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The FP-3S. Three channels. Two servo choices. Single-stick control.



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EDITORIAL

From The Shop 2

FEATURE ARTICLES

| | |
|-------------------------------------|-----|
| Art Chester's Jeep | 32 |
| R/C Flying and the Law — Part VIII | 40 |
| A New Horizon: The Outboard | |
| Tunnell Hull — Part III | 42 |
| A Different Outlook on Tools | 44 |
| Snark | 48 |
| Retract Wheel Wells | 52 |
| RCM Product Report: The L.R. Taylor | |
| Co. Multi Charger | 53 |
| Saracen — Easy Packer | 54 |
| 1/2A Foam Learjet | 56 |
| An RCM Tribute To Walt Schroder | 66 |
| Realistic Rivets | 78 |
| Can You Disc It? | 79 |
| Save Those Pieces | 88 |
| RCM's Model of the Month Contest | 100 |

DEPARTMENTS

| | |
|----------------------|----|
| Cunningham On R/C | 8 |
| Engine Clinic | 10 |
| Sunday Flier | 16 |
| Big Is Beautiful | 22 |
| Pit Stop | 27 |
| Here's How | 64 |
| Radio Spectrum | 67 |
| Soaring | 71 |
| Scale Views | 74 |
| Cap'n Dick's Cockpit | 76 |
| For What It's Worth | 82 |

PRODUCT TESTS

| | |
|--|----|
| OK Model Co., Ltd.: Cutlass 20 | 46 |
| M.E.N.: Minimousetang | 47 |
| Carl Goldberg Models: Skylark 56 Mark II | 72 |
| Peerless Corp.: Porsche 935 Turbo | 73 |

MERCHANDISING SERVICES

| | |
|-------------------|-----|
| Showcase '79 | 84 |
| Readers Exchange | 188 |
| Advertisers Index | 189 |
| Readers Service | 189 |

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This Month's Cover

features a unique shot of a Dumas Pay'a' Pack hydro against a vivid sunset on a lake in West Germany. The hydro is powered by a K & B 3.5 cc Marine engine with modification for a tuned pipe. Ektachrome transparency by Enno Roepke.

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From the Shop

DON DEWEY

Leon Shulman was inducted into the Model Aviation Hall of Fame in Las Vegas in 1978. Lee built his first flying rubber powered models in 1932 from kits obtained by sending in "Cracker Jacks" box tops. He won several "ribbon" awards at Junior Birdman contests as a teenager. He built and flew his first gas powered free flight model in 1936 and was awarded license "I.G.M.-0-52-1" by International Gas Model Airplane Association, and signed by Charles H. Grant. Lee pioneered one wheel model designs in the mid to late 1930's with the contest winning Sky Scraper and Sky Rocket designs.

Leon Shulman



He was very active in gas model free flight activity and won the National Model Airplane Championships, Class A in 1939, with his Sky Rocket, in 1940 with his Wedgy, and in 1941, his Zomby won. In late 1939 he was appointed "Director" of the Kresge (department store) Aero Club in Newark, N.J. and lectured and taught thousands of youngsters to build and fly model airplanes. He directed the Annual Eastern States Gas Model Championships at Hadley Field, N.J. in 1939-1941. Several of his gas model free flight designs were kitted — the Sky Rocket, Zomby, Banshee, and Zoomer.

Lee joined the U.S. Air Corps as an Aviation Cadet and earned his wings as a pilot and commissioned officer during WW II.

In 1946, while still active in free flight, he developed the Drone Diesel engine and related line of fuel, propellers, and airplane kits. He phased into the hobby model industry at different levels from manufacturer to distributor to his present work as a Manufacturer's Representative specializing in the hobby and crafts field.

Lee was also Contest Director for the AMA Nationals, and on the original Nationals Contest Council in the 50's, which was the basis for the current set-up used each year. He was extremely active in the AMA as district Vice President and also as Contest Board Chairman for several years. An important contribution was his revising the AMA Rule Book and organizing it into sections, paragraphs, numbers, and categories, making it a bible for all model builders.

In 1971 he developed the "Shulman System" of R/C Contest management which is presently being used worldwide. Although he initially enjoyed the hobby in the free flight category, he went into control line and then into radio control — always for the sport of it but, being very competitive, made his mark as a "winner" at the Nationals in each category he entered. He always belonged to model airplane clubs — the original Junior Birdman, T.A.M.B.E. Club, Skyscrapers, Kresge Aero Club, Linden Model Airplane Club and, since 1954, to the Central Jersey R/C Club. He is an honorary member of several other model airplane clubs throughout the country. He has made many friends worldwide through his hobby and a more dedicated hobbyist will not be found.

Our congratulations to Leon Shulman.

We have a problem in which you, our readers, can really help us as well as yourselves very easily. The problem is, quite simply, the volume of mail that we receive each month requesting answers to specific questions pertaining to R/C modeling. While we are always happy to receive your letters and want to provide the requested information, the volume of mail makes this virtually impossible. We make a sincere effort



Earl Witt, President of the A.M.A., presenting Leon Shulman with Honorary Model Aviation Hall of Fame Award, November, 1978 at Las Vegas International Tournament of Champions.

to answer each one as promptly as possible rather than print a selected few in a "Letters to the Editor" type column several months later.

How can you help? First, simply by stating the question clearly with enough information to explain your particular situation. Then, leave enough space at the end of your letter for us to insert a brief answer to each question. In this manner we can read the letter, scribble in the answer, stick it in that self addressed stamped envelope that you enclosed with your letter, and have your answer back in a couple of days. If we have to do the whole enchilada, such as dictating or writing a separate letter, addressing individual envelopes, etc., somehow it doesn't happen as rapidly, while the backlog of unanswered mail gets deeper on our desks. If you will help us in this way, we, in turn, can help you more rapidly and efficiently.

Speaking of mail, we are occasionally afforded a chuckle from letters such as the following:

Dear Mr. Dewey:

I am writing to tell you how much I enjoy your magazine and the new airplanes you present.

I am not an expert; I made one R/C plane and that was from your magazine. I had some problems with it, but the last crash solved them.

I have now designed and built a plane that I think you would like to put in your magazine. It is very easy to build, it only took me six months after the drawings were finished. I had to re-do the drawings several times because the parts wouldn't fit --- they do now. Although the plane doesn't look much like the drawings, it's still kind of pretty.

I did have some problems though. I used a cooking pan for the cow! and it really looks good, but it keeps falling off. I can't get the glue to stick to the Teflon, and the handle has hit the prop a couple of times. Maybe you have a suggestion.

I sure don't know how you people use epoxy to paint airplanes. By the time I squeeze it out of the tubes and mix it I can't even get the brush into it, much less paint it on the plane. All it did in my spray gun was make a big lump in the jar.

I tried MonoKote but I don't understand how you people get such nice looking planes using it. After sticking it down I wet it three times, but it didn't shrink a bit. It looks like a sandwich bag on my airplane.

to page 185

**BRAND
NEW!**

Hobby Lobby's 12 FOOT TELEMASTER \$159

List price \$199.00

This is one of the most interesting and well-thought-out RC planes you'll ever build and fly. But, at the same time it's also a bit ridiculous. For example: The fuselage is 8 feet long. Each wing half is 6 feet long. The flaps (yes, Virginia, there are flaps) have an area about the same as the entire wing area of a Jr. Telemaster. The barn door ailerons are enormous, but are designed to be operated by only one little tiny servo.

The 12 Foot Telemaster is huge, but at least we made it so it comes apart for "easy" transporting (he said, as he choked back a sardonic laugh)—the wing halves and struts come off; the fin and stab come off; the main landing gear comes off.

The "serious" side of the 12 Foot Telemaster is this: It is intended to be a light wing loading airplane. At a flying weight of 20 pounds (with Evra engine) and a wing and lifting stab total area of 3729 sq. in. (yes, a lifting stab—shades of old-timers!) the wing-stab loading is about 13 oz. per sq. ft.—like a glider! The 12 Foot Telemaster is, therefore, a very, very slow and gentle flying aircraft.

Nearly everything about this kit involved some innovation or copying of full scale aircraft design: The structure is quite like a full scale airplane; The wings were designed to be structurally sound without any covering material and can therefore be covered with inexpensive plastic covering materials; The hardware like the aileron bellcranks had to be specially made; The control surfaces use air boost techniques like full scale airplanes where necessary (the ailerons each have a trailing edge boost tab



that moves in opposition to the aileron's movement); The airplane is designed to accept our aluminum Evra engine shock mount that uses 4 rubber Lord engine mounts as in full scale aircraft. I mention all this to point out that the 12 Foot Telemaster is not just a scaled-up model airplane—it's practically unique.

The gentleman in the photo is Joe Bridi whose company builds the 12 Foot Telemaster kits for Hobby Lobby. The kits are magnificent.

In fact, I think these kits are so excellent that I'll make you this deal; If you get your 12 Foot Telemaster kit and look inside and say: "Hobby Lobby is NUTS—I do not want this much balsa wood, nor do I want this absurd huge albatross of an airplane casting its ecology-upsetting shadow over my flying field", you can give it back to the UPS driver and I will reimburse you the \$159 you paid AND send you a \$5 bill for the trouble you went to just to take a look

The engine for giant RC aircraft!

Hobby Lobby — EVRA 190
\$97.50



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Similar to full scale aircraft engine mounts. Almost totally eliminates vibration to the airframe!

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Just hacksaw it off where it exits the cowling.

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Hobby Lobby EVRA 190 Engine \$97.50

List price \$139.95

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

The Hobby Lobby-Evra 190 is a model airplane engine and not a lawn trimmer or chain saw engine: The cantilevered crankshaft does not have a protruding rear shaft; the carburetor is accessibly mounted on the rear of the engine; the engine has conventional beam mounting flanges. We also have a cast aluminum firewall mount available for it.

The Hobby Lobby-Evra 190 was designed to withstand sustained full-power running. It has large cooling fins, 4 ball or needle bearings, and a very strong conrod and crankshaft. Even the extra large prop drive unit and large prop washer were designed with giant RC aircraft in mind.

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

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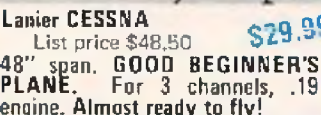
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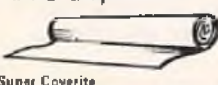
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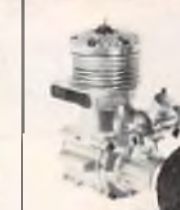
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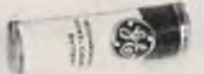


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HOBBY LOBBY
CANADA



I really is a bit of a problem trying to keep a continuous flow of ideas from column to column. This is due to the time lapse between when I write on a subject, when the ideas are printed, when the feedback comes in from you readers and, then, when I comment on this feedback. Really, about 6 months is the average for the total idea span. Then, add to that the possibility of feedback from the last column in the series, with more comment, and you can get a span of a year. By that time, I've probably forgotten just what the idea was that triggered off the first column, and you probably have forgotten all about the whole mess anyhow. The column that I wrote for the January 1979 issue brought in a bunch of return mail, and I would like to pass these thoughts on to you. I've also received quite a few comments from my friends on the same subject. To refresh your memory, the first question was what the heck to do about a beginner to this hobby/sport who becomes interested, won't take advice, or doesn't receive good advice, and winds up at the flying field with a machine that is going to self-destruct, and may injure someone else in the process.

There are several ways of looking at solving the problem --- some are based upon restricted use of club flying fields, and some are based upon trying to help the beginner whatever the type of flying field. Here, our flying field is under the control of the Thunderbirds, but is located upon public property, so anyone has access to the field at times other than club functions.

Let's take a quick peek at some of the letters. The first is from fellow Associate Editor, Claude McCullough, who is a Product Engineer for Sig Manufacturing Co., and responsible for many of the fine Sig designs.

Dear Chuck:

I read your column in the January issue (on the beginner flying a .60 powered Kougur) with interest. Your comments about the situation were right on target. We do all we can to discourage anyone from starting out over their head. Despite continual advertising and distribution of several booklets and flyers to our dealers, we still get beginners who call up and want

us to tell them that they'll be okay with some advanced airplane to start with instead of a basic trainer. I wish I could get it across to novices that despite how many hours they have in full scale aircraft, or how many times they've flown control-line, it is still a whole new set of reactions to be learned in RC.

Sincerely,
Mac.

Sig has done much work in the field for the beginner, and the booklets that Mac mentions are "The Sig Factory Fliers Pre-Flight Check List", "Basics of Radio Control", and "Here's Advice That Every New RC Flier Should Read." All of these are available from Sig and, if you're a beginner, drop them a line; if you're a concerned club, write and get several copies for distribution.

A number of letters have been received from individuals, expressing similar ideas, so the next letter that I would like to have you read is from Ken Gulliford, editor of Contrails, publication of the Charleston Radio Control Society.

Chuck:

Reference your column in the January 1979 issue concerning the newcomer problem. The CRCS has a training program that virtually assures success to the newcomer. We have several volunteer instructors in the club and their names, addresses and phone numbers are posted in the local hobby shops. When an interested newcomer starts asking questions at the shop he is given the names and can choose one that he either knows or lives near. The instructor willingly lends advice and assistance in the choice of plane and equipment, as does the hobby dealer. The newcomer is invited to the field and familiarized with the field rules and club requirements and is given a chance to see some other newcomers in action. This helps him make his choice and also gives him an opportunity to closely observe the whole scene. When he has completed his plane and installed the equipment, with the help of his instructor, a complete inspection and check out is made. If something does not meet the flight requirements of the club then the newcomer is told what to do to correct it before it can be taken out to fly. When the time comes for test flights, the instructor will test fly and trim the plane for him. No fancy flying with a

newcomer's airplane. We let him do that when he is ready. After familiarization time on the ground the instructor will take the plane off and establish level flight at moderate speed and then begin instructing the newcomer with short periods of hands-on flying. The instructor oversees the progress of the student and decides when he has attained sufficient skill to perform the required check flight that identifies him as a qualified flyer. A second instructor is asked to observe the check flight. If the student can perform a take-off followed by a loop, roll, Immelman and landing, then, and only then, is he allowed to fly unassisted. At sometime during his check out flight, the instructor may ask to take over the plane for a moment, put it in an unusual attitude, return the transmitter to the student, and tell him to recover.

We have been using this system for several years and very few first airplanes do not last through the qualification period. Nobody flies at our field unless he is a club member or a guest of a member. All flyers must have an AMA and FCC license.

Our system may seem a little demanding on the volunteer instructor and you are right, but they are volunteers and they derive great satisfaction from the job. When the time comes for new instructors, it is very rewarding to get volunteers from those who were students not so very long ago. This system also allows the student to progress at his own speed with no time pressures to bug him.

The situation where a newcomer arrives at the field and proceeds to fire up and crash does not exist here. Any new member who professes to be able to fly prior to membership has to demonstrate that ability to two instructors. And, finally, only qualified members are allowed to vote in club matters. Of the 83 members in our club, more than half are the result of this training program.

Ken Gulliford

Seems to me that the Charleston club has taken care of things pretty darn well, and it would be beneficial if other clubs took a similar approach.

Naturally, most beginners to the sport of RC building and flying gravitate to the nearest hobby shop for advice. This

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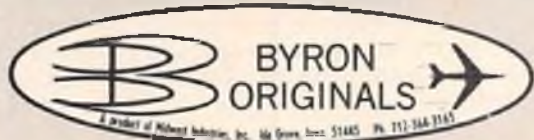
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Dear Mr. Lee,

I'm a newcomer to this fine hobby of radio controlled flying models, so bear with me.

To start with, I bought a .40 power trainer for my first R/C job. Well, I also bought a Fox .40 Schnuerle, my plane's power source.

Up to this point everything is fine. When (and if) the snow melts up here, I will start the break-in of my "mill." Everything is no sweat until after break-in.

What kind of muffler do I get? At first I was sure I was getting the Fox conventional type muffler. But I heard that the Fox was a "flow-through" type and I remember reading something that flow-through are the worst for noise reduction. While still searching for an answer, I found two more mufflers that seemed good, the JCM airfoil muffler and the Semco regular expansion. Could you make any recommendations about the preceding mufflers? Also tell me if my info is right.

I have a couple more questions.

(1) In the RCM Flight Training Course, your chapter talked about fuel additives. I recalled seeing some stuff called Varfree engine cleaner. The product is sold by Sig Manufacturing. It says you can add 2% to fuel to keep engine clean. Any comments?

(2) In the same chapter you mentioned Lubricin N-1. This sounds great, but I was wondering if it can harm my engine (Fox .40). The instructions state that the engine doesn't have a liking towards any synthetic oils, and will burn out and ruin the engine.

(3) Also the instruction booklet said that break-in of their engine doesn't mean prolonged bench running. They also state that by about 50 flights everything shall be perfect. You state that once the needle is set correctly, mount and fly. Can you tell me the correct break-in procedure?

Thank you,
Peter Turner
Fayetteville, N.Y.

Generally speaking the flow-through type mufflers are noisier than the closed type. However, the flow-through type are more efficient causing less power loss and engine heat. There are any number of good mufflers on the market

— both the Semco and JCM Airfoil work very well. It is simply a matter of which will fit your application the best.

I have yet to find any fuel additive that will keep our model engines completely clean and free of varnish and carbon. Some, when poured down the venturi, will loosen a lot of varnish as noted by dark residue on the wing and a slight increase in rpm. However, after two or three flights, things are back to original. Running 2% in the fuel probably helps a little towards holding down varnish build-up but, over a period of time, the varnish and carbon will be back requiring disassembly of the engine for cleaning. The use of Varfree or similar engine cleaner certainly does not hurt anything.

Lubricin N-1 is manufactured by Baker Castor Oil Co. — the same people who make Baker AA castor oil used in model fuels. Lubricin N-1 is a derivative of castor oil — not a synthetic. It would not harm your Fox in any way and is actually a desirable additive to castor oil based fuel. It adds film strength to castor oil and seems to have a slight detergent action. Incidentally, guys, don't deluge me with letters now asking where you can buy Lubricin in your area. Drag out your phone book and check the yellow pages under vegetable oils. Baker Castor Oil Co. has outlets in most all major cities and will have a listing. Check with them for distributors in your area.

Regarding your last question — I don't see where my break-in instructions differ that much from my old friend Duke's. Lapped engines usually require a short bench run period followed by break-in in the air. Ringed and ABC engines can usually be flown out of the box if precaution is observed. You quote me as saying "set the needle and fly" but this is not quoting me correctly. I always say set the needle so that the engine is breaking back and forth between a two and four cycle and then go ahead and fly; each flight the mixture can be leaned slightly. By the 6th or 7th flight you should be able to run the engine in a slightly rich two cycle. This, however, will depend on the particular engine and how tight it is. You cannot make one statement cover all engines. If, after six or seven flights, the engine will not hold a slightly rich two cycle, then it is going to

require additional rich running. Fox recommends a prolonged break-in just to be sure guys do not goof up their engines trying to run them too lean too soon --- just a safety precaution.

Dear Mr. Lee,

I am presently building a twin engine R/C Hydroplane using opposite rotation and K & B .40 engines for power (rear rotor ABC rear exhaust with full wave OPS 40 nitro pipes and exhaust throttles). I have a few questions concerning this set-up:

(1) Which would be better for a venturi, the spray bar type now supplied or the older annular ring with several jets (the bore appears to be OS similar size)?

(2) To run one engine backwards, I've been told to rotate the backplate 90° to the right (clockwise). Should the engine be expected to run at the same speed and power as it would in the normal backplate configuration?

(3) In your last article on tuned pipes, you spoke of raising the exhaust port for better pipe timing. Has this already been done on the K & B since it normally runs with the minipipe?

(4) Have you had any experience with nitrous oxide injection into the venturi in OS model engines? I understand from conversations with sprint car drivers that it is useful in full size engines even with nitrated fuels (mainly to improve low end torque which would be very useful in a boat to get it moving considering the high pitch props in use today).

Thank you for your help in these matters.

Sincerely yours,

John Qian

W. Melbourne, Florida

The spray bar type venturi and the older annular ring (sprinkler) carburetors had the same I.D. — .343". However, the spray bar in the latest type does, in effect, reduce the venturi size — this helping to increase fuel draw. If you do want more performance from the engines, the sprinkler type carburetors would give a small rpm increase. However, fuel draw would be more critical as would tank size and position, etc. If going this route I would

to page 12

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A voltage regulator powers the radio receiver from the motive battery, eliminating the weight of the receiver battery. Electronic circuitry automatically turns the motor off when the battery gets low, assuring positive control.

ENGINE CLINIC

from page 10

recommend using Robart pumps on the engines. With the Robart pump you could also drill out the venturi to .375" for added performance. In lieu of this you could also use the "shut off" carburetors used on the Formula 1 pylon engines. These have a .375 I.D. venturi to begin with and no obstructing spray bar. Frankly this is the route I would go as no drilling is required. Also the sprinkler carburetors are very susceptible to dirt and foreign matter due to the small size of the fuel holes.

Rotating the back plate 90° will reverse the rotation of the engine, however, this does alter the timing of the engine. In the 12,000 rpm range you would not notice much difference in performance between the engines. When you get into the higher rpm ranges then you will see a difference. The only way to have both motors perform equally would be to make a new rotor timed for reverse rotation.

The exhaust port on the K & B 6.5 engines (marine and aircraft) have had the exhaust port raised for "pipe" timing as supplied from the factory.

I am familiar with Nitrous oxide injection having been active in hot-rodging and drag racing in years past. I have never given it a try with model engines, however, as precise

metering is very important and this usually has to be done in conjunction with water injection to control detonation, things would get a little complicated trying to do this on a model engine. I know of several fellows who tried bleeding Nitrous oxide down the intake with the engine running but ended up with a hole burned through the top of the piston, much the same as would occur with oxygen injection.

Dear Mr. Lee,

I have four O.S. Max engines, .15, .20, .60, and the .80, all these run very good except the .60 — I am having problems with it. I'm running an 11(7/8) prop, 5% nitro, 25% on the oil in the fuel and needle valve is set a little on the rich side.

I broke it in according to instructions with the engine. O.A.T. was 39°F when I had the engine on the bench. It got an outstanding idle, but at full bore it will drink up about 2 ounces of fuel and start to sag. I bring it back to idle — it takes time for the engine to idle itself down, but the next time at full bore I let it die out. Then I found out it was overheating, so I disassembled the engine and I found some metal particles in the crankcase sleeve is pretty well scorched from the heat, but no scratches.

The piston, ring, and everything else seemed to be okay. Also the fuel is

filtered twice from the 8 ounce tank before it goes to the carb. Do I have to replace the ring and sleeve or should I assemble it and run it again? It's going in my Commanche. Your help will be deeply appreciated.

Your constant reader,
Gerald E. Atchisen
Jacksonville, Fla.

It is pretty hard for me to say whether your O.S. .60 suffered permanent damage or not when you allowed it to die lean without being able to inspect the engine. The metal particles had to come from somewhere. Of course there is always the possibility they were in the engine when you got it. One thing you never want to do is let a new engine start up and die lean. More new engines are permanently damaged by allowing this to happen than any other cause. If there was any tendency for the engine to sag off lean at full throttle, the engine should have been kept running in a slobbering rich four cycle until it would start to hold a leaner setting. Production assembly does leave something to be desired at times and there will be considerable variance in fits between engines of the same make. You evidently got an engine that was fit on the tight side somewhere. Most likely the piston. If the sleeve has no scratches then it should be okay — even though they sometimes get hot enough to turn blue this does not

to page 15

Announcing the Tech R/C Midget Servo Kit

With the New Improved NE544 IC. Yes, we held off offering the NE544 Amp until all problems were eliminated. This IC features complete motor drive, no external transistors are necessary. We supply the CTS Plastic Pot element for competition performance. The Midget works on most positive pulse receivers such as Royal, Kraft, E.K., CANNON, ACE, MRC, FUTABA and provides extremely fast, accurate response.

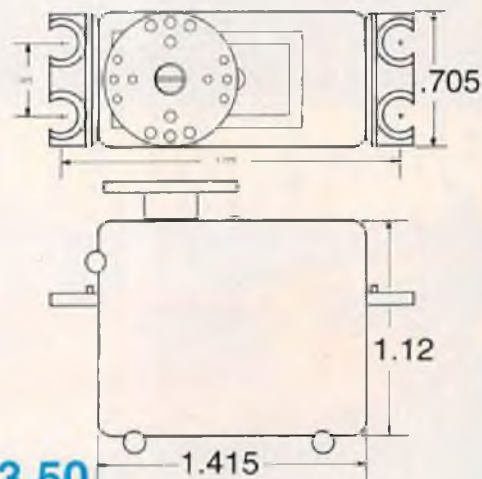
A rotary wheel, long arm, and adjustable length are furnished. Order the proper connector to match your system separately.

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Midget Servo Kit (less connector) — \$23.50



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Chevron is ideal of pattern competition, Large Helicopter, Power Boats, 1/8 Scale Race Cars, and Giant Scale Models. Write for complete literature.

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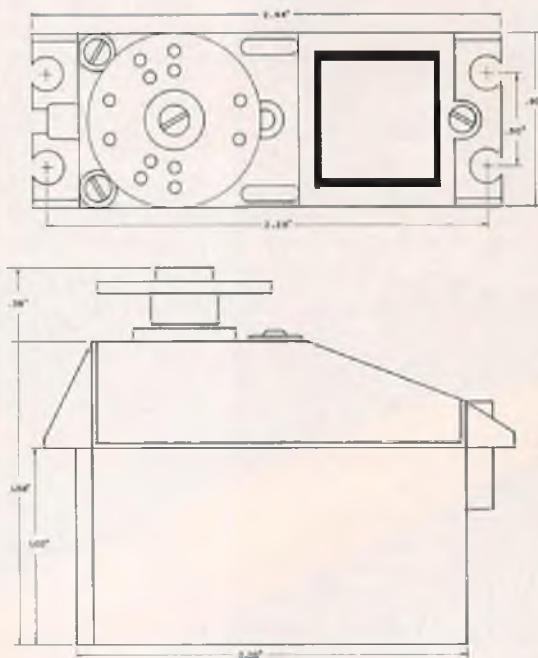
Standard Gear Ratio: 40 in. oz.

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Irwin Ohlsson

CALIFORNIA STATE CHAMPION 1937 PACEMAKER-40



The Ohlsson Pacemaker 40 was commissioned to be manufactured by OK Model Company, better known as Pilot, exclusively for Hobby Shack. This is a very high quality balsa kit, with all balsa parts hand machined and plywood parts so nicely die cut that they fall out at a touch. The Pacemaker is a fun airplane with nostalgic looks, but still modern enough to be attractive today. Being originally designed as a free flight, and a contest winner at that, it most certainly makes one fine radio control model for the novice and old timer alike! The construction, though not difficult at all, is a bit more unusual than the typical "box" style trainer, so we don't recommend this for your very first model to build!

THE KIT INCLUDES: ALUMINUM SPUN COWL • ALL LANDING GEAR WIRE PRE-BENT TO SHAPE • ALL HARDWARE INCLUDED • NUMBERED PARTS EASIER CONSTRUCTION • FULL SIZE BLUELINE PRINTS PLUS PHOTOGRAPHIC INSTRUCTIONS • HAND MACHINED Balsa PARTS • HIGH QUALITY KIT •

A Brief History -----

If anyone ever deserved to be inducted into the Modelers Hall of Fame, it was Irwin Ohlsson. I was most happy to see that he was recognized and that such a tribute was finally made to one who contributed so much. In his younger years he would spend hours each week at the local school yard helping small children learn about modeling and flying freeflight airplanes. Mr. Ohlsson is most renowned for the O&R ignition engines (the "O" was Irwin Ohlsson) which are collectors items today. In 1937, Irwin won the California State Championship with his new PACEMAKER design, flying it in free flight with his own .56 engine. After that, he kitted the model himself and sold it with an engine for \$25.00. From these sales he made enough profit to pay for the tools & dies for the manufacture of his famous O&R .23. In 1938, the first .23 came out and Ohlsson flew the PACEMAKER for the first time with 'rudder only' radio control. Next, he tried floats and has been flying this design ever since. On the cover of the November 1978 RCM, you'll find one of these models that has been flying since 1968. About 9 or so of these have been scratch built, and now we look for a lot more PACEMAKERS to be in the air, all built from our high quality balsa kit. Irwin says that the kit is the best he has ever seen, and not counting its structural redesigning for radio control, it is almost identical to the original airplane!

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from page 12/10

generally do any harm. If the piston looks okay you can probably use it. Many times when an engine is allowed to overheat the ring will lose its tension. Check the end gap. If the ends of the ring are close or touching, the ring will have to be replaced. If there is still .030" or larger gap and it seems to have spring pressure it is probably okay also. Put the engine back together and run it in a rich four cycle. After a tank this way lean it in until it's breaking back and forth between a two and four cycle and run another tank of fuel through it this way. If there is any tendency to overheat and slow down, richen the engine right away. Don't let it die lean again. When it will hold a slightly rich two cycle, install it in your aircraft and continue the break-in by running it extremely rich the first flight, a click or two leaner the second, etc. If your flying ability is up to it, make some big loops, Cuban eights, etc. By keeping the engine working it will break-in much faster. Avoid any prolonged climbing maneuvers that might lean it out. Many times fellows will purposely try a long vertical climb just to see if the engine will hold on without sagging — this being an indication of being broken-in. When the engine does stick up and turns out to be a bummer, they wonder why.

Dear Mr. Lee,

I have been reading your column for a long time and I think it really helps me. But now I have a question. I need some advice as to how to modify an engine to get more power out of it. I think that making the ports in the sleeve and crankshaft bigger will help but I don't want to go ahead and do it if it is going to hurt the engine. Your suggestions on how to do this or other ways to get more power out of my Veco .19 engine without using more nitro will be greatly appreciated.

Sincerely yours,
Rick Eubanks
Cincinnati, Ohio

Now days model engines come to you with all the "hop-up" mods already built in. In order to be competitive the manufacturers naturally want their engines to develop as much power as possible. There isn't a great deal that you can do that is going to give you any noticeable power increase. Chances are that if you get to fooling around with the size of the ports in the sleeve and crankshaft on your Veco .19 you will end up goofing up the engine. Larger ports do not necessarily mean more power; many times it can result in a power loss. Larger ports will sometimes raise the peaking speed of the engine, i.e., it will develop its maximum horsepower at a

higher rpm. To reach this higher rpm a smaller propeller is necessary. So unless you intend using the engine for racing purposes — leave it alone. More can be gained by proper fitting and blue printing than by modification to port sizes, however, this takes someone familiar with the basic engine design and experienced at engine re-working.

Dear Mr. Lee:

I have always, and will continue to read your column in RCM. I have recently experienced a very odd problem . . . perhaps you can help.

The engine is a middle aged O.S. Max 0.15 R/C. It had average draw and good power in the past. It was put on the shelf for awhile, in a plastic bag, and I just mounted it on one of my home-brew planes. Then it happened --- a problem to defy explanation!

(The First Flight — what?) I set the engine just comfortably rich. She went up and leveled off at about 100' and broke into a slobbering rich 4 cycle. I got her down and tried leaning it out some. Up again and this time she richened up to a very rich low power run. Down once more to set the needle screaming!! Up she goes and once more the fool thing richens up.

The prop is a Top Flight 8/4 nylon. The plug is Fox short R/C and fuel is Hobbyist 7½%, Kraft mount. The tank location is 1/8" below centerline, on centerline. It was 3-in-1 oiled before storage.

Any comment would be appreciated.

Sincerely,
George Turco
Carmel, N.Y.

George, your problem sure sounds like fuel foaming to me, probably caused by the nylon prop. Have you ever checked it for balance and tracking. Vibration on the ground causes the fuel to foam leaning the mixture. In the air the foaming stops and the engine goes rich. Put some foam rubber around your tank and make sure it doesn't have the battery pack wedging it tight so that it absorbs vibration.

Dear Clarence,

Recently I had my OS .60FS converted to ignition by 77 Products which proved to be an outstanding bit of work. I had on hand some no-lead gas and #70 oil mix I'd been using in my Hurler Twin and ran a couple ounces through the 60FS with success.

Then I wrote 77 Products for fuel recommendations which proved to be a 5:1 mix of 100 Octane Aviation gas and Blendzall (green can), a highly refined castor oil for motorcycle use. Fortunately, I made a small mix in a clear container and noticed the 100 octane gas and Blendzall would not stay in solution. I tried mixing the Blendzall with regular gas from my lawn mower which readily went into solution.

My conclusion is that the local 100 octane low-lead fuel and Blendzall are incompatible.

My questions are:

(1) With the four cycle engine, can I use any high test auto fuel that will mix with the Blendzall?

(2) What fuels do you recommend for two cycle ignition? #70 oil is not easy to obtain.

(3) Is "Coleman" fuel the same as the white gas we used to mix way back when?

Any advice will be appreciated.

John H. Wormley
Olney, Maryland

I have never run the O.S. four stroke engine as a spark ignition so you are one up on me there. However, being a four stroke engine it should be able to run on just about any automotive or aircraft gasoline. The higher octane gasoline (aviation) giving more power and burns cleaner than automotive gasoline. You would not want to use high octane gasoline in a two cycle engine, however, as the higher octane allows the fuel to have a longer burning period --- sometimes too long for the particular 2 cycle engine. It is best to use low octane fuel for the two strokes.

Normally gasoline will not mix with castor oil unless you add about an ounce of motor ether to a pint. Acetone will usually do the job also. Some of the more highly refined castor oils such as Blendzall and Francisco's would mix with gasoline but usually has to be shaken before use. I can't really tell you why the aviation gas would not mix and the gas from your lawnmower would. Evidently it is due to the difference in additives.

SAE #70 weight oil has become pretty difficult to obtain. If you want to mail away for the oil, there is a source. Herb Wahl of Herb's Model Motors, P.O. Box 61, Forksville, Penn. 18616, has it available for 90¢ a quart. However, there is a \$1.50 postage charge. Actually oil technology has improved tremendously in the last 20 years and the old ignition fuel lube SAE #70 oil is not really necessary. SAE 50 available at any motorcycle shop will work fine. Blendzall was also excellent but I understand it is no longer being produced.

Coleman fuel is basically a very pure white gas and works very well in the two stroke model engines. If white gas is not available in your area, I recommend Coleman fuel. Do not mistake no-lead gas for white gas. There is a big difference. The no-lead contains additives to raise the octane rating that ordinary white gas does not.

Dear Clarence,

The big plane bug is biting me and, while hobby dollars are scarce, before starting I'd appreciate your comments. I'm impressed (by advertisement) with

to page 178



Happy New Year! Okay, I know, by the time you read this the new year will be in its third month. But the year is still ahead of you, particularly the flying season. You probably are in the final stages of building that new job that's due to be test flown as soon as the mud, slush, and dirty snow has disappeared. Most of you, anyway. Those of us who are lucky enough to live in California, or Florida, or the sunny Southwest, may already be repairing our newest creations. But 1979 is gonna be a good year. Mark my word.

So was 1978, in most respects. Certainly it was for me. And largely because of you readers. Your letters are the life-blood of this column; without them, it would be hard to know just what you'd like to read about. With them, I can tell what you want to know and, also, if you have a good idea, I can pass it along to your fellow modelers. So, thanks to all of you who have taken the time to write, and I hope you'll all be doing more of it in 1979. Just a reminder --- if you want a personal reply, please send along a stamped and self addressed envelope. And I'll continue to publish those letters that have a general interest --- at least as many as there's room for.

This past year I received quite a few letters that I didn't have space to print at the time, but I saved them because they were both timeless and amusing. So here are some laughs from 1978 to help you get into a good mood for the coming flying season.

First, it is important that you have the right outlook concerning your flying skill, and some of the reasons why you can point to causes other than your own actions for some of the mishaps that might come your way. Lew Bartholomew sent in this exhaustive analysis:

Dear Ken:

I always enjoy reading your column in the mag, and I have been intending to write you for some time now. For the past five years I have been busily engaged in a serious study of R/C fliers and their problems, equipment and hardware, with the express intent of tracking down the causes of crashes, and all related information pertaining thereto.

This exhaustive study has been

concluded and I am very happy to pass along the results to you. You lucky rascal!! Do you understand that you have just scored a scoop? No one else except you and me ever know the results unless you leak the information I'm about to give you, until Ralph Nader and his group "lower the boom" on the manufacturers of our R/C gear and hardware.

You seem like a nice fella, and since I'm a pretty good judge of character (and believe me, you are a character!), I am going to assume that the information I'm about to reveal to you will be safeguarded, and you will not divulge this information until such time as action has been taken against the parties to this gigantic "rip-off" and they have been taken to task.

I spent the first three years interviewing model aircraft operators who had experienced serious crashes. Of over two thousand pilots interviewed, only two laid the blame on pilot error. Even then, one of the two passed the blame along to a friend who was trimming out the airplane for him. Now the only conclusion one can draw from the above research is: very few crashes are caused by pilot error.

Why, then, do so many crashes wind up in the P.E. category? Simply because the manufacturers of our radios and hardware have been putting the blame on us, the almost infallible operators of radio control equipment! You want proof!! Look at the following results of some of the tests I've made in the last five years.

Rubber Bands - *You and I, and just about all fliers use them to secure the wings tightly to the fuselage. This means that the rubber bands we buy in good faith should be the very best that modern technology and science can produce. We have a lot of expensive and valuable gear entrusted to those fasteners, but those we've been buying will allow the wing to separate from the fuselage during high "G" loads, even when we use two or three!! I have purposely crashed several planes at high speed to see what would happen, using twelve rubber bands, and the results were always the same. Those lousy, cheap bands busted every time!*

Balsa Wood - *The quality of the balsa*

we buy nowadays is bad. I flew three pattern ships into the side of a schoolhouse on purpose, just to check this out. I didn't get back one good wing out of three tries! That should be proof positive that our balsa wood is not grade A stuff.

Batteries - *Many of the crashes investigated pointed directly to batteries which were obviously the result of poor engineering and shoddy manufacturing techniques. Many of the fliers questioned verified that they had fully charged their batteries, but had been prevented from going out to fly for a couple of weeks. Those lousy batteries wouldn't even hold a charge! I think that's terrible, to sell junk like that to unsuspecting R/C people!*

I found five instances where transmitters were knocked or dropped from the hoods of autos, quite accidentally, and they didn't work after that! That's awful. Had they landed on concrete, I would say "maybe" but on blacktop? Aw, c'mon now! They're making 'em chintzy, that's all.

I feel it's high time someone exposed the tactics being used against us, to make it appear that everything that goes wrong is our fault, and Ken, I hope this confidential information will prompt you to use all your influence to get the ball rolling.

I have a lot more evidence, but I'm going to withhold that until I check you out a little better. I don't want to leak too much information to the manufacturers until I am sure they cannot crawl out from under the preponderance of evidence I have amassed against them. When everything is ready, you will get all the scoop first, cause you're my buddie.

Keep those columns comin', Cousin, and best of luck to you and yours, always.

Sincerely,
Lew Bartholomew
Niles, Mi.

Naturally, at Lew's request, I kept the results of his study confidential until I checked with modelers all over the country. Now it's time to release it, so all of you can take "appropriate" action. That's the word. Appropriate. Then,
to page 19



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Nuff said?

ALL YOU HAVE TO DO TO SAVE ONE DOLLAR is ASK FOR JET



Dear Carl:

I'm enclosing a picture of my Baron 58, with my daughter. I was able to get some factory drawings, and I scaled it 2.25" to the foot. It has done very well for me on the contest circuit—three first places this summer. It's built almost entirely with JET. It really speeds the construction time; and most important, it keeps the weight down!

I've had many pleasant experiences with your designs. My first successful gas job back in the 30's was a Clipper, and I learned to fly R/C in 1964 with a Senior Falcon. I still recommend the Senior Falcon as a first airplane for a beginner; I haven't seen anything better yet. Oh! If we had only had JET back in those days.

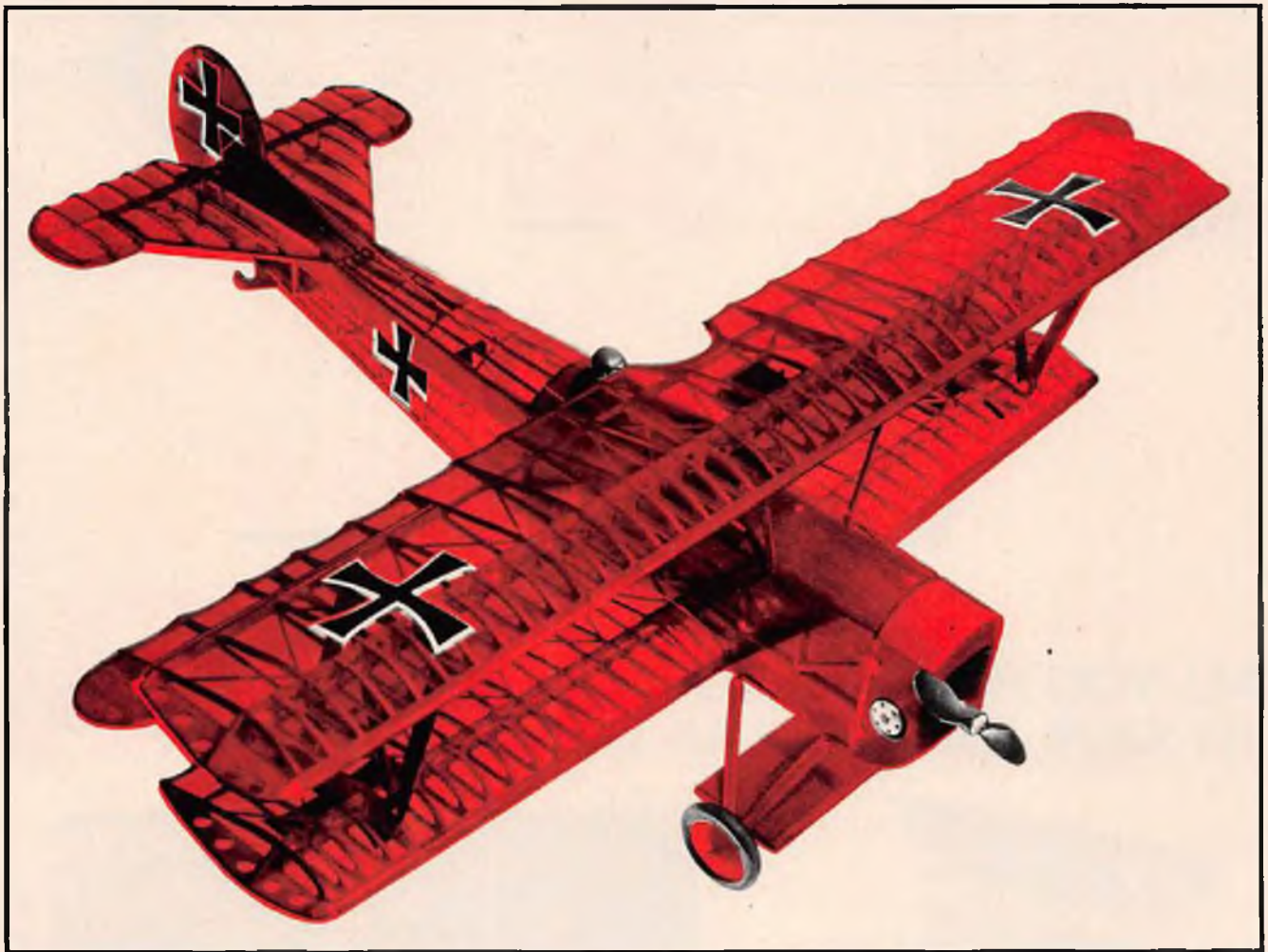
Cordially,

M. C. Caddell

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from page 16

when you've done it, and it backfired, you can't blame either Lew or me. Just fix your airplane and try something different. Maybe a buddybox?

Or perhaps you have a design problem that requires some original thinking. Danny Moe of Bremerton, Wash, has figured out how to solve the clearance problem with pylon mounted engines above the cockpit. Here's his drawing, "Improvise."

Danny didn't say how old he is, but I guess he's one of our younger enthusiasts. Here's part of the letter he sent along with his drawing:

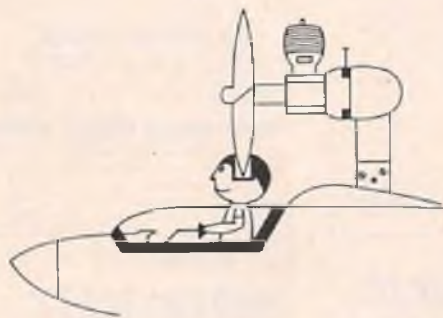
To Ken Willard:

I decided to give you this "funny" to put in the magazine. I wouldn't have sent this in at all if my grandpa didn't laugh at it, which he did. I hope you enjoy it.

P.S. I wasted about ten pieces of paper trying to get it right so that's as good as I could do.

"Don't break your hi-starts or wear out your winch"

Danny Moe



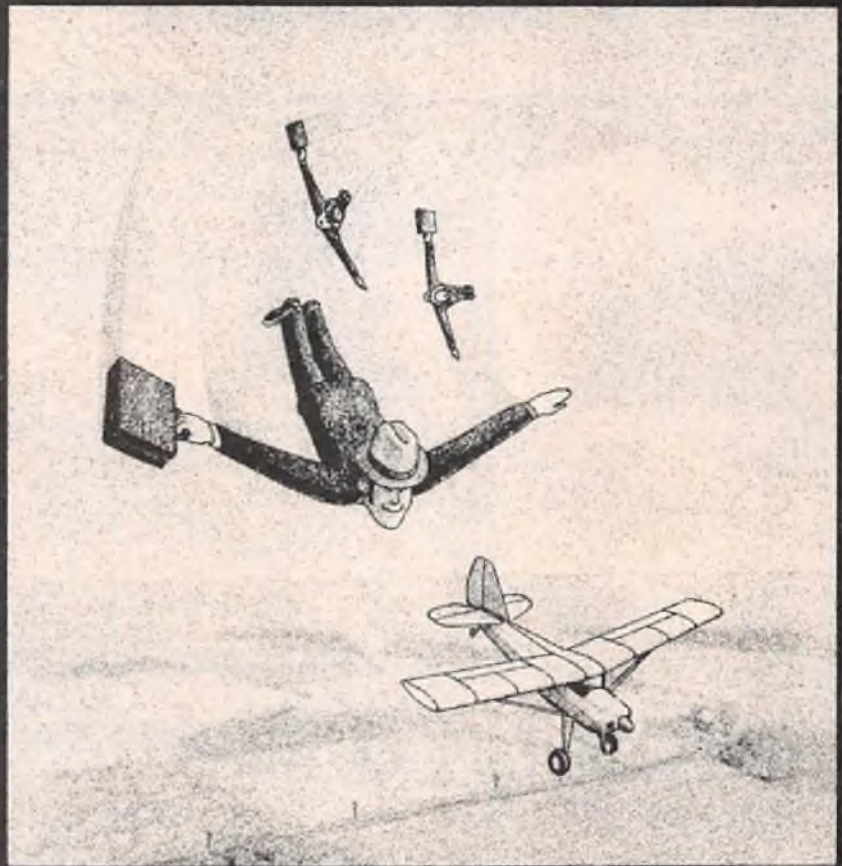
I'm probably as old as your grandpa, Danny, and your picture made me laugh, too. And so will the other readers. After all, a lot of people think we've all got a hole in our heads for building a beautiful model and then throwing it up in the air like we do.

Well, maybe we are a bit confused. Or something. I'm not quite sure what, so read this letter from Ron Ashton:

Dear Radio Control Modeler,
Don Dewey, Chuck, Jim,
Clarence and Ken,

You are doing very good work for us readers. Sometimes you say "I've discussed this in previous columns, but you still write in and ask." Well, old boy, it's not that we're dumb, or don't read very carefully, it's simply that we are new modelers, and if you've written it before, it won't be taxing your brains to write it again, so it's money for nothing, isn't it?

You remind me of the drill sergeant who had a new squad every few weeks
to page 168



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44⁹⁹

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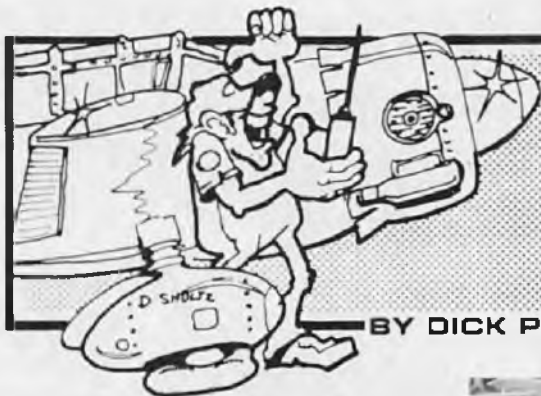
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BIG is Beautiful

BY DICK PHILLIPS



The popularity of the so-called "Fun Fly" in which no competition is involved, continues to increase. Compared to the fun flies which result in the destruction of at least a half dozen models as the pilot tries to get under a limbo bar set 10" or 12" off the ground, the new type of fun fly is a chance for modelers to attend and take part in a fun event without the attendant white knuckle syndrome being present. There is ample opportunity to hangar fly, take part in social functions and, in short, have an enjoyable time without smashing a year's work into scrap in the process.

One such event which is gaining in popularity and participation is sponsored by the Kitchener Waterloo Flying Dutchmen in Ontario, Canada. A good friend and correspondent, Dave Henshaw, sent me some pictures taken there in 1978, a few of which appear here. K/W has been attracting more and more Quarter Scalers in the past couple of years and this past event was no



Another superb flyer from the prolific Jim Messer. Ercoupe looks good, flies even better. Note the STARS Bristol Scouts in the background.



Jim Crawford and Bud Barkley swap tall tales over Jim's Quadra powered Nieuport.

exception. The STARS of Olean, New York, have been taking their big Bristol Scouts to K/W for a couple of years and they tell me the hospitality is the absolute best. They are always made welcome and they have an enjoyable weekend. This past two years the weather has cooperated for one day and been terrible the next so it has really been a one day affair although is intended to cover a weekend.

The 1978 event witnessed (as far as I am aware) the first mid-air between two large models. Woody Clapp (STARS), whose scratch-built Sopwith Triplane appeared here a few months ago, had his Tripe in the air when it was brushed by one of the Bristols. The resultant separation of tailplane and fuselage produced a spectacular crash with the unhappy result that the Tripe went home in a very large plastic bag. The reports I have had indicate there wasn't a salvageable piece of the airframe worth

mentioning! What is even more surprising is that that Tripe and the Bristol were the **only** aircraft in the air at the time; they were being flown by STARS members who are brothers and they seem to have made history! The Bristol survived with minor damage and the famous and prolific Dr. Clapp is back on the board with another project.

★ ★

Sig Manufacturing of Montezuma, Iowa, sent along a proof copy of a page from their next catalogue. This details the supplies they are stocking for the large models now being built. As I have mentioned before, I use their Lite Ply quite extensively in my building and, aside from the fact that you should stiffen it with strip wood in the larger pieces, I find it to be an excellent material with which to work. It cuts well with the average modeling knife, sands to an easily finished surface, and is very strong. I often use it in place of balsa wood for such items as wing ribs, formers, and the like.

Sig will now be stocking 7/32" piano wire as well, which should help solve the problem of landing gear folding up under the loads of our larger birds. They also have good supplies of spruce strips in both 36" and 48" lengths. Size for size replacement of balsa strips with spruce is a good way to assure adequate strength in your enlarged version of a conventional model. Their large Kwik-type links and rods are a welcome

to page 24



Bob Dunn, Olean, New York, and another STARS member brought along his Nieuport 28, also Quadra powered.

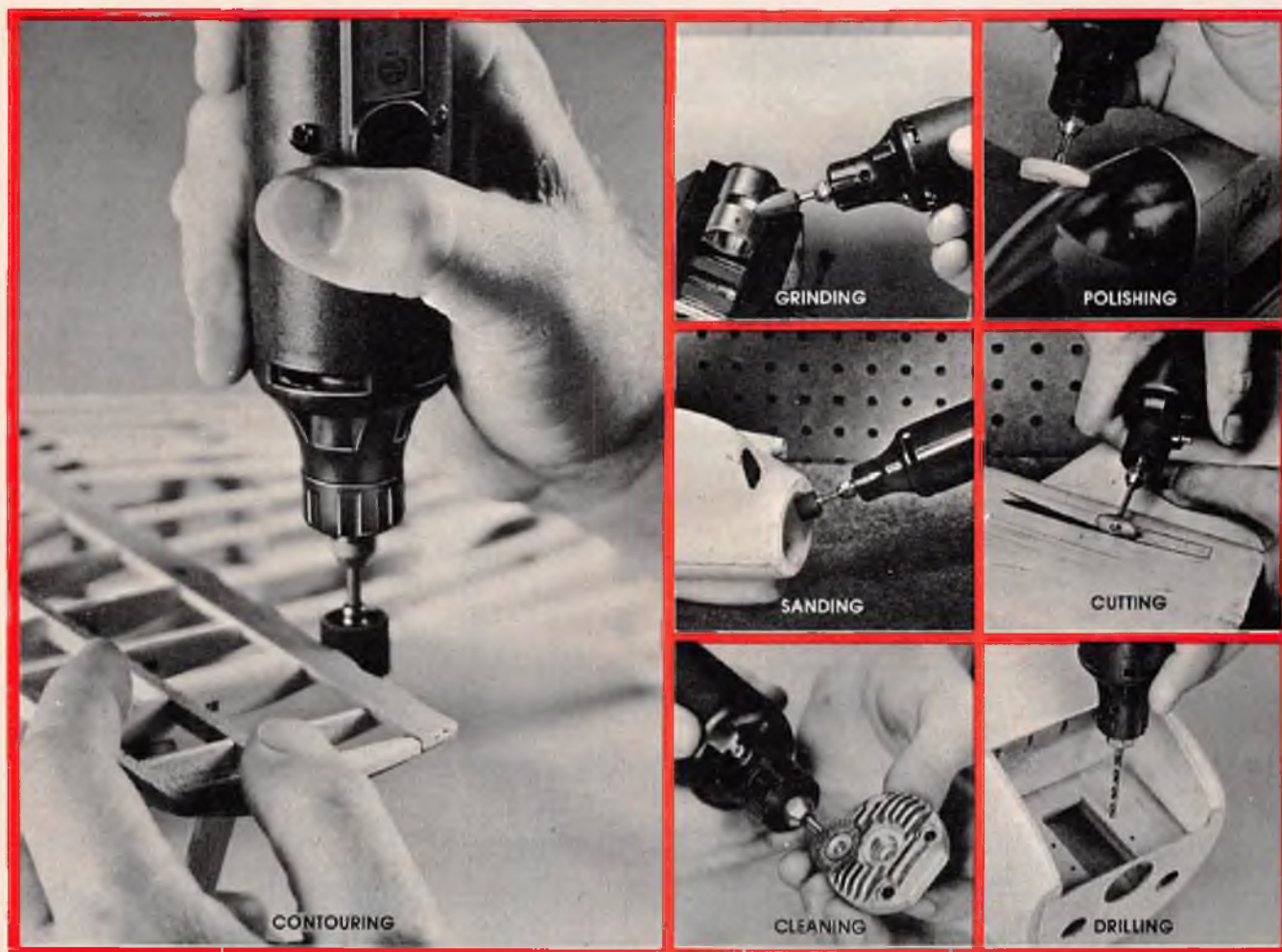


Jim Messer of Allegany, New York, member of the STARS, built this Piper Tomahawk --- flies like a pattern ship. Jim is considering putting out plans for this creation.



Fairchild 71 in Canadian Civil Markings from Dick Spiedle of Buffalo area who often flies with the St. Catherines club in Ontario. Looks like BIG is very big in New York State.

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BIG IS BEAUTIFUL

from page 22

addition to the Quarter Scale scene in order to assure the type of strength we need in our larger, more powerful birds. They stock tempered brass sheeting in 1/16" and 1/32" thicknesses for making up all those little fittings no one makes yet. They know what they are talking about at Sig as Hazel is now flying a Quarter Scale version of her well known Clipped Wing Cub, with a Quadra in the engine room, so they have the experience to know what is required. It would not surprise me to see a kit (in Quarter Scale) of this very agile model coming out of Montezuma in the foreseeable future. I'll be surprised if it is not a good balance of excellent quality and reasonable price.

★ ★

Dario Brisighella, whose name has appeared here in last month's column, has sent me some photos of a scale model he built of an aircraft he restored in full scale. N12DB is a 1947 Stinson Voyager 108-2. The model is from Dario's own plans and recently took second in scale and "Best in Show" at the 6th Annual Chicago Expo. As all of us do, from time to time, Dario goofed and left his presentation book at home when going to the contest at Chicago, and the points lost by that omission may well have spelled the difference between the second place he took and the 'might have been' first.

to page 26



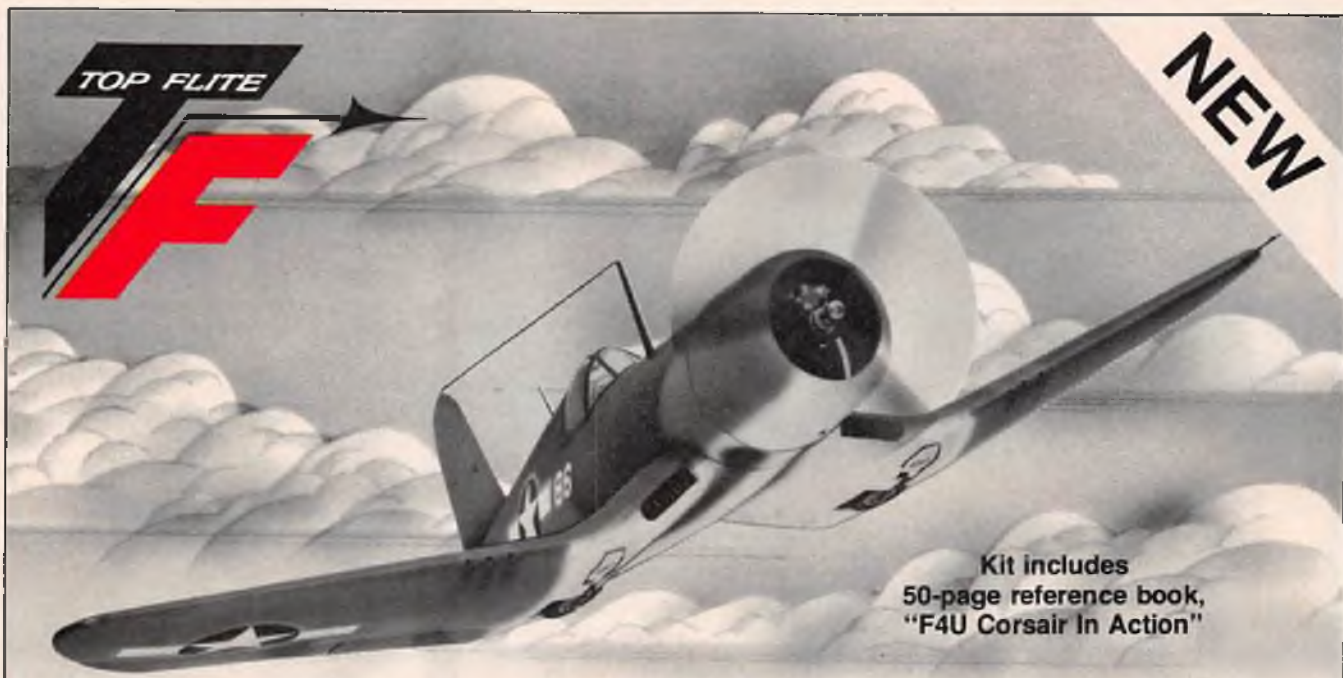
Dario Brisighella of Oak Creek, Wisconsin, did the restoration of the original of this beauty, a 1947 Stinson 108-2. Much of the material used in the model was left over from the restoration of the original.



Interior detail of the Stinson 108-2 indicates why the model took "Best in Show" at Chicago (see details in Big Is Beautiful). If you were Quarter Scale in size, you could step in and take her away!



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| Wing span | 61" |
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R/C Modeler Magazine, August 1975



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Flying Models, May 1976

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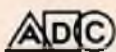
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BIG IS BEAUTIFUL

from page 24/22

The model is mainly balsa with spruce longerons in the fuselage and wing spars. The tail feathers were constructed of foam, balsa covered. The entire model is silk covered (8 yards of it!). Cowl and pants are fiberglass, doors and instrument panel are sheet styrene as are the engine grilles and oil cooler intake. The main gear is 3/8" drill rod stock and the tail wheel bracket is machined from magnesium. The gear is spring loaded to carry the 24 pound all-up weight of the model.

The flaps and ailerons use four servos and are hinged with aluminum hinges. The model contains approximately 200' of wire to serve all of the lights, the strobe and the scattered servos.

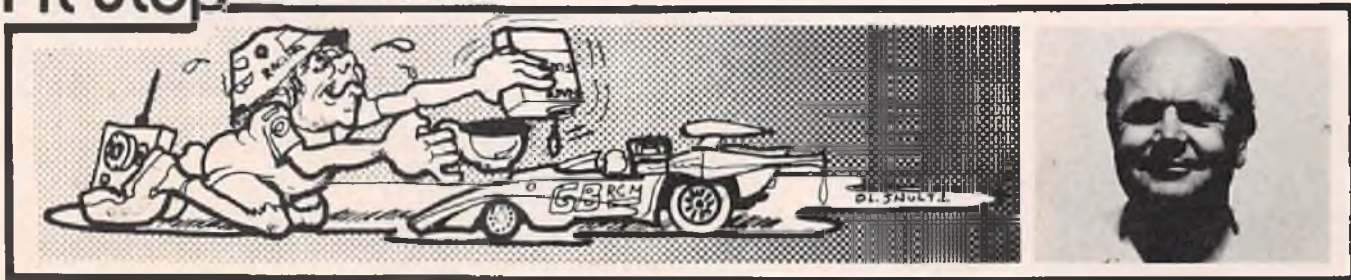
The radio is a Kraft with KP-14 servos. Navigational lights are from Kavan's Blinking Light Set. The interior was crafted from material left over after the 8 month restoration of the full scale bird and, as can be seen from the photos, the interior is very complete indeed. The original was awarded "Best Stinson Classic" at the EAA Convention in 1971 and in 1972 was runner up in open competition at the EAA Fly-In at Burlington, Wisconsin. As a personal opinion, I think they are both a tribute to the skill and dedication of the man responsible. Dario has put it as well as anyone in repeating the old adage, "One never really finishes a scale model, one merely stops working on it!"

★ ★

I recently received some information from EK-logictrol which will be of interest to those building large models. They are adding another servo to their line of RC equipment. The servo will be identified as the XM Maxi Mite, and its power output will be 1/3 greater than their 180° SM servo. It's a 90° servo which weighs 2 ounces, and puts out 6 pounds at the arm. That's 1.91 inch/pounds! It's physical dimensions in inches are: .85" x 1.94" x 1.59". The current drain at idle is 8.3 ma, and stalled is 580 ma, so don't stall it! Control accuracy is better than 1%, transit time is .3 seconds. The motor is a 16 mm, silver alloy brushed, 4 ohm job. The new servo will mount in EK's UM-3 or UM-7 mount (multiple) or the AM-1 or AM-2 for single installations. It is a rotary servo and sounds like a great addition to the line. As regular readers will already know, I used EK SM servos in my Cub and they have produced sufficient power to operate even the huge ailerons on the Cub. This new addition will produce a third more power than the SM's. Check with your hobby dealer for availability or write EK-logictrol at 3322 Stovall St., Irving, Texas 75061. Price will be \$49.95 and a 180° version will follow in a few months.

★ ★

to page 160



It seems one of the biggest mysteries connected with 1/12 scale electric cars, is charging the batteries. Normally, this wouldn't seem like much of a problem, with the experience you've had with nicad (nickel-cadmium) batteries. It's just simply a matter of hooking up the charger and 14 to 16 hours later your batteries are fully charged. Now that's fine with the type of nicad batteries and charger as used in your normal radio transmitter pack. You can even forget to disconnect the charger and finally realize you've been charging your batteries for 2 or 3 days or longer. No harm's been done. The slow charge type nicads, with slow type charger, charge at such a low rate, generally about 1/15 the capacity rate of the battery, that even after the batteries are fully charged, the charger can be left on with no harm done to the batteries or charger. The batteries and charger have a built-in safety factor making this possible. Your batteries will be fully charged in 16 hours, so we strongly recommended you discontinue charging at this point. Further charging time will not increase battery life.

Fast Charge Batteries

General Electric's fast charge nicad batteries are specially designed for fast charging and fast discharging. These became popular for use in portable electric drills and various battery powered garden tools. The type cells we use are rated at 1.2 amp/hrs. and 1.25 volts. Battery packs are made up of 4



State of the art in 1/12 Scale electric car battery chargers. Operates on 12 volt DC or 110 volt AC. Built in 15 minute timer. Built in Digital LCD voltmeter. Constant current 4 amp or 2 amp capacity with ampmeter. Automatic 4 or 6 cell output. Discharge circuit turns off automatically.



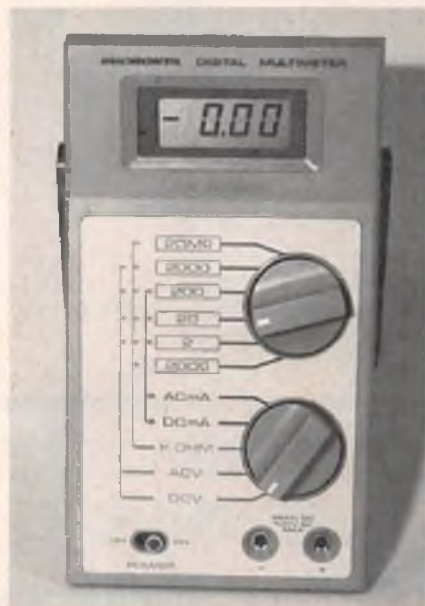
Interior of charger is more complicated than most chargers because of combined 12 VDC and 110 VAC capabilities, etc. Also the constant current capabilities require a very special circuit for this function. Charger was designed by Roger Curtis and built by Mike Reedy.



A typical charger used by many racers is like this one made by Tony Vales in Rhode Island. 12 VDC and 110 VAC capability. Adjustable amperage output. Ampmeter and expanded scale voltmeter. 15 minute timer.

cells (5 volts) or 6 cells (7.5 volts). 4 cells are used for indoor racing where space is limited and, generally, the traction on the track used is not too high. On the outdoor tracks, the traction is generally higher and the tracks larger, so 6 cell packs, giving the cars more power are the most popular.

Charging these fast charge battery packs in your 1/12 race car is a little more complicated than simply charging the nicads in your transmitter. You had all night to charge your transmitter batteries, but when you drive or race your 1/12 cars, as soon as the car batteries go dead, you want to hurry up and charge them up right away so you can go race again. We're now talking about a time period of approximately 15 minutes. The problem with the fast charge batteries, is that when they are fast charged they must be charged correctly. There is very little room for error from overcharge, because the fast charge rate is so high, that overcharging



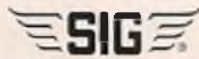
New LCD Multitester which is very popular now with the racers is this Micronta brand from Radio Shack at \$79.95. 20 DCV Digital Voltmeter - scale gives large, easy to read .4" high numbers.



Multimeters similar to this are also popular, but are not near as accurate as the Digital Voltmeter. Prices range from \$10.00 to \$60.00 or more. Radio Shack has a Micronta Expanded Scale Voltmeter used for checking batteries only. It costs about \$9.00. Has a range for 9 volt batteries.

to page 30

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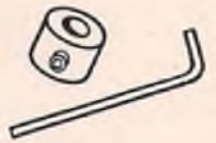
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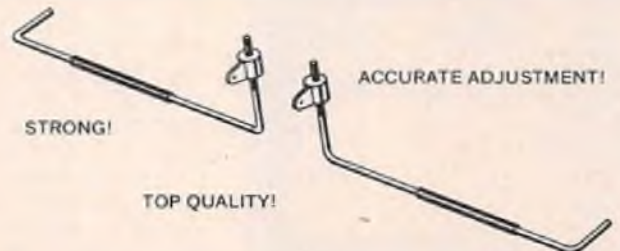
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We recommend that the novice begin his training program by using rudder control for first flights and later on switch to aileron control. Ailerons are supplied in the kit for 4 channel use but the model can also be flown on 2 or 3 channels and rudder 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!



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KADET

Designed by CLAUDE McCULLOUGH

LENGTH: 42 in.
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WEIGHT: 4 Lbs.
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KAVALIER \$44.95

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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.



\$44.95 KOMANDER

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



\$47.50



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.

ENGINES: .40 to .50
WING SPAN: 51 in.
WING AREA: 550 Sq. In.
LENGTH: 45-1/2 in.

FOAM CORE WING



Balsa Skin Plywood Skin

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KOMET

Designed by MAXEY HESTER

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

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PIT STOP

from page 27

is **dangerous** and also damaging to the batteries. As an example, the **slow** charge battery was charged at 0.05 C (battery capacity), which is a relatively low-safe charging rate, even when the battery is fully charged. But with the fast charge batteries and chargers, we'll be dumping in 4 amps or 3.33 C, which is 66 times as much amperage as the slow chargers. This is perfectly safe until the battery becomes fully charged. After the battery is fully charged, **this high charging rate must be stopped**. If the high charging rate continues after the battery is fully charged, one or more of the cells will become hot, causing a pressure build-up inside the cell. Continued overcharge builds up more pressure inside the cell, until the excessive pressure causes the safety vent to open discharging electrolyte. (This is a popping sound heard at the races.) This electrolyte is potassium hydroxide. In the event you should get some in your eye, flush your eye out with water. Beside the possibility of getting electrolyte on you, every time a cell vents, it becomes weaker.

It's only possible to put so much electricity into a battery. Overcharging does not mean that you're forcing the battery to accept more electricity. On the contrary. If you try to continue charging after the battery is fully charged, the battery will heat up and you will be starting your race with hot (heated) batteries, that will actually be down in capacity. The ideal battery temperature, for the type batteries we're using, is between 40 and 75 degrees. The batteries will operate in higher temperatures. At last years Nationals, at Ratley's Raceway, it was 105° inside the metal building. The batteries worked okay, not 100%, but good enough for us to run our 8 minute races. Naturally, when you start with batteries that are already at 105°, charging is more critical.

Now that I've told you all the pitfalls about charging, I'll tell you how easy it is to do correctly. G.E. recommends that a combination of voltage and temperature be used with fast charge batteries to determine when they are fully charged. This would involve digital voltmeters and individual cell temperature sensors. We are not quite to this point yet, but we're close. Digital LCD voltmeters are now available for \$70.00, and your fingers can act as temperature sensors.

I'll now describe the ideal Fast Charge System as used by the Experts in 1/12 electric cars around the country. This requires a Digital LCD voltmeter and a constant 4 amp adjustable rate charger. What we're trying to do is fast charge the batteries at a constant 4 amp current, until the batteries show 1 volt less than fully charged, where we'll switch to a 2 amp charge, or less, until the battery

voltage stops climbing. When we start charging a 6 cell pack, the voltmeter **might** read, as an example, 8.50 volts, which is actually the battery and charger voltage together. The starting voltage will vary depending on how far down the battery pack is and how much output the charger has. The battery voltage will slowly start to rise, 8.51, 8.52, 8.53, etc. It will continue to rise (as an example) to 9.25 volts. At this point we'll switch the charger to 2 amps. When the batteries near full charge, they'll be able to come

to page 156



The G.E. Fast Charge batteries we use are sub "C" size cells rated at 1.2 amp hour and 1.25 volts. The battery packs are made up of either 4 or 6 cells. 4 cells used indoors and 6 cells outdoors. Shown is half of a 6 cell pack. The 3 cells are welded together at the factory and encased in a white plastic container, which has been cut away here.

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ART CHESTER'S JEEP

A magnificent Stand-Off Sport Scale model of the front runner of the Golden Age of air racing. This .61 powered beauty of Art Chester's Jeep flies the way you wished all R/C models flew.

By Colonel John A. de Vries and George Fischer

For a while, it lay cut up and brutalized. What was once a truly unique racing airplane had its slim Menasco engine wrenched from its mounts and a flat Continental welded in its place. The free-flowing streamlined landing gear was hacked off and two stubby hunks of steel, carrying a couple of chubby air wheels, substituted. The ugly modifications were made so that the "Jeep" could meet the rules for "Goodyear" racers. But, today, all of that is being changed. Art Chester's beautiful racer is being restored to its original glory. Mr. Henry Proescher is rebuilding the "Jeep" for the EAA Air Museum.

During air racing's Golden Age, the Jeep was always a front-runner. Under the sure hand of its designer and builder, Art Chester, it showed the way around pylons from 1932 to 1937. Only when the more-powerful "Goon", with a six

cylinder Menasco, fancy French Ratier propeller, and retractable landing gear was ready to burn up the race courses did Chester sell his "Jeep".

Our Stand-Off (Sport) Scale is slightly larger than 1/4 size of the real Jeep. The scale, 3 1/2" equals 1", puts the model into the "Monster Scale" category although the wing span is a reasonable 60". Power is provided by a .61 --- and a reduction drive isn't necessary! The 850 square inch wing and the tail surfaces have been enlarged a tad from dead-on scale, but it'll take a good ruler and a sharp eye to detect the divergence. There are a host of good scale references. John Underwood's "The Art Chester Story" has some superb pictures of the Jeep and the British Aeromodeler Jeep 3-views (available from Bob Holman) show the plane in its various incarnations. Hirsch drawings are also good for your scale

presentation.

Our model isn't too complex, as scale models tend to be. But, it isn't a two week project, either. George Fischer, who built **three** prototype models for this article, took 12 months to produce them --- but, in the process, taught himself how to produce magnificent fiberglass parts. If you've built and flown four or five R/C models you won't have any trouble building and flying the Jeep.

There wasn't an airplane, before or since, with a wing shaped just like the Jeep's. It's wider and thicker in the middle of each panel than it is on the ends! Our model uses a foam wing, built up from five hot wire cut cores. The constant chord center section requires two center section rib templates. Inner wing panels are cut using a center section rib and a mid-wing template (be sure to cut two "handed" inner panels!). The outer wing panels use the mid-wing





TYPE AIRCRAFT
Sport Scale
WINGSPAN
62 1/4 Inches
WING CHORD
12-13/16" (Avg.)
TOTAL WING AREA
750 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Semi-Symmetrical (M-6 Scale)
WING PLANFORM
Chester's Design
DIHEDRAL, EACH TIP
None
O.A. FUSELAGE LENGTH
51-9/16"

template, again, plus a tip rib template. The outer panels are "handed" as well, and should have 1/4" of washout cut into them.

Wing alignment is easy --- because the top of the wing is flat. When George cut the first set of cores for our models, he called the author with a lot of concern in his voice. The trailing edge didn't appear to be straight, from root to tip --- and he wondered if he'd cut the panels correctly. He had --- there's an apparent upward bend in the trailing edge that is visible when you study photographs of the "real" Jeep! So, when you epoxy the five foam cores together, keep the top surface of the wing flat, the leading edges and trailing edges aligned, and your wing will be "right".

With the foam cores glued together, groove the top surface for two wing spars. They may be made from hard balsa, spruce or plywood. They're 1/4" thick, 1" deep and 36" long and tie all of the wing panels together. Although we used spruce, balsa spars would be more than adequate because the wing sheeting adds a lot of strength. The rear spar's location is a bit more critical than the front one because it'll hold the wing hold-down dowels and face up to a former in the fuselage. Before sheeting the wing (we used 3/32" sheet balsa) groove the cores for either aileron torque rods or a bellcrank aileron actuating system. Our models used both systems --- but, torque rods are scale.

Sheet the top of the wing first, with the sheets running span-wise. Stagger the ends of the sheeting strips. George ran a couple of the sheets on the bottom of the

wing at a 45° angle across the mid-panel joint - to add even more strength. We did not make up complete wing skins but, rather, added full 3" sheets one at a time. With the wing sheeted, add the top blocks (balsa), leading edges, aileron spars and sheet balsa ailerons. Have at it with the sanding blocks after hinging the ailerons in place. When everything is smooth, notch the center section trailing edge to the rear spar, 2 1/2" either side of the wing's center line. Line the raw foam that's exposed with some 1/16" sheet balsa.

Dig a hole in the center section (bottom) for the aileron servo. Bolt the servo in place and hook it up to the aileron actuating system you've chosen. Although equal action ailerons work okay, we found better rolling response from our models when we used differential (about 1/2" of up, 1/4" of down --- measured at the inboard end of the aileron's trailing edge). The bottom mounted servo clears space for the instrument panel that we show on the drawing.

Fabricate the wing struts from balsa strips, wire and three (each) Kwik-Links. The adjustable links will help you size things later on in the construction sequence. Restrain yourself if you have the urge to install the wing strut fixtures into the wing at this point! They're inset later, when we install the wing to the fuselage and it's a lot easier to align the bird at that time! If it'll make you feel



REC. FUEL TANK SIZE
12-14 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4

CONTROL FUNCTIONS
Rud., Elev., Ail. & Throt.

BASIC MATERIALS USED IN CONSTRUCTION
Fuselage Balsa, Spruce & Ply
Wing Foam & Balsa
Empennage Balsa
Weight Ready-To-Fly 152 Ounces
Wing Loading 29.2 Oz./Sq. Ft.



RADIO COMPARTMENT AREA
(L) 15" X (W) 5 3/4" X (H) 4 3/4"
STABILIZER SPAN
18 1/2 Inches
STABILIZER CHORD (Incl. elev.)
10 1/2" (Avg.)
STABILIZER AREA
215 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
11 1/4" (incl. fuselage)
VERTICAL FIN WIDTH (Incl. rud.)
12 1/4" (Max.)
REC. ENGINE SIZE
.60-.61 (Pumper)

better, you can cut out the aluminum strut fixtures and their plywood blocks --- just to be ready.

Both the fin/rudder and the stabilizer/elevator outlines should be of laminated construction. It's lighter and the "grain" runs in the right direction! Use 1/4" x 1/16" balsa laminations built up at least 1/4" thick. Add the spars and internal ribs before "lifting" the outlines from the building board --- to retain their shape. Note that the fin spar also forms the rear post of the fuselage. And don't cut the movable surfaces free at this time --- wait until you've rounded the laminated edges and are ready to install the hinges. There's a mid-elevator fairing to be cut out and a couple of streamlined "bumps" to be made (but which are glued onto the covered rudder). We used long rudder and elevator horns.

One of the features of the full scale Jeep was hinge-line shrouding. Chester used it to squeeze the last mph out of the bird. When the tail surfaces are covered, a 5/8" strip of litho plate (thin aluminum) is added --- not only for scale appearance but it makes the model fly better!

The basic fuselage "box" may be built one of two ways --- we tried both ways. The lighter construction uses the 3/16" square balsa (or spruce) longerons and uprights. If you go this route, fill in the forward open bays of the fuselage sides with 3/16" sheet balsa with the grain running diagonally. You may also opt for 3/16" sheet balsa fuselage sides. In either case, add the 1/16" plywood doublers before you assemble the "box"

with 3/16" square cross-pieces. Install one cross-piece, temporarily, in the place of the plywood wing mount former — until the whole fuselage is glued together. Epoxy the 1/4" ply fuselage front in place and back it with triangular stock for strength. Make sure that the vertical slots in this piece of plywood are truly vertical — because the motor mounts are inserted in them later and lock-in the engine thrust line. Add all of the balsa gussets shown on the drawings as well as the stabilizer mount.

Position the wing carefully on the top of the forward longerons and shim it up to the proper + 1° incidence angle. "Pull" the temporary upper fuselage cross-piece at the wing dowel former location and replace it with the already drilled 1/4" plywood wing mount former. With the wing pinned in place, drill the former and install two 1/4" wing hold-down dowels — which are epoxied into the wing. You may have to "pack" the area between the aft surface of the rear wing spar and the wing mount former to assure a smooth, tight, square fit. It's worth the fussing! When the epoxy has cured, reinforce the wing mount former fore and aft with triangular stock to both sides of the fuselage.

With the wing still in place, glue the stabilizer in position and then build up the fuselage top, from firewall to rudder post. Note that the fuselage top from the firewall aft to the rear of the cockpit is glued to the wing center section — and is removed with the wing when the model is disassembled. The front, 1/4" ply former is drilled to accept 1/4 x 20 bolts that hold the front of the wing in position. The entire "wing upper front fuselage" assembly is held rigidly in place — and none of the "fixin's" will show on the completed model.

The upper front fuselage is planked over formers. Aft of the cockpit, formers and stringers are used --- to provide for full-sheet sheeting. Glue the formers in place, inlet the stringers flush with their surface (it's easier to cut the stringer notches with the formers installed — they stay straight!). Note that the area immediately below the fin is **not** sheeted. This allows the fin covering material to form a fillet with the rear fuselage. Glue the fin and its spar in place.

There are a couple of 1/8" dowels to be added between the two rear cockpit formers and the side and bottom stringers to be added before the fuselage framing is complete. Inlet the hard maple stock tail skid. Make sure the grain runs the "long way" of the skid and epoxy a replaceable metal (aluminum, tin can) skid surface to it.

It's cowl building and engine mounting time! Probably the only "tricky" part of building our model of the Jeep is the construction and alignment of the

engine mount. Measure twice, do a careful job of plywood cutting and the job won't be too difficult. The engine mount consists of two plywood sides (1/4") that fit into the slots cut into the "firewall" joined in front with a 1/4" plywood motor mount. That's not double talk — we didn't know what else to call the plywood that holds the motor mount! The length of the sides of the motor mount must be cut to fit your .60-.61 engine. Front rotor engines will require a prop shaft extension (3/4" — Fox) so that the carb won't protrude into the cowl line. Figure this extra length when sizing the motor mount sides! The drawings show the motor mount sides that fit the K & B .61 "pumper" — and that's also the reason for the hole in the motor mount — to get at the pump adjustment.

Install a Kraft or Tatone engine mount to the engine mount mount (we used 6-32 blind nuts) and then glue the whole engine mount assembly together with epoxy. Use the slow drying variety and it's a good idea if you've bolted the engine in place. Jiggle things around to achieve a 0-0 engine thrust line. If you get a tad of down and/or right thrust in the inverted engine, no sweat, but it isn't necessary. If you want a super-sanitary engine installation, you can "tilt" the .60 about 15° clockwise from true vertical — to place the cylinder exactly behind the scale cowl air intake. We found, despite the capacious cowling and with plenty of air in and out, that aluminum baffles were needed to cool the engine properly. They're wired to the cylinder.

When the motor mount epoxy has cured, add the triangular reinforcements and the fuel tank floor (1/8" balsa). Adjust it up or down to align the fuel tank with the needle valve on the engine.

Cowl construction is not detailed on our drawings — because the cowl can be made a couple of ways. We made one from 1/2" thick balsa slabs, the other from fiberglass. Both methods work well and provide plenty of room around the engine for a muffler. The fiberglass route is the preferred one because all of the cooling louvers in the cowl can be made functional. A balsa or foam "plug" required the same carving effort as the wooden cowl, so there are only a couple of extra steps to make the more efficient nose fairing. In any event, leave the engine mounted, together with the 3" spinner, so its lines may be "flowed" from spinner to cowling. The drawings show the scale spinner (and, yes, George made one from fiberglass that fits the Midwest aluminum back plate — for scale judging). Just aft of the cowling on the left side of the fuselage, are two large air outlets (scale). They can be carved out to make them functional, holes are shown in the firewall drawings to accommodate them. You'll notice

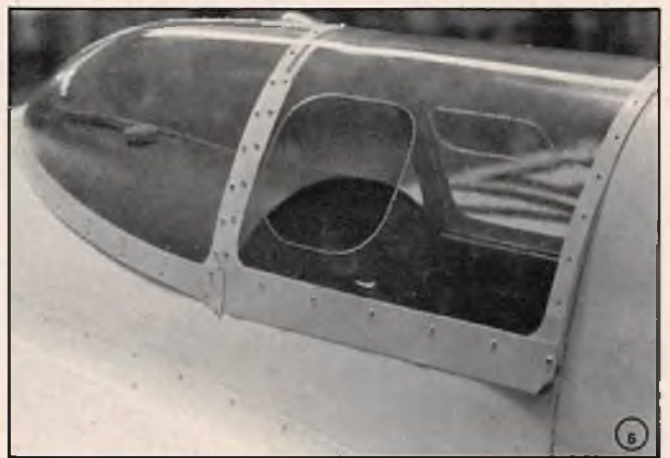
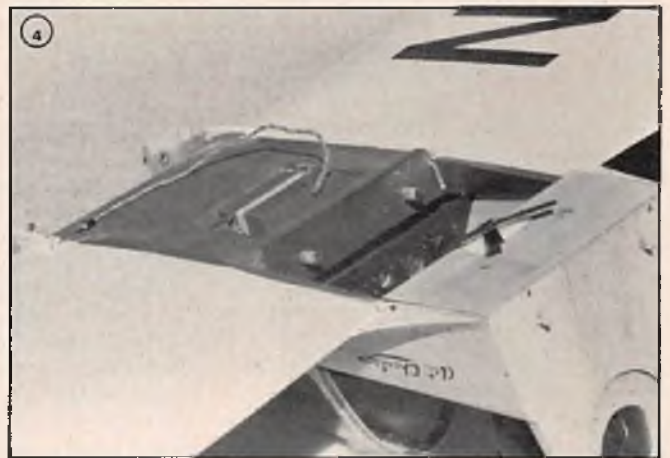
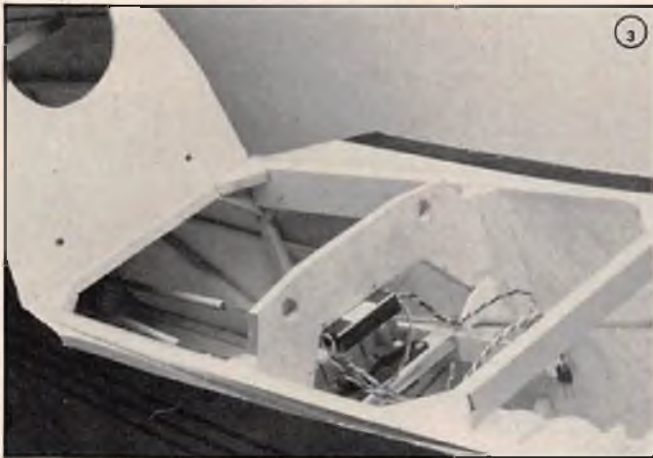
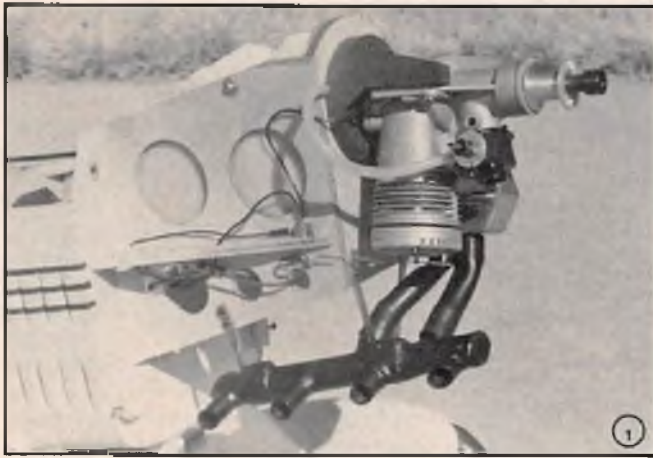
that, in our photos, George went hog wild and welded together a full scale exhaust system. It's not strictly necessary but it is easy to lead the engine's exhaust to the scale openings on the lower right of the cowl. Use four cowl mounting brackets and screws to hold the cowl in place.

The Jeep's fixed landing gear is distinctive and well worth the work to duplicate its flowing lines. The front view drawing shows the full sized 5/32" music wire front strut pattern. The 1/8" rear strut, is bent to the same pattern, but terminates at the large radius bend. The gear wires are bent and then mounted in the fuselage in two maple landing gear blocks — like those used in low wing pattern ships. They're strapped in place using the usual metal straps and small screws.

Silver solder (or bind with copper wire and soft solder) the landing gear wires together. While you've got the torch out, solder the wing strut bracket to the forward wire. Add the 1/32" ply landing gear fairing leading and trailing edges to the struts along with the plywood "ribs". Glue the landing gear fairing leading and trailing edge balsa "thickeners" to the ply. Notch the lower balsa blocks (that form the fairing between the fabric covered portion of the strut and the wheel pant) — and glue 'em in place. Assemble the wheel pants (1/4" sheet balsa cores and sides) and sand them to streamlined shape. The pants will be held in place, using Fox flanged wheel collars, so carefully trim the lower fairing blocks to butt up against the pants. Sandpaper, glued around a 1/2" dowel, will help "flow" the various parts of the landing gear fairing together. We used Kraft 3" wheels (because they're narrow enough to be scale) but other narrow wheels may be used.

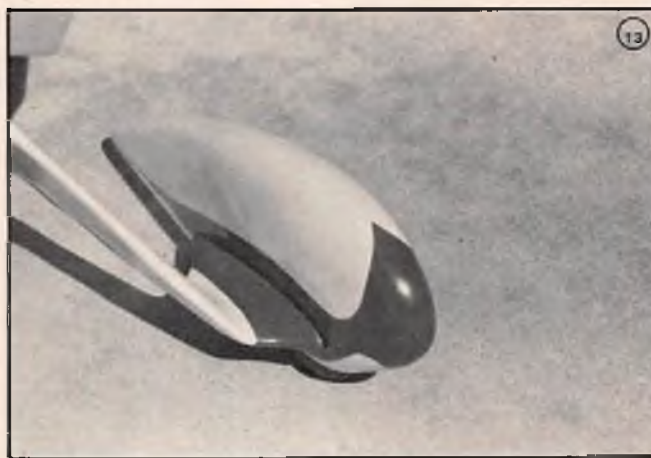
The windshield and canopy are molded in one piece and cut apart when they're formed. Carve a form and "pull" a canopy. We tried using butyrate heat forming plastic and found, for a canopy as large as the Jeep's, that the heavier stock (.040 or thicker) wouldn't form correctly without a vacuum system. We ended up making our canopies from 1/16" Plexiglass, which draped beautifully over the form. The openings in the canopy were easy to cut out and we heat formed the tiny airscoop that was Hot Stuffed (very carefully) into position on the upper right rear of the windshield. As may be seen in our photographs, George fashioned the cockpit framing from thin litho (aluminum) plates. He then went "ape" and added a bunch of eyeglass temple screws to the framework — for scale appearance. The canopy had been cut free and was held in place by the forward cockpit framing and two small screws

text to page 148

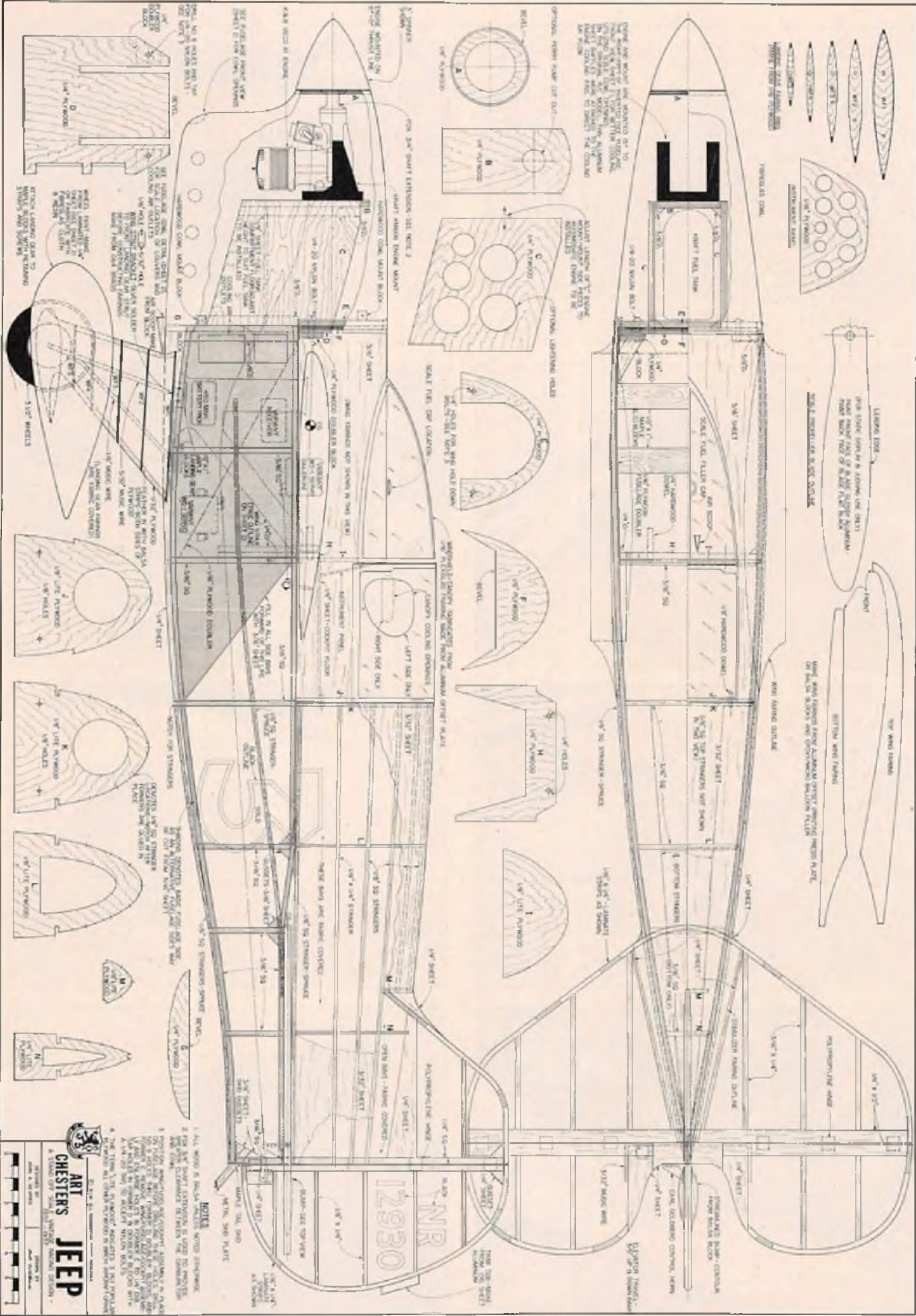


(1) Engine mount. Lee-Veco .61 exhausts into Taton muffer. Silicone rubber extensions join to Fischer-built scale exhaust pipe. Wires are for glow plug heating system, operated by micro-switch on throttle push rod. Note 3/4" prop shaft extension - which keeps the Perry out of the cowl contours. Also, 1/4" holes through firewall for wing mount. Engine is "tilted" 10° clockwise from vertical to line cooling fins with scale cowl air intake. Fuel line from Perry pump comes through groove in Kraft engine mount. (2) Where's the radio? It's there, on the floor of the fuselage. Note the scale air outlets on the left as well as the wing strut anchor soldered to the front landing gear strut. The holes in the firewall are for the 1/4-20 wing mount bolts that are hidden when the cowl's in place. (3) Close-up of the wing dowel former. Two 1/4" dowels in rear of wing center-section mate with former to hold wing in place. Note 1/8" dowel holes in aft-cockpit former. They help align forward upper fuselage. (4) Under side of wing center-section showing dowels, and front plywood former through which bolts hold wing in position. Tape strips on the right are the ends of the shoulder straps, which hold "Art" in the cockpit. (5) Windshield up close. Framing is thin aluminum sheet. George Fischer was in the process of adding eyeglass temple screws when photo was taken. Small, transparent scale airscoop was Hot Stuffed in place on 1/16" Plexiglas cockpit cover. Scale fuel cap is well forward under windshield. (6) Canopy, showing scale cooling air cut-outs. Canopy is held in place by cockpit framing and two screws. (7) Art - surveying his instruments. He's carved from foam - because nobody makes a 3 1/2" scale pilot.





(8) Art - again. He "sits" on two dowels and is held in place by his shoulder straps. His helmet was formerly a part of Mrs. Fischer's old pocketbook. (9) Business end of No. 2 prototype "Jeep". Single exhaust tube, from Talone muffler exits second scale exhaust pipe position. (10) Tail feathers of the Jeep. Photo shows thin aluminum stabilizer fillet and rudder trim tab. Bumps on the lower rudder are balsa. Note particularly how the rudder hinge line is shrouded and the way the Coverite forms the fin fuselage fillet. (11) Underwing detail. Note how "flat" the wing strut anchors are - and the Velcro tape that hold the wing strut fairing in place. This particular wing uses the bellcrank aileron actuating system - torque rods are scale. License numbers are spray painted through simple masks - auto rubbing compound removes overspray. (12) Wing strut and strut fairings. Three Kwik-Links connect to two wing brackets and bracket on landing gear. Fairings are molded butyrate heat-forming plastic, formed over a plug. (13) Wheel pant and landing gear fairing. Chester was noted for getting the greatest speed from his designs by carefully streamlining everything. Note how strut "flows" into the wheel pant - the pants are held in place with Fox flanged wheel collars. (14) Test pilot, Ivan Munninghoff, with friend, before the first flight. Ivan had to contend with aft CG and super-touchy elevators.



NOTE

1. ALL WOOD IS Balsa UNLESS NOTED OTHERWISE.
2. FOR 1/2" SHEET EXTENSION IS USED TO INDICATE THE LOCATION OF THE EXTENSION.
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10. THE 1/2" SHEET EXTENSION IS USED TO INDICATE THE LOCATION OF THE EXTENSION.

ART JEEP CHESTERS

12930 NR

PLANS NO 179B (2)

RC FLYING AND THE LAW

Part VIII

Questions and Answers

In R/C modeling, as in almost everything else, we learn from the problems faced by others. Certainly there is a great deal to learn which may be applicable and of use to those throughout our nation who have faced particular "law related" problems and seek advice concerning radio controlled flying. This segment of this continuing series is devoted to reproducing questions put to me by modelers throughout the country and the responses that have been given.

Let's start with a letter received from an Indiana modeler:

I was pleased to receive your reply May 27th, to my previous letter. I have continued to follow your 'Transitioning' series and I wish it had been out last year before I started my lessons. Your suggestion about liability insurance shook me up since no one else had mentioned it before. I have about 60 hours now with no insurance coverage! I plan to correct that situation.

My reason for writing this letter is not all pleasure. I have just finished your "RC Flying and the Law" article in the July RCM and was left with a couple of questions. After realizing what any R/C pilot can let himself in for, I began to access my safety practices and those of our club members.

Our club field belongs to the Eagles Country Club and is within 300 feet of their front door. There are also houses on all 4 points of the compass, though it is not heavily populated. Worst of all, within 100 feet of our runway is an area used by the Eagles for a 'Turkey Shoot'. They are holding them all year round now, drawing crowds of 30 or more people who, of course, pay no attention to our planes at all. I have worried about this situation for some time and now have resolved not to fly there again. I have moved my operations to a small private flying field run by an R/C Modeler and crop duster. There I can combine pleasure with pleasure.



By Arthur J. Sabin
Prof. of Law

Although my move has gotten me away from crowds of people and homes, I am still concerned about some of the items the R/C pilot in your article was being sued for. I am a modeler with 17 years experience. Would a court consider me an expert and accept my own inspection of my own aircraft? If not, could another experienced club member act as an inspector and would his inspection place him in liability if an accident occurred with that plane?

You also mentioned the AMA safety Code and that it must be obeyed for the AMA insurance to be good. I re-read it and I discovered at least one major violation I have made in the past and one I know that almost every flyer I know has made. That is flying a new or newly repaired model before the public without a test flight. This is done regularly at our field. I was wondering how many times planes have been flown for the very first time at a contest, especially a scale meet! I wonder how many AMA members have read the Safety Code?"

The response was as follows:

Indeed you are wise to get away from any place that people congregate or live for your flying. I just finished reading a couple of hundred page deposition taken of the R/C pilot who hit the woman who was a spectator watching a swimming meet; in that case, the field was about 200 yards or so from where the flying was taking place.

To specifically answer some of the questions you asked, it isn't a matter of you being "an expert" in terms of inspecting your aircraft, but rather whether you had enough experience to know whether the plane was safe or not through your own inspection. Obviously with the amount of experience you have, if you looked over the plane as a reasonable man would have reviewed that plane before flying and believed it to be safe, then you are acting reasonably. In the eyes of the law you would only be required to get someone else into the act if indeed you didn't have sufficient experience to tell whether the plane was safe or there was something about the plane which, given your experience, indicated that you ought to get another opinion.

As to the AMA Safety Code, there is no question that a test flight should be made away from any spectators or potential of injury to anyone. Keep in mind that the Safety Code is there as a sort of measure as to whether negligent conduct has taken place; it also constitutes a potential out for the insurance carrier because a requirement of the insurance coverable is that you obey the Safety Code. By violating the Safety Code you leave it up to the company as to whether they will or will not accept responsibility for defense and ultimately to pay for any damages.

From Alabama came the following request:

Mr. Sabin,

I am writing this letter for our club, the Anniston Modelers Association in regard to your article on RIC Flying and the Law. We have a question concerning where we fly. Our club rents a field off the east end of an active airport from the airport operator. The question is in the event of an accident with our models and a full size plane, would our AMA insurance cover damages and legal action.

Our club is in the process of being AMA chartered and our members belong to the AMA. Your answer to this question would be deeply appreciated.

To which the following was the response:

I am pleased to respond to your interesting letter concerning the location of your field and AMA insurance. I would, however, defer answering this question and instead recommend that you put the situation directly to the AMA who will either answer the question themselves or place the matter before their insurance carrier for a proper response.

Plainly put, my reaction, observations and opinion would be of much less value than that which you should receive from the AMA directly or through their carrier. I have found the AMA to be extremely helpful and diligent in these matters and therefore I would recommend that you write to:

Mr. Carl P. Maroney, Assistant Executive Director, Academy of Model Aeronautics, 815-15th Street, N.W., Washington, D.C. 20005.

I would, however, want to take the opportunity to give you the following observations: You do not indicate how far off the east end of the active runway of the airport your flying field is located. I would, however, specifically bring to your attention the official Safety Code of the Academy of Model Aeronautics which states under, "General," No. 2 "I will not fly my model higher than approximately 400 feet within three miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full scale aircraft."

This safety provision reflects, in turn, an Advisory Circular which I believe was issued by the Federal Aviation Administration in this matter.

I would also want you to have in mind that under the AMA insurance that any member carries or that the Club has as a chartered club, the insurance coverage is conditioned upon obedience to proper flying in terms of safety precautions. Therefore, certainly a very real question exists since your letter at least suggests the potential of a violation of a promulgated safety rule or at least the potential of such violation which, in turn, might lead the insurance carrier to deny

liability in the event of a mishap.

Some time later, this modeler responded to my suggestion as follows:

The answer they (the AMA) gave me was as long as our club followed the AMA Safety Code that we would be covered under the insurance.

From Pennsylvania came the following letter:

I have read your five articles in RCM entitled "RIC Flying and the Law"

I am a member of a flying club. I am also on the Board of Directors. The club is incorporated. The club owns the flying field, approx. 10 acres.

Recently, some of the members and officers decided to re-write and revise the by-laws. One of the changes is that because the FCC permits a Class "C" license to be assigned to 12 year old citizens, our club will accept anyone 12 years old and over and permit them to be a full member to be accorded all privileges except they cannot hold office until he or she reaches the age of 21.

I would appreciate the answers to the following questions:

(1) To what extent is the club and members liable for the actions and damages, if any, caused by the very young members?

(2) Would you advise me not to hold office in the club if this proposal should be approved?

This proposal has not been finalized as yet because the present by-laws require a total of 3 consecutive monthly meetings for amendments or changes in the by-laws to be read and voted on at all 3 meetings and approved by a 2/3 majority of the members present. Only one meeting has been held since the proposal was made. The vote was in favor of the proposal by a narrow margin.

I would appreciate receiving your views before January 29, 1979, as this is the date of our next meeting. I am certain there will be a reading and vote taken at this meeting. Your answers will greatly influence my actions and the stand I take.

To which the following response was given:

I have received your letter of December 19th, 1978 and have reviewed same. Let me respond to your questions as follows, keeping in mind that my opinions are of informal nature and that you should be guided by Pennsylvania law. Undoubtedly you have some attorney who has been handling the corporate affairs of your club and by all means you should review the matter with that attorney.

You should understand that so long as your club is incorporated, any liability of any nature, so long as it was a club activity or some action taking place on the club owned flying site, the liability is essentially that of your incorporated club. Therefore, the extent of liability in

the event that you were not insured for whatever incident was involved would be the assets of the incorporated club. Usually this doesn't amount to much of anything but in your case, the club owns the flying field and that may indeed be a valuable piece of property. The major aspect is that of insurance. Assuming your club is a chartered AMA club, then AMA insurance is applicable to club sanctioned activities. I would caution you, however, that the club activities should conform to the AMA Safety Code in all respects.

Specifically, for example, that means monitoring the activities at the flying field so that they conform to AMA standards.

Assuming that the 12 year olds belong to AMA (which they should in order to be individually insured), AMA coverage would be applicable to the activities of such young modelers and pilots engaged in modeling or flying activities that are part of the club's activities. The only potential source of danger would be, I feel, the fact that certain defenses would be available to those younger modelers who are less than legal age with respect to any accidents they cause. On the other hand, there is greater responsibility on the part of the club to monitor the activities of such younger members because the negligence of such younger members may be attributable to the club. In turn, however, is the importance of insurance which would cover any such negligence so long as the club is properly AMA chartered and following the AMA Safety Code.

As you have noted from reading my articles and those which appear subsequent to your letter, Pennsylvania is the state where it has been decided that a radio controlled model is "an aircraft" and therefore Home Owners' carriers (which would include all modelers who carry Home Owners' insurance including members of a family where the younger modelers are involved) may not be applicable insurance, leaving the AMA insurance as the **only** insurance for the modeler and the club.

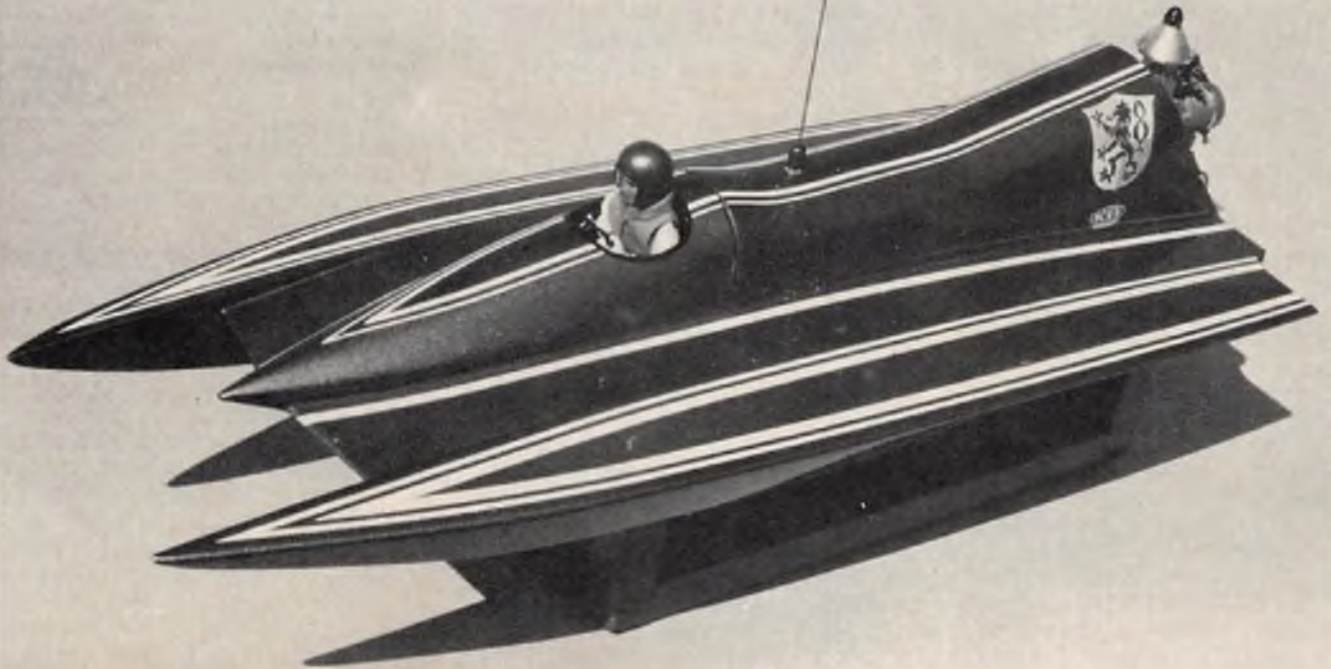
I hope that this information helps you to decide as to whether you want to continue to hold office in the club. I would certainly want to be certain that the club is properly incorporated and in good standing as a corporation and that the AMA insurance is in force and finally that the club actively pursues compliance with the AMA Safety Code.

★

One theme that runs through this material should be emphasized. Every insurance policy has its limitations, not only in terms of the amount of money liability that it provides, but also in terms of certain exclusions or limitations. A very important limitation which is often ignored in terms of its potential

to page 148

A NEW HORIZON: The Outboard Tunnel Hull



Part III BY JAY SELBY

This article is an in-depth look at the design characteristics of the latest new class on the RC boating scene: The Outboard Tunnel Hull. It is written by veteran driver, tunnel designer NAMBA Outboard Chairman, Jay Selby.

AIRFLOW AND STREAMLINING

The first two parts of this series dealt with a general overview of outboard tunnels, tunnel theory, tunnel design, and trim control.

Let's move to the top side or deck of a tunnel hull. When I picked the brains of the drivers of full scale tunnels, there seemed to be quite a divergence of opinion in regards to the airflow over the deck, cowling, and fin area. Some dismissed my questions as unimportant, others were not too sure just how important "above water" design is. The attitude seemed to be "it's what's down under that counts." However, after careful observation, some deep cogitating, and then experimentation, one just has to reach the conclusion that it is highly important to design a streamlined configuration conducive to good airflow; the parts well blended into a whole pleasing to the eye, that will inevitably be the best running hull.

In Figure #1, I show two different shapes as used on tunnel hulls for the deck. I have often questioned drivers of the full scale OPC's as to why some decks are flat, others curved. The

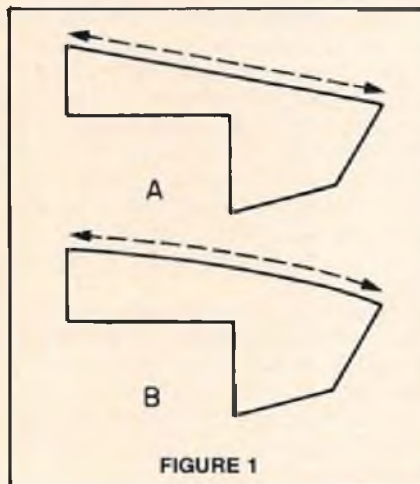


FIGURE 1

answer was that the flat deck (A in Figure #1) is used because the plywood is easier to attach to the frame! "B" of the same figure looks a bit better and perhaps would dump the air more readily. Since the idea is to hold the air as long as possible on the top of the deck, the better choice would be "A" of Figure #1.

The most obvious problem that one faces top side is the driver. If you have observed OPC tunnels at close range, most designs have not solved the problem of the driver "sitting in the wind". There are several reasons: First, because of the nature of the construction of our catamaran, the floor that the driver's seat rests upon is quite high in regards to the base line. Second,

there is the problem of vision. With a slanted cowling as most tunnels utilize, the driver almost looks down on the water and psychologically must feel that he is a little more in command. Third, the driver wants to be "in the hull" becoming a blend of man and machine, yet not be strapped in any way to the hull, so that if he has to make a split second exit, he can. Hence the reason for the "head and shoulder above the cockpit" approach. Some of our model RC tunnels have gotten around to a reclining driver. Full size tunnels have also experimented with this — the most recent coming to mind are an OPC Evenrude powered Mod U tunnel, driven by Jimbo McConnell, that required the driver to operate in a "lay-down" driving position; a Mercury powered Noddeland hull raced in the Paris 6 Hour Grand Prix by the Norwegians Jonassen and Hillestad, with a reclining driver (legs to the rear) both 1977 vintage; and a few years ago Dick Sherrer used the reclining "setting" approach with dual "sticks" on each side of the cockpit to steer, with only his head showing above the cowling.

The cockpit cowling then should start at a fairly sharp point at the bow and then increase in size just enough to house the driver and enclose the dashboard, or instrumentation, steering wheel, padded seat, and other gear. The fin or turtle deck (aft of the cockpit) has gone through radical changes almost from the beginning. Figure #2 shows some of the designs. "A" is a standard treatment of

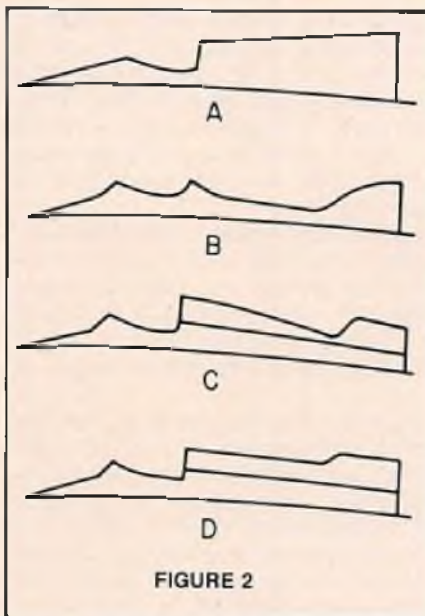


FIGURE 2

the fin; "B" is a design perhaps first fielded by Molinari hulls because some still pictures of a hull at full speed showed a "dent" in the fin just in front of the engine that (it was theorized) was caused by wind pressure. To alleviate this problem, the whole design concept of the fin was changed by lowering and streamlining. "C" shows a style used by Cees Van Der Velden of Holland; and "D" has been observed on Billy Seebold hulls. Coupled with these are as many endless number of variants as there are drivers. The vertical "stabilizer type" treatment of the rear of the fin (Figure #2, B and C) really serves a useful function. Just as a rudder on an airplane, it does help in maintaining directional stability. practical, I decided to remove the turtle deck on a tunnel with a vertical stabilizer, and the control on the straightaway and turns was definitely sluggish. There is the answer as to whether a fin does its job.

The one critical point top side is the area between the cockpit and the sponson. This, in essence, becomes a lifting airfoil (See Figure #3). The

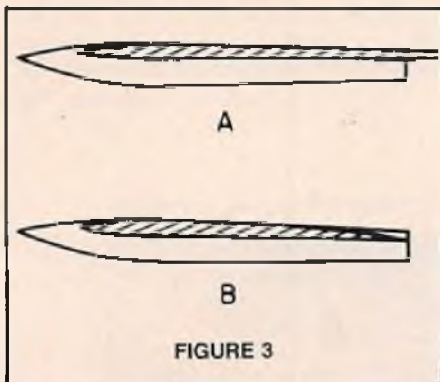


FIGURE 3

problem here is to try to design a streamlined section **but** not to the point that it acts too much like a wing and flies the bow. As in "A", the trailing edge should be fairly thick. "B" in Figure #3

would act the same as an aircraft wing. Again, if you have a third trim you could really control the tendency of the hull to leave the water. This type of an airfoil, though, has been used with success on small full size outboard hydros.

Moving to the bow again, there are a number of configurations that have been successful. The most effective is the pickle-fork which we have already discussed. Figure #4 shows some variations on that theme. The "blunt" or "squared" bow is still used and Figure #5 shows that and other styles. All are functional and the designer builder can make his own choice. Obviously, it is much easier to design and build a fully enclosed bow, but keep in mind that the whole idea is to take away the upward lift at the bow.

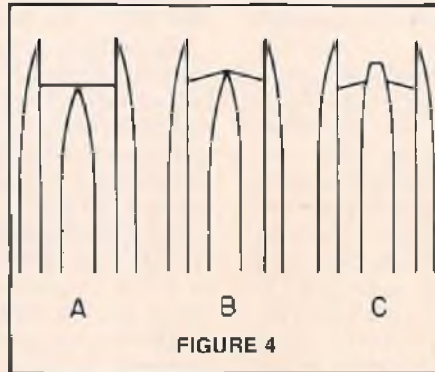


FIGURE 4

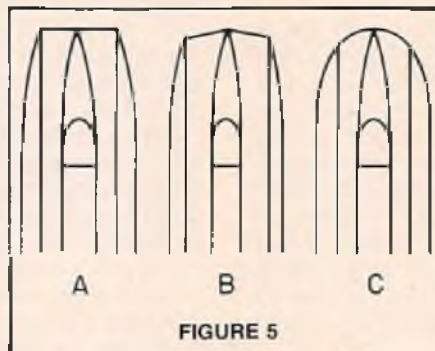


FIGURE 5

As viewed from the top, the shape of the cockpit and turtle deck (fin behind the cockpit) must be streamlined. Figure #6 shows two styles. In model RC boat hulls, "A" seems to lend itself best because of the problem of an RC water proof box and the size of the fuel tank, plus a 3" width at the transom that will be required if the K & B Auto Trim is installed.

Another innovation, and a design feature that helps hold the air on the deck plus adding a "rocket like" effect in appearance, is the addition of a "water deflector" or mini-fin on the outer edge of the hull at the stern (Figure #7). As our tunnel negotiates a turn, and the water climbs the side of the sponson, the fin aids in turning it away from the top of the deck, thereby helping turn capability. It is especially beneficial if the design of the sponson is "low profile" or of less depth, otherwise I feel it is more cosmetic than useful.

In a following installment we will look into some construction techniques. □

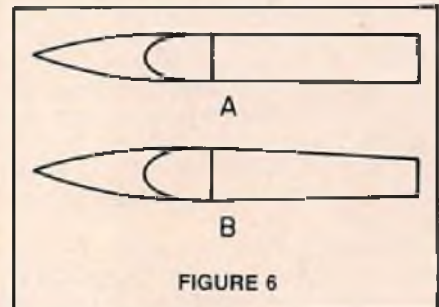


FIGURE 6

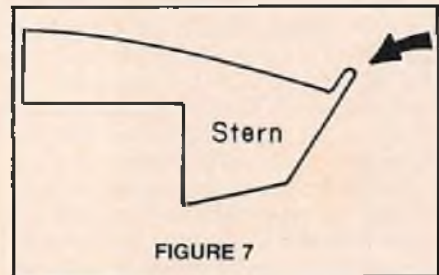
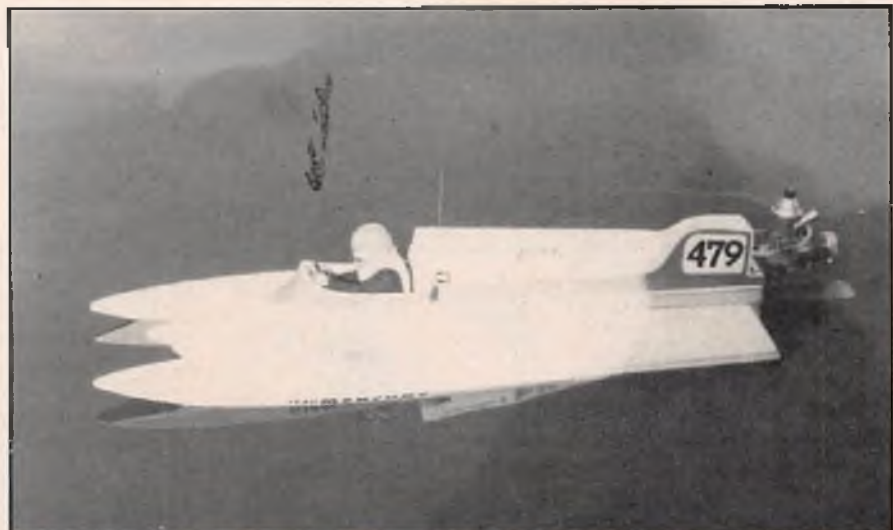


FIGURE 7



The author's streamlined version of a Billy Seebold Tunnel at rest.

A DIFFERENT OUTLOOK ON TOOLS

By Paul Denson

In the average article for beginners to the modeling field you will find a list of necessary tools. Almost never does it give the slightest inkling of how the modeler will be expected to use these tools, invariably it just jumps into how to build and the tools are never mentioned again. This isn't a list for the beginners, but you beginners don't despair — you can profit too. It is a list of common garden variety tools not necessarily used in modeling but ones that have been extremely useful to me and **how** they are used.

My most favored tool, except for the single edge razor blade, is my 6" Stanley Handyman plane. The blade is somewhat thicker than the single edge razor blade, easy to sharpen, and holds an edge indefinitely. It is, of course, not as easy to adjust as a plane with a knurled knob but with a little practice you can make microscopic adjustments. It fits in one hand and excels at shaping leading edges on wing, removing corners from fuselages, and cutting bevels. I saw my own spruce and it is great for planing off that fraction of an inch that I oversawed the 1/4" x 1/4" longeron. When you need to remove a small amount from the edge of a sheet of balsa to get it to fit, this is the tool.

Another cutting tool which, by the way, works like a free-style plane is a knife. A special one I like is called a cork knife and as you know, cork is much softer than balsa and, therefore, much harder to cut cleanly. If this knife cuts cork cleanly imagine what it can do with balsa. The knife was purchased at a scientific supply house and has no edge bevel like an ordinary knife or razor blade. The blade is one taper from the back to the cutting edge and is sharpened almost flat on the stone. It takes an edge that you can't believe. I own nothing that cuts balsa blocks better and I use it for whittling out wing tips, nose blocks and fuselage corners. It must be sharpened more often than the plane blade but the edge it takes matches a single edge razor blade.

Right now, I am into Quarter Scale and I find it is necessary to take small bits off ends of 1/4" square and 3/8" square strips when constructing longerons and uprights for fuselages. The X-Acto saw and miter box are the only way to cut the pieces to length but the ends are always ragged from the saw. Cut them a bit long and then trim to exact length with the cork knife in the miter box.

A few years ago I bought two 1/8" x 4 Sears Craftsman small screwdrivers. On one I filed the flanges off of the sides of the tip making a 3/32" which exactly fits the trim screw of a Kraft servo. The narrow screwdriver is used for tiny machine screws also, and the wider one for fasteners such as #2 sheet metal screws used in servo installation. If you occasionally stroke them from end to end with a magnet they will hold the screws you are going to insert.

I find a pair of rule calipers almost indispensable in the shop, if you aren't sure of the thickness of that piece of balsa from the scrap drawer, or the diameter of a piece of piano wire, or the size of that stray drill-bit, the calipers will tell you instantly. If you intend to acquire a pair, be sure they measure both in English and metric. The ones shown measure inside as well as outside.

When I was involved with sailplanes, the large field box utilized by power flyers was unnecessary. All you took to the field was glider, transmitter, and a small tool box. The tool box shown was originally a sewing box purchased at the nearby variety store. I bought a green one, trimmed it in black and anyone could determine my frequency instantly by looking at the box. The tray had posts for spools of thread and compartments for needles, pins and bobbins. I cut the posts off at the bottom of the tray with a hot wire, and used this compartment for long tools such as X-Acto knives, screwdrivers and small pliers. The larger tools and the epoxy tubes went in the bottom. Nuts, screws, and servo accessories were stored in the small compartments. The box is kept in the shop now and is used for storage of radio and servo components and hardware.

The three drill bit holders are actually regular modeler's tools but are unusual in that they are set up permanently. The short one with the knob on top contains a 1/16" drill which is used most frequently, the X-Acto knife holder supports a 3/32" drill and the pin vise holds 5/64" and 3/64" drills. These are kept in the top drawer of my field box which sits out when I am in the shop and is my small-tool box. In drilling most holes of this size, power really isn't necessary and my 3/8" shop drill is a bit too large to take these small drills. As you use them, you get to know the drill size by the holder.

The hemostat is an occasional tool and it may be purchased at a military surplus store for a few cents and is used as a shut-off clamp for surgical tubing, to pick up small things lost down in a fuselage, and as a clamp for holding things to be soldered --- and they really do lock on tightly.

I have two long aluminum straight-edges, one 1/8" x 3/4" by 6' from the Reynolds aluminum display at the hardware store. The other is an aluminum meter stick, and it has inches on the other side. It is rare that I make a cut in balsa or anything else for that matter without a jig or straight-edge. Mostly these two straight-edges are used in scaling up plans, however, you can use them to cut strips of trim MonoKote for decorating your pride and joy. If you need strips of balsa or just want to straighten up the edge of a piece of warped sheet balsa, anchor each end of the aluminum straight-edge with shot bags

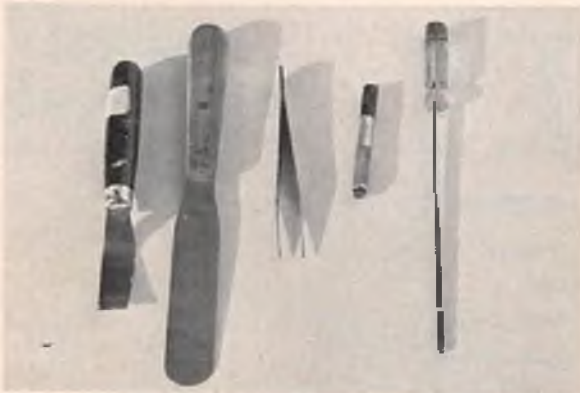
to page 142

L to R: Calipers, hemostat and stubby screwdriver.

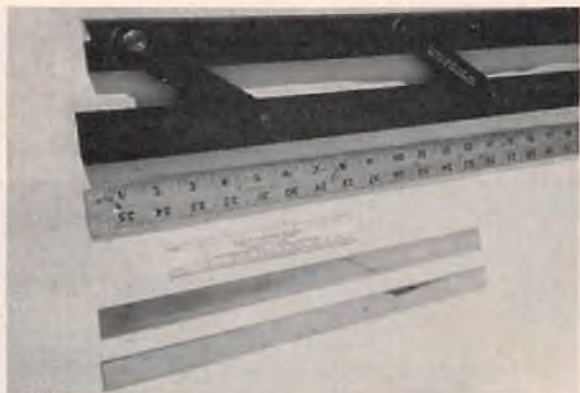


Home-made shot bags — toothbrush for size comparison.





L to R: Small palette knife with square tip, large palette knife with round tip, tweezers, magnetic screw starter and Allen wrench welded to old screwdriver.



TOP to BOTTOM: Parallel rulers and various other straight edges.



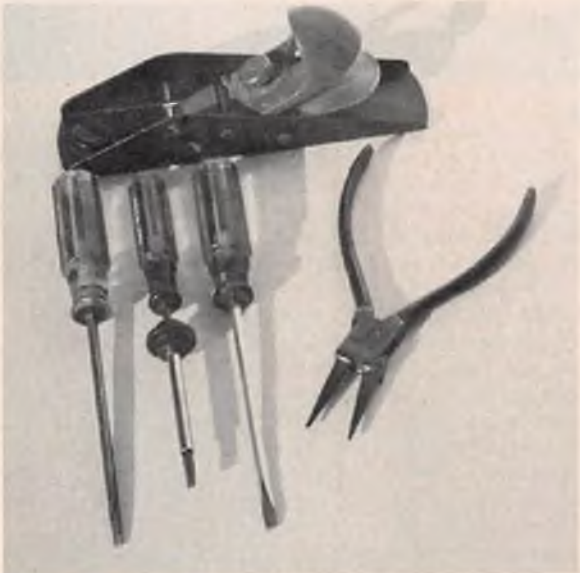
Sewing box converted to R/C use. Tray lifts out with storage below.



L to R: Jeweler's screwdriver, 1/16" X-Acto drill, X-Acto knife with 3/32" drill, pin vice 5/64" and 3/64" drills and X-Acto knife shown for size.



ABOVE, L to R: Cork knife, miter box and X-Acto saw. RIGHT: Top is a Stanley plane - L to R: 3/32" screwdriver, screw starter, 1/8" x 4" screwdriver and long nose wire pliers. BELOW: RCM epoxy mixer Mod. II with mixing sticks. 5 min. epoxy tubes held in a baby food jar. BELOW, RIGHT: Top is a 1/2 size miter saw with X-Acto razor saw on bottom.



RCM PRODUCT TEST

**OK Model Co.
CUTLASS 20**



The Cutlass 20 is a delta model manufactured by OK Model Co. Ltd., and sold by Hobby Shack stores. Upon inspection of the kit, one is immediately impressed by the overall packaging. There are several separate bags containing pre-cut balsa parts and a bag of necessary hardware, including nuts, bolts, hinges, control horns, landing gear straps, and aileron bellcranks. You will need a 4 oz. fuel tank, three 2" diameter wheels and a 1 3/4" diameter spinner to complete the kit. The wood quality is excellent with the only exception being soft aileron and elevator stock in the kit that I received. These I chose to replace with harder material. Only the plywood parts in the kit are die-cut, all remaining parts are either pre-cut or pre-shaped. In reference to Pilot's die-cutting, anyone who has ever built one of their kits can attest to their quality. The plywood parts literally fall out of their respective sheets.

Two plan sheets are provided, a normal top view, side view with construction notes, and a separate sheet with construction photos and parts list. Being a delta wing, one would want to carefully study the plans before starting actual construction to familiarize oneself with the proper assembly techniques. Actual building time is quite fast due, in part, to an excellent fit of the parts. The installation of the wing sheeting is the most time consuming. Here I used a combination of Hot Stuff and Titebond to speed things up.

Not shown on the plans, but what I feel is a worthwhile addition, is installing a steerable nose wheel assembly. By using the kit's nose wheel strut and adding a 1/8" steerable nose wheel bracket and steering arm from Carl Goldberg this can be easily accomplished. This modification necessitated the construction of a new 1/4" plywood firewall and use of a

to page 141

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

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

SPECIFICATIONS

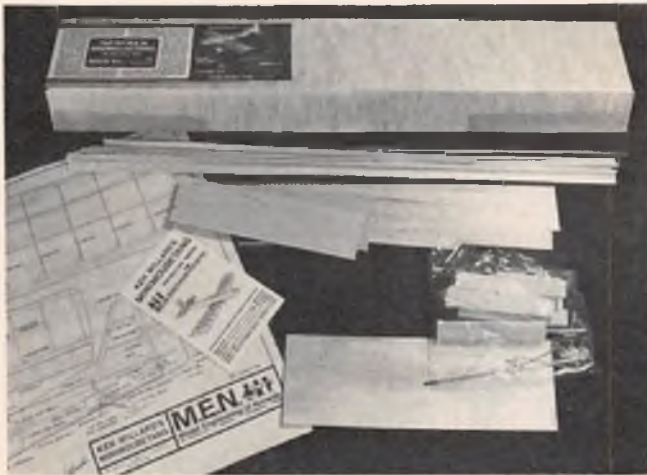
| | |
|---------------------------------------|--|
| Name | CUTLASS 20 |
| Aircraft Type | Delta Wing |
| Manufactured By | OK Model Co., Ltd. |
| Imported By | Hobby Shack 18480 Bandilier Circle Fountain Valley, California 92708 |
| Mfg. Suggested Retail Price | \$39.99 |
| Available From | Hobby Shack |
| Mfg. Recommended Usage | General Sport |
| Wing Span | 39 1/2 Inches |
| Total Wing Area | 480 Square Inches |
| Fuselage Length | 10 Inches |
| Radio Compartment Dimensions | (L) 12" x (W) 2 1/4" x (H) 2 1/2" |
| Wing Location | Delta Wing |
| Airfoil | Symmetrical |
| Wing Planform | Swept L.E. |
| Dihedral (each tip) | 0 |
| Stabilizer Span | NA |
| Stabilizer Chord (incl. elev.) | NA |
| Total Stab Area | NA |
| Stab Airfoil Section | NA |
| Stabilizer Location | NA |
| Vertical Fin Height | 6 Inches |
| Vertical Fin Width (incl. rud.) | 7 Inches |
| Mfg. Rec. Engine Range | 19-45 Cu. In. |
| Recommended Fuel Tank Size | 180 cc |
| Landing Gear | Tricycle |
| Recommended No. of Channels | 4 |
| Recommended Control Functions | Rud., Elev., Throt., Ail. |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa & Ply |
| Wing | Balsa & Ply |
| Tail Surfaces | Balsa |
| Hardware Incl. In Kit | See Text |
| Plan Size | 25" x 37" (1 sheet) |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | No |
| Construction Photos | Yes |
| Kit Includes | Die-Cut & Shaped Parts |
| Mfg. Rec. Flying Weight | 52-58 Oz. |
| Wing loading based on rec. flying wt. | 16-18 Oz./Sq. Ft. |

RCM PROTOTYPE

| | |
|-------------------------------------|------------------|
| Weight, Ready To Fly | 58 Ounces |
| Wing Loading | 17.4 Oz./Sq. Ft. |
| Covering & finishing materials used | See Text |
| Engine Make & Disp. | H.B. .25 |
| Muffler Used | H.B. |
| Radio Used | Kraft |
| Tank Size Used | 4 Ounce |

RCM PRODUCT TEST

M.E.N. MINIMOUSTANG



If you have been a long time builder of Ken Willard's designs, whether from articles in RCM or from the kits that have appeared on the shelves of the hobby shops, there would be no doubt in your mind that the Minimousetang by Model Engineering of Norwalk, was Ken's. That highly undercambered wing goes way back to his Showmaster which by the way also was a fantastic flyer. The wing gives the Minimousetang the ability to be flown from the local park, school playground, or the parking lot of the nearby supermarket. It is a great plane for the beginner or the expert to fly during these days of expensive fuel and ever shrinking flying fields. If you are able to get the high school football field for a Sunday Fun Fly, it is great to use the goal posts for a limbo contest. You beginners get some practice before you try that.

The instruction book is one of the best that has come to our attention in a long time. Not only is there a numbered step by step set of building instructions but there are diagrams that tell exactly how each piece of top and bottom sheeting is cut from the 1/16" balsa sheets included in the kit. The drawings are simple and direct, there is a layout of how each piece of covering material is cut from the roll, every square inch is utilized. It even shows how to make hinges from the covering material for the stab and rudder. The hardware package contained control horns, snap links and rods, screws, tail wheel and landing gear along with wheel retainers. The identification drawings of the sheet balsa die-cut parts call out the name of every piece in case the plane is being built by a novice. This helps locate the parts listed on the plans. In the back is a parts list and a cutting list that tells you the size of every piece, whether or not it is die-cut and, from what thickness of balsa it is cut. This is the best and most comprehensive instruction book we have seen in years.

to page 140

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

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

SPECIFICATIONS

| | |
|---------------------------------------|--|
| Name | MINI MOUSTANG |
| Aircraft Type | General Sport |
| Manufactured By | M.E.N. 54 Chestnut Hill Norwalk, Connecticut 06851 |
| Mfg. Suggested Retail Price | \$24.95 |
| Available From | Mfg. & Retail Outlets |
| Mfg. Recommended Usage | General Sport |
| Wing Span | 35 Inches |
| Wing Chord | 6½ Inches |
| Total Wing Area | 235 Square Inches |
| Fuselage Length | 27 Inches |
| Radio Compartment Dimensions | (L) 10" x (W) 2" x (H) 2½" |
| Wing Location | Low Wing |
| Airfoil | Undercamber |
| Wing Planform | Constant Chord |
| Dihedral (each tip) | 2½ Inch |
| Stabilizer Span | 13 Inches |
| Stabilizer Chord (Incl. elev.) | 4¾ Inches |
| Total Stab Area | 62 Square Inches |
| Stab Airfoil Section | Flat |
| Stabilizer Location | Top Of Fuselage |
| Vertical Fin Height | 4 Inches |
| Vertical Fin Width (Incl. rud.) | 5 Inches |
| Mfg. Rec. Engine Range | .049 Cu. In. |
| Recommended Fuel Tank Size | Integral Tank Mount |
| Landing Gear | Conventional |
| Recommended No. of Channels | 2 |
| Recommended Control Functions | Rudder & Elevator |
| Basic Materials Used in Construction: | |
| Fuselage | Balsa & Ply |
| Wing | Balsa |
| Tail Surfaces | Balsa |
| Hardware Incl. in Kit | See Text |
| Plan Size | 24" x 36" (1 sheet) |
| Building Instructions on Plan Sheets | No |
| Instruction Manual | Yes (20 pgs.) |
| Construction Photos | No |
| Kit Includes | Die-Cut Parts |
| Mfg. Rec. Flying Weight | 15 Oz. |
| Wing loading based on rec. flying wt. | 9.19 Oz./Sq. Ft. |

RCM PROTOTYPE

| | |
|-------------------------------------|----------------------|
| Weight, Ready To Fly | 18 Ounces |
| Wing Loading | 11 Oz./Sq. Ft. |
| Covering & Finishing materials used | SuperKote & MonoKote |
| Engine Make & Disp. | Cox .049 |
| Muffler Used | Cox QZ |
| Radio Used | Kraft |
| Tank Size Used | NA |



SNARK

By Mike Hollison

Snark was inspired by a collection of C/L stunt ships that the author saw lined up at a local flying exhibition. With a few modifications such as a wider fuselage to take the radio gear, a more substantial fin/rudder for stability, and a Sullivan molded foam wing, Snark was born.

The plane is a pleasure to fly, and both construction and handling are well within the capabilities of a reasonably experienced modeler.

Wing Construction:

Snark has only flown with a foam wing; however, plans for a built-up wing are shown for those who prefer a more traditional approach.

First of all, notch both leading and trailing edges for the wing ribs and epoxy the aileron hinges into place. Then, building one panel at a time, cement the ribs into position, add 3/16" square spars top and bottom, and fill in the space between them with 3/16" scrap balsa sheet.

Next, cut two undercarriage mounts from 1/4" ply, and epoxy a stack of three squares of 1/4" ply at one end for the torque box. Epoxy one mount in position, then cut the 1/8" ply dihedral wing brace and epoxy that in place also.

Cover one panel with 1/16" balsa sheet, after first gluing the scrap balsa wedge in place for the wing mounting bolt. Epoxy the remaining wing panel at the correct dihedral angle, then sheet and add the torque rods, ailerons, balsa

wing tips and locating dowel. Finally, fiberglass the wing center section and put aside.

The Sullivan molded foam wing is even easier to construct since one merely follows the instructions included in the package! However, a couple of changes need to be made to suit the design.

First, each panel must be cut down by 8 1/2" at the tip, reducing the length of each wing half from 31 1/2" to 23". Next, the spaces provided for the landing gear blocks must be filled in with a strip of 1/4" sheet balsa, and a new space cut as shown on the built-up wing. The molded squares immediately around this new mounting slot should also be filled in with 1/4" balsa sheet. Remember to use only Titobond, or a similar adhesive here, not balsa cement, as this will attack the foam core.

The landing gear blocks should now be epoxied into position, and the center section sanded so that the required dihedral angle may be obtained.

Balsa tips should then be added to each panel, as should the 1/2" balsa ribs at the center section, and the building instructions supplied by the manufacturer followed from this point on. The author sheeted and capstripped the wing as directed, fiberglassed the center section and, once the balsa fillets beneath the wing had been sanded flush with the fuselage, covered the finished

to page 50

Designed for a .35-.40 engine, the Snark is tailored to fit the needs of the Sunday Flier.



SNARK

Designed By : Mike Hollison

TYPE AIRCRAFT

Sport/Stunt

WINGSPAN

48 Inches

WING CHORD

Root 11 $\frac{7}{8}$ " — Tip 10 $\frac{1}{2}$ "

TOTAL WING AREA

528 Sq. In. (Approx.)

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

3/4 Inch

OVERALL FUSELAGE LENGTH

42 $\frac{3}{4}$ Inches

RADIO COMPARTMENT AREA

(L) 17" x (W) 2 $\frac{3}{4}$ " x (H) 2 $\frac{1}{2}$ "

STABILIZER SPAN

20 Inches

STABILIZER CHORD (Incl. elev.)

6" (Avg.)

STABILIZER AREA

120 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

5 $\frac{1}{4}$ Inches

VERTICAL FIN WIDTH (Incl. rud.)

5 $\frac{1}{2}$ " (Avg.)

REC. ENGINE SIZE

.35- 40 Cubic Inch

FUEL TANK SIZE

6 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

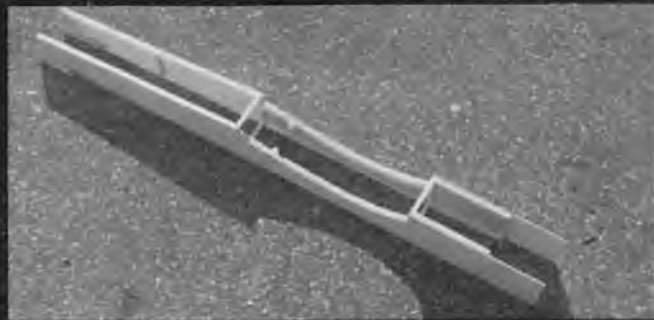
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply
Wing Foam, Balsa & Ply
Empennage Balsa
Wt. Ready-To-Fly 80 Ounces
Wing Loading 21.8 Oz/Sq. Ft.

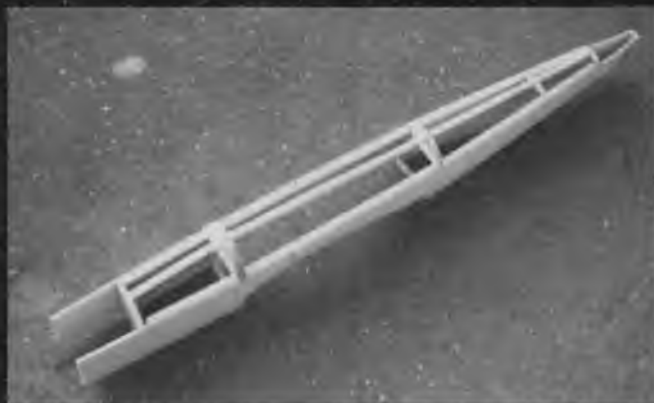




Fuselage side complete with nylon wing hold-down bracket attached.



Inverted fuselage sides joined at wing saddle on a flat surface. Check for proper alignment.



Basic fuselage structure completed awaiting top and bottom sheeting.



Sullivan foam wing ready for sheeting.



Sheeting and capstrips added to Sullivan foam wing. Plans also show a built-up wing.



Completed Snark shows the clean and simple lines. A Wing Mfg. canopy could be added.

wing with Solarfilm.

Fuselage Construction:

The fuselage is basically a box structure with a turtle deck top and should present no problems to the average builder.

Cut two sides from 3/32" balsa, then add the 1/32" ply doublers as shown. Glue on the 1/4" square stringers, spacers, and balsa side rails, then bolt the Du-Bro wing mounting brackets in position ensuring that they match up with the bolt holes in the wing.

Next, cut the motor bulkhead from 1/8" ply, drill for fuel lines and throttle pushrod, and bolt on the pre-tapped motor mount as shown in the plan. Epoxy the bulkhead and balsa spacers to the fuselage sides, ensuring that all is

square; then glue the fuselage tail together.

Install a six or eight ounce fuel tank at this point, epoxy the 1/8" ply wing retaining bulkhead in place, then cut top formers F1 and F2, and glue in place. Add the 1/4" square balsa spine, and cover the top with 1/16" sheet balsa. Sheet the bottom of the fuselage back from the trailing edge with 3/32" balsa.

Add scrap balsa blocks around the nose, slide a 2" diameter spinner onto the motor, and bolt to the engine mount. Wrap the motor in a plastic bag to prevent dust from getting inside, and sand the fuselage nose flush with the spinner. When this is done, remove the motor, and epoxy the 1/32" ply spinner ring to the carved balsa nose.

Finally, bolt the wing to the fuselage and, using scrap balsa, build up the center section of the wing to conform with the lines of the fuselage bottom. Cover the wing with Solarfilm.

Tail Assembly and Landing Gear Construction:

The vertical and horizontal stabilizers are cut from lightweight 1/4" balsa, hinged and epoxied to the fuselage.

The tailwheel strut is bent from 1/16" diameter wire, and glued in position as shown, and the main landing gear bent from 5/32" diameter wire. Be sure that the wheels are cambered slightly, and that each one points inwards toward the nose. This will ensure that the plane tracks in a straight line on take-off.

to page 140

RETRACT WHEEL WELLS

By Joseph
Utasi

Have you ever seen a ship with beautifully dressed wheel wells and wished that yours looked that good? Well, they can, and it's not that hard, either!

Of course, you can use those vacuum formed jobs, or just coat those ugly holes with epoxy 'cause no one sees the bottom anyway . . . Or, with just a little bit more effort, you can feel proud when you're bolting your wing on in front of other modeler's scrutinizing eyes.

The method that I'm going to describe not only results in a professional looking job, but also returns a lot of the structural strength to the wing in the retract area. This might come in handy the first time you cycle those new air driven retracts with maximum pressure!

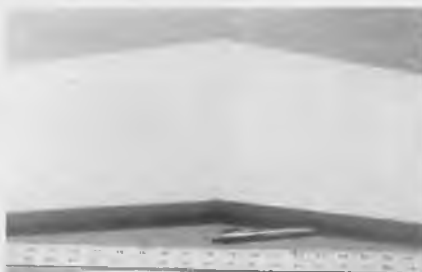
Note that the wing cores are not relieved all the way through the airfoil, but only deep enough to accommodate the wheel used. This will prevent the "ripple" in the top wingskin where it would be unsupported otherwise.



Step 1: Obtain an empty soup can. The average size (10½ oz.) is just right for 2¼" wheels.



Step 2: Use a carborundum disc in your Dremel tool and cut a series of teeth in the lip of the can. Be careful not to cut completely through the "roll" of the can, or it won't hold its round shape!



Step 3: Mark your wing cores with cross-hairs where the well will be located.



Step 4: Center the can over the markings. It's easy if you mark the can at 90 degree intervals.



Step 5: Lightly press the can on the foam and verify the centering.



Step 6: Gently twist the can while using a light pressure. Only go as deep as you have to!



Step 7: Use a screwdriver to "pick" out the foam. Be careful not to "ding" the sides of the well. Rub the screwdriver across the bottom of the well and the beads of foam will pop out one at a time till its level.



Step 8: Using 1/16" balsa, twist the "can cutter" and you've got the bottom of the wells done. They're even the right size!



Step 9: Form the well sidewalls from 1/16" balsa, with the grain as shown.



Step 10: Before gluing the sidewalls, "pad" the wheels with some foam rubber and tape, so that they will hold the walls in place — or just use some bigger wheels.

to page 136

The L.R. Taylor Co.

MULTI CHARGER

By Ben Strasser



Okay, it's time for you to take the new POOI (Powers Of Observation and Inference) intelligence test. How many nicad battery packs are being charged in the photograph above? No fair reading ahead, count what you see in the picture.

L.R. Taylor's new Multi-Charger is a real convenience item for those among us who are fortunate enough to have more than one R/C system to fly on weekends. If you have a couple of radios and airplanes or sailplanes (Yup, that's a Gryphon modified for a pod and landing gear) and you want to charge them, you'll have to find a double electrical outlet and end up with a mess of wires. In addition, if you have some back-up or extra battery packs you want to top off (they should be kept in a charged condition while in storage), more chargers and more outlets are needed. Unless you have Lloyd Taylor's Multi-Charger, that is.

Ready for the answer to the POOI Test? The answer (for those who didn't just count the LED indicator lights or charging wires on the face of the unit) is four receiver battery packs and two transmitter battery packs are being charged simultaneously. And, plugging in one transmitter or receiver battery pack alone is okay since each circuit is independently wired to protect the battery packs. The Multi-Charger operates on 117VAC, 60 Hz, with 220VAC, 50Hz units available on special order. Whether you have the

usual 8-cell, 9.6 volt transmitter or either the 5-cell, 6 volt or 9-cell, 10.8 volt configuration, the same multi charger is used. No special orders required. We've been using one of these units for several months now and find that it really works very well. Actually, we've retired all of our other chargers except our field fast charger in favor of this one.

In addition to the convenience factor because there's only one charger to get out and plug in, we are pleased that Mr. Taylor has designed the unit to charge the nicads at the safe 50 MAH nominal rate. For the less technically minded RC'ers among us, with that rate you should charge the nicads for a 14-16 hour period. Plug them in, in the evening, before you go flying, check the

LED indicator lights to make sure the batteries are charging, and get on to other things. The batteries will be fully charged when you're ready the next day. In addition, you don't have to worry about overcharging and damaging your battery packs if you over-sleep or had only one or two flights last time out. They can be charged considerably longer than the 16 hour period with no damage. We've always been concerned about using the faster rate 6 hour chargers supplied with many R/C systems. Overnight is too long (unless you stay up late and get up early) and can damage a battery pack. Yet, if you charge the day before you fly, you have to remember to unplug the charger 6 hours later or use a separate timer. More wires, more worries, more foolin' around.

For safety, the unit is transformer isolated from the AC line. As mentioned earlier, red LED's monitor the charging so you can tell when a battery has failed and refuses to take a charge, when you might have plugged it in wrong, or when you have the receiver switch in the wrong position. With a compact size of 3 $\frac{3}{4}$ " x 6 $\frac{1}{4}$ " x 2", the Multi-Charger works with nearly all R/C systems currently sold. Those transmitters that have an internal charger, however, will have to be modified to by-pass the internal charger if you want to use the unit with them. While it is sold without charging plugs, the L.R. Taylor Co. can supply the necessary set-up for your R/C system if you indicate the make, type, and year of your systems. Each Multi-Charger includes simple operating instructions and a 90-day manufacturer's warranty.

Available either at your local hobby shop as a great companion unit for Taylor's Power Pacer, or directly from L.R. Taylor Co. at 2083 $\frac{1}{2}$ Roscoe Blvd., Canoga Park, Ca. 91306 (213) 360-1178 for \$24.95. The Multi-Charger is an economical, convenient, and safe way to charge the nicads in the R/C system for your powered plane, sailplane, boat, or R/C car for a good day out among 'em. □





SARACEN

..... easy packer

By Bill Evans

The fascination and interest in compact products is greater than the pace at which inventiveness can produce to satisfy the demand. Any of us can easily get turned on by the handy dandy compact units, which do several jobs and can be folded, squeezed, and stuffed into neat little packages that can easily be stored and carried.

Such interest in packaging and development is very heavy in all industries. Many of these techniques developed for other uses have been adapted to use in model aviation. Development of more compact electronic components has been especially beneficial in the development in the current state of the art of our radio equipment.

The Easy Packer version of the original Saracen (RCM April 1976) came as a result of almost instant reader questions about the possibility of using rods and tubes to attach the Saracen wings. Also the author's interest in loading a Saracen on top of a mule and packing it to fly off some lofty Sierra peak helped spur work on the Easy Packer. It was from such trips that the name Easy Packer came.

The feature of being able to separate the wing panels from the Saracen fuselage and pack into a 36" x 6" x 14" package has been made even more attractive through the effort of G.B. Shaw Enterprises, which has developed a wing sox for the Easy Packer. The Easy Packer Wing Sox has four pockets;

one for each wing panel, one for the fuselage, and a fourth pocket to hold the wing rods. So the "cased" Saracen will easily fit in so small a space as behind the seat of a pick-up truck, as fellow flyer Wayne Sakamoto does. Wayne drives a pick-up as a part of his construction work and always has an Easy Packer behind his seat, so after his last job for the day he visits a nearby slope and makes good use of his ever-ready Saracen.

If you now own a Saracen you may wish to convert it to the Easy Packer version. New construction as well as conversion may be accomplished by following construction instructions.

MATERIALS

- 1 — 1/2" x 2" x 36" balsa (med.-hard).
 - 1 — 3/32" x 6" x 14" plywood.
 - 3 — 3/16" I.D. brass tubing, 12" lengths.
 - 1 — 3/16" piano wire.
- Scrap balsa.

CONSTRUCTION

Cut four root wing ribs from 3/32" plywood (two for fuselage sides and one for each wing panel). If 14" ply is not available, shorten the trailing edge end and later fill with balsa scrap.

Clamp the four ply ribs together and sand smooth.

Mark 1/4" holes for 3/16" I.D. brass tubing on the top rib (keeping all four clamped together) and drill the two holes (for the brass tubing) through all four ribs at the same time.

Cut two 14" long pieces from the 3/16" wire stock.

Cut two pieces from the 3/16" I.D.

brass tubing stock (length of each of these two pieces is determined by adding 3/16" to the width of the fuselage. If the fuselage is 2 1/2" wide, add 3/16", so cut each piece 2-11/16").

Slide brass tubes through the holes in the fuselage and epoxy one of the 3/32" ply wing root ribs to each side of the fuselage. **Note:** It is important that these tubes be parallel to each other as well as parallel to the bottom of the fuselage. To check this alignment push the 3/16" piano wire rods through the brass tubes and measure to make sure that the distance between the rod at the tips, which will go into the wing panel, is the same on either side. This alignment must be as close as you can get it and this must be done before the epoxy sets up. It may be helpful to make a dry run and check for this alignment before epoxy is applied.

Cut four pieces 6" long from the 1/2" x 2" x 36" balsa stock.

Cut a groove 1/4" wide and 1/4" deep in the wing blocks.

Cut four 6" long pieces from the 3/16" I.D. brass tubing.

Plug one end of each of these pieces of tubing with scrap balsa.

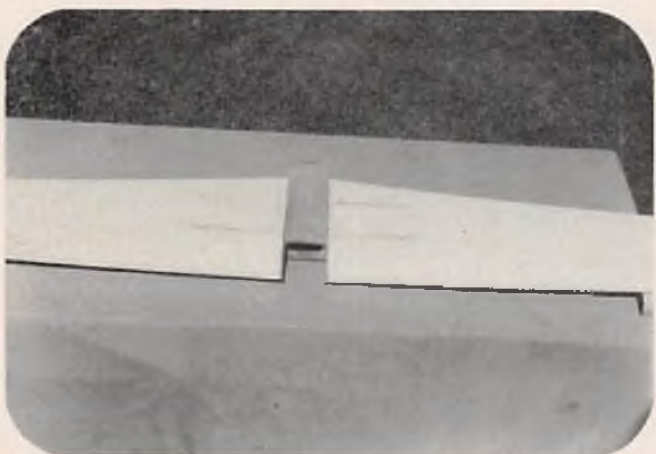
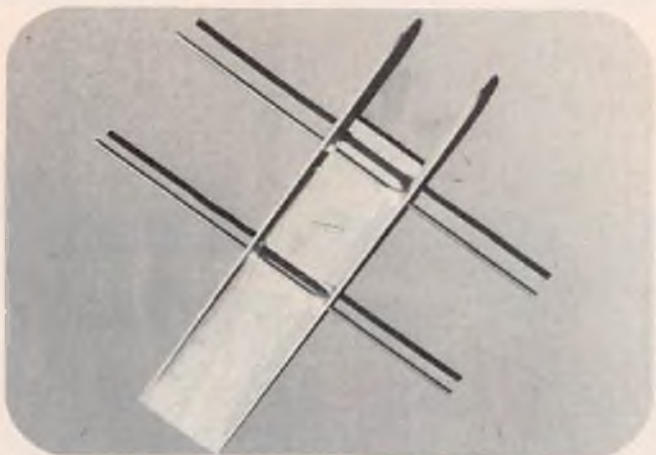
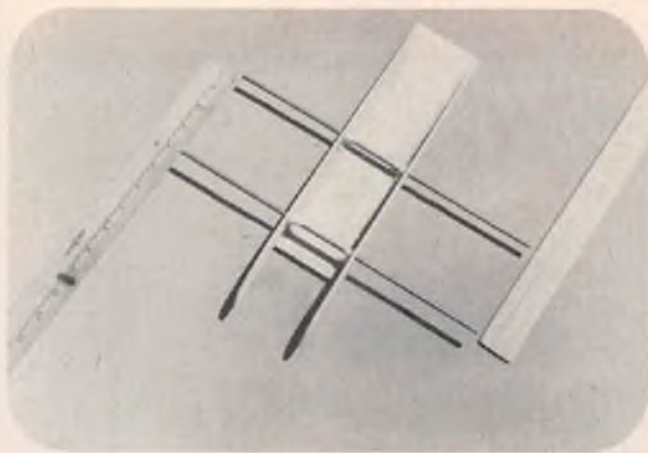
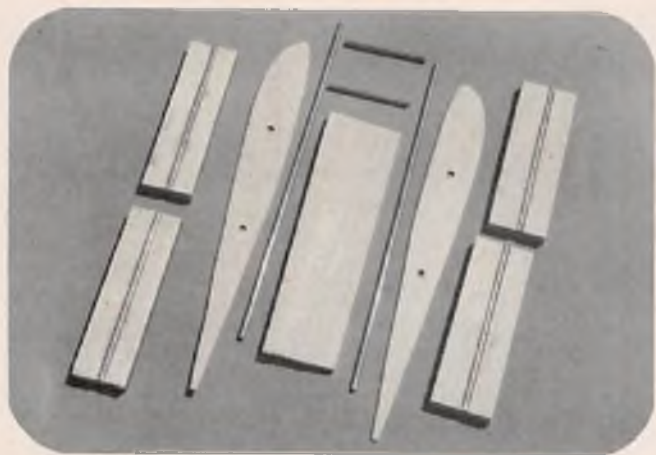
Epoxy the tubing into the 1/2" x 2" x 6" wing blocks.

Place the fuselage on a flat surface and push the 3/16" wire rods through the fuselage.

Slide the four wing blocks into the wire rods.

Place the right wing panel against the

to page 136



1ST ROW LEFT: Easy Packer take down parts kit - plywood ribs, wire rod, brass tubing and wing blocks. 1ST ROW RIGHT: Center section assembly with top removed - 3/16" I.D. brass tubing epoxied to ply ribs, 3/16" wire rods pushed in place through tubing, ruler to check alignment at both ends. 2ND ROW LEFT: Center section close-up, ply ribs epoxied to 1/8" sheet bottom, center section brass tubes in place. 2ND ROW RIGHT: Wing panels ready for joining to wing blocks, the 1/2" x 2" balsa wing blocks (wing tubing which has been epoxied into the wing blocks) have been pushed onto the 3/16" wire rods and the wing cores have been notched to slide onto the center section assembly. 3RD ROW LEFT: Wing cores in place ready to epoxy - notice blocks under wing tips to set dihedral. Epoxy wing blocks into wing cores. 3RD ROW RIGHT: Casad Saracen Easy Packer - end strap serves to hold wings and fuselage from sliding out of Wing Sox. 4TH ROW LEFT: Wing Sox opened. Ready to remove and assemble Easy Packer. The pocket left of the rudder holds the 3/16" wire wing rods.



1/2A FOAM LEARJET



Would you believe, a .60 size model powered by a .051. When this foam Learjet makes a low, fast pass down the field, you can hardly tell it from the real thing. The Tee Dee in the tail is virtually impossible to see.

By Carl L. Green

Look around at the models at the flying fields these days and you will see either jumbo airplanes or peanut planes, and if you have a small engine you're stuck with building a mini-size plane, right? Look again! Would you believe this .60 size plane flies with a 1/2A engine?

This Stand-Off Scale of a Lear Jet is not much to look at up close but, make a 4' high pass down the runway and you'll really draw the attention!

The small engine on this size plane isn't noticeable in flight. You will also find, because of the large size, it takes two hands to launch. Climb-outs are similar to a powered glider. Most stalls are straight ahead, only the most violent stalls will make a wing fall. Once the engine quits, it glides quite well. With the nose flared up, landings seem to stretch forever.

If you like to fly them low and fast, guesstimated speed on level flight would be about 30 miles per hour. It has been flown in 20 mph winds but it isn't the pleasure it is on a calm evening.

The airfoil is a 'so high — but a little longer with a curve on the top but not so much on the bottom' or a scratch drawn semi-symmetrical.

Most of the plane is expanded polystyrene beads (later referred to as foam) but a few pieces of wood, wire, or fiberglass are put in for strength only where needed. The nose section is the only part that doesn't use a template for cutting. In other words, cut off everything that doesn't look like a Lear Jet, using the top and side views from the plans.

I hope, even if your 'bag' isn't the Lear, that my technique of cutting foam might spark your imagination for a creation of your own.

One last word before we start, **no** putty and very little paint to keep it **light**.

If your "hot cutter" is too short or your blocks too short for a one piece fuselage, it can be cut in three separate sections: nose, center (with wing saddle), and tail cone, and glued together.

Fuselage:

Start with 7" square block 48" long. Secure the wing saddle template so that the leading edge of the wing is 25" from the nose (Photo 1). Support a hot wire 2" high across your table. Lay the block across the wire at the leading edge of the wing saddle. After the weight of the block has cut the leading edge, pull the block forward cutting the top of the wing saddle (Photo 2) until you reach the trailing edge. Lifting the block will complete the wing saddle cut. Mark center lines, vertical and horizontal, at both ends and attach templates F1 and F2 to the ends (Photo 3).

Skewer block between two nails at the center lines so that the block can be rotated (Photo 4). Nails can be taped between wall and chair, wall and desk, desk and chair, etc. Starting with the

bottom side up, lay hot wire on the templates and rotate the block making a 7" diameter cylinder (Photo 5). Before removing the cylinder from the block, mark the top view and the side view of the nose section, respectively, on the block and cut (Photos 6 and 7). Lightly mark the top and bottom center line from the nose to the tail to keep the wing pins and tail fins better aligned.

Attach templates F3 above and tangent to the center line of the tail end of the cylinder (Photo 8). One layer of masking tape under a piece of soft wire 19" from the tail end keeps the wire from marking up the fuselage while cutting the tail cone (Photo 8).

Skewer between nails again at the nose and through the template F3 (Photo 9). Rotate the fuselage again with hot wire laid between F3 and the soft wire. It will rotate eccentrically to give an off center cone shape (Photo 10). Re-mark the top and bottom center lines again. Cut the fuselage in half (about the center of the wing saddle). Attach F2 to the front half at the cut just made. Attach F3 to the nose making sure that the slots in F2 and F3 are lined up with the bottom center line. By taking hot wire around inside of F2, but keeping it at center hole of F3, we hollow the inside out in a cone shape (Photo 11). Now do the same with the tail. Trim the wing saddle to approximately 3/4" thick (Photo 12). Cut W1 and W2 from 1/16" ply. Drill W1 for the wing dowel. Cut a slot up into the fuselage at both the leading and trailing edges (Photo 13) just deep enough that W1 and W2 will fit, respectively. Glue W1 and W2 in place and glue the fuselage halves together.

Wings:

The plans show both root and tip templates for the usual way of cutting wings and stabilizer, but I prefer a different method for tapered wings. The root template is attached to the block of foam with screws. Fasten one end of the hot wire to the wall level with the template. The template must be 70" from the end of the wire that is fastened to the wall for the proper taper of the wing (Photo 14). Trim the wings to fit the plan. The trailing edge should be 1/4" thick at both the root and the tip. Cut out for the servo; cut leading edge flat at the root and the tip if too long (Photo 15). Cut a groove 1/8" deep 1/4" wide for the spar. The edge of a file works good here (Photo 16). Notice the spar does not run to the wing tip. Glue the spar into the groove. Glue a 1/4" square to the trailing edge. Glue the wing down, and 1/16" ply dowel brace between wing, and prop the tips up 1 3/4" each tip for dihedral. Bend 1/16" music wire for torque rods using inner NyRods for torque rod bearings (Photo 17). Cut the trailing edge stock and slot for torque tubes. Glue into place (Photo 18). Hinge ailerons, fiberglass wing center section, install servo and

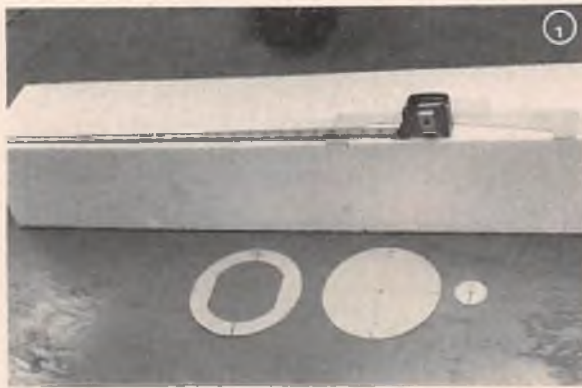
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1/2 A FOAM LEARJET Designed By : Carl L. Green

| | |
|--------------------------------|-------------------------------|
| TYPE AIRCRAFT | Stand-Off Scale |
| WINGSPAN | 55 Inches |
| WING CHORD | 9 1/2" (Avg.) |
| TOTAL WING AREA | 522 Square Inches |
| WING LOCATION | Low Wing |
| AIRFOIL | Semi-Symmetrical |
| WING PLANFORM | Swept L.E. |
| DIHEDRAL, EACH TIP | 1 3/4 Inches |
| OVERALL FUSELAGE LENGTH | 62 1/2 Inches |
| RADIO COMPARTMENT AREA | (L) 11 1/4" x (W) 4" x (H) 4" |
| STABILATOR SPAN | 22 Inches |
| STABILATOR CHORD | 4 7/8" (Avg.) |
| STABILATOR AREA | 107 Square Inches |
| STAB AIRFOIL SECTION | Symmetrical |
| STABILATOR LOCATION | Top Of Fin |
| VERTICAL FIN HEIGHT | 7 Inches |
| VERTICAL FIN WIDTH | 8 7/8" (Avg.) |
| REC. ENGINE SIZE | TD .051 cu. in. |
| FUEL TANK SIZE | Integral Tank Mount |
| LANDING GEAR | None |
| REC. NO. OF CHANNELS | 2 |
| CONTROL FUNCTIONS | Ailerons & Stabilator |

BASIC MATERIALS USED IN CONSTRUCTION

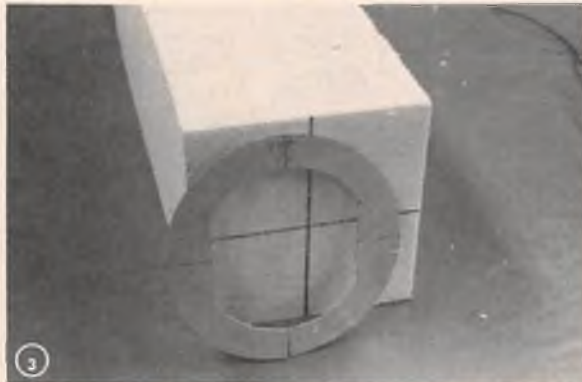
| | | |
|------------------|-------|--------------------------|
| Fuselage | | Foam & Ply |
| Wing | | Foam, Spruce, Balsa, Ply |
| Empennage | | Foam & Balsa |
| Wt. Ready-To-Fly | | 44 Ounces |
| Wing Loading | | 12.2 Oz/Sq. Ft. |



Block with fuselage templates.



Cutting the wing saddle.



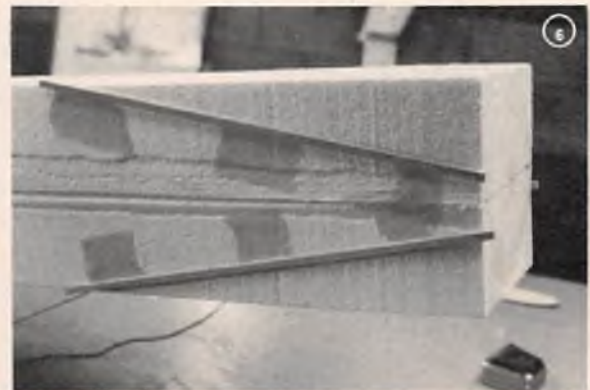
Preparing to cut the fuselage cylinder.



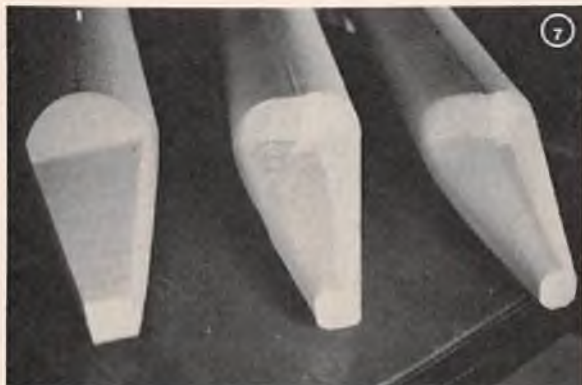
Set up to rotate fuselage block on nails.



Finished cut of cylinder.



Rough cutting the nose section before removing the cylinder from the block makes this part easier.



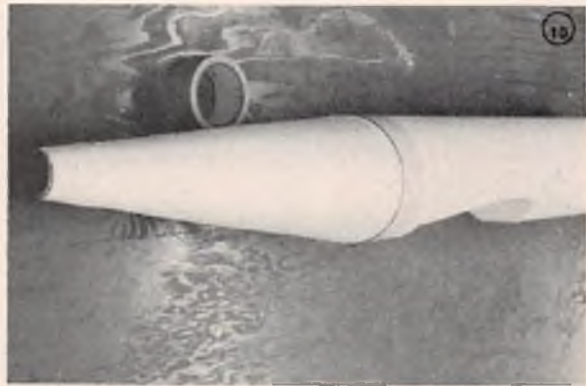
Rough cut nose (left) to finished shape (right).



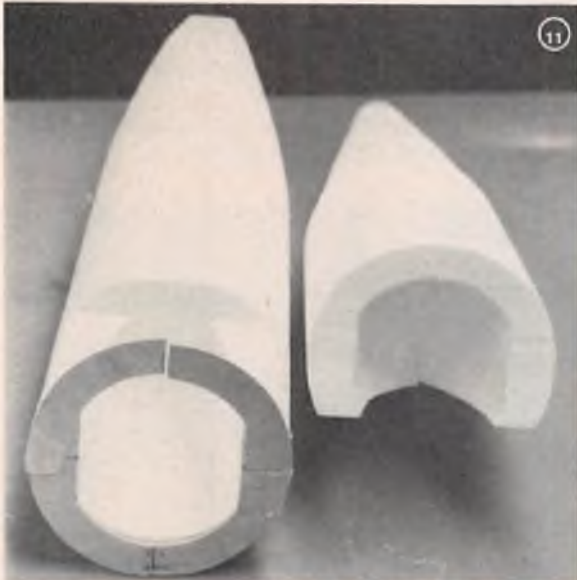
Setting up to cut tail cone.



Ready to rotate fuselage to cut off center tail cone.



Finished cut of tail cone (this procedure could be used to cut glider tail cones also).



Fuselage hollowed out using templates F2, F3 after cutting in half.



Trimming wing saddle on rear half of fuse.



Cutting slot for W1 to fit in fuselage front half.



Cutting the tapered wing – the nail is 70" from, and level with, the root template.



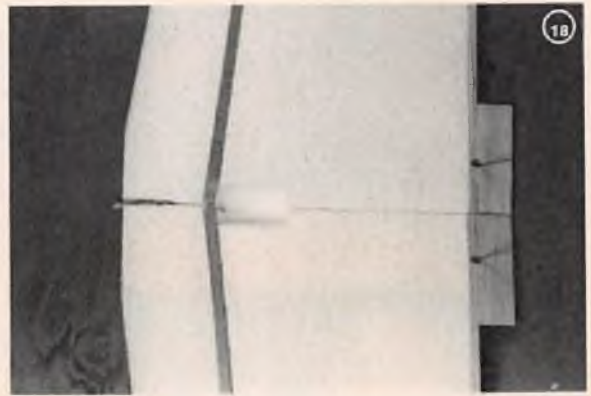
(Front of picture): Pieces cut off to fit plan. (Back): Pieces of wood to be glued for finished wing.



Cutting groove for spruce spar.



Torque rod, bearing, and T.E.



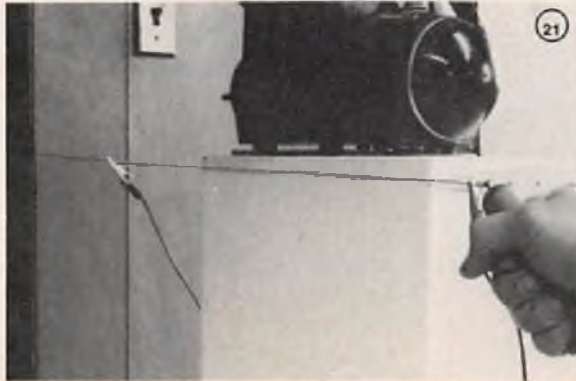
Wing halves glued together with wing pin, spars, torque rod, and T.E. center section.



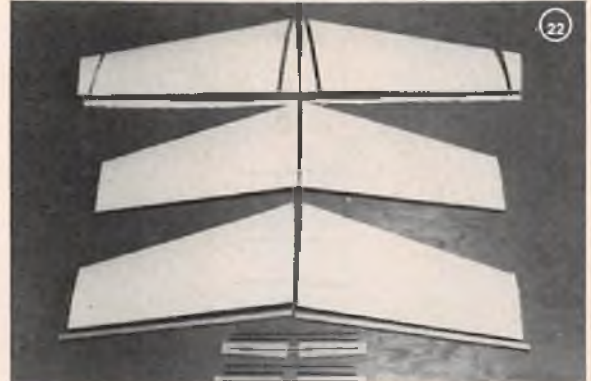
Finished wing with ailerons, servo tray, servo, and center fiberglass (with Hobbypro II glue).



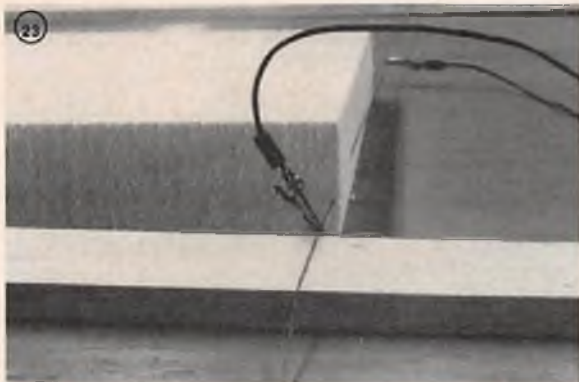
Close-up of center section.



Cutting the stab – nail is 32" from, and level with, the root template. (The shorter the wire used to cut with, the less voltage required for proper heat.)



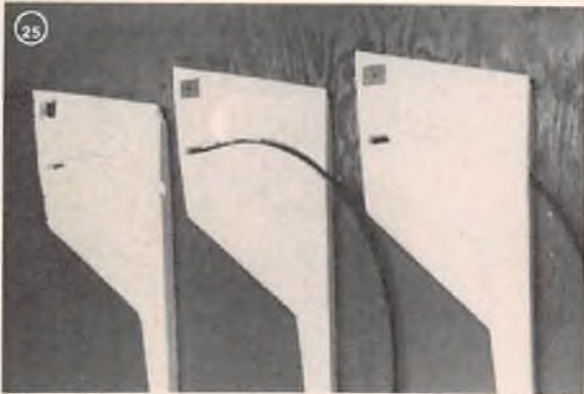
Stab trimmed to plans (back of pic.) for proper sweep (center), 1/16" wire, tubes, and balsa used for finishing stab (front).



Cutting 3/4" sheet for tail fin (this method of cutting sheet any size down to 1/8" thick).



Cutting the tail fin.



L.E. and T.E. shaped with groove and hole for torque support block (left). Pushrod and block in place (center). Pushrod covered with scrap (right).



Inner NyRod with 1/16" wire (flown one year without any signs of wear and no problems).



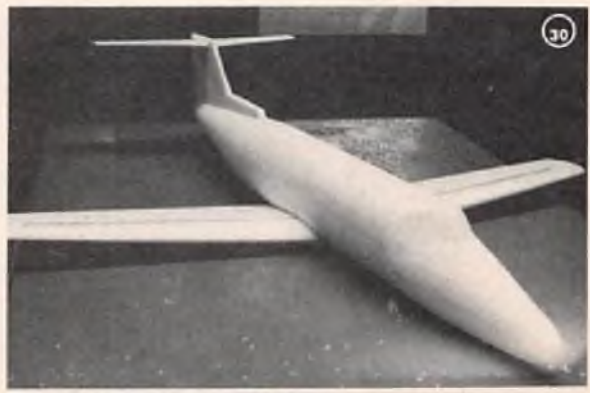
Close-up of tail fin with 1/16" wire set up for flying stab.



Finished tail fin and stab ready to be glued to fuselage.



Pushing tail fin NyRod into fuselage.



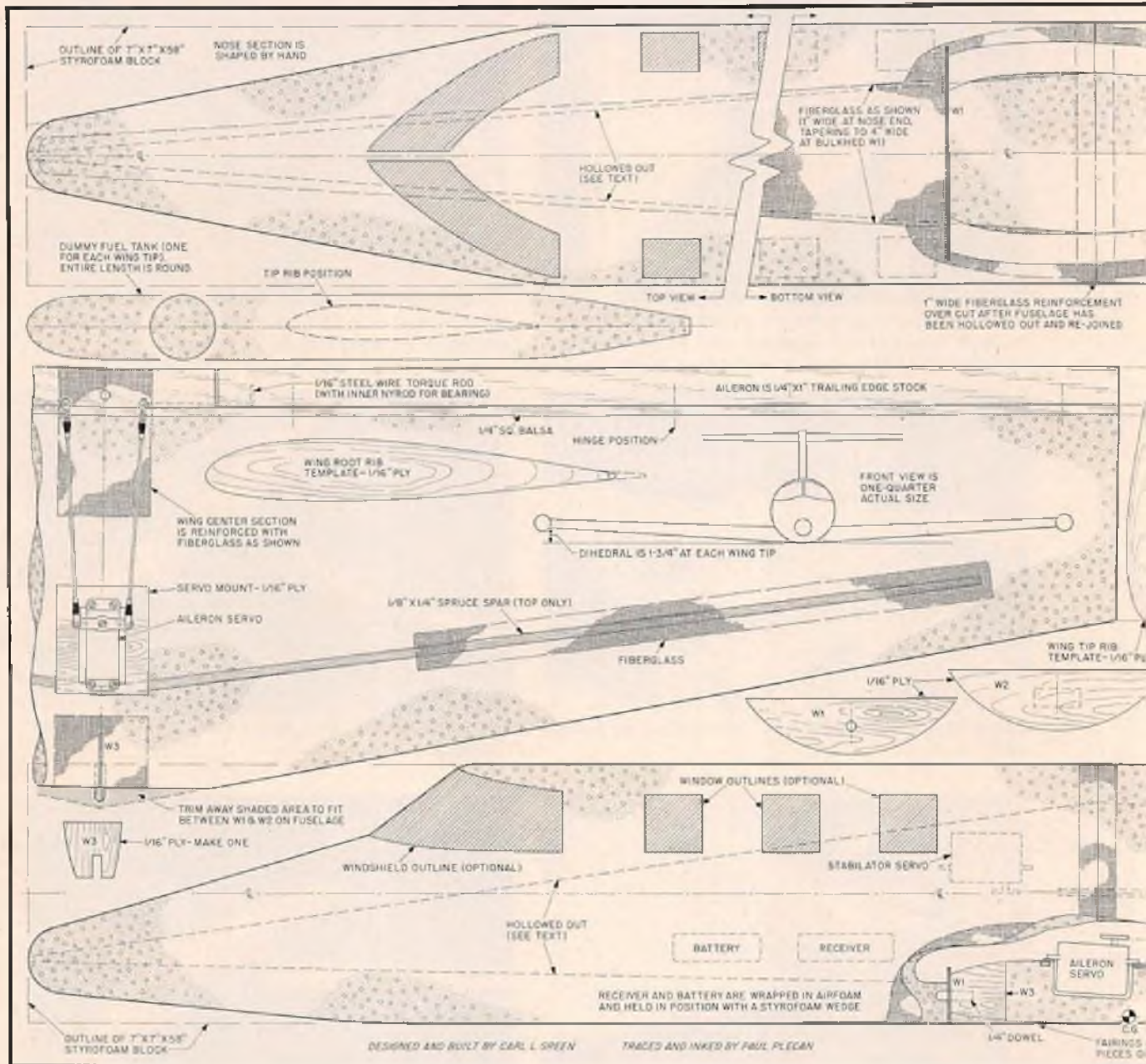
Ready for the final touches.



Good TD .051 and 6/3 pusher prop on a tank mount.



Ready to fly.



pushrods (Photos 19 and 20).

Stabilator:

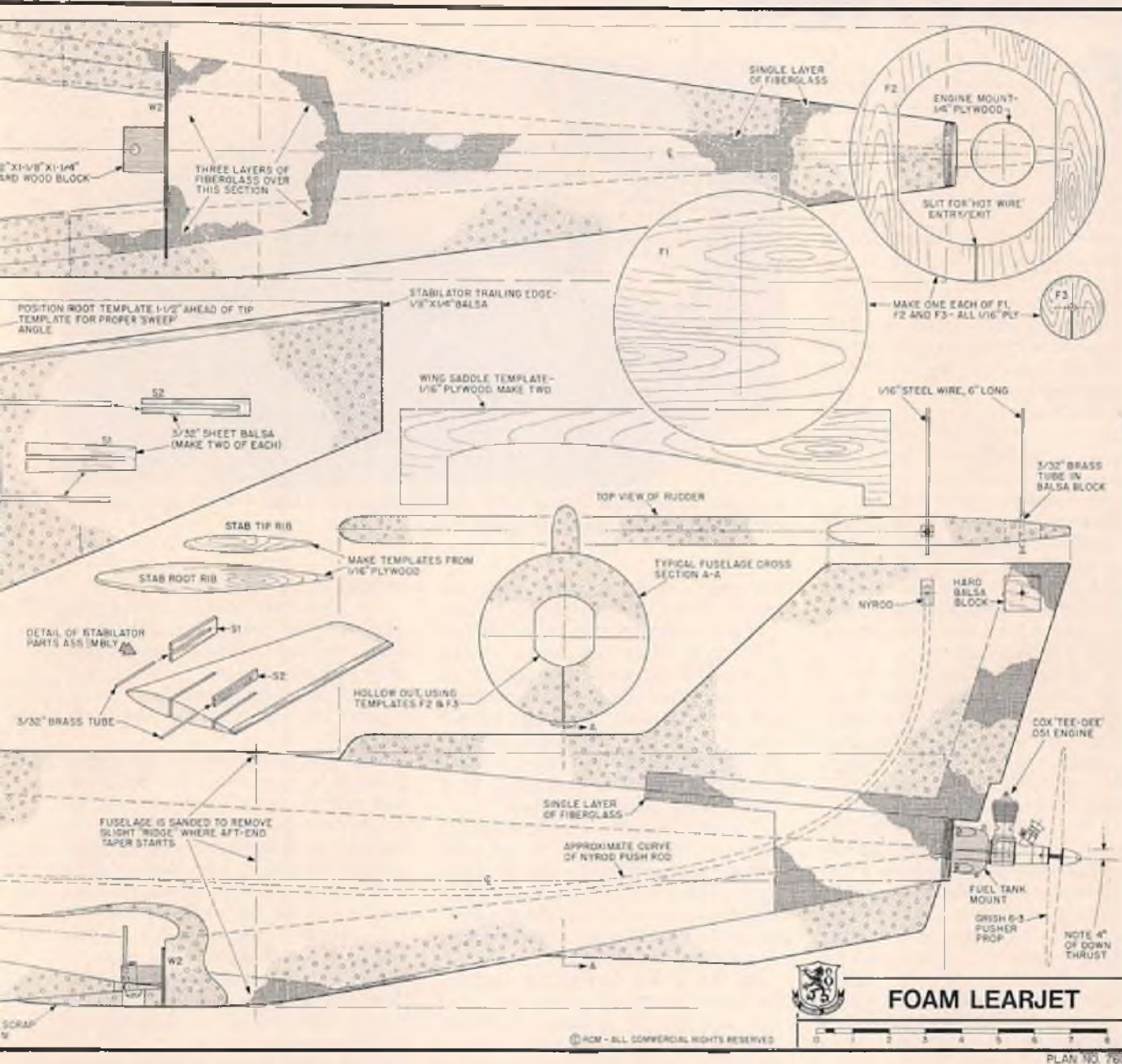
In place of the usual stabilizer and elevator, a one piece "stabilator" is used. The stabilator is cut using the same method as the wing except the nail should be 32" from the template (Photo 21). Cut a 13" long stabilator because part of the root and tip are cut off for the sweep design (Photo 22). Cut the trailing edge, root, and tip to the shape on the plans. Glue the 1/8" x 1/4" balsa on the trailing edge. Cut the slots for the 3/32" balsa in the brass tube. Cut two pieces of 1/16" music wire 6" long and put (do not glue) it in the brass tubes, while gluing the balsa and tubes in place. This will help keep the two stabilator halves

aligned with each other.

Tail Fin:

The tail fin is cut from a 3/4" sheet. I make this sheet by laying my hot wire across two pieces of 3/4" furring strips (Photo 23). Outline the tail fin and sub fin and cut out with a knife (Photo 24). By drawing a center line on the top and back of the fin it will be easier to check the symmetry as we shape it. A file works good for rough shaping but don't get the trailing edge less than 1/4" thick. Cut the hole for the balsa block and a slot 3/8" deep for the NyRod (see plans). Glue the NyRod into the slot and finish filling the slot with scrap foam (Photo 25). Drill a 1/16" hole in the inner NyRod 3/16" from the end for the 1/16" wire (Photo

26). Install the inner NyRod in place. Push half of the 1/16" wire through the hole in the inner NyRod. Install the balsa block and drill the hole for the 3/32" brass tube bushing (Photo 27). Glue the tube in the balsa leaving a little sticking out each side. This will keep the epoxy from entering the tube while fiberglassing later. Glue the block in the tail fin with the stabilators in place. Be sure to keep the stabilators at right angle to the fin while the glue sets up. It should now look like Photo 28. Cut a hole in the fuselage for the NyRod to enter (Photo 29). Put the wings on temporarily when gluing the tail fin in place to keep the tail fin perpendicular to the wings (Photo 30). Sanding a flat spot on the tail cone where the fin goes will make a better glue joint.



FOAM LEARJET



FOAM LEARJET

NOTE 4" OF DOWN THRUST

SCRAM

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PLAN NO. 760

Final Assembly:

Glue the hardwood block to W2 and drill and tap for the nylon wing bolt.

Glue on the firewall.

Fiberglass the bottom of the fuselage, tail cone, and firewall, and tail fin, according to the plans.

Glue on the sub fin now.

The wing tanks are hand shaped with a knife, file, and sanded. They are attached to the wing with Velcro.

A good TD .051 is mounted to the tail with a tank mount pushing a 6/3 prop (Photo 31).

The whole plane is sanded to your satisfaction (windows, numbers, etc.). A light coat of polyurethane varnish seals the plane (Photo 32).

Wing fairings at the leading and

trailing edges can be made from scrap pieces of foam without adding much weight.

The leading edge of the stabilator moves 1/2" up and 1/2" down. The ailerons move 3/8" up and 3/8" down.

As with all planes using ailerons, up elevator is necessary for turns. Response is slower on this size plane, but very positive.

My next project will have a larger motor on the tail or — how about two 1/2A ducted fans??

BILL OF MATERIALS (EXCLUDING FOAM)

Fuselage:

- 1/16" ply — wing mounting
- (1) 1/4" ply 2" diameter — motor mount
- (1) small hardwood block

Wing:

- (1) 1/4" x 2" dowel wing mount
- (1) 1/8" x 1/4" x 48" spruce spar
- (2) 1/4" x 1/4" x 36" balsa — trailing edge
- (2) 1" x 1/4" x 36" balsa trailing edge stock — ailerons
- (1) nylon bolt
- (6) hinges 1/16" ply (wing pin support — servo tray)

Tail:

- (1) 3/32" x 12" brass tube stab bushing and mount
- 3/32" balsa sheet stab — support
- (1) 1/8" x 1/4" x 24" balsa stab trailing edge
- (1) small hard balsa block 1" x 1" x 3/4" — stab bushing support

Miscellaneous:

- NyRod — stabilator (flying stab) pushrod
- 1/16" music wire — torque rods, stab rods
- Fiberglass cloth, Hobbypoxy glue (reinforcement)
- Velcro — attach wing tanks

HERE'S HOW

You know today's radio gear is so reliable that we can't blame hardly any of the crackups that do occur on the radio manufacturers. I can remember back in the days when flying with reeds, how frustrating it was. Those familiar words, "I ain't got it" echoed across many a flying field and the guys on the flight line would pick up their planes in case it was necessary to run. However, crackups will always be with us and sooner or later you will make a miscalculation and — yep, it will be necessary to put it back together or bury it forever. Dr. Ralph Leidner, a dentist in Coral Gables, Florida, apparently had a few misfortunes with his birds and has come up with an excellent method of repairing a broken foam wing. His unique clamping method will allow you to repair a broken wing with ease.

Many new enthusiasts are not familiar with repair methods which the veteran flyers may have used for years. Perhaps a review would be in order for them, as many have discarded airplanes which could easily have been salvaged by repairing a broken foam wing.

The typical wing has a balsa or plywood skin over the foam core. When they fracture, they have many sharp, loose splinters which prevent the close approximation of the two panels. Take a sharp razor blade, X-Acto knife, etc., and trim off these sharp edges; also pick off any loose beads of foam with your fingernail. The broken panel should now fit together easily and accurately; if they do not, remove more splinters and foam.

A slower setting epoxy such as Hobby epoxy II or Sig is the only satisfactory "glue" for re-attaching the broken panels to each other. These epoxies can be made somewhat thicker and lighter by adding phenolic micro-balloons during the mixing process.

Since Ralph found it difficult to hold



A super all-purpose cutter with interchangeable blade — trims and cuts all covering material available today.

the panels tightly together while the epoxy cured, he devised a simple "custom" clamping method. To do this, drill two or three 1/8" or 1/4" holes vertically through each panel about 2" or more on either side of the break. Then run some specially bent coat hanger wire through the 1/8" holes, or 1/4" dowels through the 1/4" holes. I prefer the coat hanger wire as it is easier to attach rubber bands to the wire.

The loops or hooks in the coat hanger wire can be easily bent on one end before insertion from the bottom of the wing, and the top hook bent after insertion. Next, wing hold-down rubber bands are moderately stretched and wrapped around the hooks.

As the rubber bands are applied, epoxy will ooze out of the joint. You may wipe this off, or leave a little and wrap over it with a strip of film (such as MonoKote backing film) or a strip of glass cloth. Later remove the film — but

naturally leave the glass cloth.

The wing may now be checked for alignment, and propped up with blocks where needed to prevent any change while the epoxy cures. When cured, remove rubber bands, cut (with a wire nipper) the coat hanger wire, and remove it.

The wing will usually be adequately strong at this point, however, if the break was near the center, a spar is needed. Simply saw about an 8"-12" long slot in the wing with a hacksaw blade, or coping saw, or cut with a long blade X-Acto knife. Use a 1/8" thick wood file to widen and true up the slit, and then fill it with 1/8" aircraft plywood (or 1/4" if you prefer) epoxied in place. An alternate, or additional method, of strengthening the joint is to wrap it with glass cloth and epoxy, exactly the same as a centerjoint is reinforced. The spar is preferred as it can be kept flush with the wing surface.

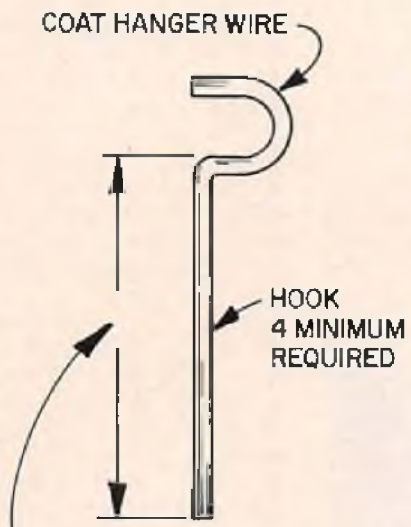
to page 128



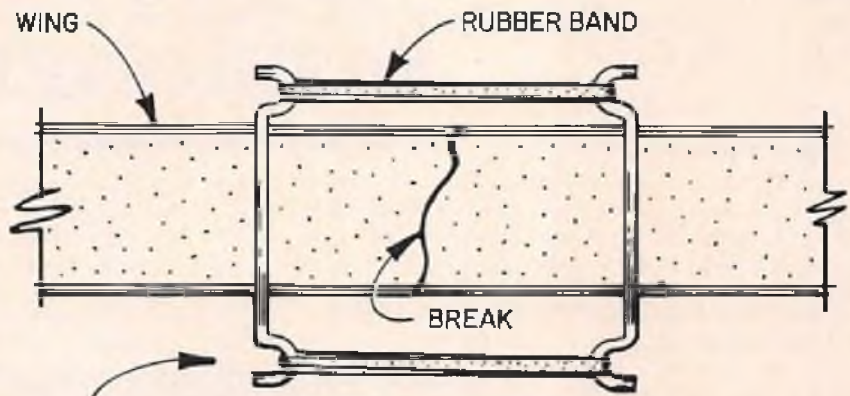
Blade changing is a snap. Any standard double edge razor blade will do.



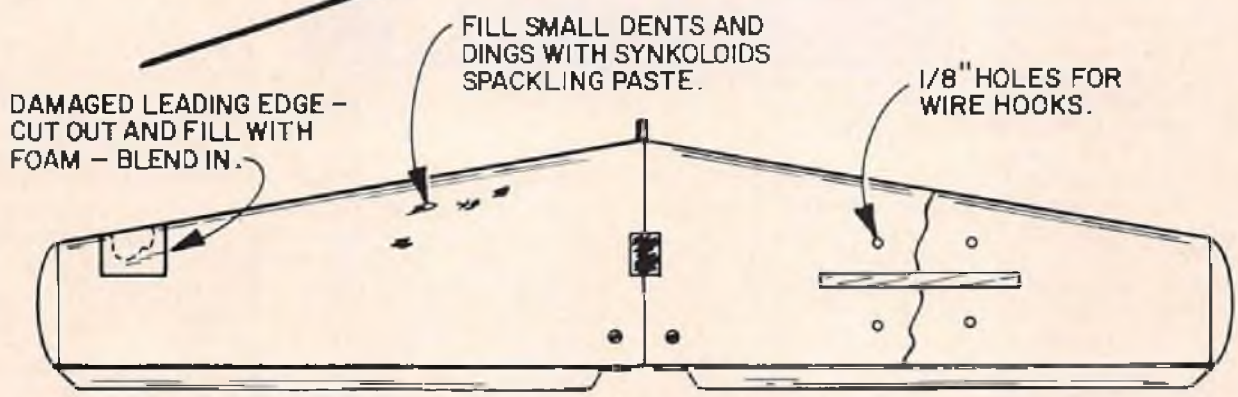
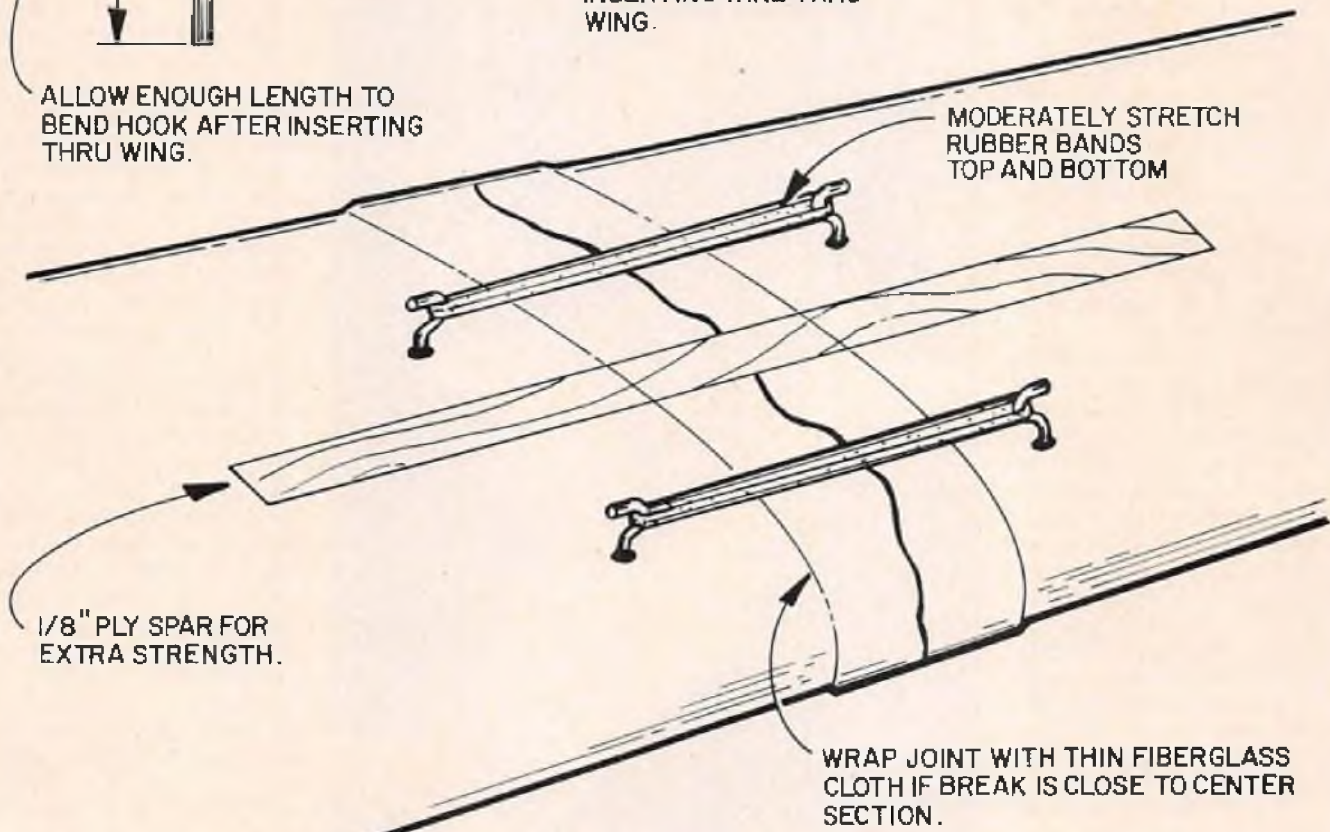
All-purpose cutter in action. Simple to use.



ALLOW ENOUGH LENGTH TO BEND HOOK AFTER INSERTING THRU WING.



FORM THIS END AFTER INSERTING WIRE THRU WING.



MANY THANKS TO - DR. RALPH LEIDNER CORAL GABLES, FL

TYPICAL WING REPAIRS

AN RCM TRIBUTE TO WALTER SCHRODER

By the Staff of R/C Modeler Magazine

Aero Therm, a company that designed and manufactured aircraft seats. An aircraft seat is not considered a glamorous product but the requirements of passenger comfort and load capability versus the critical weight factors add up to one huge challenge. Walt designed ejection seats for the X-1, X-2 and X-3, and the seats for the Beech T-34. The T-34 seats were also fitted to the Polaris atomic submarine as crash dive seats.

He did, however, have the chore of designing one glamorous aircraft seat. President Eisenhower presented a Douglas DC-6 as a gift to Ibn Saud of Saudi Arabia, which required a plush custom interior. Walt's job was to design a throne seat to locate the monarch's head at least 17" above anyone in his presence. Simple arithmetic could handle the dimensions but Ibn Saud weighed in excess of 300 pounds and the throne must meet a 9G load capability while remaining within strict weight limitations. It wasn't easy but Walt accomplished the task to the satisfaction of everyone.

Any attempt to condense Walt Schroder's busy life to a few lines of type is futile. Things like being the model editor of Air Trails, holding a patent for Flight Controller (a control line control system), free-lance tech manual writing, ghost writing of political speeches, and . . . on, and . . . on, would fill a book. The stories he can tell about his world travels in behalf of MAN are unreal. His experiences with 5 years of involvement with the Tournament of Champions are fascinating.

Yes, Walt has retired from Model Airplane News. During a recent visit to RCM's editorial offices, he did admit that after just a short time of inactivity he is driving his family up the walls. Five will get you ten it will not be long before he is working at something in the modeling game and will probably be working harder than ever.

In summation we will apply to Walt Schroder his own phrasing of the highest compliment that he pays to another person: "He is one helluva man!" □

Walt Schroder, the most renowned, respected, and beloved individual in the magazine publishing business, retired from his position as President and Publisher of Model Airplane News, effective January 1, 1979.

The first issue of MAN listing Walt as Editor was August 1960. During his distinguished association with MAN he has been the recipient of numerous modeling honors including the Model Aviation Hall of Fame, AMA Fellow, AMA Leader Member, 8 Ball Club Distinguished Service, and the Walt Billet Trophy. Abroad, he has received awards from modeling organizations in Australia, Germany, India, Rhodesia, Sweden, and Switzerland.

His appearance at numerous modeling activities has been visible proof of his personal interest in what was happening and who was doing it, a difficult task — considering the demands of publishing a monthly magazine.

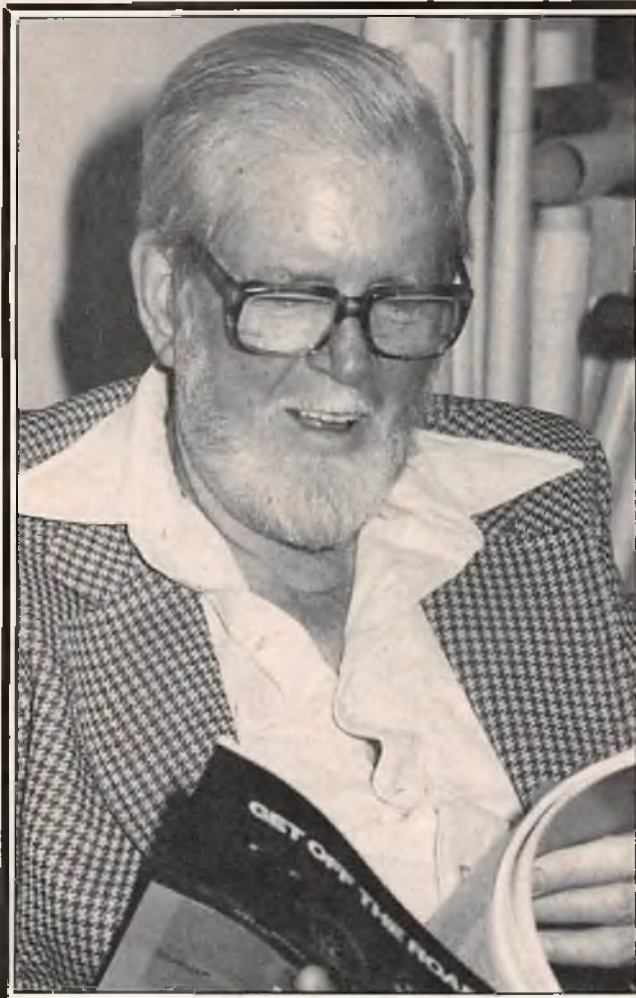
As for his own modeling background, he has had over 120 of his own designs published and/or kitted. Walt is no stranger to the model industry; for several years he was a consultant to Megow, in 1947-1948 he helped form and operate Eagle Model Aircraft Company. Eagle was the first model company to use four color advertising and the first to offer prefabricated kits (ARF). Unfortunately, the world wasn't quite ready for such advances and Eagle wasn't too successful.

The Eagle enterprise followed a machine shop partnership, during WW II, with Ben Shereshaw that was formed in 1940. Ben was in charge of engineering and Walt ran the shop. The most well known of their products was the Bantam engine (.19 disp.) which rivaled the Ohlsson .19 and .23 in popularity. During that partnership it seems that Ben had a bookkeeper who attracted Walt's perceptive eyes. In short order she became, as he describes her, his Team Manager — she is the gracious Susan Schroder.

Walt's colorful career would not be complete without

mentioning a much earlier activity. During 1927-1929 he drove race cars. At one time he held a dirt track record. He was driving the first race car ever fitted with an aluminum body and was powered by a Liberty

a door to door basis. His very first house call resulted in a sale and that time period netted the highest monthly income that he has ever earned. His success with Electrolux led to a district



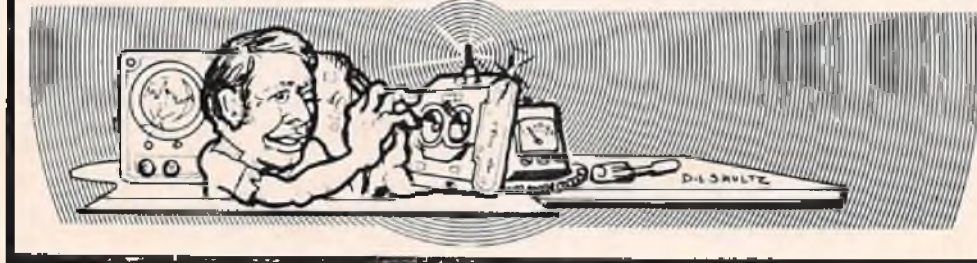
Walter L. Schroder, former MAN At Work, during a recent visit to RCM. The ad copy on the back of the magazine was purely coincidental.

12 cylinder aircraft engine. His racing came to an abrupt halt at a major race when he performed a slow roll and totally destroyed the car. The accident was recorded in its entirety by a Pathe News cameraman.

A clue to Walt's ability to get things done goes back to the Depression years of the early 1930's when he was selling Electrolux vacuum cleaners on

manager position with the Singer Sewing Machine Company. In this endeavor, the larger corporate regulations seemed to squelch his individual initiative which prompted Walt's departure so he could be his own man.

A little known facet of Walt's tremendous talent is in the field of engineering. From 1950-1959 he worked as a sales engineer for



Before we get into the technical stuff this month, I think it is appropriate to discuss a letter that concerns a subject we've been talking about quite a bit lately.

More RC Frequencies

Dear Jim,

In the December RCM you said the AMA is doing everyone a favor by trying to get us more frequencies, as though the "good" of having more frequencies were one of those self-evident truths. The fact is I rarely spend an afternoon soaring at my favorite slope that I don't see at least one mid-air collision. I understand that mid-air aren't uncommon among powered planes at Sepulveda Basin either. What would it be like if we doubled the number of planes in the air? We need more places to fly, not more frequencies!

Regards,

Bruce Orsborn
Laguna Beach, Cal.

My first reaction is one of complete agreement. In fact, I very seldom fly at Sepulveda Basin anymore for the very reason Bruce mentioned; mid-air. I seldom have a frequency conflict, being on 53.1 MHz, but it is impossible to do any kind of pattern practicing with three or four other guys in the air usually flitting around right in front of you. The net result is I end up flying at a less than desirable field, further from home, but it is easier on the nerves.

On the other side of the coin, however, let's consider where we were a few years ago, before we had 72 MHz and before the CB problem. It would have been very easy to apply the same logic that Bruce is using now. We had five 27 MHz frequencies plus the six meter band, which could mean six or seven airplanes in the air which would have caused a lot of mid-air. The reason it didn't is that not very many people could consistently fly, flight after flight, week after week, without crashing. The net result was that the skies were never too crowded. Back to the point. If we had concluded that five or six frequencies is enough because of air space limitations, we would be in deep trouble now, as we all know that in most areas the 27 MHz frequencies are not usable. The same thing could happen to the 72 MHz band. We already know the FCC does not reserve "our" 72 MHz frequencies for

RC and the demand for them is going to continue to increase. I don't want to alarm anyone but eventually you could end up with some industrial users making two or three or more frequencies unusable in certain areas. This is most likely to happen in populated areas where there are lots of RC'ers and few flying sites. The results would be long lines to fly on the remaining good frequencies. From a pure statistical standpoint, the more frequencies available the less chance there is for this to happen. If in addition you work out an agreement to have exclusive RC frequencies or at least confine the other users to low power, and also get some frequencies in another band, you have really reduced the probability of having too few usable frequencies some day, and the good is self-evident. The AMA is doing all those things.

But don't stop looking for flying sites.

Maintenance

Maintenance of RC equipment has turned out to be a very popular subject. Peter Berg, a member of the engineering staff at Kraft Systems, sent us the following letter based on their experience which encompasses a significant number of systems and types of environment.

Dear Jim,

Can't help but say that we enjoy your articles in *RC Modeler*, especially since they deal with subjects that are close to the mind and body of RC fliers who would like to know what makes "their stuff tick." During the last few months you have touched on some subjects where we have some experience which we would like to share with you and your readers, if you see fit.

Really, what we should consider to evaluate are all the moving parts in the RC system, so we start by listing them:

Stick and stick pots.

Wires from stick pots to encoder.

Servo motor.

Servo gear train.

Servo pot.

Control linkage.

Control surface hinges.

Barring failure of an electrical component, which does not occur very often except in a crash, the above list represents all moving parts and believe me, I have seen all of them fail at one

time or another!

Stick and stick pots:

Theoretically, the stick pot moves exactly as much as the servo it is controlling and, if you have two airborne systems using the same transmitter, twice as much. Fortunately, the transmitters have plenty of room to utilize a large variety of off-the-shelf pots. Many transmitters use either a high-resolution wire wound pot or an 'infinite resolution' instrumentation pot, both designed for long life. Typically, the stick movement allows approximately 60° of rotation of the wiper on the 270 to 300° pot element.

Assuming that the mechanism of the stick itself stays together, the stick pots are probably the only items in the transmitter that may at some time require replacement (I am excluding your favorite subject: batteries).

Wires from stick pots to encoder:

Whether so-called open gimbal sticks or closed gimbal sticks are used, the wires to the stick pots will have to travel with either stick movement or with trim adjustment. The manufacturers typically make sure that this cabling twists rather than bends, and they use multi-strand wire (up to 19 strands per wire). Sometimes, strain reliefs are added. However, it doesn't hurt to take the back off the transmitter and inspect this cabling and the solder joints at the stick pots.

Servo motor:

Even though this is a very critical part of the servo, the motors have, over the years, been so much improved, that failures, other than those as a result of mis-treatment or those caused by normal wear, hardly occur. A few comments: The servo motors have very little starting torque and, as a result require almost 'no-load' starting. In order to support starting, the motors typically have a five-segment commutator, and a very light pinion loading. One of the worst enemies of these motors is oil. Most motors have oilite bearings. These porous bearings have been impregnated with a very special bearing lubricant, which should be good for the life of the bearing. It also remains viscous over a wide range of temperatures. Adding oil to either top or bottom bearing is strictly no good as it may thicken with cold weather, it may

collect dirt or dust particles (caking) and worst of all – it may migrate into the motor housing and wind up on the commutator where it builds a nice, crash-creating, insulating film. It is very difficult to establish a nominal life expectancy of a clean servo motor; it is typically limited to brush/commutator wear. Some of this may be detected by observing motor current under load and/or by monitoring current flow and spikes on an oscilloscope. I agree with your findings that servo torque (and speed) become reduced before a terminal motor failure occurs.

Servo gear train:

Servo gear trains are typically made from some sort of plastic. Especially the output gear and the one driving it should be made from a strong plastic such as nylon, zytel, or a filled variety of these materials. All these materials are self-lubricating and, again, should never be oiled. We have seen servos that barely moved when cold and found oil in the gears. Sometimes this oil is castor and traveled all the way up the throttle linkage!

Other than damage to the output gears, there should not be any maintenance required. Check your output gears for teeth bending, however. This may occur during a hard landing (nose gear shock) or result from a crash. It will cause unreliable servo operation and put an unnecessary load on the motor.

Servo pot:

This is a delicious subject, since it is probably more controversial than anything else in the entire R/C system. When evaluating servos, we've seen anything from carbon film pots to ceramic pots and conductive plastic pots. We've seen stiff wipers, soft wipers, single and multi-finger wipers and button wipers. We've seen direct driven pots and we've seen pots driven by an intermediate gear. We've even seen servos that have an extra gear in them that may be inserted in the gear train to reverse the servo travel without having to change any internal wiring. In general, most of them work well. There is one very important aspect to the pot/wiper interface: there must be, at all times, a very intimate contact between them, even under some of the most stringent vibration and G-forces. Typically, this is achieved by attaining a wiper pressure that will cause a constant 'rubbing' contact, which is good for performance but which will cause wear. Most manufacturers spend a lot of time and money on life testing (on the bench) and vibration testing (in the air) of their servos. Personally, I prefer to use a pot/wiper combination that I know will perform at all times; if set up correctly in the factory, it will do just that. It will also do something else for you: it will tell you when it is time to be replaced by starting to give a non-smooth

response or by starting to 'jitter' around neutral. Although we have a continuous test program going on at Kraft, which includes evaluation of 'anything new' (including the Giezendanner wiper, which I think shares the interface wear between the pot and the wiper). Fortunately, this program indicates possible problems with new products which as a result never make it to the production line. So we are still using the proven hard-carbon pots (baked on ceramic substrate). The trade-offs between direct-drive of the pot and the decoupled systems have been pretty well covered by you in a previous issue; personally (again), I prefer the no-play direct drive.

Several people probably remember the early linear (?) servos with the longitudinal wire wound pot which required occasional cleaning with an eraser. Or the capacitor feedback element. Or the variable inductor method used by F & M. Frankly, I think that we should try to get rid of the contact method of feedback entirely which (and here I disagree with you) probably is less predictable and more problem creating in any servo than any other component is. Several roads are open for research: optical, re-evaluation of the variable C or variable L methods, strain gauge, AC field disturbance, etc. Lots of work to get there, but also, lots of fun!

Control linkage and control surface hinges:

No wise words from me on this subject (I don't have any). Only one thing: sloppy linkages tend to cancel all the effort the manufacturers of servos spend to create a product that returns to neutral 'within one-half of one degree'. They may also impose vibration on the servo's output arm which, in turn, will cause premature failure of output arm and/or pot, whether decoupled or not.

And one more: half a turn of the clevis onto the threaded part of the pushrod is not enough!

Best regards,
Peter Berg,
Vista, California

Peter also gave me hell for saying FM would work on the same frequency as an AM system, but I think I already retracted that statement. Don't try to fly your new FM system with an AM transmitter on the same frequency even if it seems to work for a little while.

Comments on Peter's letter: One theme that comes out in any discussion concerning maintenance of R/C equipment is that of cleanliness. Keep out the oil, dirt, dust, etc., and your equipment will last quite awhile. This is not confined to the airborne equipment. How many times have you seen a guy with the prop wash and exhaust picking up sand and gravel and blasting his transmitter while he adjusts the needle valve? It is not just "open" stick

transmitters that are vulnerable, and in fact I think you can damage the closed slick ball joint just as quickly as the bearing surfaces in the open stick. I remember flying a Bonner System with plastic closed sticks during a windy contest on the Henderson Dry Lake near Las Vegas back in the sixties. After one day of that, the ball joints were completely wiped out. So take care of that transmitter and consider keeping it in a soft bag or case when not in actual use. Don't be afraid to take the back off and do a little dusting once in awhile with a soft brush. While you're inside, take a look at the wiring harness, particularly where the wires are soldered to pots that move. Make sure the wire is not flexing at a spot where solder could have wicked inside the insulation, resulting in solid rather than stranded wire. Normally there will be a spot tie or the harness will be bonded to prevent this. If it has come loose, repair it. Take a good look at the connection to the antenna. Quite often the entire antenna assembly turns when you try to tighten your antenna putting a strain on the inside connection. If the post does come loose, tighten it from the inside, not by turning the antenna post with the antenna.

I agree the newer servo motors seem to be getting better, but I still think this is the most worrisome component in the servo, because when it fails it has a good chance of destroying your model, if it was on elevator or aileron. I agree it would be nice to get rid of feedback pots as we now know them, but at least they just get ratty. They don't quit completely.

We've got more on servo motors in the next letter, but before we move on, make sure Peter's message on keeping oil out of the motors sinks in. Keep your radio compartment sealed as best you can. Don't make holes twice as big as you need in the firewall. Run throttle pushrods through NyRod or similar tubing. And get in there and clean once in awhile.

The message on pots seems to be — set plenty of pressure on the pot wiper and accept the pot wear. Reading between the lines, I think it is clear everyone would like a better solution, and maybe we'll see it soon.

I'd like to thank Peter for his letter because it represents experience with huge numbers of radios, something it would take most of us a couple of life-times to accumulate.

Servo Motor Maintenance

I know last month I thought motor maintenance was beyond most modelers so I didn't print part of a letter. But that's not in keeping with my normal policy, and besides, I tried this one and it was actually pretty easy. But if you screw up, don't blame me.

Dear Mr. Oddino:

I thought you might appreciate knowing how I solve my servo motor

reliability problems. Let me begin by saying that about once a year I have had a crash due to the particular control simply refusing to operate. I knew that I wasn't experiencing radio interference because the other controls worked properly during the time that one channel didn't. Also, my servos go "wild" when RFI is present. Different channels were affected, so I suspected something inconsistent was going on. Of course the radio always worked perfectly when I went over to pick up the pieces, and nobody seemed to know what the problem was. Suffice to say, I finally found the problem was in the particular servo motor that operated the particular control at the time of the crash. The motor was found to have a black, greasy "crud" on the commutator when torn down. I should point out that I only fly sailplanes, so engine oil is not a factor. The lack of vibration in a glider probably makes matters worse because there is no vibration to jar the servo motor off its dead spot.

Being meticulous and very concerned about reliability, I tore all my motors down and found that some had the "crud" and some didn't. My best guess is that some of the motors have excess oil in the bearing that is finding its way to the commutator. In support of this is the fact that the older the motor was the less likely it was to be fouled even though some crud was noticed on the commutator where the brushes didn't rub. I suspect that these motors probably ridded themselves of excess oil early in their life and then the commutator actually got cleaner as the brushes wiped it. I should point out that I put lots of hours on my radios.

Well, I said I had a solution so I'll stop the sad stories and get on with it. My motors are the 16mm Japanese instrument motors used in the smaller servos. The first thing I do when I get a servo (and what I have done to all my old servos) is take the motor out and run it at a medium speed for 6 to 8 hours. I use my bench power supply for this, but I'm sure some clip leads on a flashlite would work fine. Sure, you'll run down some flashlite batteries, but that's cheaper than crashing an airplane. I heat the motor up moderately with a MonoKote heat gun about half way through the run. This is done in an attempt to get all excess oil out of the bearings. This run-in doesn't wear out the motor. In fact, it seems to be just enough to free up the bearings and only partially seat the brushes (a good idea in any DC motor).

The motor is then disassembled by taking a pair of jeweler's screwdrivers and prying off the brass pinion by levering with the screwdrivers equally on both sides under the pinion simultaneously. The two screws in the back of the motor can now be removed. Be sure to put a mark on the back plate

and the motor housing so that you know where to align the parts when you put them back together. With a modeler's pin, the rotor shaft is pushed through the bearing and out the back of the motor housing. You will now have the rotor separated from the motor housing and the back plate and brushes will still be on the rotor shaft. I carefully remove the back plate with brushes from the rotor.

There is usually a small amount of crud present and I take cotton swabs and acetone and get the commutator clean. The brushes are also cleaned, of course. I also swab the bearing with acetone to clear any excess oil. Finally, I take some 600 grit sandpaper, cut a piece about 6" long and 1/8" wide, and while holding the rotor gently in a vice I work over the commutator lightly with the sandpaper until it is spotless. A clean toothbrush is then used to clear the commutator slots of any copper dust and the commutator is cleaned once more with acetone.

Using great care not to touch any of the brushes or commutator with an oily finger, the motor is reassembled. Note that there is a brass ring inside the motor housing that the screws thread into. This ring is free to rotate. You must be careful that it is lined up with your screws so that you can get the screws to start. When the motor is back together, I leave the screws a little loose and connect up my power supply and ammeter. The motor is then run at moderate speed and the back plate is slowly rotated while the ammeter is watched and motor rpm is noted. I usually find that by simply adjusting for minimum current draw which will also be maximum RPM I can improve the motor timing considerably. All my motors have been off by anywhere from 1/2 degree to 4 degrees. The screws are then tightened and the brass pinion is gently pressed back onto the shaft with the aid of a drill press. I chuck up a piece of brass tubing that will fit over the shaft but still push on the pinion and use this tubing for pressing. The tubing will not scratch the rotor shaft. The servo is then reassembled.

It is immediately apparent that after this treatment the servos are much faster than before. They are also somewhat more powerful. But best of all, I have never had another servo motor failure!

After 8 months I tore down one of these motors for inspection and found that the commutator was still shiny clean, so I am hopeful that the problem is solved. I note that these motors seem to last forever. In three years of several times weekly flying, I have never wore out a motor although I have worn out servo mechanics bearings.

I might add that the oily, dirty, high vibration environment of the power plane puts unique stresses on a servo motor. While the motor treatment above

certainly can't hurt, it may not "cure" motor problems in power ships.

It is, admittedly, a major undertaking to overhaul motors the way described above, and a friend of mine has an easier way. I'm not sure how well it works, but he simply submerges his motors, intact, in alcohol and runs them back and forth several times for a few seconds. He notes that they rapidly seem to "free up" and when they run no faster he figures they are clean, removes them from the alcohol bath, and drains them. Note that this should only be done with "rubbing alcohol" (isopropyl alcohol), and not "denatured alcohol" (methyl alcohol), or ethyl alcohol as the latter are flammable.

My main concern with the alcohol bath method is what the alcohol does to the oil in the bearings. However, it is probably better than doing nothing or buying new motors every month!

Note that in my treatment there is never any oil added to the motor bearings!

Green Air,
Roger R. Sanders
Atwater, Calif.

First of all I'd like to underline Roger's comment about motor dead spots showing up more in gliders without vibration vs. power ships. This is true and I have seen guys take-off with power planes with suspect motors with the comment — "They'll work under vibration." For goodness sake don't try that trick. If you suspect a problem, do something about it.

My only comment on the disassembly/assembly procedure, concerns removing the rotor shaft, intact with the back plate, from the motor housing. The magnet in the housing tries to pull on the rotor, so what I do is hold the back plate/rotor against the bench with the modeler's pin or sixteenth wire against the shaft, and lift the housing from the rotor. During reassembly the housing is slid down the wire and over the rotor. While inside, check the wires from the armature to the five commutator segments. A broken wire will cause a dead spot, just like a bad contact between brush and commutator. I've considered some type of conformal coating to support these wires, but have never tried it. Anyone out there got any comments?

Again note the emphasis on cleanliness. Our servo motors are really pretty nice pieces of machinery and if we take care of them they should last many years.

The last paragraph on the alcohol bath method is not as crazy as it sounds, but don't try it yet. We'll have more on that subject next month.

By the way, while I went through this procedure, which was not that difficult, I have no quick way of evaluating it. The motor I picked by chance was not very cruddy and even though it ran well when

I finished, I have no way of knowing that it will last forever. I'd appreciate hearing from anyone who tries this and has good or bad experience. Hopefully it won't be for a couple of years.

Ham Bands

Dear Mr. Oddino,

I have been flying model airplanes for many years and am a CD for the AMA. Yesterday I decided that the time had come and I took my examinations for my amateur radio license. I passed all the requirements for Amateur Extra on my first try. My principal objective was to operate some of my airplanes on the 10 m band. One of my radios is now on a CB frequency and is therefore of no use to me. I am aware, of course, that when radios are operated on the ham bands for model aircraft applications that it is on the 6 m band. The FCC has no information on which frequencies have been set aside for this purpose, and the convention seems to be known only by word of mouth. First of all, I would like to know where this convention is documented and how hams operating on the 6 m band are to know that this convention exists. I believe that since model airplane radios use interrupted unmodulated carriers that this constitutes an A1 emission. The low end of the 10 m band permits A1 emissions only, and I believe the extreme low end of it is generally avoided by high power radio amateurs to avoid spilling over out of the band. I therefore conclude that this would be a reasonable choice for me to modify my 27 MHz radio to, even though we are approaching a period of high solar activity. I believe it is legal in the eyes of the FCC and reasonable on technical grounds. What is your view?

Sincerely,
Frank Kelly
Long Beach, Calif.

Operation on the ten meter band is nothing new. There were at least four of us that used it at Sepulveda Basin during the sixties. I think Colby Evett still uses it. The reason most activity is on the six meter band is because of the simpler code test required for a technician license. Most modelers have no desire to use the code so they quit after they get to five words per minute. I believe the AMA set up the present convention and I'm sure most hams are unaware of it. However, they normally don't use the upper end (53-54 MHz) because of the proximity to channel two. However, more and more repeaters are going up and while the people who coordinate those things are aware of our convention, we must still be on the lookout.

Getting back to ten meters. We kind of established our own convention there with frequencies of 29.4 MHz, 29.45, etc., fifty KHz apart. All that is required to convert your 27 MHz equipment is new crystals and tuning. We never had any

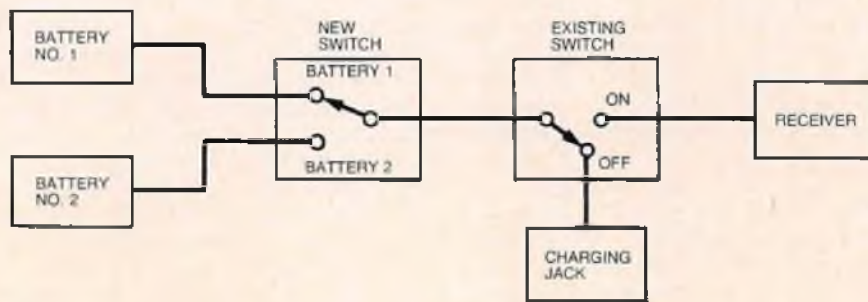


FIGURE 1

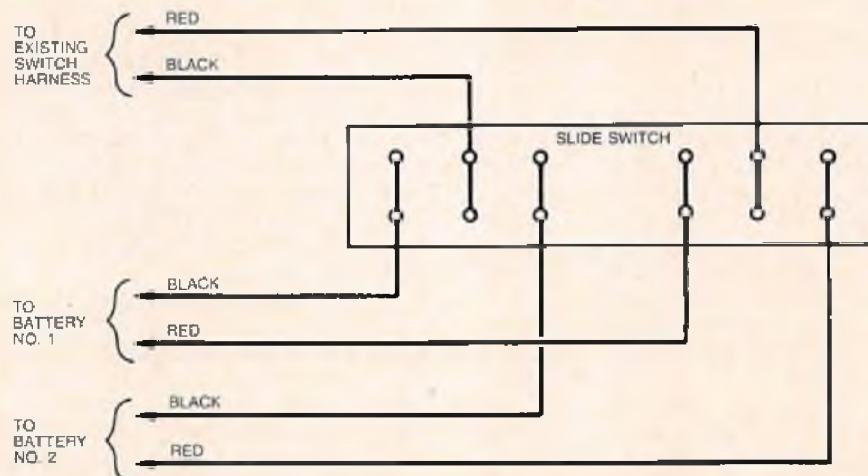


FIGURE 2

trouble but I would suggest monitoring first. Unfortunately some CB'ers found this band and with their low regard for the law have moved in. And if they operate on illegal frequencies, you can imagine what they use for power. Remember you must have at least a General Class license to use ten meters.

Using Multiple Battery Packs

Dear Mr. Oddino,

I am not electronically minded, and I don't pretend to know anything about the tech. aspects of the radio equipment I am using.

I can follow simple ABC instructions, however, and I have managed to complete (successfully) some of Ace Mfg. kits.

My question is, how to hook up two battery packs for use with standard Futaba gear. I have 8 ea. 600 ma GE nicads that I would like to make into battery packs for a 1/4 J3 that I'm building, but past the normal 4.8 volt normal set-up I am lost.

Wouldn't I need to have a diode protected "Y" harness to hook up both packs, or what would be the simplest configuration? If you could sketch a diagram for me I sure would appreciate it.

I would also have a problem in charging the 600 ma cells. I want to use one of the new Ace "Uni-Chargers", but I don't know what resistor to use to get the correct charge rate for this size cell.

I want to charge all 8 cells at the same time.

If you could help me I surely would appreciate it.

Sincerely,
Allan Wehman Jr.
Ludson, S.C.

If you've got a big airplane that can carry more batteries or needs more battery capacity, because of more servos or higher current drain servos, you are much better off with larger capacity batteries rather than more batteries. For instance, four 1.2 amp/hr cells are probably cheaper and weigh less than eight 600 ma/hr cells. They also have lower internal resistance which means the voltage will not vary as much under the normal fluctuating loads we have in R/C systems.

The only argument for two sets of cells is to have redundancy, such that if one pack failed, the other would take over. There were some "black boxes" on the market that would accomplish this.

If one pack went below some pre-set voltage, say 4.5 volts, it would automatically switch over to the other pack. This shouldn't be too hard to engineer, with all the integrated circuits available these days. If someone works one out send it in.

You never want to connect two nicad packs in parallel. You could isolate them with diodes as Allan suggests, but you would get a voltage drop of about six-tenths of a volt which lowers servo power and even causes loss of sensitivity in some receivers. Given that

Soaring AL KINDRICK



Present world champ Skip Miller launches his "Aquila Grande". Note Skip's voice command, I guess it helps.



Lee Renaud checks all functions before every flight. Sailplane is Lee's 2 meter "Butea".

Over the period of the next three months I am going to paint you a word picture of our three F.A.I. finalists who will represent the United States at Belgium for the World Soaring Championships.

I asked each member for a brief history of himself, his modeling career, and his goals, and how the game plan as a team and as an individual will propel the U.S. team to a first place victory.

Starting with the current World Champion, Skip Miller, here is a mini-autobiography.

Skip moved to Colorado in 1968 where he currently resides with his wife, Meesh, in Boulder, Colorado. He studied Aeronautical Engineering at Northrup Institute of Technology and the

University of Kentucky and is presently President of his Land Surveying Company in Boulder, Colorado.

Skip started in R/C soaring only three years ago and, in September of 1976, made the United States F.A.I. team selection finals as an alternate and unknown. He placed 2nd in the three day finals competition becoming one man of the three man U.S. team selected to compete in South Africa at the World Championships. In March and April 1977, he competed in the World Championships in Pretoria, South Africa. After six days of competition with 12 other countries, Skip became the First World Champion of R/C Soaring and led the U.S. to a team victory.

In the Fall of 1977, he won the Regional League of Silent Flight Tournament and in the three day Nationals held in Riverside, California, he won his class and was Overall Champion of 1977 Nationals.

Skip is currently a member of the Rocky Mountain Soaring Association of Denver and holds numerous club records and was Overall Club Champion in 1977.

He placed third in the 1978 Team Finals (FAI) in Pensacola, Florida, and his points as an individual will now count for the U.S. team score. As current world champion of R/C Soaring, Skip will go to Belgium this year to defend his title.

Skip's sailplane is an 'Aquila Grande' (soon to be released by Cox Airtronics). It is the next logical step from the Standard Class Aquila. It was, of course, designed by Lee Renaud and is a typically competitive Renaud design. Structurally the sailplane is very strong,

with the wing having a semi-symmetrical airfoil. The sailplane's strongest suit is thermalling, followed by great L/D for the distance task and excellent ballasting potential for speed. It is a very consistent ship. Consistency, not speed, is the most important factor in F.A.I. flying.

Skip Miller feels the Grande' is well suited to his type of flying style and is looking forward to flying it in the World Champion meet in Belgium. He has great confidence in his two teammates, Terry Koplan and Steve Work. With the team manager, Dan Pruss, Skip is convinced the U.S. has a team of phenomenal strength.

Rick Norwood, of SULA fame, is a
to page 124



Flying wing and owner Rick Norwood. Wife Nancy works overtime to help with MonoKote costs.



Mike Regan launches his new creation for fast flight, the "Lyre Bird".

RCM PRODUCT TEST

Carl Goldberg Models SKYLARK 56 Mk II



The Skylark 56 Mark II is an intermediate level sport pattern aircraft designed for engines of .30 to .40 cubic inches of displacement. Manufactured by Carl Goldberg Models of Chicago, Illinois, the Skylark 56 Mark II is an update of their long popular Skylark 56 aircraft. The Mark II incorporates a longer, wider, reinforced fuselage nose section, strengthened fuselage, a symmetrical wing, improved plans, complete hardware pack, and it is further enhanced by the addition of a molded canopy/cockpit interior which fits inside the streamlined canopy.

Modelers familiar with the other Carl Goldberg kit designs will discover that the Mark II is consistent, in that it follows the same time proven construction methods and techniques.

The full size plan sheet, which is printed on both sides is very clear and complete. All assembly steps are numbered and have accompanying detail views. Also included are construction and flying pamphlets which cover construction options such as the incorporation of wing bolts in lieu of the dowel/rubber band method, less wing dihedral for the more advanced pilots, and general flying tips and suggestions. The plans and instructions are truly excellent. Also impressive by its completeness, is the hardware package. Every accessory is provided to complete the aircraft, even down to socket head cap screws to mount the engine. The monetary savings and convenience of the Mark II's hardware package will be especially appreciated by modelers who have had past experience with a kit that included a minimal hardware package.

The wing, which is symmetrical, is of conventional balsa rib and spar construction with a solid leading and trailing edge. The main balsa spar is reinforced by the addition of 1/8" x 1/4" to page 122

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

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

SPECIFICATIONS

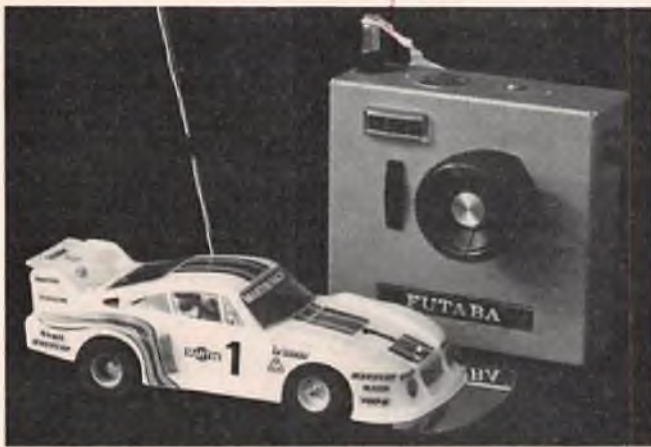
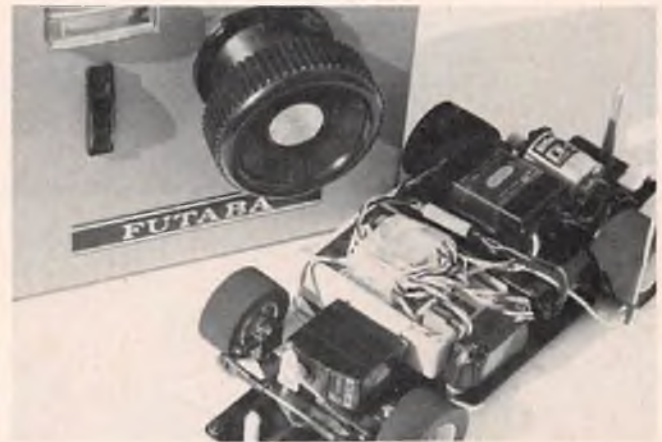
| | |
|---------------------------------------|---|
| Name | Skylark 56 Mark II |
| Aircraft Type | Sport or Pattern |
| Manufactured By | Carl Goldberg Models, Inc. 4734 W. Chicago Ave. Chicago, Illinois 60651 |
| Mfg. Suggested Retail Price | \$49.95 |
| Available From | Retail Outlets |
| Mfg. Recommended Usage | Sport & Competition |
| Wing Span | 56 Inches |
| Wing Chord | 10 Inches |
| Total Wing Area | 558 Square Inches |
| Fuselage Length | 46 Inches |
| Radio Compartment Dimensions | (L) 10" x (W) 2 1/2" x (H) 3 1/2" (Avg.) |
| Wing Location | Low Wing |
| Airfoil | Symmetrical |
| Wing Planform | Constant Chord |
| Dihedral (each tip) | 1 1/4" |
| Stabilizer Span | 22 Inches |
| Stabilizer Chord (incl. elev.) | 6 1/2" (Avg.) |
| Total Stab Area | 143 Square Inches |
| Stab Airfoil Section | Symmetrical |
| Stabilizer Location | Top Of Fuselage |
| Vertical Fin Height | 7 Inches |
| Vertical Fin Width (incl. rud.) | 6" (Max.) |
| Mfg. Rec. Engine Range | .30-.40 cu. in. |
| Recommended Fuel Tank Size | 8 Ounce |
| Landing Gear | Tricycle |
| 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 |
| Hardware Included in Kit | See text |
| Plan Size | 35" x 45" (1 sheet) |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | 2 Pamphlets |
| Construction Photos | No |
| Kit Includes | Die-Cut & Shaped Parts |
| Mfg. Rec. Flying Weight | 76-84 Oz. |
| Wing loading based on rec. flying wt. | 19.6-21.7 Oz./Sq. Ft. |

RCM PROTOTYPE

| | |
|-------------------------------------|----------------------|
| Weight, Ready To Fly | 75 Ounces |
| Wing Loading | 19.35 Oz./Sq. Ft. |
| Covering & finishing materials used | See Text |
| Engine Make & Disp. | K & B .40 |
| Muffler Used | McAllister Flow Thru |
| Radio Used | Westport Variant |
| Tank Size Used | 8 Oz. |

RCM PRODUCT TEST

**Peerless Corp.
PORSCHE 935**



If you have been considering investing in an RC electric fun-car you may have been thinking that 1/20th scale is a bit small to be effective. We must admit that the thought had crossed our minds too. However, that was before we had built and run the Peerless Porsche 935 Turbo. This little car looks good, handles good, and the little 'sunavagun' motors around at a very high rate of knots; far, far in excess of any scale speed.

As supplied in the kit, the front end is already assembled, as is the rear end, motor and gearing, and all mounted to the chassis. The front end is quite a classy installation as the tie rod ends and steering arm rod are all ball and socket joints (pretty fancy for a car of this class). All you have to do is install a 5-cell nicad pack, charging jack, electronic speed controller, receiver, switch, antenna, and one servo. The one nicad pack powers both the car and the radio receiver.

There is a six page folder of instructions with drawings and photographs to assist you in the assembly process. We found only one bit of head scratching confusion in the whole thing. That came about because we are the original 'good guys' who always study the **complete** instruction manual **before** we start building or assembling any project. The instructions show a very clear perspective drawing of where to position the equipment in the 'BMW' and the 'de Tomaso' bodied versions of the kit and another drawing of the equipment locations in the Porsche 935 version. Ours was the Porsche — so why the confusion? Well, the problem was that on the final page is a nice, big, clear photograph of a finished chassis with all the equipment in place and it bears absolutely **no** resemblance to **either** of the installations shown in the drawings!! We liked the drawing version better anyway so we made a temporary pile of radio bits, etc., on the chassis (as per the drawing) and then checked to see if the body would position properly over this

SPECIFICATIONS

| | |
|-------------------------------------|---|
| Name | Porsche 935 Turbo |
| Car Type | 1/20 scale, fun, sport |
| Manufactured By | Peerless Corp. 3919 M Street Philadelphia, Pennsylvania 19124 |
| Mfg. Suggested Retail Price | \$80.00 |
| Available From | Mfg. & Retail Outlets |
| Length | 9 3/4 inches |
| Width | 4 inches |
| Height | 2 1/2 inches |
| Wheel Base | 4 1/2 inches |
| Track | 3" Front — 3 1/4" Rear |
| Weight | 11 1/2 ounces |
| Suspension | Transverse leaf front, chassis flex rear |
| Gear Ratio | 5:1, 10 tooth drive, 50 tooth driven 8 tooth and 12 tooth alternate drive gears are supplied in the kit |
| Motor | Kyosho Little Sport |
| Fuel | 6v, 5 nicads (not incl.) |
| Speed Control | Electronic proportional |
| Rec. Number of Channels | 2 |
| Recommended Control Functions | Channel 1 forward & reverse with proportional speed — Channel 2 steering |

Basic Materials Used in Construction:

| | |
|---------------------------|---|
| Chassis | Duraluminum |
| Gears | Nylon |
| Shafts | Steel |
| Wheels | Die-cast alloy |
| Tires | Sponge rubber |
| Body | Vacu-formed polycarbonate |
| Instruction Manual | Yes (6 pages) |
| Construction Photos | Yes & Diagrams |
| Kit Includes | All hardware, foam mounting tape decals, charging jack |

RCM PROTOTYPE

| | |
|--------------------------------|---------------------|
| Finishing Materials Used | See Text |
| Engine Make | As supplied |
| Gearing Used | 10 tooth drive, 5:1 |
| Muffler Used | Not Required |
| Radio Used | Futaba |

heap without fouling. It did, so we proceeded, gung ho, along that line of attack.

We were using a Futaba wheel control radio system and ours has the heavy duty servos (S7) made especially to take
to page 112

Scale Views

CLAUDE McCULLOUGH



Right Stripe

The final touch on a scale model is the markings. If incorrectly done, the realistic effect is spoiled. From time to time we plan to present standard and official markings data for your scale reference files. To start the effort off, here is the factory layout plan for the J-3 Cub. This originally appeared in the EAA magazine Sport Aviation in an article by Lu Sutherland. Use these dimensions and a scale Cub will look just like the Lock Haven product. Watch out, though, for restored Cubs which have been repainted free-hand by the owner. Don't pick one of these as a model subject. Also, if the model has been "sport-scaled" and has altered measurements, then the color striping may need some eyeball engineering as well.

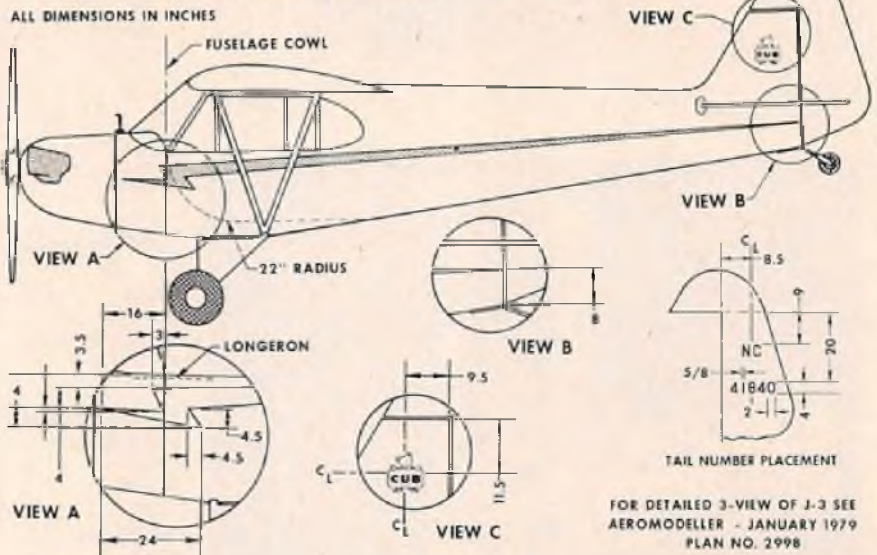
There is an approved cockpit interior for the Cub. To quote Lu Sutherland: "The inside of the cockpit should first be sprayed with Lock Haven yellow. The lower portion of both sides and the firewall should then be sprayed with gloss black dope or enamel. The boundary of the black should start at the center of the cluster (of steel tubing --- McCullough) at the edge of the instrument panel and curve down and back through 90° with a radius of 22" centered on the longeron. It should continue in a straight line to the aft edge of the inside fabric parallel to the bottom of the window."

Cubs are to RC about what Mustangs are to the plastic model hobby. The recognition factor makes them favorites. Bud Nosen, Practical Scale, and Span Aero all have 1/4 Scales. Sig's is 71" span for up to .40 engines. The German WIK company makes one for up to .40's at 62". Sterling has a smaller 54" version. World Engines Cub features fast assembly and simplified construction. Sure Flite has an ARF all molded foam entry in the field. There are probably more.

An Indispensable Book

I get a lot of mail from scale builders wanting to know where to find 3-views of specific aircraft. It used to be I had to rely on my memory to come up with an answer, since I have never found the time to sort my basement full of aviation

PIPER J-3 MARKINGS LAYOUT FROM EAA "SPORT AVIATION"



paper. Luckily, one of the few things I am good at is remembering 3-views. But it was a hit or miss proposition before RCM made it a lot simpler a few years ago with the publication of a book by Herman Luevano called "Scale Reference Guide." Though it is advertised regularly as a part of the RCM Anthology Library Series, a lot of you must not read the ads closely, for I find many scalers not really aware of the nature of this helpful index. The book lists most of the 3-view drawings that



Inside the Scale Reference Guide. One handy bit of information included is the number of the applicable Profile when one is available for the subject aircraft.



scale reference guide

EDITED BY HERMAN LUEVANO

A Reference Guide Listing Virtually Every Scale Plan Or Three-View Published Over The Past 40 Years. Also Includes Reprints Of Dave Platt's Scale In Hand Column.



have been published in English and American model magazines over the last 40 years, gives the name and date of the magazine in which each appeared, and even lists the page number. Samples of Paul Matt's excellent drawings and scale model photos by Dick Tichenor illustrate the volume with selections from Dave Platt's "Scale In Hand" column included. Last but not least, all of the scale construction articles of the same time period are covered. Aircraft types are arranged alphabetically and you need only flip a few pages to find full coverage of your current favorite subject. The Guide has saved me hours of searching through the stacks. It is even more valuable for

those without a magazine collection, since you can narrow down the number of issues required to locate a good drawing. Every serious modeler should have a copy. Price is \$4.50 by book rate mail, airmail is \$1.00 more, foreign orders \$2.00 more. Send to RCM, Box 487, Sierra Madre, Calif. 91024.

Those Were The Good Old Days!

Back in the 1930's, a feature of most any large sized town was the second-hand magazine store. I first discovered one on a family trip to Kansas City and was promptly hooked by the crowded shelves of old MAN's (at 2 for 5¢!), Flying Aces, G-8 and His Battle Aces, Aero Digest, even an early home-builder's publication whose name I have forgotten. I had already badly dented my vacation spending money stocking up on Paulonia wood props, a Jimmie Allen kit and the like at Country Club Aero Supply and I promptly spent all of my remaining cash for an armload of magazines. That was the start of a case of collecting fever that has never really been cured. Soon I had my bedroom well filled and used to pore over them by the hour, soaking up aeronautical lore and planning fantastic scale models --- when I could afford them! But then came World War II and while I was away on a G.I. conducted tour of Europe, one of those fervent patriotic scrap paper drives (sob!) swallowed up my prized library --- including copies of Flying Aces with my first published efforts at drawings plans and writing articles.



All four of these magazines from the 1940's are no longer published. Air Trails was a Life-sized publication that sold for 15 cents. No issue of Flying Aces was complete without an episode from the comedy adventures of World War I flier Phineas Pinkham. Both magazines had model building departments that eventually grew and took over entirely.

I started collecting all over again 1946, though not with quite the same intensity as before. For one thing, second hand magazine stores seemed to have disappeared. Still the new pile grew relentlessly and automatically, just from subscribing to a lot of magazines. And of

course the growth of modeling and sport aviation activities has brought about the birth of many new air-oriented publications to replace those old titles that will never die, but faded away. I find that most scale modelers are collectors at heart & have a stash of back issue magazines & out of print books. A major outgrowth of the Old Timer movement is the preservation on our early hobby artifacts of all kinds. Just keep an eye out for the start of any scrap paper drives!

Vol. 1 — No. 1

The goal of every collector is to have a run of magazines starting with the very first issue published. That copy is nearly always rarer than succeeding issues, for usually only a limited number of copies are printed so the publisher can test the market without committing financial hari-kari. If you should happen to find a copy of Superman Comics Vol. 1 — No. 1 in your attic, you'll find out what I mean. People will come with lots of money and a strange glint in their eye. Back issue magazine dealers always list the first issue separately from succeeding issues and often will only sell them in complete Vol. 1 sets. That's why I like to find out about a new magazine before it goes on sale, to be sure of getting the initial issue.

Which reminds me of how I first heard about RCM. It was at the 1963 Nationals in Los Alamitos. Don Deway was there with a sign on his car announcing a new RC-only magazine and passing out leaflets. It sounded like a good idea to me and I sent in a subscription as soon as I got back home. When Vol. 1 — No. 1 for October arrived, it proved to be an interesting package with coverage of the Nats, a construction article for Phil Kraft's "Stagger-Bi" biplane and other features.



The first three issues of RCM were 40 to 44 pages with two-color covers featuring black and white photos.

In his editorial for that first issue, Don remarked that he had been told that a new magazine stood a 92% chance of failing but he was content to look at the equation the other way by multiplying the remaining 8% times the number of helpful modelers he had encountered in the hobby. Looking at RCM today, the largest and most prestigious publication in its field, there doesn't seem much doubt that Don beat those long odds by a country mile!

The Back Issue Store Revisited

The nostalgia, antique and old-timer crazes that started getting up steam in the 60's have brought collecting back date magazines to the forefront at a major activity. This rise in interest has made old magazines a lot more valuable than they used to be. Supply and demand at work. It's understandable and not much different from the situation with other collecting fields like artist's works, stamps and coins. So nowadays you can be pretty certain that most copies of old magazines will cost you more than the price at publication. But, by the same token, the value of these historical objects stays with them and it is not too hard to find a buyer should it ever become necessary to dispose of a collection.

Even if you are not interested in really bearing down on collecting you will still need specific issues from time to time to get together a scale presentation or design a scratch-built model. So Scale Views is starting a search to locate all of the back issue magazine dealers around as an important source of scale data. The Scale Reference Guide will tell which issue to buy --- here are some places they can be found:

Everybody's Bookshop, 317 W. 6th St., Los Angeles, Ca. 90014. Those who read RCM classified department will have noticed the regular ads of this modern day equivalent of the second-hand magazine store --- and, in fact, they have been in business since 1925. Their list of aviation titles includes: Aviation Week, Aero Digest, Air Classics, Air News, Air Progress, Air Trails, American Modeler, Flying, Flying Aces, Flying Models, Model Airplane News, Model Builder, Plane and Pilot, Private Pilot, R/C Modeler, etc. Prices range from \$10.00 to \$20.00 per copy, depending on the age and scarcity. Send a self-addressed stamped envelope for their catalog list and you can also send in a list of the titles and dates you are looking for and they'll let you know what is available.

Chip Klaver of Everybody's tells me they have a good selection of post World War II magazines but pre-war issues come and go quickly. They buy old magazines constantly, so have new supplies regularly. At the moment, RCM is available from the first issue in complete runs, Air Trails from 1937 and M.A.N. from 1940. They do not handle foreign aviation magazines. For modelers in the L.A. area who want to come in person, the store is open from 10 a.m. to 6 p.m. Monday through Saturday, closed on Sundays. You can also call (213) 623-6234 (but not collect) and get information as to available issues.

Aero Literature, P.O. Box 1441, Olympia, WA 98507. This is mainly a

to page 98



Cap'n Dicks Cockpit BY DICK BRADFORD



FIRST DAY AT THE TRACK

This is not an article for the R/C car gang --- it's aimed primarily at the airborne fraternity!

"We'll be at Northtown tomorrow — why don't you come up and drive my car?"

Roger Berquist was at the other end of the phone. Roger is president of the Twin City Radio Control Car Club (TCRCCC) and has most impressive credentials including a National Championship in Class B super stock -- runner-up in the oval the same year (1976) -- and a third in the Formula I U.S. Championships in Kansas City this summer.

I explained to Roger that I had never seen an R/C car in the flesh — had very little idea of the techniques involved in road racing — and except for an interest in Gene Husting's super monthly column in RCM, had no contact at all with the R/C 'ground pounders.'

"Makes no difference," quipped Roger, "I think it will be a revelation for you to drive one -- might make good copy for your column -- and give you and other 'airplane guys' more respect for our end of the hobby."

I met Roger in the pit area of the Northtown (a shopping center in North suburban Minneapolis) track. I must admit that I was impressed with the set-up — a permanently marked and cornered track layed flat on parking lot black top with a surrounding 'quick retract' crash barrier (see photo). The pit area and drivers 'rostrum' were on the north end and the spectators area was situated on a beautiful grassy knoll to the south. For the spectators it was great — like looking down into an amphitheater.

Roger had the top off his car (a Delta Super J powered by a Glen Dye modified K & B .21), and was 'tweaking' its 'innards' when I arrived.

"Hi Rog — what you doing?"

"Just getting it ready for you, Dick."

"But that's gotta be your best car -- I might cream it."

"I trust ya -- things 'll go O.K." (fool!)

Roger reached for the P.A. mike and announced that "the track will be closed while Cap'n Dick Bradford of RCM drives!"

I could have died (or at least crawled in a hole)! I had hoped for total



Some of the TCRCCC boys -- L to R: Gary Tintes, Rus Tesch, Curtis Tesch, Ken Grieger, Barry Downs, Roger Berquist, Don Block, Greg Lieberg, Al McPeak, Bob Block --- club has 18 members.

anonymity -- you know, two eyeballs and an antenna peering from some dark corner. But no — suddenly I found myself on the elevated drivers platform with Rog, and the eyes of the world (or so it felt) upon me.

Roger took a couple of laps to check the trim and engine response -- then handed me the box.

"This lever is the throttle and brake; this donut, of course, is the steering wheel; this slide works the steering trim; and the knob on the top is the brake over-ride (oh me!). The car is handling well -- running straight and very predictable. I've got 10% fuel on board -- that'll give you a good top end, but slow down your acceleration and lessen the possibility of a spin-out (he sounded like my instructor in Aviation Cadets). Keep it slow and easy the first couple of laps (would he believe the first couple of hundred). Have at it!"

I gingerly cracked the throttle and was off. The response was instantaneous -- no detectable lag whatsoever. The first turn (and crash wall) was 50' ahead. Time to throw in some right aileron, let up on the throttle, and hold a little up elevator to keep her level in the turn! Throttle worked fine — aileron worked

fine — but got no response at all from the elevators (hmmm)! Whew -- made it through the first 'S' -- now I'm on the straightaway -- now to open her up -- ugh! Wrong way on the lever -- brakes check O.K.! -- push it the right way, stupid! Zing! -- Holy Cow -- ease off, ease off, the crash wall is coming up too fast. Brakes! No, stupid -- the other way! -- even faster! Where's the 'dead man' switch? -- Turn, turn! I wish those guys would stop laughing -- can't concentrate. Whew! -- made it, but darn near rolled. Opposite aileron did nothing! Doggone I wish I could get some altitude and get out of trouble (use altitude for brains my old instructor used to say)! Made it through the first lap -- applause (I'll get even with Roger)! Made it through another lap -- and another -- and a batch more -- lost count. Confidence building within my breast -- this is getting easy -- open her up, I'll show 'em! Zap, it quit! "What's the matter, Rog? Out of gas? Aw heck, just when I was getting good! -- (Whew!) -- Do it again? -- No thanks, let's let the other guys use the track." (Hide -- regain composure!)

After that humbling, but very accelerating experience, my appetite

to page 94



The club has beautiful equipment and facilities including portable drivers platform and P.A. system.



Super track in the Northtown Shopping Center --- Twin Cities boys run every weekend.



Cap'n Dick receiving 'ground school' from Roger Berquist during his first 'solo'.



Active pit area - the car gang have lots of 'goodies'.



Delta car by Ken Grieger of Cottage Grove, Minn.



Roger Berquist's carb. air filter (see text), chassis is Delta Super J powered by Dye modified K & B .21.



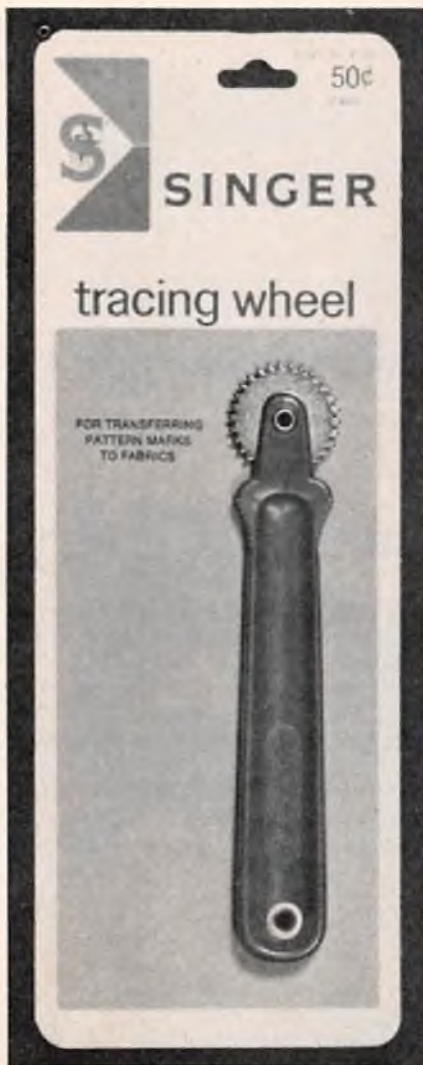
Disk brake on Roger's car --- this machine took 3rd in '78 Formula I U.S. Championships.



Curtis Tesch readys Veco/McCoy powered Delta car for 100 lap race.

REALISTIC RIVETS

By Akira Unosaki



Scale building has always been a popular part of our hobby and a visit to any of the shows, be it a local affair or one of the big national extravaganzas, is sure to make the average enthusiast stand in awe at the beautiful workmanship displayed. Fortunately, the model industry furnishes an almost endless list of accessories that go a long way in assisting the builder who strives for realism. One of the things we are left to cope with on our own, however, is the problem of duplicating a line of rivets. Solutions for this knotty problem range from inking in seams and rivets, to forming rivet heads by the application of minute dots of glue! One of the easiest and best methods to "rivet" your film finished bird is by the use of a tracing wheel. If you are not into cutting, sewing, and making your own clothes, you might wonder what a tracing wheel is. Ask your mother, wife, or girl friend, and they'll tell you that a tracing wheel is a handy little gadget used to transfer guide lines from a paper pattern, through tracing paper (a sort of carbon paper), to the cloth. And before we go any further, we'd better let you know how to go about acquiring a tracing wheel. They are available at most sewing centers and yardage



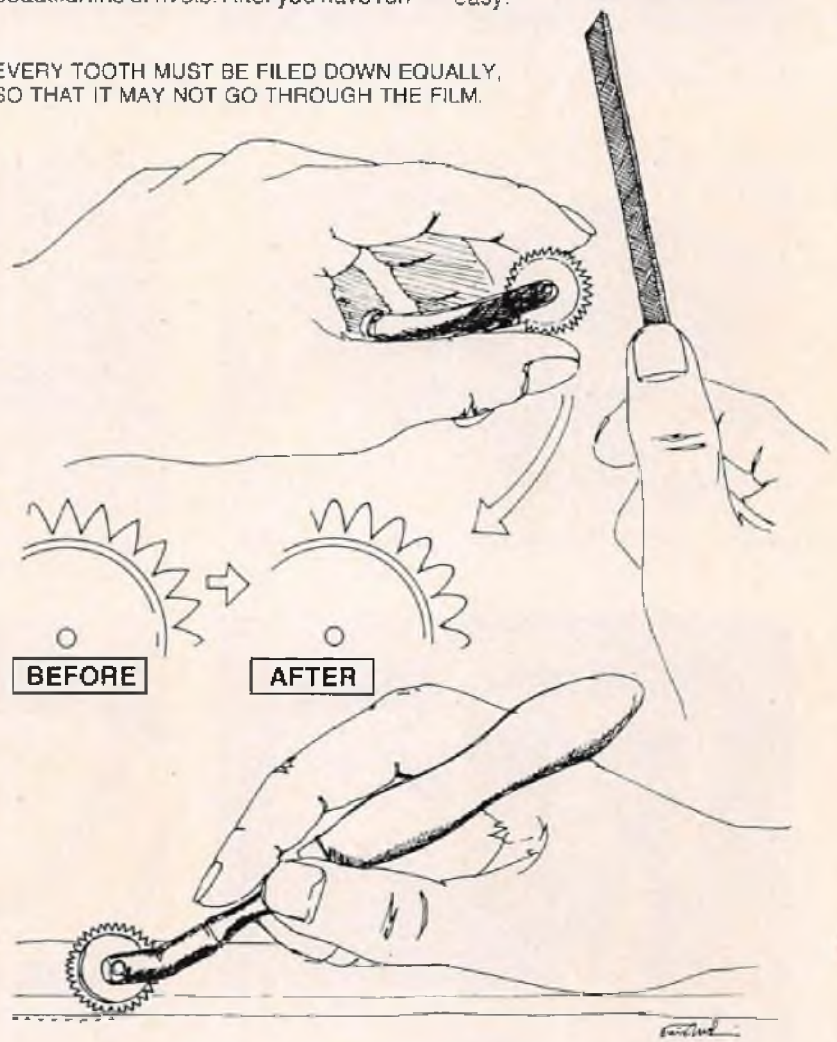
stores. Singer charges fifty cents for theirs, so you can see this will be a most inexpensive addition to your tool kit.

Prior to use on your plane, we suggest you cover a small sheet of balsa with a scrap of your favorite heat shrink plastic, and try out your tracing wheel. You'll also need a fairly thick flexible ruler. Such a ruler will give solid guidance as the tracing wheel turns alongside it, and can also be bent as you work around curved surfaces such as the fuselage. To etch a seam line, simply place your index finger on the serrated wheel so it won't revolve and, using the ruler as a guide, "draw" a seam. Then, move the ruler a slight distance and allow the wheel to revolve as you lay down a beautiful line of rivets. After you have run

a few seams and rivets on your sample, you'll be able to determine how much pressure is needed for the best results. Just take it easy, because it is possible to pierce the plastic covering, especially if the teeth on your tracing wheel are a little sharp. If you find that the teeth are punching through, use a fine file and slightly round them. This means working on each individual tooth, but it's not a long or difficult job. Some tracing wheels are okay as received, so check yours out by using the suggested test sample.

That's about it. Needless to say, the chromes, aluminum, and metallic films look especially good using this method but, regardless of the color, we are sure you'll agree that riveting was never so easy. □

EVERY TOOTH MUST BE FILED DOWN EQUALLY, SO THAT IT MAY NOT GO THROUGH THE FILM.



DRAW A LINE WITH IT ALONG A THICK RULER

CAN YOU DISC IT?

By Brian Irvine

One of the most distasteful tasks to almost any modeler is sanding. It's dirty, it makes you cough, it clogs your nose and it lays a

fine layer of dust in every nook and cranny in your shop. Worst of all, it takes so much time. And even if all of the above doesn't bother you, how many times have you been frustrated at trying to sand in the exact dihedral angle on a spar, or sand the end of a piece of tubing to a nice perpendicular surface? When you cut a piece of music wire it always has a nasty, dangerous burr on the end, and you rip the dickens out of a piece of sandpaper trying to get it cleaned up.

I had all these problems and more for a long time. Then one day I saw a tiny disc sander, with a 4" disc, sand a spruce spar down like it was made from a ripe avocado. Right then I had to have one. But the price — aargh! So I went home and started digging around in all the stuff I was supposed to throw out last summer but hadn't gotten around to. I

found an old electric motor, an old squirrel cage blower and a power cord. I bought a small piece of aluminum for the table bracket which was cut out on a Dremel jigsaw. Additional items purchased were a protractor, a pair of hinges and some screws. The protractor is attached to the bracket using cyanoacrylate. I rummaged around in my junk box for a switch and, with a scrap of plywood I had everything I needed to make my own disc sander. Mine cost a total of about \$2.00 and that's the kind of prices I like to pay.

When I got the thing built, I stood around for about two hours having the time of my life sanding all my scrap pieces of balsa and plywood into a large pile of wood dust. The thing worked like a charm and now I really don't know how to page 90

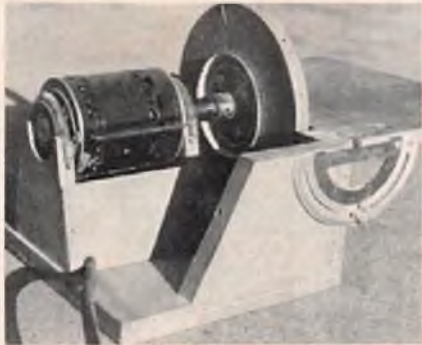


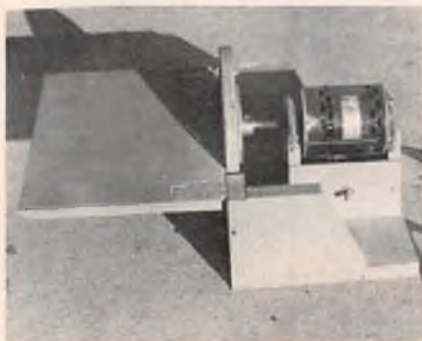
Photo shows aluminum bracket with protractor attached for table angle.



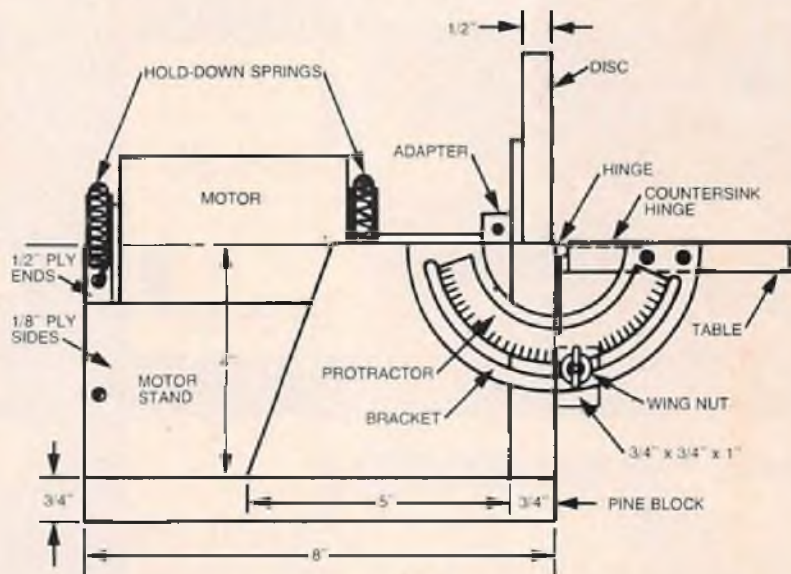
Close-up of adapter made from cut down squirrel cage blower with vanes removed.



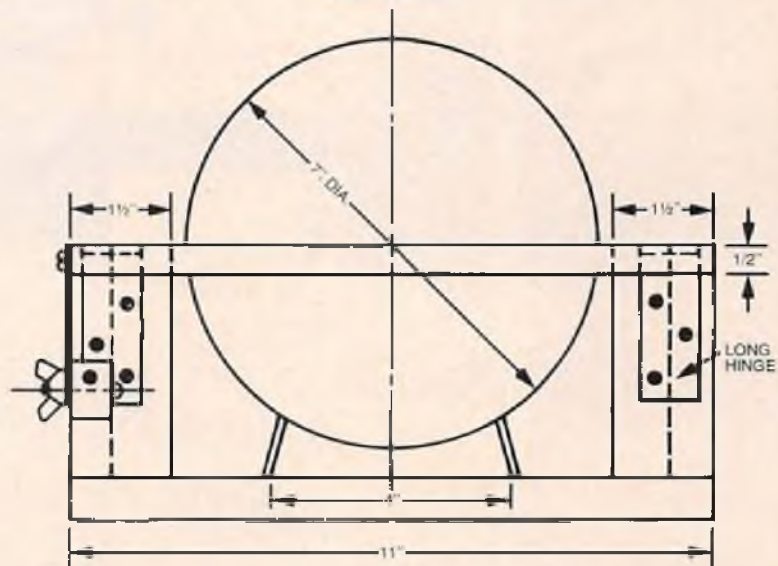
Note hinges inset in table top for flush surface.



Note on-off switch mounted at base of motor.



SIDE VIEW



FRONT VIEW

BUD NOSEN MODELS

INCORPORATED

BOX 105, TWO HARBORS, MINNESOTA 55616

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

9' PIPER J-3 CUB



Standoff Scale
Formed ABS
cowling Kit -

\$119.95

3 or 4 Channels
Flies like a
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9' CHAMPION CITABRIA



9' AERONCA "CHAMP"



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

\$99.95

3 or 4 Channels
No foam or
plastic Kit -

\$79.95

102" BUD NOSEN TRAINER



8' CURTISS JN-4D JENNY



Standoff scale
4 Channels
required Kit -

\$129.95

1/3 size Standoff
scale 4 Channels
required Kit -

\$129.95

8' 1933 GERE SPORT



9' "MR. MULLIGAN"



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

\$139.95

1/4 size Standoff
scale Molded
cowling Kit -

\$169.95

10' CESSNA 310 TWIN



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

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

OVERSEAS DISTRIBUTORS

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

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

Bud Nosen's spectacular

102" P-51 D

KIT \$169⁹⁵

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

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

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



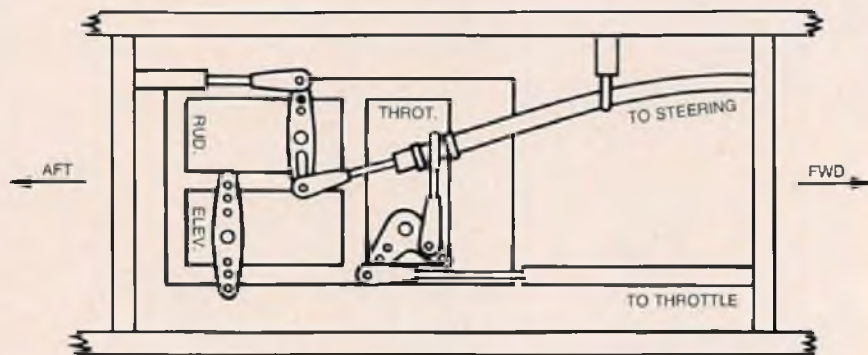
BUD NOSEN MODELS, INC.

Box 105

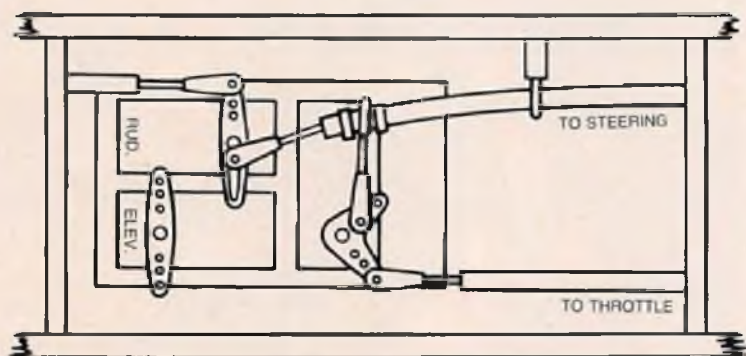
Two Harbors, MN 55616

catalog 50c

FOR WHAT IT'S WORTH



THROTTLE AT IDLE = HIGH RATIO STEERING FOR TAXIING



FULL THROTTLE = LOW RATIO STEERING FOR TAKE-OFF

NOTE: CUT SLOT IN RUDDER SERVO ARM IN TOWARD CENTER AS FAR AS POSSIBLE.

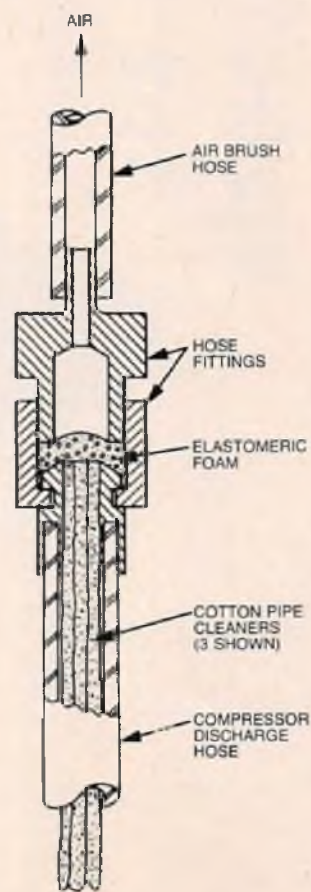
Having been out of modeling for several years, R. Tuller of Hayward, California, has recently returned to the hobby. Having been a free-flyer in the past, he is now into R/C. He noticed that new R/C'ers, along with himself, were having a problem with over-controlling on steering during take-off. This problem was overcome by using the control arrangement shown in the sketches to give variable ratio steering as needed.

Two good suggestions by Jim Richards that appeared in the Hawaii Radio Control Aircraft Association newsletter are as follows: (1) Dr. Scholl makes some super padding material for the cradle area that your wings fit in. The stuff comes in sheet form and can easily be cut into strips. It has very good adhesive on the back, so it will really stay put, even in our hot weather. When you've got it stuck down, tear off the flannel covering — the foam that is exposed is slip-proof. My problems with the foam strips supplied with the Paragon have been solved! (Note: wipe a very thin layer of 5-minute epoxy on the wood where the foam padding will be applied. After the epoxy sets-up, a good surface for the foam's adhesive is

provided.) (2) Having problems with 5-minute epoxy kicking off on you in about 2½ minutes? With our local temperature (85°) I was having all sorts of trouble, until I started placing the tubes in the refrigerator (about 30 minutes ahead of time), that did it! When I am ready to glue, I bring them out, and I've got plenty of time. Also, store your "Hot Stuff" in the refrigerator, it seems not to plug up as easily.

Have you ever been applying the final coat of epoxy paint to your latest prize creation, when out of the end of your air brush belches a large drop of condensation to completely destroy the finish that was about to put Michelangelo in 2nd place for the World's finest paint job? Jerry Livers of Santa Barbara, Calif., has discovered that condensation can be trapped by inserting low cost cotton pipe cleaners, of sufficient quantity, to loosely fill the compressor hose without significantly blocking air flow. He then places a disc of elastomeric foam on top of the pipe cleaners and joins the smaller diameter, air brush inlet hose to the compressor discharge hose, completing the condensation trap installation. The foam

keeps the pipe cleaners from migrating, one at a time into the smaller hose. This trap has been tried on several occasions when it was raining heavily outside with 100% success for spraying periods of up to one hour duration. With this condensation trap installed, it is no longer necessary to wait for a 60°F day with 50% humidity before you can start to spray your new beauty. See attached sketch.

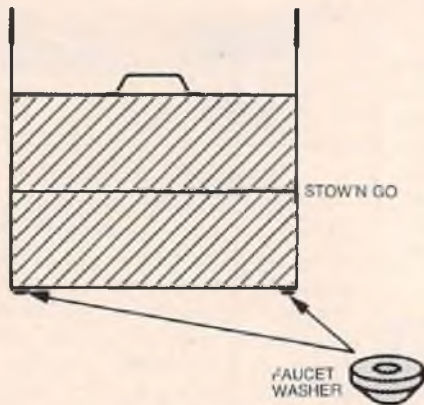


Would you like the plastic pushrod links to rotate on the ends of the pushrod wires like the metal ones do? Do you like to have to use two pairs of pliers to turn them enough to make trim adjustments? Chuck your 2-56 tap into your power drill and drive it into the link, flip it into reverse and back it out, drive it in again and out, it will now spin on the wire as well as the metal ones do. This idea was submitted by Bill Denson of Mabank, Texas, and has worked very successful for him over a long period of time.

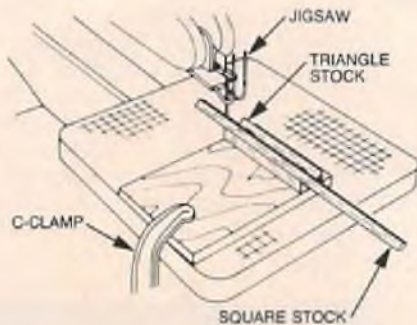
The following suggestion applies to the "Stow'n Go" field support box that was presented in the January 1978 issue of RCM. From David J. Lanz of Hamburg, New York, comes the suggestion for inexpensive but efficient set of legs for that project. Ordinary

FOR WHAT IT'S WORTH

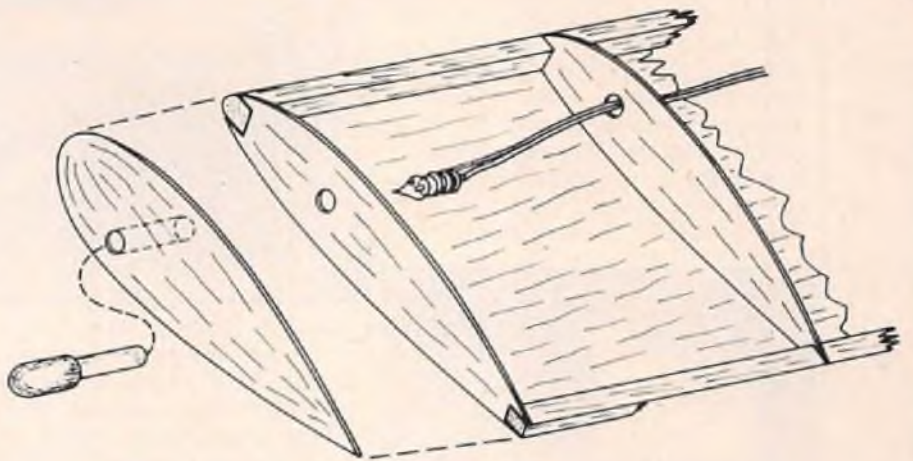
faucet washers can be purchased from your local hardware store for a few cents. As shown in the sketch, they can be attached with epoxy or cyanoacrylic adhesive. They form a sturdy, nonskid, tapered surface that is both functional and attractive.



Deane Woodiwiss, of Swartz Creek, Michigan, suggests you take a few minutes this evening to make this simple jig for your Dremel Moto shop. With this jig, and your Dremel jig saw, you can quickly and accurately cut triangle stock from square stock. As shown in the sketch, glue two 5" pieces of triangle stock to a 5" x 8" x 1/2" piece of plywood and clamp to the base of your saw. You can then feed your square stock through your saw and have any size triangle stock you desire.



A child's toy was the inspiration from Jerry D. Farr of Abilene, Texas, for this easy wing tip lighting system using normal, flashlight bulbs. The pegs that are used in a "Light Brite" toy are light conducting and come in all the right colors. Three 1 1/2 volt penlight bulbs and a four (4) pencil battery box are all that's needed to run the system and, if the pencils are on the Center of Gravity there is no need for a switch. Just remove the cells for sport flying. The last rib bay becomes the light box and the peg inserted into the tip is the finished light (see sketch). Spraying the inside of the rib bay with white or silver paint might

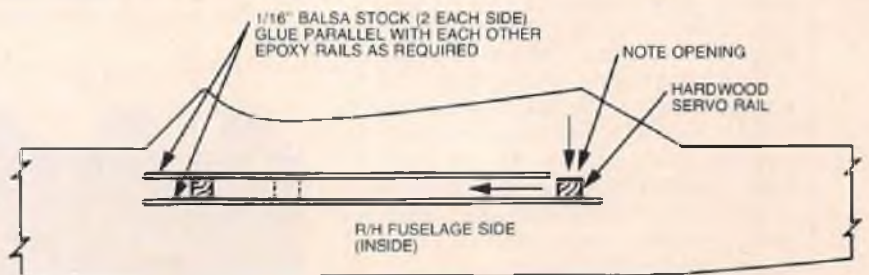


improve the system but it hasn't been tried as yet. Penlight Bulbs are thick glass and seem to last longer than airplanes do.

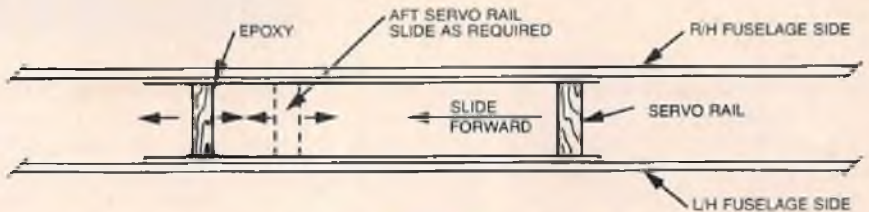
Luke A. Kemon of Satellite Beach, Florida, found a use for the bottom of the new 2 liter Coke bottles. They make perfect engine cowls for the .40 size planes. All you have to do is break loose the bottom from the plastic bottle and cut the center out and fill the small holes in. They can be mounted like any other cowl — i.e., with screws and washers. They also make nice junk parts holders.

To aid in the installation of your servo rails and also guarantee alignment when the servos are installed is the suggestion from Steve Matthews of Lynnwood, Washington. Before assembly of the fuselage, glue two 1/16" sq. balsa strips lengthwise on the inside of each fuselage side. These strips should be spaced far enough apart for the servo rails to slide fore and aft. The accompanying sketch is self explanatory.

Having just completed a T 28B, Ted Hoffmann of Thibodaux, Louisiana, discovered a very easy method of masking on compound curves and irregular shapes. The basic item needed is clear contact paper. One can either draw the desired design on the clear side or first make a cardboard template that can be laid over the clear side. Use an X-Acto knife or razor blade and cut the desired shape from the contact paper. Be sure to leave sufficient amounts of contact paper around the area to be worked. This adds to hold the shape of the design. After the desired cutting is done, flip the paper over on the backing side. Carefully cut through the backing only about 1/4" to 1/2" around the design on large designs, closer on small designs. You are now ready to press the design in place. Air brush the area and immediately pull the paper away from the plane. Sharp clean lines are left without any mess left like electrical tape. It works well. Try it for yourself.



SIDE VIEW



TOP VIEW

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.



A BREAKTHROUGH IN SERVOS!

Ace R/C, Box 511, 116 W. 19th St., Higginsville, Mo. 64037, is proud to announce a new member to the family of servos in the popular Digital Commander line of radio equipment kits, the Bantam Midget. A brother to the Bantam servo (which has been a respected name in servos for years), the Bantam Midget is considerably smaller and lighter, but boasts the same torque and gear strength as its big brother with even a bit more speed. Notice the extremely low profile — important when interfacing the elevator and rudder servos with the aileron servo and linkages. Re-read the above paragraph then consider the fact that the Midget offers a servo that is in the micro-miniature category but also has the power and strength for .60 powered pattern ships! Truly a universal servo. A Signetics 544 IC, external driver transistors, quality plastic conductive element pot and other components make a combination that has become synonymous with Ace R/C and Digital Commander servos. Servos that have "Competition Grade" performance with an economical price tag. The Bantam Midget will work with any modern positive pulse system. For negative pulse systems (ProLine, etc.) a pulse inverter (14G18-\$2) is required for each servo. A rotary wheel, extended arm, and an adjustable arm are furnished. No connectors are furnished with servo kits. All of the flite packs and complete systems are available with the Midget option; please write for details.

MAGNUM

Futuraglass Design, One Cannon Dr., Nashua, N.H. 03060, presents their "Magnum" tunnel hull, a lightweight design intended for the K & B 3.5 Outboard motor. The "Magnum" features a brilliant Gelcoat finish,



positive foam flotation, and hand laminated fiberglass. It comes joined and almost ready to run. Colors available include competition orange, British racing green, racing red, and medium blue. Length of the "Magnum" is 29 $\frac{3}{8}$ ", width is 14 $\frac{5}{8}$ " and tunnel width is 8 $\frac{1}{2}$ ".



TEE PINS

DJ's Multistripe, Box 9382, Glendale, Calif. 91206, introduces their "Tee Pins." These Tee Pins are plated steel to resist bending and will last many times longer than brass. Prices: 100, \$1.25; 500, \$5.95. Available from your hobby dealer.



"PERFECT" ENGINE CLEANER

From R & S Hobby Products, Inc., P.O. Box 1161, Oak Lawn, Ill 60453, is "Perfect" engine cleaner which will clean oil, varnish, and dirt, but will not harm plastic parts. It also works well in

Sonic Cleaner. Comes in 16 oz. plastic bottles.



CESSNA 150 TRAINER

Champion Model Aeroplane, P.O. Box 45, Keyport, New Jersey 07735, is ready to ship the new 150/152 Stand-Off Scale version of the famous Cessna 150 Trainer. It is a superb kit, engineered for easy construction with many isometric views and detailed step by step instructions on the full size plans. The fuselage is a box type sheet balsa construction with a cross over torsion bar main landing gear. Steerable nose gear hardware is included. The wing is conventional construction with die-cut ribs, grooved leading edge and spruce spars. The wing is attached with dowel pins and nylon bolts. The rudder and stabilizer are pre-cut 1/4" sheet balsa. The 150/152 was test flown many months to evaluate the flight performance. The design proved stable, groovy and maneuvers very well with an excellent roll rate. The operating flaps react similar to the full size Cessna. Full flap deflection allows a steep approach without excessive airspeed build up. The 150/152 then lands in a very short distance after the round out. The 150/152 Stand-Off Scale offers the Sunday flyer or the competition modeler the unique features of operating flaps, excellent flight characteristics and realistic appearance. A real fun machine.



DEEP VEE BOAT FOR RACING OR SPORT

Prather Products introduces the Prather Deep Vee Boat Kit designed by George Campbell, well known racing champion. The hull and deck are of epoxy fiberglass construction and are factory joined for the true warp free alignment. The kit includes hard maple engine mounts, plywood bulkheads,

showcase '79

foam flotation, and a complete 28 page photo illustrated assembly instruction booklet. The Deep Vee is 40" long, weighs 8-9 lbs., ready to run, and is suitable for .40-.65 engines. It meets the legal racing requirements for Deep Vee .40 or .65 and Mono .40 or .65 classes. A running hardware kit specifically designed for the Prather 40" Deep Vee is also available. The Boat Kit is priced at \$99.95 from dealers or direct from Prather Products, 1660 Ravenna Ave, Wilmington, Calif. 90744.



EXECUTIVE ENGINES RUNNING RADIALS

A new company, Executive Engines Co., 16650 So. 104th Ave., Orland Park, Ill. 60462 (312) 349-1998, will introduce their new 5 and 7 cylinder radial engines at Toledo Expo '79. These units, for scale and quarter scale models, are four-cycle, high torque units that swing 16/8 through 20/6 props. Smooth, low vibration, easy starting, with low fuel consumption on mild glow engine fuel, are some of the features. With a 6" diameter and only 23 ounces of weight (27 oz. on 7 cyl.) the engines will be offered in three versions. Customers may have choice of polished aluminum, anodized black, or the delux Collector's Gold Edition package, trimmed in 14K gold. All versions are fully operational and carry the manufacturer's warranty for 90 days. Direct sales only.

DRILL CHUCK FOR MINI STARTER

Astro Flight Inc., 13377 Beach Ave., Venice, Calif. 90291, presents a drill chuck for their mini starter. This nifty drill chuck is a very handy item for your tool box. The 1/4" jacob's chuck snap into the drive collar of the mini starter instantly converting it into a powerful electric drill



and/or grinder. All drill bits from the smallest drill to 1/4" sizes can be accommodated, including Dremel tools, and Black and Decker rotary rasps. The unit comes with the chuck key neatly packaged in a see through container. Available now at your favorite dealer or order direct at \$10.95.



QUADRA ENGINE MOUNT

A machined cast aluminum mount for the Quadra engine is being offered by C.B. Associates. The mount is designed for flat firewall installation and features a wide mounting hole pattern for rigid support. The mounts are in stock and retail for \$19.95 from C.B. Associates, Inc., 21658 Cloud Way, Hayward, Calif. 94545.



SUPER GNAT SAILPLANE KIT

The 'Super Gnat' sailplane has opened up a whole new dimension in R/C soaring. This compact and durable R/C sailplane kit looks and performs like the full size ships. The Super Gnat's knock down design permits it to fit in its 36" carrying box with enough extra room to hold transmitter, hi-start, and flight kit. Designed around a standard 8 oz. radio, the Super Gnat's excellent small field capabilities bring flying as close as your own back yard. For the beginner the Super Gnat provides exceptional stability, strength, and simplicity. The advanced flyer will experience

maneuverability and "big plane" performance never before seen in a small plane. Special features include: energy absorbing sponge rubber nose, quick building plywood and spruce fuselage, crash-proof pop-off tail (no rubber bands required), internally seating plug together rubber band on wings, complete hardware package and skids, quick building balsa and spruce wing and tail surfaces, and a comprehensive step by step instruction book. From R & Z Systems Engineering, P.O. Box 1249, Pacific Palisades, Calif. 90272.



SCALE DISPLAY PROPS

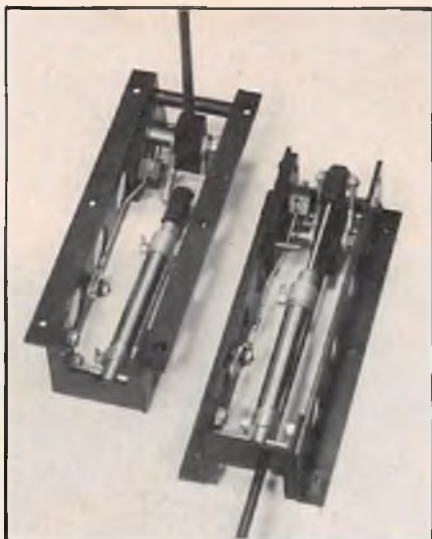
Bob Holman Plans, P.O. Box 741, San Bernardino, Calif. 92402, announces their scale display props to fit the Royal Corsair, and the Taylor Corsair and Hellcat. The props are made of epoxy/glass with hollow blades and hub. The price is \$15.00 plus \$2.00 packaging and shipping (Calif. residents add 6% sales tax). Separate blades are available. Coming soon are four blade props for the FW-190 and P-51. Send \$1.00 to Bob for his large "Best of Scale" catalog with over 20 pages filled with scale goodies.



CONTEST AWARD CERTIFICATE

In its constant effort to support and encourage those involved in the modeling hobby, Bavarian Precision Products Co., is offering discount Contest Award Certificates. These certificates will only be given on request to model clubs sponsoring competitive events. The winners of Awards Certificates will be able to purchase, direct from Bavarian Precision Products

Co., any HB engine he or she desires at 40% off the current list price. Contest Directors must make their request for certificates directly to Bavarian Precision Products Co., P.O. Box 6, New Canaan, Conn. 06840.



HEAVY DUTY RETRACTS

Custom Retracts Mfg., 16751 Noyes Avenue, Irvine, Calif. 92714, (714 540-5094) offers a retractable landing gear system for the larger models. This landing gear system is designed to handle 1/4 to 1/3 scale aircraft. The basic frame is constructed of sturdy aircraft quality aluminum (T6-6061) with a black anodized finish to resist corrosion. The gear leg strut is of 1/4" dia. chrome silica which, under 200 lbs. of force will only bend 1/2". The locking mechanism requires at least 150 lbs. to collapse. The air cylinder is guaranteed by the cylinder manufacturer, Bimba, to produce thousands of trouble free cycles. For the suggested retail price of \$179.00 you will receive two main retractable landing gear, two T-fittings, 20' of air tubing, one control valve, one fillable air canister and four 1/4" wheel collars. Additional options are: gear legs bent to accommodate 4, 5, or 6" tires at \$2.50 a set and, for only \$9.95, speed control valves for scale retracting of the gear are also available. A pair of main gears weigh approximately 4 lbs. (less wheels). Dealer or distributor inquiries invited.

PHOENIX 8 KIT

Aero Composites, 411 Townsend Place, Dayton, Ohio 45431, is now producing Don Lowe's all new Phoenix 8. Don's latest pattern design is his most beautiful yet — both in appearance and flying qualities. The wing and stab have been repositioned to virtually eliminate roll coupling with rudder. Wing area has been increased to carry the weight of today's engines and tuned pipes. The



fuselage has been contoured to provide maximum strength with a minimum of weight (19 oz.). The kit features an epoxy/glass fuselage with molded canopy detail stab fillets, and pushrod guides. The belly pan includes molded wing bolt recesses. The foam blocks are faced to provide accurate building/alignment jigs with wing dihedral pre-cut in the blocks. Provision has been made for optional "flying stab" installation. Detailed plans and instructions are included. The deluxe kit features a complete wood package, highest quality motor mount, and control surface hardware. Specs for the Phoenix are: wingspan 64", wing area 730", engine .60, radio 4 + channels. The price is \$79.95 for the standard kit and \$119.95 for the deluxe kit. Through your dealer or if unavailable order direct from Aero Composites. Dealer inquiries invited.



POLY CHARGER

Bill Evans Air Craft introduces the Poly Charger. The Poly Charger is designed to provide a convenient, safe, single source charger. It will independently or simultaneously charge up to two transmitters and four airborne nicad battery packs. It features a safe charge rate, independent charge circuits, transformer isolation, and will operate with nearly all radio systems on the market. For more information, contact Bill Evans Air Craft, 19216 Calvert St., Reseda, Calif. 91335.

FOX EAGLE II

Fox Manufacturing, 5305 Towson Ave., Fort Smith, Ark. 72901, announces production of their all new Eagle II. This great new .60 should have special appeal to pattern flying because of its unusually high power output and its durability. Available in both side exhaust



and rear exhaust configurations. Weight 17 ounces, bore .906, stroke .937. The Eagle II features an unusually large connecting rod and rod bearings. Price is \$125.00. Available at dealers everywhere.



SUPER ESQUIRE KIT

If you've wanted to build and fly a big airplane, but you've been waiting for Midwest to come out with a big kit, here it is! The Super Esquire is the classic Esquire kit, only now it's 1 1/2 times bigger! Best of all, a .60 size engine will fly it with half the power in reserve, without the need of a gear reduction unit. Kit features include Micro-cut balsa, plywood and bass. All ribs are die-cut and dihedral braces machined. Main landing gear is formed and included with molded tailwheel hardware, aluminum motor mount with nylon blocks, formed ABS cowling and much hardware. Specs are: wingspan 80", engine .40-.60, weight 8 1/2 lbs. (no fuel), and designed for 3 channel operation. Priced at \$94.95 at your hobby dealer. Manufactured by Midwest Products, 400 South Indiana St., Hobart, Indiana 46342. Phone (219) 942-1134.



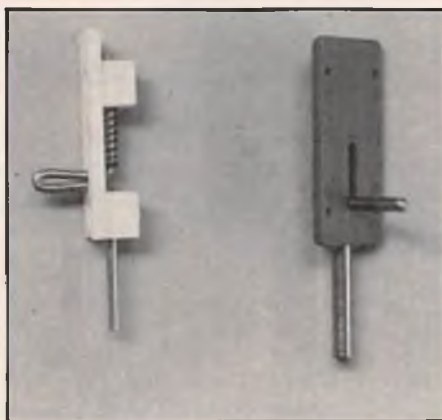
ON-BOARD IGNITION SYSTEM

L & L Electronics has released the first successful On-Board Ignition

System for glow plug engines. Combining electronic temperature regulations with micro technology has produced the first continuous "Hot Plug" system that is light enough and practical for most .40 size and larger planes. The system not only adds to scale appearance, but aids in engine performance in such areas as smoother idle, better throttle response, more power, and increased fuel economy. The system is rechargeable from most 4.8 and 9.6 volt nicad chargers without any adapters, as a regulating circuit is incorporated into the unit. The system can provide up to three days flying from a single charge, and has sufficient power to allow twin engine operation from a single system. Total life expectancy is 500 complete discharge/charge cycles. Priced at \$19.95, the system is available from retail outlets and direct from L & L Electronics, P.O. Box 13434, Albuquerque, New Mexico 87112.



they can be adapted to two, three, or four bladed airscrews, with the base flange marked accordingly. Ask for them at your local hobby supplier or write: PICA Products, 2657 N.E. 188 St., Miami, Florida 33180, phone (305) 935-1436.



HATCH LATCHES

Two new products have been announced by Robinaire of Boca Raton, Florida. They are the CL-1 canopy, cowling and hatch latch, and the CL-2 wing latch. The CL-1 is ideal for such things as sailplane canopies and power plane hatches, cowlings and canopies. It can also serve as a wing latch for 1/2A size aircraft. The CL-2, with its 1/8" steel pin, will hold the wing in place on even the largest and fastest of planes. Instead of the hassle of putting in and taking out screws, and the inevitable slip of the screwdriver, a flip of the finger and the wing is on or off. Spring loaded, it cannot release itself. Distributors and dealers should contact Robinaire at P.O. Box K, Boca Raton, Florida 33432.



TRANS AM R/C CAR

MRC's Pontiac Trans-Am comes complete ready to run, all you add are the batteries. The 2 channel radio installed allows the car to operate in forward and reverse as well as proportional left and right steering

control. Outdoor range on this 1/12 scale car is approximately 250 feet. The car is available in 5 different colors. Each color is a different frequency; therefore, you can run 5 cars simultaneously. Available through retail outlets at a suggested list price of \$72.95. Manufactured by Model Rectifier Corp., 2500 Woodbridge Ave., Edison, New Jersey 08817.



4-WAY™ SCREWDRIVER IN ONE TOOL

A 4-Way Workmaster® screwdriver is designed to serve as four screwdrivers in one tool representing a 40% saving over the purchase of four individual Workmaster screwdrivers. As a combination tool it saves time because right at hand are two slotted bits (3/16" and 1/4") and two Phillips bits (1 pt. and 2 pt.). Bits lock into the barrel of the driver; the barrel locks into the handle. When one bit is ready to drive, the other is in storage position in the barrel. When the 1/4" is ready to drive or draw slotted screws, there's a 2 pt. Phillips in the storage position in the barrel. Flip the barrel, snap it back into the handle and a 1 pt. Phillips is ready for action. Flip the tip once more and you have a 3/16" slotted bit. All bits are protected with black oxide for rust resistance. The barrel is zinc plated to resist rust. Workmaster quality handle has the unique triangular shape that fits the fist naturally for better comfort and more torque with less effort. No. 66-401, 4-Way Workmaster screwdriver, suggested retail \$4.99. Stanley Tools, Box 1800, New Britain, Conn. 06037.

SEALING IRON REPLACEMENT SHOES

Top Flite Models, Inc., of Chicago, Illinois, now offers a replacement shoe for your Top Flite sealing iron. If for some reason the shoe on your iron is damaged, scratched, dented, or the teflon is worn off, it can now be replaced. This saves the expense of buying a new iron by simply removing four screws and

to page 88



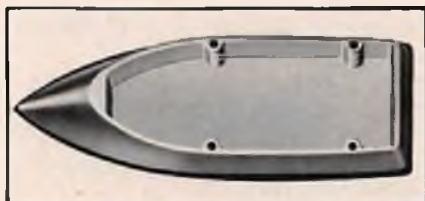
RELEASABLE TOW HOOK

Another neat product from Logictrol International Corp., 3300 Stovall Street, Irvine, Texas 75061. The THR-2 is a very reliable servo actuated tow release with an adjustable captured hook. A return spring is provided for hook reset. The captured feature is fail-safe and adjustable from outside of the glider. This is the original sailplane releasable tow hook updated for the competition flyer. Available direct or from hobby shops with a suggested list price of \$4.98.

SCALE NYLON SPINNERS

Pictured are three scale nylon spinners that are available in colors as well as in a chrome finish. These spinners are precision made with two-screw fittings and two positive locating pins. The base of the spinner does not have any cutaways, therefore,

from page 87/84



the old shoe, then installing the new shoe.

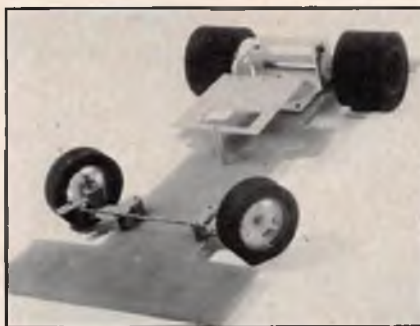
Covering jobs can be resumed with confidence because this shoe has the same design features and high quality teflon coating as the original shoe. Suggested price for the new replacement shoe is \$4.95. More information on Top Flite products is described in their 12-page catalog. Send request for catalog along with 50 cents to: Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, Ill. 60639.



MODEL RACING YACHT

An exciting new R/C model racing yacht has been introduced by David Mainwaring, Heritage Marine, P.O. Box 554, Dept. S-2, Needham, Mass. 02192. The model was specially designed by the distinguished naval architect Henry A. Scheel of Rockport, Maine, for David L. Mainwaring. The Scheel 50 sails with stability and speed in winds over twenty knots while carrying a full 1000 square inches of sail. Henry Scheel is among the tiny handful of naval architects who have designed specifically for radio controlled model sailboating. He has a national reputation as the result of his many successes in big boat design, but his Scheel 50 is neither merely a scaled down version of a larger craft nor merely an adaptation. It is a brand new design intended exclusively for radio control model sailing. The Scheel 50 is unique in having an integral fiberglass hull and deck. This means that all models that come out of the molds are identical ---

the problems a modeler faces in joining hull to deck and still meeting class specifications have been eliminated. The Scheel 50 is available as a ready to sail model (includes all radio equipment) for the skipper who wants a ready made boat which can be rigged and ready to sail in an evening. For the model builder the Scheel 50 is available in kit form. For a complete description and prices write to Heritage Marine at the above address.



RACE CAR CHASSIS

Leisure Electronics announces the availability of the phenomenal Model 100 Chassis in a stripped form sans electronics. This routed and computer drilled fiberglass chassis is the same one used by Team Leisure in the November 1-2-3 sweep of the Western Regional 1/12 Scale Stock Class Championships at Thorpe Raceway. Priced at \$65.00, it is a superb platform from which to build a 1/12 scale championship class car. For the gas enthusiasts, at least one example has been seen testing at Thorpe with excellent results. For further information contact Roland Boucher, Leisure Electronics, 11 Deerspring, Irvine, Calif. 92714.



DEEP VEE RACING BOAT

The Streaker: Here is a fiberglass competition Deep Vee that is both IMPBA & NAMBA legal. This fiberglass hull is designed for top performance, having already won two NAMBA District Championship Races in 1978. The deck installation with built-in rub rail makes for easy deck installation and super strength. The hull is designed to handle all 6.5cc engines available. Kit comes with necessary wooden engine rails, rear hatch, and uses a Steve Muck's R/C Boat 5" motor mount and competition Stern Drive set-up. Building instructions include page after page of photographs and building hints. Length is 39 1/2", width 10 1/4". For more information, contact your dealer or write Steve Muck's R/C Boats, 6003 Daven Oaks Dr., Dallas, Texas 75248, for Kit #58. □

SAVE THOSE PIECES

By Will Hicks

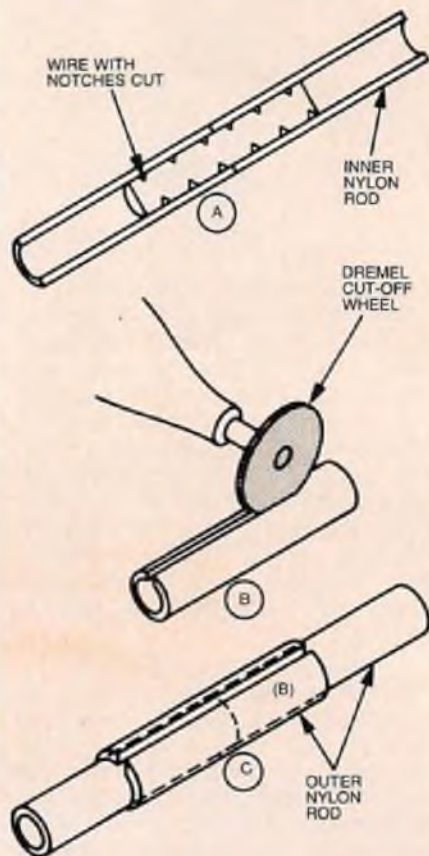
If you have looked around your shop and saw all kinds of odd lengths of plastic pushrods laying around doing nothing and collecting dust, here's an idea that will save you money on your next airplane and clean up the area.

Why not splice together odd sizes of plastic pushrod to make some useful working lengths. This includes inner and outer tubes.

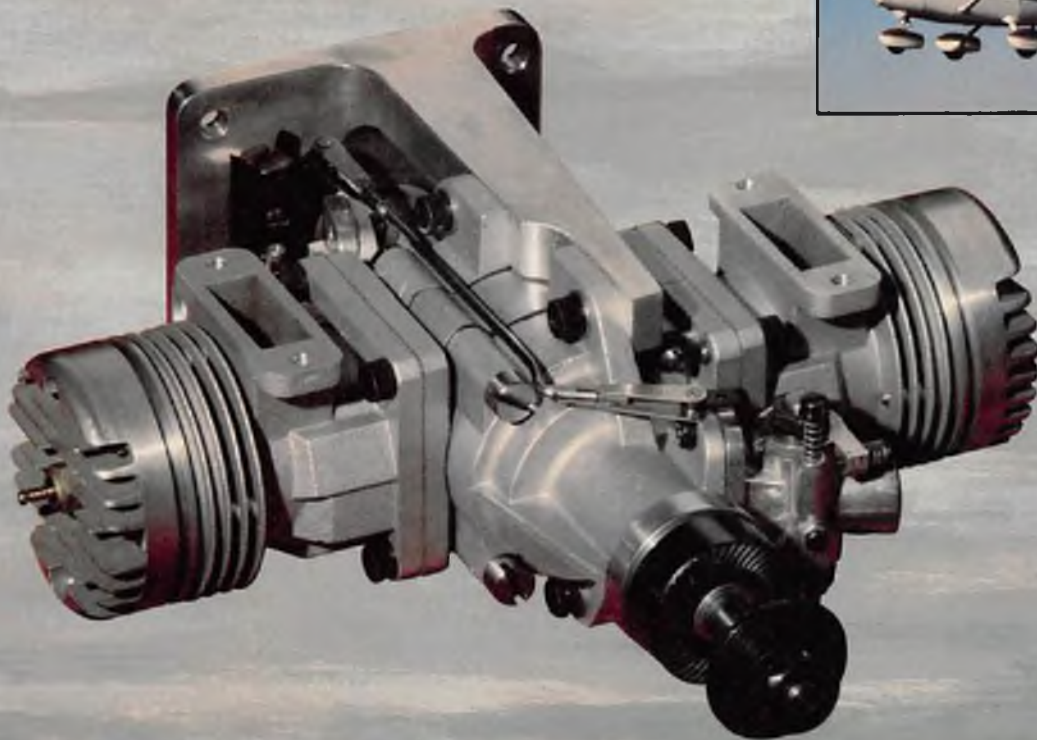
You will need a Dremel tool fitted with a cutting wheel, piano wire, Hot Stuff, micro balloons, and safety glasses.

Drawing (A) shows the inner rod. Find a piece of piano wire that fits snugly inside the rod and cut off a piece 3/4" long. Put on your safety glasses. Use the Dremel tool to notch the wire at random. Push one half of the wire into one piece of rod while putting micro balloons into the notches as the wire slips into the rod. Add another length of rod to the other end of the wire just like before. With the two pieces of inner rod butted together, add 2 or 3 drops of Hot Stuff at the splice. Capillary action will draw Hot Stuff through the micro balloons to make a firm bond. After the Hot Stuff has

to page 90



THE ULTIMATE IN RC FLYING FOX 20CC OPPOSED TWIN



The Fox Twin is the finest two cylinder model airplane motor ever produced. Every design consideration and manufacturing care has been taken to make the Fox Twin a really practical power plant.

The two cylinder opposed simultaneous firing configuration was selected because equal and opposite piston motions cancel each other out vibration wise and produces a smoother running configuration than the alternate firing in line motor. In addition, the opposed cylinder configuration cools better and fits most scale models better.

The cylinder configuration is of the most modern and advanced schneurle porting, featuring Fox exclusive angle side flow bypasses. The cylinder is glass hard and the pistons are made of the hardest piston alloy available. The crankshaft is of hardened steel, and extremely massive compared to any other motor you have seen. The massive crankshaft construction was necessary because the terrific power of earlier experimental cranks twisted in two for conventionally proportioned shafts. The dual carburetion makes possible adjusting each cylinder for maximum power, a failing of most earlier

twins, where a single carburetor would result in one cylinder running rich and the other lean. Although the Fox Twin can turn a 17, 18 or 19 inch propeller faster than most chain saw engines of equal displacement, its true potential is achieved by letting it rev up. The result is the ability to fly your airplane in a realistic manner, using a scale type propeller, but if you are performance minded, then put on a smaller propeller and really move out. We recommend a 15-6 for average models.

Each Fox Twin is factory run at full power, assuring you that when you buy this and put it in your model, you can fly. The carburetor has been adjusted and synchronized for atmospheric conditions at the factory. Unless you are at a rather high altitude, no further adjustments should be necessary.



TWIN Fox Twin \$250.00

SPECIFICATIONS:

Bore907
Stroke837
H.P. (at 14,000 RPM)3 plus
Weight2# 8oz.

Standard accessories: Firewall type motor mount, carburetor interlink, fuel line "Y" fitting.

For More Information - Call: 1-501-646-1656.

WHAT'S SO GREAT ABOUT THE PERRY PUMP AND PERRY PUMP CARBURETOR? HERE'S WHAT:

"The Pump and Carb work extremely well and I am very pleased with it."

"I have a Perry Pump/Carb on a Veco .61 which works fine - greatest thing since the glow plug!" - P.W., Alabama

"I have gotten great satisfaction from your carburetor."

"I always knew the S.T.G. 60ABC was a good engine but with the pump it will out perform any Speed Webra in D.C.R.C." - J.M., Maryland

"Thanks for a fine product... is very impressive." - H.M., Canada

"I really believe you have a fine product here. The increase in performance is incredible." - R.R., New York

"I recently installed your pump system on my Webra Speed .61 and was very pleased. The engine gained about 600 rpm." - C.S., Canada

"The engine performs beautifully and the Perry carburetor seems to be working flawlessly." - W.S., Illinois

"And I must tell you the pump and regulator have worked very good. The rpm increases 1000 rpm on my OS FSR." - E.T., Sweden

"Love that pump."

"... also my thanks for the pump won at the Omaha contest." - E.C., Kansas

"... and let me compliment you on a piece of equipment that does more than even your advertising claims." - P.H., New Mexico

"I was so pleased with its performance that I wish to order another set."

"I want to tell you that when I installed this pump and carb on my old Veco '72, I had the sweetest running, highest revving engine in the area." - P.H., New Mexico

"I have been flying my O.S. Blackhead .60 for nine months with your pump and carburetor. It has increased the engine's performance a noticeable amount and I have become very dependent on it." - E.M., APO S.F.

"I think the pump is the best thing to come along since canned beer. Keep it up!" - P.W., Alabama

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1978 WINS

1st - Mint Julep
1st - Crittendon, KY
1st - Lexington, KY
1st - Celina, OH
2nd - Nashville, TN
2nd - Milwaukee, WI
2nd - Chicago Expo

Basic Kit: \$34.95
Deluxe Kit: \$109.95

BASIC KIT INCLUDES: Fiberglass fuselage with bulkhead installed and molded in line, foam wing and stab cores, L.G. blocks and wires, nose gear wire, 4" fiberglass tape, plans and instructions.

DELUXE KIT INCLUDES: All above plus all belts and hardware, fiberglass wingtips, hinges, fiberglass push rods, aaron linkage, prop link, L.G. struts and screws, wing belts, all control horns, nose gear steering arm and Du Bro throttle linkage.

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AMA & FAI PATTERN DESIGN



ACCURATE THRUST LINE
AND INCIDENCE MARKS
MOLDED ON FUSELAGE

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WING SPAN - 64"
WING AREA - 670 Sq. In.
MOTOR - .81 Cu. In.
WEIGHT - 8 To 9 Lb.

Designed and
Distributed by:

Paul Clements
KITTY HAWK
MODELS

P.O. Box 104, #104

Phone (812) 723-3601

SAVE THOSE PIECES

from page 88

flashed, pull test the splice. During the pull test, remember pressure of approx. 3 lbs. is enough. Most aircraft will not exceed this amount at the flight controls.

Next, take a piece of outer rod 3/4" long and cut it lengthwise with the Dremel tool (B). Again, don't forget the safety glasses. Butt two pieces of outer tube together and put part (B) over them and center (B) over the butt line. Flow Hot Stuff all around (B). This makes a nice neat splice (C).

There, you have a length of plastic control rod that can be used for rudder control or nose gear steering. I've used this splice method in fun fly type aircraft and 1/4 midget's. To this date, there have been no failures.

Give the splice a try. I'm sure you'll be pleased with the results. □

CAN YOU DISC IT?

from page 79



View showing spring hold-down clamps for motor.

I got along without it. A disc sander is one of those things that you put off buying or making but when you finally get one you use it constantly. So why don't you give it a try. Yours may cost more than \$2.00, but even if it costs \$20.00, it's still half the price of a commercially available type. You might have to improvise a bit, but with some digging and a little of that modeler's ingenuity you should be able to come up with a nice little unit, and something you'll be damned glad you put the effort into.

The adapter to attach the disc to the motor shaft is made from a cut-down squirrel cage blower with all the vanes removed. The motor should run at about 1800 RPM. Anything faster will burn the wood. The type of motor hold-down will depend on the type of motor you use. I used a very old style large typewriter motor. You can buy small motors of 1/12 or 1/20 hp in the hardware store for about \$10.00. All parts are made from plywood unless noted. □

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For FF or RC OLD TIMERS

Get 'em up with power and then the beauty of flight is riding a thermal. All kits conform to S.A.M. rules.



- Quaker, 54" \$21.99
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Bolink 1/12 Scale ELECTRIC CAR

Assembled! Slick and ready to run with .05 motor, NiCads and charger. Instant excitement!



plus KP2AW RADIO **\$168.99**

Midwest AXIFLO DUCTED FAN

Throttle capability determined by engine. Assembles easily. Operates with or without tank pressure.



\$33.56

Rhom RETRACTS

Dependable retraction and extension, no balance springs needed. Fit minimum 1" wing thickness.



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- .19 R/C \$30.99
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- .40 R/C w/pump \$57.00
- .61 R/C w/muffler \$54.99
- .61 R/C w/pump & muffler \$69.99



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Smith MINIPLANE

KADET with ailerons \$27.95

\$38.45

KOUGAR \$33.25

Beginner or expert, fun or competition, whatever your pleasure, Sig has a kit for you! Great planes with proven performance. Excellent plans with lots of pictures make your building easier and faster.

NEW

Prather DEEP VEE BOAT

Designed by George Campbell

For Sport or Racing

- Epoxy fiberglass hull
- Factory joined deck & hull
- Plywood bulkheads
- 3/8" hard maple motor mount rails

\$79.99

plus postage

The ability of a deep vee to take rough water will deliver consistent performance whether you're racing in competition or just showing-off for the spectators. Prather's Deep Vee has the ability to compete in a variety of racing events — in more than one class!

Strong, warp resistant fiberglass construction. Hull & deck factory joined for ease of assembly and true alignment. 40" length, for .40 to .65 engine. Racing Class — Deep Vee .40 or .65, Mono .40 or .65.

Running Hardware Kit, \$41.98 Hatch Cover, \$16.99

UGLY STIK

\$41.99

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Craft-Air-ready-to-use FIELD SUPPORT BOX

\$19.99

No paint or glue needed. Easy to clean.

Made of hi-density polyethylene, practically indestructible. Bright yellow, holds all your goodies.



The building season is here!

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| 1/4x3x36 | 15@ .67 | \$10.05 |
| 5/16x3x36 | 10@ .88 | \$ 8.80 |
| 1/2x3x36 | 10@1.02 | \$10.20 |
| 3/8x4x36 | 20@ .66 | \$13.20 |
| 1/2x4x36 | 20@ .68 | \$13.60 |
| 5/8x4x36 | 15@ .81 | \$12.15 |
| 3/4x4x36 | 15@ .89 | \$13.35 |
| 1/2x4x36 | 10@1.07 | \$10.70 |
| 5/8x4x36 | 7@1.40 | \$ 9.80 |
| 3/4x4x36 | 6@1.85 | \$11.10 |

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Super Hero Balsa Assortment

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- 3" (20) 1/16x36 (4) 1/8x36
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with **KRAFT KP4A RADIO** all NiCad w/3 servos

\$249⁹⁹



A just-a-jig Full House

Build accurate wings fast & easy. Adapters convert to fuse-jig. **\$39⁹⁹**

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Deluxe

Get precise angles on any sandable material. Sands dihedral angle into center sections of foam or built up wings. Performs butt & edge bevel, square up, edge straighten, sheet & spar splice and more. Easy to build kit.

SUPER SANDER

3 Sizes Aluminum tube with handle. E-Z Flex Metalite Cloth bonded to bottom. Easy to guide.

1-ft. . \$ 3.96
2-ft. . \$ 9.99
3-ft. . \$10.99

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What you need to make your building easier and better. Other models in stock at money-saving prices.

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Assembled, instant load **\$3⁶⁶**

Exploding Bombs **2 for \$7⁶⁶**

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Super resilient, polyurethane finish. One-step system, lightweight and fuel proof. Formulated to meet the modeler's exacting needs.

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\$31⁹⁹

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Stable, maneuverable for fun 'n learning. Foam wing, Krome Coat covering, formed landing gear, hardware package in kit.

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For .19-.35 engine

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71½" span sailplane kit with everything except glue, covering & radio. Flat bottom airfoil.

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\$28⁸⁸

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Reliable, rugged and easy to fly! Beefed-up version of original Falcon 56 — you'll love it. Full size plans.



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Sporty plane capable of full pattern maneuvers. Redesigned for added beauty and strength. Symmetrical airfoil wing and ailerons; aileron hardware in kit.

Calling the HM is like shopping over the counter-use your MasterCard or Visa, we pay postage.



Sig **KIWI** plus Fox .36 R/C **\$53⁹⁹**

Muffler extra

M.E.N. TRAINER plus Fox .19 R/C

\$44⁹⁹



Muffler extra

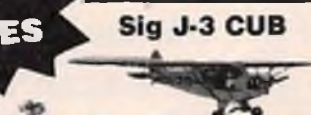
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Transparent or opaque



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Southern R/C ALLEY KAT plus Fox .36 R/C **\$59⁹⁹**

Muffler extra



SILENT SQUIRE plus 2 rolls EconoKote **\$36⁹⁹**



Sig SCALE

| | |
|---------------------------|---------|
| Citabra | \$45.45 |
| J-3 Cub | \$31.45 |
| Clipped Cub | \$31.45 |
| Liberty Sport | \$50.75 |
| Skybolt | \$48.95 |
| Cessna | \$52.45 |
| Cessna Window Kit, \$2.95 | |
| Chipmunk | \$45.45 |
| P-51 | \$43.75 |

HB ENGINES

Steady power for smooth maneuvers

| | |
|---------------|---------|
| .12 R/C | \$27.99 |
| .15 R/C | \$30.25 |
| .20 R/C | \$35.15 |
| .25 R/C | \$39.20 |

Above prices include muffler

40 PDP*

.61 PDP*

*Muffler \$7.15 extra

Manifolds & pipes in stock

C.B. Associates SCALE TAIL WHEEL



\$5⁷⁵

Scaled to fit .60 powered biplanes. Spring leaves may be added or subtracted for heavier or lighter airplanes. Spring steering is positive up to about 65° angle.



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| | |
|---|---------|
| Legionair 100, biggest standard class | \$57.99 |
| Legionair 132, middle size | \$72.00 |
| Legionair 140, 1978 TANGERINE WINNER | \$82.99 |



SHUTTLE

2 meter design with no carving or complex building. Complete kit.

| | |
|-------------------|---------|
| Shuttle 78 | \$33.60 |
| Shuttle 100 | \$39.60 |
| Shuttle 132 | \$46.80 |

NEW FROM WORLD

SuperTigre and SG Racing Car



SuperTigre

1 - This latest G.80 Bluehead incorporates an ABC sleeve and aluminum piston with a pinned ring. The main advantage of this scheme is that it combines the thermal stability of the ABC engine with the non-critical fit advantages of the ringed engine to produce a powerful, smooth, long life engine. \$89.95.

2 - This is the very latest from Supertigre, working with SG, in a race car engine. This X-21 features the latest in simultaneous time Schnuerli porting. Note the big air cooled head fins. This engine is available, marked as the SG version, to fit the SG clutch and also available with the standard 1/4" x 28 thread shaft. Either engine is priced at \$84.95.

3 - The small engine is the X-11 plain bearing. The larger engine is the X-40 front intake rear exhaust ABC ring. We have distributed a sample shipment of the new X-40 front intake and are expecting a large shipment of the X-11 about the third week in March. The X-11 is \$37.85 and the X-40 is \$84.50.

SG Race Car

4 - RALLYE 235 GT. This semi-scale kit features a thick ABS fuselage, pre-covered veneer wings, and a very complete hardware package including fuel tank, hinges, control linkages, glue, motor mount, and wheel pants. Span: 59"; weight: 5 1/2 lbs.; length: 37"; engine: 30-40; wing area: 512 sq. in.; radio: 4 Channel. \$144.95.

5 - SG FUTURA III RACE CAR. This is SG's best competition 1/8 scale race car. The kit is complete with the SG X-21 race car engine, clutch, fuel tank, wheels, and tires. This combination should yield a very competitive car for the coming season. \$265.00 with engine. Bodies (not included in kit) are available in four types: McLaren M27, Lotus JPS, Wolf WR1, and Porsche 917/30K. All parts, including different gears, are available from World Engines.

6 - ALPHA. A semi-scaled motor glider, with the same basic features as the Rallye 235 GT and, likewise, an absolutely beautiful kit. Span: 90"; weight: 4 1/2 lbs.; length: 44"; engine: .15; wing area: 729 sq. in.; radio: 4 Channel. \$124.95.



World Engines

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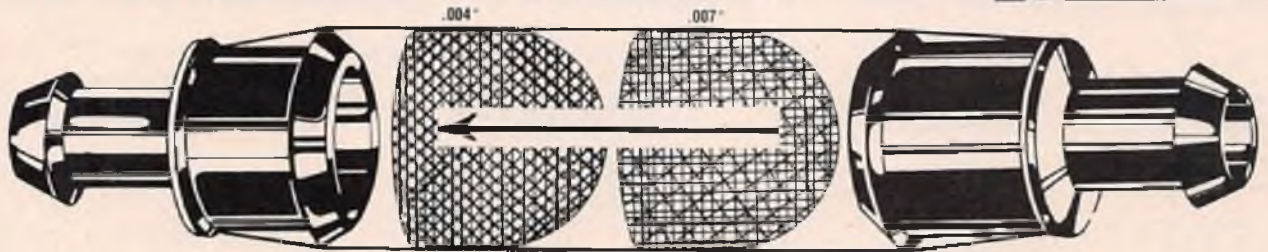


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Have you discovered super Sulli-Cone fuel tubing yet? It is something else.

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SCALE VIEWS

from page 75/74

mail-order business, not a store. I suspect that Dick Seeley, the proprietor, is basically an avid aviation collector who deals in magazines as a way of

having custody of a really big library. His collection has 20,000 issues, about 2,000 of them are pre-1940 dates. In addition to the magazines already mentioned in the preceding item, Dick also has Wings, Air Power, Popular Aviation, Sportsman Pilot, Sport Aviation, Air Tech and the American Aviation Historical Society Journal among others. Also available are many foreign publications valuable to scale

builders --- Koku Fan, Flying Review, Flight, Air Pictorial, Aeromodeler, Aireview, Aircraft Illustrated, and more. Of special interest is his collection of Profile Publications, those ready made scale presentations, now out of print and very hard to find in the earlier editions. Prices range from \$10.00 each on older magazines on down to \$1.00 each for recent issues. Send him a
to page 100

NEW!

Prather
Deep Vee

Designed by George Campbell

FEATURING...

- Factory joined deck and hull
- Epoxy fiberglass hull
- 3/8" hard maple motor mount rails
- Plywood Bulkheads
- Foam Flotation
- Complete Instruction Booklet with Photos

AVAILABLE SEPARATELY:

- Running Hardware Kit
- Hatch Cover
- Rudders
- Flex Cable and Stub Shaft (.150" and 3/16")
- High Speed Bearings (Thrust and Needle)
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SPECIFICATIONS:

Length - 40"
Engine - .40 to .65
Weight - 8-9 lb.
Racing Class -
Deep Vee .40 or .60
Mono - .40 or .60



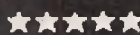
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Special
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- 3 ch. kit...\$49.95 4 ch. kit...\$52.95
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NEW! NEW! NEW!



"Johnny Casburn"
Power Panel
Reg. \$39.95
Introductory Price \$28.95



Pylon Brand Starter
Std. \$26.95 Delux \$29.95



Taylor & Co
Power Pacer
Super Sale \$49.95

After more than a year in development, Casburn Kits is introducing the new Funette trainer. The flying ease of this new bird is unbelievable, and is matched by the ease of assembly. An excellent "first bird", the Funette will allow most new RC'ers to solo in half the time it took before. The Funette is destined to become the all-time classic trainer.

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- 600 Sq. in. 90% pre-built Balsa covered wing
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- Only join wing halves, add cap strips and tips
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- A truly "forgiving" trainer — requiring only 3 ch. operation to have .40 size flying ease

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10% NITRO CONTENT \$6.98 per gal. in cases (4 per case); \$7.98 single gallon. 15% \$7.98 per gallon in cases. Shipped Freight Collect. We use UPS when possible.

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- OS 40 SR with muffler 74.95
- VECO 61 with muffler 59.95
- KB 40 44.95
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- Webra Speed 129.95
- OS 60 SR with muffler 84.95

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EWH Super Hustler complete with 6-bolt prop hub transistor ignition and much more **\$179.95**

NEW QUADRA ENGINE - 2 cycle, 2 cubic inches, 2 HP, comes complete with Prop. Adapter, engine mount, muff. Pump type carb. \$121.50
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- The finest German Precision Craftsmanship with PDP (Perry Directional Porting)
- .12 \$32.95
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- .40 PDP 64.95
- .61 PDP 84.95

(All engines have ball bearings. Add \$7.98 for .40 and .60 mufflers.)

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Texas residents add 5% Sales tax
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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 February 1979 issue.

APRIL WINNERS

SECOND PLACE

Bryan Booze
Bloomington, Indiana

This Skybolt was constructed from a Sig kit by a 15 year old modeler. The Skybolt has a 51" span, weighs 8 lbs., and uses a Super Tigre .60. Bryan flies it with a World Engines Expert 5 channel radio. An exceptionally attractive biplane.



THIRD PLACE

Harold E. Cullens
Yuba City, California

A nostalgic Albatross, an R/C assist Old Timer, built from plans from John Pond's Old Time Plan Service and a partial kit from Schmidt's Custom Kits.

Sporting an 80" span, weighing 3 lb. 5 oz., it is powered by a Super Tigre 35 G21 engine. Fuel shut-off, rudder and elevator control is provided by a Cirrus Sport Three from Hobby Shack. Covering material is transparent orange Kwik Kote from Hobby Shack.



FIRST PLACE

Edward W.G. Morgan
Brockville, Ontario, Canada

A scratch-built Messerschmitt BF 109EF constructed of balsa and loam, has 81 1/4" span, weighs 7 lbs., and is powered by a Super Tigre G 60 Blue Head. Camouflage colored dope is applied over Super Coverite for finish. An Orbit 72 five channel radio is used for control.

SCALE VIEWS

from page 98/74

self-addressed stamped envelope when requesting a copy of his catalog list or with inquiries about specific title availability. If a desired magazine is not

available, he will put you on a waiting list and try to get it. All copies sold are double checked as being complete and intact before shipment. You can contact Dick by phone any weekday after 4:30 p.m. Pacific Time or anytime on weekends. The number is (206) 943-8316. Arrangements can be made

to come in person if a prior appointment is made. Incidentally, he also carries a line of photos taken by aviation photographer Edgar Diegan that were formerly sold through the concern known as Airbooks.

Mil-Air Publishing, 11809 S. Albutis Ave, Norwalk, Calif, 90650. Harry "The Aviation Bookie" Miller is another collector of long standing who has slowly graduated into handling back issue magazines. He is presently warehousing his vast collection of books, magazines and photos in hangars at the Compton, Calif. airport, and is in the process of sorting, indexing and shelving them to make it possible to locate items quickly. In addition to all of the magazines previously listed earlier, he also has Air Aces, Aircraft Age, Air World, Scale Models, Scale Modeler, Model Art, AOPA Pilot, Sport Flying, Western Flying and more. Many date back into the 1930's. Harry does not have a printed catalog yet. Send him your want list along with a stamped self-addressed envelope. He'll reply as to availability and price. Call before coming in person, his hours at the airport are irregular. Phone either (213) 863-5028 or (213) 632-8081. He thinks he may have one of the largest collections in the world. If you were at the Riverside Nationals you may have run across his Aviation Bookmobile, a sort of

to page 112



REALISM! SCALE ACCESSORIES

RADIO CONTROL
CONTROL-LINE
FREE-FLIGHT

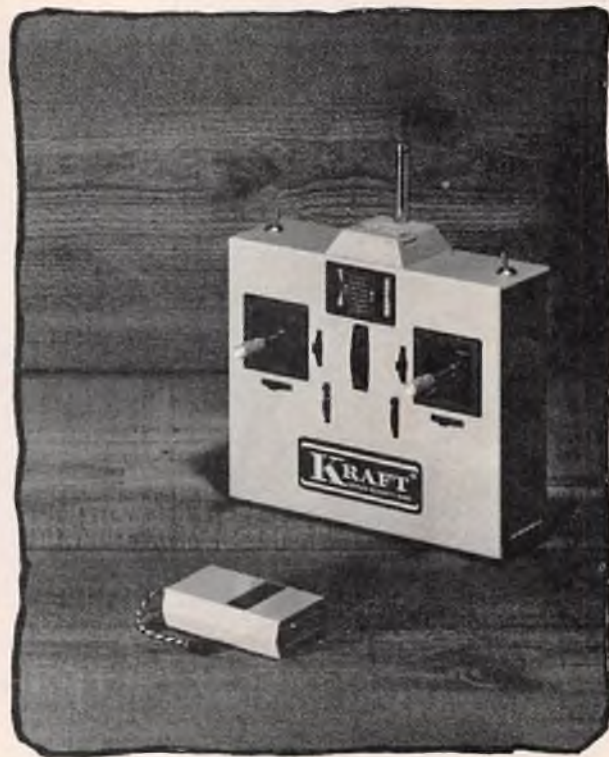
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Pioneers



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Continued development led to other significant breakthroughs. In 1964, our KP-4 introduced the age of reliable digital radio control. It was simply the best you could own, and it was backed with the superior design and high quality that had come to be associated with the Kraft name.

In 1968, our Gold Medal Series brought simplicity, miniaturization, and lower cost to the average enthusiast. It was the most popular system of its day, and is now considered to be an R.C. classic. Nineteen Seventy-five brought the world's first programmable R.C. system designed for the competitive modeler, Phil Kraft's Signature Series. The 1976 Bicentennial Series was the first to

feature interchangeable frequency modules, making easy frequency changing in the same band or to all frequencies in other bands a reality. In 1977, we built the world's smallest and lightest servo, the KPS-18, which set a new standard in miniaturization. Last year, we developed an FM receiver and transmitter module for present and future applications.

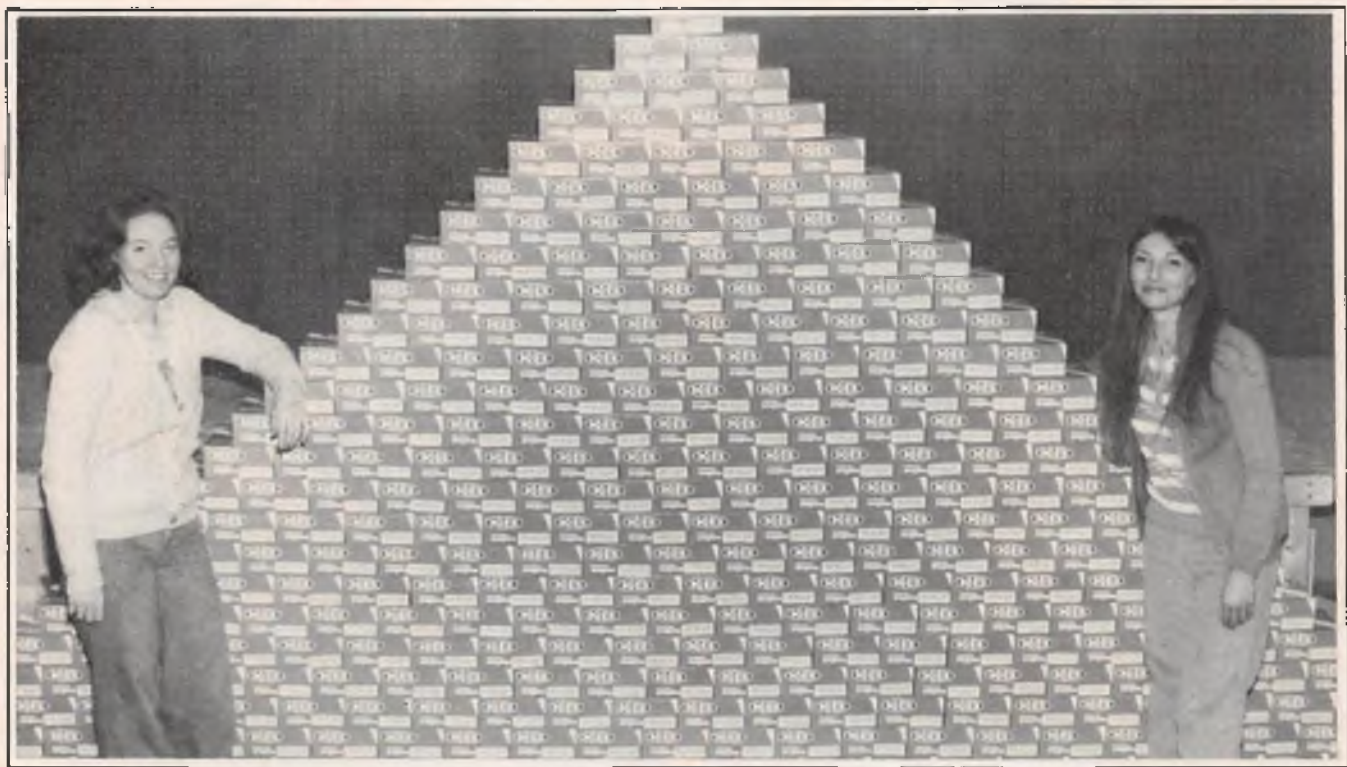
Today, our Series '79 and Sport Series systems are a culmination of 20 years' design experience and innovation. We offer seven different systems with a wide range of components and accessories. Kraft continues to stand for progressive design, quality, reliability, and service. As a demonstration of our confidence, all new systems are covered by a one-year limited warranty. Write for a free catalog.

Remember, we've been leading the way since 1959!

450 W. California Avenue
P.O. Box 1268, Vista, California 92083
(714) 724-7146

KRAFT
SYSTEMS, INC.

TOWER IS INVENTORY !



Here are Jo Ann Felty (left) and Shirley Montague (right), our Warehouse Managers, showing you the largest inventory of K&B .61 RC Engines in the World (at the time the picture was taken). If you think that looks like a lot of engines, YOU'RE RIGHT! We have over 5,000 engines of all different types in stock at any given time. It's this in-depth stocking that assures you that if anyone has what you're looking for - it's Tower Hobbies!

WORLD'S LARGEST RC INVENTORY! Right now Tower Hobbies has over ONE MILLION DOLLARS of RC inventory in stock. Our 29,000 square foot facility is just loaded with over 3,000 different items from over 130 manufacturers. We specialize exclusively in RC oriented products so that we can give you the best selection and the best service possible. No matter what your RC needs are, we have it! You can enjoy the convenience of shopping at the World's largest RC hobby shop while never having to leave the quiet comfort of your own home. We're as close as your TOLL FREE telephone or mailbox.

YOU NAME IT - WE HAVE IT! At any given time, we stock over 1500 radios of many different frequencies, brands, and gimbal stick configurations - from single channel to seven channel. We stock over 120 different types of engines. We have thousands of airplane kits and all of the accessories to go with them; whether you want 1/8A, racers, trainers, pattern kits, scale aircraft, pylon racers, biplanes, sport planes, multi-engine planes, or gliders. We carry kits made of wood, foam, or fiberglass. We stock helicopters, over 20 different cars (gas and electric), and over 50 different types of boats. Plus, we warehouse tools, coverings, adhesives, batteries, chargers, starters, hardware kits, paint, etc. EVERYTHING YOU NEED!

WE STOCK IN DEPTH! There's only one reason why we have over ONE MILLION DOLLARS of RC inventory in stock - so when you want it, we have it ready for immediate delivery. We all know that sometimes demand simply exceeds availability, and no matter how much you may want something, sometimes it just can't be found. We make every possible effort to have it for you. With our tremendous buying power, we're able to buy huge production runs of hard-to-get items whenever they're available. We frequently purchase up to a one year's supply of some items so when you want it, we have it! And we won't ever tell you "If we don't have it, you don't need it". We don't make excuses; we go to absolute extremes to make sure that we DO HAVE IT!

FOR YOU! Our customers are, by far, the most important priority here at Tower Hobbies. We fill one order at a time, and when we're working on YOUR order, that's the most important consideration we have! When we're working on your order, all of our resources are here just for you, so you can get what you want, when you want it, at the lowest possible price. When you think RC, think Tower! Call us today (TOLL FREE) for all of your RC modeling needs!

TOWER HOBBIES IS THE ONLY RC COMPANY YOU'LL EVER NEED!



TOWER HOBBIES

P.O. BOX 778 CHAMPAIGN, ILLINOIS 61820

217-384-1010

CONTINENTAL UNITED STATES (EXCEPT ILLINOIS):

800-637-7686

ILLINOIS RESIDENTS ONLY:

800-252-3336



TOWER HOBBIES

P.O. BOX 778 CHAMPAIGN, ILLINOIS 61820

\$\$ SUPER SPECIALS OF THE MONTH \$\$

The following Tower Hobbies pages represent super savings for you on hundreds of popular items; specially selected for you from our huge, several thousand item inventory. This page gives you complete information on how to place your order with Tower Hobbies, and how to obtain any other information that you may need relative to that important purchasing decision.

The special stock numbers must be used for the super special prices to be honored. Tower will do everything possible to keep all special items in stock throughout the special; however, if necessary, Tower reserves the right to cancel and/or place limits on any or all items. For your convenience, Tower will accept backorders for only those items which we will be able to deliver within a reasonable amount of time. All of our super special prices are subject to change if the manufacturers retail prices change during the sale period.

HOW TO ORDER FROM TOWER

Ordering your modeling supplies from Tower Hobbies is just as fun and easy as sitting in your favorite lounge chair. You'll never have to worry about fighting a crowd, and when you deal with Tower Hobbies you're always assured of getting low, low sale prices, the best selection, and the best help and advice that you can possibly get ANYWHERE in the world. There are two easy ways to order:

BY TOLL FREE PHONES

When you place your order over the phone we will ship it to you C.O.D., and you pay for it when it's delivered to your door.

When you phone in your order, please have the stock numbers written down ready to give to the order taker.

800-637-7686 CONTINENTAL UNITED STATES (EXCEPT ILLINOIS)
800-252-3336 ILLINOIS RESIDENTS ONLY

The "800" WATS lines are open weekdays from 9:00 A.M. to 5:00 P.M., Monday through Thursday evenings 5:00 P.M. to 9:00 P.M., and 10:00 A.M. to 5:00 P.M. on Saturdays. Closed Friday evenings and Sunday.

BY MAIL ORDER

If you have a Tower order form, please use it. If not, then just use any piece of paper or stationery. Write down all of the items that you want along with their special stock numbers and prices. Total them up (Illinois residents add 5% sales tax) and add \$2.00 for postage, handling, and full insurance, to obtain the grand total. Obtain a money order, certified check, bank check, or write a personal check for the grand total amount (personal checks may be delayed to allow for clearance). Foreign orders add \$10.00 (excess will be refunded with order). Date of postmark determines special period eligibility. Send your order along with full payment to:

TOWER HOBBIES
P.O. BOX 778
CHAMPAIGN, ILLINOIS 61820

HOW TO GET INFORMATION FROM TOWER

The following list gives our other phone numbers and a brief description of why and when to call them. Please write these down for future reference, or just save this page.

217-384-1010: This number can be used by anyone from anywhere in the world to PLACE AN ORDER with our phone sales staff. Primary useage comes from foreign customers or from Alaska, Hawaii or Puerto Rico, however, anyone can use it.

217-384-1097: This number is a HOT LINE direct to the desk of Bill Baxter, who is our resident RC expert. If you have a technical question or a problem you need help with then call Bill on this number. It is answered on Monday through Friday from 9:00 A.M. to 5:00 P.M. only.

217-384-7217: This number is a HOT LINE direct to our main office. If you should have a question about an order such as when it was shipped, then call this number. Our office staff will immediately look up whatever you need to know and give you an instant answer to your question or problem, Monday through Friday, 9:00 A.M. to 5:00 P.M. only.

TOWER CATALOG!

The Bible of the RC hobby! ANYONE interested in the RC hobby should have this catalog! It's the finest available, featuring 294 exciting, fully illustrated pages of over 3,000 RC items from over 130 manufacturers at super discount prices, including all of the latest RC products. It's filled with helpful information, and is complete in every detail. Get it free with your first order, or send \$1.50 today!!



TOWER HAS EVERYTHING!

You can count on Tower for all of your day to day modeling needs, as well as a one stop source of full information. Think of Tower the next time . . .

- ... You need new product information
- ... You want to check on current prices
- ... You need to know current availabilities
- ... You want super last service
- ... You want to save money on all of your R/C needs
- ... You want to do business with the BIGGEST AND THE BEST!

ORDERING INFORMATION GUIDE



TOWER

P.O. BOX 778
CHAMPAIGN, ILLINOIS 61820

EVERYTHING YOU WANT!

TOWER IS DEDICATED TO OFFERING YOU THE VERY BEST VALUE AND SERVICE THAT IS POSSIBLE! IN KEEPING WITH THIS PHILOSOPHY, WE HAVE RESEARCHED THE INDUSTRY WITH PAIN-TAKING CARE TO FIND OUT EXACTLY WHAT YOU WANT IN A RADIO CONTROL SYSTEM.

YOU WANT QUALITY! That's why we took our Radio Control System Formulas exclusively to Kraft Systems, Inc., of California to be manufactured to our exact specifications. Kraft quality is absolutely unparalleled by anyone else in the world. Kraft's outstanding success is attributed to their experience, high standards for materials and production, and quality control systems. Kraft means quality in every detail. For example, our rugged servos are made of tough ABS plastic which helps them live longer. Our sockets are gold plated beryllium copper, crimp connected to machine-cut and stripped wire to assure you reliable conductivity. The plastic plug body extends over the wiring insulation to prevent stress at the junction between the pin and the wire. Not only is this wiring method inherently more reliable than soldered connections, it also insures uniform quality. Tower Hobbies is the most reputable RC distributor in the business. Tower Hobbies and Kraft Systems make an unbeatable combination! Just ask any one of the thousands of modelers who own one of our fine digital proportional radio control systems!

YOU WANT VALUE! Tower Hobbies radios give you absolutely the maximum amount of radio for the least amount of money -- and that's value! There is nothing cheap about a Tower radio. The design is the latest, the manufacturer is the finest, the quality is peerless, and the service is second to none. So how then can the price be the lowest in the industry? Simple. Tower's tremendous buying power allows us to create economies due to volume -- and there are no middlemen between us and the manufacturer to artificially jack up the price. You're paying the bottom dollar price for the top of the line product.

YOU WANT PRECISE, TOTAL CONTROL! All of our receivers have double tuned R.F. sections to minimize harmonic type interference and all have special noise rejection circuitry permitting their operation even under the most adverse conditions. Both Tower systems feature a dual function meter that allows you to check RF and absolute battery voltage. This allows you to monitor your flying time and to check for possible cell malfunction. This deluxe feature is usually found only on systems in the \$500.00 price range. All of our servos use an integrated circuit amplifier to produce centering and tracking accuracy better than 1/2%, virtually zero drift with changes in temperature and voltage, uniform duty cycle in both directions, smoothness, and excellent damping characteristics. The reference potentiometer element is driven directly from the output drive. This is extremely important for servo accuracy! Our control sticks give you a true, accurate feel for precision flying, and the popular closed gimbal configuration protects the transmitter from the elements for a longer life. We were thinking about your desire for precise, total control when we designed our powerful, yet light weight airborne systems! This gives you greater maneuverability, and faster climbing, acceleration, and top speed potential.

YOU WANT PRESTIGE! Radio Control Modelers represent an artistic breed of people who demand quality detailing, and can appreciate the most subtle esthetic appeals. Tower radios were designed with this in mind, of course. There is just something very elegant about that rich ivory color accented with black trim pieces. That's in keeping with the total quality feel of Tower radios -- that first class feeling. With Tower Hobbies radio control systems you go first class in quality, performance, and appearance. When you show up at the field with a Tower radio, everyone will know that you're a person who demands only the finest value. Your choice of a Tower radio shows you're a smart shopper!

YOU WANT FLEXIBILITY! Tower radios will give you the widest range of applications and the greatest performance that you could possibly ask for. The top of the line Tower 6 channel system is perfect for all radio control applications from 1/8A to pattern ships. The top of the line Tower 3 channel system is perfect for small aircraft, gliders, boats, and cars; lightweight, yet very rugged. The Tower 6 and Tower 3 components are fully compatible with the previous Tower 5 model as well as the entire line of Kraft Systems radios (except for the "A" Series). This gives you the greatest accessory and feature availability in the industry -- interchange flight packs, servos, trays, output arms, or almost anything else from the Kraft line-up of outstanding products.

YOU WANT ASSURANCE! Even in consideration of the meticulous care that goes into every Tower radio, you know that nothing on Earth is truly perfect. Our Tower radio control systems are warranted against defects in materials and workmanship for 180 days from the date of purchase. There are six Tower Hobbies Service Centers across the United States authorized to perform warranty repair work. If you should need repair work after the warranty period, any one of dozens of Authorized Kraft Service Centers can perform such work for you.

ORDER NOW! Both systems are in stock for immediate delivery on the 72 MHz frequency of your choice. Call Toll Free right now for immediate COD delivery, or send your order in the mail along with the purchase amount plus \$2.00 for postage, handling, and insurance. If you are not 100% satisfied with your Tower radio after receiving it, then simply send it back in original condition within 10 days for a full purchase price refund.

HOBBIES

PHONE
(217) 384-1010

ILLINOIS TOLL FREE: 800-252-3336
CONTINENTAL UNITED STATES TOLL FREE: 800-637-7686



WITH THE PURCHASE OF A
TOWER 6, YOU CAN NOW GET
A FIFTH SERVO (1411 ONLY)
FOR ONLY \$14.98!
STOCK No. RCM206
LIMIT OF 1 SERVO PER RADIO.

ABSOLUTELY THE BEST
RADIO VALUES IN THE
INDUSTRY!

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 four KPS-14 or KPS-15 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 the 14's and 13.5 ounces with the 15's.

With KPS-14's - ONLY \$199.95 (Stock No. RCM205)

With KPS-15's - ONLY \$209.95 (Stock No. RCM121)



WITH THE PURCHASE OF A TOWER 3,
YOU CAN NOW GET A THIRD
SERVO FOR ONLY \$14.98!
STOCK No. RCM207
LIMIT OF 1 SERVO PER RADIO.

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

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THESE SPECIALS ARE GOOD UNTIL APRIL 15th, 1979, ONLY
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HOT STUFF 40% 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 \$2.38 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 ~~\$7.50~~ NOW ONLY \$3.88 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 ~~\$84.95~~ NOW ONLY \$59.48 RCM014

STERLING 39% OFF
1/2 A CORSAIR

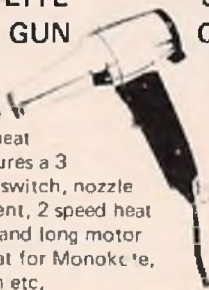


This all balsa 36" span kit features special hardware and decal sheet. Requires a .049-.10 engine and a 2 channel radio.

RETAIL ~~\$31.95~~ NOW ONLY \$19.48 RCM003

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 28% OFF
2 CHANNEL RADIO

28% 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. 11 pencil batteries are required.

RETAIL ~~\$99.95~~ NOW ONLY \$71.98 RCM105

FUTABA 30% OFF
FP-2GS 2 CHAN. RADIO

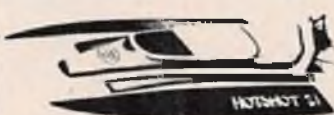
30% OFF



This is the least expensive 2 channel available anywhere. It comes with 2 servos and is ideal for cars, boats, small airplanes, or gliders. Works great in the Centurion or Sportavia. Requires 12 pencil batteries.

RETAIL ~~\$89.95~~ NOW ONLY \$69.98 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 ~~\$67.95~~ NOW ONLY \$44.18 RCM008

K & B 40% OFF
.40 RC ENGINE



The most popular .40 ever made! Features a Perry carb.

Quantities are limited. Limit of 1 engine per order until sold out.

RETAIL ~~\$72.50~~ NOW ONLY \$43.48 RCM009

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 ~~\$64.95~~ NOW ONLY \$45.48 RCM001

K & B 40% OFF
.61 R/C ENGINE



The most popular .60 engine in the R/C hobby!

This outstanding engine features a Perry carb and muffler.

RETAIL ~~\$96.50~~ NOW ONLY \$57.88 RCM012

ZAP ZAP ZAP ZAP 44% OFF



Zap is a Super Cyanoacrylate adhesive that is super fast setting. Large size comes with extra applicators. Limit of 6 per order.

RETAIL ~~\$3.50~~ NOW ONLY \$1.98 RCM013

DU-BRO 36% OFF
KWIK FILL FUEL PUMP

36% OFF



RETAIL ~~\$10.95~~ NOW ONLY \$6.98 RCM010

HOUSE OF BALSA 30% OFF
P-51D (.29-.40)



This all balsa sport, stand-off scale ship is beautiful. It has a 49" wing span and takes a .29 - .40 engine.

RETAIL ~~\$59.95~~ NOW ONLY \$41.98 RCM011

HOBBIES

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(217) 384-1010

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CONTINENTAL UNITED STATES TOLL FREE: 800-637-7686

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TOP FLITE SEALING IRON

30%
OFF



This sealing iron is great for covering with Monokote, Solarfilm, etc. It features adjustable temperature, teflon shoe, and a handy shape. Excellent quality.

RETAIL NOW ONLY \$13.98
\$19.95 RCM202

DREMEL MODEL 381 MOTO-TOOL WITH FULL ACCESSORIES

41% OFF



The Model 381 is the ultimate in hand grinders. It features variable speed control, ball bearings, and full accessories.

RETAIL NOW ONLY \$42.98
\$72.95 RCM015

MILLER No. 2017 SPRAY SET

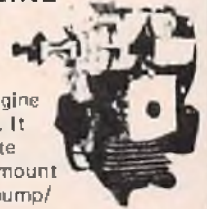
40%
OFF



Complete set includes a 12 foot air hose, compressor, spray gun, air brush, and nozzles.

RETAIL NOW ONLY \$46.78
\$77.95 RCM016

QUADRA 2 CUBIC INCH ENGINE



The perfect engine for the biggies. It comes complete with muffler, mount and Tillison pump/carb. Longlasting.

RETAIL NOW ONLY \$99.98
\$139.95 RCM017

DEVCON 5 MINUTE EPOXY IN ECONOMY 9 OZ. SIZE

40% OFF



Now in squeeze bottles for your convenience. Limit of 3 per order.

RETAIL NOW ONLY \$3.48
\$5.80 RCM018

DREMEL 572 MOTO SHOP

36%
OFF



This deluxe saw features a complete accessory set of blades, discs, etc. and flexible shaft. Limit of 1.

RETAIL NOW ONLY \$60.98
\$94.95 RCM019

GOLDBERG FALCON 56

40%
OFF



This all time best seller is now redesigned with allerons. 56" span. Uses a .15 - .35 engine, all balsa construction. An excellent trainer.

RETAIL NOW ONLY \$26.98
\$44.95 RCM020

ZINGER WOOD PROPS

35%
OFF



Two popular sizes—Stock up now on these high quality props!

10X6 WOOD PROPS(6)
RETAIL NOW ONLY \$5.48
\$8.40 RCM021

11X7 WOOD PROPS(6)
RETAIL NOW ONLY \$6.28
\$9.60 RCM022

POWER PACER BATTERY TESTER

22%
OFF



A new ni-cad battery tester, cycler, and charger. Works great!

RETAIL NOW ONLY \$46.98
\$59.95

RCM023 9.6 volt
RCM024 6 volt

GOLDBERG SKYLARK 56 MK II

40%
OFF



Fun to fly sport airplane with pattern capabilities. 56" span. .30 to .40 size engine, all balsa construction. New improved design!

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 \$23.98
\$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

20%
OFF



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 Car with Futaba FP-2F Radio already installed.
RETAIL NOW ONLY \$174.98
\$239.95 RCM113

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

35%
OFF

Features reel, tubing, towline, parachute, stake, tow ring, and strong construction. For sailplanes of 100" wingspan and larger.



RETAIL NOW ONLY \$27.88
\$42.95 RCM029

AIRTRONICS OLYMPIC II

30%
OFF



This 99.9" span trainer is capable of contest competition. All balsa with pre-cut parts. An excellent quality sailplane.

RETAIL NOW ONLY \$34.98
\$49.95 RCM030

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

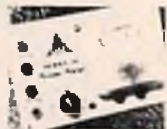


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**DA ENTERPRISES 36%
SERIES IV OFF
POWER PANEL**



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 \$22.48
\$34.95 RCM033

**BRIDI RCM 32%
TRAINER 40 OFF**



This popular all balsa trainer has a 52" span and takes a .35 - .49 engine. A high quality kit.

RETAIL NOW ONLY \$37.38
\$54.95 RCM034

**COX TD .049 38%
STD. ENGINE OFF**



A super hot 1/2A engine ideal for free flight, control line, 1/2A RC, and more.

RETAIL NOW ONLY \$12.98
\$20.95 RCM035

**DUNE BUGGY 25%
BUGGY OFF**



This unbelievably rugged kit can tackle the roughest course imaginable. Uses a 2 ch. radio and a .19 size RC engine. 17" length.

RETAIL NOW ONLY \$149.98
\$199.95 RCM036

**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

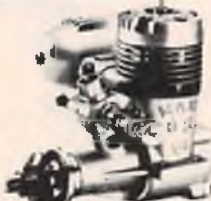
RETAIL NOW ONLY \$11.98
\$23.95 RCM037

12 VOLT BATTERY CHARGER

To go with your 12 volt motorcycle battery, or any other 12 volt battery, we now have this high quality charger that does a perfect job. Safe and easy to use. Works great with battery at left. UL approved.

RETAIL NOW ONLY \$6.98
\$13.95 RCM038

**O.S. MAX .20 RC 30%
W/MUFFLER OFF**

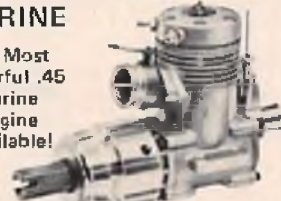


This reliable and long lasting RC engine is a favorite! O.S. Max engines are known for their high quality.

RETAIL NOW ONLY \$29.98
\$42.95 RCM232

**K&B .45 (7.5cc) 40%
RC SCHNEURLE OFF
MARINE**

The Most Powerful .45 Marine Engine Available!



Features ball-bearings, butterfly throttle, and a water cooled head. Its rotatable case permits changing of exhaust from forward to aft.

RETAIL NOW ONLY \$71.98
\$120.00 RCM238

**MARK'S MODELS 35%
WANDERER OFF**



This easy to build and easy to fly glider has a 72" wingspan. So stable it will fly free flight without a radio. Great for the beginner!

RETAIL NOW ONLY \$12.98
\$19.95 RCM041

**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

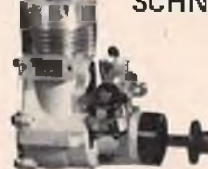
**BRIDI RCM 32%
TRAINER 60 OFF**



This popular all balsa trainer has a 58" span and takes a .40 - .60 engine. High quality, flies great.

RETAIL NOW ONLY \$42.78
\$62.95 RCM043

40% OFF FOX .45 RC BALL-BEARING SCHNEURLE



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 \$38.98
\$64.95 RCM044

**VK CHEROKEE 30%
OFF**



This semi-scale model features a 65" span and uses a .40-.61 engine. Full length die cut sides. A good-looking high quality kit.

RETAIL NOW ONLY \$48.98
\$69.95 RCM045

**O.S. MAX 30%
.25 RC OFF**



This popular and powerful engine comes with a muffler. Super value.

RETAIL NOW ONLY \$31.48
\$44.95 RCM261

**LANIER 36%
COMET II OFF**



This popular almost ready-to-fly features a 63" span and takes a .50 - .61 engine. Great trainer.

RETAIL NOW ONLY \$39.98
\$62.50 RCM047

**ASSOCIATED 39%
RC 200 KIT OFF**



See Tower Hobbies Catalog P. 118 for available bodies. 22" body length. Features ballbearings for rear axle & clutch, glass chassis, disc brakes. Kit comes complete less engine, body, and radio. Best gas car anywhere!

RETAIL NOW ONLY \$119.98
\$195.00 RCM048

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**K&B .40 RC W/
PERRY PUMP &
CARB NO. 8360** **40%
OFF**



Features Perry Pump/Regulator and a larger Perry Carb specifically designed to be used with the Pump/Regulator system. Adds 1000 RPM's!
RETAIL NOW ONLY \$62.98
\$105.00 RCM049

**ASSOCIATED RC 12E
ELECTRIC CAR KIT** **30%
OFF**



This rugged 1/12 scale race car kit is the ultimate in electric competition. The basic RC12E kit No. 3000 does not include motor, batteries, or body.
RETAIL NOW ONLY \$37.78
\$54.00 RCM245
Kit No. 3012 with engine and 6-cell batteries.
RETAIL NOW ONLY \$69.98
\$102.00 RCM246

**PICA
DUELIST 2/40** **35%
OFF**



This easy to fly, all balsa kit is an ideal twin engine trainer. 67" span. Uses two .23-.40 size engines and a 4 or 5 channel radio.
RETAIL NOW ONLY \$58.48
\$89.95 RCM051

**JENSEN DAS
UGLY STICK** **36%
OFF**



This all balsa kit is the ideal trainer. 60" span. Uses a .45 to .61 size engine and a 4 ch. radio. Very stable.
RETAIL NOW ONLY \$39.98
\$62.50 RCM052

**MRC PORSCHE
934 TURBO** **30%
OFF**



This electric RC favorite is 1/12 scale & 15" long. It features a high output electric motor, 2 forward & 2 reverse speeds, precise scale detailing, & a rugged ABS plastic body. Requires any 2 ch. radio.
RETAIL NOW ONLY \$45.48
\$64.98 RCM074

**MIDWEST
ATTACKER** **40%
OFF**



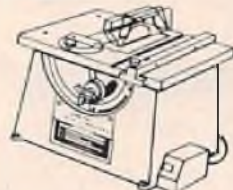
This all molded styrofoam kit builds fast and flies great. 48" span. Uses a .19-.35 engine. Very popular.
RETAIL NOW ONLY \$25.98
\$42.95 RCM054

A-JUSTO-JIG **33%
OFF**



This complete wing & fuse jig holds alignment within .1%. Allows you to make up to a 6 foot wing. Fuse jig fits on without tearing down your wing jig.
RETAIL NOW ONLY \$39.98
\$59.95 RCM055

**DREMEL 580
TABLE SAW** **39%
OFF**



Multi-purpose table saw especially designed for hobbyists. Rips, cross cuts, miters, straight cuts, dadoes.
RETAIL NOW ONLY \$60.98
\$99.95 RCM056

**MIDWEST
CARDINAL
A.R.F.** **35%
OFF**



This all foam trainer has a 46" span. Uses a 2-3 ch. radio, & a .049 to .15 size engine. Rugged and flies great.
RETAIL NOW ONLY \$21.38
\$32.95 RCM057

**STERLING
PUDDLE
JUMPER MK II** **38%
OFF**



This airboat has a plastic hull and cabin with balsa and plywood parts. It uses a 2 channel and a .15 to .35.
RETAIL NOW ONLY \$25.98
\$41.95 RCM058

**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 \$104.98
\$152.00 RCM244

**O.S. MAX .60 FSR
RC W/ MUFFLER** **30%
OFF**



This is a front rotor, Schneurle ported ball bearing RC engine that comes complete with a muffler. O.S. Max is known for high quality!
RETAIL NOW ONLY \$90.98
\$129.95 RCM243

**BRIDI
UFO** **30%
OFF**



The ultimate in pattern! This new release is .60 size with fiberglass fuselage and foam wings.
RETAIL NOW ONLY \$90.98
\$129.95 RCM061

**STAFFORD
TWIN
COMMANCHE** **30%
OFF**



This museum scale twin engine favorite is always in high demand. It's all-balsa, has a 72" span, and needs two .40 engines.
RETAIL NOW ONLY \$97.98
\$139.95 RCM062

**DUMAS BIG
SWAMP BUGGY** **36%
OFF**



This rugged and stable airboat runs on water, dry grass, or snow. Really moves out with a .40 and speeds with a .60. Lots of fun!
RETAIL NOW ONLY \$19.88
\$31.00 RCM063

**X-ACTO
No. 5087
KNIFE &
TOOL
CHEST** **30% OFF**



Contains Nos. 1, 2, & 5 knives, complete asst. of blades, gouges, routers; plus X-Acto planer, sander, hobby-craft saw, spokeshave, balsa stripper, pin vise, screwdriver, asstd. drill bits. Comes in a large fitted wood chest.
RETAIL NOW ONLY \$20.98
\$29.95 RCM004



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CHAMPAIGN, ILLINOIS 61820

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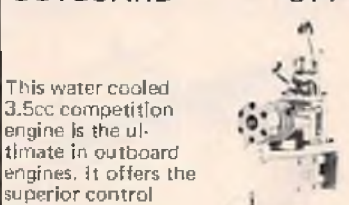
**ANDREWS
AEROMASTER** 35%
OFF



The world's most popular RC biplane! This balsa kit has a 52" span. Uses a .60 - .78 size engine and a 4 channel radio.

RETAIL NOW ONLY \$51.98
\$79.95 RCM065

**K&B .21
OUTBOARD** 40%
OFF



This water cooled 3.5cc competition engine is the ultimate in outboard engines. It offers the superior control characteristics of outboard drive.

RETAIL NOW ONLY \$59.98
\$99.50 RCM152

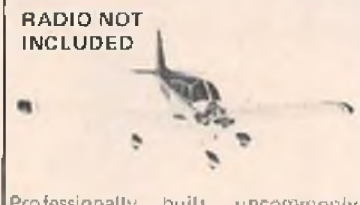
**FOX 1.2 CU. IN.
OPPOSED TWIN** 30%
OFF



One of the finest 2 cylinder model airplane engines ever produced! Develops over 3 horses! The Fox Twin is a smooth running power plant.

RETAIL NOW ONLY \$174.98
\$250.00 RCM234

**MRC RTF
CHEROKEE** 25%
OFF



RADIO NOT INCLUDED

Professionally built, uncommonly attractive. Made for the sport flier. 57.5" span. Comes with an Enya .40 engine with muffler installed. Uses a 4 ch. radio. Fiberglass fuselage.

RETAIL NOW ONLY \$314.98
\$419.95 RCM067

**MRC RTF
CESSNA** 25%
OFF



RADIO NOT INCLUDED

MRC's fine fiberglass Cessna trainer comes completely ready-to-fly. Requires a 4 ch. radio. An Enya .35 RC engine and fuel tank are already installed. 55" span. It can be in the air within one hour.

RETAIL NOW ONLY \$277.48
\$369.95 RCM068

**MRC RTF
HAWK TRAINER** 25%
OFF



You can be ready to fly this foam trainer within one hour. Comes with an Enya .15 engine already installed with muffler. Uses a 2 or 3 ch. radio.

RETAIL NOW ONLY \$73.48
\$98.00 RCM069

**MRC FMC
COMBAT VEHICLE** 20%
OFF



This 1/12 scale electric RC vehicle has 2 forward & 2 reverse speed control. Big output electric motor for indoor or outdoor quiet running. Excellent detailed scale! Requires a 2 ch. radio. 15" length.

RETAIL NOW ONLY \$59.98
\$74.98 RCM070

**MRC SHERMAN
TANK** 20%
OFF



Building is simple due to a complete manual containing about 50 photos, and exploded views. Requires a 2 ch. radio with 2 servos and 6 "D" size batteries. 14" length.

RETAIL NOW ONLY \$107.98
\$134.98 RCM071

**MRC LEOPARD
ELECTRIC TANK** 20%
OFF



18" length. Takes 40 degree inclines with ease. Movable latches, swiveling periscope, and authentic decals. Operates forward, reverse, left or right. It turns on a dime.

RETAIL NOW ONLY \$139.98
\$174.98 RCM072

**COX
READY TO FLY
CUB TRAINER** 25%
OFF



RADIO ALREADY INSTALLED! Designed for the 1st time RC pilot! Single channel proportional radio system and Cox .020 engine already installed! Rugged foam construction. Has a 28" wingspan.

RETAIL NOW ONLY \$74.98
\$99.95 RCM233

**MRC TYRRELL
6 WHEELER** 30%
OFF



This 1/10 scale electric RC car is 16" long & features 2 forward & 2 reverse speeds, high output electric motor, rugged ABS plastic body & excellent detailing. Requires any two channel radio.

RETAIL NOW ONLY \$47.58
\$67.98 RCM075

PICA WACO 33%
OFF



This balsa and plywood kit has a 60" span. Uses a 4 - 6 ch. radio and a .40 - .60 size engine. All nylon fittings, wire landing gear, and struts included.

RETAIL NOW ONLY \$53.58
\$79.95 RCM165

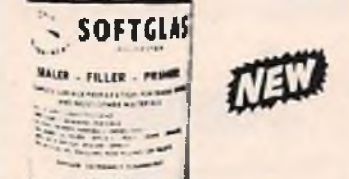
**MRC MARTINI
PORSCHE** 30%
OFF



This 1/12 scale RC electric racer has 2 forward & 2 reverse speed control, high output electric motor, & scale detailing. Requires any 2 ch. radio. Batteries not included. 15" length.

RETAIL NOW ONLY \$47.58
\$67.98 RCM073

SOFTGLAS 22%
OFF



The new, complete sealer-filler-primer for balsa wood models. Sands as easily as primer! Easy to apply. Dries hard, fast, and flexible.

RETAIL NOW ONLY \$6.98
\$8.95 RCM077

**MIDWEST
SWEET STIK** 40%
OFF



54" span. Uses a .19 to .45 size engine. Requires a 4 ch. radio. This is a small version of the famous Ugly Stik. It's an excellent, ultra simple trainer.

RETAIL NOW ONLY \$25.78
\$42.95 RCM078

**GOLDBERG
SR. FALCON** 40%
OFF



The Sr. Falcon is the standard big trainer. 69" span. Uses a 4 ch. radio and a .35 to .60 size engine. Every design element is engineered for simplicity and fast-building.

RETAIL NOW ONLY \$35.98
\$59.95 RCM079

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| MODEL | RETAIL | NOW ONLY | STOCK NUMBER |
|--------------------------|--------------------------|--------------------------|--------------------------|
| KRAFT KRAFT KRAFT | KRAFT KRAFT KRAFT | KRAFT KRAFT KRAFT | KRAFT KRAFT KRAFT |
| KP-2AW (Wheel) | \$129.95 | \$88.98 | RCM080 |
| KP-2A (2 Stick) | 129.95 | 88.98 | RCM081 |
| KP-2AS (1 Stick) | 129.95 | 88.98 | RCM082 |
| KP-4A | 299.95 | 189.98 | RCM083 |
| KP-6A | 329.95 | 204.98 | RCM084 |
| KP-5C | 375.43 | 269.98 | RCM085 |
| KP-5CS | 375.43 | 269.98 | RCM086 |
| KP-7C | 515.43 | 369.98 | RCM087 |
| KP-7CS | 515.43 | 369.98 | RCM088 |
| KPS-14II Servo | 44.95 | 34.88 | RCM089 |
| KPS-15II Servo | 44.95 | 34.88 | RCM090 |

KRAFT RADIOS WITH KPS-15IIA SERVOS ARE EXTRA

| FUTABA | FUTABA | FUTABA | FUTABA | FUTABA |
|--------------------------|--------|--------|--------|--------|
| FP-2GS | 109.95 | 69.98 | RCM091 | |
| FP-2F | 149.95 | 98.98 | RCM092 | |
| FP-2E | 149.95 | 98.98 | RCM093 | |
| FP-3S With S-17 or S-18 | 144.95 | 94.98 | RCM094 | |
| FP-3S With S-20 | 169.95 | 109.98 | RCM208 | |
| FP-3FN | 219.95 | 142.98 | RCM095 | |
| FP-4FN With S-17 or S-18 | 289.95 | 185.98 | RCM096 | |
| FP-4FN With S-16 | 319.95 | 204.98 | RCM097 | |
| FP-5FN With S-16 | 359.95 | 229.98 | RCM098 | |
| FP-6FN With S-17 or S-18 | 339.95 | 216.98 | RCM099 | |
| FP-6FN With S-16 | 369.95 | 236.98 | RCM100 | |
| FP-7GN | 579.95 | 369.98 | RCM101 | |
| S-18 Servo | 29.95 | 22.48 | RCM247 | |
| S-16 Servo | 39.95 | 29.98 | RCM103 | |
| S-7 Servo | 39.95 | 29.98 | RCM104 | |

| SANWA | SANWA | SANWA | SANWA | SANWA |
|-----------------------------|--------|--------|--------|-------|
| No. 8020 2 Ch. | 99.95 | 71.98 | RCM105 | |
| No. 8044 4 Ch. With 4 Minis | 279.95 | 184.98 | RCM248 | |
| No. 8054 5 Ch. With 4 Minis | 299.95 | 194.98 | RCM249 | |

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|--------------|-------------------------------|----------|------------|
| RCM107 | Airtronics Aquila | \$69.95 | \$48.98 |
| | American RC Helicopters | Call For | Low Prices |
| RCM250 | B&D 3 Gear Pneumatic Retracts | 89.95 | 70.98 |
| RCM251 | Badger 200-1 Air-Brush Kit | 32.95 | 21.38 |
| RCM209 | Bridl Dirty Birdy 40 - wood | 59.95 | 40.78 |
| RCM114 | Bridl Dirty Birdy 60 - wood | 84.95 | 57.78 |
| RCM210 | Bridl Dirty Birdy 60 - glass | 124.95 | 87.48 |
| RCM115 | Bridl Super Fil 4-20 | 29.95 | 20.38 |
| RCM116 | Bridl Super Kaos 40 | 55.95 | 37.98 |
| RCM118 | Bridl Super Kaos 60 | 69.95 | 47.58 |
| RCM119 | Bridl AT-6 Texan | 134.95 | 91.78 |
| RCM124 | Coverlto Balsarite | 3.20 | 1.98 |
| RCM125 | Cox Electric Ferrari | 119.95 | 83.98 |
| RCM128 | Craft-Air Butterfly II | 49.95 | 32.48 |
| RCM212 | Craft-Air SD-100 Glider | 59.95 | 35.98 |

| STOCK NUMBER | DESCRIPTION | RETAIL | NOW ONLY |
|--------------|-------------------------------------|--------------|------------|
| RCM129 | Craft-Air Windrifter Glider | \$47.95 | \$28.78 |
| RCM214 | Craft-Air Drifter II Glider - NEW!! | 19.95 | 13.98 |
| RCM215 | Dubro Lg. Nylon Hinges (15) | 2.49 | 1.78 |
| RCM216 | Dubro Flex Cable - 20" | 1.49 | .98 |
| RCM217 | Dubro No. 203 Kwik-Switch Mount | 1.75 | 1.28 |
| RCM252 | Dubro Muff-L-Air II - K&B .40 | 8.95 | 6.28 |
| RCM131 | Dumas Atlas Van Lines U1 | 47.95 | 31.18 |
| RCM219 | Dumas Hot Shot - wood | 30.00 | 19.49 |
| RCM220 | Dumas Competition DV60 - glass | 100.00 | 63.98 |
| RCM236 | Edson Adjustable Motor Mount | 6.95 | 5.58 |
| RCM132 | Fox .15 RC Schneurle | 37.95 | 22.78 |
| RCM133 | Fox .19 RC | 36.95 | 22.18 |
| RCM135 | Fox .36 RC | 39.95 | 23.98 |
| RCM136 | Fox .40 RC Schneurle | 45.95 | 27.58 |
| RCM137 | Fox .45 RC Schneurle | 51.95 | 31.18 |
| RCM138 | Fox .60 RC Eagle | 69.95 | 41.98 |
| RCM139 | Fox .60 RC Hawk | 84.95 | 50.98 |
| RCM140 | Globea Fire Plug | 26.95 | 18.88 |
| RCM237 | Goldberg RG3 Tri-gear Retracts | 24.95 | 17.48 |
| RCM263 | Goldberg RPS1 Retract Power System | 29.95 | 19.98 |
| RCM141 | Goldberg Skylane 62 | 59.95 | 35.98 |
| | HB Engines | Call For | Low Prices |
| RCM144 | Hobbyoxy Formula 2 Epoxy | 4.00 | 2.68 |
| RCM145 | Hot Stuff Blue Line .5 oz. | 4.95 | 2.98 |
| | Jemco Kits | 25 - 30% Off | Retail |
| RCM151 | K&B .40 RC Sport Marine | 75.00 | 44.98 |
| RCM153 | K&B .21 Inboard | 69.50 | 41.58 |
| RCM266 | K&B .45 (7.5cc) RC Schneurle | 40% Off | Retail |
| RCM222 | Kraft KPS-18 Super-Mini Servo | 59.95 | 43.98 |
| | Kwikcote - ALL COLORS | 8.00 | 2.98 |
| RCM239 | L&L On-Board Ignition System | 19.95 | 13.98 |
| RCM223 | Lanier Jester II | 73.50 | 45.58 |
| RCM154 | Latrax Alpha w/radio | 65.10 | 39.98 |
| RCM155 | Latrax Mustang w/radio | 70.60 | 42.98 |
| RCM156 | Marks Bushwacker w/accessories | 52.95 | 31.78 |
| RCM157 | Man Trainer (1.15 - .25) | 31.95 | 22.38 |
| RCM158 | Microflame Dix. Welding Kit | 35.95 | 23.28 |
| RCM161 | Midwest Little Stik | 33.95 | 20.38 |
| RCM160 | Midwest Strikemaster | 69.95 | 41.98 |
| RCM241 | Midwest High Models 1/4A Hornet | 20.95 | 13.98 |
| | Monokote Reg & Trans 6' rolls | 9.00 | 4.98 |
| | Nosen (ALL KITS) | 28% Off | Retail |
| RCM242 | OPS .60 RC Marine w/Tuned Pipe | 189.00 | 139.98 |
| RCM162 | Pacer X-30 Adhesive | 3.50 | 1.98 |
| RCM163 | Pacer Zap 1 oz. Econopak | 5.95 | 3.58 |
| RCM254 | Pica Cessna 182 - NEW!! | 89.95 | 59.98 |
| RCM164 | Pica T-28B | 79.95 | 53.58 |
| RCM255 | Robart Auto Mix | 9.95 | 7.48 |
| RCM227 | Robart Super Pumper MK II | 17.95 | 10.78 |
| RCM166 | Robart Wing Incidence Motor | 15.95 | 10.98 |
| RCM168 | Selector Custom Iron | 25.75 | 17.28 |
| RCM256 | Sig Kadet | 39.95 | 28.78 |
| RCM257 | Sig Kougur | 47.50 | 34.18 |
| RCM258 | Sig Smith Miniplane | 54.95 | 39.58 |
| RCM171 | Skyglas Curears | 70.00 | 45.48 |
| RCM169 | Skyglas Phoenix 5 | 55.00 | 36.98 |
| RCM170 | Skyglas Phoenix 6 | 70.00 | 45.48 |
| RCM172 | Skyglas Vertigo II | 70.00 | 45.48 |
| RCM173 | Slimline Muffler for K&B .35-.40 | 8.95 | 6.28 |
| | Solarfilm - Reg Colors | 7.98 | 3.98 |
| RCM174 | Sonic GR-3A Retract System | 55.90 | 36.38 |
| RCM177 | Southern RC Compensator - glass | 89.95 | 58.48 |
| RCM179 | Sonitronics 12 v. Fuel Pump | 14.95 | 11.98 |
| RCM180 | Sterling Fladgling | 41.95 | 26.48 |
| RCM183 | Surafite Foam Skylane 182 | 37.95 | 24.68 |
| RCM184 | Surafite Foam J-3 Cub | 37.95 | 24.68 |
| RCM185 | Surafite Spitfire - foam | 37.95 | 24.68 |
| RCM259 | Top Flite Corsair - NEW!! | 99.95 | 59.98 |
| RCM188 | Top Flite Freshman Trainer | 47.95 | 29.18 |
| RCM229 | Top Flite Contender | 56.95 | 34.18 |
| RCM189 | Top Flite P-51 Mustang | 74.95 | 44.98 |
| RCM190 | Top Flite P-40 Warhawk | 74.95 | 44.98 |
| RCM186 | Top Flite 10x6 (12) Super Maple | 16.20 | 10.58 |
| RCM187 | Top Flite 11x7 (12) Super Maple | 18.60 | 11.98 |
| RCM230 | Tower No. 11 Knife Blades (5) | .80 | .38 |
| RCM191 | Tower 12 v. Gel-Cell | 26.95 | 19.98 |
| RCM260 | Tower Display Prop w/Clock | 54.95 | 34.98 |
| RCM200 | Tower MAN Trainer 40 | 54.95 | 34.98 |
| RCM196 | X-Acto No. 5083 Dix. Knife Chest | 7.99 | 5.58 |
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SCALE VIEWS

from page 100/74

shop on wheels, selling aviation books and magazines. He takes this to all major air events he can and it is a familiar sight at airshows.

Footnotes

If any other back issue magazine collectors, dealers or their customers are listening, send in some details of the operation and we'll list it here.

A future round-up in this column will include government sources of pictures and drawings. With the Freedom of Information Law in effect, it is possible to obtain copies of this kind of thing if the Bureau drawer it is buried in can be ferreted out. Readers who have run across depositories of this data are urged to send in the detail to be included in a complete and compact directory. □

PORSCHE 935 TURBO

from page 73

the hammering and pounding experienced when running fast cars and fast boats. The S7 servo is far too big to fit in the limited space between the front wheels on this chassis. The standard Futaba S6 servo should fit OK but it will be necessary to remove the mounting lugs from the servo case to get clearance. Fortunately, we had a miniature Futaba S20 servo which went right in with room to spare but is still rugged enough to withstand the steering stresses likely to be encountered with a car of this caliber.

Only the one servo is required since the speed controller is all electronic and plugs directly into the radio receiver.

This little piece of jollity replaces entirely the usual bulky combination of "servo, wiper arm, resistor" that is pretty well standard in electric cars. We were quite impressed with this feature. We didn't realize until we were well along with the assembly that it is not only a fully proportional speed controller but it is forward and reverse too. The kit comes in a high strength, glossy covered box showing photographs of the car and highlighting features of the kit, but they chose to ignore the forward and reverse capability. Since this is a fun-car, and not for sanctioned racing, we feel the manufacturer missed out significantly when they omitted any mention of the forward/reverse feature on that good old 'silent salesman', the box. It is barely mentioned in the booklet also; referenced only as a detail in the fine print. A fully proportional, forward and

to page 116



THESE TWO ELECTRONIC THROTTLES GIVE FULL SPEED CONTROL OF YOUR ELECTRIC MODEL...

These are the world's most advanced solid-state motor speed controls for electric-powered cars, boats, planes. They eliminate servos, cumbersome rheostats and micro-switches. Plug into receiver throttle connector. Unique "Unidrive" circuitry.

*Pat. pend.



Electronic Throttle Model ET-3

Model ET-3 is the highest efficiency, fully proportional forward speed control. Controls Astroflight 02 thru 25, Dumas and Kroker motors and others rated 4.8-36V, 20 amps max. Works with positive or negative pulse receivers. No adjustments required. Extends light time by as much as 300%. Same size and weight as a servo.

Price \$43.95



Reversing Electronic Throttle Model RET-4

Gives fully proportional forward and reverse control from only one channel. Controls Astroflight 05 & 10, Dumas, Vantec IM-4 and others rated 3.6-12VDC, 10 amps max. Compatible with all 1/12-scale electric cars.

Price \$58.95

NO RISK 21-day trial. If you are not **COMPLETELY SATISFIED**, we will immediately **BUY BACK** any items you purchase! Send check, money order or C.O.D. We pay postage. Or call our order taker right now: (213) 993-1073.

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- CLEARING STOCK FOR MODEL CHANGE
- ALL BRAND NEW WITH FULL WARRANTY
- BUY TODAY - CALL OR WRITE NOW

OUR BIGGEST RADIO DISCOUNT EVENT

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SYSTEM INCLUDES: 6 CHANNEL TRANSMITTER WITH NI-CADS, 6 CHANNEL RECEIVER, NI-CAD AIRBORNE BATTERY PACK, 4 SERVOS, DUAL CHARGER FOR Tx AND Rx, SERVO TRAYS, INSTRUCTION BOOKLET, FREQUENCY FLAG AND FULL 180 DAY WARRANTY 72 or 27 MHz.

179⁹⁹



Why the big savings?

THE ANSWER IS SIMPLE. IN A FEW MONTHS WE WILL MAKE A SLIGHT MODEL CHANGE AND INTRODUCE OUR 1979 RADIO SYSTEMS. WE STILL HAVE A FEW THOUSAND CIRRUS 700 SERIES SETS AND WANT TO CLEAR THEM OUT FAST! TO ACHIEVE THIS AS QUICKLY AS POSSIBLE, WE ARE OFFERING THESE DEEP CUT DISCOUNT PRICES. THESE ARE BRAND NEW RADIOS, FEATURING OUR TRIPLE TUNED FRONT END RECEIVERS, AND COME WITH FULL WARRANTIES. AS WE HAVE DONE IN THE PAST WITH OTHER MODEL CHANGES, WE WILL CONTINUE TO MAINTAIN SERVICE FOR YEARS TO COME. ORDER SOON, SO YOU WON'T BE DISSAPPOINTED WHEN WE RUN OUT!

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SYSTEM INCLUDES: 3 CHANNEL TRANSMITTER (DRY), 3 CHANNEL RECEIVER, AIRBORNE BATTERY PACK (DRY), 2 SERVOS, SWITCH HARNESS, SERVO TRAYS, FREQUENCY FLAG, INSTRUCTION BOOKLET AND FULL 180 DAY WARRANTY. 72 or 27 MHz.

89⁹⁹

CIRRUS 4 CHANNEL 4 SERVOS ALL NI-CADS

SYSTEM INCLUDES: 4 CHANNEL TRANSMITTER WITH NI-CADS, 4 CHANNEL RECEIVER, NI-CAD AIRBORNE BATTERY PACK, 4 SERVOS, DUAL CHARGER FOR Tx AND Rx, SERVO TRAYS, SWITCH HARNESS, FREQUENCY FLAG, INSTRUCTION BOOKLET AND FULL 180 DAY WARRANTY. 72 or 27 MHz.

159⁹⁹

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Hurry! Supply is Limited!

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We carry the complete Windspiel and Wanitschek line of fine sailplanes and accessories. Call us for our competitive prices.

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BankAmericard, Visa, Mastercharge welcome! Call us at (213) 240-5810 for fast mail order service and our low prices on Kraft, Futaba, E-K and Royal Radios or stop by Mon. thru Sun. at 1844 W. Glenoaks Blvd., Glendale, Ca. 91201

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| FP4-FN S-16 .. 199.95 |
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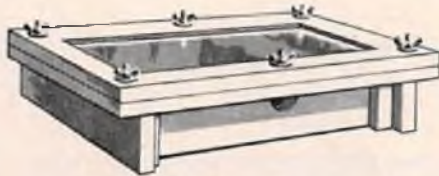


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Hot-Hed takes the guesswork out of engine settings and cowl air flow—A visible heat indicator applied in dots, Hot-Hed changes color when engine gets too hot.

\$3.00 per half oz. bottle
(Comes with instructions)

FORMICATOR



Vacuum former for plastics—Easy to make your own cowls, wheel pants, canopies, etc.—Works with home oven and hose type vacuum cleaner.

\$39—(Includes Asst. Pack of ABS)
(Instructions for assembly and use included)

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ABS Plastic Sheets for the Formicator—
All sheets 8½" x 17"—Packs Only

| THICKNESS | PCS. PER PACK | PACK PRICE |
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| .020 (1/50") | 30 | \$13.00 |
| .030 (1/32") | 20 | 13.00 |
| .045 (3/64") | 13 | 13.00 |
| .060 (1/16") | 10 | 13.00 |
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Assortment Pack (see below) 13.00
Assortment Pack contains: 6-.020/ 4-.030/ 3-.045 2-.060/ and 1-.090 sheets. Any pack \$12.00 when ordered with the Formicator. ALL ABS is white only.

Over 3½ lbs. per pack

*** ALL U.S. ORDERS SHIPPED
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Trouble getting it together?

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\$2.00 per two foot roll
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\$8.00 per unit
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(Complete instructions for mixing and use)

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Newark, Delaware 19711

PORSCHE 935 TURBO

from page 112/73

reverse, electronic speed controller costs around \$60.00 if you want to buy one. Admittedly, they can handle more current than this one has to cope with but the electronic principles are the same and this complete kit, including the controller, lists for only \$80.00.

The actual assembly is straightforward following the instructions. We chose to use a replacement Futaba socket on the battery leads rather than cutting the connector off the receiver lead and making a soldered joint to the battery. (We have to be able to move our radio equipment around from model to model and need the flexibility of simple plug-in connections.) The speed controller already had a Futaba connector on it which can be changed quite simply if you are using another brand of radio. All that remained was dressing up the body with the very comprehensive decals provided. The decals are the water-soak variety and good quality throughout. We spent exactly six hours total on the entire assembly and decaying. This gave us a very good looking piece of automobile. We then dug out our roll of Uncle Joe Bridi's 1/16" silver striping tape and detailed out all the windows and door areas which really made it look sharp and occupied about two hours more. Don't forget to use some 'stickum' to hold the tires on the wheels — we used 'Hot Stuff'. This car has enough performance to make this operation a must if you don't plan on spending all your time straightening tires instead of driving.

If you are considering the purchase of this, or any other, electric car and you also are in need of a radio for it, we suggest you consider one with a steering wheel control on the transmitter. We have been more than happy with our Futaba FP-T2F. It helps considerably with the orientation problems experienced with cars (or boats, for that matter) that are equipped with forward and reversing capabilities. It has a strong, steel transmitter case with voltmeter on the face. The receiver operates on 4.8 to 6.0 volts and has the added advantage of interchangeable plug-in crystals so that frequencies can be switched quickly and simply if you are on 27 MHz. (Beware: crystal changes on the 72 MHz frequencies may only be made by a licensed, second class operator, and that's an FCC rule!) These quick change crystals are available at \$8.95 each for 27 MHz and \$11.95 each for 72 MHz.

The FP-T2F is available at a suggested list price of \$149.95 ready to
to page 118

GIANT SCALE BUFFS



C-D MASTER DESIGNS YOU NEVER BELIEVED YOU'D SEE MODELED
New SE Plans List (260, With Pin) for 15c
S.A.S. Env. But included with Catalog

| Plan # | Name | Price |
|--------|--------------------|-------|
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| 62 | Curtiss Hawk PSE | \$15. |
| 95 | Monocoupe Spl. | \$39. |
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| 62 | Howard like Buc. | \$39. |
| 78 | RT's Weddel-Wm | \$39. |
| 78 | Jim Wed.-Wm | \$39. |
| 62 | Hess. Air Mullig'n | \$39. |
| 64 | Boech C17-B Stag | \$39. |
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| 82 | Silverson TW 58-7 | \$15. |
| 74 | T.I. Pavo Special | \$49. |
| 63 | Grum. Skyrocket | \$24. |
| 75 | Republic Sea Bee | \$24. |
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| 77 | Bee. B-17G Fort | \$35. |
| 102 | Bee. B-17G Fort | \$49. |
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| 63 | NA Maulader B-26 | \$39. |
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| 98 | Stear Key. P17 | \$45. |
| 99 | Bl. Widow P-61 | \$49. |
| 71 | Doug DC-3 (C-47) | \$39. |
| 95 | Doug DC-3 (C-47) | \$49. |
| 86 | Hawks T/A Tex | \$42. |
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| 55 | Heath Baby Bul. | \$33. |
| 60 | Doug Acrlpt M-3 | \$29. |
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| 107 | Martin B-1 Bom | \$33. |
| 61 | Lindig's NX211 | \$22. |
| 91 | Lindig's NX211 | \$39. |
| 54 | Fairchild PT-26 | \$25. |
| 68 | Junk. JU88 B&H | \$25. |
| 82 | Siemens-Sch. DIV | \$35. |
| 58 | Gotha QIV Bomb | \$39. |
| 108 | Sikorsky S-38 | \$44. |
| 100 | Hind. Pge D400 | \$45. |
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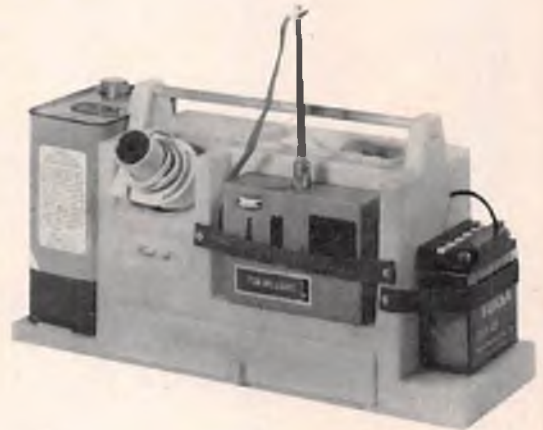
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GOOD FOR \$1.00 ON \$20.00 PURCHASE OR MORE. DIRECT ORDERS ONLY.

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WING'S EXCLUSIVE CUTTING METHOD, DEVELOPED BY RALPH ANDRAE, MAKES OUR CORES SUPERIOR TO OTHERS.

ADD \$ 4.00 TO ANY WING AND GET THE FOLLOWING OUTSTANDING VALUE:

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- WING HOLD DOWN BOLTS 1.89
- COPPER CUT OUT WIRE .29

\$11.87

NOTE: WRITE FOR SPECIAL QUANTITY DISCOUNTS FOR CLUBS & MANUFACTURERS.

FREE WING LOADING CHART IN EVERY KIT

STYROFOAM BLOCKS no. 220

1 LB. DENSITY VIRGIN EXPANDED BEAD BLOCKS, 3 1/2" x 1 1/2" x 1/2" FOR MAKING WINGS FUSELAGES AND STABS. \$12.95 EA. 3 FOR \$30.00

More quality products from WING MFG.

NYLON WING BOLTS

LOW PROFILE NYLON WING BOLT 1/16" x 1/2" WITH HEX KEY HEAD FOR FASTEST AND CLEANEST REMOVAL OF WING. COMES WITH ALLEN WRENCH AND NYLON WASHERS TO PREVENT CRUNCHING WHEN WING IS BOLTED DOWN. INCLUDES 4 BOLTS, 4 WASHERS & WRENCH.

ITEM #215 8 Piece kit \$ 13.95

WING SKIN ADHESIVES

These are all fast drying adhesives with extremely minimum retention.

Spray Adhesive
4oz. Can for Small Wing \$2.95
12oz. Can for Large Wing \$3.95

Thin-Stick Adhesive (Break On)
16oz. Can for Large Wing \$3.45

1" WIDE ALL PURE BRISTLE BRUSHES WITH WOOD HANDLES.

IDEAL FOR APPLYING WING ADHESIVE, EPOXY & POLYESTER RESIN. CAN BE CLEANED MANY TIMES WITHOUT BRISTLES CURLING. HANDLES WON'T MELT IN SOLVENTS LIKE PLASTIC BRUSHES.

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3/8" WIDE PURE BRISTLE ACID BRUSHES WITH METAL HANDLES. IDEAL FOR APPLYING EPOXY, RESIN, FILLERS, ETC.

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LIGHT WEIGHT BIRCH AIRCRAFT FLYWOOD WING SKINS. HAS A SATIN SMOOTH SURFACE WITH NO OPEN GRAIN. BENDS AROUND LEADING EDGES EASILY, 10 TIMES STRONGER THAN Balsa—48" x 48" x .018 THICK \$15.95 SHEET

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SEND 10¢ FOR COMPLETE PRODUCT CATALOG

PORSCHE 935 TURBO

from page 116/73

go into operation with the addition of regular carbon or alkaline batteries. If you prefer the convenience of rechargeable nicads, Futaba makes a kit available (FPBK-2) of nicad cells and a trickle charger that will convert both transmitter and receiver, at a suggested

list price of \$54.95. Depending on how, and in what, you intend to use the radio, Futaba makes available the miniature S20 servos, the standard S6's, and the heavy duty S7's, and all are interchangeable with the one radio system. Check them all out; we think you will like the advantages of a wheel control transmitter, whatever brand you decide suits you best.

So, we were finally ready to put it

down on the floor, switch on and make like Bobby Unser. We somehow have the feeling that Bobby wouldn't have driven it straight into the table leg but how were we to know that it possessed both the acceleration and the traction to evaporate south as fast as it did when we flipped the throttle open? It has about a three foot turning circle (and that's diameter, not radius) so it is well adapted

to page 122



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Made in W. Germany

PERFORMANCE • PRECISION • POWER

DESIGNED AND MANUFACTURED TO MEET THE HIGH PERFORMANCE DEMANDS OF TOMORROW'S COMPETITION... TODAY!

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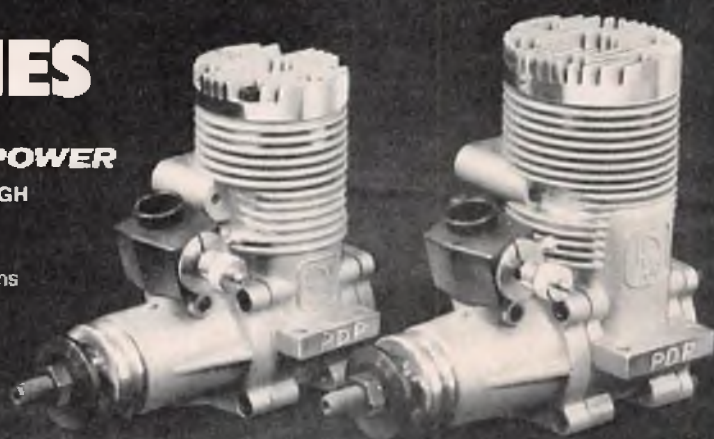
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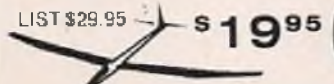
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SEE BYRO-DRIVE DETAILS ON PAGE 9 OF THIS ISSUE.

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- * Detailed assembly manual with many photos, drawings, templates and helpful tips on how to build and ready your Pitts for flight.
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Scale Modeling

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Wing Span: 68"

Wing Area: 1400 sq. in.

Length: 62"

Wt.: Approx. 14 lbs.

(including .60 engine, **Byro-Drive**, Econokote covering).



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PORSCHE 935 TURBO

from page 118/73

for indoor negotiations. Outdoors, on a flat surface, it will drift in power-on turns, and it will spin half way down the kitchen linoleum if you try the same high jinks in there. Its high speed, in such a small package, evokes more oohs and aahs from our visitors than our bigger and faster 1/12th scale cars do --- it is so unexpected. It really is an outstanding little car if you are looking for some family fun and games, like time trials around a furniture strewn hazard track with a few reversing maneuvers included. We think you will like it. We did!! □

SKYLARK 56 MARK II

from page 72

basswood strips on its top and bottom surfaces. The center section is sheeted and reinforced with several 1/8" plywood dihedral braces, which also tie into the main landing gear blocks and plywood rib reinforcing pieces.

The rudder, vertical fin, and elevators are sheet balsa, and the stabilizer is of balsa rib and spar construction, similar to the wing.

The fuselage is comprised of sheet balsa sides, with 1/8" plywood doublers and wing saddle triplers.

The 1/8" plywood bulkheads are keyed into the fuselage doublers via notches and tabs. The engine is installed with hardwood main beams and breakaway engine mounts, which eliminate the need for a radial type engine mount.

If we were to fault any aspect of the Mark II kit it would be relative to the quality of the die-cutting of the plywood parts. Perhaps our test kit was produced near the end of a large kit run, as the dies were obviously dull. The plywood parts were only cut about halfway through the sheets, and these cuts were somewhat mashed. This has been brought to the manufacturer's attention and steps are being taken to correct the problem. We would hasten to add that the balsa die-cutting was very good.

We also used Carl Goldberg's JET glue for most construction phases of our test aircraft. This fine glue speeds the assembly process and virtually no weight is added to the completed aircraft with its use.

Our Skylark Mark II was finished with Solarfilm on the wings and horizontal tail surfaces, K & B Super Pox primer and enamel on the fuselage and vertical tail surfaces. Additional detail was added with the application of the decals which are also supplied with the kit.

to page 124

INTRODUCING: CESSNA 182

IT'S AEROBATIC,
YET IT'S A TRAINER
... AND IT'S SCALE

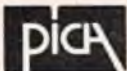


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The kit is all-balsa, with lots of hardware and molded parts for speedy construction. The clear plans and special illustrated construction booklet make it a kit that anyone can build.

SPECIFICATIONS

- 72" span
- 702 sq. in. area
- 5-7 lbs. flying weight
- Power:
 - .40 (as a trainer)
 - .60 (for aerobatics)
- Four channels
(flaps optional)



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SKYLARK 56 MARK II

from page 122/72

The radio installed was Westport International's Variant System, and a K & B .40 R/C engine was used for power. While the instructions indicate that the Skylark's engine size can be from .30 to .40 cubic inches in displacement, we believe that the .40 size engine is a far wiser power choice. The Skylark will certainly fly with a .30 or .35 size engine, however, we feel that it just won't fly anywhere near as well as the .40 powered ship. Our test aircraft's ready to fly, dry weight, was 75 ounces.

We expected the Mark II to be a fine flying sport aircraft and we were not disappointed. Ground handling is excellent and take-offs are equally good — just open the throttle, hold a touch of right rudder and a little up elevator, and the Mark II will fly itself off the ground. In-flight characteristics are good also. The Mark II will perform all pattern maneuvers in a commendable fashion and there were no apparent nasty traits or tendencies in evidence. Landings are smooth and easy; almost trainer-like with regard to stability, just at a faster speed.

In summary, the Skylark 56 Mark II is a fine sport or novice pattern aircraft. It is a sound, well engineered design, that is capable of withstanding the rigors of "Sunday" flying and would be a good aircraft for the novice flyer to consider, when ready to graduate from a high wing trainer type. It is also ideally suited for the flyer with an interest in competing in the novice pattern event. □

SOARING

from page 71

very active flying wing designer, builder, meet director, and overall wing enthusiast. The photo shows Rick and his latest creation which I had the opportunity to fly — a very memorable occasion. The wing is very smooth, light on its feet, and an overall thermal ship. It has a reflex airfoil, rudder, and ailerons. When Rick has perfected his design I will pass on all the pertinent data on this fine ship.

to page 126

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Wing span 67"
Wing chord 14"
Total wing area 795 sq."
Fuselage length 54"
Stabilizer span 27"
Verticle fin 10 1/4"
Rec engine 23-40
Gear: Fixed or retract
Channels: 4 (5 wire)
Control functions:
Ailerons, Elevator,
Throttle, Rudder
Construction: Balsa
Plan sizes 35"x67"
Instruction manual
and construction
photos included
Kit includes: Die cut
balsa shaped
parts, hardwood
plywood, aileron
torque rods,
hardware
Flying weight
6-8 lbs

The Duellist 2/40 has been designed as an easy-to-fly and safe handling twin engine R.C. model. Combining elegant appearance with simple structure, it's ideal for the modeler who has progressed through the usual trainers and pattern or low wing sport ships. As such, it offers a further level of enjoyment in the R.C. hobby, and a new accomplishment in flying skills to the builder.

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Weight 19-22 oz.
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Radio 2-5 channels

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SOARING

from page 124/71

From the Weak Signals of Toledo, Ohio, newsletter comes a great hint to strengthen the large rudder and stab area of our sailplanes when drilling lightening holes that leave very thin and weakened sections. "Applying Hot Stuff to the drilled areas will help return the stiffness to a rudder that has large lightening holes cut into it. The Hot Stuff should be applied to the inside or end grain of each hole plus to the surfaces

between the holes. The Hot Stuff soaks into the wood and, when cured, adds considerably to its stiffness. This technique can be used on other areas also. Leading edges and trailing edges that are too soft can be hardened by applying Hot Stuff to them in the same manner. The part should be sanded to shape before applying so that only light sanding is required to restore the surface after applying Hot Stuff. Check this technique on scrap balsa first, especially if the surface is to be painted."

One of the very important functions that we all should perform before every flight is to check every control surface,

control rods and horns, and servo placement and output wheel, or arm, before each flight. On the smaller and narrower fuselages of our sailplanes the slightest movement of a servo that is taped in could be disastrous. Remove the canopy and look at the "innards" while you cycle the controls.

Another new bird on the scene is Mike Reagan's "Lyre Bird" a very sleek and fast, no dihedral, elevator and ailerons ship. It went up on the launch extremely fast and thermalled in average lift. Mike is the designer, builder and he will pass on more information when he finalizes the design.

NEW! SINGLE STICK KNOB IMPROVED! 2 AXIS GIMBAL



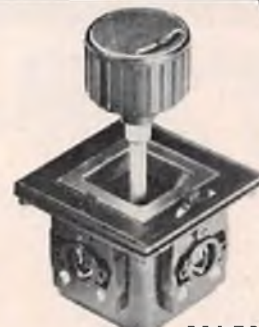
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R/C Modeler



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

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In closing this month's chatter, I am going to quote again from the newsletter of the Dallas Radio Control Club. It fits the situation that all of us who give our all to our respective clubs find ourselves in.

"Someone has said that there are four kinds of bones in every organization.

"There are Wishbones, who spend their time wishing someone else would do the work.

"There are the Jawbones, who do all the talking but little else.

"Next, there are the Knucklebones, who knock everything anyone ever tries to do.

"And finally, there are the Backbones,

who get under the load and do the work."

As I have said in previous columns, get involved with your club, participate in various activities and by all means teach a kid to fly.

Sending our soaring team to Belgium this year is very expensive. Your individual or club donation will be greatly appreciated and only \$5.00 will get you a commemorative patch and one decal indicating your support. Send your donation to USA/FAI Soaring Team Fund, P.O. Box 4319, Irvine, Calif. 92715.

Let's hear from all of you enthusiasts — see ya in Toledo.

Good Lift. □

RADIO SPECTRUM

from page 70/67

you already have two battery packs and want to use them, I would be tempted to add another switch harness as shown in Figure 1.

You could monitor either pack through the charging jack with your expanded scale voltmeter and switch over when the first pack got low, just as you might switch fuel tanks in a full scale airplane. You could also charge both packs through the charging jack but only one at a time. The actual wiring of the new switch is shown in Figure 2.

You would normally charge these at a

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50 to 60 ma rate, for twelve to sixteen hours. There is a way to put the packs in series so they could be charged at the same time, but I do not know if the Ace charger can handle 8 cells in series.

FM Experimenters

RCM received a letter with the following note attached:

Wonder if Jim Oddino could get me the names and addresses of others who are playing with F.M. RIC? I would like to exchange processes and results with others. Also tell Jim to keep up the good work on the tech part — there are more people interested than you might think. If Jim has anything, I would like to see it. I have been experimenting in the 220 MHz and the High end of the two meter Ham band. If you want more details, let me know.

Walls C. Shreffler
613 Florence Ave.
Joliet, Illinois 60433

I would like to be kept informed about

what is going on out there but I might suggest that you guys write to Mr. Shreffler direct. I had some stuff working on the bench about a year ago but I got pretty busy at work and then Kraft Systems sent me one of their FM rigs to play with so I haven't got back to it. I was trying, and did manage to get about 12 KHz deviation pulling a crystal with a varactor diode. I ran the crystal at its fundamental and tripled right in the collector of the oscillator. My long range plan was to use a 10.7 MHz IF with a 15 KHz bandwidth and a monolithic crystal filter in the quadrature detector. Theoretically the wider bandwidth should give some added interference rejection and the 10.7 MHz IF should get rid of the image problem. I like the idea of looking for higher RF frequencies but two meters and 220 are getting pretty popular with Hams these days. May need to go even higher and yes, we would like more details. □

HERE'S HOW

from page 64

Many times there will be a few large gouges in the leading edge, which are impractical to fill with the usual dent repair materials (epoxy, micro-balloons, etc.). In these cases, cut a squared out section from the wing and fit in a foam block. Sand the block to shape in the wing, and then epoxy in place. Cover the repair with silk, dacron, silkspan, or glass cloth, and epoxy. MonoKote can also be used (regular — not super).

It is now necessary to fill small dings, the purposely drilled holes, and the areas from which small splinters of skin

to page 134



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On the right is your steering stick. Move it right or left—a little or a lot. Steering is precise. This stick, too, has a trim adjustment so that when the stick is untouched the car will run straight and true.

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Pro-Cision makes three versions of the Porsche—each on a different frequency. This means all three Porsches can race together. Great for car clubs or for you and a buddy or two to learn who is the best driver.

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As an optional extra, Pro-Cision offers a charger that plugs right into the car. With this charger and a set of Ni-Cad batteries you'll probably never have to buy car batteries again.

There are many radio-controlled cars on the market. Most of them are toys. If you want the real thing...if you want true quality and lasting satisfaction, look for the name Pro-Cision—the industry leader. Pro-Cision's quality control, research and famous service center are your assurance of lasting quality.

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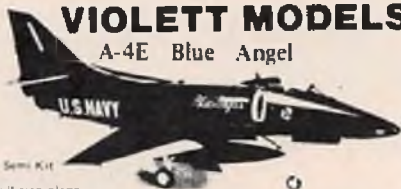
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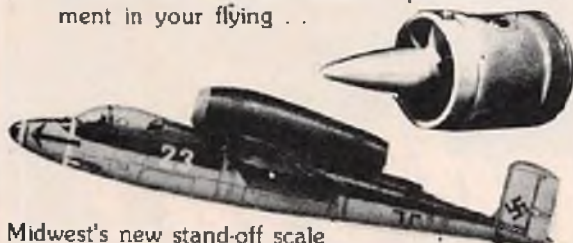
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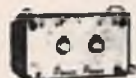
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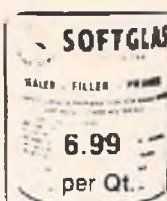


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HERE'S HOW

from page 128/64

were removed. Synkoloids spackling paste is excellent for this and it will not attack foam. It is available in most hardware stores.

Sand the repairs and brush on Hobbyoxy paint, or re-spray the entire wing. MonoKote (regular) is an alternate

choice.

Ralph has salvaged many wings by the above methods, in a fraction of the time required to build a new wing from scratch, and of course, at a much lower cost for materials.

I ran across this neat cutter called "Zippy". It's an all purpose cutter and has proven ideal for cutting and trimming all of the covering materials available. Best of all, it has a replaceable cutting

blade. Just press down on the knurled button and push out the blade. Replace it with any standard double edged razor blade. No need to throw it away when dull. It can be purchased for one dollar from most stationary or drafting supply stores or write to Alvin and Company, P.O. Box 1975, San Leandro, Calif 94577, Telephone (415) 278-3040. You'll find it simply great, for cutting and trimming while covering! □

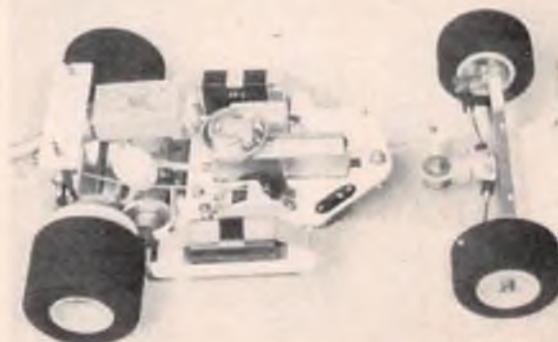
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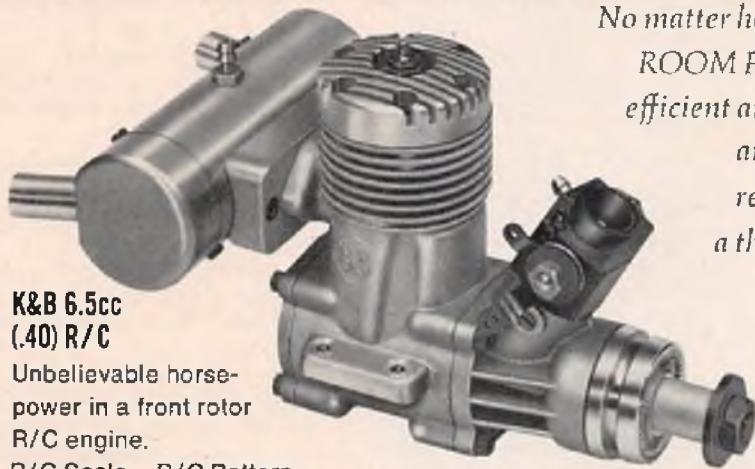
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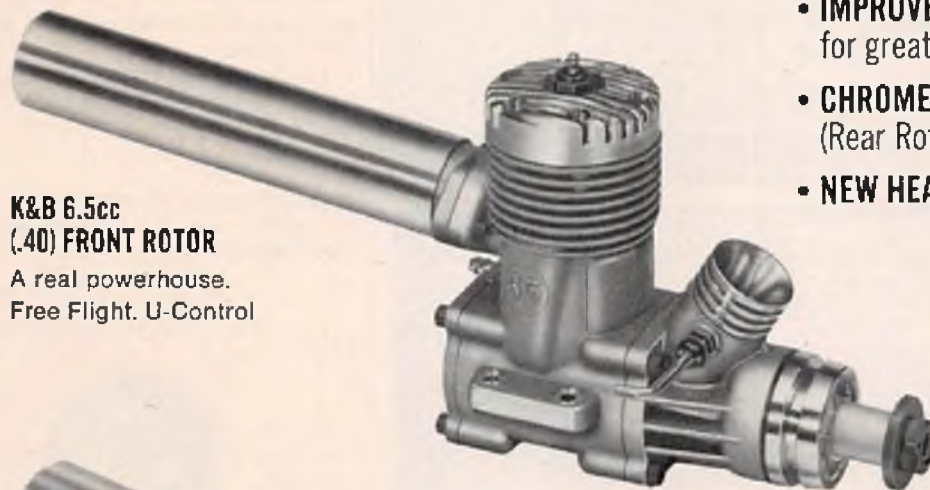
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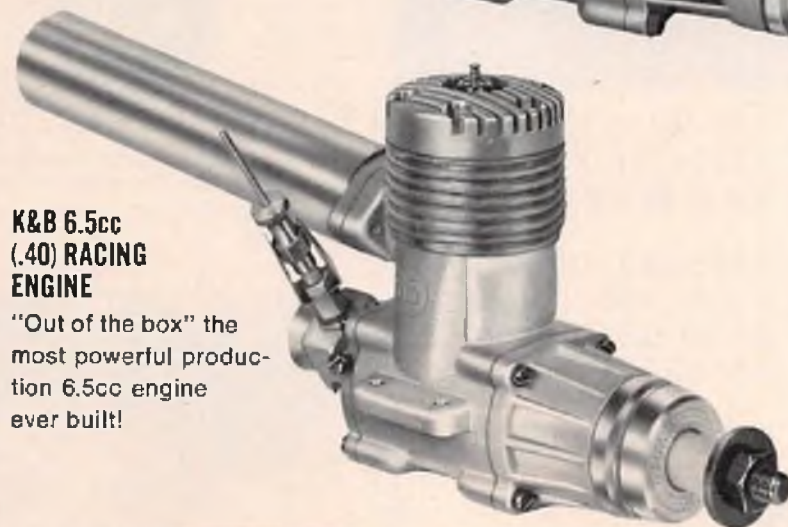
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| Cox 8022 | 139.95 | 93. | 2 | no |
| Logictrol Nimbus | 135.00 | 98. | 2 | no |
| 2 Channel Dual stick | | | | |
| Cox 8020 | 99.95 | 70. | 2 | no |
| Futaba FP-2GS | 99.95 | 70. | 2 | no |
| Futaba FP-2E | 149.95 | 100. | 2 | no |
| Futaba FP-2E S17 | 129.95 | 87. | 2 | no |
| MRC 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 S17 | 129.95 | 87. | 2 | no |
| 3 Channel Single stick | | | | |
| Cox 8031 | 159.95 | 104. | 2 | no |
| Futaba FP-3S | 159.95 | 106. | 2 | no |
| Futaba FP-3S S17 | 139.95 | 93. | 2 | no |
| Logictrol LRB-3 | 159.00 | 100. | 2 | no |
| Logictrol Ranger | 175.00 | 113. | 2 | no |
| 3 Channel Dual stick | | | | |
| Cox 8033 | 229.95 | 148. | 3 | yes |
| Futaba FP-3FN | 209.95 | 138. | 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-4N | 309.95 | 197. | 4 | yes |
| Futaba FP-4FN S17 | 279.95 | 182. | 4 | yes |
| Logictrol Nimbus | 309.00 | 187. | 4 | yes |
| MRC 774 | 279.95 | 189. | 4 | yes |
| 5 Channel Dual stick | | | | |
| Cox 8054 | 299.95 | 190. | 4 | yes |
| Futaba FP-5FN | 359.95 | 225. | 4 | yes |
| Logictrol LRB 2-5 | 285.00 | 179. | 4 | Radio |
| Logictrol Champion | 369.95 | 225. | 4 | yes |
| MRC 775 | 379.95 | 251. | 4 | yes |
| 5 Channel Single stick | | | | |
| Logictrol LRB 1-5 | 310.00 | 197. | 4 | Radio |
| 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 S17 | 329.95 | 210. | 4 | yes |
| 7 Channel Dual stick | | | | |
| Futaba FP-7G | 579.95 | 385. | 4 | yes |
| Logictrol Super Pro | 419.95 | 255. | 4 | yes |
| 7 Channel Single stick | | | | |
| Logictrol Super Pro | 440.95 | 270. | 4 | yes |

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| Grand Espirit | 129.95 | 91.00 |
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SARACEN

from page 54

fuselage root rib so it rests under the wing blocks.

Use a felt pen to mark the wing blocks location on the wing.

Cut wing block notches in wing core.

Repeat above for left wing.

Put weights on the fuselage to hold it in place on the flat surface.

Slide the right wing panel onto the wing blocks so that it rests against the root rib and block up the wing tip for 1" of dihedral (under each tip).

Epoxy right wing onto the wing blocks.

Repeat above for left wing.

Trim wing blocks flush with wing surface.

Epoxy 3/32" wing root ribs to each wing panel. Use wing rods to align the ribs (be sure not to get epoxy into the wing tubes).

Sheet, sand and cover wing.

Your detachable Saracen wing set-up is complete. All you need do is insert in a couple of screw hooks into the 3/32" plywood wing roots. Between these hooks you will stretch a rubber band which will hold the wing panels against the fuselage.

Finish your Saracen Easy Packer per Saracen instructions in RCM, April 1976. □

RETRACT WHEEL WELLS

from page 52



Step 11: Use a slow setting epoxy and line the well with the sidewall first. The wheel will hold everything in place till the epoxy sets.



Step 12: Epoxy the bottom sheeting in the well. It should be a perfect fit! Trim off the excess sidewall with a razor blade.

to page 140

The new Cox Cub revolutionizes radio control.



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Say that you're building a couple of new planes this winter and you'd like to put a radio in each plane that you get ready to fly but it would mean having to buy two new systems . . . that could cost you \$500 and up! You probably already have a good radio with a transmitter you are used to and like. No matter what brand, a Digital Commander Flite Pack kit is compatible with your transmitter without ANY modification to the transmitter as long as they are on the same frequency! There are only a couple of isolated exceptions to this statement.



BANTAM MIDGET servo option. Measures 0.7" X 1.125" X 1.43", weighs .85 oz. and has 20 in. oz. of thrust. Perfect for full size 1/2A's or .60 pattern ships!

You can build a flite pack kit, tune it to your existing transmitter, and install it in your plane just as if you had bought a complete new system and at a fraction of the cost. By the same token, if you have some extra servos, no matter what brand, our Digital Commander receiver will operate them. Or, if you want to have servos in all your planes and switch one re-

ceiver from plane to plane, our servos are compatible with your receiver, no matter who made it.



MICRO servo option. Measures 0.625" X 1.25" X 1.28", weighs .75 oz. and has 4 lbs. of thrust. Where you need the smallest size and weight possible.

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Because the Digital Commander units are kits, and because there is very little difference in the basic electronic concept between brands of radios, they can be matched and tuned to your existing equipment as you are building. Also you learn a good deal about the operation of your system that can save some trips to a service center.



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|----------|--|----------|
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| 12G28-2R | Double Deck Receiver and Two Bantam Midget Servos | 80.95 |
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These Flite Packs are unassembled and have 100 mah ni-cd batteries:

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|----------|--|--------|
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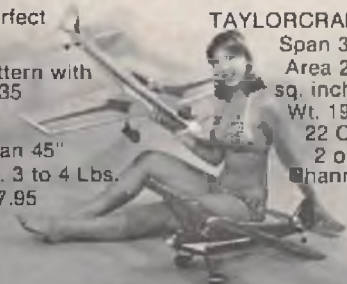
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RETRACT WHEEL WELLS

from page 136/52



Step 13: Sheet the wing in your usual fashion, locate the wells, and carefully enlarge the hole. The last 1/16" should be done with fine sandpaper to keep things under control. Coat the entire well with epoxy glue to seal it up from oil, water, and dirt. □

SNARK

from page 50/48

Cut a pair of landing gear 'doors' from 1/32" ply, bind and epoxy to the wire, then bolt the gear to the wing with Goldberg landing gear clamps.

All that remains now is for the motor and radio to be installed and the model painted.

Flying:

Snark flies slow & stable and should present no problems to the beginning stunt pilot. Take-offs are straight and true, and the Sullivan wing shows no tendency to stall even when the engine is throttled way back on landing approaches.

While Snark was not designed as a pattern ship, its performance is lively and much like the C/L planes it was modeled after. Square and triangular loops are easily done, and the author is now working on wing-overs. Happy stunting! □

MINIMOUSSETANG

from page 47

To determine the feasibility of placing this plane in the beginner's category, a relative novice to RC modeling was allowed to build this particular kit under the close personal supervision of an experienced builder. Previously he had built a few U-Control planes and with the help of the highly detailed instruction book and a few hints from his mentor, he turned out a beautiful plane anyone would enjoy flying.

Flying this plane was as great as was the anticipation. From the launch, it flew straight out climbing as it went, controls were not over sensitive but, when asked

to do a maneuver, it was done crisply. The landing was the most fun of all, it was flown until all the fuel was used up and from high over the field it was put into a gentle glide, in fact we were wondering if it would thermal. It maintained this long flat glide until it touched down light as a feather on the runway. It is a great little plane and one you would be proud to own and fly. □

CUTLASS 20

from page 46

... radial engine mount instead of the beam mounts provided in the kit.

The model was covered with Silkspun Coverite prior to installation of the engine pod and vertical fin. These parts were then installed and, along with the control surfaces, were given a coat of finishing resin. All excess resin was removed using paper towels before the resin hardened. After a light sanding, the model was sprayed with several coats of acrylic lacquer primer to fill the grain and again sanded. Final color was Ditzler's acrylic lacquer. This type of finish is fast, easy, and will withstand up to 25% nitro sport fuels.

Wanting to try a H.B. engine for some time now, I felt that this was the right opportunity. I used a H.B. .25 with stock muffler which proved to be a good choice. Four Kraft KPS 14 were installed utilizing the servo tray furnished in the kit but these must be mounted crosswise instead of the usual fore and aft configuration. There is ample room for the gear even though the radio compartment is narrow. Depending upon final balance, the battery may need to be placed to the rear of the servos. I mounted the switch and charging socket to the top sheeting via a hole in the radio compartment side wall.

Before going to the flying field, check balance and adjust surface throws to those shown on the plans. The latter step is essential, my Cutlass proved to be very maneuverable and had I not followed the manufacturer's recommendations I'm sure that the first flight would have been its last. To achieve balance as indicated on the plans, 3 oz. of nose weight was needed. On the maiden flight, maximum up trim was needed along with back pressure on the stick to maintain level flight. After removing the added nose weight this condition was corrected. This would indicate that the Center of Gravity should be farther rearward than shown on the plans and that this position should be used only as a guideline before arriving at the final balance. Stalls are gentle with no apparent drop off to either side. Landings are a thing of beauty because of the safe, slow-speed approaches one can make. Overall flight

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performance is excellent with the Cutlass 20 being a very stable design.

At first glance, the price tag of \$39.99 seems a little high for a .20 powered kit but after one considers the quality and flight capabilities of the Cutlass the price can easily be justified. For someone wanting to try a change of pace from the conventional styled airplanes, this Pilot kit Cutlass 20 will make the transition easy.

A DIFFERENT OUTLOOK ON TOOLS

from page 44

... (which will be discussed later) then slice away with your cutting tool. When setting up my workbench or changing the particle board top, I use the long one to determine that my workbench is flat

with no dips or humps to ruin wings. Edge-wise they will not follow the contour of the workbench unless it is perfectly flat. I also have three smaller straight-edges made from a harder grade of aluminum; they are 3/4" wide and 6", 12", 18", respectively. Ask a tin smith and he can cut you a handful in a few minutes from his scrap aluminum, or galvanized sheet would do as well.

to page 144

THE WING JIG II—PRICE: \$34.50



The original RCM Wing Jig, first published in the August 1967 issue of this magazine made it possible for many modelers to build their airplane wings warp-free and in far less time than it had previously taken. The **WING JIG II** offers many design improvements on the original version that greatly extends both its versatility and the accuracy of the wings produced. It is now used exclusively in the RCM shop for all building projects.

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A DIFFERENT OUTLOOK ON TOOLS

from page 142/44

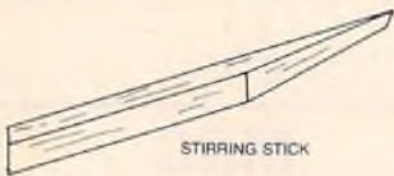
Another tool that is extremely useful is a palette knife. The ordinary one that you buy at the art store has the end of the blade rounded. Snap off that blade about 3" from the handle, file it square, smooth it on a sharpening stone, and use it as a small putty knife. It puts spackling compound in surface defects as well as anything I have ever used. It even fills nail holes in the walls of the house. Also, it is quite useful when applying MonoKote. Hold it against the face of your iron until it gets as hot as the iron, then use it to get into places too small for the iron. It must be heated quite often since it does not hold the heat very well. Recently I found a new use for it — measuring and mixing the new "stay where you put it" thixotropic epoxy from Hobbypoxy. It is fantastic stuff for vertical application and making fillets that will stay put.

A half size back or miter saw which is about twice the size of the normal razor saw was purchased for a trim molding job in the house and it has been in the shop ever since. It is hardly ever used with a miter box, usually it is used free-hand to saw thicker balsa. If the block is too thick, cut half way through, reverse the block and cut the other half. Standard carpenter saws really butcher balsa wood, this saw has 16 teeth per inch and cuts much smoother. It compares favorably to the razor saw (which has 25 teeth to the inch) in cutting balsa and also saws hardwood.

My bags full of lead shot have been mentioned before in RCM by a good friend, Frank Finney, and with his permission I am going to again flail a dead horse. I have four 2½ lb. bags which Jeri fabricated for me. I discovered how handy they were when drawing plans for articles. They securely held curves and straight-edges in place on the drafting table. I understand from Frank that draftsmen have been using them for years. Oh! well, there goes another original idea. Have you ever wished for two more hands when applying MonoKote to a wing? You can prop the wing up vertically with a couple of lead bags when sealing edges, or hold the wing flat on the workbench with a couple of them when covering a compound wing tip. I use them while gluing, while sanding, while planing --- in fact, the paper background for the accompanying pictures was held tightly in place against a gentle breeze that was trying to destroy my efforts.

The RCM Epoxy Mixer Mod. II was built from an article in a back issue of RCM and it was discovered quite quickly that there was something missing. Every time I started to mix the epoxy, the paper

went round and round and the epoxy stayed still. Kinda like trying to write a note on a polished surface of your desk while using your other hand to hold the phone. This is probably the reason the guy invented that rubber gizmo that lets you hold the phone on your shoulder and frees both hands. The original mixer had one blade and used to tear off the paper. I used two, one at each end of the mixing stage. When mixing, the two blades keep the paper from rotating. There are washers under each end of the hack saw blades so that the dry epoxy puddle will pull through. After you pull the paper through and tear it off, pull through a half inch more paper then fold it up against the cut off blade. The folded up part will act as a handle next time and the fold binds against the blade and helps keep it from moving while stirring.



The stirring stick shown is made from 1/8" x 1/4" spruce or other scrap hardwood. It is tapered from one side then the end is beveled. Quite often, I will taper from one side, taper from one edge, then cut the bevel. The taper on the edge allows it to act as a squeegee when applying epoxy to sheet balsa. The sticks are almost useless without the tip bevel. The stick is great for applying epoxy when installing hinges. I make the side taper very long then the tip becomes thin enough to stuff epoxy to the bottom of the hinge slot. Wipe the surface clean with a tissue, insert the hinge and there won't be a bit of surface epoxy to clog the hinge pin. Be sure to wipe your stirring sticks clean with a tissue before the epoxy hardens or you are going to have to re-point them.

A few other incidental tools pictured show, for example, a stubby funny looking screwdriver for getting into stubby funny places. A toothbrush to show size of the shot bags is great for cleaning engines after an uncontrolled hard landing (better known as a crash).

Parallel rulers are used in enlarging plans, and a jeweler's screwdriver for fixing your glasses so you can see to work with the other tools.

The pliers are of a type seen in few workshops. They are wire pliers, the noses are round and do a fantastic job on the smaller sizes of piano wire.

And, finally, a screw starter which is a companion piece to the two Craftsman screwdrivers and is great for getting that screw started in places where fingers just won't reach.

If you have any ideas along these lines, send them to "For What It's Worth" in care of RCM --- they might publish them. □



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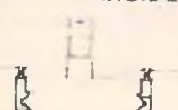
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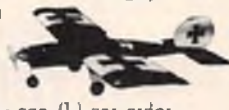
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| 2022 Speed control for 6v mtr. | 15.99 |
| 2023 Speed control for 12v mtr. | 15.99 |

MISC. ACCESSORIES

| | |
|--------------------------|------|
| 6 volt 4 ampere wet cell | 6.99 |
| 6 volt charger for above | 7.90 |

ZINGER MAPLE PROPS

| Dia. | Pitch | 6/pkg | ea. |
|-------|---------|-------|------|
| 7 | 4,5,6,7 | 5.19 | .96 |
| 7 1/2 | 4,5,6,7 | 5.19 | .96 |
| 8 | 4,5,6,7 | 5.62 | 1.04 |
| 8 1/2 | 4,5,6,7 | 5.62 | 1.04 |
| 9 | 4,5,6,7 | 5.62 | 1.04 |
| 10 | 4,5,6,7 | 5.99 | 1.12 |
| 11 | 5,6,7,8 | 6.91 | 1.28 |

TOP FLITE PROPS

| Super Maple | /doz | ea. |
|---------------------|-------|------|
| 9 x 6 | 10.50 | 1.00 |
| 10 x 6 | 11.34 | 1.08 |
| 11 x 6, 7, 7 1/2, 8 | 13.02 | 1.24 |
| 12 x 6 | 15.12 | 1.44 |

See our catalog listing for additional Zinger and Top Flite props.

SALE ENDS APRIL 15, 1979

(after which regular low prices will resume)

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Sale prices on left page and above star bordered area, supercede regular low prices in balance of ad or catalog.

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Must have expiration date

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Charge Card & C.O.D. orders - \$1.25 EXTRA

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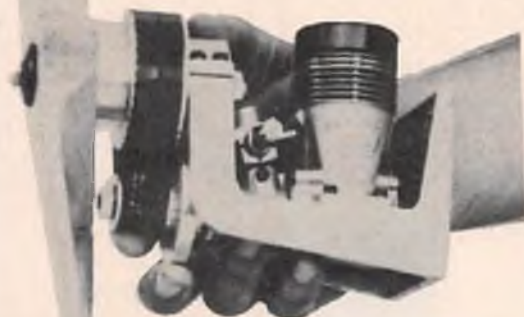
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"NEWS"

IT'S HARD TO BE HUMBLE WHEN YOU'VE GOT A WINNER

We've had some questions about turning a 60 into a 120. It's true the Maximizer™ won't double the horsepower, but it will just about double the thrust due to using a larger more efficient prop. Hence the 60 into 120 claim.



(LOOK HOW COMPACT IT IS!!!)

Quite a number of builders are using 40 size engines with great success. For this size a 16x10 or 18x6 seems about right with the standard ratio. Use a 14x10 or 16x6 with the optional pulley.

PRICE STILL \$85.00 DEALER INQUIRIES INVITED



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TELEPHONE: 216/332-0865

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R/C FLYING AND THE LAW

from page 41/40

implications is the obligation on the part of the club and/or the individual modeler to have obeyed the AMA Safety Code, a copy of which is available from the AMA as well as printed on material received by every member; it also appears in the Rule Book every member receives. A reminder of this limitation was contained in the letter sent by AMA with its individual membership materials for 1979 membership renewals. That paragraph read as follows:

"AMA coverage applies anytime, anywhere — it is not limited to model flying at contests or on the club field. It even applies to flying at public demonstrations and air shows. The governing factor is not the size or type of model, nor is it the location — what counts is the manner of flying, as per the **AMA Safety Code.** . . ."

Once again, if you have not recently looked over the AMA Safety Code, it behooves you to do so. It also is of importance for every club to insist that all members observe this Safety Code. A number of clubs have delegated individuals who are specifically charged with monitoring compliance at all club events or flying times. This is certainly an idea to be endorsed as a worthwhile precaution to be taken by every flying group. Let's keep R/C flying fun and accident free! If an accident does occur, we want the protection of that insurance and that, in turn, may very likely depend upon strict adherence to the AMA Safety Code.

If you have any particular questions or problems, feel free to write to me at 315 S. Plymouth Ct., Chicago, Ill. 60604. □

ART CHESTER'S JEEP

from page 35/32

added to the lower rear of the removable section.

"Art Chester" was carved from polyurathane foam — since nobody makes a 3½" scale pilot. His helmet was formed from one of Mrs. Fischer's old pocket books! George sewed it together and made "Art's" goggles from some "Liquid Steel". He filed them to shape and added scrap Plexiglass lenses. There **must** be an easier way!

Before covering the model, assemble it and fit the wing strut anchors into the wing. The front strut of the "V" is perpendicular to the aircraft's center

to page 150



MUTCHLER'S HOBBIES

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| Upstart II | 10.95 |
| All Star | 14.95 |
| Mach None | 11.95 |
| Shrike | 17.95 |
| Guppy | 5.95 |
| GLH II (balsa) | 11.95 |
| GLH II (foam) | 10.95 |
| Super Pacer | 19.95 |
| Pacer | 11.95 |
| Dick's Dream | 6.95 |
| Whizard | 11.95 |
| Foam Wings | 2.07 |

-A-JUSTO JIG-

| | |
|---------------|-------|
| Full House | 36.95 |
| 1/2A Retracts | 6.95 |

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|----------------|-------|
| Aeromaster Too | 53.95 |
| Big H Ray | 29.95 |
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| S Ray | 24.95 |
| H Ray | 26.95 |
| Trainermaster | 36.95 |

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|---------------------|--------|
| Super Fil | 59.95 |
| Cosmic Wind (1/2) | 95.95 |
| Soar Bridi | 12.50 |
| Waco | 66.95 |
| UFO | 89.95 |
| AT6 Texan | 95.95 |
| Dirty Birdy (glass) | 84.95 |
| Dirty Birdy 60 | 54.95 |
| Dirty Birdy 40 | 38.95 |
| Basic Trainer | 24.95 |
| RCM Trainer 10 | 19.95 |
| RCM Trainer 20 | 24.95 |
| RCM Trainer 40 | 34.95 |
| RCM Trainer 60 | 40.95 |
| Quickest 500 | 29.95 |
| Super Kaos 40 | 36.95 |
| Super Kaos 60 | 47.95 |
| Kaos | 43.95 |
| Tweedy Bird | 29.95 |
| 15-500 | 26.95 |
| P51 D (glass) | 95.95 |
| Lockheed Sirius | 95.95 |
| Chipmunk (glass) | 82.95 |
| Shrike (glass) | 126.95 |
| Quickest 200 | 18.95 |
| RCM Sportster | 24.95 |
| Rearwin Speedster | 89.95 |
| Sun Fil 4-20 | 21.95 |
| Classic 40 | 36.95 |
| Tiger Cat | 132.95 |
| T-28 | 92.95 |
| Splitfire | 90.95 |
| Babe Corbin Ace | 89.95 |
| AT6 | 95.95 |

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| Custom van | 39.95 |
| Dune buggy | 43.95 |
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| Silkspun Coverite | 5.74 |
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| Antique Coverite | 5.74 |
| Balsarite | 2.24 |
| Glaskote (Vopt) | 1.99 |
| Glaskote thinner(pt) | 1.75 |

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| Windrifter | 29.95 |
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| Viking | 55.95 |
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| E.S. Voltmeter | 17.95 |
| Sid.HiStart | 25.49 |
| H.D.HiStart | 29.95 |
| Delux S.O.HiStart | 37.95 |

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| Single Range | 14.95 |
| Dual Range | 17.95 |
| Mini | 11.95 |
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| 261 Moto-tool kit | 29.95 |
| 271 Moto-tool kit | 29.95 |
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| 371 Moto-tool kit | 35.95 |
| 381 Moto-tool kit | 43.95 |
| 571 Moto-shop | 44.95 |
| 572 Moto-shop del. | 56.95 |
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| 223 Universal stanc | 8.95 |
| 217 foot sp. contra | 15.95 |
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| Skooter II (racing) | 18.95 |
| EZ Trainer | 18.95 |
| EZ Sport | 18.95 |

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|------------------------|-------|
| Fire Plug | 17.95 |
| Fire Plug Charger | 5.17 |
| Stinger (1/2A starter) | 22.95 |
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| 1/2A racing plug | 1.25 |
| 1/2A sport plug | .97 |

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| Sr. Falcon Deluxe | 34.95 |
| Skyline 62 | 34.95 |
| Shoestring | 28.95 |
| Ranger 42(ARF) | 15.95 |

-HALLCO-

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|---------------------|------|
| B105-1 landing gear | 2.63 |
| B105-2 landing gear | 2.98 |
| B105-3 landing gear | 3.33 |
| B105-4 landing gear | 3.65 |
| B105-5 landing gear | 4.38 |
| B105-3 landing gear | 3.50 |
| B106-4 landing gear | 4.03 |
| B106-5 landing gear | 5.25 |
| B106-6 landing gear | 6.83 |

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| | |
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| Clear 1/2oz | 1.95 |

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| 1/2A ME109 | 19.95 |
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| 1/2A P-47 | 21.95 |
| 1/2A Bonanza | 19.95 |
| 1/2A Focke Wolfe | 21.95 |
| 1/2A Chipmunk | 19.95 |
| Nomad II | 14.95 |
| Shoestring | 26.95 |
| Miss Dora | 26.95 |
| Pietenpol | 36.95 |
| Nomad | 10.95 |

-JENSEN-

| | |
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| Oas Ugly Stick | 38.95 |
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| Corsair | 39.95 |

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| Multi-Charger | 19.95 |

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| Comet II | 40.95 |
| Jester C | 47.95 |
| Caprice C | 47.95 |
| Cessna | 32.95 |
| Transit | 30.95 |
| Pinto | 32.95 |

-MACO-

| | |
|-----------------|-------|
| Tiger Cat | 36.95 |
| Simplex Trainer | 26.95 |
| Vaga | 38.95 |

-MARKS MODELS-

| | |
|-------------|-------|
| Wanderer 99 | 20.95 |
| Wanderer | 12.95 |
| Windward | 20.95 |
| Windfree | 25.95 |
| Bushwacker | 25.95 |
| Sunny | 19.95 |

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| | |
|-------------------|-------|
| Stinger II | 41.95 |
| Hiperbiplane | 41.95 |
| Peppermint Pattie | 27.95 |

-MEN-

| | |
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| MEN Trainer | 22.95 |
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| Super Chipmunk | 18.95 |
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| Sweet Stick | 23.95 |
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| 2011 air brush set | 40.95 |
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| 18 gun | 9.57 |
| 16 gun | 5.70 |
| 14 gun | 4.50 |

-NOSEN-

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| Citabria | 74.95 |
| Trainer | 55.95 |
| P51 | 118.95 |
| Citabria | 89.95 |
| Mulligan | 97.95 |
| Aeronca | 89.95 |
| J-3 | 83.95 |

-PACER-

| | |
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| Econo-Pak Zap | 4.16 |
| 1/2oz Zap | 1.69 |
| X-30 (30 seconds) | 1.69 |
| Zap Applicators | .35 |

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| 728 | 52.98 |
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| Little Toni (1/2midg) | 57.95 |
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| Pole Cat | 20.95 |

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| F100 Super Sabre | 59.95 |
| Super Hunter II 60 | 48.95 |
| Super Hunter II 40 | 41.95 |
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| Maxi Acro Trainer | 87.95 |
| Acro Trainer | 48.95 |
| Acro Trainer 40 | 41.95 |

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| Pitts 52 | 66.95 |
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| Komet Balsa skin | 32.95 |
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| Komander | 30.95 |
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| Skybolt | 69.95 |

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| Solo MK II | 32.95 |
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-SONIC-TRONICS-

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| Slide winder pump | 6.27 |
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| Super Buckaneer | 29.95 |
| Tom Kitty mk15 | 27.95 |
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| Mini Fledgling | 14.95 |
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| PT17 | 62.95 |
| Super Cruiser | 34.95 |
| J3 | 18.95 |
| PT19 | 18.95 |

-STRICK'S-

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-SURE FLITE-

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| Cessna 182 (foam) | 24.95 |
| Piper Cub (foam) | 24.95 |
| Splitfire (foam) | 24.95 |
| Howard dga 1/2A pete | 16.95 |
| Baby Birdie | 11.95 |
| Super Eye Scar | 34.95 |

-TOP FLITE-

| | |
|------------------|-------|
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P47 Thunderbolt 59.95
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| Fokker Triplane | 45.95 |
| Cherokee Babe | 27.95 |
| Cherokee | 46.95 |
| Navajo | 46.95 |
| Corben Super-Ace | 31.95 |
| Sopwith Camel | 46.95 |

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| Love Maching | 28.95 |

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| 25 F SR R/C | 41.95 |
| 30 R/C | 35.95 |
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| 60 F SR w/pump | 111.95 |

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| | |
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| 61 R/C W/pump | 67.95 |
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| 40 R/C w/pump | 53.95 |
| 40 R/C Marine | 44.95 |
| 35 R/C | 22.95 |
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| 6.5CC R/C | 64.95 |

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| 15 R/C SR 2BB | 36.95 |
| 19 R/C bushing | 21.95 |
| 25 R/C bushing | 21.95 |
| 29 R/C bushing | 22.95 |
| 36 R/C bush, slide ex. | 21.95 |
| 40 R/C SR bush. | 26.95 |
| 40 R/C SR BB | 41.95 |
| 45 R/C SR bush. | 30.95 |
| 45 R/C SR BB | 41.95 |
| 60 Eagle R/C | 40.95 |
| 60 Hawk R/C | 49.95 |

-RADIO'S-

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| 6 channel w/S17 | 209.95 |
| 6 channel w/S16 | 239.95 |
| 7 channel | 394.95 |

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- PRACTICAL SCALE - TIGER MOTH \$189⁹⁵
- PRACTICAL SCALE - BE2c \$189⁹⁵
- PICA - WACO \$52⁹⁵

OLD TIMERS

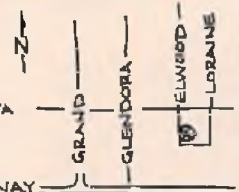
- P&W PARTIAL KITS - POWERHOUSE, ZIPPER, BUCCANEER, PLAYBOY SR, MERCURY, DALAIRE, MISS AMERICA, CLIPPER, TRENTON TERROR.
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- \$12⁹⁵ WILL GET YOU A SOAR BIRDY, WANDERER 72, OR DRIFTER II

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- TOP FLITE - P-40 \$41⁹⁵, P-47 \$55⁹⁵, P-51 \$41⁹⁵
- HOUSE OF BALSA - P-51 \$41⁹⁵



ADD \$2.00 PER ORDER FOR SHIPPING - CALIFORNIA RESIDENTS ADD 6% SALES TAX - HOURS: 12-9. SAT. 9-5. SUN. 1-5

ART CHESTER'S JEEP

from page 148/32

line. The wing strut fairings on the wing are a distinctive part of the Jeep's design. They're almost impossible to draw — in two dimensions, so examine the photos carefully to understand their shape. We molded ours over a foam form from thin butyrate sheet and held them to the wing with strips of Velcro tape. They could be carved from balsa, however. Wing and stabilizer fillets were fashioned from litho plate.

We used Coverite — because George

wanted to try it on the Jeep. It worked beautifully — particularly in the fin-fuselage fillet area. Painted, it looks like fabric and is easy to apply. We found that it is a bit thicker than MonoKote but raw edges could be sealed and smoothed with Acryl-Blue Glazing Putty (get it at an auto paint supply house — the blue putty sands easier than balsa!). The fuselage, landing gear struts, and tail surfaces are the only parts that need to be covered. The wing was resined, sanded, and the trim tape was applied to simulate rib positions. The tape was faired, using the blue putty, and a final coat of resin applied.

Painting the Jeep was a big job —

because there's a lot of area to cover. George sprayed on one coat of auto primer, most of which he sanded away because paint weight can build up fast! The Jeep we chose to duplicate (there are several versions of the Chester paint job possible) was all-over cream with black, gold, and forest green trim. We thrashed through all of the automotive paint chips we could find finally choosing Ditzler #81584 (cream) acrylic auto paint and trimmed it with Ditzler #43822 (forest green). We also used Ditzler black and gold. Sig's Diana Cream is also a good paint match, if you prefer butyrate dope.

to page 154

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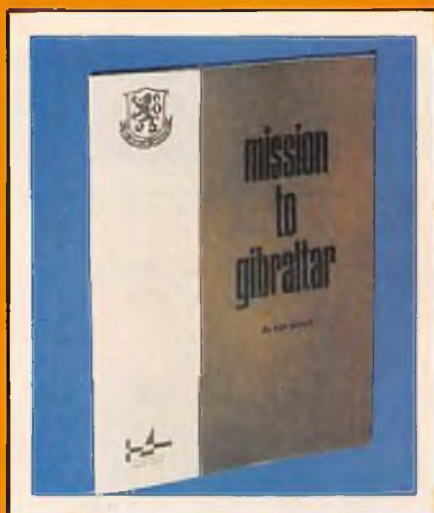
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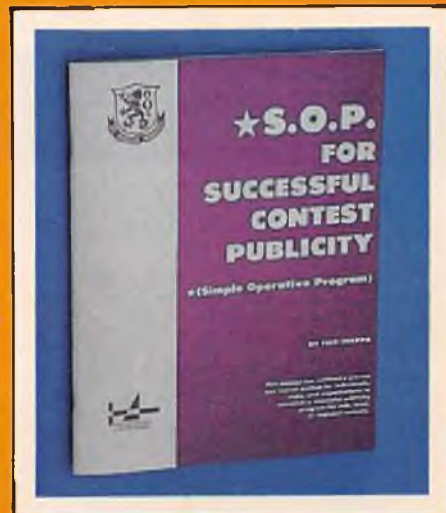
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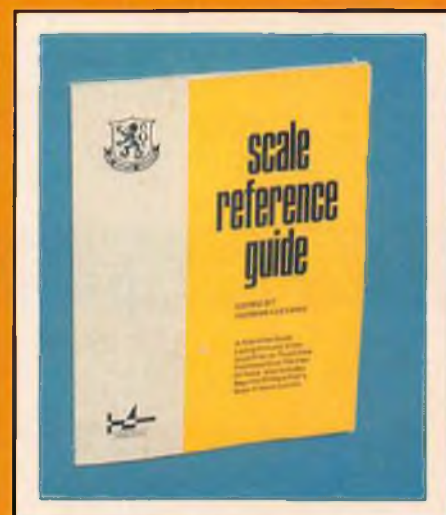
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|-----|------|-----|
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|-----------|-----------|------------|
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| 175 | 1-8x1-4 | 65 |

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ART CHESTER'S JEEP

from page 150/32

The black license numbers, on wing and rudder, were sprayed through simple paper masks, taped into position. After the paint was dry, rubbing the number areas with automotive rubbing compound will remove any overspray and leave the numbers sharply outlined. The same technique was used for the black-outlined "No. 3" racing numbers on wing and fuselage. The small legends on the model were painted on, free-hand.

George carved a 21" scale propeller from a balsa blank — to go with the scale spinner. We've included a 1/2 blade pattern for the prop on the drawing. It's painted aluminum on the front and anti-glare black on the back of the blades.

The only major task remaining is the installation of the radio. As usual, we used it to balance the model. There's a lot of room for the installation! George added some neat touches when he installed his 10 channel EK. He ran the throttle pushrod **outside** the ply engine mount. It made for a difficult wire-bending job but it permitted him to include a glow plug heating micro switch. At half throttle or less, the micro switch closes and a nicad battery keeps the glow plug hot. The nicad, which has enough "poop" for engine starting, is located in the bottom of the fuselage, just aft of the firewall. George also installed a polarized plug in one of the left side air outlets --- so that we'd be able to start the engine on external batteries, too.

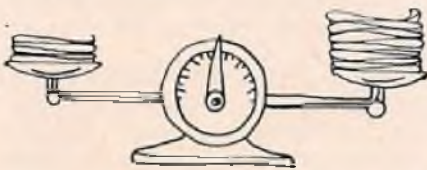
With a good radio range check, the CG in the proper position, and a well run-in Lee-Veco, we were ready to go fly! We wish we could say the model flew right off the drawing board --- but, it didn't. The first test flight was the last for our first model. An aft CG (that strange wing shape is deceptive) plus overly sensitive elevators conspired to generate a snap on the final approach — with the inevitable result. We learned where the CG should be and how effective the Jeep's controls really are. The rudder should be limited to 1/2" movement either way; the elevators plus or minus 1/4" to 3/8" (**no more!**) and the ailerons to 3/4" **total** movement (with differential, more **up** than **down**).

The second model, with the proper control set-up, flew like a pussycat. It was stable as a rock but flew as easily as the prototype. With the fixed tail skid and the slightly nose-heavy bias, we don't recommend much ground maneuvering unless you have an educated hand on the throttle. Otherwise, the Jeep handles like a gentle pattern ship. □

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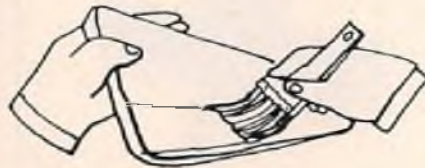
2. **Same weight as silk.** Super Coverite looks like silk, but it's 100x stronger. Since it requires 1/3rd the paint, it weighs the same or less than painted silk. Being a woven fabric, it's very authentic. Tough, too. Comes in red, white, blue, yellow, orange and "antique fabric".



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PIT STOP

from page 30/27

closer to a 100% capacity with a slower charge rate which keeps the temperature down longer. When we switch to 2 amps the voltmeter then might drop to read 9.00 volts — remember, we're reading battery and charger voltage. The voltage will keep rising, but at a slower rate. The battery voltage will keep rising until the batteries are fully charged, which will look something like this. Remember, these voltages are used as an example only 9.75, 9.76, 9.77, 9.78, 9.78, 9.79, 9.78, 9.79, 9.80, 9.79, 9.80, 9.79, 9.78, 9.77, — disconnect the charger! When the voltage starts to peak out, be ready to turn the charger off as soon as the voltage starts to definitely drop. You can also feel the batteries with your fingers and you'll notice the temperature rise. If the batteries feel a little warmer than your fingers, that's just right. If the batteries feel hot, you've gone into overcharge. Again, I want to say the examples I've given of voltages will vary considerably depending on the ambient temperature, and the power source used. They're meant as an example only.

Obviously, everyone can't afford a \$70.00 voltmeter and a custom built charger. But that's an ideal situation, and not really necessary. Now let's go to the other equipment extreme. To begin with, whatever type car and charger you have, pay attention and go by all the instructions the manufacturer recommends. He knows the best way to use his equipment. Most cars come with a charging cord, which is connected to the 12 volt battery in the family auto. If a charging cord is all that is used, then battery temperature must be used to tell "full charge". In order to tell charge by the temperature methods, you must be able to touch the metal sides of the batteries directly. Trying to tell battery temperature through plastic, tape and cardboard wrappings is impossible. As soon as you even think the batteries are starting to get warmer, **stop charging**. With a fully charged 6 cell pack and a stock motor, the car should run for about 10 minutes. The car will run the fastest, the first minute, then it will run at a slightly slower speed, the next 8 minutes. The last minute, it will start slowing down more and more. When you know the car is definitely running slower, stop running it. Otherwise the battery voltage will get too low to operate the radio, and you'll lose control of the car. You can also run the batteries down too low, which could cause one cell to reverse polarity and weaken your battery pack. As soon as the car starts to slow down, stop running it. Feel the batteries. If they are warm, you can go ahead and recharge them. If they're hot, you may have drained them down too

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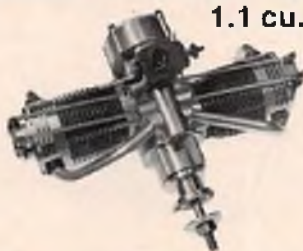
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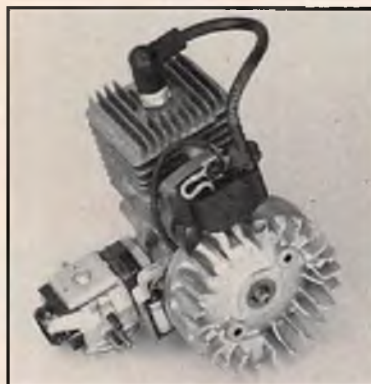
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far. Let them cool off, then you can recharge them. Recharging with the cord should take 15 to 25 minutes, again depending on how far down the batteries are and the type of cord or resistor system. The battery temperature will tell when they're charged.

There are a number of commercially available Fast Chargers on the market now, such as the ones available from Leisure Electronics and Astro Flight. Kraft, JoMac, Associated, and others, are also coming out with Fast Chargers for the electric cars. These are available in 12 volt and 110 volt models. So far, all of these chargers are **not** automatic and they do require the racer to turn them off before they go into overcharge, using either the temperature or Digital Voltmeter method, or both methods. However some companies are trying to make an automatic charger which will automatically turn itself off as soon as the battery is fully charged. The problems here are staggering though, coupled with costs, and as of this time there are none available.

One other good feature on some chargers, is a discharge circuit. It seems nicads have this ability to "remember" charge or discharge sequences. Let's say your nicads have the capacity to run your car for 10 minutes. Let's also say your club has 5 minute practice heats. Your batteries will never get fully drained. They then have this ability to "remember" the 5 minute period. When it comes time for the 8 minute race, your batteries will run strong for 5 minutes and then start to slow down before 8 minutes. By using the discharge cycle on the charger, it breaks down this "memory" and, after recharging, allows you to use the full capacity of the batteries. Good luck and keep your batteries cool.

1/8 Scale World Championships

The 1/8 Scale World Championships will be held in Geneva, Switzerland, from July 1st to July 8th, 1979. This will be for Can-Am cars on a road course. It will be a large 1,000 foot long course and will run in a counter-clockwise direction, which is the opposite direction as used in the USA.

The course will be laid out on a large parking lot and will be painted down on the lot. The lot is used as a parking lot for a large sporting complex, and is smooth and it appears it will have good traction after a couple days running on it.

European entries will be limited to 100. 30 to 40 American drivers are expected to compete. About 40 drivers are coming from Japan, plus drivers from So. Africa, Venezuela, Australia, and the Phillipines, making the total entry about 200. Further info and entry blanks can be obtained from 2E Championnat Du Monde De Boiture R/C, Case Postale 55, 1211 Geneve 1, Switzerland.

to page 160

**DODGSON
DESIGNS**

**TOMORROW'S
DESIGNS TODAY**



DAVE JOHNSON WITH HIS MAESTRO MK III.



DAVE JOHNSON & MAESTRO ----- CHAMPS !!!

FOR THE 6TH CONSECUTIVE YEAR DODGSON DESIGNS GLIDERS HAVE BEEN FLOWN BY THE WINNERS OF THE NORTHWEST SOARING SOCIETY GRAND-CHAMPIONSHIP DAVE JOHNSON, of Portland, Oregon, established himself as the TOP FLYER IN THE NORTHWEST SOARING SOCIETY for 1978. Flying his MAESTRO MK III, Dave WON THE 1978 N.W.S.S. CHAMPIONSHIP CONTEST and through consistently excellent flying all season, Dave with his Maestro has also won the 1978 N.W.S.S. SEASON GRAND-CHAMPIONSHIP, making him a DOUBLE CROWN WINNER. Dave has exhibited with his Maestro, great skill in landing consistency and in working light lift and tiny bubbles close to the ground as well as being an all-round great flyer. CONGRATULATIONS DAVE!

Other notable events in the Northwest this past season were: MAESTROS WON THE TOP 5 PLACES IN OPEN CLASS at the 1978 REGIONAL L.S.F. TOURNAMENT! The NEW MEGAN in pre-production form, flown by TOM NEILSON, MADE AN INSTANT SENSATION. Among other accomplishments, TOM AND HIS MEGAN WON THE LARGEST CONTEST sanctioned by N.H.S.S. in 1978, held in Victoria, B.C. NICE WORK TOM!

1978 USHERED IN the beginning of A NEW ERA IN COMPETITION SAILPLANE DESIGN. No longer are flyers content with ugly, slow free-flight inspired gliders when they can win WITH MAESTROS, THE SLEEK, VERSATILE, EXCITING MULTICHANNEL MACHINES.

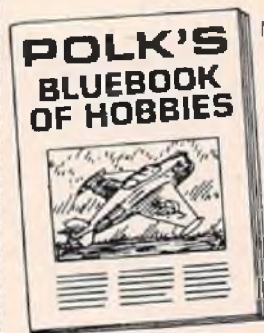
MAESTRO SERIES: Megan - \$129.95, Tallman - \$124.95, MK III - \$119.95, Caliente - \$119.95.

OTHER KITS AND PRODUCTS: Todi - \$104.95, Gu11 11 - \$89.95, Hi-Jacker 11 - \$89.95, Aluminum Winch Drum - \$35.00.

THE DODGSON DESIGNS FACTORY AT CAMINO ISLAND, WA. (U.S.A.), IS THE SOLE MANUFACTURER AND DISTRIBUTOR OF DODGSON DESIGNS PRODUCTS. DO NOT BE FOOLED BY FOREIGN IMITATIONS AND IMITATIONS!

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I am pleased to announce the addition of Paasche Air Brushes and accessories to my line of fine tools - As always warehouse to you prices, with dollar savings. If you have been thinking of purchasing an air brush but were afraid to get your feet wet, why not try the "How to Paint with Air Book" to build your confidence. Don't ruin a good model with a sloppy paint job - I supply everything but the air, for you modelers who own Air Brushes and are fed up with propellant cans that run out, get cold or just don't work, I also have a fine line of Compressors at money saving prices.



AIRBRUSHES

"HOW TO PAINT WITH AIR"

How to Paint with Air by Knauer, an outstanding commercial artist. It shows how the application of an airbrush can produce startling results.

"HTPA" .. BOOK \$5.50

"HAPK" HOBBY & AUTO PAINT KIT



This set is ideal for the Auto, Van or Cycle enthusiast who wants to fancy up his or her wheels with a modern paint job.

Set contains: 1P 1/32" flow pencil for decorative striping, 1-AE2 syphon sprayer with HL 3/16"-6" air hose, plus a H&L air brush, complete with A-1/8"-6" hose for finer detail spraying.

"HAPK" .. HOBBY & AUTO PAINT KIT \$65.95

PAASCHE AIRBRUSH SELECTION



"AB" DOUBLE ACTION AIRBRUSH

Recommended where the finest of detail is essential. Fluids used are: India Inks, Light Oil and water Colors perfectly mixed and strained. Produces a pattern from the finest of hair lines to 3/4" at a distance of approximately 5". By reducing air pressure you can achieve stipple effects. Air Pressure: 3/4 CFM @ 28 to 30 lbs. PSI. AB Brush comes complete with 1 dozen needles, hanger, screw driver, wrench, tweezers and "22" lessons booklet.

"AB" .. DOUBLE ACTION AIRBRUSH \$117.95



"M" DOUBLE ACTION AIRBRUSH

Precision instrument, perfect for detailing, shading and tinting. Designed for use by Professionals. "M" Airbrushes are packed with 1/8 oz. metal color cup, 1 oz. color bottle assembly, reamer, hanger and "22" airbrush lessons booklet.

Suggested Air Pressure: 1/2 to 1 CFM @ 20 to 30 PSI.
 "M"-No.1 Smallest Pattern-Light coverage 1/64" to 1". Light materials, water colors and India ink.
 "M"-No.2 Pattern of 1/32" to 1". Light materials, water colors and India ink.

SPECIFY YOUR CHOICE \$34.95



"VL" DOUBLE ACTION AIRBRUSH

Versatile smoothness permits flexibility of air and color action without work stoppage. Selection of sizes should be based on application, pattern desired and fluid to be used. "VL" Airbrushes are packed with 1/4 oz. metal color cup, 1 oz. color bottle, reamer, extra needle and tip in handle, wrench, hanger and "22" airbrush lessons booklet.

Suggested Air Pressure: 1/2 to 1 CFM @ 20 to 40 PSI depending on fluid being sprayed and size of airbrush.
 "VL"-#1 Smallest Pattern-Light coverage of 1/32" to 1". Light materials, inks, oils, dyes and water colors.
 "VL"-#3 Medium Pattern-More material, 1/32" to 1-1/4" Above materials plus thinned lacquers, enamels and acrylics.
 "VL"-#5 Largest Pattern-Faster coverage 1/16" to 1-1/2". Free flowing lacquers, enamels and acrylics.

SPECIFY YOUR CHOICE \$39.95



"H" SINGLE ACTION AIRBRUSH

Dependable and adaptable. World's most popular airbrush. Used by Hobbyists and Professionals. "H" Airbrushes are packed with 1/8 oz. metal color cup, 3 oz. color bottle assembly, 2 wrenches, hanger, and "22" airbrush lesson booklet.

Suggested Air Pressure: 1/2 to 1 CFM @ 20 to 40 PSI, depending on fluid being sprayed and size of airbrush.
 "H"-#1 Smallest Pattern-Light coverage 1/32" to 1". Light materials, inks, oils, stains and water colors.
 "H"-#3 Medium Pattern-More material, 1/32" to 1-1/4". Above materials plus thinned lacquers, lacquers, enamels and varnishes.
 "H"-#5 Largest Pattern-Faster coverage 1/32" to 1-1/2". Free flowing fluids.

SPECIFY YOUR CHOICE \$19.50



"M" #1 SINGLE ACTION AIRBRUSH

Easy to master and simple to operate. Ideal for instructional use in Industrial Arts. Enables a beginner to effectively spray light materials in small patterns. "M"-#1 packed with 1/4 oz. metal color cup, 1/2 oz. color bottle assembly, 2 wrenches, hanger and "22" airbrush lessons booklet.

Suggested Air Pressure: 1/2 to 3/4 CFM @ 20 to 30 PSI.
 "M"-#1 .. SINGLE ACTION AIRBRUSH \$12.75



"M" SET COMPLETE

This set combines the versatility of all three "M" size Airbrushes by including all three nozzles, metal color cup, appropriate bottle assemblies, hanger, wrenches and an A-1/8"-6" air hose with couplings.

"M"-Set .. COMPLETE \$1.95



Hose to fit all Paasche Airbrushes 10' long with 1/4" Compressor fitting in stock.

A-1/8"-10' HOSE BRAIDED \$3.95

NOT ILLUSTRATED No Air Required

"FP" FLOW PENCIL

Ideal instrument to flow a line on horizontal surface, without masking or overspray. NIB size designates width of stripe.

Cones with 1/16"-1/32"-1/64" and 3/64" NIBS. Tested with 1/32 other sizes packed in vial.

"FP" .. FLOW PENCIL \$26.95



"AEC" AIR ERASER

This versatile instrument can erase errors or act as an etching tool. Includes a carboly tip for longer life, the AEC Air Eraser is used by Hobbyists, Manufacturers, the Dental Profession, Lithographers, etc. This unit can etch without marring a fine surface such as brass. Removes oxidation or discoloration. Can etch glass or cut monograms. Clean dry air is a must. Pressures recommended are from 20 to 80 PSI.

"AEC" .. AIR ERASER \$25.95



AEC-K Air Eraser Kit includes: AEC Air Eraser with carboly tip, AEC-5 oz. jar fast cutting compound, A-1/8"-4" hose with couplings, and moisture trap installed, AEO respirator NIOSH (Safety Approved), wrench and hanger.

"AEC-K" .. AIR ERASER KIT \$45.95

I also stock the most popular cutting compound "AEX", which has a particle size from 20 to 75 Microns, with average 37.5 Microns, well within established criteria.

"AEX" 5 lbs. .. CUTTING COMPOUND \$6.95

#B0 DUAL FILTER RESPIRATOR

Industrial quality PAASCHE'S (NIOSH) safety approved respirator. For use with air eraser or while spraying in enclosed area.

B0 .. RESPIRATOR \$13.45

25 .. REFILL FILTERS FOR ABOVE (per doz.) \$1.00

CAUTION: WHEN SPRAY PAINTING - CLEAN DRY AIR IS A MUST - PLUS A WELL VENTILATED WORK AREA.



"MT" MOISTURE TRAP

Small 2" long, can be inserted into the 1/8" Air Hose to remove moisture from airline.

"MT" .. MOISTURE TRAP \$5.65

414 PP



COMPLETE PAINT SPRAY OUTFIT

Craftsmen and homeowners by the score know the usefulness of this paint sprayer. Now that we have added a Brown Hobby Gun, hobbyist artist and teachers join the crowd!

The new Hobby Gun is ideal for fine, delicate craft and model painting, and of course, auto touch up. For the big projects, the quart size spray gun does an hours painting in minutes. Sprays household and garden insecticides, too. The compressor also inflates tires, rafts, boats, balloons, beach toys and footballs. Spray gauge indicates proper viscosity of paint. Its an all purpose outfit for small jobs and an even greater value with the addition of the Hobby Gun. Outfit comes complete with compressor, quart size spray gun, 2 hoses, hobby gun, inflator kit and spray gauge.

B-414PP .. PAINT SPRAY OUTFIT 58.95

COMPRESSOR WITH BLEEDER VALVE

Lightweight compressor never needs lubrication and delivers 1.0 CFM at 20 PSI. Maximum pressure is 45 PSI. Included is a brass bleeder valve to let some air escape for use with other manufacturers (non bleeder) air brushes. This is so compressor won't stall from back pressure. Ideal for use with air brushes. This is the same compressor as above only with bleeder valve.

B-410MG .. COMPRESSOR & BLEEDER VALVE 48.95

370 Automatic Porto Tank

Five-gallon steel air storage tank holds ample air for air brush use, plus many other uses for the home shop. Complete with air shut-off cock, pressure switch set at 30-45 PSI, 15 ft. air hose and tire chucks; No. 331 multi-purpose spray gun 1 qt. cup.

Air delivery 2.4 CFM at 30 PSI, 4.2 CFM air displacement, 50 PSI safety valve setting. 2 in. IPS thread. 1/3 H.P. 110V 60 cy. AC motor. 21x9x19 in. overall.

370 Porto Tank \$118.95



4" PRECISION DISC SANDER

The Jarmac Disc Sander was designed for heavy duty, professional, production use. Because of the simplicity of design and small size (4" diameter disc and 4 x 5" table), this all metal Sander now finds a wide range of uses among model and miniature makers, hobbyists, and home craftsmen.

This tool satisfies the need for a fast way to remove burrs and rough edges from wood, plastic, and metal; round off corners; and form accurate, clean angles from 45 to 90 degrees. Modules on plastic model parts are easily removed and parts can be shaved down for precision fits in seconds.

The mitre guide, adjustable to any angle, can be set quickly to make a clean, accurate mitred surface in seconds by merely plunging the part into the surface of the sanding disc.

Assembled boxes, cabinets, table tops, etc. can be sanded in this manner to remove excessive glue and smooth out irregular joints. The metal disc that supports the sandpaper provides support for making straight edges when parts are pressed against it. The table has a machined slot for the mitre guide that is perfectly parallel to the sanding disc. This results in the ultimate in accuracy when making picture frames and where other precision acute angles or perfect right angle surfaces are required. The high quality, sanding discs that come with the Sander are capable of sanding metal and can be used for sharpening chisels, knives, and other hand tools; cleaning edges of brass railroad track, etc.

The sandpaper discs are self adhesive for quick changeover. The used sandpaper is removed simply by peeling it off the metal disc.

2001 .. JARMAC 4" DISC SANDER 44.95
2002 .. FINE SANDING DISCS (3 per pk) 2.25
2003 .. COARSE SANDING DISCS (3 per pk) 2.25

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Yes! I have the whole Oremel line in stock. Order what you want or what you haven't been able to purchase at your local hobby shop. We wanted show all the items with their discounted prices listed are just a few of the larger ticket items.

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| 8003 | Combination Blade 30 teeth..... | 4.00 |
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X-8010 ... Finishing Brush 15.50

NEW

SHERLINE PRODUCTS



SHERLINE'S "NEW" 3051-N

Quick acting screwless toolmaker's vise, exerts pressure at a 45° downward angle to keep work from lifting. Overall Length ... 4" Total Height ... 2 1/2" Width of Jaws ... 2" Clamping Capacity ... 7 1/2" Height of Grooved Jaws ... 1 1/2" Rough adjustment is made by pulling steel pin and sliding jaw up to work - then tightening with allen wrench. Base and body parts are black anodized, machined aluminum. This little gem offers both precision and reasonable cost, although these features are found only on expensive toolmaker's vises. Includes hold downs.

3051-N ... MILLING VISE 26.95
5000 ... Vertical Mill 212.00

Sherline Lathe with American threads. Standard equipment included with the lathe consists of motor and speed control, pulleys, belt, faceplate and carrier, two dead centers, two Hexagon keys, toolpost and tool bit, three-car cord, instruction booklet and guarantee card.

4000 ... Sherline Lathe 192.55

4000-A comes complete with the following: Sherline Lathe (4000) - Tall Stock Chuck and Key (1072) No. 1 Morse Arbor (1188) - 3-Jaw Chuck (1041) - Everything needed to get started.

4000-A ... Sherline Lathe 232.55

SEE MY AD OCTOBER R.C.N. FOR FULL SPECIFICATIONS

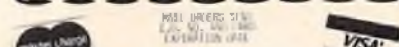
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"BIRD OF TIME" LEADS THE NATION!

Steve Work, flying the Bird of Time, holds the No. 1 slot on the team representing the United States at the World Soaring Championships being held in Belgium July 1979.

Span . . . 118 Inches

Wing Loading, Ready To Fly . . . 5.6 Oz. Sq. Ft.

ALL BALSA CONSTRUCTION

MARK'S MODELS

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PIT STOP

from page 157/27

For all you guys who want to make it a European racing vacation, the following weekend in Weisbaden, Germany, there will be an open invitation race for Can-Am cars on a new R.C. car track. This is a special track for R.C. cars only, with grass borders and grass infield. This is also quite a bit different from any of our tracks in the USA and should be a lot of fun to run on. Further info can be obtained from: Karlheinz Will, 6202 Weisbaden-Biebrich, Biebricher Allee 177, West Germany. □

BIG IS BEAUTIFUL

from page 26/22

Regular readers will recall my mentioning in last month's column that I had heard from Dario Brisighella of Oak Creek, Wisconsin, telling me that he had come up with a method to reduce the vibration in the Quadra engine. I immediately sent him one of my Quadra flywheels and he has done his thing with it and returned it to me.

Just to set the stage, I have two of

them --- one has been flown quite a bit and one has almost zero time on it. I sent Dario the flywheel from the new engine and received it back just a couple of days ago. I ran it that same evening and I was impressed, comparing it to the engine with the time on it. Idle has smoothed out very noticeably and it appears to run better (less vibration) throughout the entire throttle range. Now, I'm no engineer and do not have any sophisticated test equipment, and I admit to comparing two different engines rather than a 'before' and 'after' test on the same engine. I feel that there is a significant difference and the chap

to page 163

Model Master™ Caddy

- ★ Special plastic laminate exterior
- ★ Weather, Max Burn & Fuel resistant surface
- ★ Paper towel holder
- ★ Four colors: Orange-Red, Yellow-Blue
- ★ Wide stance, All Aluminum legs
- ★ Light weight



- ★ Optional Aluminum detachable POWER MODULE CASE
- ★ Carries starter, 12v battery, power panel transmitter & has hooks for cutting gloves & starter cords



Starter, 12v battery per panel trans not included!

- ★ Recessed lockup parts & scale from rolling off!
- ★ Optional clear plastic 18 # steel organizer
- ★ Additional storage for 2nd trans, tools, props, etc.



- ★ Model cradles telescopic & tilt for field repairs
- ★ Fuselage cradles available in four standard sizes (see below)
- ★ Cradles are interchangeable with wing, boat and helicopter cradles
- ★ All cradles are interchangeable with our bench top MODEL MASTER CRADLE set.



How to Order:

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Name _____
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MODEL MASTER CADDY \$19.50
POWER MODULE CASE (optional) \$19.50
18 DRW # CABINET INST LD (optional) \$30

* Select any two fuselage cradle sizes with MODEL MASTER CADDY.
Circle: A-(25) B-(35) C-(5) D-(18)

Patent Pending

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IN TOUGH COMPETITION THERMALON IS HARD TO BEAT!

Model airplanes, needless to say, are subject to hard abuse. The way they are built and covered will, in turn, determine how they withstand a typical day at the flying field.

This is where Thermalon can help! Because it is a woven polyester fabric, it's tough—tougher than the equivalent plastic iron-on or even silk. Yet, when it comes to finished appearance and ease of application, it's every bit as good and more. Thermalon is pre-painted in layers to a high-gloss finish that gives a deeper quality look than plastic and, once ironed into place, it won't re-sag over time!

ADD IT UP—STRENGTH AND BEAUTY. Two good reasons to give it a try on your next project—you've nothing to lose and, in all likelihood, a more attractively finished airplane to gain.

Available at your local dealer.

COLORS

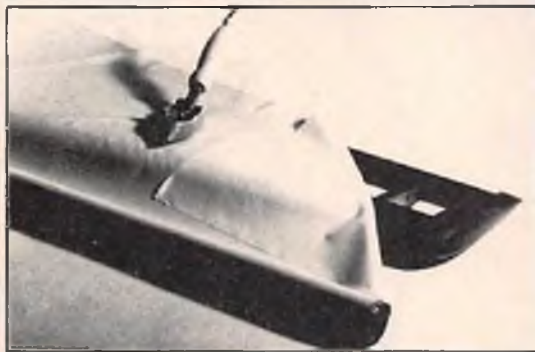
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ULTRAGLOSS THERMALON

Price:
44" x 15' 47.95
38" x 44" 10.75

WHAT IS THERMALON

THERMALON was developed by Royal to combine the quality, strength and beauty of a silk and dope finish with the convenience, speed and odorless application of the plastic iron-on films. It is a woven polyester fabric that is coated with a thermal activated adhesive on one side and painted to a high gloss, fuel-proof finish on the other. When heat is applied, the fabric will adhere to the uncovered structure and will shrink tightly into place.



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WHY USE THERMALON

1. THERMALON saves time! It offers one-step, easy-on convenience.
2. THERMALON shrinks evenly from all directions. This means that there is no fabric grain to worry about when covering and even shrink tension is exerted over the entire structure.
3. THERMALON gives the deep-gloss, quality look of a silk and dope finish. Ultragloss THERMALON gives a deeper, more scale-like gloss than the plastic films or competitive iron-on fabrics.
4. THERMALON stays shrunk! Once applied, it won't re-sag like the plastic films tend to do over time.
5. THERMALON can be applied within the heat range of most covering irons. The working temperature is 300° F, which is far less than the maximum and beyond iron temperatures required of some competitive iron-on fabrics.
6. THERMALON has superior handling characteristics on compound curves. Because the fabric tends to shrink evenly and because it shrinks 9% more than the leading iron-on fabric, much of the work is taken out of covering.
7. THERMALON is lighter than the leading competitive iron-on fabric! If weight is a consideration, you can save approximately 10% by using Ultragloss THERMALON over a competitive gloss iron-on fabric.
8. THERMALON accepts most paints or comes in colors, if you prefer not to paint. It is currently available in red, white, navy blue, orange and yellow. THERMALON will accept Pactra dope, K&B, Pactra and Hobby Proxy epoxy paints. It will also accept Perfect and Pactra poly-urethane paints.
9. THERMALON comes in gloss or matte finishes. The matte is called Superweave and is lighter than the gloss (Ultragloss) THERMALON. It can be used where weight is critical or for scale where matte finishes are desirable.
10. THERMALON is strong! Since it is a woven fabric, it is far stronger than any of the plastic films.

25th TOLEDO

ANNUAL RADIO CONTROL EXPOSITION

The 1979 edition of the world's greatest radio control exposition promises to be the best as this is our Silver Anniversary. Plan now to attend and bring your latest completely finished model to display or enter the competition for awards. The WRIGHT FLYER, which has been displayed for the past three years, will be awarded to this year's Best of Show winner. See and meet the leading radio control manufacturers and personalities. We will celebrate our twenty-fifth birthday at the Toledo Sports Arena at One Main Street next to the historic Maumee River. This year's show features the Saturday Night Auction and one of the world's largest Swap Shops. During the course of the exposition complete r/c systems, radios, engines, and accessories will be raffled off. We are open to the public all three great days. So, come, join us, help us celebrate the Silver Anniversary edition of unquestionably, the world's greatest radio control show.

APRIL 6, 7 & 8, 1979

| | |
|----------|-----------------|
| FRIDAY | 9 am to 6 pm |
| SATURDAY | 9 am to 6 pm |
| SUNDAY | 9 am to 3:30 pm |

presented by **Weak Signals R/C Club**
P.O. Box 5772
Toledo, Ohio 43613



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OR BY MAIL



PRODUCTS

FAST SERVICE



CUSTOM-CRAFTED MODEL AIRCRAFT AND R/C PRODUCTS

—BEGINNERS—
TRAINERS

| ANDREWS | REG | DELUX |
|-----------------|-------|-------|
| H ray | 27.50 | 41.00 |
| Big H ray | 31.00 | 45.00 |
| BRIDI | | |
| RCM-40 | 39.00 | 54.00 |
| RCM-60 | 43.25 | 59.00 |
| GOLDBERG | | |
| Falcon 56 II | 27.50 | 42.00 |
| Sr. Falcon | 36.95 | 52.00 |
| JENSEN | | |
| Ugly Stick | 41.75 | 58.00 |
| MIDWEST | | |
| Sweetstick | 25.86 | 41.00 |

REDCO DELUX KITS: (Trainers) Almost everything you will need. Each delux kit contains 4 oz. Wilhold glue, a 2.5 oz. set of Devcon 5 min. epoxy (Tubes) EK hinges, nyrod, & illex cable control rod sets as required, ail. control horns, wheel collars, metal & nylon clevises, box of rubber bands, as req. plus Dubro low bounce wheels, fuel line, and the right Sullivan tank for the largest engine called for. 2" CG spinners, Kraft Hayes Eng. mounts and Banner axels are also included in kits needing these items. 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

| SuperManacoat | RETAIL | REDCO |
|--------------------------|--------|-------|
| Opaque Colors (per roll) | 9.00 | 5.35 |
| Metallics (per roll) | 10.50 | 6.35 |
| Reg. Monoc | 4.50 | 2.75 |
| Trim (solid) | 1.19 | 1.00 |
| Trim (checks) & Glo | 1.59 | 1.30 |
| Super Coverite | 7.75 | 5.50 |
| TF Monoc. Iron | 18.95 | 13.75 |
| TF Heat Gun | 27.95 | 19.50 |

COMBOS

| | |
|---------------------------|-------|
| RCM T 40 w/Fox 40 SCHN | 68.00 |
| RCM T 60 w/K&B 61 w/MUFF | 96.00 |
| Big H Ray w/Fox 45BB SCHN | 72.00 |
| Skylark 56 w/Fox 45 SCHN | 72.00 |
| Tweedy Bird w/OS25 SCHN | 70.00 |
| Sun-FH 4-20 w/OS25 SCHN | 61.00 |

REDCO PRODUCTS

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VIENNA, VA 22180

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|--------------------------|--------|-------|
| Aeromaster Too | 79.95 | 52.50 |
| BRIDI | | |
| Sunflit 4-20 | 29.95 | 21.50 |
| Tweedy Bird | 39.95 | 30.25 |
| Dirty Birdy 40 | 59.95 | 41.50 |
| Dirty Birdy 60 | 84.95 | 59.95 |
| Dirty Birdy 60(G) | 124.95 | 85.00 |
| Kaos 60 | 66.95 | 46.50 |
| Super Kaos 40 | 55.95 | 40.00 |
| Super Kaos 60 | 69.95 | 48.00 |
| UFO (G) | 129.95 | 92.00 |
| GOLDBERG | | |
| Skylark 56 II | 49.95 | 30.75 |
| MIDWEST | | |
| Mach 1 | 94.95 | 63.50 |
| STAFFORD | | |
| EAA Acro Sport | 64.95 | 46.50 |
| EAA Acro Sport Foam Wing | 69.95 | 49.95 |

R/C ENGINES

| FOX (all w/o MUFF) | RETAIL | REDCO |
|-----------------------------|--------|-------|
| .40 STD SCHN | 45.95 | 30.95 |
| .40 BB SCHN | 64.95 | 42.95 |
| .45 BB SCHN | 64.95 | 42.95 |
| .60 BB Eagle | 64.95 | 42.95 |
| Other sizes in stock P.O.R. | | |

K&B

| | | |
|-----------------------------|--------|-------|
| .40 Series 75 | 67.50 | 39.99 |
| .40 w/Pump | 95.00 | 57.75 |
| .61 Series 75 w/Muff | 90.00 | 55.00 |
| .61 Ser. 75 w/Pump w/Muff | 115.00 | 68.50 |
| Other sizes in stock P.O.R. | | |

O.S. MAX

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|--|--------|--------|
| .25 FSR w/Muff | 59.95 | 41.50 |
| .60 FSR w/Muff | 129.95 | 93.50 |
| .60 FSR Pump w/Muff | 159.95 | 110.00 |
| Other sizes in stock Check avail. P.O.R. | | |

KRAFT

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|------------|-------|-------|
| .61 w/Muff | 99.95 | 79.50 |
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SUPERTIGRE

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| X 60 SE schen | 125.00 | 85.00 |
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WEBRA P.O.R.

SCALE KITS

| BRIDI Glass kits check availability | RETAIL | REDCO |
|--|--------|-------|
| P.O.R. | | |
| JEMCO | | |
| FW-190 D9 | 58.50 | 39.50 |
| P-51 | 58.50 | 39.50 |
| PT-19 | 54.50 | 39.50 |
| ME-109 | 54.50 | 39.50 |
| F4U | 68.50 | 47.50 |
| 6F6 | 68.50 | 51.50 |
| T-6 | 58.50 | 42.00 |
| HOUSE OF Balsa | | |
| P-51 40 | 54.95 | 39.00 |
| MIDWEST | | |
| Pills | 94.95 | 64.00 |
| NOSEN check availability P.O.R. | | |
| PICA (Platt) | | |
| T-28 | 79.95 | 54.95 |
| Spitfire | 79.95 | 54.95 |
| Fw-190 D9 | 79.95 | 54.95 |
| Waco | 79.95 | 54.95 |
| Duelist 2/40 | 89.95 | 58.95 |

BOB HOLMAN KITS AND PLAN PACS

KIT SPECIALS

| ROYAL | RETAIL | REDCO |
|-----------|--------|-------|
| F4U 60 | 94.95 | 77.50 |
| P-51D | 94.95 | 77.50 |
| F8F | 94.95 | 75.50 |
| Hein Sr. | 94.95 | 75.50 |
| Oscar Sr. | 89.95 | 73.00 |
| SIG | | |
| Ryan STA | 73.50 | 62.95 |

SCALE WINNERS READY TO FLY

| | |
|--------------------------------------|--------|
| PLATT T-28 | P.O.R. |
| PLATT FW-190 | P.O.R. |
| ROYAL SPIT 60 | P.O.R. |
| ROYAL F4U 60 | |
| See R/C Modeler Dec. 78 Model of Mo. | P.O.R. |

BIG DEAL

| | |
|--|--------|
| Nosen P-51 plus a 60 Maximizer | 182.50 |
| Nosen Mulligan plus Super Hustler engine plus FREE 20 x 8 prop | 279.00 |

RETRACTS

| RHOM | RETAIL | REDCO |
|-----------------|--------|-------|
| 2 Gear Mains | 87.00 | 57.75 |
| 2 Gear FW-190 | 89.50 | 59.50 |
| 2 Gear 90° | 114.95 | 75.99 |
| 3 Gear Belly Mt | 125.00 | 80.50 |
| 3 Gear Firewall | 125.00 | 80.50 |

THINK BIG

| | RETAIL | REDCO |
|--|--------|-------------------|
| 60 Maximizer Extra Belts | 85.00 | 61.50 2.00 ea. |
| 20x10 Grish prop (best for this unit.) | 8.00 | 6.95 |
| QUADRA | 139.95 | 95.00 |
| 20x6 TF Super M Prop | 7.95 | 6.50 |
| 20x8 TF Super M Prop | 7.95 | 6.50 |

SUPER

| | |
|---|--------|
| E.W.H. Super Hustler Engine with FREE 20x8 Prop | 179.95 |
| Pre-drilled 20x8 prop for super hustler | 7.95 |

WHEELS

| UNIVERSAL SCALE | RETAIL | REDCO |
|-----------------|--------|-------|
| 2 1/4" | 4.50 | 3.40 |
| 2 1/2" | 4.65 | 3.50 |
| 3" | 4.95 | 3.65 |
| 3 1/4" | 5.20 | 3.95 |
| 3 1/2" | 5.65 | 4.25 |
| 3 3/4" | 5.95 | 4.50 |
| 4" Diamond | 8.99 | 6.95 |
| 4" Straight | 8.49 | 6.50 |

MISC.

| | | |
|----------------------------|-------|-------|
| Robart Sup. Pump | 17.95 | 12.95 |
| Robart auto mix | 9.95 | 6.95 |
| Robart Super Stnd | 4.98 | 3.50 |
| Fitteglass Mask film 15oz. | 5.95 | 4.50 |
| K&B Resin Qt. | 7.50 | 5.50 |
| K&B 3/4oz. cloth | 3.75 | 2.25 |
| Devcon 5 min 9 oz. | 5.80 | 3.75 |
| Devcon 5 min 2 1/2 oz. | 2.65 | 2.05 |
| Vortac bomb twin pkg. | 9.98 | 7.00 |
| Hot Stuff 14.2 gr. | 3.50 | 2.10 |

ORDERING INFORMATION

ADD \$2.50 (+ \$1.00 for C.O.D.) to all orders for shipping and handling costs except for oversized kits i.e. Bridi Glass Kits, which require \$6.00 + \$1.00. Shipping excess will be refunded in cash. Credit card customers please include card number and exp. date. Some items in limited quantity and all are subject to availability. Prices may change if retail prices change.

VA RESIDENTS ADD 4% SALES TAX
THANK YOU FOR SHOPPING REDCO

BIG IS BEAUTIFUL

from page 160/22

who helped with the test run of the modified engine agrees with me.

Dario's address and the details were in last month's column, and he tells me he has discovered significant differences between flywheels. So, if your Quadra shakes, rattles, and rolls, send it to Dario, he sure made mine better.

On the same subject, anyone who had witnessed the two of us trying to get a tachometer reading on the modified engine, using one of Zingers lovely 20/8 props, would have laughed. We were

using a Heath Thumtack which reads reflected or transmitted light off or through the prop and were unable to get a reading. We finally managed to figure it out. If you can set the meter up using either an incandescent or fluorescent light, then it is going to be just a tad difficult to get a reading from a spinning prop under that same light! (Bonehead move of the year, anyone?)

★ ★

The guys at Quarter Headquarters (P.O. Box 12321, San Francisco, Calif. 94112) are batting them out as fast as I can keep up with them. Their current offering (see photo) is a Quarter Scale cowl in polished aluminum. It is 8 1/2" in diameter and 5 1/4" deep. It's a perfect fit

for the Dave Platt Bucker Jungmeister, and valve cover blisters are available. Mounting brackets are also available. I would suspect this cowl is adaptable to many models and, so far as I am aware, it is a first for large models. The cowl is No. C-8 at \$17.50, and the Blister/bracket package (No. C-8B) is \$6.50. Order through your dealer or, if not available, order direct. Postage and handling comes to \$1.50 and California residents must include the 6% sales tax. That's a Quadra in the photo and it looks like it might just fit! The variety of products being readied for market by Quarter Headquarters is such that they are going to have a pretty complete line

to page 166

EMPIRE MODELS

Do You Like To Play
In The Water?
Build This Dumas
Deep Vee 40 C/F
And Learn How Much Fun
The Water Can Be!

\$64.95



ASTRO FLIGHT

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|--------------------|-------|
| ASW 17 Sailplane | 62.75 |
| Martinez Sailplane | 31.75 |
| Electra Fly | 17.75 |
| Californian | 51.75 |
| ALCANTARA | |
| Sid. H. Star | 26.25 |
| HD 14 Star | 29.95 |
| Astro 10 System | 54.75 |
| Astro 15 System | 66.75 |
| Astro 25 System | 74.75 |

AIRTRONICS

| | |
|-------------|-------|
| Q-Tea | 20.09 |
| Square Soar | 22.75 |
| Gare Sport | 36.55 |
| Questor | 31.95 |
| Aquila St | 63.95 |
| Olympic II | 45.75 |
| Acro-star | 82.49 |

BATTERIES

| | |
|--------------------|-------|
| Nicads | |
| 1.25 V 2 Amp | 1.98 |
| 1.25 V 7 Amp | 2.95 |
| 1.25 V AA 500 MAMP | 1.75 |
| Sealed Lead | |
| 12 Volt 1.9 Amp | 14.95 |

BRID

| | |
|-------------------|--------|
| T-10 Trainer | 18.75 |
| T-20 Trainer | 29.95 |
| RCM Trainer 40 | 37.49 |
| RCM Trainer 60 | 44.95 |
| RCM 15-500 | 29.95 |
| RCM Sportster | 29.95 |
| Super Kaos 40 | 39.31 |
| Super Kaos 60 | 52.49 |
| Shrike Commander | 138.95 |
| Dirty Birdy 40 | 44.25 |
| P-51 Mustang | 97.49 |
| T-6 Texan | 97.49 |
| Quickest 500 | 29.95 |
| RCM Basic Trainer | 29.95 |
| Dirty Birdy | 63.75 |
| Soar Birdy | 13.50 |

PICA

| | |
|---------------|-------|
| RC-2 T-28 B | 69.95 |
| RC-3 FW 190 | 69.95 |
| RC-4 WACO F-3 | 69.95 |
| RC-5 Duellist | 72.95 |

DUMAS Sail Boats

| | |
|-------------------------|--------|
| Hobie Cat | 7.75 |
| Alcott Sun Fish | 13.75 |
| 30 Star Class | 33.75 |
| 45 Star Class | 79.00 |
| Bingo 50/800 Fiberglass | 180.00 |
| 219 Lightning | 14.25 |
| *NEW* Dumas Huson | 119.75 |
| Etchells 50/800 | 163.95 |
| East Coast 12 Meter | |
| Fiberglass | 180.00 |
| Probar Sail Unit | 35.95 |

Dumas Hardware 25% Off
Current List

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| Coast Guard Lifeboat | 37.90 |
| Tuna Clipper | 31.25 |
| Little Shelley Foss | 28.50 |
| Shelley Foss | 51.95 |
| Coast Guard 40' Utility | 30.50 |
| Dauntless | 43.20 |

DUMAS Hydro & Deep Vee

| | |
|---------------------------|-------|
| AVL-1 Atlas Van Lines | 7.85 |
| AVL-40 Atlas Van Lines 40 | 36.95 |
| Pay 'n Pak | 27.00 |
| Hot Shot Tunnel Hull | 20.95 |
| U-76 Hydro | 34.95 |
| DV-20CF Deep Vee 20 | |
| Competition Fiberglass | 50.95 |
| DV-40CF Deep Vee 40 | |
| Competition Fiberglass | 64.95 |
| DV-60CF Deep Vee 60 | |
| Competition Fiberglass | 69.50 |
| DV-10 Mahogany | 7.85 |
| Deep Vee 21 1313 | 29.95 |
| *NEW* Atlas Van Lines U-1 | 33.25 |
| *NEW* Hot Shot 21 | |
| Glass Kit | 47.25 |

MIDWEST CONTROL LINE PRICES SLASHED!

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|-------------------|-------|------------------|
| 215 Magician 15 | 8.75 | 12.95 |
| 235 Magician 35 | 12.49 | 18.95 |
| 236 King Cobra 35 | 14.95 | 21.95 |
| 237 Mustang 35 | 14.95 | 21.95 |

E.D. TUNED PIPES

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|------------------|-------|
| #1 15-20 | 17.25 |
| #2 1 29-40 | 18.65 |
| #3 Quiet 1 40-60 | 21.75 |

FOX ENGINES

| | |
|-----------------------|-------|
| 11600 15 Schn | 19.56 |
| 21600 15 Schn R/C | 26.56 |
| 21900 19 R/C | 25.86 |
| 22500 25 R/C | 21.60 |
| 13500 35 Stunt | 19.56 |
| 13600 36 | 19.56 |
| 13700 36 BB Combat | 34.96 |
| 23600 36 R/C | 25.86 |
| 24500 45 R/C Schn | 36.35 |
| 26099 60 BB Eagle R/C | 48.95 |

Fox Tanks Wheels All in Stock
Mufflers 25% Off List

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|---------------------|-------|
| Ranger 42 ARF | 19.16 |
| Falcon 56 II | 34.95 |
| Sr. Falcon | 44.75 |
| Jr. Falcon | 9.55 |
| *NEW* SKYLARK 56 II | 34.95 |
| Jr. Skylark | 11.95 |
| Skylark 62 | 44.75 |

HUGHEY BOATS

| | |
|-----------|-------|
| 20 Rigger | 84.95 |
| 40 Rigger | 92.50 |
| 19 Hydro | 66.75 |

INTERNATIONAL PIPES

| | |
|------------------|-------|
| 501 1 15 Size | 14.95 |
| 503 1 19 21 Size | 16.50 |
| 507 1 40 Size | 17.25 |
| 509 1 45 Size | 18.25 |
| 511 1 61 71 Size | 18.25 |

K & B

| | |
|-----------------------|-------|
| 6711 19 | 26.95 |
| 6712 19 R/C | 33.75 |
| 8450 3.5 F Rotor | 41.75 |
| 7860 35 Plain Bearing | 21.95 |
| 7861 35 R/C | 25.65 |
| 8600 5.8cc FF Racing | 68.65 |
| 8380 3.5cc R/C | 48.50 |
| 8382 3.5 cc Outboard | 72.95 |
| 8011 40 R/C | 42.25 |
| 8360 40 R/C Pump | 60.49 |
| 9040 40 RSII Marine | 72.95 |
| 6525 61 R/C | 57.49 |
| 6535 61 R/C Pumper | 74.25 |

LANIER

| | |
|-----------|-------|
| Comet II | 43.95 |
| Cessna | 34.85 |
| Pinto | 34.85 |
| Jester II | 55.15 |

MARKS MODELS

| | |
|-------------|-------|
| Windward 72 | 25.80 |
| Windfree 99 | 35.25 |

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| Bushwacker w/o access | 35 |
| Wanderer | 15 |
| Sunny | 25 |
| Windfree RTC | 107 |
| Wanderer RTC | 53 |
| Trainer 40 RTC | 78 |

MIDWEST

| | |
|---------------------|----|
| 106 Tri Squire | 21 |
| 109 Lil Tri Squire | 15 |
| 122 Das Lil Stik | 22 |
| 125 Cessna Cardinal | 21 |
| 126 Super Chipmunk | 21 |
| 128 Sweet Stik | 27 |
| 129 Cardinal Squire | 57 |
| 130 Strike Master | 49 |
| 131 Pitts Special | 71 |
| 134 Attacker | 27 |
| Love Machine | 32 |
| AXIFLO40 | 35 |
| AXIFLO49 | 28 |
| Easy Flyer | |
| 60 Trainer | 60 |
| Hankel He-162 | 53 |

SIG

| | |
|---------------------|----|
| Kadel | 27 |
| Kougar | 35 |
| Komander | 30 |
| Citabria | 45 |
| Chipmunk R/C | 47 |
| J-3 Cub | 30 |
| Clipped Wing Cub | 30 |
| Smith Mini Plane | 39 |
| Double II | 19 |
| Super Sport | 15 |
| Liberty Sport | 50 |
| Sig Minow | 22 |
| Cessna 150 | 55 |
| Mustang Stunter U/C | 22 |

STEVE MUCK

| | |
|-----------------------|----|
| North Wind 40/60 Mono | 44 |
| Lil Lightning 21 O. B | 36 |
| Bushwacker 20 Hydro | 82 |
| Lil Northwind 20 Mono | 42 |

SURE FLITE MODELS

| | |
|-----------------|----|
| J-3 Cub ARF | 28 |
| Spitfire ARF | 28 |
| 7' Citabria | 84 |
| A7-A Corsair II | 28 |
| Baby Turkey | 19 |

TOP FLIGHT MODELS

| | |
|------------------|----|
| P-51 Mustang | 46 |
| P-40 Warhawk | 46 |
| P-39 Aircobra | 46 |
| P-47 Thunderbolt | 63 |
| ST-10A | 46 |
| School Master | 11 |
| Freshman Trainer | 35 |

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| | | |
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| 1.75 | 1.98 | 2.95 |

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DIRTY BIRDY 40**
\$44.25



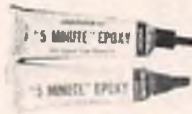
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40% ALL SIZES!

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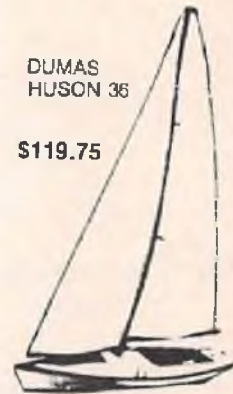


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| 5% | \$ 6.20 | \$28 | \$158 FOB |
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BIG IS BEAUTIFUL

from page 163/22

of accessories for those of us who believe Big Is Beautiful. I hear rumors they will soon have Quarter full sized instrument faces on the market, and that is great!



Quarter Headquarters are now producing this Quarter sized cowling. Fits the Dave Platt Bucker Jungmeister if you happen to be scratch building the model from RCM plans. Blister kit and mount hardware also available.

★ ★

I have just received Dave Platt's Bucker Jungmeister kit and have started construction on it. I must say that Dave has lived up to his reputation with this kit. The wood is really great --- I haven't found a piece in it that I would replace so far. The model is Quarter Scale with a wingspan of 64 7/8" so it is not a huge bird. The wing spars are spruce (1/4 x 3/4 front, 1/4 x 5/8 rear) so there is lots of strength in the wing. I have sheeted the 1/8" sheet sides of the fuselage with 1/32" ply for added strength as I plan to use a .85 cubic inch gasoline engine in mine. The model, as designed, was flown on a good .60 and would take a .91 as well. My predilection for gasoline powered engine is leading me to do a little experimenting. The kit is well designed (as one would expect from Dave) although construction is a bit harder than your average trainer. The moderately experienced modeler would have no difficulty with it at all. Several variations are shown on the plan and changes to different modifications would present no problem to the above builder. Excellent three-views are included with the kit to accommodate several different aircraft. It can be built as a sport scale or full AMA at the builder's discretion.

★ ★

Bill Skipper of Scale Craft RC (1907 14th Ave., Greeley, Colorado 80631) has a new Curtiss Robin plan at 22% full scale on the market at \$25.00 postpaid. I received one from Bill the other day and it is a beauty. Bill says it flies like a dream and I don't doubt that at all. It comes out around 12 to 15 pounds with 12 square feet of wing area and is meant to be

to page 168

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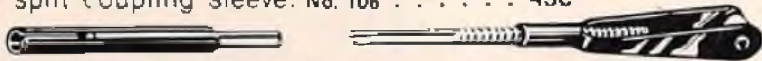
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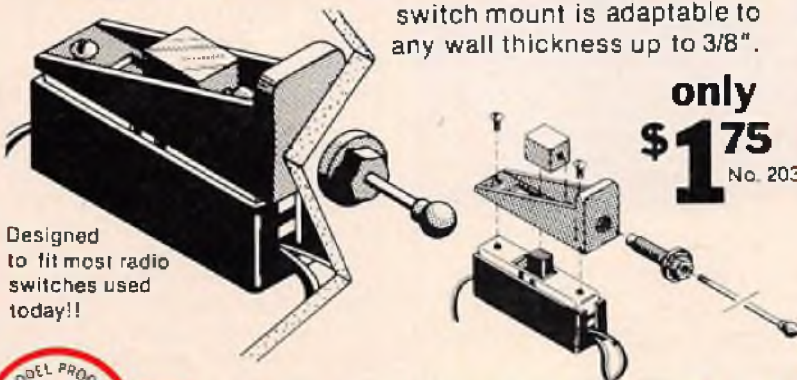


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BIG IS BEAUTIFUL

from page 166/22

flown on a Suevia or one of the larger glow engines. A Quadra, or one of the other currently available gas engines, would require some alteration in the engine house and the engine would be out in plain view (or at least a good part of it would). Lots of spruce is used in construction and it should be a strong, good flying bird. It, too, is aimed at the experienced builder and Bill has adhered to the KISS principal (Keep It Simple, Stupid) so the plan is uncluttered with extraneous detail. Very straightforward construction is used throughout with a novel and very strong wing connection being provided. If you are into Quarter Scale, you should add this plan to your library.

★ ★

That's it for this month. Once again, the space available has been used up. See you next month . . . Big Is Beautiful! □

SUNDAY FLIER

from page 19/16

and to one new squad he shouted "Don't youse guys ever learn?"

According to Ken Willard youse guys open his mail, so when you've read this Mr. Dum Dum entry, please pass it on.

My first model was a 700 Squares O.T., three channels with two stick radio and standard set-up.

Second model, which I wasn't quite ready for, was four channel, same radio type.

At the field with both models, I set up the four channel, did the range check, walk-round, and control movement check.

On second thoughts, I decided to fly the O.T. wing on the four channel model, thus lessening the chance of piling it in. (This was mid-week, I was flying alone.)

I changed the wings and since I had already done my checks (Ellery Queen stand by), I proceeded to take-off. After take-off the model was climbing but banking left, so I raised my left leg to compensate (I call this my Tom Seaver style). The model continued its bank, so I held the Tx over to the right and put my tongue out. In spite of these basic preventive measures the (censored) . . . So what went wrong??

I took off on both Tx sticks, then, being used to three channels, I operated on the right stick, but three channels gives you rudder and elevator on the right stick, whereas four channels gives you rudder and ailerons on the right stick . . . and the ailerons are in the car, aren't they? Yes. And where are your brains?

to page 170



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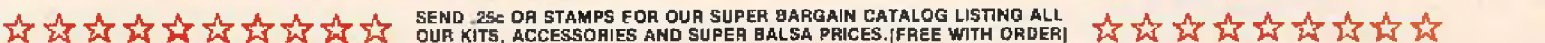
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SUNDAY FLIER

from page 168/16

Well, they're in my left foot and it's still up in the air.

I have to agree, Ron. We forget that new modelers are coming into the sport every day, and didn't read something we wrote five years ago. Also, your description of control by body English (went left, so raised left leg) is very typical of a lot of modelers on the flight line. You must be one helluva flier.

★

Charles K. Carter of Charleston Heights, South Carolina sent in the following letter:

Dear Ken,
Enclosed are some photos of my

K & B 40 powered Pondhopper built from your plans. The plane is a very stable and easy flyer and I have gotten much enjoyment from it. I first flew it off the ground with the wheels on and then put it on the water and it did even better. Then I found I could fly it off our field with no wheels (you guessed it, grass). The



Chuck Carter's Pondhopper taxiing in after a flight.

only problem I have had, minor at that, is when taxiing on the water in any wind, if it gets cross wind, the downwind wing dips in, it turns that way (away from the wind) and then the other dips in and I end up doing S-turns downwind.

I want to let you in on a super invention I am working on if you'll keep it under your hat. In an effort to avoid building tail heavy, I often end up with ships which are nose heavy and the only solution is to put lead in the tail and that is just the place where the other guys tell me I should get it out! Then I saw some ads for the round washer like weights to put on the prop shaft if you're one of those ham listed builders and need weight up front and the light dawned. **Negaweights!!** These little beauties are much like the prop shaft weights, but instead of adding weight, they subtract it! The advantages and applications for the modeler should be

to page 174

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| 4FN (S-17) | 178.00 | 6FN (S-16) | 235.00 |
| 4FN (S-16) | 194.00 | 7GN | 390.00 |
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ALL BALSA, 50" SPAN, ALLERONS, MORNING FLAPS, ALL DELUXE PARTS AS IN OTHER CHAMPION KITS. LIST \$44.95 BHC ONLY \$31.50

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| 774-4 CHAN | 279.95 | 197.95 |
| 765-5 CHAN | 349.95 | 227.95 |
| 775-5 CHAN | 379.95 | 237.95 |

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| CESSNA | 449.95 | 320.00 |
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| S T R15 FI R | 60.00 | 36.00 |
| S T 23 RC w/muff | 34.00 | 32.40 |
| S T 35 RC | 59.99 | 36.00 |
| FOX 35 STAIN | 26.95 | 16.20 |
| FOX 35 CARRIER | 69.95 | 41.97 |
| ENYA 60 RC XE CHROME | 234.95 | 127.00 |
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SUNDAY FLIER

from page 170/16

obvious. I haven't been able to put as much time as I would like into this project, and I seem to have run into a few minor technical snags, but I am sure I will have them worked out before too long. As soon as I have them perfected, I'll send you some and you can try them out.

Thanks for your fine work on behalf of us good old Sunday Fliers, and keep the new and unique designs coming.

*Charles K. Carter
Charleston Hgts., S.C.*

Chuck, the modeling world anxiously awaits that glorious day when you will be able to announce that you've overcome the technical snags. And is it really true that, in one of your experimental mailings of a one ounce Negaweight, the Post Office paid you fifteen cents for the Negapostage?

Chuck's letter also brings up a technical point. He sent in several beautiful photos of his Pondhopper in full color, plus a couple of black and white action shots, one of which is shown. But fellas, please remember that color shots are costly, both to you and to us, and we rarely use them. If you want to see your masterpiece in print, swallow your rightful pride in its beautiful colors, and send in a 5 x 7 single weight black and white gloss print. The odds will then be in your favor that the picture will appear. Got it? Do it!

★

DICK WEBER SETS WORLD'S CLOSED COURSE SPEED RECORD

On January 1, 1979, Dick Weber, well known record setter, did it again. Here is the description of the aircraft and the flight, and the specifications for the classification, as they were submitted to the Federation Aeronautique International.

Description of Aircraft and Flight

The aircraft, a Top Dawg, has been flown in many pylon races. It was built in 1973 from the Top Flite kit, and has a modified wing and fuselage. An 18 cm diameter, 15 cm pitch propeller was fitted to the 2.5 cc glow engine. Three radio channels were used to control elevator, rudder and throttle.

The aircraft was hand launched by the pilot, who was located at the Start/Finish line, near the timers and a pylon judge. A pylon judge was situated at each pylon of the course. Flight altitude around the course was 3-25 meters, and the aircraft clearly flew well outside the space bounded by the four pylons. The aircraft landed 102 meters from the launch point.

to page 176

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1/4 size and 1/3 size
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Quality

The Homelite Division of Textron and EWH Specialties have melded together their years of experience to produce the definitive answer to 1/4 size and 1/3 size engines. No fly-by-night obscure manufacturer. Homelite has 57 years of experience building high quality and high reliability 2-cycle engines. Roller bearings are used on both ends of the crankshaft as well as both ends of the connecting rod. Crankshaft counterweights are equal in weight to minimize vibration and prolong engine life. A transistor ignition is used on the Super Hustler. No cumbersome flywheel and magneto to cause vibration, radio interference, or front bearing wear.

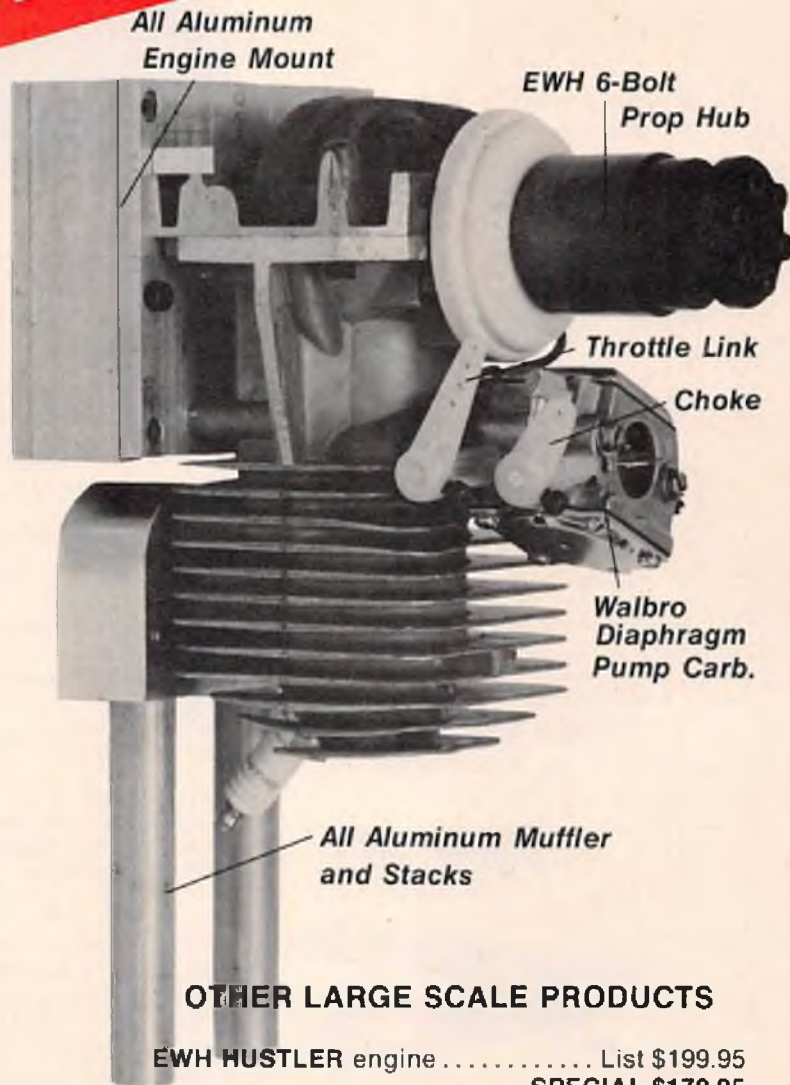
Reliability

The Super Hustler is loop scavenged for excellent breathing and power. Hemi-head combustion chamber provides smooth idling and easy starting. Roller bearings are used at all wear points. The choke is in the carburetor. Each engine comes with the EWH 6-bolt Prop Hub to allow adjustment of prop tip tracking.

Power

The Super Hustler has super power. 2.6 cu. in. displacement. Burning gasoline and chain saw oil, delivers 23-24 pounds of thrust on a 20" X 8" prop at 6,800 to 7,100 rpm. Any prop from 18" X 6" to 20" X 8" is well within the operational range of the Super Hustler.

After all the hours and all the dollars you put into your large size aircraft, don't gamble on what's-their-name's engine.



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| EWH Heavy Duty Tailwheel | 9.95 |
| EWH HUSTLER PROPS | |
| 20 x 8" | 7.95 |
| 18 x 6" (not recommended for Hustler) . | 7.95 |
| EWH Aileron Hinge Kit | 14.95 |
| Spark Plugs | 1.95 |
| Fuel Line (by the foot) | .65 |
| 33 oz. Metal Tank Kit (for gasoline/with clunk) | 3.95 |
| High Point Prop Balancer | 19.95 |

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MS

National Multiple Sclerosis Society
205 East 42nd Street
New York, New York 10017

In our world today, an estimated one and a half million persons are victims of multiple sclerosis. MS is a mysterious, debilitating crippler, for which there is no known cause or cure, that seemingly comes from nowhere to strike at young people in their prime years.

There used to be no help, no hope. But through the efforts of the National Multiple Sclerosis Society, and the contributions of caring people, a massive research program is under way. Many feel the answer is closer than ever before. And we can find it, with your help. A major health problem, multiple sclerosis is one of the worst cripplers since polio. It should not exist in our world today.

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SUNDAY FLIER

from page 174/16



The course was set up at the Castle Marina Airstrip on Kent Island, Maryland, because this site is flatter than 1 meter in 200 meters within 1 km of the course, as required by the 1979 FAI Sporting Code.

**To The Sporting Code
Federation Aeronautique Internationale
Request For Confirmation Of A Model
Aircraft
Record For Speed In A Closed Circuit**

CLASSIFICATION
Flight Category Radio Controlled
Type of Model Aeroplane
Method of Propulsion Piston Engine
Record Speed in a Closed Circuit

Record Figure Claimed 83.52 km/hr=51.9 mph
Name of Modeler Richard R. Weber
Name of N.Ae.C. National Aeronautic Association of USA
Date of Record January 1, 1979
Place of Record - Kent Island, Maryland, USA
Time of Release - Approximately 15:22 EST
Method of Checking Crystal-controlled digital time pieces

RCM extends congratulations to Dick, and is proud to have had a small part in the record. The Top Dawg was designed by Ken Willard, RCM's Chief Sunday Flier, and originally published in RCM as a construction article. Top Flite then bought the design for kitting, and thousands have been built from the kit, both for sport flying and for racing.



As I said at the beginning of this column, 1978 was a good year, in most respects. However, it is with great sadness that I heard from my good friend Sid Axelrod that his long time partner in Top Flite Models, Mike Schlesinger, passed away on Sunday, December 17, 1978. On that same day, seventy-five years earlier, the Wright brothers began a new era in the lives of mankind. I, for one, will now always remember that date for two reasons --- the Wright brothers and Mike.

to page 178

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Like the Wright brothers, Mike was dedicated to aviation, even though he didn't fly, and so far as I ever knew, never really built model airplanes. But he knew as much about them, and much more, than the great majority of modeling enthusiasts all over the world. His contributions to the sport and hobby were numerous, and mostly unrecorded, but there isn't a modeler alive today who isn't aware of his best known accomplishment. The unfortunate part of it is that most of you know about the accomplishment without knowing who is principally responsible for its introduction and use in the modeling field. In case you are one of the latter, let me tell you a little bit about it.

Back in the late sixties --- around 1966 or '67 if memory serves me right, I received a package from Sid and Mike. "Try this stuff and tell us what you think. We've been experimenting with it, and now we think it's ready to be offered to modelers."

So I did --- and agreed with them. And the material came on the market. MonoKote!

Yes. In case you didn't know it, Mike worked with his supplier, pleading, cajoling, threatening as only he could, until he was satisfied, through reports he received from several of us who helped test the plastic, that it was ready for the modeling fraternity. And through the following years, he continued to work — in the background — to improve the quality to its present state.

So everytime you use a sheet of MonoKote, take just a moment to give thanks to Mike Schlesinger, aviation enthusiast, innovator, gentleman, and friend.

So long, Mike. Be seeing you one of these days. □

ENGINE CLINIC

from page 15/10

Steward Aircraft Maximizer (page 147 Feb. RCM).

If this concept works well I would think .35 or .40 size units should allow us to swing 14" props on my Antic with considerable fuel savings over a .60. Back to Bud Nosen size ships --- could a Quadra type gasoline engine do the job as well? Total cost would be the same though I wonder about parts or reliability. Well that should be enough to get you started and it may be you "pays your money and takes your choice," but I feel there are many like myself who (in my case) are ten years older since last

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| T-28 | .60 | 66" | glass/foam |
| Spitfire* | .60 | 64" | glass/foam |
| Tiger Cat* | T/.40 | 65" | glass/foam |
| Shrike | T/.40 | 79 1/2" | glass/foam |
| Waco* | .60 | 62" | glass/foam |
| Kraft Super Fli | .60 | 60 1/2" | balsa/foam |

*Available late '79

TRAINER BRIDIKITS

| | Eng. | Wing Span | Const. |
|-------------------|------|-----------|--------|
| RCM Trainer .60 | .60 | 60" | balsa |
| RCM Trainer .40 | .40 | 50" | balsa |
| RCM Trainer .20 | .20 | 45 1/2" | balsa |
| RCM Trainer .10 | .09 | 36 3/4" | balsa |
| RCM Trainer .05 | .049 | 36 3/4" | balsa |
| RCM Basic Trainer | .19 | 50" | balsa |

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| | | | |
|------------|--|-----|-------|
| Soar Birdy | | 78" | balsa |
| Big Birdy | | | balsa |

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| | | | |
|----------|---------|--|-------|
| Chubasco | .40-.60 | | glass |
| Chubasco | .21 I/O | | glass |

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| | Eng. | Wing Span | Const. |
|---------------|------|-----------|--------|
| RCM Sportster | .19 | 50" | balsa |
| Tweedy Bird | .19 | 48 1/4" | balsa |
| 15-500 | .40 | 51" | balsa |
| Quickest 500 | .40 | 50 1/4" | balsa |
| Quickest 200 | .051 | 31 1/4" | balsa |
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ENGINE CLINIC

from page 178/10

writing you and crave a bigger ship (so I can see it) that would fly slower to allow my aging reflexes to keep up with it.

Thanks, keep up the great column.

Chuck Baker
Jacksonville, Florida

Actually whether you go with the gear reduction unit or with one of the larger

Quadra engines will depend a lot on the particular application. As I have pointed out several times in the past, the gear reduction units run in the 2-1 reduction range. This means the engine screams away at 13,000-14,000 rpm while the prop churns away at 6,000-7,000. Using a scale ship such as Nosen's P-51 engine, sound would be more realistic. With your Antic putting along, the sound would be far from realistic. But in the

case of the Antic, you don't need all the power of a Quadra — a .60-.80 being the most power most fellows require.

The Quadra has proven to be a reliable power plant as has the gear reduction units. There are pros and cons for the use of each. So it is a matter of personal decision — which will best lend itself to your application.

That's it for another month, guys.

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ERIC MEYERS



I AM SURE GLAD THAT YOU GOOD FOR MAKE AN AUTO MIX AND SUPER PUMP WHEN I RECEIVED MY WEBRA 91 WE COULDN'T GET THE ENGINE TO RUN ON HALF THROTTLE. IT SIMPLY WOULD NOT DRAW FUEL AS THE CARBURATOR DIAPHRAGM WAS TOO LARGE. I THEN INSTALLED A SUPER PUMPER AND AUTO MIX AND PROBLEM WAS SOLVED. I PLAN ON USING THE WEBRA 91 CARBURATOR ON MY FUTURE AIRPLANE NEXT YEAR BECAUSE THE WEBRA 91 CARBURATOR HAS A GEAR MIXTURE CONTROL. AS THE WEBRA 91 CARBURATOR IS UNPRESSURIZED YOU MUST USE THE SUPER PUMPER / AUTO MIX

FRED K



JUST A NOTE TO LET YOU KNOW HOW THE SUPER PUMPER / AUTO MIX COMBINATION IS WORKING OUT. I HAVE INSTALLED IT IN MY LAS VEGAS TOURNAMENT CLASS CLASSIC AIRPLANE WHICH USES A 91 ENGINE. RESULTS ARE OUTSTANDING. IT WORKS PERFECTLY AT ANY RPM AND IN ANY POSITION AND TRANSITIONS FROM LOW TO HIGH SPEED ARE VERY SMOOTH. AS I HAVE LOCATED THE FUEL TANK FAR FROM THE REAR AND BELOW THE ENGINE WITHOUT ENCOUNTERING ANY PROBLEMS. IN SUMMARY I AM VERY PLEASED WITH THE TROUBLE FREE PERFORMANCE OF THE SUPER PUMPER / AUTO MIX

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Before ending I do want to make the same old plea that I have many times in the past regarding material for this column. Any letters related to this column should be sent direct to R/C Modeler. Do not send to my business address. It does not speed up a reply. In fact, I give preference to the fellows who do write through the magazine as requested. If you do want a personal reply, keep the letter short and include a

SASE. I can't promise a reply even if you do enclose the SASE, but your chances are better. And above all — **no phone calls** related to this column. I have a business to run and the phone calls take a big chunk out of the day, especially when I get several a day from fellows wanting to know why their Enya blows fuel out the front bearing, their Fox .19 won't idle below 2,000, how to mix their own fuel, etc., etc. □

CUNNINGHAM ON R/C

from page 8

advice can range from super good to simply horrible. Today, with the popularity of RC ever spreading, more and more stores are adding a hobby shop to their business. Many toy stores,

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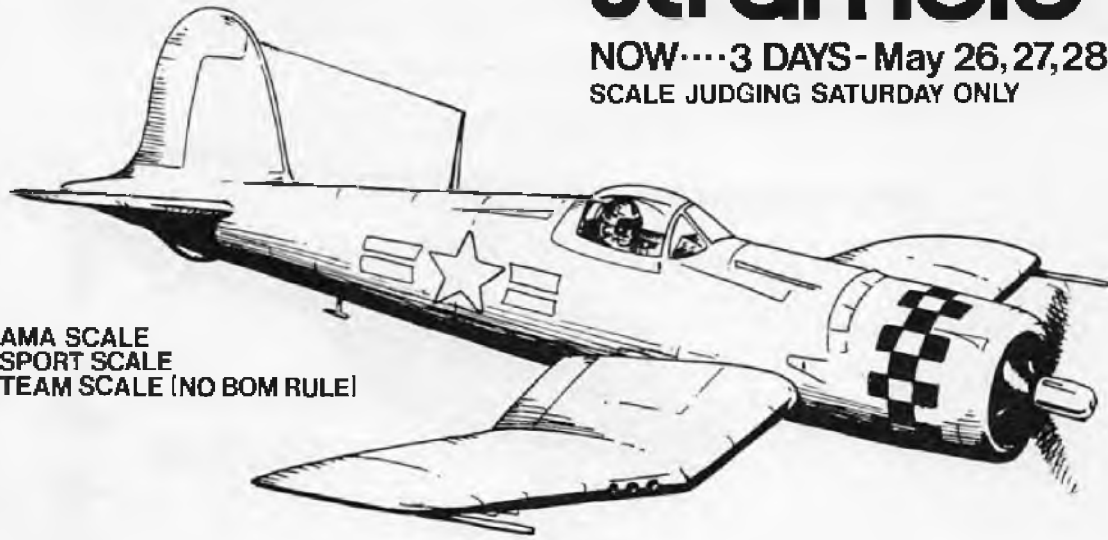


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train shops, or even department stores, have a section devoted to RC modeling, and it's a good chance that the man behind the counter of that store is not an active RC flier. A really good, full service hobby shop is a great thing to have and one which all RC'ers should prize. But, even with a good hobby shop, there is rarely a bulletin board, or other space devoted to the local clubs, or information on where to fly, how to join, how to get help, etc. Not many hobby shop owners have the time, or the patience, to teach all of their new customers how to fly. This should be a joint action on the part of the hobby shops and the area clubs. It would be good business for a hobby shop

owner to devote some time and space to the local clubs, and good business on the part of the clubs to use this space to post information on upcoming events, when and where the club meets and the names of several people to contact for added information. And, it is most important to any club to keep this information current. All clubs need an influx of new members, just as all hobby shops need an influx of new customers. By working hand in hand, everyone benefits, especially the poor guy who decides that he would like to give RC a try.

One last letter on the subject, from Don Summers, giving the newcomers

view of this situation.

Dear Mr. Cunningham:

Having just started in RC flying after about 30 years having gone by since I flew my U-control plane, I read each issue of RCM usually from cover to cover and noted with some interest your comments on the newcomer to RC flying. Being a newcomer, too, I have made several observations and asked several questions and I have reached a couple of conclusions.

Before I bought the first piece of anything that had anything to do with RC flying, I did have the opportunity to look through several back issues of

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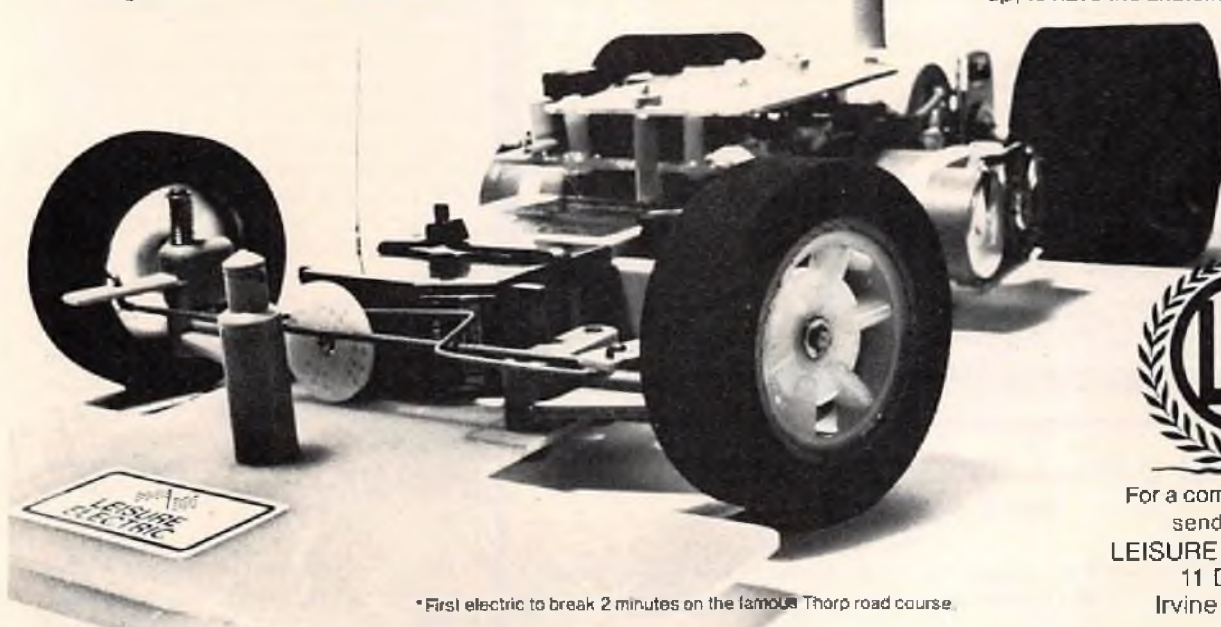
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some of the magazines on the hobby. I then visited three flying fields and several hobby shops to ask more questions and I was somewhat amazed at some of the answers I received to the basic question: "I am just starting in RC flying and would like to have some recommendations on getting started. That is, what type of plane, what size, any specific kit for a beginner, what size motor, where do the guys fly around here, and how do I get in touch with the local club, if any?"

The answer about what type of plane was almost the same from most everyone I talked with, however, the fellows at a couple of the fields I visited

sure had a different view as to the size of plane for a beginner.

The answer to what size motor to start out with can be summed up fairly well in the answer I got at a flying field I visited while in North Central Ohio. "Motor size naturally depends on what size plane you choose to build, also on whether you buy your fuel through the club or at a hobby shop -- it is expensive."

In two of the shops I visited and asked questions, I discovered that they did not participate in the hobby and did not really know much about the local club, but was sure if I went to the flying field I could find out from some of the flyers.

At one shop I was told if I did not fly a

.60 or bigger type plane I would be in the very minority. In the five shops I visited I always had to ask about the local club. Is this the rule throughout the rest of the country? In a couple of the shops I have noticed a small bulletin board with small notes about this or that piece of equipment or model for sale, or something wanted to buy, swap or trade, but never anything about the name of the club, where they meet, where the field is located, who to contact for more information, or an added note something like this: "If you are a beginner in the RC hobby, please for your safety and enjoyment, and the others around you, please contact

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someone from our organization and we will be more than happy to help you get started, with a minimum of disappointments and a maximum of fun and enjoyment, into a remarkable safe and fascinating hobby." Is this unreasonable to ask of clubs and the local hobby shops?

Also, if somehow the shop or club could get some back issues of the magazines in the hands of the beginner or newly interested person, I think this would help acquaint them with some of the words and terms that are unique to the hobby. Also, it can help them to realize the complete scope of the RC field as a total. Members of a club could take turns in the handling of newcomers or inquiries for information pertaining to the club rules and regulations, etc.

One more comment and I will sign off. At all of the fields I visited, I was always treated very cordially and the fellows were always willing to answer my questions and help any way they could, maybe that says something about the true sportsmanship in this field. Hope this little note may be of some help or interest.

Don Summers

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So, there you have three inputs on what I consider to be a very important problem --- how to help the newcomer. There is no doubt in my mind that all of us want to lend a hand to the beginner, and it is a responsibility that extends all through the hobby. If we are to grow, and continue to enjoy our sport, then we must make it at least accessible to the beginner. Nothing will give RC a black eye quicker than a serious accident, or death, caused by unskillful thumbs twiddling the transmitter sticks. If you are a good RC pilot, then take some of your time to help someone else. If you're a hobby shop owner, then give some thought towards making space available to local clubs to post notices and assistance to the newcomers and, if you're a member of an existing club, then do something towards the establishment of a good training program. I highly recommend the purchase of the Flight Training Course offered by RCM. (See advertisement in this issue.)

All of you jumbo builders and fliers --- no, I don't mean the pilots are jumbos, just the airplanes --- make sure that you mark on your calendar the dates of July 21 and 22, 1979. The dates of the Second Annual Southwestern Jumbo RC Fly In to be held at Thunderbird Field, on the shores of Lake Benbrook, just west of Fort Worth, Texas. This event is for you and I know that you will enjoy it. For added information, write to me at 2440 Colonial Parkway, Fort Worth, Texas. Plan to be there.

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FROM THE SHOP

from page 2

When I took the plane to the field to test fly it, there were a lot of comments. I know it must be good for Stand-Off Scale because one fellow said, "I wouldn't touch that plane with a ten foot pole." One guy told me it was a wonder airplane, but I know jealousy when I see it. His remark that it would be a wonder if it flew was a dead give away.

The plane was a biplane, but when I started the engine the bottom wing fell off so now it's a monoplane. I think it looks better too, but not quite as scale. I can't find any real airplane it looks like.

I am very disappointed with the local model group here. In all of the magazines you people say how the modelers like to help and give assistance --- bull. When I started the engine and put it back on, it kept falling off --- the people that are so willing to help weren't anywhere around. Some drove off, others just got in their cars. Several tried to hide behind the garbage cans, but I saw them anyway.

The first flight was uneventful, almost. With the .19 at full throttle the nine pound airplane roared down the runway. Well, it didn't exactly roar down the runway, but it was moving. To show how great this design really is --- I think the only trim change it would have needed was a little up. It hit the fence at the far end of the runway, I think it was a fence. I couldn't really see too good that far away. I couldn't try it again because it needed some repairs after the cows walked on it and the tractor ran over it.

I was going to take some pictures of my plane, but I forgot the film and it's too late now.

If you would like to publish my design I will send the new drawings. They are easy to read because most the lines are between the newsprint, but the headlines are in the way of some of the ribs. But I'm sure Dick Kidd can read them because he is so good. When your test plane is finished I would really appreciate one of Dick Tichenor's fine photos of it.

I can't afford to send a self addressed stamped envelope for the money Pat Crews is going to send. I lost the suit to the farmer --- I still don't think MonoKote will hurt tractor lugs.

*Yours truly,
Mort Scrunch*

Thanks, Mort, we can hardly wait (?). We slightly suspect that Mort is really Bob and Doris. (Oh boy! That's Rich.)
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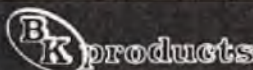
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CORRECTION

In the March 1979 issue of RCM, the price for the Negotiator plan #755 was omitted by mistake. The price of this plan is \$5.75 and the price of the Negotiator templates #755T is \$2.50.

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| 1 | Ace Radio Control | 138-139 | 50 | Hobby Barn | 130-131-132-133 | 99 | Polk's Hobby Dept. Store | 157 |
| 2 | Andrews Medal Aircraft | 188 | 51 | Hobbyvint | 166 | 100 | Prather Products | 98 |
| 3 | American R/C Helicopters | 142 | 52 | Hobby Lobby Int. | 3-4-5-6-7 | 101 | Precision Products | 129 |
| 4 | America's Hobby Center, Inc. | 95 | 53 | Hobby Market | 91-92-93 | 102 | Proctor Enterprises | 166 |
| 5 | Applied Design Corp. | 26 | 54 | Hobby Shack | 14-20-21-113 | 103 | Quarter Scale Associates | 150 |
| 6 | Associated | 134-177 | 55 | Hobby World | 19 | 104 | Rador Co. Ltd. | 136 |
| 7 | Asira Flight | 12 | 56 | Horner's Sales | 156 | 105 | RCM Anthology Library | 152-153 |
| 8 | Balsa U.S.A. | 169 | 57 | Howard B. Muehl | 157 | 106 | RCM Binders | 185 |
| 9 | Bavarian Precision Products | 118 | 58 | Idea Development, Inc. | 116 | 107 | RCM Plans Service | 167 |
| 10 | BD Hobby Warehouse | 136 | 59 | Indy RC | 190-191-192-3rd Cover | 108 | RCM Products | 186 |
| 11 | BE Products | 185 | 60 | Jack Stafford Models | 126 | 109 | RCM Subscription Service | 187 |
| 12 | Birdi Hobby | 179 | 61 | Jet Hangar Hobbies | 168 | 110 | R/C Country | 150 |
| 13 | Brown Hobby Center | 172-173 | 62 | J-S Enterprises | 176 | 111 | Rebel Radio Control | 124 |
| 14 | Bud Nosen Models | 80-81 | 63 | Kavan | 181 | 112 | Reclco | 163 |
| 15 | Calgary Hobby Supply Ltd. | 156 | 64 | K & B Aurora | 135 | 113 | Rianda Designs | 172 |
| 16 | Carl Goldberg Models | 17 | 65 | Kendal Model Engines | 30 | 114 | Robert Mfg. Co. | 180-181 |
| 17 | Cleveland Model | 116 | 66 | Kraft Midwest | 174 | 115 | Rockel City R/C Specialties | 166 |
| 18 | Concept Models | 185 | 67 | Kraft Orange County | 168 | 116 | Royal | 13-161 |
| 19 | Consumer Hobby Corp. | 31 | 68 | Kraft Systems | 101-160-182 | 117 | R & S Hobby Products | 76 |
| 20 | Coverite | 141-155-176 | 69 | K & S Engineering | 154 | 118 | San Antonio Hobby Shop | 128 |
| 21 | Cox Avionics | 137 | 70 | Kusjon Kraftsmanship | 176 | 119 | Satellite City | 170 |
| 22 | Craft-Air | 117 | 71 | Lanier Industries | 170 | 120 | Schluter Products | 112 |
| 23 | Curtis Company | 142 | 72 | Larsen Electronics | 183 | 121 | Sheldon's Hobby Shop | 148 |
| 24 | DaCa Model Products | 160 | 73 | Uico Systems | 151 | 122 | Sig Manufacturing Co. | 28-29 |
| 25 | DA Enterprises | 122 | 74 | L & L Electronics | 141 | 123 | Skycraft Associates | 176 |
| 26 | Dave's Custom Models | 114-115 | 75 | Logictrol International Corp. | 11 | 124 | Sky Master Industries | 124 |
| 27 | Davis Diesel | 50 | 76 | L.R. Taylor & Co. | 140 | 125 | Sanic Tronics | 74 |
| 28 | Des Tek Industries | 166 | 77 | M.A.C.K. Products | 156 | 126 | Southwestern R/C Distributor | 178 |
| 29 | Dodgson Designs | 157 | 78 | MACS | 171 | 127 | Specialty Models | 127 |
| 30 | Dremel Mfg. Co. | 23 | 79 | Mark's Models | 160 | 128 | Standard Hobby | 146-147 |
| 31 | Du Bro Products | 167 | 80 | Michigan Hobby Hangar | 140 | 129 | Stirling Models | 143 |
| 32 | Dunham's R & R | 126 | 81 | Mikro-X Products | 140 | 130 | Stewart Aircraft | 148 |
| 33 | Dynaknight Int. | 138 | 82 | Midwest Industries | 9-120-121 | 131 | Stressed Skin Design Inc. | 181 |
| 34 | Eastercraft Specialty Products | 145 | 83 | Midwest Products | 178 | 132 | Sullivan Products | 98 |
| 35 | Edson Enterprises | 144 | 84 | Model Merchant | 126 | 133 | Techni Models | 127 |
| 36 | Empire Models | 164-165 | 85 | Model Rectifier Corp. | 4th Cover | 134 | Thorp Manufacturing | 157 |
| 37 | E.W.H. Specialties | 175 | 86 | Morgan's Hobby Enterprises | 144 | 135 | Toledo | 162 |
| 38 | Exhibition Flying Show | 174 | 87 | Murchler's Hobbies | 149 | 136 | Top Flite Models Inc. | 25 |
| 39 | 1st Annual Q.S.A.A. Fly-In | 184 | 88 | Nelson Model Products | 156 | 137 | Tower Hobbies | 102 thru 711 |
| 40 | Phyllis Models | 141 | 89 | Northeast Engineering | 24 | 138 | Vantec | 112 |
| 41 | Fox Mfg. Co. | 11 | 90 | Novak Electronics | 184 | 139 | Vortec Mfg. Co. | 185 |
| 42 | Futaba | 2nd Cover | 91 | NSS | 176 | 140 | Warehouse Hobbies | 99 |
| 43 | Carham Model Products | 116 | 92 | Orange Coast Hobbies | 119 | 141 | Williams Bros. | 100 |
| 44 | Great Lakes Model Aviation Expo | 116 | 93 | Orlins RC Aircraft Mfg. | 18 | 142 | Windspeil Models | 144 |
| 45 | Hallco | 140 | 94 | Patty's Corner | 158-159 | 143 | Wing Mfg. | 118 |
| 46 | Heath Company | 145 | 95 | Paul Clements' Kitty Hawk Models | 90 | 144 | Winning Model & Hobby | 174 |
| 47 | Hi-Flight Model Products | 127 | 96 | Peelless | 176 | 145 | W.L.C. Company | 124 |
| 48 | Hobbies Etc. | 184 | 97 | Perry Automotive | 90 | 146 | World Engines | 96-97 |
| 49 | Hobbies West, Inc. | 168 | 98 | Pico | 94-123-125-154 | 147 | World War II Scramble | 182 |

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| | | | | | |
|-----|------------------------------|------|--------------------------|------|----------------------|
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| 22. | Carl Goldberg Models | 69. | Hobby Shack | 123. | Prather Products |
| 27. | Coverite | 71. | Hobby World | 136. | Robart Mfg. Co. |
| 31. | DA Enterprises | 77. | Indy R/C | 140. | Royal |
| 34. | Dremel Mfg. | 88. | Kavan | 146. | R & S Hobby Products |
| 39. | DaCa Model Products | 90. | K & B Aurora Hobbycrafts | 163. | Stressed Skin Design |
| 41. | Edson Enterprises | 94. | Kraft Systems | 165. | Sterling Models |
| 43. | Logictrol International | 96. | Lanier Industries | 168. | Techni Models |
| 49. | Fox Mfg. | 98. | L & L Electronics | 173. | Vantec |
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ME 109

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Now is the time to get your radio gear and engines in shape for spring. To help you with this task Indy has a large supply of QS, Supertigre and Coma parts. We also stock K&B parts. We carry gear sets, arms, etc., for the Krait, Cox and World Engines radios. Don't forget to check your starting battery and if it has been wiped out by winter, take advantage of our 40% off on the Yuasa 12 volt, 6 amp gel cell and charger combo.

SEE YOU AT TOLEDO!



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It weighs from 2 to 2 1/2 pounds and
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