel tank installation did not crowd anything in the front end. Access holes were drilled in the cowl for the needle valve and glow plug. There is more than enough room for any size .60 engine.

#### Radio:

Radio room is more than enough. In fact, you could install a back-up system if you so desired, honest! It was a pleasure to work on a scale airplane with that much room. Figure on a lot of foam around the receiver and battery pack, as

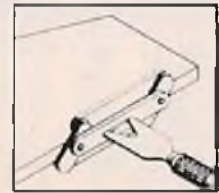
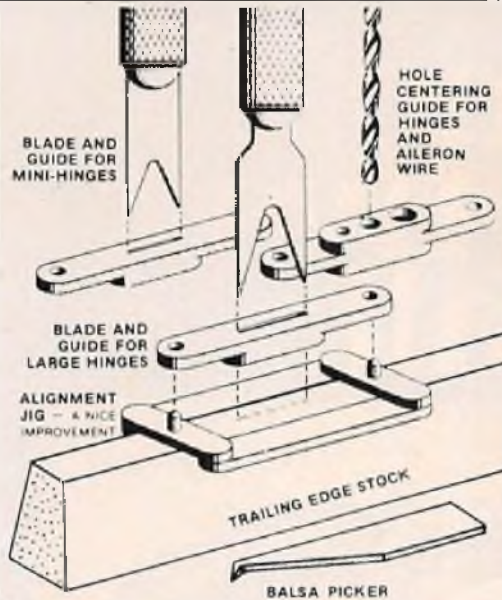
to page 92

# KWIK-HINGE SLOTTER

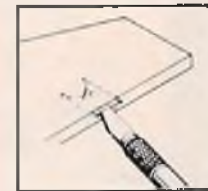
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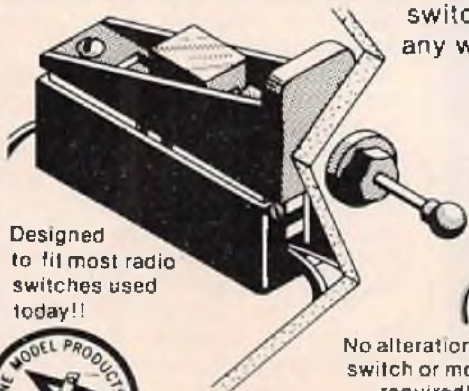
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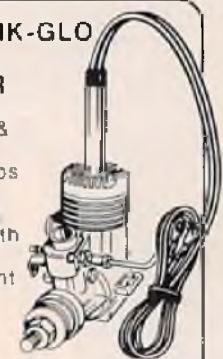


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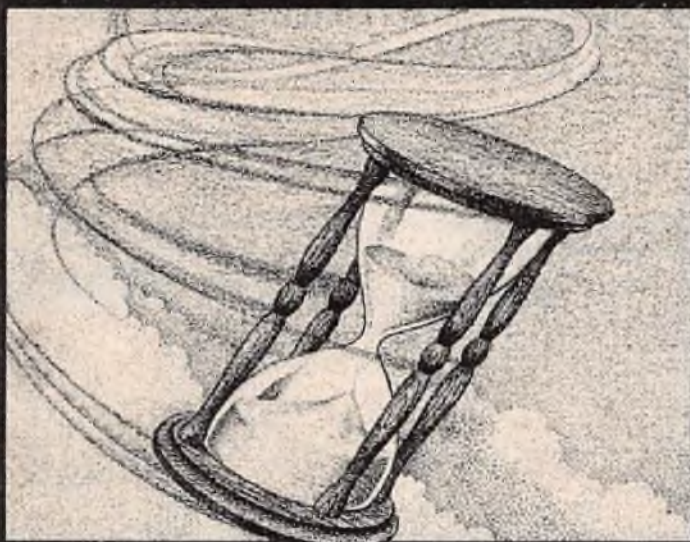


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## PITTS S-2

from page 90/64

there is a lot of space up there. I used a Kraft Series 75-7B radio with KPS-14 servos. All were installed in trays as per the manufacturer's instructions.

### Flying:

So here we have a good looking airplane and pilot (?) but are they worth a darn? Yes, to both! The extra 5" or so over the standard Pitts make this model a lot easier to fly (yes, I've flown the one-holer). Not at all sensitive on the elevator, if the C.G. is as shown on the plans. Ground handling is good to excellent. Not like a pattern type airplane, it is honest and predictable in the air and especially so on landing.

### Conclusion:

While this kit shouldn't be suggested as your first R/C project, it is a snap after you have a bit of experience. Royal is to be commended as this kit is excellent as is the complete Royal line. Try a two-holer. We think you will like it and it is more fun with a two holer! □

## BIG IS BEAUTIFUL

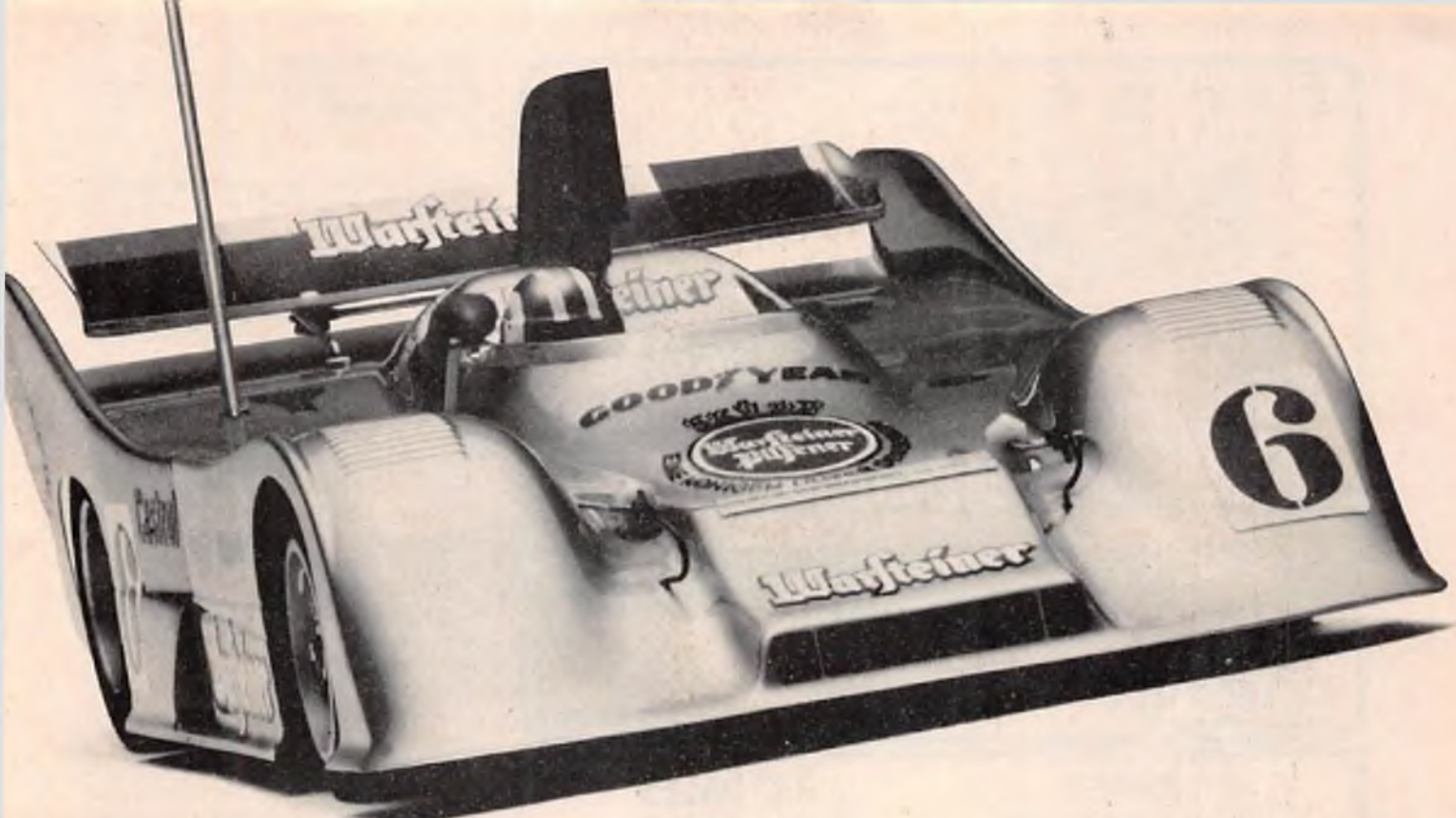
from page 63

current retail prices, you'll discover that my spruce is a real bargain! Not to mention the fact that it is absolutely perfect wood, with nothing to throw away except the sawdust, and even that's too nice to discard! (My source is Sport Aviation, E2651 Number 3 Road, Richmond, B.C. Canada V6X 2B2.) I suspect you will find that there are suppliers to the homebuilt market all over the country and that they would be able to supply the wood you need if you cannot find anything locally that suits your purpose.

I use the spruce for longerons and for the normal things we'd use strip wood for. I have used cedar for leading edges, and such items, in that it is a bit softer, lighter and, therefore, works a little easier than the harder spruce.

For filler blocks (i.e., wing tips, cowl blocks and that sort of thing) I prefer to use polyurethane foam. Sig sells this as a two solution material that makes about 25 times its original volume in a foam that will accept fibreglass resin right on top of it. Handy for finishing and a lot less trouble than trying to find large (and expensive) chunks of balsa for the same purposes. This material is used as an insulation and should be readily available almost anywhere. It can be gotten in sheets or in the two liquid form which is great for making small bits you need and even for filling areas which you feel need a bit more support from the

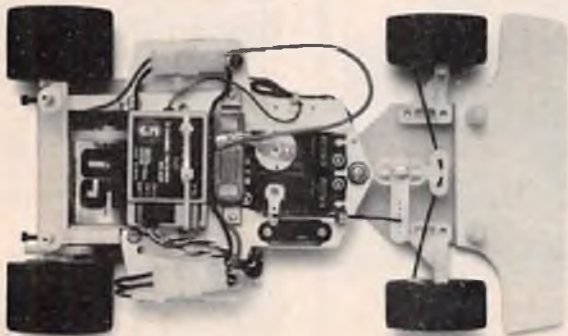
to page 94



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## GO RACING WITH THE TEAM.

If racing is the name of your game, take to the track with Team Associated. In RC car competition, from Southern California to the South of France, we've built a track record that includes the World Championships and over a dozen ROAR National Titles.



The Nats-winning RC12E features die-cut fiberglass chassis, lightweight racing wheels and tires, tough glass-filled nylon pillow blocks and complete, detailed instructions including racing tips from Gene Husling and Roger Curtiss. Approved for ROAR competition.

### THE RC12E'S TRACK RECORD AT THE NATS

ROAR Nationals Expert Class 1:12 Scale Electrics				
		Production	Stock	Modified
1978	4cell	No event	MRP	RC12E
	6cell	No event	RC12E	RC12E
1979	4cell	No event	RC12E	No event
	6cell	RC12E	RC12E	RC12E

\*4 cell cars run indoors, 6 cell cars outdoors. Chart shows all expert class main events under official ROAR sanction since the RC12E was introduced.

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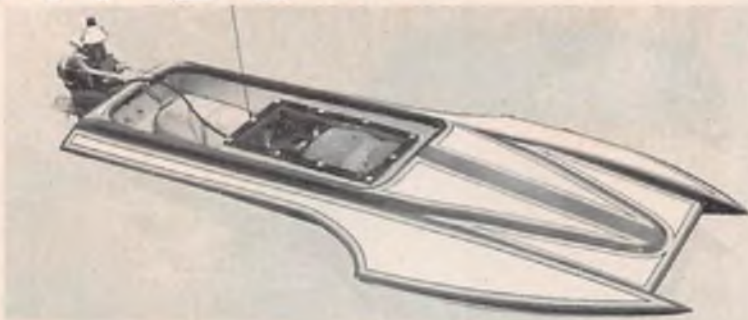
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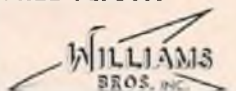
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**BIG IS BEAUTIFUL**

from page 92/63

inside. Be careful that you do not confine this mixture while it is foaming up though, as it will develop tremendous internal pressure and tear things up pretty good!

Wing ribs don't really require a lot of strength (except where they are part of wing mounting); fuselage formers the same except where they support the loads of landing gear and engine mounting, so most of mine are made up from mahogany door skins. They are cheap as dirt (approximately \$1.49 each, on special and with some slight damage) and a couple of them will build a lot of wing ribs and formers!

Where real strength is required, it's hard to beat ordinary plywood, the same stuff you'd use to handyman around the house with and if you are using it for a firewall, lay a layer of glass cloth and resin on it and you'll find it's more than adequate.

Preparing the strip wood can be done on any radial arm or table saw. (It's a bit of an overkill to use a radial arm saw for



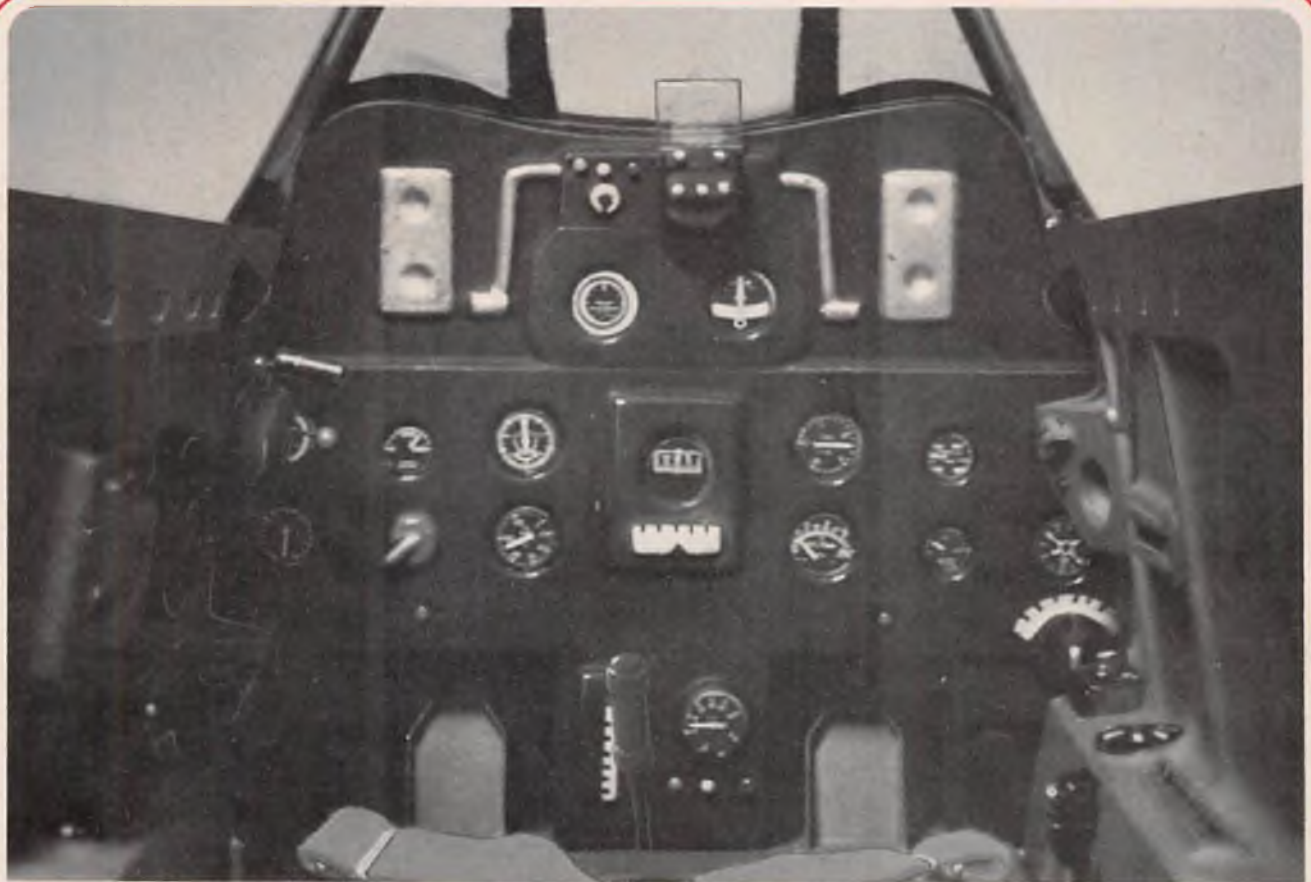
Charlie Mills' Quadra powered big model. Designed by Charlie Mills and Harvey Hill and called the Hill-Mill Special. No performance data available although it has flown.



Jim Messer of the STARS designed and built this Ercoupe and has both plans and a soon to be available kit. Coupe has bags of hours on it and flies very well from all reports. Jim flew it prior to painting and it is obvious the paint job improved its looks!



Stinson Voyager by Art Lane. 101" span, designed for the Quadra, plywood and cedar construction - not yet flown.



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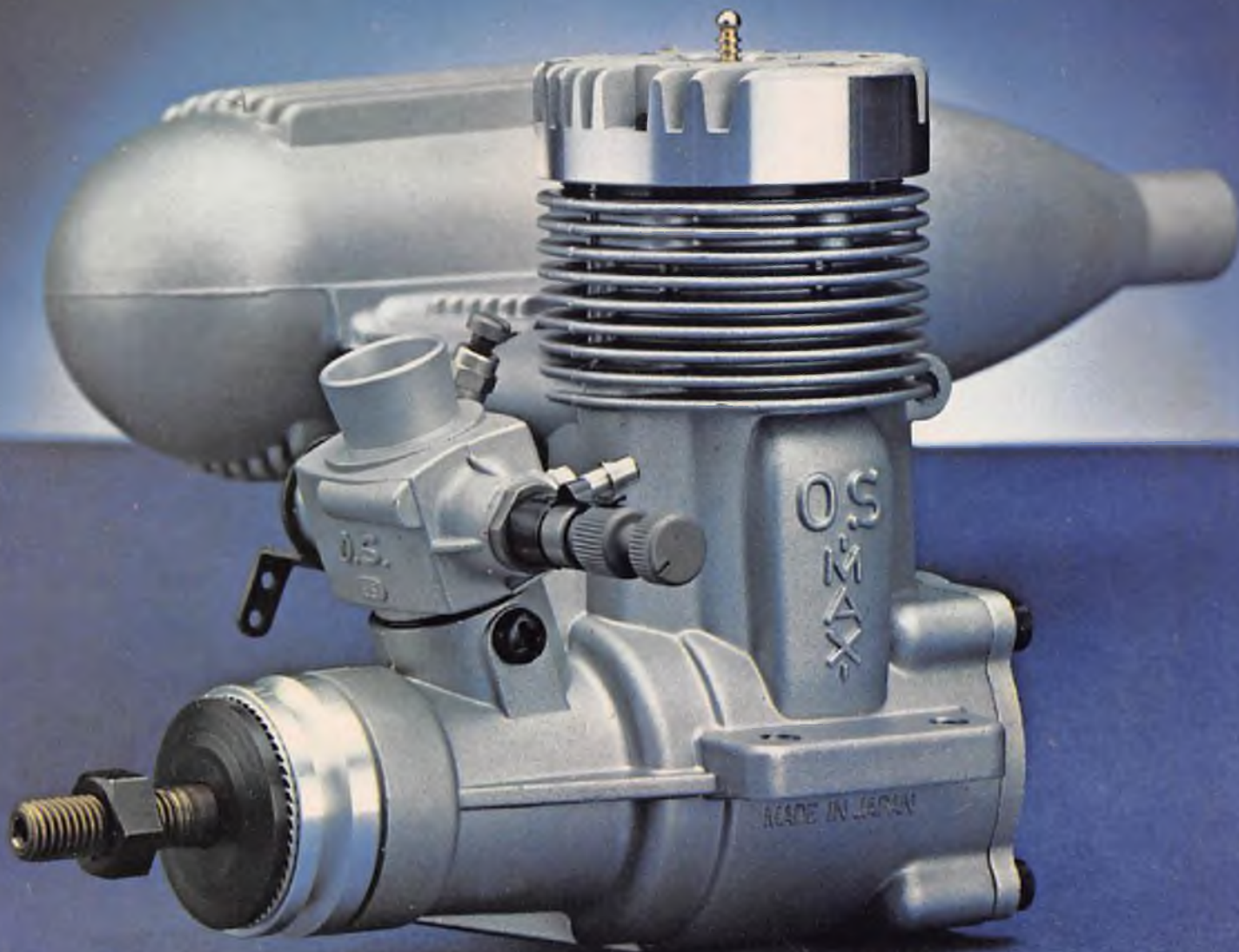
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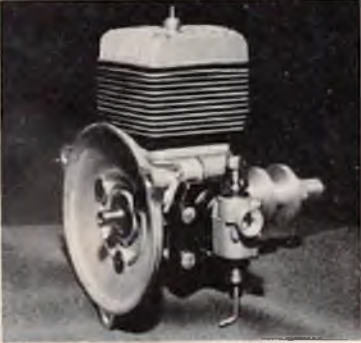
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## BIG IS BEAUTIFUL

from page 94/63

cutting 1/4 square stock, but it works!) I prefer a radial arm saw as it is a bit more versatile (especially for the amateur) and it takes up less room in the shop. I use planer blades (hollow ground ones) and if they are kept sharp, they'll produce usable wood right off the saw.

The smaller sizes tend to chatter a bit and it is necessary to provide for a means of holding them tight to the table and to the rip fence to prevent this chatter as it is both dangerous and beats

the wood up pretty badly. One of these days, I'm going to get around to making myself a couple of spring loaded arms with a bearing on them --- the bearing to be held against the side of the wood, trapping it against the fence, and one to do the same thing from the top, holding the wood against the table. For the moment, I just clamp a couple of scrap pieces of the wood to the fence, one ahead of and one behind the blade, which hold the wood being ripped down against the table. It works well for me and keeps the wood from being chewed up as it goes through the saw. I have cut right down to 1/8 x 1/8 using this method. Just be careful, fingers are hard

to replace and you should wear eye protection as well since you are working fairly close to the blade at times.

Cutting wing ribs and formers from the mahogany door skins is no different than we have always done --- it just takes a bit more effort.

Actual construction does not differ greatly from what we have always done, with a couple of extra steps. Driving pins through the spruce is not as easy as doing so through balsa, so I cut a small piece of brass tubing, sufficient sized ID to take the pins I use, and cut it to length. This length being about 1/8" shorter than the pin and less the thickness of the

to page 100

# MIRAGE

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As featured in Feb '79  
R/C Modeler



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Surface loading	4.43 oz./sq. ft.	4.29 oz./sq. ft.



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from page 98/63

material I am building with. The pin placed inside the tubing can then be driven right through the construction material into the building board. Then remove the pin, take off the piece of tubing and replace the pin. It's a little time consuming, but so is driving several pins into the same hole and throwing them away until you get one through!

Now, referring to the sketch in Figure 1, after you have built the fuselage sides,

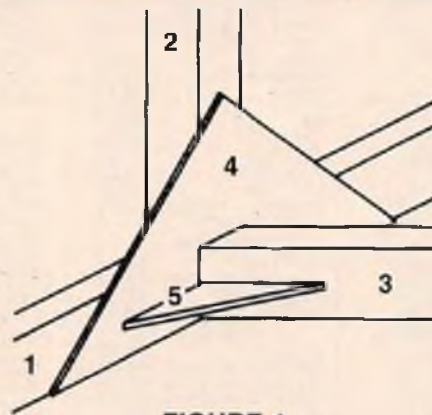


FIGURE 1

apply small plywood gusset plates at every joint. These can be either inside or outside the fuselage depending on what you are building. A fuselage with stringers running along the sides to hold the fabric off the fuselage side panel will accept them outside and they won't show after finishing. Otherwise put them inside as shown (#4 in the sketch).

#1 is the bottom fuselage longeron, #2 is the vertical joiners between the top and bottom longeron and #3, the cross members joining the fuselage sides. Adding the gusset #4 adds significantly to the glued surface and also provides a shear prevention across the joint between 1 and 2. Once the crosspiece is

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in place, a pair of gussetts (#5) can then be added front and rear and you will have a very strong joint which won't show through the covering material. I make the side gussetts out of scrap 1/32" plywood (never throw anything away, no matter how small, right?) and the bottom gussetts out of 1/8" ply, usually scraps of the door skins.

Sure it's a bit tedious doing this, but it sure is strong. The confidence you'll feel at flying around with them in place is worth all the time it takes to do it.

I use the same glues we have always used, the epoxies, and Wilhold or any good aliphatic resin type glue. They work fine with the woods I have

mentioned and if you do your gusseting properly, you'll have the strongest fuselage you have ever built.

On models where the plan calls for balsa filler pieces between the fuselage framing members, this can be done with any GIS (Good One Side) plywood and will provide greater strength with a slight increase in weight over the balsa originally called for.

Firewalls deserve some extra attention on the big birds. Where possible, back them up with triangular stock (you can cut this out of cedar scraps on your saw) and then glass them into place to be extra safe. If that firewall pulls out, you are using too big of

an engine!

Covering and finishing were covered in a recent column so should not require any additional information. You can use any of the conventional covering materials, they all work okay.

Landing gear is a whole subject by itself, and I'll do that next column, with some solutions which have been tried and which seem to work.

Much of what is contained in this issue has been mentioned in the past, but a little review now and then doesn't hurt and the newcomers to Big Is Beautiful will benefit from the information.

★

to page 112

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PERRY PUMP &  
CARB NO. 8360**

**35%  
OFF**



Features Perry Pump/Regulator and a larger Perry Carb specifically designed to be used with the Pump/Regulator system. Adds 1000 RPM's!  
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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! Body and radio (requires a 2 ch. radio) are not included. Fiberglass chassis.  
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Span 41 1/2". Requires a .19-.35 size engine & a 3 to 4 channel radio. Includes molded foam wings, cowl & wheel pants, decals, pre-bent wire cabane parts, maingear, instructions and 3 ch. hardware. Also included are templates to paint the distinctive color scheme.  
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WING AND FUSE  
JIG**

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TABLE SAW**

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A.R.F.**

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OLYMPIC II**

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MARINE WITH  
TUNED PIPE**

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RETAIL NOW ONLY \$28.78  
\$47.98 RCM020

**K&B .40 RC ENGINE  
No. 8011** 40% OFF



THE MOST  
POPULAR RC  
ENGINE EVER  
MADE!!

Features a unique design for high power; and a Irvine carburetor for excellent throttle response and easy adjustment - from a slow smooth idle to a roaring top speed.

RETAIL NOW ONLY \$43.48  
\$72.50 RCM009

**LATRAX CORVETTE  
W/RADIO** 31% OFF

Won a 1st & a 2nd in the ROAR NATSI



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 \$109.98  
\$159.95 RCM244

**GOLDBERG  
SKYLARK 56  
MK II** 40% OFF



Extensively improved construction, strength, and flight performance! 56" span. Requires a .30-.40 size engine and a 4 ch. radio. This fun to fly balsa sport plane has pattern capabilities. It makes a great low-wing trainer.

RETAIL NOW ONLY \$29.98  
\$49.95 RCM025

**SULLIVAN ELECTRIC  
STARTERS**



Hi-torque, hi-rpm 12 v. starters. These heavy duty, long life starters develop more torque and rpm's than any other starters!

RETAIL NOW ONLY \$24.98  
\$38.95 RCM026  
Dlx. model has V-groove in drive cone for starter belt. Starts copters, airplanes, boats, and cars.

RETAIL NOW ONLY \$27.28  
\$41.95 RCM182

**BOLINK  
ELECTRIC CAR**



This 2 ch. 1/12 scale electric car comes already assembled with .05 motor, nicads, & charger. Goes over 25 miles per hour!

RETAIL NOW ONLY \$79.98  
\$99.95 RCM027  
Bolink kit for above car - must be assembled. BLX-1355.

RETAIL NOW ONLY \$59.98  
\$79.95 RCM280

**CRAFT-AIR  
FIELD BOX** 33% OFF



It's ready to use, not a kit, made of lightweight indestructible polyethylene. 22" long & holds everything. A SUPER BUY!

RETAIL NOW ONLY \$19.98  
\$29.95 RCM028

**CRAFT-AIR  
HI-START  
HEAVY DUTY** 34% OFF

Features reel, tubing, towline, parachute, stake, tow ring, and strong construction. For sailplanes of 100" wingspan and larger.



RETAIL NOW ONLY \$32.98  
\$49.95 RCM029

**CRAFT-AIR  
DRIFTER II** 30% OFF



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.

RETAIL NOW ONLY \$13.98  
\$19.95 RCM214

**S & O BATTERY  
TESTER** 33% OFF



Tests 8 cell transmitter and 4 cell receiver nicad packs under load. Extremely accurate scales. Detects bad cells and/or abnormal current drain.

RETAIL NOW ONLY \$19.98  
\$29.95 RCM031



# TOWER

P.O. BOX 778  
CHAMPAIGN, ILLINOIS 61820

THESE SPECIALS ARE GOOD UNTIL THE 15th OF THE MONTH OF THIS ISSUE, ONLY.  
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**PEERLESS 1/12  
ELECTRIC RC  
PORSCHE TURBO**

**52%  
OFF**



**LOWEST PRICE EVER!!**

This 1/12 scale Super Sports Porsche speeds over 25 m.p.h! Requires a 2 ch., 2 servo radio system. Includes factory assembled chassis with high powered motor installed, and pre-painted body with decals. **RETAIL NOW ONLY \$54.98 \$115.00**

**RCM344**

**PEERLESS NI-CAD 46%  
QUICK CHARGER OFF**



The Peerless Super Ni-Cad Quick-Charger is made specially for Peerless Super Ni-Cad batteries & can be charged by a 12 v. battery. Features a 15 minute timer with a safety resistance factor incorporated. **RETAIL NOW ONLY \$14.98 \$27.95**

**RCM345**

**COX TD .049  
STD. ENGINE 40%  
OFF**



A super hot 1/4A engine ideal for free flight, control line, 1/4A RC, and more. **RETAIL NOW ONLY \$14.98 \$24.95**

**RCM035**

**PICA BUCKER 30%  
JUNGMEISTER OFF**



A new model biplane perfect for stand-off scale. This all balsa kit will accept any .40-.60 size engine. 60" span. Features mylar decals, plastic cowl, and wheel pants. Its ready-to-fly weight is 7 pounds. **RETAIL NOW ONLY \$69.98 \$99.95**

**RCM340**

**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 \$8.95**

**RCM038**

**MONOGRAM RC 40%  
LEOPARD TANK OFF**



Radio included! This 1/32 scale tank is 8 1/2" long. It comes completely ready to run except for three "C" batteries and two 9 v. batteries which are not included. Four pylons are included. Climbs up steep grades. **RETAIL NOW ONLY \$29.98 \$49.95**

**RCM302**

**ANDREWS 39%  
AEROMASTER 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 \$84.95**

**RCM065**

**DA ENTERPRISES 36%  
SERIES IV OFF  
POWER PANEL**



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 \$24.98 \$38.95**

**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 32%  
TRAINER 60 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**

**FOX .40 RC 38%  
SCHNEURLE OFF**

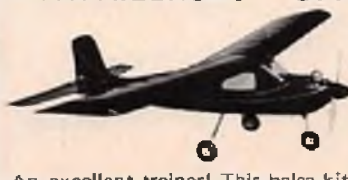
**No.24000**



The economical Fox .40 RC Schneurle features a restyled exterior, steel thrust washer, improved carb suction, and lightweight pistons. Very good power! **RETAIL NOW ONLY \$28.48 \$45.95**

**RCM136**

**SIG KADET 28%  
WITH AILERONS OFF**



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. Aileron accessories included. **RETAIL NOW ONLY \$31.68 \$43.95**

**RCM256**

**LANIER 37%  
COMET II 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 \$40.98 \$64.95**

**RCM047**

**ASSOCIATED RC 39%  
200 & 300 CAR OFF  
KITS**



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**  
NEW!! RC 300 Kit 32% OFF  
**RETAIL NOW ONLY \$129.98 \$190.00**

**RCM301**

# HOBBIES

PHONE  
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ILLINOIS TOLL FREE: 800-252-3336  
CONTINENTAL UNITED STATES TOLL FREE: 800-637-7686

**WOW!**  
**LOOK AT THIS!**

TOWER SIX CHANNEL RADIO

**\$149.95**

WITH 2 KPS-14II SERVOS



**TOWER SIX CHANNEL SYSTEM** - The Tower 6 channel transmitter comes in the popular 2 stick closed gimbal configuration. Standard equipment includes a fully proportional fifth channel; toggle switch sixth channel; choice of 2, 3, or 4 KPS-14II servos, or 4 KPS-15II servos; lightweight slimline high range receiver which is very convenient to install; nicad transmitter battery pack; powerful 550 MAH nicad receiver battery pack; charger; switch harness with external receptacle for charging convenience; servo trays; full servo accessories, and a dual function meter that indicates both RF and absolute battery voltage. The Tower 6 channel system has an airborne pack weight of only 11.9 ounces with 4 KPS-14II servos, and 13.5 ounces with 4 KPS-15II servos.  
**WITH 4 KPS-15II SERVOS - NOW ONLY \$209.95 - STOCK NO. RCM121**

**ABSOLUTELY THE BEST  
RADIO VALUES IN THE  
INDUSTRY!**

**GET A TRANSMITTER NICAD  
BATTERY NOW AND MAKE  
YOUR TOWER HOBBIES 3 CHANNEL  
ALL NICAD! ONLY \$14.98!  
STOCK No. RCM203**



**TOWER THREE CHANNEL SYSTEM** - The Tower 3 channel transmitter comes in the popular single stick closed gimbal configuration. Standard equipment includes a fully proportional third channel, two KPS-14 servos, lightweight slimline high range receiver which is very convenient to install, powerful 450 MAH nicad receiver battery pack, charger, switch harness with external receptacle for charging convenience, servo accessories, and a dual function meter that indicates both RF and absolute battery voltage. The dry cell transmitter (battery not included) can easily be converted to nicad operation by adding a nicad pack. The Tower 3 channel system has an airborne pack weight of only 7.9 ounces.

**STOCK No. RCM204**

**RETAIL \$210.00**

**NOW ONLY \$119.95**



# TOWER

P.O. BOX 778  
CHAMPAIGN, ILLINOIS 61820

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**HOT STUFF 30% OFF**



Hot Stuff is an instant bonding cyanoacrylate super adhesive that is a must for modelers. Stock up now at this super price. .5 oz.

RETAIL ~~\$3.95~~ NOW ONLY \$2.78  
RCM007

**TOWER HOBBIES 48% OFF**  
**R/C LONG GLOW PLUGS**

These excellent glow plugs feature an idle bar. Made by the world's finest plug manufacturer especially for Tower. 6 plugs per package.



The best buy anywhere!  
RETAIL ~~\$8.94~~ NOW ONLY \$4.68  
RCM002

**COX READY TO FLY SPORTAVIA 30% OFF**  
**THE PERFECT TRAINER**



This ready-to-fly foam design has been acclaimed by many flyers to be undoubtedly the best trainer ever for the first-flight beginner. Its 70" span, slow flight, and unbelievable stability make it a beginner's dream. It comes complete with a Cox .049 engine and all hardware installed. Molded cavities inside the fuselage are designed so the Sanwa No. 8020 2 channel radio drops right into place. With very little change any 2 channel works great. Factory finished in gleaming white with pressure sensitive decals. No building required. Be in the air in less than 1 hour. Radio not included.

RETAIL ~~\$89.95~~ NOW ONLY \$62.98  
RCM014

**BUD NOSEN 25% OFF**  
**BIG STICK**

**NEW**

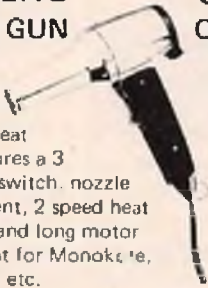


This 1/4 scale giant Ugly Stick makes a great trainer! 8 1/2' span. Requires a 4 channel radio and a Quadra engine. Strong, stable, and easy to build.

RETAIL ~~\$129.95~~ NOW ONLY \$97.48  
RCM346

**TOP FLITE 33% OFF**  
**HEAT GUN**

This fine quality heat gun features a 3 position switch, nozzle attachment, 2 speed heat control, and long motor life. Great for Monokote, Solarfilm etc.



RETAIL ~~\$29.95~~ NOW ONLY \$19.98  
RCM005

**COX/SANWA No. 8020 30% OFF**  
**2 CHANNEL RADIO**



30% OFF

This 2 channel favorite comes with 2 micro servos which will fit into the smallest airplanes, gliders, cars, or boats. It is designed to drop right into the Sportavia and Centurion. 12 pennell batteries are required.

RETAIL ~~\$99.95~~ NOW ONLY \$69.98  
RCM105

**FUTABA 34% OFF**  
**FP-2GS 2 CHAN. RADIO**



34% OFF

One of the least expensive 2 channels available anywhere. It comes with 2 servos and is ideal for cars, boats, small planes, or gliders. Great in the Centurion or Sportavia. Requires 11 pennell batteries.

RETAIL ~~\$109.95~~ NOW ONLY \$72.98  
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 ~~\$72.50~~ NOW ONLY \$46.98  
RCM008

**K&B .21 35% 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 ~~\$107.00~~ NOW ONLY \$69.98  
RCM152

**COX 30% OFF**  
**READY TO FLY CESSNA CENTURION**

30% 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 \$48.98  
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 ~~\$96.50~~ NOW ONLY \$57.88  
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 ~~\$9.95~~ NOW ONLY \$7.48  
RCM255

**DU-BRO 36% OFF**  
**KWIK FILL FUEL PUMP**

36% OFF

RETAIL ~~\$10.95~~ NOW ONLY \$6.98  
RCM010



**WEBRA .61 RC SPEED 34% OFF**  
**SCHNEURLE**



Features the slide valve Dynamix carb which is used by top pattern flyers. The new carb must use pressure (either muff or pump) to run properly. It has a stronger crankshaft & a wider intake port to produce & handle the extra power.

RETAIL ~~\$229.80~~ NOW ONLY \$119.98  
RCM341

# HOBBIES

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(217) 384-1010

ILLINOIS TOLL FREE: 800-252-3336  
CONTINENTAL UNITED STATES TOLL FREE: 800-637-7686

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*Radio  
Sale!*

MODEL	RETAIL	NOW ONLY	STOCK NUMBER
<b>KRAFT KRAFT KRAFT KRAFT KRAFT KRAFT</b>			
KP-2AW (Wheel) w/14IIA's	\$139.95	\$94.98	RCM080
KP-2AW (Wheel) w/15IIA's	145.95	98.98	RCM267
KP-2A (2 Stick) w/14IIA's	139.95	94.98	RCM081
KP-2A (2 Stick) w/15IIA's	145.95	98.98	RCM268
KP-2AS (1 Stick) w/14IIA's	139.95	94.98	RCM082
KP-2AS (1 Stick) w/15IIA's	145.95	98.98	RCM269
KP-3AS w/KPS-14IIA's	149.95	99.98	RCM328
KP-3AS w/KPS-15IIA's	155.95	104.98	RCM329
KP-4A w/KPS-14IIA's	309.95	196.98	RCM083
KP-4A w/KPS-15IIA's	321.95	204.98	RCM270
KP-6A w/KPS-14IIA's	339.95	216.98	RCM084
KP-6A w/KPS-15IIA's	351.95	224.98	RCM271
KP-5C w/14II's or 15II's	389.95	259.98	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
KPS-14I Servo	44.95	32.98	RCM089
KPS-15II Servo	44.95	32.98	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
KPS-20 Ball Bearing Water Resistant Servo	49.95	38.98	RCM330
<b>FUTABA FUTABA FUTABA FUTABA FUTABA</b>			
FP-2GS	109.95	72.98	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	144.98	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-7 Servo	39.95	29.98	RCM104
S-16 Servo	39.95	29.98	RCM103
S-18 Servo	29.95	22.48	RCM247
S-20 Servo (Mini)	39.95	29.98	RCM331
<b>SANWA SANWA SANWA SANWA SANWA SANWA</b>			
No.8020 2 Channel	99.95	69.98	RCM105

STOCK NUMBER	DESCRIPTION	RETAIL	NOW ONLY
RCM209	Bridl Dirty Birdy 40 - wood	\$59.95	\$40.78
RCM353	Bridl F-7 Tigercat - glass	198.95	142.98
RCM118	Bridl Super Kaps 60	69.95	47.58
RCM034	Bridl Trainer 40	54.95	37.38
RCM061	Bridl UFO	129.95	89.98
RCM127	Cox Tee Dee .09	26.95	18.88
RCM126	Cox Tee Dee .051	24.95	16.98
RCM312	Craft-Air Piece O'Cake	24.95	17.48
RCM354	Dramel No. 210 Drill Press	23.95	17.98
RCM351	Dumas American Enterprise	75.00	49.98
RCM220	Dumas Competition DV-60 - glass	105.00	66.98
RCM355	Dumas DV-10 - glass	22.50	15.78
RCM219	Dumas Hot Shot - wood	33.50	21.78
RCM318	Dumas Sail Control Unit	55.00	39.98
RCM132	Fox .15 RC Schnourle	37.95	22.78
RCM133	Fox .19 RC	36.95	22.98
RCM320	Fox .35 U/C Engine	26.95	17.98
RCM135	Fox .36 RC	39.95	25.98
RCM234	Fox 1.2 cu. in. Twin	250.00	174.98
RCM321	HB .15 RC BB w/Muffler	43.23	31.98
RCM142	HB .40 RC BB PDP No. 4200	84.34	61.98
RCM143	HB .61 RC BB PDP No. 6300	119.26	87.68
RCM324	Hi-Flight Mirage Glider	59.95	41.98
RCM287	House of Balsa P-51D .40	64.95	39.98
RCM298	Jet Hangar .40 Ducted Fan	69.95	56.98
RCM046	K&B .19 RC	50.00	32.48
RCM153	K&B .21 Inboard Marine	74.00	47.98
RCM151	K&B .40 RC Sport Marine	82.50	52.98
RCM342	K&B .40 RC RE Schnourle w/Muff	110.00	69.98
RCM223	Lanier Jester	74.95	46.98
RCM224	Lanier Transit	47.95	30.68
RCM023	L.R. Taylor Power Pacer 9.6 v.	59.95	46.98
RCM156	Mark's Bushwacker w/Accessories	52.95	33.98
RCM157	MEN Trainer (.15-.25)	31.95	22.98
RCM356	Miller No. 2134 Spray Set	95.95	57.58
RCM068	Monokote Reg & Trans 6' Rolls	9.00	5.38
RCM067	MRC RTF Cessna w/Enya .35 RC	449.95	277.48
RCM077	MRC RTF Cherokee w/Enya .40 RC	499.95	314.98
RCM242	Ohio Suporstar Softglas Qt.	9.95	7.98
RCM357	OPS .60 RC Marine w/Tuned Pipe	195.00	147.98
RCM358	O.S. Max & Supertigre Engines	Call For Low Prices	
RCM013	O.S. Max .15 RC w/Muffler	42.00	29.98
RCM344	O.S. Max .35 RC w/Muffler	58.00	43.48
RCM051	Pacer Zap .36 oz.	3.50	2.28
RCM226	Peerless 1/12 Electric Porsche	115.00	54.98
RCM164	Pica Duellst 2/40	89.95	59.98
RCM165	Pica Focke Wulf 190	89.95	59.98
RCM284	Pica T-28B	89.95	59.98
RCM285	Pica Waco	89.95	59.98
RCM297	Rhom 2 Gear Retracts - mains	87.00	56.58
RCM227	Rhom 3 Gear Retracts - firewall	125.00	79.98
RCM166	Rhom 3 Gear Retracts - Flat Mt.	125.00	79.98
RCM290	Robart Super Pumper MK II	17.95	11.98
RCM325	Robart Wing Incidence Meter	15.95	10.98
RCM257	Royal Photocell Tachometer	39.95	33.98
RCM289	Sig Cavalier	49.95	35.98
RCM352	Sig Cougar	52.50	37.78
RCM174	Sig Piper J-3 Cub	49.95	35.98
RCM179	Sig Scamp - NEW!!	24.50	17.68
RCM175	Sonic GR-3A Retract System	59.95	41.98
RCM359	Sonictronics 12 v. Fuel Pump	15.95	11.98
RCM062	Spickler Quickie 500	43.95	32.98
RCM003	Stafford B-24	199.95	139.98
RCM180	Stafford Twin Commancha	149.95	104.98
RCM181	Sterling 1/2 A Corsair	31.95	20.98
RCM360	Sterling Fledgling	41.95	26.48
RCM361	Sterling PT-17 Stearman	98.95	64.28
RCM183	Supertigre X-11 RC Schnourle w/Muff	37.95	26.58
RCM184	Supertigre X-60 RC SE Schnourle	129.95	90.98
RCM313	Sureflite Foam Skylane 182	39.95	25.98
RCM229	Sureflite Foam J-3 Cub	39.95	25.98
RCM188	Top Flite Contender 40	49.95	32.98
RCM189	Top Flite Contender 60	56.95	36.98
RCM190	Top Flite Freshman Trainer	47.95	30.98
RCM186	Top Flite P-51 Mustang	74.95	48.68
RCM260	Top Flite P-40	74.95	48.68
RCM194	Top Flite 10x6 (6) Super Maple	8.10	5.68
RCM201	Tower Display Prop w/Clock	59.95	37.98
RCM004	VK Sopwith Camel	74.95	52.48
RCM197	Wing Love Machine	49.95	27.98
	X-Acto 5087 Dlx. Knife & Tool Chest	29.95	20.98
	X-Acto 5099 Super Tool Cabinet	89.50	62.68



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EXTRA HEAVY DUTY  
LATCHING INSURES  
BOMB ASSEMBLY  
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**BRIGHT ORANGE.**

JUST FOR FUN.  
EASY TO SEE AND  
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REUSABLE SIMULATED  
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serving San Diego Co.*



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**15%**    **\$7.50**

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## BIG IS BEAUTIFUL

from page 101/63

Just a couple of quick notes before shutting down for this issue. In last month's column, I mentioned a smoke material named Butyl Carbitol-Dowanol B etc., etc. Don Godfrey, who passed along the information to me, has reported that this material and the smoke it makes attacks the common finishes used in modeling and removes them. He suggests that if you are going to use them, keep them away from the finish on your model. Don uses a long filler tube for his smoke tank and a long overflow to keep the material away from contact with painted surfaces. The smoke itself is not quite as bad as the material but it too will remove the paint from your model. Don is currently trying a paraffin based smoke material and will be reporting on it in the near future.

Fred Eastman of Eastcraft Specialty Products Inc., P.O. Box 25, Irwin, Pennsylvania 15642, dropped me a note recently to report that he has just been granted a patent on his airborne starter for models. You will all be familiar with the starter as it has been reported here and you'll undoubtedly have seen the ads for it.

Fred has also recently completed some modifications to the starter system, principally an improvement to the clutch assembly and he says it is now capable of withstanding all the abuse anyone could apply to it. Fred has also produced a new style pulley/clutch assembly, a new hardened crankshaft adapter for the clutch to ride on, and a new type of belt which will give longer life than the original belt he was using. The instructions which come with the unit have been up-dated and will make it a bit easier to install.

And that's not all --- Fred will be supplying the above items to anyone who has purchased a starter in the past year (since its release to the market) and apparently without charge. He goes on to say, "Every chance I get, I try to improve my product. I won't let a system go out of here unless it is 100% right. This is what has held up my deliveries for the past three to four months."

So, if you have had one on order and were getting impatient, don't despair, Fred is doing right by his customers and, in this day of "That's good enough!" and "Ship it anyway, just get it out of here!" it's a pleasure to know of someone who is interested in and dedicated to quality. Fred has one of the new units on its way to me and I'll be commenting on it after it has been flown.

That's it for this month --- keep me in touch with your winter building project. If you have something new, or a design of your own, there are thousands of us just waiting to hear about it. □

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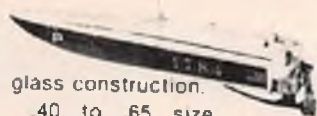
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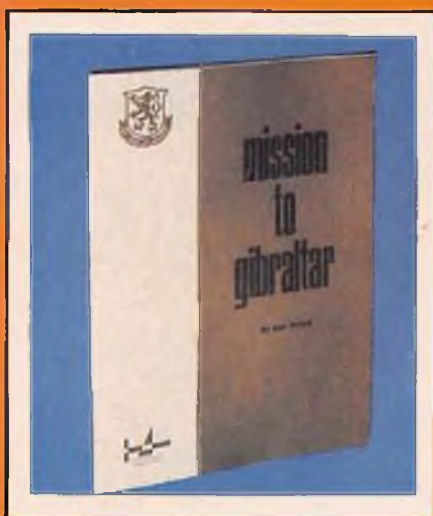
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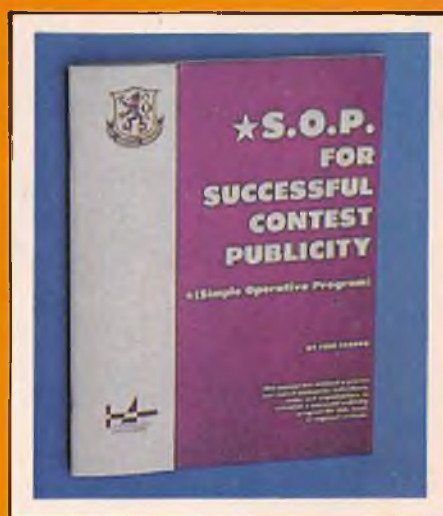
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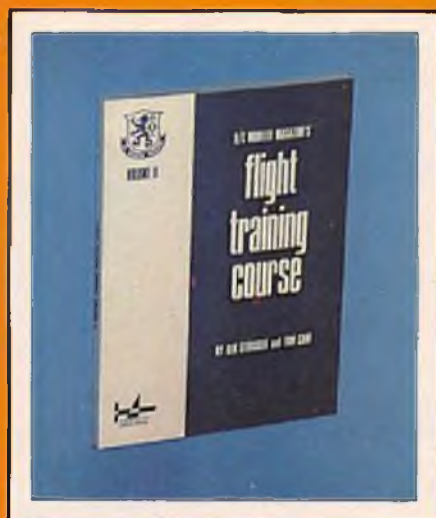
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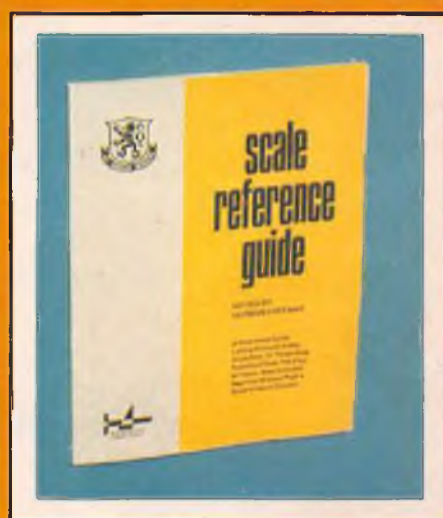
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## RADIO SPECTRUM

from page 62/61

way to go. The current drain is about 130 ma and dry batteries don't last long. The mod kit will pay for itself before you get in the air.

**Nicads in Parallel**

Dear Jim,

*In the April issue of RCM you caution a reader to never use nicad batteries in parallel.*

*I am very curious why you were so emphatic about this point. Would you mind going into detail in one of your articles or letter answers as to the electronics of the "no no."*

*Also, why is it that RCM prints Anthology Library books on everything but electronics? Where can a modeler pick up a current book on RC electronics and related electronic projects as they appear in your articles?*

*Thank you,  
Rudolph Miller  
Indian Head, MD*

Nicad batteries have very low internal resistance which means very high currents can flow out of them during use and into them during charging. These are very nice properties for our applications. However, this can cause some problems if we put nicads in parallel. During charging, there is no way to make the current divide equally, so the net result is one battery will charge at a higher rate than the other and in fact one may never be fully charged. During discharge, when one cell in one side of the parallel packs goes dead, you essentially have a four cell pack in parallel with a three cell pack and nothing in-between to limit the current

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## CHARLIE VIOSCA

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**"HOT STUFF" SAVED MY DAY.  
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Dear Bill:

I recently entered the realm of Quarter Scale by building a Puma with Super Hustler engine by E.W.H. The model is built 95% with Hot Stuff and while flying it one day, I had a control linkage failure to the elevator. At the time, the model was about two hundred feet in the air so I immediately cut the throttle and kept the wings level until it hit the ground. This twenty six pound bird really hit the ground hard, bounced and cart wheeled. I fully expected the model to be severely damaged, if not totally irreparable. When I got to it I was amazed to find that the only damage was a broken prop, bent right gear and Super Monokote split on the top of the right wing. While repairing the Monokote damage I carefully inspected the wing but found no major structural damage. There was a slight wing tip damage to the balsa where the right wing hit the ground and cartwheeled and there were three wing ribs loosened where they join the aluminum spar. Hot Stuff quickly repaired this and after about two hours of Monokote repairs, the model was ready to fly again. I can't tell you how pleased I am to know how strong Hot Stuff really is. If you learn how to use Hot Stuff properly, you don't really need anything else.

Sincerely,

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flow. The results will probably be smoke and fire.

Either buy a bigger battery or put a switch between the two packs so you can charge and discharge them separately.

It is pretty hard to stay current in R/C electronics unless you are working 8-10 hours a day on it like many guys are. However, there are many books available in your local electronics store that cover all phases of electronics. A good bookstore usually has ample reading material on electronics also. Amateur radio books and periodicals are a good way to start because they are generally written without a lot of

complicated math. A book called "Solid State Design For The Radio Amateur" is particularly good.

#### **Giezendanner Wipers**

I get a lot of letters from guys complaining about the pots in their transmitters. Almost all of these are from people who have transmitters with the small pots, which are essentially the same as those used in servos. While the transmitter doesn't see the same vibration as the servo, eventually you can expect the pots to get ratty just like they do in servos. You can clean them and lubricate them and they will work better for awhile but eventually the time between cleaning becomes less and

less. It may not be obvious but the Giezendanner wipers should solve the transmitter problems too. Anyone out there tried this yet?

I hear through the grapevine that almost all the manufacturers are looking at wipers similar to the Giezendanner. If this industry keeps going we're going to have some first class equipment available.

#### **Motor Cleaning Caution**

Haven't heard too much one way or the other about cleaning servo motors. I tried it and gave a motor to a guy to test. I haven't heard from him, so I assume it is still working. The following letter proves

to page 126

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Model 2115

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AB200 Airbrush kit. Non-bleeding airbrush, open and fine nozzles, 2 extra jars, propellant reg. valve	.....	7.99
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- .40-size engine

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Stable, easy to fly, yet fully aerobatic performance. Take offs and landings are smooth and gentle. A chip off the Lazy Ace for the fun flyer working his way up to "big."

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## RADIO SPECTRUM

from page 123/61

someone is happy with the results and also offers some info that could save your day.

Dear Jim,

I enjoyed reading your column about radio maintenance in the April issue of RCM. After reading Roger Sanders' letter about cleaning and adjusting servo motors, I decided to give it a try. I had an old motor that had been replaced in a servo at the factory. This

motor was very dirty and would not turn. So I took it apart and cleaned it per Roger's letter. After reassembly, the motor ran. Good!

I don't have a test rig or amp meter, I just hooked it to some batteries to test it. With the motor running I turned the base while listening for the sound of max rpm. When it sounded like it was peaked I started tightening the screws. Suddenly it stopped! Was it in a bind? While I was looking and wondering, the wires to the batteries got hot and the insulation started to melt. The batteries were getting hot too. So I disconnected.

It took some study and a few tries. But I finally found out what I did wrong.

First I didn't put a mark on the base and the case of the motor, then while turning the base for max rpm it just so happened that the three flats on the sides of the brass retaining ring lined up with the detents that are pressed into the sides of the motor case. This allowed the ring to pull free when the screws were lightened. There were enough threads on the screws to draw the ring right up into contact with the posts that hold the brushes. Creating a dead short, surprise, surprise!

After I got that straightened out, new wires installed to the batteries, the motor ran good.

to page 128

PEOPLE GREETINGS

FROM

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- Engine .15-.20
- Jig built fuselage
- Wing 90% built

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 Reg. \$39.95  
 Introductory Price **\$28.95**

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**\$6.98**

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(All engines have ball bearings. Add \$7.98 for .40 and .60 mufflers.)

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Cox 8022	139.95	93	2	no
Logitrol Nimbus	141.75	103	2	no
2 Channel Dual stick				
Cox 8020	95.95	70	2	no
Futaba FP-20S	109.95	77	2	no
Futaba FP-2E	149.95	100	2	no
Futaba FP-2E 518	134.95	91	2	no
MIRC 772	119.95	84	2	no
2 Channel Wheel				
Cox 8021	139.95	93	2	no
Futaba FP-2F	149.95	100	2	no
Futaba FP-2F 518	134.95	91	2	no
3 Channel Single stick				
Cox 8031	159.95	104	2	no
Futaba FP-35	169.95	113	2	no
Futaba FP-35 518	144.95	97	2	no
Logitrol LRB-3	166.95	105	2	no
Logitrol Ranger	187.95	119	2	no
3 Channel Dual stick				
Futaba FP-3FN	219.95	145	2	yes
4 Channel				
Cox 8040	299.95	189	4	yes
Cox 8044	279.95	178	4	yes
Cox 8048	449.95	285	4	yes
Futaba FP-4H	319.95	203	4	yes
Futaba FP-4FN 518	289.95	188	4	yes
Logitrol Nimbus	324.50	213	4	yes
5 Channel Dual stick				
Cox 8054	299.95	190	4	yes
Futaba FP-5FN	359.95	225	4	yes
Logitrol LRB 2-5	299.25	189	4	Reentry
Logitrol Champion	388.50	337	4	yes
6 Channel Single stick				
Logitrol LRB 1-5	325.50	207	4	Reentry
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
7 Channel Dual stick				
Logitrol Super Pro	440.95	268	4	yes
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Only \$159.00

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MASTERCHARGE & VISA ACCEPTED

## RADIO SPECTRUM

from page 126/61

*In spite of all this I am convinced that this cleaning operation is worthwhile, because I cleaned a motor in a servo that had been very erratic. Now it operates very good.*

*Well maybe this will help somebody else. I also think I'm going to look into some servo testers.*

Thanks,  
James G. Williams  
Carrollton, Texas

## SEMPERFI

from page 57/56

Locate the approximate position of the elevator, rudder, and throttle servos, and install the NyRod guides for them. Install the balsa bulkhead and floor that forms the tank compartment and mount the tank with foam wedges on both sides to hold it in place. Epoxy two pieces of 1/8" brass tube through the firewall for the fuel and overflow lines and connect them to the tank with fuel line tubing. Sheet the fuselage top and bottom at the firewall, and the bottom at the tail, with 1/16" plywood as shown, and finish the sheeting with 1/16" balsa.

Drill the two 1/8" holes in the landing gear mount as shown on the plans. The holes go into the plywood pads above the mount on each side of the fuselage and receive the torque anchors of each landing gear leg. Sand the entire fuselage with 100 grit sandpaper to round the edges. Mount the wing in its saddle and hold it in position with rubber bands around the fuselage and then build the bottom fairing. The front and back of this fairing are scrap 1/8" balsa and the sides are the pieces saved from the fuselage. Sheet the bottom with 1/16" balsa and sand to match the fuselage.

### Tail:

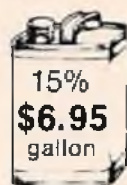
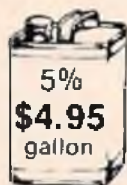
The stabilizer and vertical fin are built over the plan from 3/8" x 3/16" and 3/16" square balsa. Pin the trailing edge in place and add the 1/32" x 3/16" plywood doubler before the 3/16" center sheet and 3/16" square ribs. The fin is built in the same way but without the plywood doubler. Cut the elevator from soft 3/16" sheet and install the 3/16" dowel through before making the rudder cut-out at the trailing edge. This is done to assure alignment of both sides of the elevator. The rudder is also cut from 3/16" soft balsa. Inlay 1/32" plywood on both sides, as shown, for the tail wheel steering bracket. Sand the completed surfaces and the airplane is ready to cover.

### Finishing:

The original is covered with MonoKote --- yellow for the wing and stab, and blue for the fuselage and fin. The trim and

Sheldon's

## MODEL FUEL SPECIAL



- HIGHEST QUALITY INGREDIENTS.
- DETERGENT ACTION TO CUT VARNISH
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insignia are cut from red, white and blue MonoKote. Cover the wing and ailerons separately and epoxy the aileron torque rods to the pre-drilled and notched ailerons when they are hinged to the trailing edge of the wing. The elevator and rudder should be covered before they are hinged to their mating surfaces.

Bend the landing gear from 1/8" music wire to the shape shown on the plan. Solder a washer in the bend at the axle to keep the wheel running true, and install the wheels with collars or soldered washers. The gear is mounted on the bottom of the fuselage in the grooved landing gear mounting block by sliding the torque anchors into the previously drilled holes. They are held in place with landing gear mounting brackets and small wood screws. Epoxy the wing hold-down dowels in place and paint them with epoxy to protect them from the exhaust. The tail wheel mount is cut away at the top rear to clear a bend in the 1/16" music wire strut which forms the tiller. The strut is bent to shape and the tail wheel is installed before the mount is epoxied to the plywood mounting plate. The tiller is run through a U-shaped bracket in which a rubber grommet has been installed, and the bracket is bolted to the plywood pads at the bottom of the rudder. This type of mounting gives some reduction in the steering rate and aids in ground stability.

Before installing the motor mount, it is a good idea to give the firewall a coat of epoxy paint to match the fuselage; it looks good and protects the plywood from oil and dirt. Overlap the MonoKote slightly at the firewall to seal the sides.

The throttle line to the engine is iron florist's wire and there is a V-shaped link bent in it just forward of the firewall at full low throttle to act as an adjustment and a strain relief. It is connected to the throttle servo with a Z bend. The ailerons, elevator, and rudder, are connected with standard hardware and/or NyRod and clevises.

Balance the airplane at the Center of Gravity shown. This is accomplished by moving the servos fore and aft until the desired CG is attained. The batteries should be in front of the 1/4" ply bulkhead (F2). The antenna is run out through a small piece of plastic tubing epoxied to the top of the cabin and is connected to the top of the fin with a pin and small rubber band.

#### Flying:

Semperfi handles well on the ground and, when the throttle is advanced, the tail will come up all by itself; when it does, it is ready to rotate. The original model needed right trim on the initial flight due to a warped wing but, after a session with the heat gun, all trim was returned to neutral. The airplane has no bad habits and has quite a wide performance envelope --- and it sure looks good against a blue sky and white clouds. Build one, you'll like it! □



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Speed control - forward, reverse, neutral with trim adjustments, Precise steering; Complete with Ni-Cad battery & charger

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Span: 60.6 in.  
Area: 573.5 sq.in.  
Engine: .40  
Radio: 4 channel

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QUICK BUILT **Q.B. 20S**  
WOOD KIT



Span: 52 in.  
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Span: 65 in.  
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Light Red - Dark Red - Orange - Yellow - Light Blue - Medium Blue - Dark Blue - White - Black - Clear

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Span: 44 in.  
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**BIRD OF TIME**  
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Span: 118 in.  
Area: 1070 sq.in.

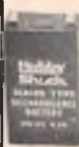
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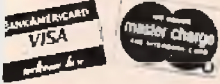
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Radio: 2 channel

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Area: 632.4 sq.in.  
Engine: .40  
Radio: 4 channel

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**PACEMAKER**  
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**\$29.99**


PACEMAKER PLUS FLOAT KIT  
*Both for* **\$86.47**

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Req. **\$24.99**  
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Radio: 2 channel

**\$19.79**

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Engine: .29 - .40  
Radio: 4 channel

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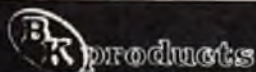
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CG OR NOT CG

from page 53

the flying field with a wrench, or screwdriver, taped to its nose, or a glob of modeling clay stuck to a wing tip --- to balance the bird. This might be okay for some fliers as a temporary expedient --- to get in a test flight. But, it's aerodynamically pretty crummy! A model that far out of trim should have been balanced at home. There are a bunch of materials that can be used, inside the model that won't screw up its aerodynamics. Lead shot or fishing sinkers in a puddle of epoxy is a good way to go as are stick-on lead weights. Big nails, driven into a balsa wing tip, properly countersunk, covered and painted are a lateral balance standby. Prop shaft weights are okay if they're balanced. It's kinda dumb, balancing the model but goofing up a good engine with an out-of-balance weight (or prop, or spinner). A heavier, balanced spinner might help with a tail heavy model while another coat of paint on the tail feathers might be all you need for a nose heavy one. On tricycle geared models a lighter or heavier nose wheel might help. Rudder and elevator pushrods may be contributing to tail heaviness because most of their weight is aft of the CG. Balsa rods or cable connections to the tail surfaces might be just the thing your model needs to balance it. The point of this "truism" is that the material you use to balance your model should be "inside", where it won't add odd drag forces.

(12) The battery in a model is a pretty concentrated bit of weight --- and its position usually has a great effect on a model's balance. In a way, this is unfortunate because the battery often has to be placed beneath the fuel tank. Bad news, if the tank leaks! So, if you have a choice, put the nicad above the "nitro" --- and as far forward as practical.

(13) On some models, the engine can be shifted fore or aft on its bearers --- as an aid to balance. As long as you don't have to "fair" a spinner into the fuselage or the engine must be in a fixed position for some other reason, wait until the model is completed before drilling the engine mount holes, or fabricating the throttle pushrod. Frequently, the engine can be "jiggled" a half an inch forward or aft to help with the model's balance --- even if you're using a Kraft or Tatone mount.

(14) In the final analysis, there ain't any substitutes for experience in locating the right balance point for a specific model. The designer can point out where it should be, approximately. But it takes test flights to pin it down exactly for your model. It's worth the trouble --- and the "CG Finder" will help you do it! □

**VARIEZE**

from page 50/49

1/16" wire around it three times. I used 1/16" welding rod, the copper coated type for gas welding, as it is softer than music wire, but the latter will work. Once the spiral is wound, bend the upper and lower sections as shown on the plans. Make one right and one left. Solder a washer to the top and bottom of the coil section to provide a flat top and bottom surface. Mount the wire lever on the wing with a 2-56 bolt. Install the slotted aileron horn and check for proper action. You will probably need to do some minor bending of the wire and carving on the horn slot to achieve free action. Next, lay a bead of white glue in the wing slot and install the aileron control cable. Also epoxy it to the 3/16" support balsa on the inside of the rudder. The aileron control clevis goes below the rudder throw mechanism. At the center of the wing, the yellow plastic tubing comes slightly out of the wing. The two cable ends and the wire for the aileron servo link are soldered together at the center. You will have to slide the aileron servo arm over the wire link after the servo is installed.

Once the wing is done, the fuselage can be completed. Mount the wing using the pan screws. Lightly glue on the foam hatch and the wing block. Use a sharp knife and sandpaper to shape the foam block. Be careful with the sandpaper as too much pressure will tear the foam. The hatch was designed to use a 2" thick chunk of the blue insulation foam available from lumber yards. One panel will serve your building needs for years. You may even be able to scrounge enough at the lumber yard from damaged panels. After shaping, remove the hatch block and install the front 1/64" plywood face and the 1/8" dowel. At the bottom rear of the hatch, cut a 1/16" deep recess to hold a 1" square piece of 1/16" plywood. Cut a strip of brass shim stock 1/2" wide and 1" long. Bend a sharp V in the last 3/8" and fit it to the balsa that holds the leading edge of the wing. Lay this brass strip in the recess in the hatch and epoxy the plywood plate on top of it. While the wing is mounted, carve the wing strakes from 1" foam and fit them to the leading edge of the wing. **Note:** They will be glued to the fuselage side but not to the wing. The engine cowl can also be added. The cowl can be built up from balsa or made of foam and fiberglass using the "balloon method." The plywood ring adds strength to the thin cowl edge behind the propeller.

Most versions of the Varieze are done in white with a minimum of trim, thus the model was covered completely with white Solarfilm. Be sure to completely cover all foam surfaces so they are not exposed to fuel. Although the plans and the photos show wheel pants, I would

to page 138



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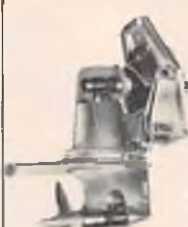


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WING SPAN 46" FOR .15-.25 ENGINE  
WING AREA 340 sq. in. 2-3 Channel Radio



CHC SUPER DEAL  
SUEVIA  
1.5 RC SCHNEURLE  
WITH MUFFLER  
LIST \$296.95  
CHC \$149.98

### ENYA ENGINES

	LIST	CHC		LIST	CHC
09 RC	\$ 42.98	\$ 24.98	60RC BB G8	\$144.98	\$ 70.98
15 RC	48.98	29.98	19RCX Sch. w/Muff.	104.98	65.98
19 RC	53.98	27.98	25RCX Sch. w/Muff.	109.98	68.98
29 RC	59.98	33.98	40RCX Sch. w/Muff.	149.98	93.98
35 RC	62.98	34.98	45RCX Sch. w/Muff.	159.98	99.98
40 RC	106.98	55.98	49RCX Sch. w/Muff.	155.98	97.98
45 RC	106.98	55.98	60RCX Sch. w/Muff.	234.98	119.98
60B11 RC	137.98	68.98			

### FOX ENGINES

	LIST	CHC		LIST	CHC
15 RC Sch.	\$ 37.95	\$ 22.98	40 RC	\$ 72.50	\$ 45.98
19 RC	36.95	22.98	40 RC Press.	105.00	67.98
25 RC	36.95	22.98	19 RC	50.00	32.98
29 RC	39.95	24.98	61 RC	96.50	60.98
36 RC	39.95	24.98	61 RC Press.	125.00	80.98
60 EAGLE	69.95	38.98	21 Out Marine	107.00	64.98
1.2 Opp. TWIN	250.00	184.98	21 in Marine	74.00	44.98

### K&B ENGINES

	LIST	CHC
40 RC	\$ 72.50	\$ 45.98
40 RC Press.	105.00	67.98
19 RC	50.00	32.98
61 RC	96.50	60.98
61 RC Press.	125.00	80.98
21 Out Marine	107.00	64.98
21 in Marine	74.00	44.98

### OS ENGINES With Muffler

	LIST	CHC		LIST	CHC
15 RC	\$ 40.95	\$ 30.95	40 RC	\$134.65	\$ 70.98
20 RC	43.95	32.95	61 RC	181.30	94.98
25 RC	46.95	34.95	20 RC FR Sch.	117.25	72.98
30 RC	50.95	35.95	40 RC FR Sch.	156.30	81.98
40 RC	76.95	53.95	61 RC FR Sch.	217.20	113.98
			91 RC FR Sch.	253.65	132.98

### WEBRA ENGINES

	LIST	CHC
40 RC	\$134.65	\$ 70.98
61 RC	181.30	94.98
20 RC FR Sch.	117.25	72.98
40 RC FR Sch.	156.30	81.98
61 RC FR Sch.	217.20	113.98
91 RC FR Sch.	253.65	132.98

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1 Pc. Fibreglass Fuselage Detailed Molding - All Precut Engine Mount Bulkheads, formers Pre-Assembled. Complete w/landing gear & hardware. Builds quick so you have more time for the fun part detailing. Flies 3-4 Ch. elev., rudder, aileron, throttle.



List \$140.98 CHC \$84.95

WING SPAN: 58"  
WING AREA: 570 sq. in.

FOR: .35-.45 Engine  
3-4 Channel Radio



TAMIYA R/C CARS	LIST	CHC		LIST	CHC
RA1201 Porsche 934	\$74.98	\$49.98	RA1206 Porsche 936	\$68.98	\$39.98
RA1202 Porsche 935	77.98	54.98	RA1207 Lam. Cheatah	89.98	61.98
RA1003 Tyrrell P34	77.98	55.98	RA1208 Countach	84.98	59.98
RA1204 XR311 Combat	84.98	59.98	RA1209 Toyota Cel.	84.98	59.98
RA1205 Lamborghini	77.98	42.98	RA1210 Ligier	74.98	41.98



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3 Wire Servo w/Deans 3-pin Conn. Set  
Standard & Triangle Arms supplied  
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Includes 1 each  
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Pkg. Silicon Tubing Smoked Canopy  
Motor Mount 29-40 Size

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All metal, no drilling needed.  
Complete w/clip & mounting hardware.

.15 - .25	\$3.95
.29 - .40	4.50
.45 - .60	4.95



### BRIDI

	LIST	CHC
Trainer 40	\$54.95	\$36.98
Super Kaos 40	55.95	37.98
Dirty Birdy 40	59.95	40.98
Kaos 60	66.95	43.98
Super Kaos 60	69.95	47.98
Basic Trainer	39.95	26.98
Sportster	39.95	26.98
T-20 Trainer	34.95	23.98
Quickest 500	42.95	28.98

### LANIER



	LIST	CHC
Cessna	\$48.50	\$30.98
Transit	46.50	29.98
Pinto	48.50	30.98
Comet II	62.50	39.98
Caprice	73.50	47.98
Jester	73.50	47.98

### M.E.N.

	LIST	CHC
Trainer 20	\$31.95	\$22.98
Buzzard		
Bombshell	53.95	37.98

### P.I.C.A.

	LIST	CHC
Spitfire	\$89.95	\$54.98
T-28-B	89.95	54.98
FW 190	89.95	54.98
WACO	89.95	54.98
Dualist	99.95	62.98
Cessna 182	99.95	62.98

### MRC RTF

	LIST	CHC
Cessna 177 w/En. .35 & Muffler Installed	\$449.95	\$259.98
Cherokee w/En. .40 & Muffler Installed	499.95	309.98
Hawk Trainer w/En. .15 & Muffler Installed	98.00	74.98
Electra Hawk	199.98	112.98

### MRC R/C TANKS

	LIST	CHC
Sherman RT1601	\$156.98	\$107.98
Leopard RT1602	199.98	137.98
Gepard RT1603	249.95	172.98
RC-11 Batt/Chgr.	29.95	24.98

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VARIEZE

from page 135/49

not recommend them as they are a nuisance on 1/2A airplanes.

### Flying

As set up on the plans, the elevator should be somewhat insensitive while the ailerons are very sensitive due to the large throw needed to make the kick-out rudders work. Note that the elevator action is backwards from normal practice. Pulling back on the transmitter stick should make the elevator go down to cause the canard to lift. I installed a Sullivan 1 ounce tank from my pattern plane and left the clunk as is. It seems to work well even though logic says the clunk should be at the rear of the tank. Both a Cox three bladed and Grish 5/4 two bladed pusher propellers have been used, but the latter is preferred. The Center of Gravity should be 1 3/4" ahead of the leading edge of the wing.

If you have the proper incidence settings and C.G., all should go well. Like all 1/2A planes, do not launch unless the engine is peaked. I always hand launch and have yet to hit the prop with my hand. Once airborne, the Varieze flies like a slow Pacer. It is very stable, will loop, has a lightning roll, and a good glide. Due to the built-in incidence, the canard stalls before the main wing and a mushy condition, rather than a stall, results. If you slow the plane up at the top of a loop, it will snap roll to the upright position and keep on flying. I have been unable to sustain inverted flight.

Let me say a final word about trim if your plane does not fly off the bench. The crucial factors are canard incidence, elevator throw, C.G., and engine thrust line. If the plane enters a mushy condition whenever up elevator is used, reduce the throw. If it persists, reduce the canard incidence. If it flies but requires down elevator to maintain level flight, move the C.G. forward. A bit more down thrust also helps. The Varieze is somewhat insensitive to forward C.G., but very sensitive to rearward C.G. Thus, to err towards the front is best.

In the air, the Varieze is an eye catching plane and you should enjoy flying something out of the modified Taurus mold.

### BILL OF MATERIALS

#### Balsa

(all medium unless specified)

- 2 — 1/2 x 1 1/2 x 5 soft.
- 1 — 3/8 x 3 x 24 hard.
- 2 — 1/4 x 5/16 x 36 hard.
- 2 — 1/4 x 36 trailing edge stock.
- 1 — 1/4 x 3 x 5.
- 2 — 3/16 x 3 x 36.
- 1 — 1/8 x 3 x 36.
- 1 — 2 x 3 x 2 1/2 soft.
- 1 — 1 x 3 x 5.

#### Plywood

- 1 — 1/4 x 2 x 2 1/2.
- 1 — 3/32 x 1 x 10.
- 1 — 1/16 x 6 x 12.

#### Foam

- 1 — 2 x 3 x 19 blue construction foam.

#### Music wire

- 1 — 3/32 dia x 36.
- 2 — 1/16 dia x 6 M.W. or welding rod.
- 2 — .025 dia x 4.

#### Miscellaneous

- 2 — Sullivan GRC-3 Gold'N-Rod cable in tubing.
- 2 — large aileron horns.
- 2 — small Goldberg nylon clevis.
- 12 — small Klett hinges.
- 1 — Kraft Hayes KM 0.5 engine mount
- 6 — 2-56 x 1" bolts
- 4 — 2-56 x 1/2 bolts.
- 4 — 2-56 blind nuts.
- 2 — #6 x 3/4 pan screws.
- 1 — 1 1/8" spinner.
- 1 — Grish 5/4 pusher prop.
- 1 — 1 1/4" Perfect wheel.
- 2 — 1 1/2" Perfect wheels.
- 1 — roll white Solarfilm.
- 1 — elevator horn.

#### AIR FORCE MUSEUM

from page 48/46

You can do it in one day, but you'll want two, and three is not too much. We heartily recommend you plan a visit with Dick Uppstrom and his Museum anytime you are in this part of the U.S., we promise you will come away happy, and impressed. Bring your camera!

#### PROCTOR'S MAGNIFICENT FLYING MACHINES

from page 45/44

.... In fact the planes were Wakefields; they were the United States' first Wakefield team. While they were in England they met Thomas C.O. Sopwith, designer of the Camel and were quite surprised that the gentleman who took the time to ask many questions concerning their displayed models was His Royal Highness, The Prince of Wales.

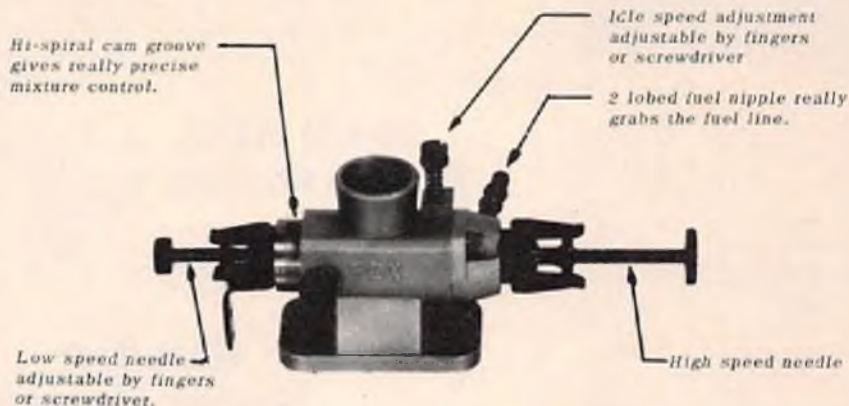
Unfortunately the boys' light balsa Wakefields did not fare so well against the British flyer's spruce and bamboo planes. They were blown out of sight before the heavier planes were. To blunt the disappointment of the loss, later in Paris they were invited to attend a banquet honoring the 20th Anniversary of Louis Bleriot's flight across the English Channel. Lou still remembers how elated that nineteen year old was to be personally introduced to the famous aviator.

One of the unexpected highlights of the whole trip happened upon his return home where he was feted at a Lou Proctor Air Jubilee, held at the Vancouver Municipal Airport. It was here that he proudly showed off his prize

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# 1995

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Fits Fox 40 - 45 motors
- FOX MK-X-B Carb (.312 throat)  
Fits Eagle, Hawk, Twin
- FOX MK-X-C Carb (.330 throat)  
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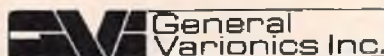
Unlike any other device, this tiny module\* actually records battery use on board your aircraft or on your transmitter. The PIC 5000 actually remembers how much battery capacity has been used since the last charge and shows how much is left! No voltmeter, E.S.V. or LED can do that! Used alone or with any battery cycler, it's an indispensable addition to any system. Used with our new Uni-Cycle 5000, it's the most powerful battery management system you can own!



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Free Floating Mount.

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winning model, then later in the festivities he and his friend Jim Walker were appointed judges of the scale model airplane contest. Jim Walker later became the father of U-Control and was elected to the AMA Hall of Fame.

When all the furor had settled down, Lou took a job with Boeing in Seattle where he stayed through WW II. The next thirteen years were spent earning a living through a series of interesting and challenging jobs. Manufacturing parts for racing cars and boats, spinning metals, chain saw manufacturing, high pressure oil line construction and, finally, a stint as a night club owner in Havana, Cuba. During this period of

time, at a party for show business friends, Lou met his wife to be, and he and Elsa were married in 1955.

In 1958 they moved to San Diego where he took a position at Ryan Aeronautics, the firm that long ago had manufactured Lindberg's Spirit of St. Louis. It was also in 1958 that Lou built the Antic prototype and from the pictures of this early trike landing gear plane in the kit instructions you can see how 21 years of improvements have brought about today's model which reflects Lou's motto, 'Pride of Ownership Comes with A Proctor Kit.'

In 1965, at the urging of Elsa and friends, Lou retired from his career in

aerospace and started Proctor Enterprises with the Antic as his only kit. Next came the Nieuport, followed by the Antic Bipe, the Mini Antic and the Antic Parasol. He is also involved with a Jenny kit for which he can furnish all parts, fittings and drawings.

As previously mentioned, Lou is a pilot and when he is not demonstrating his kits, or flying them for fun, he spends part of each weekend flying. During his residence in San Diego, Lou has been in on the construction of a couple of full sized homebuilt planes and has owned three planes, two Cessnas and a Taylorcraft which he rebuilt.

to page 142

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Wingspan . . . . . 3 meters (118 in.)  
Wing area . . . . . 120 in.<sup>2</sup>  
Flying Weight . . . . . Mark I, 52 oz.  
Mark II, 54 oz.  
Wing Loading . . . . . Mark I 6½ oz./ft.<sup>2</sup>  
Mark II 6½ oz./ft.<sup>2</sup>  
w/Ballast 17 oz./ft.<sup>2</sup>  
Mark I Airfoil . . . . . 11½% Flat Bottom  
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**PROCTOR'S MAGNIFICENT FLYING MACHINES**

from page 140/44

My first introduction to Lou, the modeler, came at a regular meeting of the San Diego Drones Model Airplane Club where Lou was the guest speaker. I knew he built and sold the Antic line but I was completely unaware that the Antics were only the tip of his modeling iceberg. He showed one hour of color slides with running commentary. Most of the planes shown were his and very seldom were there two slides of the same plane. All of them were beautiful planes, completely detailed. Some were low wing, some were biplanes, some were scale and many his own design. This was followed, if you can follow such an act, by movies that were sent to him from England and Switzerland by flyers who built and flew Antic products. Of particular interest was the film of an Antic flown from a lively picturesque lake high in the Swiss Alps on the prototype Antic floats. He is in contact with modelers from all over the world and his office walls are papered with pictures of them and their Antics.

It would be remiss to finish this article without a few words from others who know Lou. In tribute to his skill as a builder and designer, Walt Schroder editorialized about one of Lou's articles in Model Airplane News as follows:

"On a rare occasion we have a model which just must be published and the Bolero is one of these; however, the engineering drawings are such that it would be impossible to print them adequately in the magazine and do the model justice."

And finally as to his faithfulness to his motto, I think Hobby Shack's Paul Bender in his column "Plane Talk" covered the situation adequately when he spoke of Lou Proctor:

"You really have to see it to appreciate what this man has done. Everything is orderly and neat . . . Mr. Proctor is one manufacturer who makes a model kit with a true craftsmanship and love that has been disappearing over the years. To date, he has not yielded to the pressures that make it the easiest way for the least money. It is hard for me to put in words how truly dedicated this man is to his product but it shows up inside the box." □

**TAKE A SAILPLANE OUT TO LAUNCH**

from page 43/42

line broke just as the ship left my hand during high-angle javelin launches. Unless a go-for-broke feeling sweeps over you, a 45° initial angle permits a down elevator recovery in case the line breaks.

The next point of discussion affecting launch altitude is C.G. and tow hook

to page 144

CANNON—WEBRA—DUBRO—K & S—PACTRA—ENYA—KRAFT—MIDWEST—FUTABA—

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## VANTEC

8832 Shirley Ave. Suite 4  
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## TAKE A SAILPLANE OUT TO LAUNCH

from page 142/42

location. Towing does not add any unusual requirements on C.G. location. It may, however, generate a new pseudo Center of Gravity. The Center of Gravity is the centroid of the forces of gravity acting on a body. If, as in Figure 2, we replace the force of gravity  $F_g$  with  $F_t$ , we have modified the free C.G. by an amount dependent on the relative magnitude of  $F_t$  and  $F_g$  and their relative locations. If the towing force  $F_t$  passes forward of the real C.G., it has an effect not unlike moving the C.G. forward which, as in free flight, requires up-elevator to maintain level flight. If the towing force line passes aft of the real C.G., the "effective" C.G. moves aft. As the C.G. moves aft, the ship will trim at a

higher and higher lift coefficient until it either stalls or goes unstable when the new C.G. reaches the neutral point and the static margin becomes zero. In a free-flying ship, as the static margin approaches zero, it begins to fly with an undulating or phugoid motion. This is the familiar "nose light" glide and is not a result of stall, but a basic dynamic instability. Due to tow line restraint, an aft "effective" C.G. caused by a tow hook too far behind the real C.G. may result in a weaving instability, or the ship may go into a phugoid mode. It must be noted also that a similar weaving may be the result of a too-far forward tow hook. Here, an excess of restoring force with insufficient damping will result in an oscillation of the "flapping flag" type.

The next point to consider is winch speed. In considering glide angle, it was noted that as sailplane weight increased, the glide angle remained

constant and the speed increased in order to increase lift to sustain the added weight. On tow, lift must be high enough that its forward component is greater than the forces of gravity and drag. We, therefore, want a high effective wing loading to attain high speed. We get this by the towing force  $F_t$ .

In calm air, on a standard 6 volt winch, the best launch is achieved by running the wing flat out initially, then as the angle of trajectory flattens, a change to fast pulsing, then slowing the pulse as the angle becomes parallel to the earth. This change in winch reel speed and consequent rate at which line is taken in, actually represents the change in L/D caused by the addition of gravitational force to the drag force. If forward speed is assumed approximately constant during the launch cycle, then the worse the L/D, the faster the descent. In the

to page 148

## The Prather Deep Vee "A Complete System"

### THE KIT

\$99<sup>95</sup>

Engine - .40 to .50



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.

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PRODUCT NO. 1020

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### HATCH COVER

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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 dzus fastener connector.

### RADIO BOX

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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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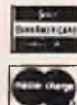
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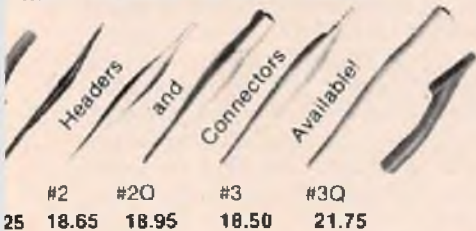


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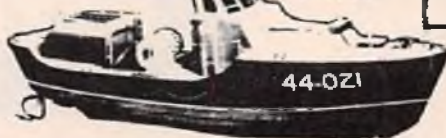
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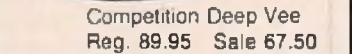
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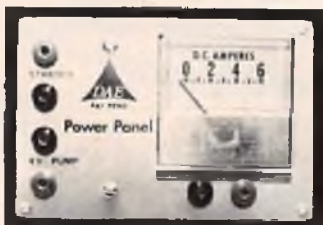


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## TAKE A SAILPLANE OUT TO LAUNCH

from page 144/42

launch case, the descent rate is the rate at which the line is taken onto the reel. Hence, to fly an optimum L/D path with a changing L/D, the descent rate must change, again assuming constant forward velocity. At the beginning of launch, the L/D is poor. As the pitch angle relative to the ground decreases, the L/D increases until at horizontal it is whatever it is in free flight.

Wind modifies the above in direct proportion to wind velocity. The wind velocity provides additional lift and the wings want to go up. However, the fuselage is constrained by the tow line and can't go up. The wings may decide to go up anyway and do so with a loud crack. Most winchs are tremendously powerful and will mindlessly grind in line as long as your foot is on the switch. In windy conditions, pulsing should start immediately. The velocity of the wind provides enough lift to go up like a rocket. Additional height can be gained because a minimum amount of line is taken onto the reel. As a matter of fact, the glider can be "kited" on the line while actually taking line off the reel. This line can then be reeled in for extra altitude and the process repeated until all the line is off the reel. This assumes the ship can lift about a pound of line. A smaller sailplane is more affected by the weight of the winch line and must be towed faster, consequently it can not be "kited" as well.

A very common launching fault is "popping off tow." It may surprise you to know that a quite probable cause is a flexible tow hook. Rod Smith taught me this. Forces on the hook are very high and if it isn't very stiff, it can deflect enough to let the ring slide off. If you are having chronic pop-off problems, somehow modify your hook to significantly stiffen it—or install a releasable hook. Even these can flex enough that the ring can slide out of capture. A yaw or a too steep trajectory can certainly cause the ring to slip off the hook but even here it is usually accompanied by hook flexing. Also, be sure the hook angle to the fuselage is slightly closed. If your hook is rigid and your launch straight, you are launching at a too high angle—crank in a little down trim.

To review the whole launch process:

(1) Never hook your sailplane to the line until both transmitter and receiver are turned on and **checked** and you are ready to go. Inadvertently stepping on the foot switch can cause all sorts of problems.

(2) Make sure your wing is level and that you launch at the angle the ship is pointed. It is disaster to point the ship up

to page 150

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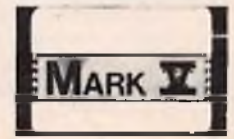
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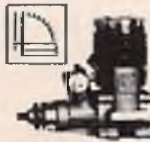


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## TAKE A SAILPLANE OUT TO LAUNCH

from page 148/42

and throw it straight out in a stalled condition.

(3) Launch at the maximum angle dictated by the strength of your throwing arm.

(4) The safe launch is at flying speed. This is a most important point. Don't just stand there and let the line jerk the ship out of your hand. When winch launching, hold until line tension builds to 10 or 15 pounds. Rear back and heave, but do it smoothly — don't come unglued and let your foot slip off the switch.

(5) For maximum performance your ship should be adjusted to climb almost vertically for the first 75'. During this initial climb in calm weather the winch should be run flat out. At the first sign of a change in trajectory the winch should begin to be pulsed and some up trim applied. Up trim should increase and the pulse rate of the winch slowed as the apex is reached. The trick in winch launching is to take in as little line as possible. This requires sensitive concentration and much practice to fly the best L/D path possible. Finally, at release, the drum is slowed to a stop to avoid backlash. If you are using a releasable tow hook and go into the release point with the winch running to gain more altitude, for goodness sake warn the winch master so he can get the brake on. There is nothing more exasperating than trying to untangle a mess when you are next up.

(6) Release should occur when the ship is no longer going up, which is not a trivial statement because it is difficult to tell. The angle and rear view make a slight climb look level. If you tow too far, you will start to pull the ship down. Watch a few experts to get a feel for what a flight path should look like. Every foot of altitude means a longer potential flight. A thermal sensor is invaluable in detecting the optimum release point.

Many flyers feel more comfortable with a high-start as opposed to a winch. Since tow is relatively gentle with rubber high-starts, and is automatic, the flyer can concentrate on flying. Also, the line is usually much lighter than a winch line. On a winch the sailplane may be called upon to lift over a half-pound of line. This can increase wing loading of a small ship beyond its performance capabilities. However, if a flyer intends to ever enter any contests, he will do well to become proficient at winch launching **before** the contest.

The lessons taught in this article are in the same spirit as a male obstetrician teaches the principles of childbirth. The information comes from study, observation and logic rather than any personal ability to perform with perfection.

Invaluable assistance was received from Ken Banks of the Torrey Pines Gulls in the preparation of this article. Invaluable means he doesn't get paid. □

## DRIFTER II

from page 41

.... just a speck in the sky --- specks have a way of getting lost. We were pleased that the flight terminated safely back at the field — elapsed time twenty minutes.

The first flight of a new plane is always a short tour around the field at an altitude low enough for close observation so we may make trim adjustments, learn flying and turning characteristics, and see how she behaves on the high-start or winch. Drifter II passed the first flight tests with flying colors.

### Conclusion:

Whether you build her for weekend sport flying or have intentions of using her in competition, we think you will find her a great machine of the highest quality with a very reasonable price tag. □

## PRATHER .40 DEEP VEE

from page 40

The entire assembly was accomplished as shown in the instruction book with only one other exception. We substituted a pair of kitchen cabinet latches for the Dzus fasteners to secure the hatch cover so that we could slap the cover in place rather than use a screwdriver each time it was removed or installed. The assembly is not only quick and easy but is most enjoyable because every step is clearly described and everything fits properly.

### Finishing:

As with any fiberglass product there are some pin holes to be filled, in this case we found very few. A coat of K & B Super Poxxy primer was sprayed on and lightly sanded. The entire boat was then sprayed with white Super Poxxy and trimmed with yellow Super Poxxy. Black striping tape was used to outline the yellow trim.

### Engine:

Each of our boats was set up for the new K & B 7.5 cc marine engines with matching K & B tuned pipes and exhaust throttles by Mike Wisniewski. The engines were installed on K & B 5" quick change engine mounts. A Norco 3/16" cable collect connector attached the drive shaft to the engine.

The fuel system was installed as shown in the installation book. It is a tandem system using two 16 oz. round Sullivan tanks in series with a 6 oz. slant Sullivan tank near the carburetor. The system is pressurized from a fitting on the tuned pipe.

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We installed a Futaba two channel radio in one boat and a Kraft in the other. Each transmitter features a wheel control for steering and the unusual throttle control mounted on the side of the case.

Two of Prather's fiberglass radio boxes had been obtained but were not used. The boxes had been designed prior to the advent of the K & B 7.5 engine and matching tune pipe and did not provide the clearance that we desired so we built up radio boxes that were a bit lower. K & B pushrod seals were used to waterproof the pushrod exits. Prather's radio boxes have since been redesigned to be compatible with all the current engine and pipe combustions.

### Running:

This is what it is all about. George Campbell more than fulfilled the design objectives mentioned above and Prather's production of the design results in a boat that is a joy to run. After several of the suggested propellers were tried, our boats performed best through the entire speed ranges with the J & G 3122 prop. Drive shaft location and angle as well as trim plate settings were shifted about during our test runs and they were all returned to the original positions as specified in the instructions for best performance. Do it as they say and you are okay.

### Conclusion:

Unfortunately, we were unable to attend the 1979 NAMBA Nats for the Enduro Event with our Prather boats. While we aren't deeply into racing, these boats are fast and we have had a ball with them. If you want to go all out with the racing equipment as we did you can be highly competitive. If you want to go with sport engines for pure enjoyment you will be hard pressed to find a more stable and easy to handle boat.

We feel that the competition boat and equipment is somewhat expensive but it is offset by the excellent quality of the equipment that we used and consider it to be a very good value for the money. □

### SILENT POWER

from page 37

other acrobatics are possible with the P-68 model. Try to keep the P-68 weight down to 54 oz. and you'll be all right.

As far as wire length goes, use the wires and connectors which have come with Astro Flight power systems since early 1978. If you have a pair of 020's, 050's, etc., which are not pre-wired, use #16 wire and reduce the slack in the wires between the battery and motors to a minimum.

Three capacitors should be used on each motor in a twin engine model to suppress brush noise --- one across the

to page 154

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### SILENT POWER

from page 152/37

motor terminals and one from each terminal to the motor to the motor case. Any size from .001  $\mu$ fd to .010  $\mu$ fd work well at reducing radio interference.

One final note about charging. I have found that my Astro 05 pack requires about 25 minutes of charging for full charge. Motor duration with this system is then about 4½ minutes.

We at RCM would like to hear from you. Which twin electrics are you flying? Has anyone tried a four engine model in this country? Please write and send

photographs (black & white) for possible inclusion in future columns on Silent Power.

### Electric Building Hints

Super Monterey or Super Malibu: If you are building either of these models you can save a great deal of time and aggravation by covering the 1/64" ply wing/canopy fairing before assembling it to the wing center section. Simply sand to shape, cover, and secure in place with a few drops of cyanoacrylate.

### Electra Fli

A snappy version of the Electra Fli can be built by removing the last rib from each wing, shortening the wing span to 40" and replacing the 3/32" balsa wing

top and bottom sheeting with 1/16" balsa. I flew a model built this way and was impressed by the speed and maneuverability of the model with an Astro 05 and a 6/4 prop. Use 1/64" ply wrapped twice around the motor to create a motor tube for the 05.

### Geared Astro 15 and 25

A few drops of WD-40 sprayed on the gear reducer belt and shaft increased performance by 50 to 100 rpm.

### New Projects

I am currently working on the design of a Stand-Off Scale BD-5 for the Astro 05. Has anyone out there tried to model the BD-5 using electric power? Other

to page 158

## Classic Models

2285 Carmelita Drive  
San Carlos, CA 94070

With Emphasis on the Classic Size Model

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## REGULAR COMPONENTS



## MICRO COMPONENTS



### SERVOS

- Double sided PC boards, 544 AA IC
- Long life potentiometers
- High quality servo motors
- 4.0 lb. power, 0.5 sec transit
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- Fast, precise high resolution
- Gold plated Deans connectors

REGULAR Size: 1.5x1.45x.73 Wt. 1.2 oz.  
MICRO Size: 1.28x1.3x.6 Wt. 0.7 oz.  
MIDGET Size: 1.12x1.43x.7 Wt. .85 oz.

### RECEIVER

- Double sided PC boards
- Double tuned front end
- 1.5  $\mu$ V, AGC on 4 stages
- Gold plated Deans connectors
- High selectivity and rejection
- 5 channels, 8 available

FREQUENCY: 72.08, 72.16, 72.24, 72.32,  
72.40, 72.96, 75.640

REGULAR Size: 1.9x1.7x.8 Wt. 1.5 oz.  
MICRO Size: 1.75x1.14x1.0 Wt. 1.5 oz.

### BATTERY

- REGULAR
- 500 mA.H, vibration resistant
  - Nylon D&R case
  - Gold plated Deans connectors

Size: 2.2x1.25x1.25 Wt. 4 oz.  
MICRO

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- Noble high quality switch
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	S5445	Rotary D&R Bantam Midget servo, assembled	(For weight and strength) 25.00	
	R2000	Receiver regular, assembled	Frequency_____ 36.00	
	R2001	Receiver micro, assembled	Frequency_____ 39.00	
	B1000	Battery regular, assembled	13.00	
	B1002	Battery micro, assembled	14.00	
	H1001	Switch harness, assembled	5.00	
	S5441K	Kit of S5441 servo	17.00	
	S5442K	Kit of S5442 servo	19.00	
	S5443K	Kit of S5443 servo	27.00	
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<input type="checkbox"/> COD, Shipping, handling & insurance <input type="checkbox"/> Cash, money order, bank draft, certified check, shipping, handling & insurance			2.50	
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580 Table Saw

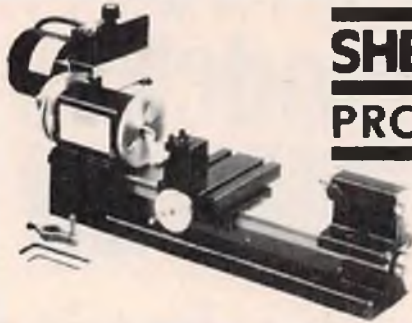
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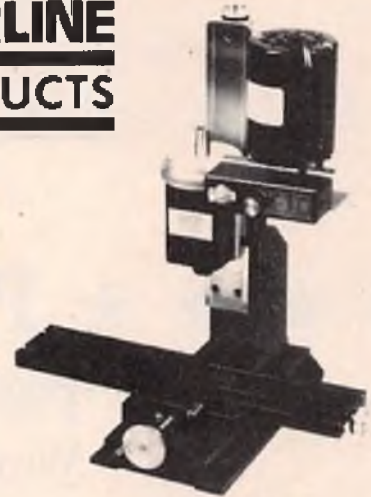
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5000 Vertical Mill ..... 246.50

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3072	Drill Chuck & Draw Bar	14.95
4004	Drive Belt	1.80

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Model Contest

The  
SOUTHWEST  
**modelers**  
**SHOW**

Manufacturers  
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★ ★ ★ ★ Public Invited ★ ★ ★ ★

June 7th & 8th 1980

Women's Building, Fair Park

Dallas, Texas

**SILENT POWER**

from page 154/37



Author's Sport racer - Astro 05, 38" wingspan, 32 oz. flying weight, motor aileron and elevator. 300 square inches.

projects include an 05 powered pylon racer and a 72" geared Astro 15 powered Taylorcraft.

Good Flying. □

**THE STING**

from page 36/32

see what's going on in the tank compartment when installing the other parts. Before cementing F-4 to F-3, check the distance from the bottom of the notches of F-4 to the top edge of F-3. Use a 1/8" x 1/4" stringer to measure this on the top and sides. Mark this and cement F-4 to F-3.

Start with the top stringer, cement into the notch on F-4 and to butt to the back side of F-3. Use Zap here, and epoxy from underside later. Cement the top stringer straight down the center of the

fuselage, and aligned on the center of F-8. The lines on F-8 represent the centers of the 1/8" x 1/4" stringer locations. Cement the stringers, working down both sides of the fuselage. One stringer on one side and one on the other side, keeping them in the same location on each side. After all stringers are cemented evenly in place, use epoxy to secure the stringers to the bulkheads. Cement tail doublers in place next.

The tail blocks are next. Tack the tail blocks together as shown on plan. Sandwiching a piece of 3/16" balsa to simulate the thickness of the fin between the two blocks, and a 1/4" thick balsa to simulate the slab. Lay this unit in place and mark the bottom with pencil. Mark the side as per drawing. Now cut and shape to conform with fuselage.

to page 160



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# REDCO PRODUCTS

CUSTOM-CRAFTED MODEL AIRCRAFT and R/C PRODUCTS



VA RESIDENTS ADD  
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H Ray	28.50	42.50
Big H Ray	32.00	46.50
BRIDI		
RCM-40	39.00	55.00
RCM-60	44.00	61.00
GOLDBERG		
Falcon 58 II	31.95	47.50
Skylark 58 II	32.50	48.95
Sr. Falcon	41.50	57.50
JENSEN		
Ugly Stick	44.00	61.00
MIDWEST		
Sweet Stick	27.50	43.50

### REDCO DELUX KITS:

All you need to complete your kit is the Radio, Engine, Covering Material and desired optional items and we can supply these also at our low prices.

### COVERING MATERIALS

	List	REDCO
SuperMonocote		
Opaque Colors		
per roll	9.00	5.50
Metallics (per roll)	10.50	6.50
Reg. Monocote	4.75	3.00
Trim (solid)	1.29	1.10
Trim (checks) & Glc	1.79	1.45
Super Coverite	8.20	6.55
Super Coverite 15'	38.84	26.75

### SPORT/PATTERN

	List	REDCO
ANDREWS		
Aeromaster Tee	84.95	54.00
BRIDI		
Sunfil 4-20	29.95	21.50
Twoedy Bird	39.95	30.00
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## THE STING

from page 158/32

Carefully cement just the blocks to the rear side of F-8. These blocks can stay there until the fin and stab are ready to be installed. Before cementing fin and stab in place, remove the 3/16" balsa and the 1/4" balsa which will leave slots for them. Bevel sand two pieces of 1/8" balsa to fit flush between the three top stringers at the top rear of the fuselage to support the dorsal fin.

Now to finish the front of The Sting. Cut the side cowl blocks from 5/8" balsa.

If you don't have 5/8" balsa, do it as shown on the plan, by laminating 1/8" balsa to the 1/2" balsa. Epoxy these blocks to the front of the firewall as per plan, bottom view. Cut the nose ring from 1/8" plywood. Install the motor mount and engine. Hang nose ring on prop shaft. Screw the back plate of spinner onto the shaft and line the plywood nose ring up with the back plate, and epoxy the nose ring in place.

Remove the engine and mount and cement the 3/8" balsa bottom cowl block in place. Cut two 3/8" triangular strips to fit the interior of the engine compartment bottom, and cement in place. Coat the engine compartment with epoxy.

Now shape the bottom front of the fuselage from the front of the wing saddle to the nose ring. Install the front wheel bearing, fuel tank, and throttle wheel pushrod. Cement the dash block in place and plank the rest of F-2T. Shape the dash block to conform with top of the nose ring.

The cowl is next. Begin by cutting and framing the top of the engine compartment with 3/16" balsa. Remove this frame and wrap 1/64" plywood around the frame and Zap the plywood to the frame. Trim excess plywood away. Coat the outside of the top cowl with contact cement and apply another sheet of 1/64" plywood. Cut out for your

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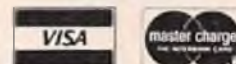
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engine. This is the way it was done on The Sting, and it works just fine. Coat the inside of the top cowl with epoxy. The hinges are set in by using pins and epoxy cement, when model was finished.

Cut the doublers from 1/8" balsa and cement them to the interior of the fuselage. You may want to change the notches of the servo rail locations to fit your servos at this point, so be careful here. The C.G. shown on the plan is right on the money, but the model should fly well 1/2" either way.

Cement the hardwood rear wing mounts into place backed up with 3/8" triangular strip to the top of these pieces

as shown on the plan. Install servo rails and servos. Install pushrods for rudder and elevator. These two pushrods exit in the same locations on both sides of the fuselage. Before planking the bottom of the fuselage, secure the pushrods to the bulkheads by cutting three pieces of 1/8" x 3/4" balsa to fit across the bulkheads. Locate the holes of the pushrods and cut holes into these cross braces to fit each pushrod. Cut across these pieces to split the holes and keep them together. Cement these cross members to the corresponding bulkheads and to the pushrods on the inside of the fuselage. When all of the pushrods are secured, plank the bottom

of the fuselage with 3/32" balsa (cross grain).

The windshield pattern is made by wrapping a piece of 8 1/2" x 11" paper around the top of the dash block at the same angle and mark the paper as to where the windshield is to fit on the fuselage. Maintain a 1/4" border for cement. Lay the pattern under the plastic and score with an X-Acto knife and just crack the windshield out. The one shown on the plan is optional. The next Sting will have the windshield wrapped around the whole cockpit.

**Built-Up Wing Construction:**

Notice that the bottom rear 2/3 of the  
to page 166

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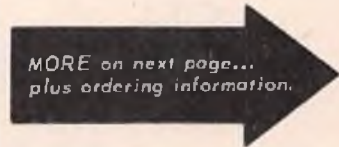
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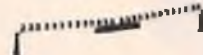
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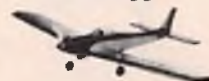
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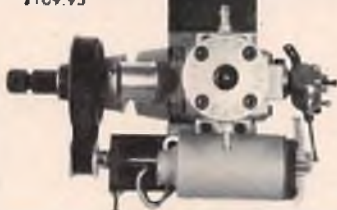
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**Aeromarine Enterprises 709 Longboat Avenue, Beachwood, N.J. 08722**

## THE STING

from page 161/32

ribs are straight for ease of construction. Begin by laying waxpaper over the wing portion of the plan. Pin the 3/32" x 1/4" balsa bottom trailing edge sheet in place over the plan. Cut all the ribs from 3/32" balsa. The bottom of the main spar will have to be shimmed up about 1/8" during construction to fit the bottom of the ribs. Pin the bottom spar in place over the plan. Now use one of the ribs as a gauge to find the location of the 3/16" square rear bottom spar, and cement this spar to the top of the trailing edge sheet. Cement all but the four center ribs in place. Cement the 1/4" x 1/2" top main spar and the 3/16" square rear spar into the top notches of the ribs.

Cut all the dihedral braces and the four half ribs from 1/8" plywood. Remove pins and elevate both wing tips up 1/4" and trim the center section until all spars butt together. Cement the dihedral braces to their respective places with epoxy cement. Now cement the two center ribs together and cut them

to fit the center of the wing. Cement the other two ribs to butt the edges of the plywood dihedral braces. Cement the top 3/32" x 1/4" top trailing edge sheet in place. With a sanding block, square off the trailing edge of the wing at this point, and cement the 3/16" x 5/8" balsa cap in place. Cement the leading edge in place and allow space for the 3/32" planking at the front edge of the ribs. Plank the top and bottom of the leading edge with 3/32" x 3" balsa sheets. Plank the center section and make cut-out for the aileron servo as shown on the plan. Cement 3/32" x 1/4" cap strips to the top and bottom of the ribs. Cut and epoxy the hardwood main landing gear mounts in place. Cut and fit 1/4" diameter front wing hold-down dowel to front of wing.

Cut the trailing edge stock to make unit for strip ailerons and cement in place at rear center section of wing. Shape ailerons and set hinges as per plan. Do not cement hinges in place yet. Bend the 5/32" diameter music wire landing gear per the pattern shown on the plan. The landing gear is held in place with four two hole metal or nylon straps and eight wood screws. The foam

wing follows the same format except the spars. Both wings, built up or foam, will have to be fiberglassed top and bottom in the center section as per plan. Cut two 1/16" plywood washers to fit to the bottom of the wing at the mounting holes. On the plan two types of tips are shown. You can choose which one you want to use. We used the solid wing tips on The Sting. Make the fin and rudder from 3/16" balsa and the stab and elevator from 1/4" balsa, joined together with a 1/4" dowel.

After all the construction is finished, the entire model was covered with MonoKote. On the sections, such as the stab that fits into the fuselage, and the top where the dorsal fin goes, the covering will have to be neatly cut away to be able to get a good glue joint. Cement all hinges in place with epoxy cement. The rudder is the last piece to be installed.

Be careful putting The Sting together. Fit first, cement later, and when the model is finished you will have a model that not only looks good but flies good also.

Good Luck and Happy Landings. □

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## SCALE VIEWS

from page 30/27

Air Force development. Illustrated with many good black and white photos, supplemented by 60 color aircraft profiles and 178 squadron and group insignia, the text is relatively brief, but to the point. I was particularly interested in the section comparing surviving specimens of the original paint used at the time to the current Federal Standard Color Specifications 595a (a document which I will cover further in a future column). Using the information given in this table, it should be possible to do a good job of reproducing paint shades on models. AFC also gives appropriate attention to the problems of "reading" black and white photography in the days of orthochromatic film, which reproduces colors in very different ways from panchromatic. Recommended for all serious scale builders. Bring on Vol. 2!

Staggerwing! by Robert T. Smith.



266 pages. Staggerwings Unlimited, P.O. Box 964, New Milford, CT 06776. \$27.95 plus \$1.75 postage. The first

edition of this epic tome was privately printed in 1967 and quickly became a sought-after collector's item. My copy is numbered (27) and signed by the author. Now it is being reprinted by a group of Beechcraft addicts of the Staggerwing Museum Foundation of Tullahoma, Tennessee, with 16 pages of current information added. A complete history of the classic biplane 17 series, copiously illustrated in color and black and white with photos, 3-views and profiles. One section reprints many pages of cutaways and exploded views from the service manuals. Using this material as a reference, a practical and exact scale duplicate of the full-size Beech 17 retract gear could be built. Anyone buying the new 1/4 Scale Staggerwing kit being produced by M.E.N. should have this book. Or anyone with a coffee table.

Waco by Ray Brandy. 163 pages. Waco Publications, 2650 W. Alex Bell Road, Dayton, Ohio 45459. \$18.95 plus \$1.50 postage. Author Brandy is the President of the National Waco Club and this book reflects his longtime interest in the subject. It covers the history of the

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company and founders, Clayton Brukner and Elwood Junkin. Lot's of black and white pictures of the factory and its products. My only regret is that



this opportunity was not used to produce a really definitive book on the Waco line in the tradition of "Staggerwing!" The publication would have been even more attractive with color photos, 3-views and cutaway drawings. But Waco nuts (your reviewer is one) will like it. □

### SOARING

from page 22

★  
A very tough question to answer and one that I get asked often is how to get more proficient in flying and landing. One could read my articles, read books, and talk to experienced flyers, but nothing can take the place of practice. Get out there and develop your own groove, don't try to copy some other pilot. This is a harder task than developing your own style. Know your sailplane characteristics and limitations. If you talk to twenty different experienced pilots on ballast and balance, you will get twenty different theories. Trim your sailplane so it is comfortable to you and your type of flying. Don't get me wrong now and not ask for help --- this is essential in getting started or trying to iron out a problem area. But get out there and practice and when you have done that, practice some more.

★  
I have had local flyers come to me and say they are going home because there is no lift today. Baloney! I have yet to fly at a field where there is absolutely no lift --- it may be a little harder to find, but it will be there. If you are still getting experience on finding lift and not having too much success, practice that old landing technique. Use a short high start, release at about 30' up and grease that turkey in for some good spot landings.

★  
Many of you who are interested in Dave Thornburg's hand launch glider have written me asking about plans and a possible kit.

A hot communique from Dave informs me that he is still doing some changing of wing dihedral and trying to find room for a ballast box.

As you know Dave writes for Bill Northrup's Model Builder Magazine, and it hurts me to say this, but his hand launch gem will be a construction article in the February or March issue of M.B. Magazine. don't forget you read about it in RCM.

★

These past two years, through this column, I have tried to present to you, news and views, hints and ideas, contests and happenings. All of this takes much time and travel and hours of reading all of the fine newsletters and correspondence, and writing the column.

I have had an assignment change with a promotion from my employer and it has become a very demanding and time consuming task. The writing of this column is going to be passed on to a gentleman by the name of Al Doig who resides in Southern California. You are going to enjoy and get countless new views on the soaring scene from Al who, has a style of writing that will entertain you, but still present the facts.

I hope you will give him the support you have given me and let him know what you want through club newsletters and personal messages. Maybe this move will give me a little time to practice some soaring and catch up to my son on the trophy shelf.

Good Lift. □

#### TAYLORCRAFT

from page 19

#### Engine:

A Cox .049 Tee Dee engine, a Kraft engine mount, and a Sullivan SS-3 (2 ounce) fuel tank were installed. We also chose to use crankcase pressure and a Kustom Kraft needle valve assembly in order to obtain better engine performance. No muffler was used.

#### Radio:

A Westport International Variant radio was installed. Two servos (rudder and elevator) were employed and a 100 mah battery pack was used. There is ample space within the fuselage to accommodate virtually any type of radio system quite easily.

#### Flying:

Our test model was balanced at the specified C.G. and 3/16" of travel movement (each direction) was used on the rudder and elevator. Ready to fly, finished weight was 20 ounces. Since our test flying was conducted from a grass field, all flights were initiated via a hand launch. The Taylorcraft is a delight to fly. It is stable and smooth in flight, yet quite agile and responsive when put through the various maneuvers. It is an easy to fly, fun type sport scale aircraft that performs as well as it looks.

to page 171

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## RESULTS OF WORLD CHAMPIONSHIPS FOR R/C AEROBATICS HELD IN SOUTH AFRICA IN OCTOBER, 1979

1. Wolfgang Matt	Liechtenstein	5531
2. Dave Brown	United States	5493
3. Mark Radcliff	United States	5275
4. Gunter Hoppe	West Germany	5264
5. Ivan Kristensen	Canada	5189
6. Bruno Giezendanner	Switzerland	5144
12. Dean Koger	United States	

#### TEAM STANDINGS

1. USA	1244
2. Italy	1194
3. West Germany	1172
4. Switzerland	1159
5. Liechtenstein	1148
6. South Africa	1116

# 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 Dremel 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. If you would like further information concerning the winning models, write to us giving us the winner's name and what month he won, and we will forward your letter on to the winner. For rules of Model of the Month Contest, see the Oct. 1979 issue.

## DECEMBER WINNERS

### SECOND PLACE

**Dick Barbosa**  
Miami Lakes, Florida

An imaginative conversion of an Andrew's Aeromaster kit resulted in this semi-scale Hawker Demon. The 9 lb. model is powered by a super Tigra .71 and is controlled by a Royal Super Sport radio.

An authentic finish is obtained from Pactra Formula U paint and hand painted insignia. Only minor alterations to the kit were required to produce this realistic model.



### THIRD PLACE

**Irene Wisley**  
Anaheim, California

An unbelievable performing fun-fly craft is the R/C version of the 1915 Cook Riser twin pusher.

Scratch-built from RCM plan #766. With a 47 in. wing span at 27.6 oz., and powered by two Cox .049 engines, the machine flies almost as well on one engine as on two. The surfaces are covered with transparent Red MonoKote and the A frame is painted with Rit Dye dissolved in clear butyrate dope. A Cannon radio using two servos was used in this model.

### FIRST PLACE

**F.J. Gonzalez**  
Blue Bell, Pennsylvania

This B-24 Liberator, built from a Stafford kit, weighs 13 lbs., 10 oz., and is powered by four O.S. Max .25 engines. Goldberg retracts with Sonic actuators are coupled to the retractable belly turret. A Kraft 7 channel radio operates the usual functions plus Fowler flaps, and operating Bomb Bay doors with bomb drop. It is a spectacular performer with 6 trouble-free flights logged at time of submittal.



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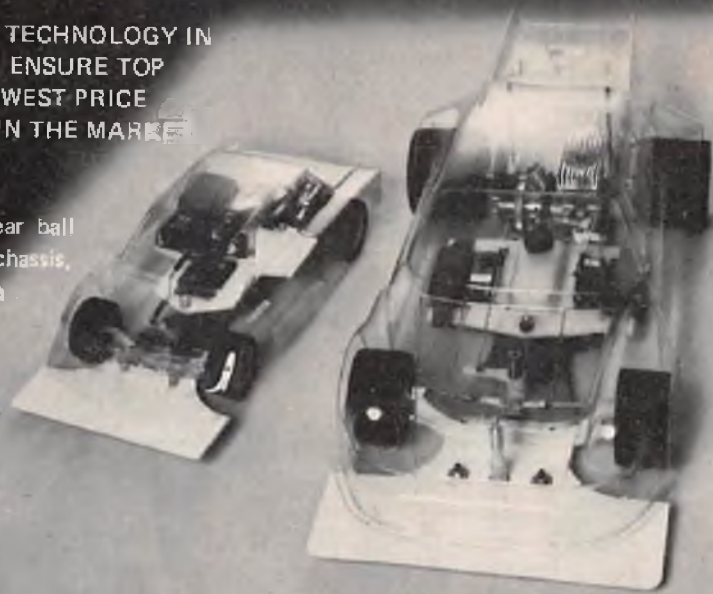
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## TAYLORCRAFT

from page 169/19

### Conclusion:

The Micro-X Taylorcraft is a kit that will be especially appealing to the older modeler, not only because of its scale vintage, but also because of its time proven construction methods. It is relatively easy to build, flies very well and looks great! □

## SUNDAY FLIER

from page 16/15



*Supermarine S-5 in flyby for photos.*

The flight was perfect. Photo No. 9 shows the model in a fly-by. Wally even did an aileron roll — much to the dismay, but finally satisfaction, of Dick.

After about a ten minute flight, Wally brought the S-5 down to a picture book landing, shut the engine off, and we went

over and towed it back to the dock. Photo No. 10 shows the happy pilot and designer with the S-5 in tow.



*Wally Rinker and Dick Hershey towing the Supermarine back to base after test flight. Two very happy Sunday fliers.*

The Clear Lake Caper was over. The Supermarine S-5 was an unqualified success. And the Lakeport Sunday Seaplane Fliers were completely happy.

So was I. The trip was more than worthwhile and, once again, the event showed that Sunday fliers like to do their thing, whether it be a 1/3 Scale model, or a 1/8 Scale model. We've got a great fraternity of Sunday fliers.

I'm proud to be one of you. Let me hear from you.

*Due to the volume of mail received, only letters which include a stamped and self-addressed envelope can be answered directly. Others, which are of general interest, will be answered in the Sunday Flier column.* □

## ENGINE CLINIC

from page 12/10

results from different oils, treatment by the modeler, etc.

I have preached on the use of air filters on aircraft engines for years. Both Perry and K & B have air filters available. Getting the guys to use them is another thing. They would rather wait until the ring/rings are lapped away, fuel is blowing out the front bearing like a spray gun from all the dirt that went down the venturi and lapped away the seal area, and then stick on a filter hoping for a miraculous cure for the damage already done.

Dear Mr. Lee;

*I have a problem. I have a Lee Veco .61 (SN 924X) with a Perry pump and carb, no pipe, with muffler pressure which turns a 10 3/4 7 1/2 Hand Crafted prop with about 13,000 rpm and 15% nitro fuel. It pulls great in the vertical maneuvers and does fine inverted. However, many times on the ground, I push the throttle up only to have the engine come up to full rpm and then die. Then, when I finally get it airborne, it will run great for four or five minutes (sometimes only three) and then quit as if you had pulled off the fuel line. I have rebuilt the fuel tank, replaced the fuel lines, replaced the carb, and checked the head and backplate bolts, and tried*

to page 174

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**ENGINE CLINIC**

from page 171/10

*different plugs with and without idle bars. Help!*

Sincerely yours;  
Chip Conklin  
Huntington Beach, Calif.

Although it is possible that both problems may be related it would appear that you have two separate problems. Dying in the air after a few minutes of flight time would indicate a hole in the pick-up tube, something wrong with the pump, etc. If the engine dies when giving it full throttle but holding it steady on the ground, then this would be caused by fuel that is too cold, a glow plug that is too cold, or a combination of both. If the engine dies on acceleration of the aircraft, then this could be fuel/glow plug or again a hole in the pick-up tube. The pick-up tube too close to the back of the tank can cause acceleration trouble. The pick-up tubes do grow longer with age, so check this. You want it to be 3/8"-1/2" from the back of the tank and be sure the clunk is heavy enough for the tube to follow the fuel. I have seen fuel tubing get old and become rigid — the clunk staying suspended 1/2" above the bottom of the tank.

You did not say what you are using for fuel or glow plug. If a home brew, try a good commercial fuel such as K & B 500, Duke's, Cool Power, Sig's, etc. Also a K & B or Fox idle bar plug. Some of the bargain jobs available through the discount houses leave a lot to be desired. Some are good and some are real bad. Also be sure there is no excess fuel line between the tank and engine that under "G" loads could be bending and shutting off the fuel. Some fellows like to leave their fuel lines longer than necessary to aid in refueling. The filter that should be used in the line then flops around causing all kinds of fuel trouble.

Dear Clarence,

*I recently finished Chuck Cunningham's Lazy Ace powered with an O.S. .80. The bird weighs about 11 1/2 lbs., and flies beautifully — but slow — too slow to really have some fun with it. The .80 is swinging a 13 1/2 prop and seems to be putting out as much power as any .80 on the field (10% nitro).*

*I tried to get more power by enlarging the venturi by 25% and the muffler discharge opening by 20%. The results were disappointing (muffler pressure was used from the beginning).*

*I believe about a year ago you had covered PDP modifications for some .60 engines, and was wondering whether or not these modifications could be used to get 15% to 20% more power out of the O.S. .80. My gut feeling is that this engine has too much internal*

to page 177

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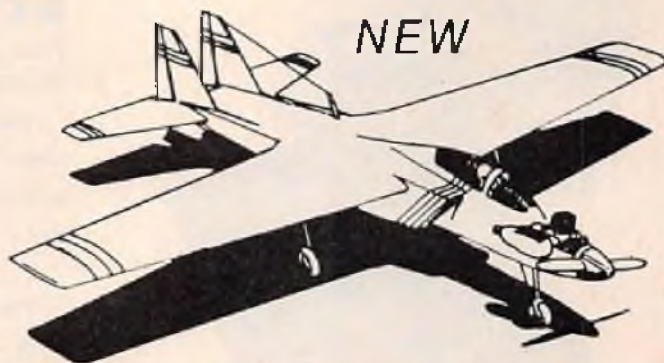
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from page 174/10

volume to breathe properly. Please let me know what you think can be done to get some power out of this beast. I have a machine shop.

Sincerely,  
Hill S. Lalin

Wayne, New Jersey

Chuck Cunningham's "Lazy Ace" has a ton of drag built in and was never intended as a high performance machine. It is supposed to fly around the sky slowly. I don't think there is anything you can do to the O.S. .80 that is going to make enough power difference to improve flying performance to any extent. You need a Quadra or one of the power reduction units that will let you swing a larger prop if you want to improve performance of the aircraft.

Although the PDP porting modification could be incorporated in the O.S. .80, it would only give you a 300-500 rpm gain. You would need more than this to show any benefit.

Enlarging the carburetor did not buy you anything because the engine is not turning fast enough to need the extra air. If you were to use a smaller prop and wind the engine up faster, then the larger carburetor would show some gain.

It has been a couple of years since I had an O.S. .80 apart. I remember at the time thinking that the drum valve intake was pretty restricted and that opening up the inlet area would help considerably. Also, timing at that time was rather conservative. Check the drum valve timing and modify it to open 35° after bottom center and to close 50° after top center.

Dear Mr. Lee,

This is the first time that I have turned to you for help. I will be very grateful to you if your advice will solve my problem, which is the following:

I built two Fiesler Storch models and in both models (one is semi-scale, the other is full scale) the engine is mounted inverted (the semi-scale is an O.S. .35 R/C, the full scale is an O.S. .40 FSR R/C engine).

I have trouble with glow plugs and with shorts and idle. All my model buddies and myself run out of ideas on how to solve the problem in order to have a reliable engine run in both models. I use Fox long R/C plugs and now I will experiment with other makes (Fusite, Glow Devil, etc.).

Hope you will be able to give me your expert advice, so I could fly with calm nerves and reliability.

Thanks for your kind answer!

Miklos Bencze  
Dothan, Alabama  
to page 181

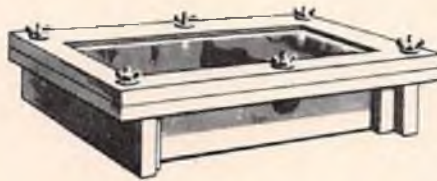


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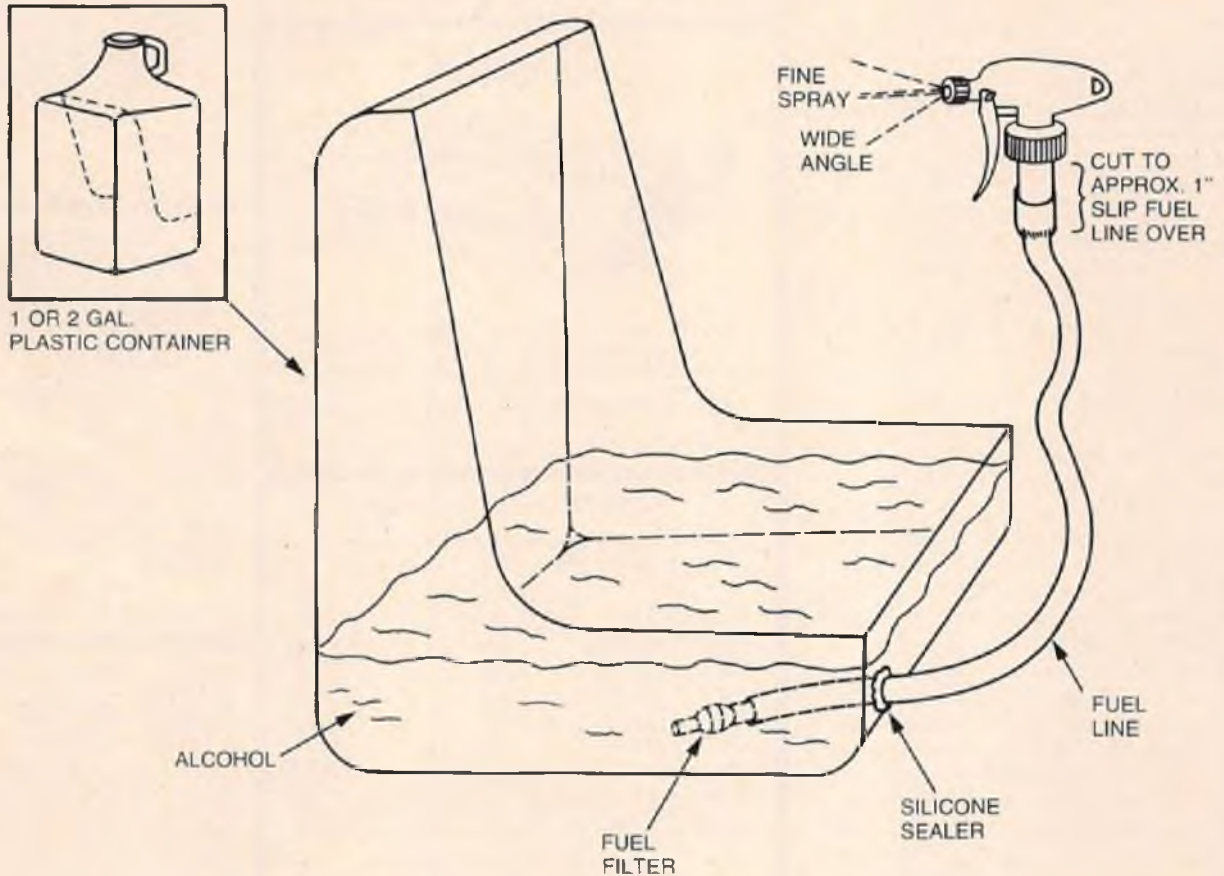
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# A BETTER WAY TO CLEAN ENGINES

By Bob Zimmerman

Out of pure necessity, I've come up with a very simple, efficient idea to clean engine parts. The sketch is mostly self-explanatory. You can let the engine parts soak in the alcohol to loosen dirt and grease, then spray them to remove the dirt in crevices, etc. The sprayer should preferably be one with an adjustable nozzle so you can concentrate the spray into crevices. These sprayers are available on many commercial cleaners, etc. The filter keeps dirt from entering the tube, thus permitting circulation of clean alcohol at all times. The hooded back-drop prevents overspray.

This set-up is especially useful for cleaning up a dirty engine after a crash. □



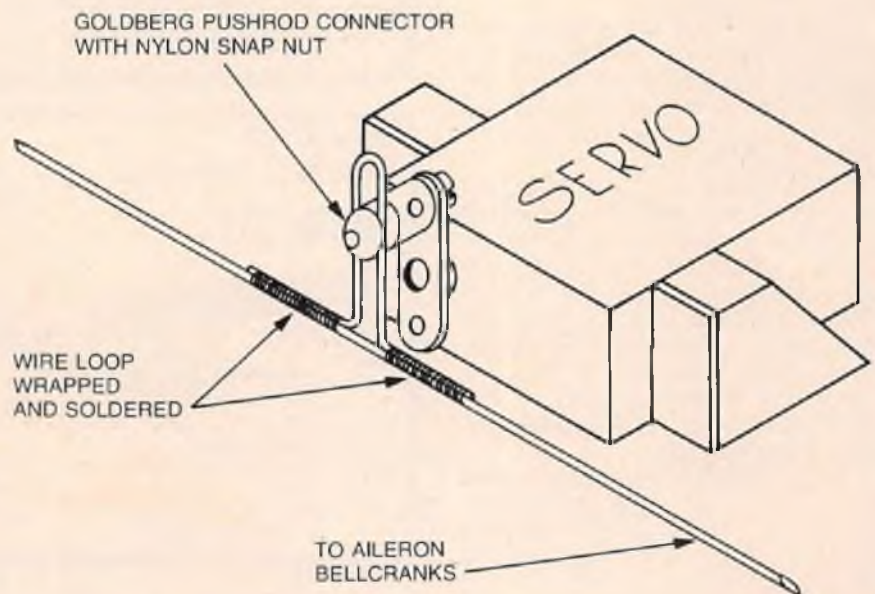
# AILERON SERVO CONNECTION

By Nathan E. Root

Most of my airplanes use bellcranks in the wings for aileron movement. The usual set up for the movement bothers me because of the constant flexing of the bellcrank wire, which also causes the aileron servo to do unnecessary rocking against its grommets.

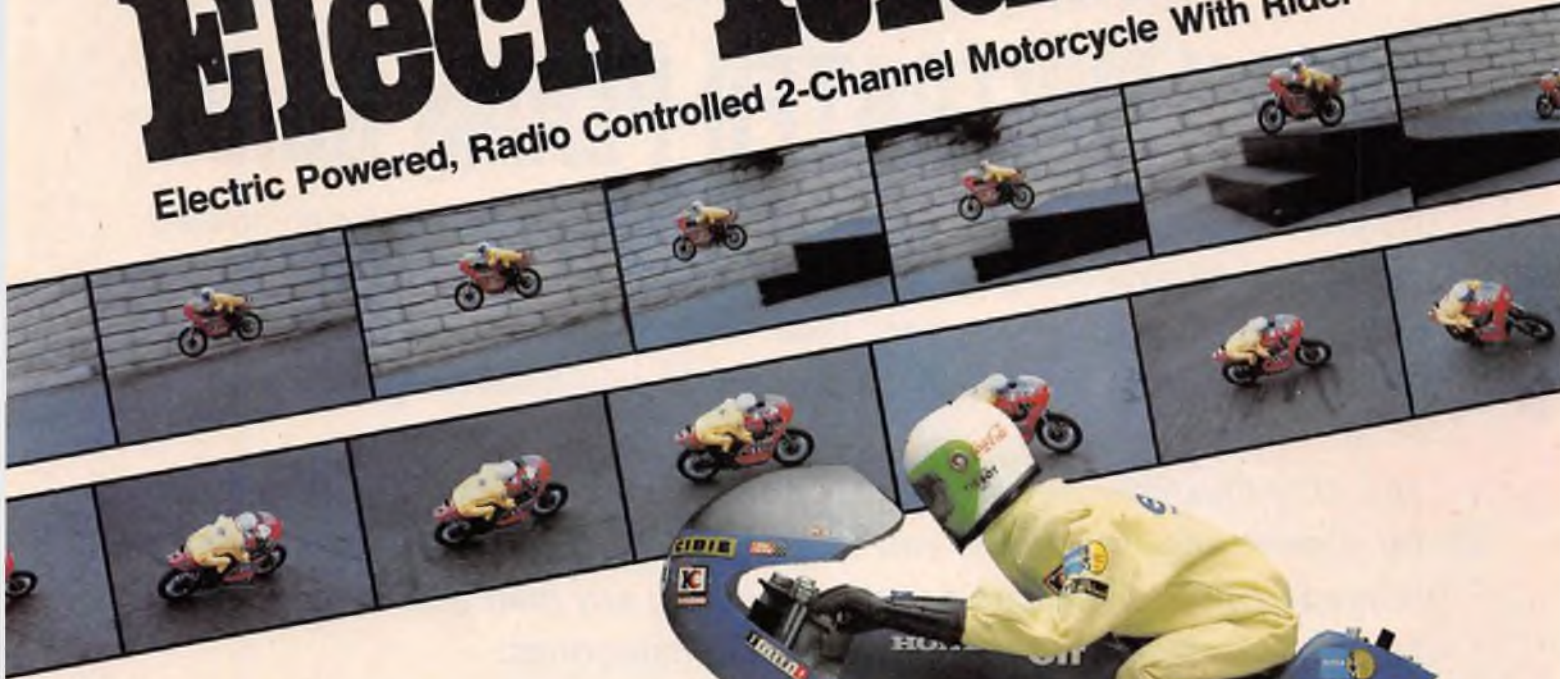
To remedy this I designed a system to allow the servo arm to move freely in its natural arc; and to keep the bellcrank wire moving straight without any flexing. As the drawing illustrates this system consists of a short piece of wire, a Goldberg pushrod connector and a standard servo arm. Make the bellcrank wire a straight shot between the bellcranks. Loop the short piece of wire, as shown, around connector pin so it slides freely with minimum play. Screw the connector to servo arm and mount servo as shown. Wrap and solder bent wire to bellcrank wire, insert connector pin and snap on nylon retainer.

Be sure to use steel collars with a dab of grease on pin. The brass connectors are too soft and can wear out. This system has worked quite well in my 60 powered airplanes. □



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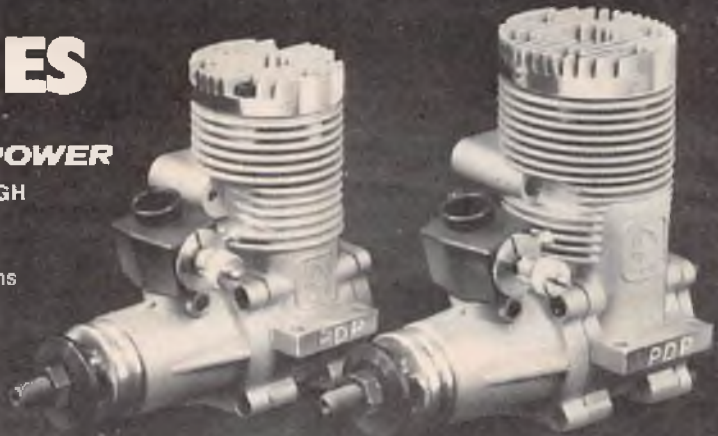
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## ENGINE CLINIC

from page 177/10

When you run an engine inverted you can expect to have idle problems. Any excess fuel or oil in the combustion chamber is going to run directly into the glow plug cavity and put out the fire. Some engines will have better idle characteristics than others, even between engines of the same make, and will be more tolerant. However, when running an engine inverted, everything has to be just right --- tank position correct, idle mixture right on (a hair on the lean side), etc., etc., A lot of variables effect the idle even in upright installations. Running an engine inverted is only asking for problems.

The best solution that we have mentioned many times in this column, is to use a nicad battery connected to the glow plug that is turned on by a micro

switch at speeds below half throttle.

The following letter pertains to a counter balance modification to the old Drone Diesel which helped the vibration problem. Many of you have probably never even heard of the Drone but it was designed and manufactured by Leon Shulman back in the mid-1940's. Leon is still engaged in the R/C business as a manufacturer's representative.

Although the suggestion pertains directly to the old Drone, it can also be applied to any engine without adequate counter balance --- the converted chain saw and utility engines such as the Quadra, etc., in particular.

The idea of exterior counter balance has been used in various ways as long as I can remember. Many times an engine that vibrates considerably can be smoothed out by using a propeller with a heavy blade. The heavy blade being

placed on the same side as the counter balance of the engine. This will only help if the engine does lack adequate counter balance. A certain amount of vibration is normal in a two cycle single cylinder engine.

Another application of external counter balance would be with the new K & B 7.5 ducted fan engine. Normal procedure is to fully balance the fan. Before doing this, try running the engine with the heavy side of the fan on the same side as the counter balance. In some cases it does seem to help vibration. The Scozzi Fan (now manufactured by Larry Wolf of Jet Hanger Hobbies) will usually have a slightly heavy side.

I wasn't able to run the picture mentioned in the letter due to it being a Polaroid print of small size.

Dear Clarence,

I call the enclosed picture "The Drone

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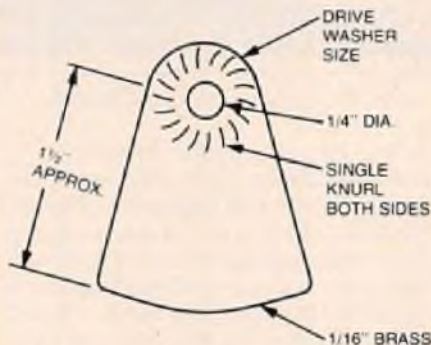
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*Diesel flies again." I made an adapter (on my 6" Atlas lathe) to fit a 20 size Perry carburetor to the plain bearing model Drone. The engine really likes R/C. It revs up to 6000 or so on a 12/8 Top Flite, or down below 1000 when throttled back. It runs much slower than the usual glo engine at our field. We fly the old timers low and slow for 10-15 minute engine runs just to see the sunlight through the transparent MonoKoted wings. The plane is my own design - sort of copied from Miss America. The Drone is a notorious vibrator so you might be interested in the external counter weight I made for it. I didn't want to modify a valuable collectors item such as a Drone in any way that was permanent so I made an external counterweight to place between the drive washer and the prop.*



*It must be positioned so it's exactly opposite the crankpin. The dimensions are trial and error. It seems to cut down on vibration somewhat. Fuel 50% ether, 50% SAE 70. You can use the picture and ideas in your column if you want.*

Regards,  
 Gus Munich  
 West Islip, New York. □

## CUNNINGHAM ON R/C

from page 8

though these are really in the minority. Ailerons and elevator on the stick, rudder on the big round knob on the top of the stick, and throttle on a small lever on the side of the transmitter. You have to cradle this transmitter in your arms to fly it properly. A number of the newer two channel rigs have divided sticks --- the left for elevator and the right for aileron, and some two channel rigs have but one stick. Again, it depends upon what you want in the future, but if you're going to be serious about learning to fly RC from the ground up, then do not purchase a two or three channel rig. Save your money until you can buy a full four channel set-up, complete with four servos, and nicad batteries. Later, when you develop a special interest such as soaring, you can purchase a two or three

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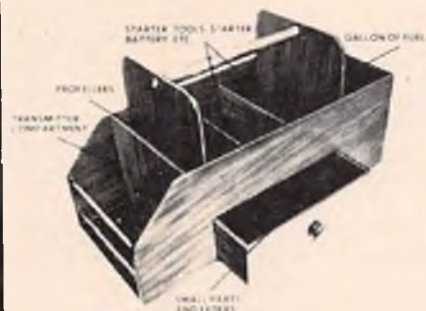
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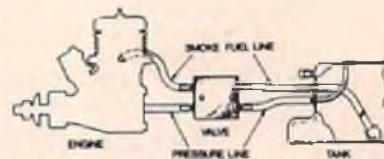
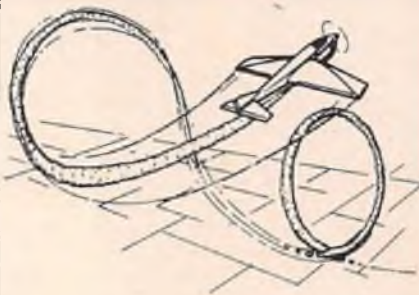
channel radio set. I have seen way too many beginners take the least expensive way and purchase a small two channel radio, and then be very unhappy when they want to graduate to an aircraft that has a throttled engine, and ailerons. One thing that you as a beginner do not need is a seven channel radio with rate selectors, roll buttons, servo reversing at the transmitter, and so on. Leave this type of radio to the real experts in scale or pattern. You're going to be happy with a four channel radio for a long time.

But, take one more look at the radio situation. If you want to fly, and you have to operate on a limited budget, then you should consider the two and three channel, non-nicad type of system. Again, it all comes back to you and what is it that you want to do, not just today, but six months from now, or next summer. If you will be content with a small aircraft flying on rudder and elevator, and you won't want to progress past this stage for a long time, then go this route, but if you really want to stick with the sport and fly an aircraft with all normal functions, then buy this type of radio. No other person can really decide for you, you must make this choice first, then go from there.

Our next question is what size engine to buy, and what size aircraft to purchase for this engine. More options exist here than in the great radio muddle. Again, we have to assess your true feelings --- big aircraft or small, large engine or small, glider or power, or a combination of both. What is most flown in your area? How much does fuel cost in your area? Do you fly from a grass field which is mowed closely, or one with tall weeds, or do you fly from a paved runway? Are there lots of wide open spaces, or is the local field surrounded by high trees? How about the wind in your area --- does it blow a good part of the time, or is it pretty calm where you live? My gosh, and you thought that all you had to do was wander into the corner hobby shop, plunk down a bunch of inflation dogged dollars and get started.

Many years ago I advocated that most beginners get started by building and flying an aircraft powered by a .19 size engine. Not too bad a thought, even today with all of the super power around. There are many nice kits on the market for the .15 to .19 engine, many of them almost totally pre-fabbed, and they all fly pretty well. It is really a pretty good place to start. Or, you may want to go the more modern route of starting with a .40 size engine and medium sized airplane. Most .40 engines are not bad on the fuel consumption side, and have plenty of power to fly most reasonable sized aircraft. You don't want, or need, to buy any type of a racing .40 engine. Purchase a nice middle of the road engine like the K & B .40 or the Max .40

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or similar. You don't need pumps, special porting, or anything that makes the .40 a more powerful engine. What you want is to purchase an engine that is easy to start, has a long life, runs reasonably well, and has an easy to set idle. Many of the popular .40 engines will idle right out of the box, with no one needed to screw around with the carburetor. For the most part, leave the large .60 engines until you want to go into larger aircraft. A .60 will burn almost twice as much fuel, and require a larger airframe to support it. And, for you beginners, stay away from the engines that require a tuned pipe, or a .90 size engine or a big gas and oil engine. Save this thrill for the day that you can handle it.

The choice of aircraft to go with your new engine is, again, quite often dictated by what's flying in your local area. For gosh sakes, don't try to scale aircraft for your first effort. You want to build an aircraft that is simple, easy to build, and repair, has a shoulder or high wing, has a long landing gear to save wear and tear on expensive props, and one that has lots of wing area. You don't need to go fast, you need an aircraft that is easy to fly, forgiving in nature, and is not an overpowered, overloaded flying bomb. All too often I have seen new pilots at the flying field with their new pride and joy . . . one that will go about two thousand miles per hour and lands at one hundred and fifty mph . . . or at least it seems that way. The aircraft flies great in the hands of an experienced pilot, but in the hands of a beginner it becomes awfully hard to handle, and the fledgling pilot has one heck of a time trying to learn to fly it.

I'm not going to make all of the kit manufacturers in the country angry at me by telling you which kits to buy, and which ones to pass up until you gain more experience, but what I am going to tell you to do is to question your local hobby shop closely, asking the questions that I have asked earlier, and come up with an aircraft that is best suited for your area, and for your interest.

Later in this series we are going to explore building and flying your new bird, the use of controls and trims, how to get into the air and down again, tricks of the trade when it comes to setting up your aircraft for that all important first flight, how to make a take-off with a two wheeled gear aircraft, how to preserve and protect your equipment, and so on. Stick around for the ride, you just may learn something.

★  
For the rest of you guys who have stuck along through the information for beginners, don't despair, each month I will try to pass along a few tips for the experienced pilot. This one concerns the Webra .91 engine. This is a great engine, with tons of power. It yanks my

new aircraft (with 1500 square inches of wing area and weighing 16 lbs.) just fine, but for a time I was about to give up on it because it simply would not run rich enough --- it would lean out on every run. I drilled out the pick-up on the Kraft 16 oz. tank a couple of sizes larger, went to larger fuel tubing, etc., and pressurized the tank from the exhaust stack, but still no luck. Suddenly my friend Oscar Slaughter said . . . "Why don't you get a pump . . . ?" Oscar was just as right as rain. The addition of the Robart high capacity pump to the engine made all of the difference in the world, now it is a running dude. It seems to enjoy operating best on a 14/6 prop. If you're going to a large engine, think about investing a bit more and getting a pump. Perhaps the carburetion will get worked out sometime, but for now, if you're having trouble, get a pump. □

#### FROM THE SHOP

from page 2

. . . lucky to be alive.

**First, don't ever start your biggie without some kind of restraint, preferably a helper who is well braced to restrain the bird at full throttle. If there is no one around to help you, drive a stake into the ground and tie the tail down! Always start your bird with the full expectation that it will go to full throttle instantly.**

**Second, if it is at all possible, start your bird from a standing position. Most of our birds are big enough that this is quite easy to do, indeed, for many of them, this is the easiest position for starting. This is important for two reasons. If you kneel in front of the plane, you are directly in front of the prop, and you are "tied down," unable to move quickly should the plane lurch forward. From the standing position, you are usually off to one side, and you can move quickly should the need arise. This position also gets your forearm farther away from those prop tips if you still restrain the bird with your opposite hand.**

**Third, to avoid almost all danger from the props, stop flipping them by hand to start them. If you really want to be a show-off and totally impress every crowd you fly in front of, install an On-Board Electric Starter! That is the safest possible alternative, and they really work great, I can attest to that. Eastcraft Specialties make one of the most thoroughly engineered units I have ever seen in the hobby.**

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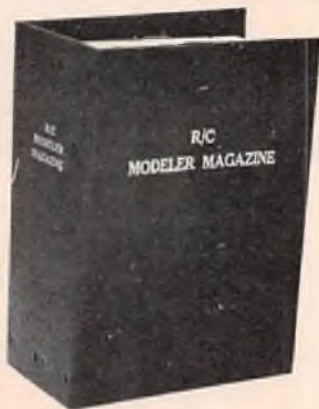
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# ADVERTISERS INDEX

1 Ace Radio Control	169	54 Gee Bee Products	182	107 O.K. Woodworks	166
2 Aeromarine Enterprises, Inc.	166	55 General Varionics	139	108 Orange Coast Hobbies	149
3 Aero Plan	174	56 Glazendanner	140	109 Original Min	170
4 Aerotrend Products	182	57 Halco	170	110 Pat's Corner	156-157
5 America's Hobby Center, Inc.	172-173	58 Harry B. Higley & Sons, Inc.	181	111 Paul Clements' Kitty Hawk Models	135
6 Associated	93-154	59 Heath Company	87	112 Perry Aeromotive	142
7 Astro Flight	12	60 Heli-Center West	169	113 Polk's Hobby Dept. Store	174
8 Authorized R/C Service	129	61 Hi-Flight Model Products	98	114 Prather Products	144
9 Balsa U.S.A.	14	62 Historical Air Collection	182	115 Precision Products	117
10 Bavarian Precision Products	181	63 Hobbies For Men	124-125	116 Procter Enterprises	112
11 BD Hobby Warehouse	128	64 Hobbyist	114 to 119	117 Pro-Line	152
12 Big Bash Contest & Swap Meet	96	65 Hobbyist	112	118 Quarter Scale Associates	161
13 Bill Evans Air/Craft	151	66 Hobby Lobby Intl.	34-36-7	119 Radar Co. Ltd.	138
14 BK Products	114	67 Hobby Market	83-84-85	120 Ralph Solderer	174
15 Bob Drively Model Aircraft, Inc.	145	68 Hobby Shack	89-130-131-132-133	121 RCM Anthology Library	120-121-180
16 Bob Marlin R/C Models	161	69 Hobby World	92	122 RCM Binders	186
17 Bridl Hobby	100	70 Horner's Sales	184	123 RCM Plans Service	187
18 Brown Hobby Center	179	71 House Of Balsa	26-82	124 RCM Products	186
19 Bud Nosen Models	80-81	72 Howard B. Huebl	82	125 RCM Subscription Service	176
20 Byron Originals	24-25	73 Idea Development, Inc.	177	126 Rebel Radio Control	143
21 Caddell-Hallock	174	74 IMS	78	127 Redco	160
22 Calgary Hobby Supply Ltd.	185	75 Indy RC	190-191-192-3rd Cover	128 R/L Control Systems	154
23 Cannon R/C Systems	135	76 Jack Stafford Models	123	129 Robart Mfg. Co.	181
24 Carl Goldberg Models	11	77 JCM Specialties	183	130 Rocket City R/C Specialties	182
25 C & D Enterprises	126	78 Jemco	90	131 Rosie's R/C Products	165
26 Classic Models	154	79 Jet Hangar Hobbies	185	132 Royal	13-95
27 Consumer Hobby Corp.	136-137	80 J-5 Enterprises	177	133 San Antonio Hobby Shop	158
28 Coverite	18	81 JolMac Products Inc.	171	134 Satekline City	123
29 Cox Airtronics	113	82 Kalmbach Press	148	135 Schluter Products	161
30 Crab-Air	141	83 Kavan	101	136 Schroders R/C Specialties	134
31 Custom Woodcraft	150	84 K & B	153	137 Sheldon's Hobby Shop	128
32 DaCa Model Products	168	85 Kendal Model Engines	174	138 Sig Manufacturing Co.	20-21
33 DA Enterprises	148	86 Kraft Midwest	134	139 Skycraft Associates	170
34 Dave Platt Models, Inc.	86-87	87 Kraft Orange County	94	140 Sky Master Industries	126
35 Dave's Custom Models	28-29	88 Kraft Systems	9-76-127	141 Sonic Tronics	88
36 D & D Hobbies	112	89 K & S Engineering	183	142 Southwest Modelers Show	158
37 Des Tak Industries	183	90 Lanier Industries	167	143 Standard Hobby	162-163-164-165
38 Distribution HQ	174	91 Lica Systems	155	144 Sterling Models	138
39 Du-Bro Products	91	92 L.R. Taylor & Co.	150	145 Stewart Aircraft	159
40 Dunham's R & R	170	93 M.A.C.K. Products	185	146 Thorp Manufacturing	151
41 Dynatruss Props	148	94 Marz	94	147 Top Rite Models Inc.	31
42 Eastcraft Specialty Products	152	95 Michigan Hobby Hangar, Inc.	167	148 Tower Hobbies	102 thru 111
43 Edson Enterprises Inc.	140	96 Midwest Model Supply Co.	90	149 Twinn-K, Inc.	82
44 Electronic Model Systems	105	97 Millcatt Corp.	184	150 United Hobby Supply	123
45 Empire Models	146-147	98 M-K Model Products	79-142	151 Vortec	144
46 E.W.M. Specialties	98	99 Model Merchant	100	152 Vonac Mfg. Co.	112
47 Executive Engines Co.	129	100 Model Rectifier Corp.	4th Cover	153 Warehouse Hobbies	127
48 1st Annual 2-Meter World Cup	150	101 MPS Products	82	154 Williams Bros.	94
49 Flightline Shirts	168	102 Mutchler's Hobbies	99	155 Wing Mfg.	174
50 Hitecraft Models	23	103 NASA	170	156 Winning Model & Hobby	184
51 Hylene Models	184	104 Northat Engineering	88	157 World Engines	96-97
52 Fox Manufacturing Co.	139	105 Nova Plastics, Inc.	160	158 W. Plekanzink, Hinterfeld 76	168
53 Futaba	2nd Cover	106 Novak Electronics	151		

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- |                                 |                              |                           |
|---------------------------------|------------------------------|---------------------------|
| 8. America's Hobby Center, Inc. | 49. Fox Manufacturing Co.    | 108. M-K Model Products   |
| 16. Bud Nosen                   | 51. Futaba Electronics       | 112. MRC                  |
| 20. Cannon R/C Systems          | 54. General Varionics        | 109. MPS Products         |
| 22. Carl Goldberg Models        | 57. Halco                    | 113. Mutchler's Hobbies   |
| 23. C & D Enterprises           | 59. Heath Company            | 121. Perry Aeromotive     |
| 25. Consumers Hobby Corp.       | 63. Hobby Market             | 123. Prather Products     |
| 27. Coverite                    | 69. Hobby Shack              | 116. Quarter Scale Assoc. |
| 29. Custom Woodcraft            | 71. Hobby World              | 136. Robart Mfg. Co.      |
| 31. DA Enterprises              | 77. Indy R/C                 | 140. Royal                |
| 35. Distribution HQ             | 83. Jemco                    | 165. Sterling Models      |
| 39. DaCa Model Products         | 88. Kavan                    | 176. Tower Hobbies        |
| 41. Edson Enterprises Inc.      | 90. K & B Aurora Hobbycrafts | 171. Twinn-K, Inc.        |
| 44. Electronic Model Systems    | 94. Kraft Systems            | 174. Vortec               |
| 46. Flightline Shirts           | 96. Lanier Industries        |                           |

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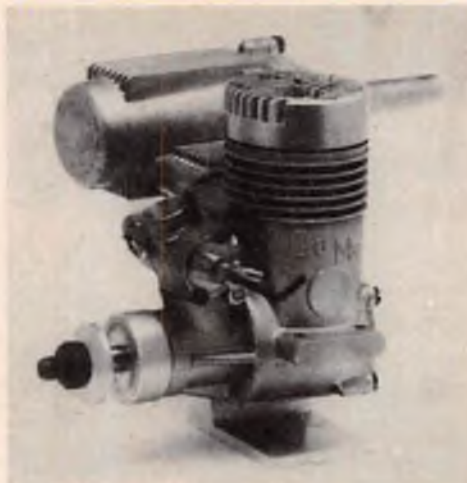
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WPK's all balsa kit of Hanna Prettnar's famous Curare 60. Comes complete with hardware and gas tank. 40 size engine. List: \$90.00. . . . . SPECIAL: \$68.50

## ENGINES



OS 15 R/C W/M

OS ENGINES	List	INDY
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OS 10 FSR R/C	38.00	28.50
OS 15 Std.	35.00	26.25
OS 15 R/C	42.00	31.50
OS 20 Std.	38.00	28.50
OS 20 R/C	46.00	34.50
OS 30 R/C	53.00	39.75
OS 30 Std.	48.00	36.00



OS 25 FSR R/C

OS 25 Std.	41.00	30.75
OS 25 R/C	49.00	36.75
OS 25 FSR Std.	57.00	42.75
OS 25 FSR R/C	64.00	48.00
OS 35 Std.	52.00	39.00
OS 35 R/C	58.00	43.50
OS 40 Std.	70.00	52.50
OS 40 R/C	80.00	60.00
OS 40 FSR R/C	93.00	69.75
OS 45 FSR R/C	109.00	81.75
OS 50 FSR	109.00	89.95
OS 60 FGR	104.00	78.00
OS 60 FSR	135.00	101.25
OS 60 FSR w/pump & carb.	155.00	124.50
Wankel	119.95	93.00
OS 36	122.00	91.50
OS 61 FSR	158.95	119.57
OS 90 R/C	225.00	158.00

### OS ENGINES WITHOUT MUFFLERS

OS 61 VF	159.95	119.57
OS 45 FSR-H	109.00	81.75
OS Four Cycle	225.00	158.00
OS Four Cycle Twin	695.00	486.50

### OS MARINE ENGINES

OS 10 Sch Marine	46.00	34.50
OS 20 Marine	55.00	41.25
OS 21 FSR		
ABC Marine	79.00	59.25
OS 30 Marine	60.00	45.00
OS 45 RSR		
Marine ABC	126.00	94.50
OS 90 RSR		
Marine	299.00	209.00



OS 60 FSR w/pump and carb

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Std. w/o M.	42.95	32.25
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X-60 R/C SE	129.95	97.50
X-60 R/C RE w/PP & Carb.	155.00	116.25
X-60 R/C SE w/PP & Carb.	155.00	116.25
G60 ABC Ring Blue Head	99.95	74.50
Tuned Exhaust Pipes		
X-60 SE	36.15	27.50
X-60 RE	36.18	27.50



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Kumar 2.5cc	Specialty Priced	\$22.95
Kumar 3.5cc	Specialty Priced	\$26.95



NOTE: Indy just obtained a large collection of new and used diesel engines. Send self-addressed stamped envelope for list.

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Come 40 R/C's are back in stock! Our congratulations to George Parks who has had fourteen 1st places in the Quikie 500 contests this year, including the Southwest Championships at Dallas over Labor Day weekend.

If you have any old engines you want to get rid of, why not trade them in on a Comco, or any other engine we have in stock. Even your junk pile engines will be worth a couple of bucks. Send your engines along with \$1.00 and a list of engines you want to trade for and Bill, our engine technician, will get back to you real quick with a deal.

Now, if you are hunting a used engine, send a self-addressed stamped envelope Indy and we will send you a current used engine list. We rate our used engines on a scale of 1 to 10. 1 and 2 are pretty junky - good parts, some even run. 3 - 5 will run and fair compression. 6 - 8 runs well, average condition, average compression. 9 and 10 are terrific, super bargains. Many of these engines are new, still in their boxes.

So don't wait... send for the used engine list right away. Also, send us your old engine you would like to trade for.

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5 Ch SS-4 S	419.95	251.00

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5 Ch 4 Servos	249.95	157.95

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2 Ch SS-2 S	139.95	99.95
2 Ch Whl. 2 S	139.95	99.95
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KP-3C DS	219.00	175.95
KP-4A DS	309.95	209.00
KP-5C DS	389.95	305.00
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KP-7CS SS	529.95	409.95

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KPS-11, 12, 14, 15	44.95	36.00
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#### MILLS 075

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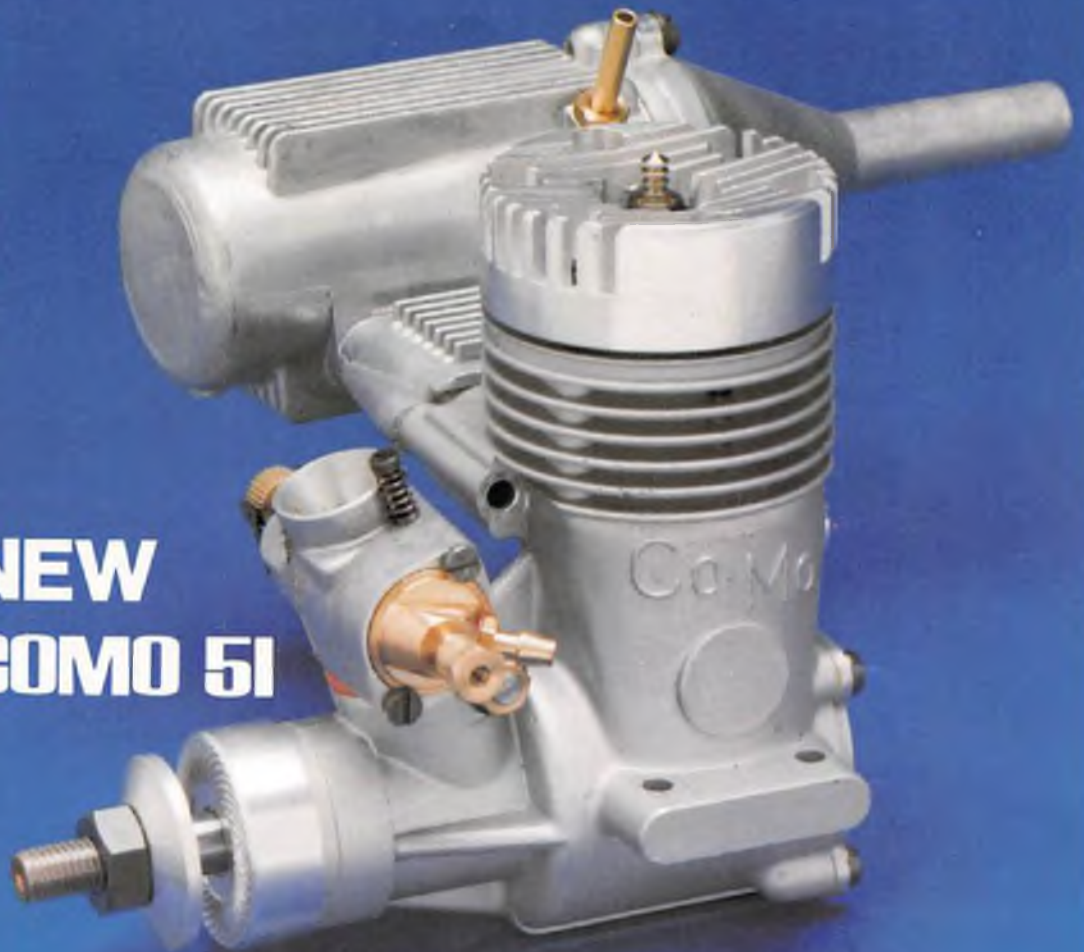
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COMO  
40 R/C**

**NEW  
COMO 51**



**COMO 40-51-40-51**

Two items this month that are very interesting - first, Como 51's are in production now and we should have them sometime this fall. The 51 is an extremely compact engine for this much displacement. We are also going to offer it as a U/Control engine for stunt enthusiasts. We are getting a shipment of Como 40's in first. A lot of you have them on order and you will be getting yours probably about

**COMO 40-51-40-51**

the time you are reading this in RCM. The second big news item this month is the fact that our friend, George Parks, won the "Quickie 500 Southwest Championships" in Dallas on Labor Day. George reports his contest record with his Como powered Cheetah is fourteen 1st places, two 2nd places, and two 3rd places out of eighteen races entered. He states that the plane holds the record for

**COMO 40-51-40-51**

his district and he thinks for the whole country - 1:39 seconds on the regular Formula I course. George has not heard of anyone turning a faster time on that course with a non-Schnuerle powered Quickie.

40 R/C - List: \$84.95 . . . . . INDY: \$55.95  
51 R/C - List: \$89.95 . . . . . INDY: \$59.95  
51 U/C - List: \$74.95 . . . . . INDY: \$48.50

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**INDY**

**ARROW**

The word we have from Africa at this time, and it is not verified, is that Wolfgang Matt won the World Pattern Championship with his Arrow. We are offering an MK kit of the Arrow. MK produces meticulous quality balsa kits. This Arrow balsa kit includes a spinner and gas tank along with complete hardware and it is made for MK retracts (List \$49.95-Indy \$39.95). Most other retracts can be made to fit. The model, retracts not included, lists for \$119.95. Indy . . . . . \$99.95

**Matt's Arrow 60**



# THREE SCREAMING, SCORCHING SCHNEURLES

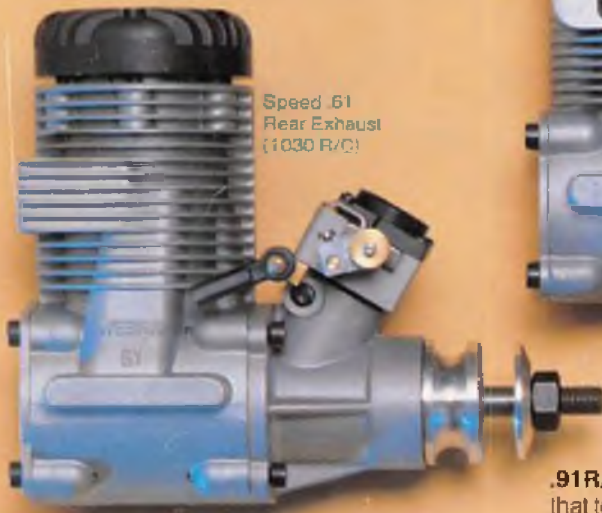
**MRC-Webra's Awesome Threesome...** You're looking at three of the most powerful engines MRC-Webra has ever made. An awesome array of brute force and controlled performance. Each has been carefully honed for the 80's... and each comes with our new slide valve Dynamix carburetor... the most advanced and efficient carb ever designed... proven in competition by the world's national and international champions.

and internal championships to it's credit. It's ready now for another decade of titles, with increased RPM's, improved timing and advanced porting.

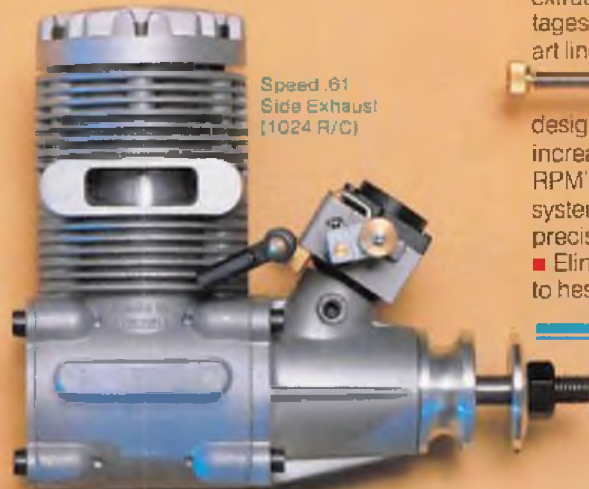
**State Of The Art Carb...** Each of these engines has in common the new MRC-Webra Dynamix Slide Valve Carburetor featuring with these extraordinary advantages: ■ State of the art linear



design increases RPM's ■ Advanced fuel metering system controls flow ■ Adjustable lever for precise matching of carb to servo throw ■ Elimination of sag at mid-range and end to hesitation.



Speed .61  
Rear Exhaust  
(1030 R/C)



Speed .61  
Side Exhaust  
(1024 R/C)

See these three, hot Schneurle ported screamers at your hobby dealer... and get ready for the 80's and beyond.

**The (1030R/C) Schneurle .61** with rear exhaust is new with a beefy 17mm crankshaft, a hefty crankcase and jumbo ball bearings. It can handle top end heat in stride, easily reaching 1.85hp at 16,000 RPM. It's the ultimate pattern engine.

And there's no secret about the proud past of these other two screamers. **The big (1024R/C) Speed .61** with a slew of nat

Ready too for tomorrow is the **.91R/C (1037R/C)**, the brute that took the '78 Tournament of Champions single handed with 18 of 28 entrants using it to harness pattern power... including the winner. It too now has the Dynamix carb and it too is bursting with raw force for the big payloads and 1/4 scale craft of the 80's



Speed .91  
Side Exhaust  
(1037 R/C)

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