

# RcM



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# radio control MODELER

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# RCM MODELER

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**This Month's Cover**

*The Stormfighter 2 makes a dramatic fly-by at Torrey Pines with a Pacific sunset as a backdrop. Construction article by designer Eckart Salomon is featured in this issue on page 40. Ektachrome transparency by Eckart Salomon.*

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# FROM THE SHOP

Don Dewey

**T**his issue is loaded with photos and words on the two biggie R/C shows. The Toledo R/C Expo and the MACS. Long Beach, California. You will find coverage by Jim Oddino, Dick Phillips, Frank Tiano, and Dick Tichenor.

The two shows have their individual characteristics. Toledo being the senior, is practically mandatory for the entire industry and draws the largest number of exhibitors. It is strictly R/C related and, to a great degree, is the premier modeling event for modelers in the colder northeast part of the country.

MACS stands for Model And Craft Show and while the R/C activity dominates, it also includes all phases of modeling and crafts. In the earlier days there was some resentment by the RC'ers toward the craft participation, now the RC'ers welcome the crafts displays as a place where their wives can browse while they catch up on the latest R/C goodies. The Long Beach Convention Center is new, air conditioned and several times as large as the Toledo Sports Arena. The MACS floor plan is based on 16 foot wide aisles which alleviate congestion and that is really beneficial as the MACS attendance now exceeds Toledo.

Both shows are great and, by being on opposite sides of the country, they really aren't competitive.

★

Recently Irwin Ohlsson called to advise us of the death of Ira Hassad, a west coast pioneer engine designer and manufacturer. Even though none of our office staff had been personally acquainted with Mr. Hassad, we were familiar with some of his engines. Irwin proceeded to relate a story that we found quite interesting and we felt that we should share it with our readers.

In 1933, Fred S. Mac Farland and C.H. Stevens were busily engaged in tooling up to produce a unique model airplane power plant. The motor was a five cylinder radial type powered by, of all things, smokeless gunpowder. The gunpowder actually was mixed with spruce sawdust, lime (to slow down burning), and steam engine oil, and pressed into a stick similar to Jetex fuel, only longer.

*The fuel stick was put into an aluminum tube connected to the engine and ignited. The pressure resulting from the burning fuel was what actually drove the motor.*

*Stevens was a die-maker and the designer of the motor. Fred Mac Farland was more of a promoter than anything else and he negotiated a contract with the Hearst newspapers through Mr. Giles of the Los Angeles Herald Examiner. The deal was to produce the motors, fuel and eventually airplane kits for the newspaper chain, for distribution to newspaper boys, as prizes for obtaining newspaper subscriptions.*

*A firm called Mototoy Manufacturing Co. was formed to produce the motor. It was located originally on Santa Monica Boulevard in Los Angeles and later it moved over to 61st St. The motor was made possible by the development of the special fuel stick by a chemical engineer hired by the firm.*

*The motor was usually demonstrated in an all metal Lockheed Vega which, though pretty, was too heavy to fly. The firm hired a young man to design and build a flyable airplane. The airplane builder was none other than Irwin Ohlsson. He built a successful airplane and conducted test flights and demonstration flights for the company. One rather unfortunate demonstration flight was made by Irwin for Mr. Giles at a large bone dry grassy field at the Arrowhead Hotel. The plane flew beautifully but, after landing, the grass caught fire and Mr. Giles had to use his sweater to beat out the flames. One of the problems with the motor was that a considerable amount of heat was generated during the burning of the fuel stick. For example, it was necessary to use mica for the cabin windows instead of cellulose. Another shortcoming was the dirty deposits which quickly formed inside the motor requiring frequent disassembly and cleaning.*

*Sometime during 1934, Irwin Ohlsson decided to leave the company and go on to bigger and better things and he arranged for a high school boy to take over as the chief model builder and test pilot.*

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Behind the scenes action while Bill Shaub was shooting our April, 1981 cover. See text for info.

# ENGINE CLINIC

Clarence Lee



In the April Engine Clinic I did a small bit on problems encountered when using the Perry pump on engines used in helicopters. The vertical position of the engine allows all the excess fuel, oil, and goop in the engine to accumulate in the pump diaphragm chamber and at times causes erratic operation. I received several letters on this topic as well as a phone call from John Perry. John says they had never experienced the problem after many hours of testing the pump in a vertical position. The letters I received were split fifty/fifty — those who had never experienced a problem with using a Perry pump in a helicopter and those who had experienced problems. Several factors are involved here that might explain why some fellows do have problems and others do not. I have noticed that the fellows just starting in helicopter flying are the ones having the most problems. Of course, this is naturally true with any form of modeling where engines are involved, whether pump equipped or not.

In the case of helicopters, many, many hours are spent learning to hover a few inches off the ground. The motor seldom is run above half throttle and at a very rich setting. Most fellows break quite a few rotor blades (and other parts) before becoming proficient at hovering and progressing to more advanced flying. When the helicopter does bite the dirt with the engine running there is a considerable amount of raw fuel in the engine. Seldom is an attempt made to fire the engine up after the crash and run the excess fuel out — this, naturally, being pretty hard to do. However, the engine should be removed from the helicopter — the back plate or pump removed — and the excess fuel flushed from the engine. The engine should then be liberally lubricated with a good penetrating oil. However, in most cases, the helicopter is thrown in the car, taken home and set on the workbench, and no engine maintenance is performed. If the repair is minor and the ship flyable, then on the next weekend a few problems occur. However, if the ship (and engine) are allowed to set for any length of time with the raw fuel in the engine, bad things happen. I have taken engines apart and found the crankcase full of gunky residue similar to the corrosion you might see on the battery terminals of your car battery. You can well imagine what this would do to the operation of the pump diaphragm. I have received engines back with the four small holes in the plastic disc (that separates the pump diaphragm from the crankcase chamber) completely plugged with corrosion, rust, and goop in general. Needless to say, the next time the engine is used there are going



*"This stupid kit, how do they expect it to fly when you can't even test glide it?"*

to be problems: usually in the form of erratic engine operation and difficulty in setting the needle valve.

Even after the pilot becomes more proficient and occasionally takes the helicopter home in one piece, few neglect to get rid of the excess fuel left in the engine. It seems to be common practice now days to shut the engine off with throttle trim while the engine is idling. This is also true of fellows flying conventional type aircraft. The fuel line should always be pulled and the engine allowed to run out dry. Ideally this should be done with the engine at full throttle since pulling the fuel line with the engine idling still leaves considerable fuel in the engine. However, with a helicopter, this would be more of a problem than with a conventional aircraft. The engine should then be loaded with a good penetrating oil. Although 3-In-1 is the most easily obtainable, a good gun oil, sewing machine oil, or one of the after run oils available at hobby shops would be even better.

It would also be a good idea when getting the helicopter home to hang it in a vertical position which would allow any excess fuel and oil, that has accumulated in the pump diaphragm chamber, to drain out. Letting the ship set on the workbench allows all the excess fuel and oil to drain into the pump diaphragm chamber.

Another factor involved is the fuel used. Since helicopter engines have a tendency to run hot, many fellows use a castor oil based fuel or add extra castor to their synthetic oil based fuels. This is fine as there is no model engine oil that can equal castor when it comes to lubrication. However, castor oil does have a lot of shortcomings, one of which is turning to gum if allowed to set for any length of time. In several months it can

develop a consistency close to chewing gum and completely lock up an engine. Imagine what this can do to the flexible diaphragm in the Perry pump.

So if you are going to use a castor oil based fuel or a mixture of castor and synthetic (more desirable) be doubly sure to run the engine out dry by pulling the fuel line after a flying session — load the engine with a good penetrating oil — and store the ship in a vertical position so that no remaining residue can collect in the pump diaphragm chamber.

Follow these precautions and you should have no problem with your Perry pump when used in a helicopter. These same things naturally also pertain to conventional aircraft as far as running the engine out dry and loading it with a good penetrating oil — something I have mentioned many times in past articles but many fellows seem to find it's too much trouble to do judging by some of the engines I get back for repair and service.



I received two items from Dick McCoy this past month that I am sure many of you will be interested in. Those running the K & B 3.5 in R/C cars and boats, the 6.5 in Formula 1, and the 7.5 marine engine have, on occasion, had the retainer in the rear bearing come apart. When this happens the pieces of brass passing through the engine usually totals it completely. The problem does not exist until using the higher nitro fuels that just put too much load on the internal parts. Dick McCoy has taken the bearing used in the K & B 3.5 — removed the brass retainer — and replaced it with a one piece plastic retainer. Dick would not say what the material is but it's evidently one of the higher temperature plastics. This same bearing is used in the Veco 19, K & B 6.5 rear rotor, K & B 7.5 Marine, O.P.S. 3.5, and Pico 3.5.

As a side note — many years ago when I was in charge of R & D for Veco Products,

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and designing the Veco .19, there was no standard size bearing available that had the required inside/outside diameter that I wanted. A special bearing of instrument quality was available but far too expensive for model engine use. After contacting Pete Reed, who was in charge of Customer Relations at Fafnir at the time, we found that by paying for tooling costs we could have the bearing made special in a standard class. Pete is a well-known R/C flier — particularly Formula I, and a real help in getting some special bearings made in years past. This particular bearing later became a standard Fafnir size and later produced by companies in Japan, Germany, and France. However, it all started with the Veco .19.

The price of the special plastic retainer bearing is \$15.00 and may be ordered from Dick at C & H Inc., 10767 Monte Vista Ave., Ontario, California 91761. The part number is MC-104.

Dick also sent along a rear bearing puller he is now making for removing this same bearing from the crankcase or front plate. Normally you can get the rear bearing out by heating the crankcase and hitting it sharply on a piece of wood. On occasion a tight bearing will take several tries and a pretty good wack. Dick's bearing puller makes things a lot easier. The price is \$8.75 and the part number MC-105.

Dear Mr. Lee,

To preface this note, I wish to say I have found your monthly articles in RCM very informative and best of all straightforward.

And the reason I'm writing to you for advice is that after canvassing the local bozos in the club and the local hobby shop owners, I have a grand total of six different answers to my questions.

To wit: where do I drill the drill hole to tap the 6-32 threads to accept the pressure tap for my Robart Super Pumper MK IV on my Enya 29 V which does not have a detachable backplate? The model number is 5225.

Robart's instructions are as follows: (Pressure tap may also be installed in



induction bypass in those applications where access to the backplate is not possible, i.e., rear rotors, bulkhead mountings, etc.)

Where is the induction bypass and where on it do I drill? I suspect it is the bulge on the cylinder opposite the exhaust stack, but I'm not drilling til I'm sure.

Also, what happens to the drill shavings? I'm sure there will be some. Do I pull off the front plate and wash out the cylinder/crankcase assembly?

Your answer is being awaited (as a couple of beer bets are riding on it) and I'm enclosing a self-addressed stamped envelope.

All of the above may be only academic if it proves the Super Pumper is not suited for the Enya .29. Let me know if they match up okay. Thanks for your time and trouble.

Sincerely,

Harold E. Decker, Jr.  
Parkville, Maryland

Even though the backplate on the Enya .29 is not removable (part of the crankcase) it is still the best place for the Robart pressure fitting. Just drill and tap as though it were removable. You will have to disassemble the engine to do this in order to avoid any metal shavings.

The bypass which is the bulge on the side of the crankcase opposite the exhaust can also be drilled and tapped for the pressure fitting but the metal is usually considerably thinner here and would not thread well. Position is not critical on the bypass.

Mr. Clarence Lee,

Sir, I read that if we let an A.B.C. engine stop on top dead center while running hot, that it might crack the cylinder. Is that right? A real tight one maybe, on fast cooling?

Thanks

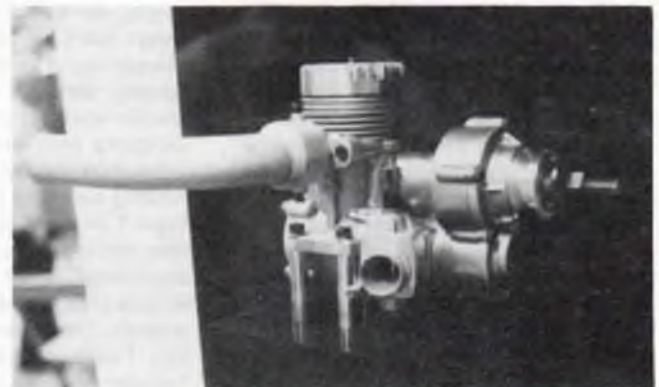
Howard L. Carpenter  
Howell, New Jersey

I do not know where you read this, but it is a bunch of balony. I have sold and repaired many hundreds of ABC piston/sleeve type engines and have yet to ever get one back with a cracked cylinder. I have had broken rods, broken crankshafts, holes melted in the tops of the pistons, split crankcases, but never a cracked sleeve. I imagine somebody somewhere has managed to crack a sleeve but it was not due to having the engine stop with the piston at top center while hot.

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O.S. Max .40 VR-P is new from World Engines. Shown at Toledo for pylon racing.



World Engines introduced the O.S. .61FSR geared engine at Toledo.

# CUNNINGHAM ON R/C

## Chuck Cunningham



**T**here are very few things in life more truly perfect than a beautiful spring day, the temperature in the low eighties, blue sky, with here and there a soft, puffy, white cloud, wind just a steady breeze straight down the runway, and the flying area occupied by friends both old and new. Lots of great flying, lots of good talking, a beginner to help over his first three flights --- now that, my friends, is really the enjoyment of life. In my book, nothing quite beats this kind of an afternoon.

Added to the enjoyment of the day was testing out my new Circus Hobbies JR eight channel radio. I put it in my Miss Fort Worth, and it operated beautifully. The control response is great, the "feel" of the sticks is just right, and the servos fit into the places vacated by one of my old standby EK radios with just minor surgery. There is only one drawback that I can find to this really super radio --- well, two, come to think about it. The first is that with all of the levers, buttons, gadgets, etc., that crowd this marvel of engineering, you really need a flight engineer to help you remember what all of the functions are. This problem can be solved by the importation of a vast number of beautiful little Japanese girls to serve as flight engineers, this, of course, brings up problem number two, how do you smuggle the flight engineers back and forth from your workshop?

One of the fascinating features of the 8 channel JR is the ability, by the use of two servos mounted side by side in the wing, to move a switch on the transmitter to allow you to depress both ailerons to form flaps, and yet to still maintain full aileron function. Also, by flipping another switch, you can couple the flap action with the elevator for tighter loops, though a tight loop is really not the flight function that you are after. Another blessing for those of us who like to fly tail draggers is the switch that you throw in the back of the transmitter to couple the rudder throw automatically with operation of the throttle. When the transmitter is in this mode at low throttle setting the rudder throw is at maximum deflection, for taxiing, spins, etc. When the throttle is in the full position setting, the rudder throw is reduced to about thirty percent of its deflection, allowing for a high speed take-off run with very little rudder and tail wheel action. Of course, all control surfaces have dual rate action, as well as a number of other preprogrammed functions that you can dial in. When you're using depressed ailerons for flaps you can preprogram the elevator for a bit of down

trim to offset the bit of extra lift caused by the depressed flaps. All of this takes a lot of time and study to master, and a heck of a lot of ground school is needed to make sure that you understand what is going to happen when you flip a switch with a wandering finger.

This radio will be a big boon to the serious pattern pilot, but it also is a super one for the dedicated sport flier. The servos are ball bearing with 45 ounces of thrust which will do nicely for most reasonably sized jumbo type models. When I first ordered my radio from Circus Hobbies, Jerry Nelson, the President of CH told me that I would really enjoy it. After I received the radio and began to look into all of the wild things that it would do, I again called Jerry requesting that flight engineer that I mentioned earlier. I've been watching the mails and UPS every day, and still no flight engineer: come on, Jerry, I really need the help.

Speaking of help (and by the time that you read this, you may have already seen the product), Devcon has a new 5-minute epoxy that may really be the ticket both in the workshop and at the flying field. It's called Pocket Epoxy. It is 5-minute epoxy that comes on a roll just like adhesive tape, and in a similar container. When you want to use Pocket Epoxy, you just tear off what you need, roll it between your fingers to mix the chemicals, and then apply it to the part that needs repair. Basically this product was developed for maintenance men working in industry, but it sounds like it would be perfect for our use. If it's not available yet in your hobby shop, it will be available from companies that sell industrial equipment and tools, but it won't be long until it appears on your hobby shop counter. Probably the two things that have come along in the past years that have made modeling easy for me are the fast setting glues and plastic covering. I always hated waiting for model cement to dry, and I always hated painting my models, just an idiosyncrasy, I know, but something about painting turns me off. I have the same reaction when Jan tells me it's time to paint something around the house.

Speaking of fast drying glues, I tried building an entire aircraft with Hot Stuff Super T --- it was super. I built my Hooker from start to finish using only Super T, from attachment of the firewall all the way through to fuel proofing the wing dowels. It made the construction unbelievably fast and easy. I must confess, though, that I did use 5-minute epoxy in one place, and one place only. When I glued the wing braces that hold the two swept back wing panels

together I didn't make the joints as tight as I should have, so after gluing every surface that I could with Super T, I went back over the gaps and filled them in with epoxy. The Hooker now has about thirty flights on it and is flying to a Super T, so give this method of construction a try.

★

Big models are here to stay. It's no longer a "flash in the pan" type of interest but, rather, a ground swelling desire on the part of modelers to create models that more nearly approach the size of full scale aircraft. I have noticed that most of the modelers who are interested in large models are those with a goodly amount of grey in the hair. Several reasons for this --- I feel that others, like myself, tend to shy away from the aircraft that leads the public to think of toys when you mention model airplanes. Sure, there is a place for every type of model and every type of modeler, but a large miniature aircraft really makes the general public sit up and take notice. I keep several photographs of my larger aircraft on the desk in my office, and almost every person who comes to call on me is amazed to see the size of them. All tend to relate model airplanes to the plastic Ukie that they tried when they were kids.

Most of the emphasis on large models has been on those powered by chain saw engines. There is no question that this type of engine has expanded the horizon of the modeler quite a bit. But, along with this move, has come a model engine size that is really quite adequate for many of the larger aircraft, and reduces the problems just a bit also. I'm speaking about the .90 class of engine. .90's can be had from Webra, O.S., and Rossi. The Rossi has so much power that it will just about blow your mind, but the price tag is up there in the mind blowing region also. Both the Webra and O.S. engines have price tags not too much higher than today's high priced .60 engines, and both engines are really super.

I started out in large aircraft by designing larger models, the Lazy Ace and Miss Texas, that could fly just great with .61 engines. The advent of .90's allowed the modeler the choice of staying with a .60, or gaining more performance by going to a .90. Many modelers have chosen each route with great success.

I have built and flown several aircraft with gas engine power, and then have designed and built four models just for .90 power. These are fun to fly and, other than taking up more room in my station wagon when going to the flying field, really require

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### SPECIFICATIONS

Name .....	GARBO ZENITH
Aircraft Type .....	Helicopter
Manufactured By .....	World Engines 8960 Rossash Ave. Cincinnati, Ohio, 45236
Mfg. Suggested Retail Price .....	\$239.95
Available From .....	Both Mfg. & Retail Outlets
Rotor Span .....	39 1/2 Inches
Mfg. Rec. Engine Range .....	.40 to .45
Recommended Fuel Tank Size .....	6 Oz.
Recommended No. of Channels .....	4
Rec. Control Functions .....	L R cyclic. Fore Aft cyclic. Tail Rotor & Throttle

#### Basic Materials Used in Construction:

Fuselage .....	Metal & Plywood
Blades .....	Hardwood
Canopy & Fins .....	PVC Plastic
Building Instructions on Plan Sheets .....	No
Instruction Manual .....	Yes (1 pg. revised 10 pgs.)
Construction Photos .....	Yes

### RCM PROTOTYPE

Radio Used .....	World Engines
Engine Make & Displacement .....	O. S. Max .45FSR
Tank Size Used .....	6 Oz.
Weight, Ready to Fly .....	101 Oz.

### SUMMARY

#### WE LIKED THE:

Pre-assembly of major components. Exploded view plans. Quality of parts. Flying characteristics.

#### WE DIDN'T LIKE THE:

Instructions (later rectified). Missing tank hardware.

**U**pon opening the box of the Garbo Zenith, you will be impressed with the packaging job done by the manufacturer. Almost all of the parts are in numbered plastic bags. Only the bulky metal and plastic parts are loose, but these are easily identifiable. Garbo has even provided spare hardware and metric Allen wrenches plus the special PVC glue required for the canopy and patching material to boot. Further examination of the packages reveals that the rotor head and main rotor shaft system are preassembled. If an ARF helicopter exists, your first impression is that this is it. That's not really true but it's not far from it either. Let's build.

#### Construction:

It's here that one of two problems were discovered with this kit. A super detailed exploded plan is provided and a set of instructions with five assembly photos included. For the experienced heli builder, it's easy to build the Zenith as it follows the same construction used in most of the popular RC helicopters on the market. But for the beginner, the instructions would not provide the guidance required to build the kit properly. We felt that these instructions would be a detractor since, as you will read later, the machine is a superb trainer. The training needs to begin with the building instructions set. We contacted World Engines, the importer, and they advised us that a supplemental set of instructions is now included with the kits so that problem was no problem any more. The supplemental set is very detailed, refers to the assembly drawing and will allow an easy assembly by the new builder. The parts fit together well and the only item not included was the fittings for the fuel tank which we will mention later. Other than glue and paint, it is all there (radio and engine not included). Pushrods and ball links are already installed on the swashplate and others are provided for use elsewhere. Curiously, the threads on the pushrods are LH on one end and RH on the other. This may seem a poor choice, but consider that trim adjustments can be made without removing the connectors. They act just like turnbuckles. Just be careful and note which end is which.

The wooden cabin parts are not pre-cut or stamped. Just use a fine tooth blade on your saw to avoid the usual plywood splinters. We used epoxy for all gluing and only the servo tray for the tail rotor servo and throttle tray required that.

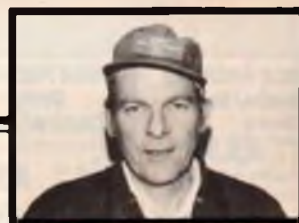
Depending on your skill with fitting canopies, you may need to add some additional security to assure that the canopy stays on in-flight. Carl Goldberg's snap-on latches solved that problem and worked just fine.

The fuel tank was not supplied with fittings and a quick check at the local hobby shops revealed that the same thing was true in their stock. Garbo left these parts out of the kit. Heli-Baby or Heli-Boy tank fittings work just fine as do many of the other Heli-Baby parts. Since the Zenith is metric, many of the parts are the same and can be used as a source of spares as can World Engines. If you cannot obtain the tank parts locally, World Engines does have them available. Following is a list of the parts: 2 — K.C. fuel tank connectors, W.E. #16810; 1 — Commercially available fuel tank clunk.

Speaking of spares, Garbo has included a spare set of main rotor blades with the kit and if your Zenith is your first helicopter, you will appreciate this. They only supply white covering material for one set of blades, but a visit to the local hardware store for some plastic

# BIG IS BEAUTIFUL

Dick Phillips



R/C Kit's Tiger Cat is not all that new but big twin engine model is impressive.

**T**oledo . . . just another place name to most, but in April it becomes a modeler's Mecca, attracting modelers from all parts of the world to view and participate in the largest strictly R/C show-and-tell in the world.

Most manufacturers introduce their new products and new kits at Toledo and it is usually the modelers first opportunity to see all the new goodies.

The 27th Annual Radio Control Exposition held in 1981, was, if not bigger, then certainly as good, as has been presented there previously. I heard complaints that there were fewer models on display this year (I heard the same thing last year, too). The crowds seemed a little thinner, but may have just been spaced a bit better than last year when Friday saw the buildings crammed to the walls with visitors, and Sunday was much less crowded.

To visit the show on Thursday, which is set-up day, makes you wonder how in the world a show could ever be put together in one day in the midst of the confusion which reigns. Packing material, which must be saved to send everything back, litters the aisles and you doubt that order will ever prevail. Yet . . . Friday morning, the booths are all in place, the floors have been swept and washed and the place looks as if it has been set-up for weeks.

For me, it was a real treat to spend the bulk of my time in the RCM booth with the



Nick Ziroll's latest addition to his plan sets in this F8F Bearcat shown in racing colors. Span is 86" and both canopy and fiberglass cowl are available.

staff and other writers present. Dick Kidd, Dick Tichenor and Bob Wallace represented the magazine staff, and Ken Willard, Jerry Smith, Jim Oddino and yours truly, represented the columnists. It's a pure delight for me to be associated with these people and even nicer to be able to visit with them from time to time.

It's always a pleasure for me to meet those who write to me from time to time and Toledo is an occasion when I can visit with some of my correspondents. It seemed all during my stay at the show that one or the other of us in the booth was off in a corner with a reader, sharing ideas and experiences, and trading shop talk. It's great and I hope to meet more of you in future years.

Large models are my bag and they were there in quantity. Some one of a kind, some kits and some new plans. One of the one of a kind variety was shown by Don Godfrey of Binghamton, New York. Don's VETY large B-25 was completed in a matter of a few weeks in order to be available for



One half sized Quickle, fourth in a series of increasing sizes. Span on this is 100", weighs 27 pounds and powered by the Quadra. Sorry, I goofed on the builder's name.

Toledo and it is very large. I did not get the chance to ask Don the exact wingspan, but I would estimate it to be about 10 to 12 feet. Weight is 60 pounds(!) and power is two 3 c.i. Kioritz engines, which should be much more than adequate to fly the models.

Dick Barron, of Barron's Scale Classics, has produced a plan for a Standard Stearman, and it is a beauty. Dick had a completely framed version and a framed fuselage at Toledo. He does nice work, both on paper and in transferring from paper to model. The Stearman he has designed is very good indeed and the construction is excellent. Not for the faint hearted nor for the inexperienced, but well worth the time and effort involved. Dick has incorporated a sprung landing gear suspension that should stand up to the occasional rough landing. If you are a Stearman buff, drop Dick Barron a note, you'll like his plans (1213 Holly Spring Lane, Grand Blanc, Michigan, 48439).

Other good looking plans available were also in evidence. Norm Rosenstock now has the plan available for his YKS-7 pictured here some months ago. Span is 99.75, weight will be 32 pounds, and Norm uses a Super Hustler on his. A Kioritz would be my choice (because I have one, I guess!). The Waco designs are all classics as far as I am concerned, but this big cabin job is one of the nicest. It looks good and, according to Norm, it flies well. It's big, the plan is well done and should present no problem to the



Kloritz engines from 3.15 h.p. to 9 h.p. make an impressive array. 9 h.p. monster weighs 8 pounds and would turn a large prop and produce lots of thrust.



Very nicely done Heinkel 51 is by Dave Zoltan of Floreffe, Pennsylvania.



Don Godfrey's huge B-25 is powered by two Kloritz engines and weighs in at 60 pounds. Conventional model construction may be stretched a bit on such a large model.





**Richard Barron's Scale Classics has a new release of the PT-17 Stearman. Nice construction and very large.**



**Spring loaded gear leg of Barron PT-17. Construction is light and strong and the flex built into the gear leg is ideal for grass strips and the occasional rough landing.**



**New in Quarter Scale plans is Jerry Behren's Travel Air 2000 nicely done here by Jerry. Plan is available, see text for details.**



**Pappy de Bolt and Midwest combine talents to produce this third scale model of the Whitman Tailwind. Construction is such that the experienced modeler will find no problems and the newcomer can produce a model with excellent flying qualities for a first venture into BIG.**



**Balsa USA's three entries into the BIG scale area. Their new Fly Baby is flanked by the well-known J-3 and Sopwith Pup. Pretty impressive line-up.**

experienced builder. (94 Cedar Dr., West Plainview, New York, 11803.)

I mentioned a while back that Norm's design for the YKS-7 would be kitted by a new manufacturer. Unfortunately, this arrangement has fallen by the wayside in the meantime and the kit will not be available at

all. My apologies to those of you who wrote to the address I gave you and received no reply. It happens from time to time and, much as I try to avoid disappointing you, sometimes I get caught up in my own enthusiasm and pass along information prematurely, before it is proven out. Such was the case with the YKS-7, but you can still have one if you'll build it from Norm's excellent plan.

It was once my ambition to have a copy of every plan in existence for the larger model. At one time that was an attainable ambition and the desire was realistic. I doubt that it is now, as the proliferation of plans for large models has surprised even me. I had not heard of Jerry Behrens before April in Toledo and discovered he has some nice stuff for the quarter scaler. I have a copy of Jerry's Travel Air 2000 and it is a good plan. In addition to the 2000, Jerry has a Travel Air 4000, and a Fokker DVI available (all \$22.95) plus a non-scale model he calls a JB Special. This can be flown as a biplane, or a low winged mono, and weighs 18 pounds. At \$21.95 it sounds like a fun machine and should perform very well indeed on the ubiquitous Quadra. On Jerry's drawing board, waiting construction, are a 80" Sopwith Pup, a 90" Waco UPF-7, an 85" Nieuport "BEBE", an 80" Sopwith Tripehound, a 90" ATO Waco and a Fokker DR-1. Jerry is, if nothing else, a prolific man at the drafting board. If you are interested in any of the above, drop Jerry a note for additional details, availability and prices. (Behren's Plan Service, 31-27 Healy Ave., Far Rockaway, New York 11691.) No C.O.D.'s.

Tom Keeling, the "T" in T & G Fiberglass, has produced a nice little plan for the Christen Eagle (both I and II shown) and will probably have the glass parts necessary, such as cowl and pants, by the time you read this. Judging by the number of Eagles and Stardusters showing up, we are going to have a little relief this year from the plethora of Pitts Specials we have seen in the past couple of years. Not that there is anything wrong with the Pitts, it's just nice to see something with two wings that isn't a Pitts.

Tom's Eagle, at 1/4 Scale, is a nice size for transport. A Quadra or a 90 can be used and, with the Quadra, it should be a real barn-burner of a flying machine! Span is 63" so it's not your usual monster and at a weight of 13 to 16 pounds it's vertical performance should be elevator-like.

Wendell Hostetler had his new P6E there as well and it looks as fine as the pictures used here a while back. Wendell's idea is to design a model for the power available rather than doing a design and then trying to find something to fly it well. It's a good concept and his Liberty Sport, Jungmeister, and now the P6E, are all designed to fly on readily available stock engines. (1041 Heatherwood Lane, Orrville, Ohio 44667.)

Giezendanner USA have announced they will have a Quarter Scale retract on the market soon, but it was not available at Toledo. I have asked them for information



**P-51 type wheels and tires for Annco's new retract system will also be available. Wheel is machined and aluminum, wheel is very secure and tire will not come off it is claimed.**



**Annco Manufacturing will be producing this good looking retract gear for Quarter Scale at what could be very attractive prices. Gear is air operated, positive locking and beautifully machined.**



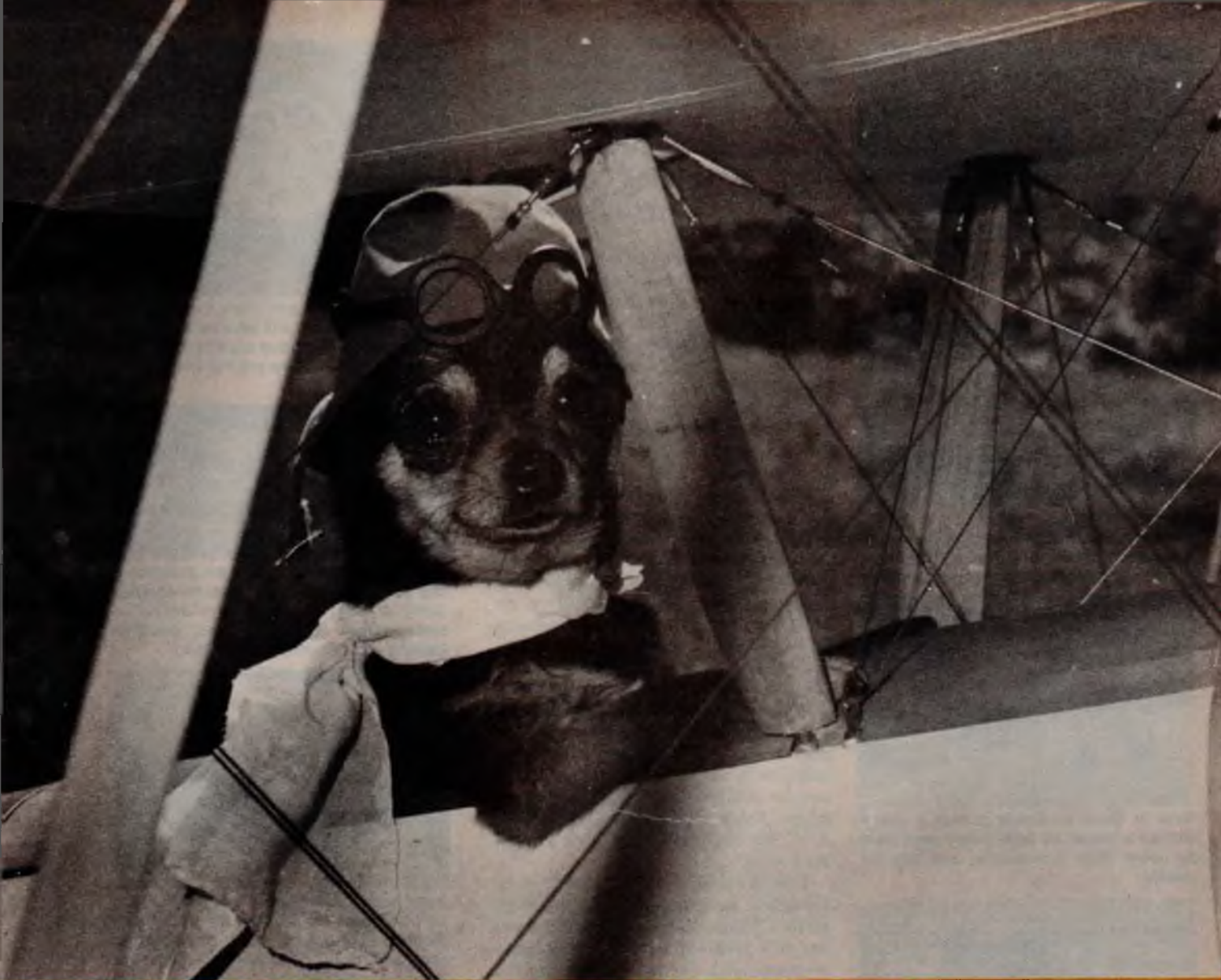
**B & B Specialties Quadra Muffler, looks good and is well-made. Their mount can be used with the muffler in a stand-off mode of the engine, may be mounted practically right on the firewall which must then be recessed for a muffler or pipe arrangement.**



**K & H Glass is producing this great J-3 cowl and dummy engine. Just the thing to dress up the engine room of your Nosen, Balsa USA, Sig or Sid Morgan Cub.**

when the gear is ready and will be reporting to you on it later.

If you are a Stinson addict or owner, you might want to add this little gem to your collection. Realistic Models (4105 Wadsworth Ct., Annandale, Virginia 22003), have a large 1947 Stinson Voyager available in kit form. While a little expensive at \$285.00, it is an excellent kit, with shaped leading edges and many other good construction techniques. The 30 page



# Sopwith Pup

**F**our years ago when I first read about the Quadra powered big ones, I became enchanted with mammoth scale. Then three years ago I decided to build a 28% Stand-Off Scale Sopwith Pup. It's 28% size because that's the largest Pup I can fit fully rigged into my Chevy Suburban.

Since my motto is, "I steal only the best," (ideas that is), I spoke with the experts in my area. Men like Granger and Larry Williams were especially helpful during the design stage. Bruce Reynolds, the archivist for the San Diego Aero-Space Museum, provided me with three-views of the Pup shortly before the museum was burned. (A new museum opened in June 1980).

I used an opaque projector to enlarge the plans onto 3' wide paper obtained from

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#### About The Author

Joseph Bukovchik is 42 years old, married, and has four daughters ages 6, 8, 10 and 12. He's a social worker, working with abused children for San Diego County. He lives in Vista, California, home of Kraft Systems. He's been a model builder since kindergarten some 37 years ago. Joe's next project is going to be a 1/2 scale Van's RV-3 and his wife doesn't know about it yet until she reads it in RCM.

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*Joseph Bukovchik, author, designer and builder of the Sopwith Pup, How's this for mammoth scale?*

## SOPWITH PUP

Designed By: Joseph Bukovchik

### TYPE AIRCRAFT

1/2A Sport Scale  
(28% of Orig. size)

### WINGSPAN

89 3/4 Inches (both wings)

### WING CHORD

18 Inches

### TOTAL WING AREA

3200 Sq. In.

### WING LOCATION

Biplane

### AIRFOIL

Semi-semicyrlical

### WING PLANFORM

Constant Chord

### DIHEDRAL EACH TIP

1 1/2 Inches (both wings)

### O.A. FUSELAGE LENGTH

57 Inches

### RADIO COMPARTMENT AREA

(L)15 1/2" x (W)5 1/2" x (H)8"

### STABILIZER SPAN

34 1/4 Inches

### STABILIZER CHORD (Incl. elev.)

13 3/4 Inches

### STABILIZER AREA

460 Square Inches

### STAB AIRFOIL SECTION

Flat



A potpourri of Sopwith Pup photos including (above) Eileen O'Malley with George Stokers' 1929 Model A convertible. The "Ace" at the controls on the opposite page gives an idea of the size of the aircraft.



**This magnificent "Pup" is a challenging project for the dedicated modeler but the reward is well worth the time and effort to construct it.**  
**By Joseph Bukovchik**

### STABILIZER LOCATION

Top of Fuselage

### VERTICAL FIN HEIGHT

11 1/2 Inches

### VERTICAL FIN WIDTH (Incl. rudder)

15 3/4 Inches (Max.)

### REC. ENGINE SIZE

1.9-2.8 cu. In.

### FUEL TANK SIZE

16 Ounces

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

4

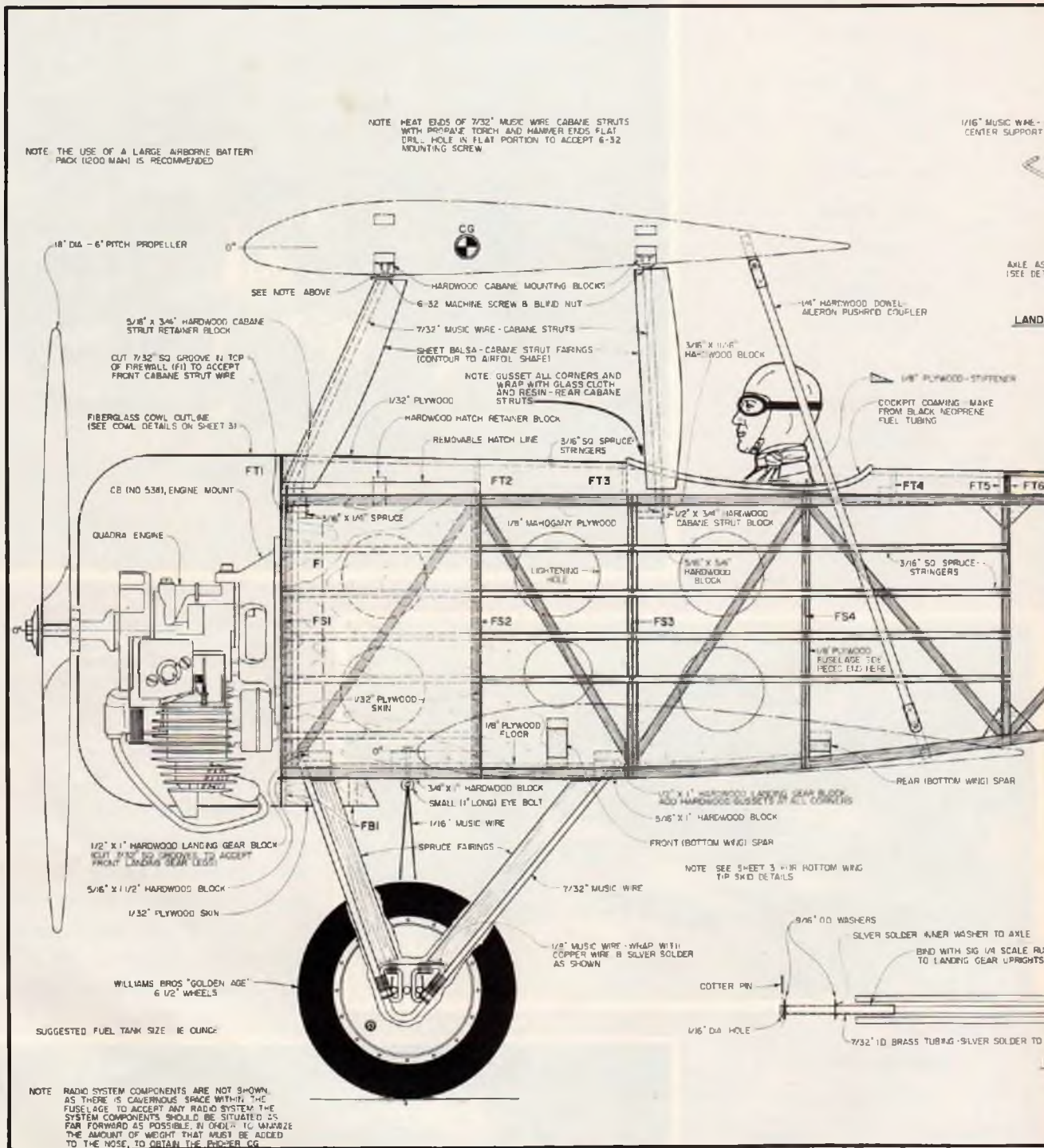
### CONTROL FUNCTIONS

Elev., Ail., Throt., Rud.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Spruce, Ply
Wing	Spruce, Ply, Balsa
Empennage	Spruce, Ply, Balsa
Wt. Ready To Fly	446 Oz.
Wing Loading	19.5-20 Oz./Sq. Ft.



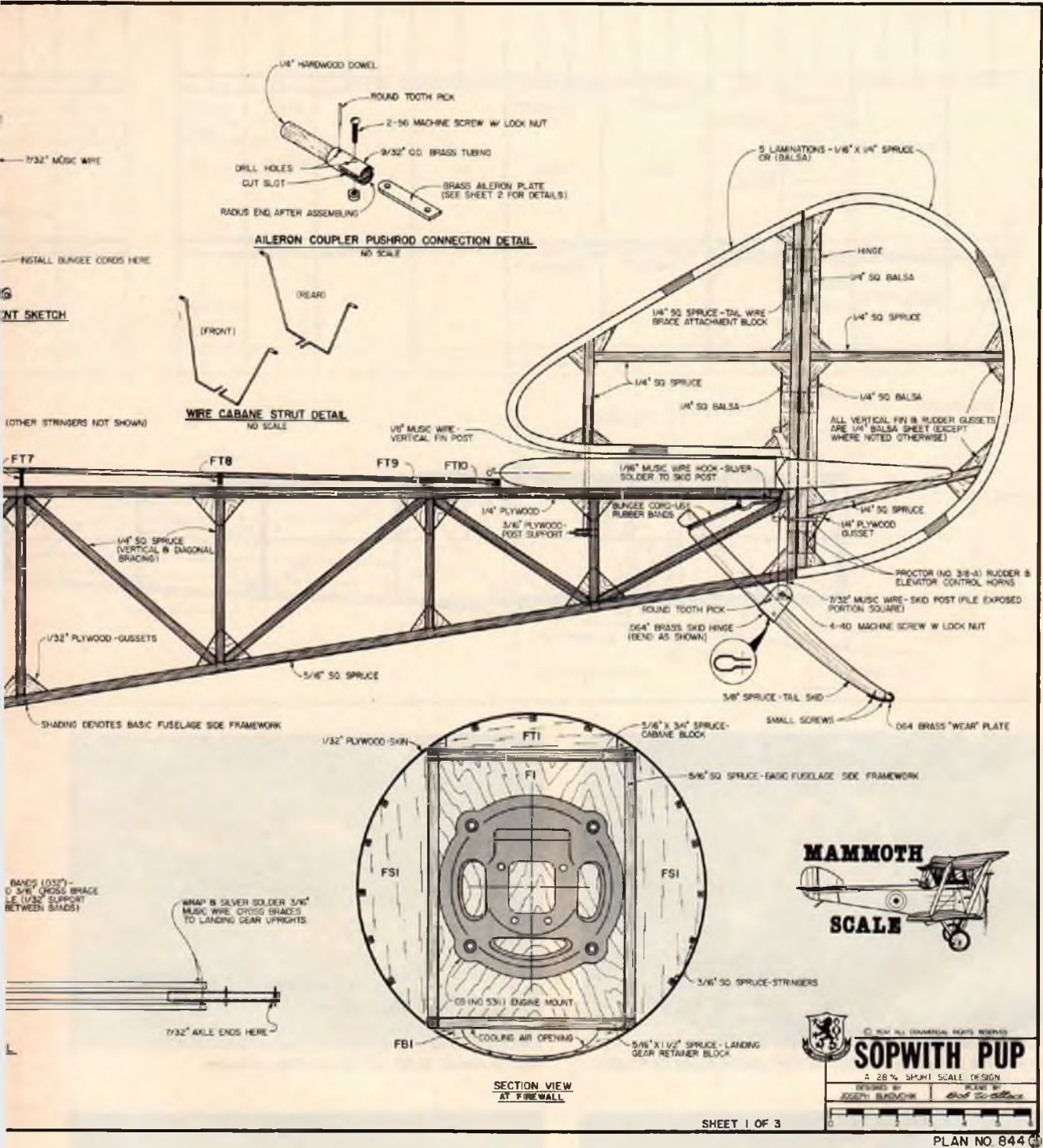


school, and then made a few design changes. The nose has been lengthened about 2 1/2" to provide for better balance. All control surfaces have been increased 5%. Wheels are 6 1/2" William's Bros. Golden Age wheels and not the Vintage type. I think the thicker rubber tire on the Golden Age type is able to handle a 28 pound plane better than its thinner counterpart. Total cost for the Pup was about \$200 minus radio and engine.

The Pup is a project for someone who can

spend a lot of time buying materials, cutting, fitting, sanding, gluing, painting, rigging and fine tuning this bird or, more appropriately, birddog. However, much of the work has already been done now that you have the plans. Mine weighs a shade under 28 pounds, but with 23 sq. feet of lifting area, the wing loading is 19 1/2 oz. per sq. foot. With its thick wing and resultant displacement effect, its effective wing loading is considerably greater in lifting capacity than that figure provides.

To begin with, I found out a lot about wood, spruce in particular. The reason why spruce is the best for our use is because it has the greatest strength of any wood for its weight. It refuses to crack like pine and, when cut into thin strips and wetted down, you can literally tie it in knots before it caves in. Since spruce is expensive at the hobby shop, I bought a 1' x 8" x 15' board of straight grained Sitka spruce from a hardwood company. I cut it in half and took it home in my VW. I cut all the spruce with a



new plywood blade on a 10" radial arm saw. Results were excellent.

**CONSTRUCTION**

**Rudder:**

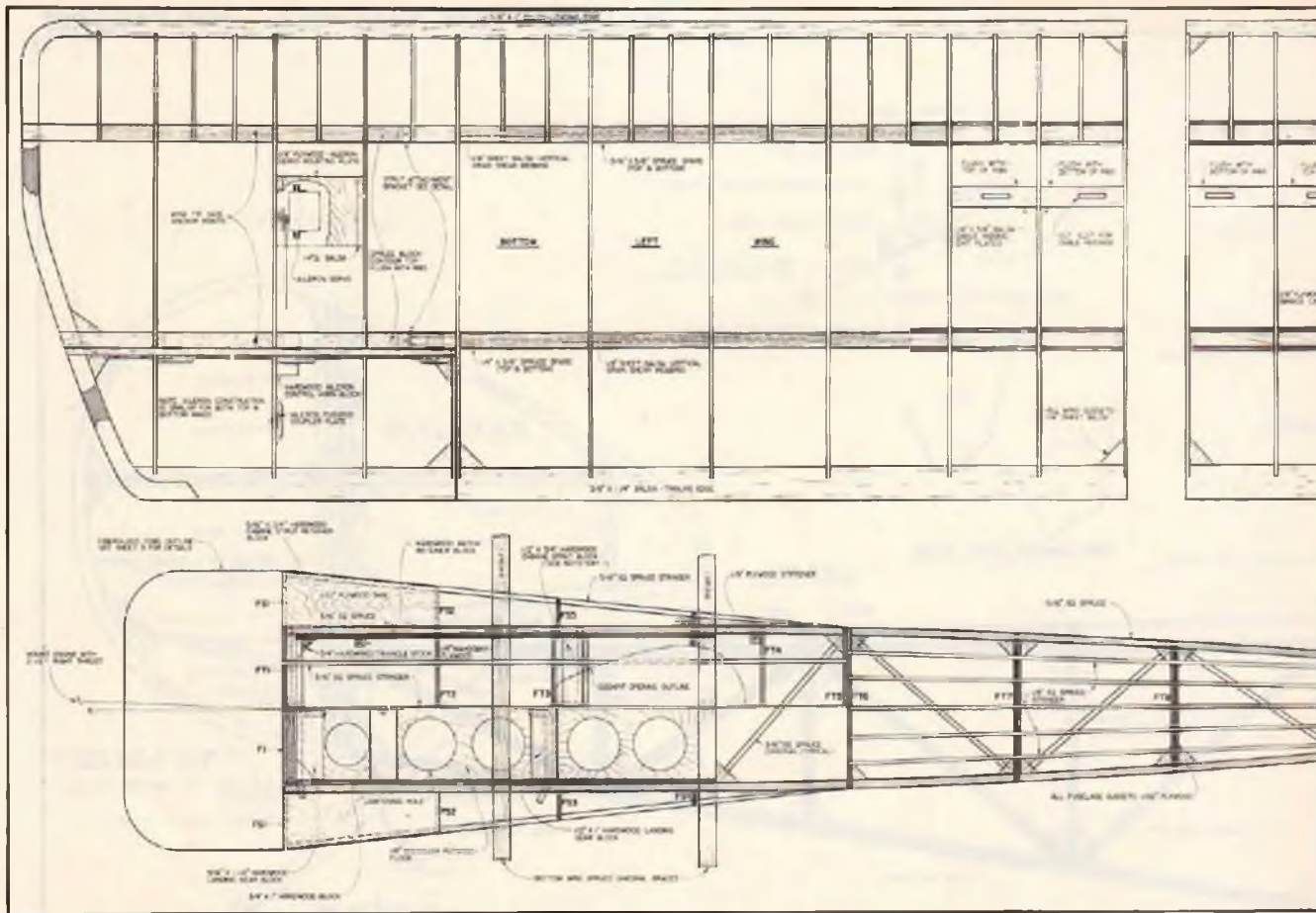
I began here because it's the easiest, simplest and instantly satisfying piece of construction. Besides, it provides good practice bending and laminating the spruce.

I used a piece of sound insulation board as my building board, placed waxpaper over the plans and drove 1 1/2" finish nails into the board to act as guides for bending the

spruce. I began with the inner piece and worked outward. After cutting the strips and wetting them down until dripping wet, I applied Titebond to both sides of each strip. Since the wood is so pliable, all laminations were in place at one time so that the whole mass could dry together. Lots of clamps and clothespins were used. It dries slow enough to give you plenty of working time to achieve fine results. Make the entire rudder outline as one piece. Thus, your strips to be laminated are about 42" long.

When the cross pieces and gussets are added, sand the rudder with a belt sander. A final hand sanding will make your results superior to anything you've done before. Try it, you'll like it. It's most authentic and antique looking.

After sanding it, cut through the hinge line with a razor saw. Obviously you have a perfect match. When some of my fellow Palomar R.C. Flyers saw the finished project, they thought it would be difficult to laminate, but it is an easy and effective



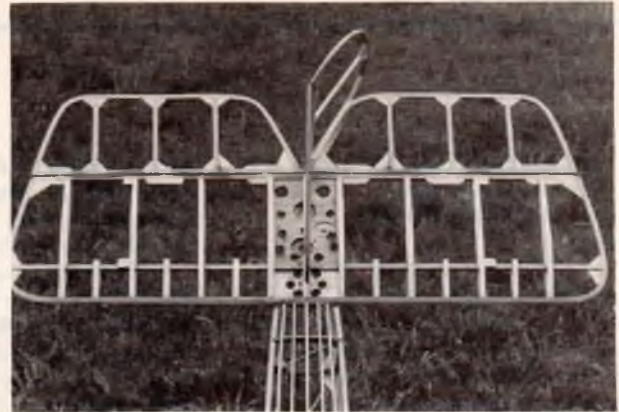
Joe and his completed "Pup." A real masterpiece and super flying machine.



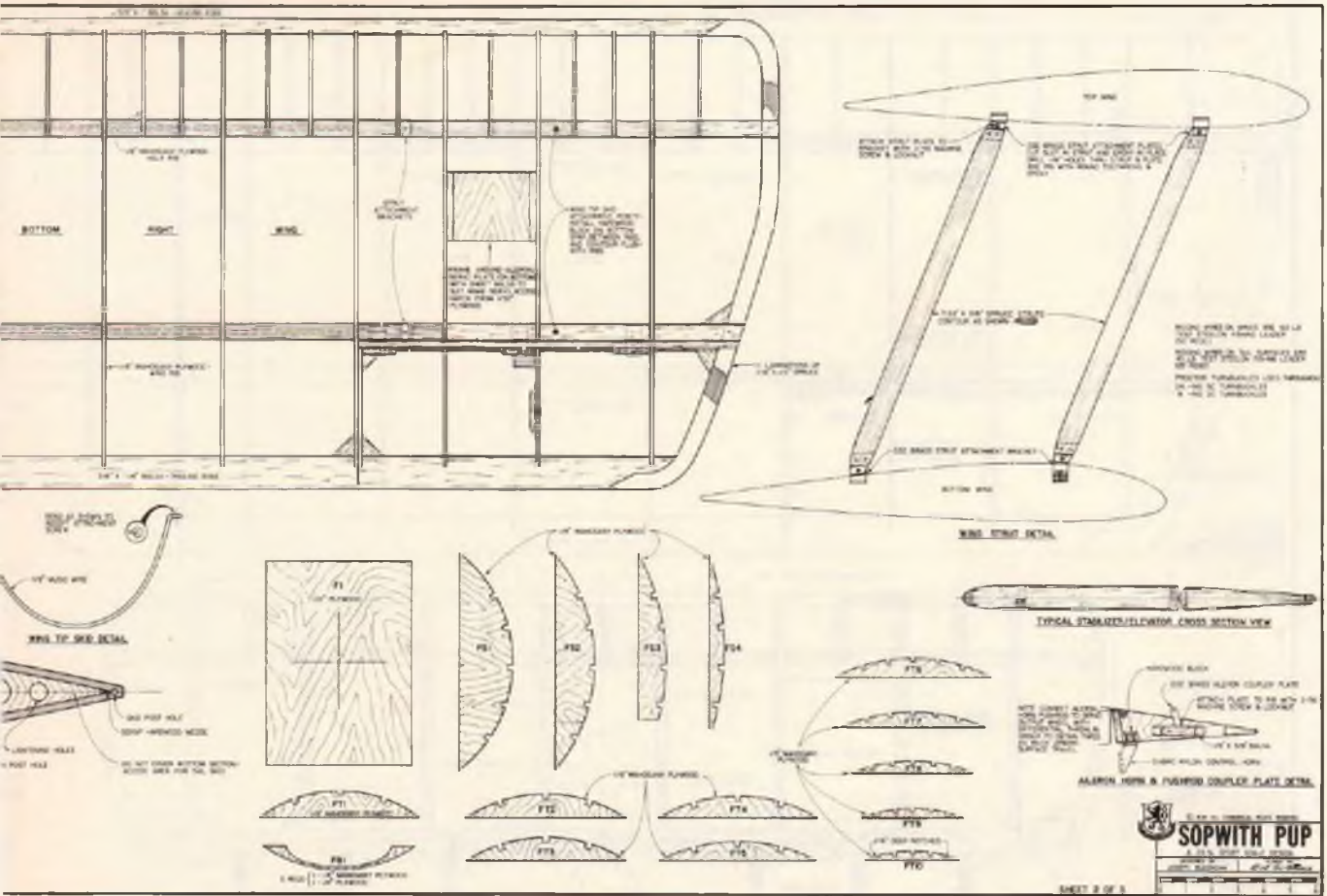
Pup is about to lift-off for another mission.



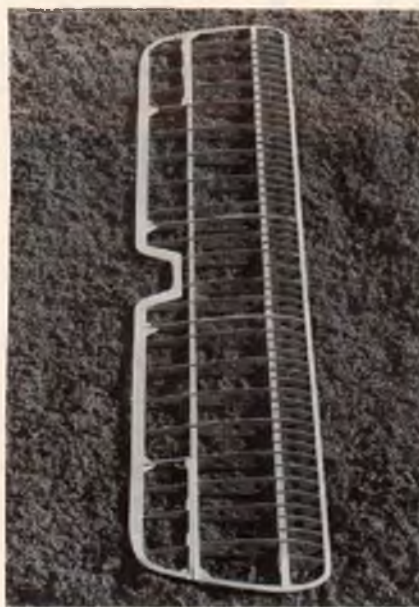
Completed fin and rudder. Fin tailpost now runs to bottom of fuselage.



Completed stab and elevator. Framework is outlined with laminated strips.



Lower wing panel completed. Wing tips are also laminated strips.



Top wing completed and sanded for final assembly.



Close-up of aileron. Note the hinges are secured by small dowels.

method of construction.

**Stabilizer:**

The stabilizer is begun the same way as the rudder, i.e., as a one piece laminated configuration. You build the leading and trailing edges with the tips as one unit. Thus, your strips are about 84" long. Next add the ribs, capstrips, gussets and plywood for mounting. Build it with epoxy. I used

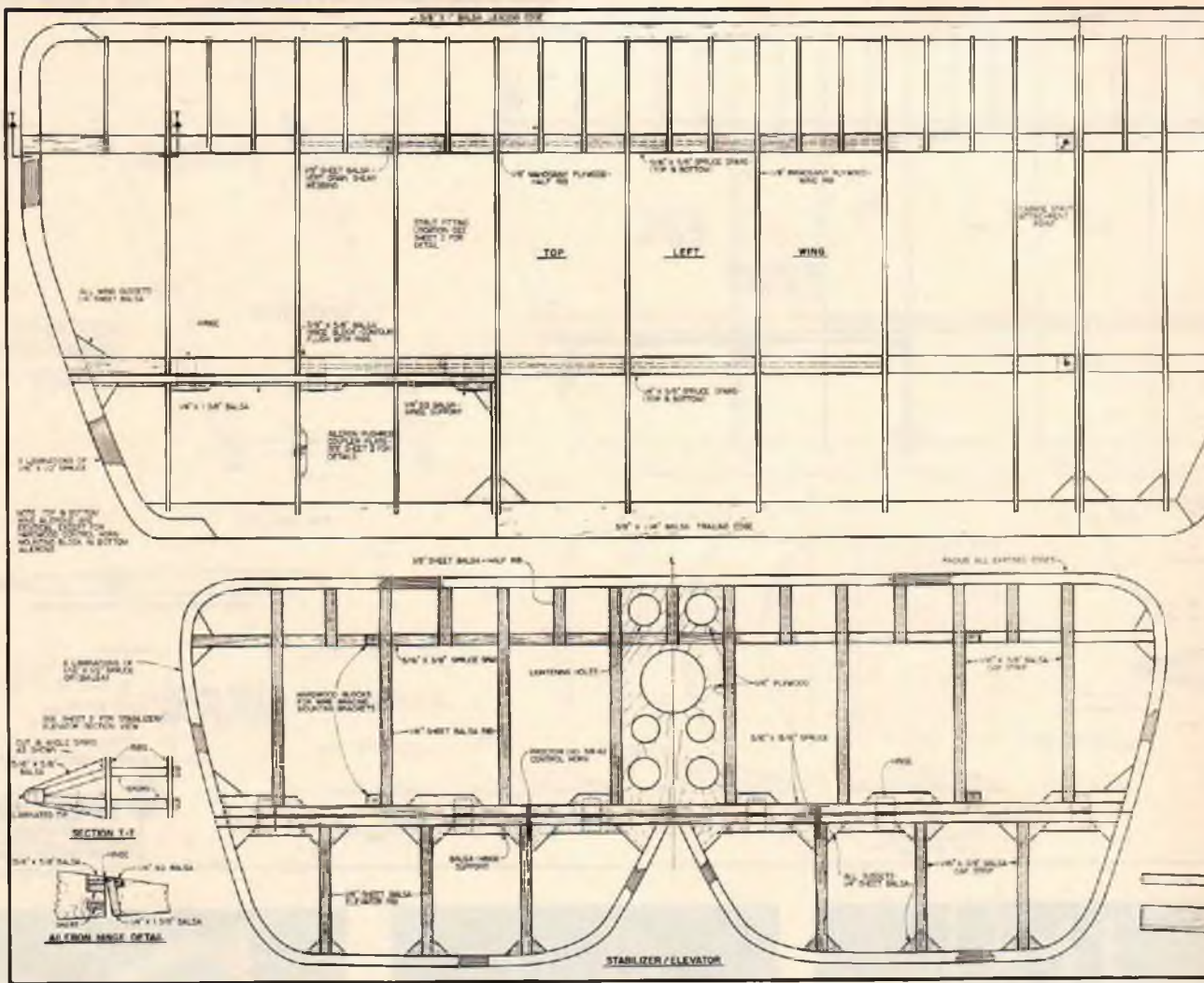
my belt sander again and finished with some final hand sanding. When done, separate the elevator from the stabilizer by cutting through the laminated ends on the hinge line.

**Cowl:**

I spun a male cowl blank on a lathe. I glued 4 x 4 redwood posts together and the results were satisfactory. Next I made a

female mold, making it in two halves. Doing it this way made it easier to extricate it from the wood plug. Further, I took some bailing wire and embedded it in the wet plaster to reinforce it. This helped to strengthen that big mold.

After applying mold release to the inside of the plaster mold, I began laying up the fiberglass cloth. Since weight is no object



**Strut attachment and alleron pushrod tie between wings.**



**Adjustable alleron pushrod detail. See text.**



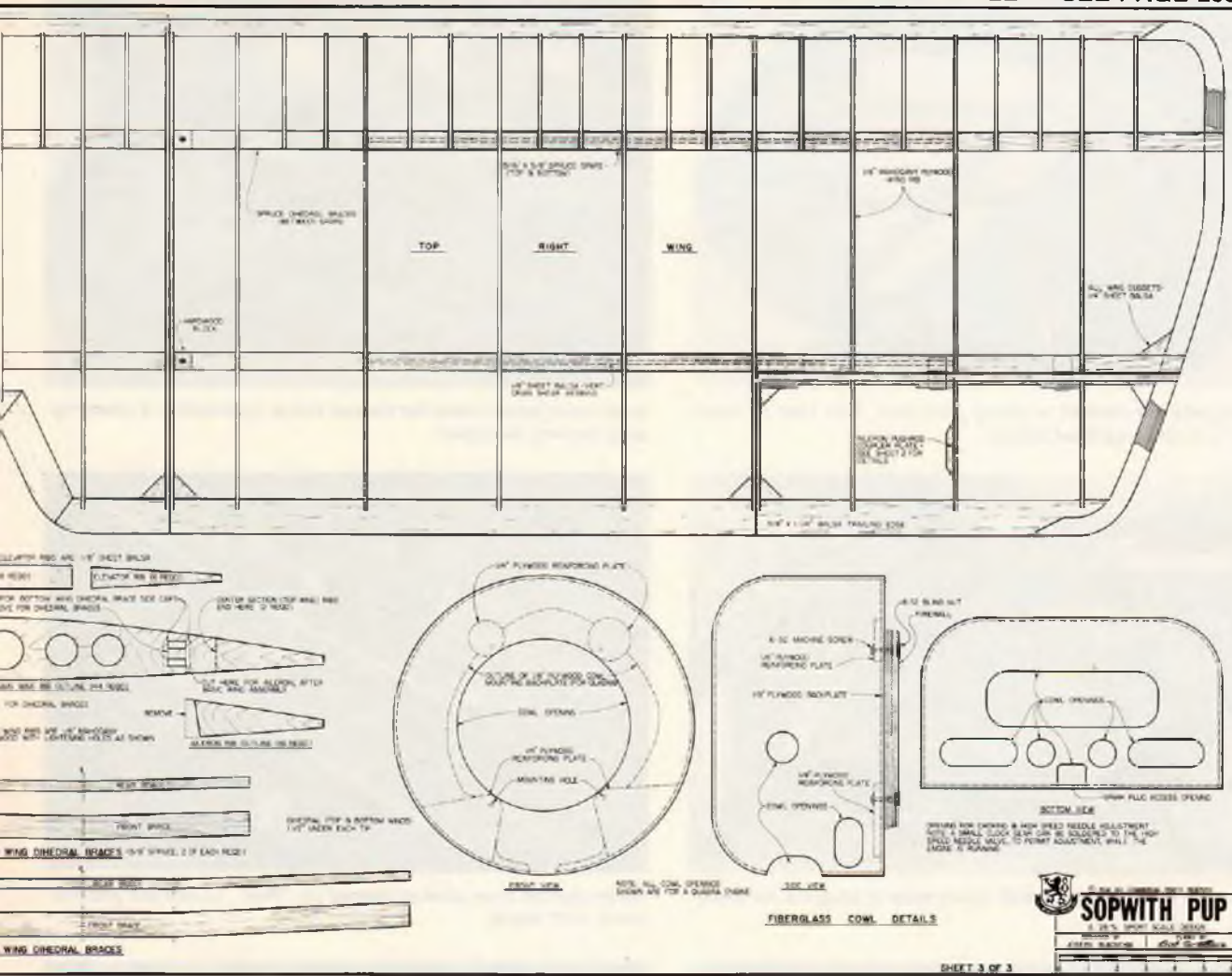
**Fiberglass cowl makes the completed nose section just like the full-size one.**

up front, you don't have to worry about getting the cowl too heavy. I applied two layers of the heaviest fiberglass cloth I could find, laying it up in 2" strips up the sides.

Then, for the second layer, I wrapped it around the inside circumference. The finished product was somewhat pock-marked with air bubbles, but

micro-balloons and filler took care of it. To mount the cowl to the firewall, I glassed a 1/8" ply backplate to the rear of the cowl, then bolted through this plate onto





**SOPWITH PUP**  
 A 1/2" SPAN SCALE MODEL  
 MODEL BY  
 JOHN B. BROWN  
 PLAN NO. 8445



Note the plug-in spars for removing the lower wings for transporting aircraft.



Completed fuselage ready for covering. This is when things get exciting.

the firewall. I used blind nuts to make its removal simple. However, since the cowl is removed many times during construction, I found it easier to mount and unmount the cowl with several machine screws.

**Fuselage:**

The body is regular stick construction that we are used to. I framed the sides, one over the other, joined them, added the cross pieces, and added the plywood floor and

sides up front. Next came the landing gear and cabane blocks with plenty of gussets. The wires were already inset into these blocks. The entire body is glued with epoxy. This is especially necessary at the tail since there is a lot of vibration there. All the wires are wrapped with fiberglass cloth before gluing them into the body.

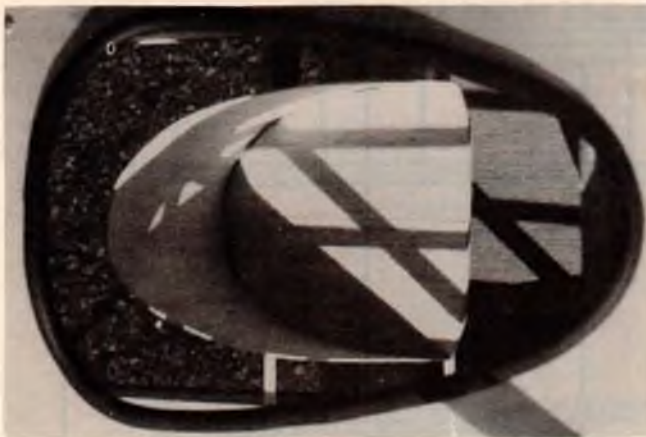
**Landing Gear:**

I used 7/32" spring steel wire for cabanes

and landing gear. Where the pieces were wrapped with copper wire, they were soldered with a propane torch. I might add that a torch is a must. The landing gear cushions in two ways. One is through the bungee cord; the other is through the rubber on the wheel. You need all the cushioning you can get with such a primitive gear.

**Cabanes:**

I used the torch on the ends of the cabane



Looking into the cockpit showing pilot seat. This kind of detail adds much to completed model.



Instrument panel looks like the real thing. Note switch & charging plug located on panel.



Close-up of landing gear detail. Good view of plug-ins for lower wings.



Three-quarter front view of framed up "Pup". Looks too good to cover with fabric.



Three-quarter rear view of "Pup." Photo shows prototype with symmetrical stab. Was later changed to a flat stab for better performance.



Fin lettering is made up from Zip-A-Tone Follo Light No's 16, 20 and 36 point. Fuselage numbers are Helvetica Medium 48 point (1/2").

wires where they bolt to the wings. Why? Heat made it easy to pound them flat so that I could bolt directly through them to the wing. It's a neat installation.

The hatch is removable which then allows for access to the inside of the fuselage. Further, since the hatch is covered with a 1/32" ply skin, it flexes easily when being installed. There is nothing difficult about the body except matching the cowl to the body. I had to use vinyl filler to achieve a perfect fit.

Not shown on the plans are the internal cross braces which travel from the top of one side of the fuselage to the bottom of the other. These are 3/16" sq. spruce.

The tail skid is a spruce, brass tipped affair. I used some waist band material from my wife's sewing kit to provide the rubber or spring type action.

**Wings:**

I began by making all the laminated wing tips first. Here I suggest you use a plywood building board so that the nails will stay in

place for all four tips. Since you have become adept at laminating, these are quite easy since they are so small when compared with the tail feathers. A belt sander is a must for these tips. Sand them now. A Ritz #2-30-12 non-scale airfoil was chosen because I didn't want this Pup to fly like a kite. This deviation from scale enhances its flight characteristics by making for better penetration and firmer control. The ribs were made from inexpensive 1/8" mahogany door skin with appropriate

lightening holes. The leading and trailing edges are notched, ribs are slipped onto the spars, ribs are fitted to the leading and trailing edges and then glued. When adding the tips, I added a spruce strip to the inside of the tip at the leading and trailing edges. I overlapped these to secure the tip to the wing. Now, the finished aircraft can be picked up at the tips!

The bottom wings plug into the fuselage. Even though I don't need to dismantle the Pup for flying, it's still a good idea to provide for plug-ins. A crash or a long trip to Las Vegas would be reason to dismantle it. I wonder which will come first.

The aileron servos are installed in the bottom wings at the appropriate places. I had Kraft fabricate aileron connecting wires to enable this type of installation. Access hatches to these servos are in the bottom of the wings. These are not shown on the plans. I used Goldberg horns on the ailerons by screwing them into a hardwood mount. I have very little down aileron, but a lot of up.

As for the pushrod between the two ailerons, I used a straight 1/4" dowel. What is not shown on the plans is that I've made them adjustable. To achieve this, I cut the dowel to the proper length, minus about 1/8". Then I cut off 3/4" and fitted the brass tube over the end of the long piece. The 3/4" piece is going to slide inside this tube to provide for the adjustment. Epoxy a 4-40 1" threaded rod into the 3/4" end so that about 5/8" of the rod sticks out. Tap a hole into the dowel where the brass tube is located. Now you can thread the 3/4" rod into it and it's adjustable.

To mount the wing tip skids, I heated up the wire ends with the torch and bent them neatly to a small circle for use as a mounting base. Next solder a washer as a mounting plate and 4-40 it to blind nuts through the lower spars. Recess these ends into the hardwood pad you've epoxied onto the lower spar at that point. Obviously, you mount the skids when the plane is covered and painted.

#### Engine:

I had Dario Brisighella counterbalance the flywheel on the Quadra to cut down vibration. After installing a six bolt prop adapter, balancing the prop, attaching an E.W.H. throttle adapter and having Bob Wisniewski braze exhaust stacks to the muffler to direct the exhaust out of the cowl.



*William Bros. 3" Gnome cylinders hide most of the engine inside the cowl.*

I mounted the engine with my own mount. I used 10e rubber washers between the bolt head and the mount, between the mount and the firewall, and between the nut and the firewall. That means 12 rubber washers. I now have a workable Quadra that is quite satisfactory. A 16 oz. tank is more than sufficient for my needs, though a 32 oz. tank would be swallowed by the Pup. I fly it with an 18/6 prop.

A final word about the landing gear. It should be trussed in the center and with the criss-cross diagonals from the hardwood block inside the bottom of the fuselage. I've increased the width of the landing gear so that it'll have better ground handling. However, it's hard to tell the 3" difference from the scale plans. It still looks like a small track.

#### Covering:

It cost \$40 for the Super Coverite and Balsarite. I pulled the Coverite very tight and have a smooth skin on the Pup. Next, Hobbycoxy clear (I used 4 cans) was sprayed and lightly sanded with #400 paper. A hint about the joints where Coverite meets Coverite on the top wing is helpful. To seal over these seams, cut a 1" strip with pinking shears, (very sharp



*Looks very much like the "Pup" is ready to go into action.*

pinking shears). Then lower the heat on your iron — I used my MonoKote iron. As an added protection against frayed ends, I put a piece of thin white paper over the strip and heated through it. Thus, the pinking edge was sharp and clear. I used five rolls of Super Coverite and then bought a 47" x 48" piece to cover the top of the bottom wings. The bottom of the bottom wings are pieced and you can hardly tell.

#### Color Scheme:

I used Formula U paints throughout except for the silver cowl area. Here I used Aerogloss Silvaire aluminum. To prepare the cowl, I sprayed it with Aerogloss balsa filler coat. The 6" area directly behind the cowl is also aluminum so, to prepare for a super smooth finish, I applied two coats of Aerogloss clear, doped in a layer of silkspan, added three more coats of clear, sprayed it several times with balsa fillercoat, sanded and sprayed the Silvaire aluminum 3 or 4 times. The last coat is compounded and polished to a rich luster. The finished product was worth all the effort because you'd bet it was aluminum for sure.

All upper surfaces are olive drab; that is, the tops of the wings and the body from the

to page 150



# SOARING

Al Doig



Jim's Granaus Baby Ila won top static points at the 1980 Nats (see text).



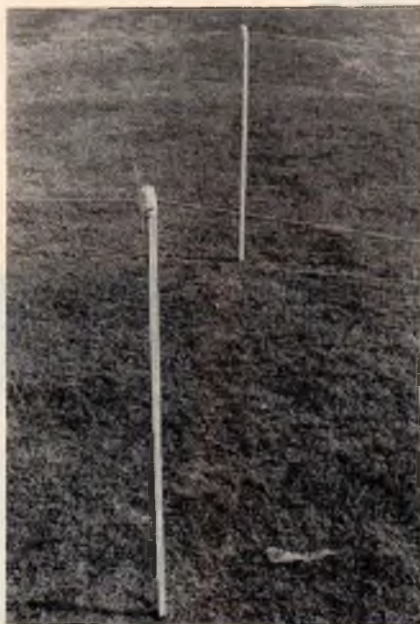
Jim's Zogling 38 about to go up on launch (see text).

**F**irst up is Charlie Ricci, of Pompano Beach, Florida. Charlie designed and built the pod and boom powered glider "Pelican" shown in the photo. It has a 72" solid balsa undercambered wing, and is powered by a .15 engine. This just shows that you needn't fly a Sagitta to have fun in this hobby. There are many fliers out there who enjoy experimenting with new configurations which fit their flying conditions and flying style.



Charlie Ricci, Pompano Beach, Florida, and his "Pelican."

planning by a bunch of guys who are willing to **work**. Anyway — back to the broken wings. I've been talking to fliers in different parts of the country, and find that there is quite a swing to 12 volt winches. There are a couple of reasons for this. First, 12 volt batteries are more readily available than 6 volt ones and, in a pinch, you can swipe one out of your car. Second, in a calm, or down-wind condition you can get a much taller launch from the snappier 12 volters. At the Spring Soaring Festival all the winches were 12 volt. Adding to the efficiency were line support posts, shown in the photo. These were 4' angle iron posts with a porcelain insulator mounted on top. The ground line is threaded through the hole



Winch line supports at Spring Soaring Festival.

in the insulator, and the pole located halfway to the turn-around. This will keep the line off the ground, or grass, for its entire length, reducing drag, especially when the grass is wet. Anyway — the system was quite peppy. Most fliers were quite accustomed to winch launching. So, aside from a few wing tips waving at each other, things progressed satisfactorily, until Sunday. Now, the San Joaquin Valley is capable of producing some Brobdingnagian thermals. One of these beauts parked right over the turn-around. Three planes, in quick succession, launched through this boomer, all sails crowding. There were three quick de-wings.

The lesson to be learned here is: if you get to the top of launch and feel the winch lug down, or grunt a bit, let off. Aside from thermals, another wing breaker is wind shear. Wind shear is a layer of rapidly moving air and is usually encountered at two or three hundred feet. The change in wind velocity is very abrupt. The effect on a launching sailplane encountering this fast moving layer of air can be severe.

A couple of the wing failures at Bakersfield were interesting. One was a Paragon, and the point of failure was exactly as described in the May 1981 RCM Soaring column. Another wing failure was a 'carbon fiber spar' Mirage. Although the 'carbon fiber spar' was broken, this was a secondary failure. The primary failure was the separation of the shear webs due to an adhesive failure to adhere. The shear webs were glued to the spar with Titebond. This just doesn't work. The wing literally exploded as shown in the photo. When Mark's Models took over the Hi-Flight product line, Mark Smith found no satisfactory way of gluing to the carbon spars, which were a part of the product line.

◆  
Back to broken wings. I recently attended a contest in Bakersfield, California, put on by the Southern San Joaquin Soaring Society. This club's Spring Soaring Festival is always a good one — very well run. This just doesn't happen. It is a result of careful

After a lengthy search, Mark found an epoxy compound that he is now happy to recommend, and supply. In the near future I hope to run some tests on carbon spars, as well as other spar material and shear webs. Look for the results downstream a ways.



Mirage wing failure.

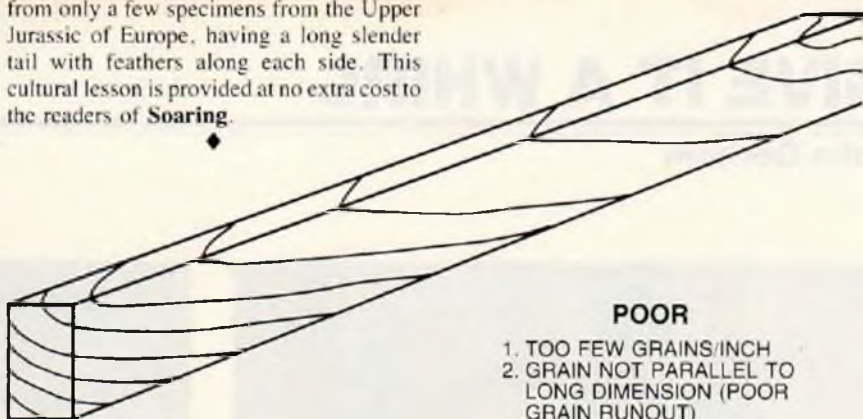
On the subject of spar failure, I received a letter from Harold F. Elig of Mound, Minnesota. As an aside, Harold said he has been able to moderate damage after wing failure with full up-elevator, and rudder to stop the spin. The impact angle can be made less steep, at least. In the case of my Paragon wing failure, I was able to steer it away from some cars, using elevator, but control was certainly minimal.

Harold attributes some spar failure to the poor quality of spruce used. I might add one point: some "spruce" or "hardwood" used in some kits, and sold in model shops, is neither spruce, nor hardwood: it is pine. This is not to say that pine is not satisfactory as spar material, but if you are looking for maximum strength, use spruce. There is one catch, however, woods vary so widely in all properties that a good grade of pine can be stronger than a poor grade of spruce. Mr. Elig included some excellent sketches that point out some properties to look for when selecting spar material. Two factors are important: grain density and grain run-out. Grain run-out is especially important. Wood will fail in shear along the grain lines. The ideal would be to have the grain lines perfectly parallel, and running the full length of the spar. Poor strength woods have the grain lines running sharply off the edges, or undulating wildly from one edge to the other. These spars are weak in both compression and bending. Next time you buy spar material, don't just sight down the stick to see if it is straight, look at the grain patterns.

Can you imagine someone naming a company Archaeopteryx Avion Associates? It makes an advertising jingle very, very difficult to sing. Anyway — it's run by Jim Ealy, P.O. Box 120, Pottstown, Pennsylvania 19464. If you are interested in interesting gliders, sailplanes, and accessories, you might just write for his catalogue. He has plans and kits for some slick vintage gliders that might pep up the scale category at some meets. Jim's Granau Baby IIa won top static points at the 1980 NATS.

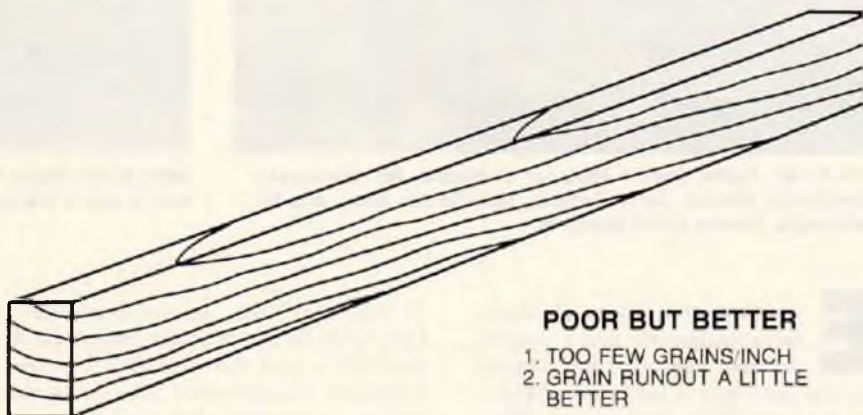
Incidentally, for those who did not rush to their dictionary, the Archaeopteryx is a genus of primitive reptile-like birds, known

from only a few specimens from the Upper Jurassic of Europe, having a long slender tail with feathers along each side. This cultural lesson is provided at no extra cost to the readers of *Soaring*.



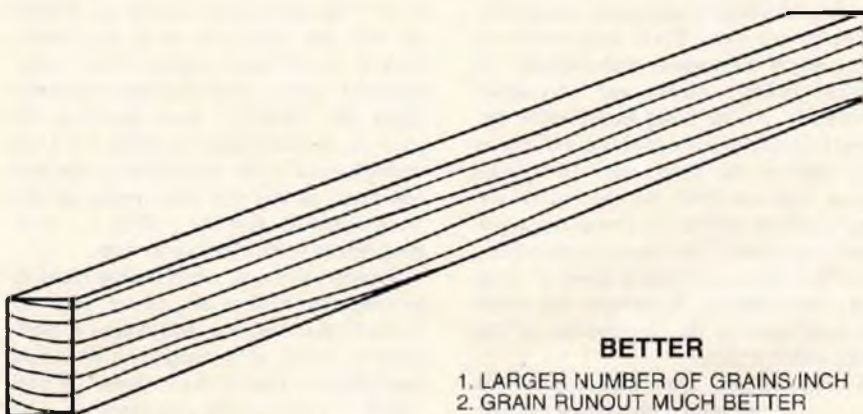
#### POOR

1. TOO FEW GRAINS/INCH
2. GRAIN NOT PARALLEL TO LONG DIMENSION (POOR GRAIN RUNOUT)



#### POOR BUT BETTER

1. TOO FEW GRAINS/INCH
2. GRAIN RUNOUT A LITTLE BETTER



#### BETTER

1. LARGER NUMBER OF GRAINS/INCH
2. GRAIN RUNOUT MUCH BETTER — LESS THAN 1 GRAIN/FOOT
3. GRAIN PARALLELS TO LONG DIMENSION

### SPAR MATERIAL EVALUATION

Speaking of spoilers, let me relate one of my many excursions into stupidity. I decided to add spoilers to one of Frank Zaic's old Floaters. I decided to not only provide a mounting place for the spoilers, but add wing area as well, by adding a flat center section and plugging the wing panels into it. I built a nice center section with a single spoiler right in the middle, driven by a self-contained servo — neat, eh? During

the test, I launched, leveled off, and opened the spoiler. The ship went absolutely berserk, as though I had cut the tail off: which, of course, I had. The spoiler so effectively blanked the stabilizer that every vestige of pitch control was lost. So, for you budding designers, watch where you locate the spoilers.

Of course I must add that I didn't start

# GIVE IT A WHIRL

John Gorham



L To R: Mr. Fujita, Export Manager of Hirobo, Mr. Matsusaka, President of Hirobo, John Gorham, Heli-Center West, and Mr. Matsumoto, Hirobo Chief Designer.



John at the Osaka R/C Hobby Show in Japan. Looks like a great way to see a show.

**E**ven though the major trade shows are several months past history by the time you read this column, there was one aspect of the MAC's (Model Arts and Crafts Show) held in Long Beach which I thought that you'd like to read about. The MAC's show is really the only major national event of this type which has scheduled flight demonstrations throughout the whole two days. These demonstrations are given by the various manufacturers of gliders, rockets, planes and, of course, helicopters. At the Long Beach show the flying takes place just outside the exhibition hall, right on the paved edge of a large lagoon. The sea front and the lagoon are separated from the Pacific Ocean by only a small strip of land. The lagoon is, therefore, filled with salt water and is about 5' deep with a mud bottom. Remember this when you read some of the descriptions of the flying which follow!

Flying sessions are scheduled for 10 a.m., 2 p.m. and 4 p.m. on the first day and

11 a.m. and 3 p.m. on the second day. Helicopters fly last, of course! Every year at least three (and this year five!) of the helicopter manufacturers provide flying demos — remember that the weather in California in May is almost guaranteed to be warm and sunny. Come to think of it, I don't remember any rainy "MAC's" shows. As a result of the great flying conditions, if there are any new aerobatics to be performed, such as round loops, square loops, rolls, inverted spins, autorotations, inverted flight, the "MAC's" show usually is the place for the first public viewing. Let's run through some of the highlights of the past few years so that you may appreciate the great exposure that the "MAC's" show provides us model helicopter nuts.

Several years ago, when not too many of us could fly well at all, eleven year old Curtis Croker flew his "Revolution I" right there in front of a couple of thousand spectators. Curtis has flown at the "MAC's" show every year since. He was

also National Junior Champ one year. Johnny Simone, Jr., demonstrated some of the first loops and rolls in public with an R/C helicopter, too, and is a regular performer year after year. Yours truly is also a veteran flier at the "MAC's" shows. When the "Heli-Boy" appeared in the U.S.A., I flew one of the first ones at each session of the show. This helicopter was different! It looped and rolled easily, of course, but it was so fast too. So fast that during one session I got confused over the orientation of the "Heli-Boy" because it had somehow got itself way out to sea and was at least 500' up. Then it was coming down and down — fast! But I couldn't see which way was up or right or left. So I "kind-a" jiggled with all the controls until the helicopter halted its downwards plunge at about 20' above the water. After this, although I was very shaky, the "Heli-Boy" was landed safely. John Tucker came up and said that he was amazed, since this was the first **inverted**

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Part of Hirobo booth at the Osaka R/C Hobby Show.



Flying at Hiroshima (Hirobo field), Cricket in foreground.

One of the things that make scale modeling interesting is all the neat little gadgets that can add realism. I recently saw an AMA movie where all the instruments on the instrument panel actually functioned. Can you imagine what went through the designer's mind while working on them? No one had ever done it before and he was out to blow the scale judge's mind. What a pity nobody could actually see the instruments work while in flight. Of course, they were demonstrated on the ground, before flight.

for all to see. No doubt, you can consider the above RC'er as one of those "scale nuts."

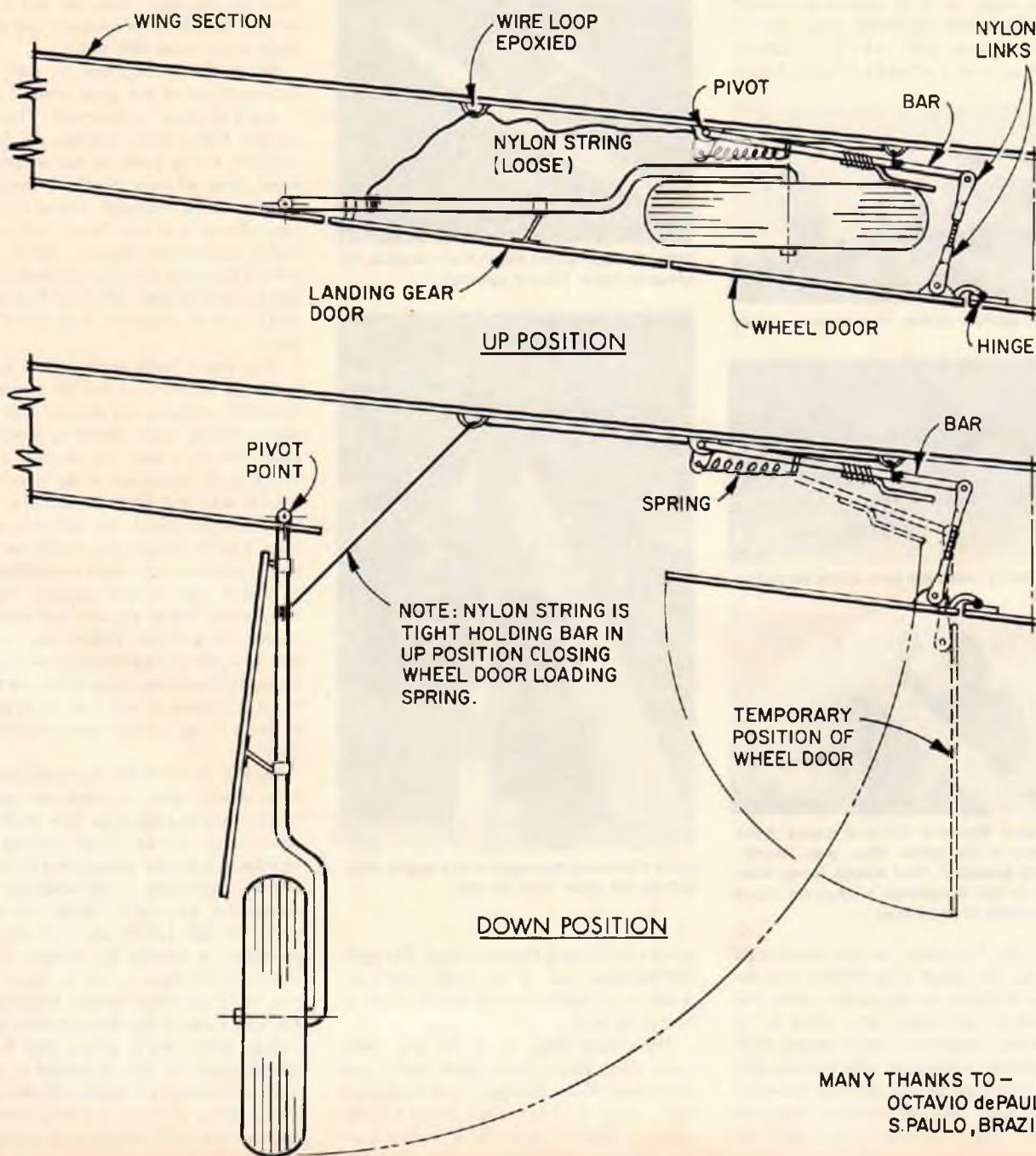
I recently received a letter from Octavio de Paula from San Paulo, Brazil, who also claims to be one of the "scale nuts." Octavio has a P-51 with operating wheel doors which operate in a rather unique way. The sketch illustrates just how it's done, however, some tinkering is required to smooth out the operation. Looks rather interesting, doesn't it. Then read on.

Here's How the wheel door operates. With the wheel in the up position, the tire

bears against the bumper wire on the bar. This holds the wheel door in the closed position. As the wheel begins to lower away from the bar, the spring pulls on the bar, causing the wheel door to open. I expect the wheel, on its way down, hitting the door would have a tendency to help open it. As the wheel reaches its full down position, a piece of nylon string tied from the landing gear strut, through wire loops to the bar, pulls the bar upward closing the wheel door. The landing gear is now down and the wheel

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## OPERATING WHEEL DOORS



MANY THANKS TO -  
OCTAVIO dePAULA  
S. PAULO, BRAZIL

# SUNDAY FLIER

Ken Willard



## Sunday Flier at the RCM Slope Races

**E**very year since 1967 R/C Modeler Magazine has sponsored the RCM Slope Soaring Trophy Races for unlimited class racing sailplanes that meet the Federation Aeronautique Internationale (FAI) standards. Those standards are quite straightforward. Maximum allowable weight is eleven pounds. Maximum surface loading (includes projected wing and tail surface areas) is 24.51 ounces per square foot. Maximum allowable wing area is fifteen square feet, which is largely academic, in view of the area loading limits.



Typical launch scene, one minute before start.



Four racers make the turn at the far pylon. Close!



Paul and Richard Gerard came from England to compete. Paul was fourth, Richard seventh. Paul would have been higher in the standings except for radio malfunction in tow races.

With the FAI limits, as you can readily compute, the actual wing loading will run around 28 ounces per square foot, when you discount the tail surface area. Even so, in good wind conditions, course speeds of 55 mph have been achieved, which means that actual speeds on the straightaway runs were over 70 mph, and, on occasion, when the wind is a quartering wind to the slope, the



The Gerards were a team. Paul called for Richard, and Richard called for Paul.



Dave Katagiri came down from Seattle. He loves to race. Placed seventh.



Jerry Krainock manages a wry smile after rolling his racer into the hill.

downwind ground speeds exceed 100 mph. On the other end of the scale, when the winds were light, average speeds were as low as 20 mph.

There have been, in the 14 year span, some good races, some great races, and some lousy races. But they've all been great fun --- even the lousy ones. There was the year we tried to have them in San Luis

Obispo --- twice. Once in the spring, and then later on, because there wasn't enough wind to keep even a thermal job up. We finally did get in four rounds to make it official, but in the meantime we amused ourselves while waiting for the wind by having a frisbee contest. Well, not exactly your run-of-the-mill frisbee contest. Some of us who were born in small towns, and had been in cowchip contests, suggested it, and the idea caught on. I was disqualified; the racers said I had too much experience in throwing the bull. Also, we had to warn some of the city boys not to try and pick up chips which were still warm.

But that was long ago --- part of the historical lore of this great event.

And I do mean "great event." The RCM Trophy Races bring together the greatest sailplane racing pilots in the world. They come from all over North America, and entrants from England, Canada, Hawaii have also tried to win. No --- we've never had an entrant from Austria --- but we'd love to have the Sitars if they could make it. Paul and Richard Gerard, and Peter Hatchett did make it from England. Paul took fourth place.

This year's races were one of the very best tests we've ever had for proving the versatility of the racing designs. The winds were blowing from fifteen to twenty-five mph, but they also would shift from a direction perpendicular to the slope to one which was parallel. When the latter condition prevailed, the lift was almost zilch. I know. It happened during one of my races, and my racer, which was ballasted for a twelve mph vector against the hill, disappeared below the hill and crashed. I wasn't the only one, either. One race was won by a contestant who managed to stay up for the full eight laps after all the rest had hit the beach below. It took him seven minutes to finish --- an average speed of seventeen mph!

Racing, in any form, is always exciting. Man against man, or man and machine against man and machine. One of the great equalizers about slope racing with sailplanes is that the same power is available to every contestant --- the wind and its lift component. You can't "tweak" the needle valve, or add a little nitro, or shave the propeller, or modify the porting. It's the wind, and you have to use it "as is." Can you imagine what would happen in a Formula 1 race if the director were to say, "Okay, guys. We're gonna start the race and your engines will be limited to 18,000 rpm. Our acoustical timer will check you. Then, during the race, you will all have to throttle back to 10,000 rpm on signal, and





**Nancy Lowe, all bundled up for the cold weather, kept the records straight. What a gal! Worked all the time.**



**Ken Willard's "Fasdassel" canard makes a turn.**



**Gerry Arana keeps Ken Willard on course. Jerry Krainock steadies Gary Ittner.**



**Alex Bower tied with Roger Sanders for the design award. Note polyhedral.**



**Sunny California? Whitey Pritchard, Ken Willard, Gene Stottrup and Tully Simoni in racing garb for Bud McCrary Course. Cold!**



**Racer wears a hat! Ken Willard's "Fasdassel" caught Bud McCrary's hat on launch. Had to land to get it off.**

Highway 1. It's right on the shores of the Pacific Ocean, and the onshore winds, in the spring, are usually very dependable. This year they were great, except for occasionally veering to go almost parallel to the hill so the lift became marginal, then, at other times, coming straight in so the "lead sleds" could really cook. A real test of versatility.

In former issues of RCM, the race procedure has been described, but for you newcomers, here's how it goes. A course is set up, about 600' long. The racing pilots stand at one end of the course, and flagmen are stationed at the other end. At the start of a race, each plane is held up and identified



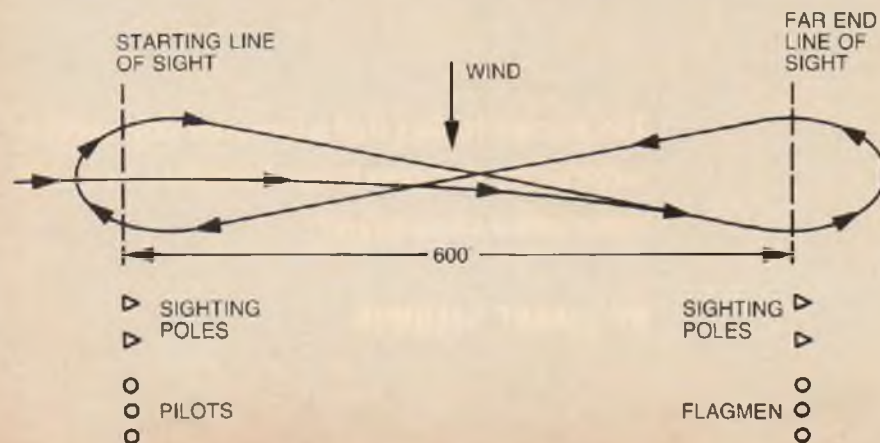
**Jerry Krainock's 10' racer makes a high speed turn. Note aluminum ailerons.**



**The Winnah! Gerry Arana and his "Grand Boss." One more time and he retires the second RCM Permanent Trophy. It won't be easy. We're all gunning for him. Wait 'till next year.**

complete the race!" Yet that is what happens in slope racing. The wind gives you full power, then drops. It's up to you to make maximum use of whatever power is there.

Another thing. The course, in slope racing, is best described as "destruction derby" racing. Since the wind blows against the slope, all turns are into the wind -- and that means flying a figure eight pattern -- left turn at the far end, right turn at the near end, like this:



Naturally, unless the race is very close (and some of them are) some racers are going upwind when others are going downwind, and they pass each other in the middle of the course. Close!

The site of this year's RCM Trophy Races was Bud McCrary's landing strip at Big Creek Lumber Company, some eighteen miles north of Santa Cruz, California, on

for the flagmen, and a separate flag is established for each plane. When identification is completed, a tape is started with the phrase, "One minute to start." The racers can be launched at any time from then until fifteen seconds before the actual start time. Pilots have a "pitman," or "caller" who launches the plane and then comes back to call the pilot's turn at the far end of the course when the flagman drops his flag. (Woe be it to the pilot who thinks he can anticipate the turn.)

The planes "orbit" for altitude before the start, which is a countdown "five, four, three, two, one, start!" The planes must be behind the starting line at the signal

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# STORMFIGHTER 2



The precise feeling that a powered ship evokes, inspired the designer to see how close he could come with a slope soarer.

BY ECKART SALOMON

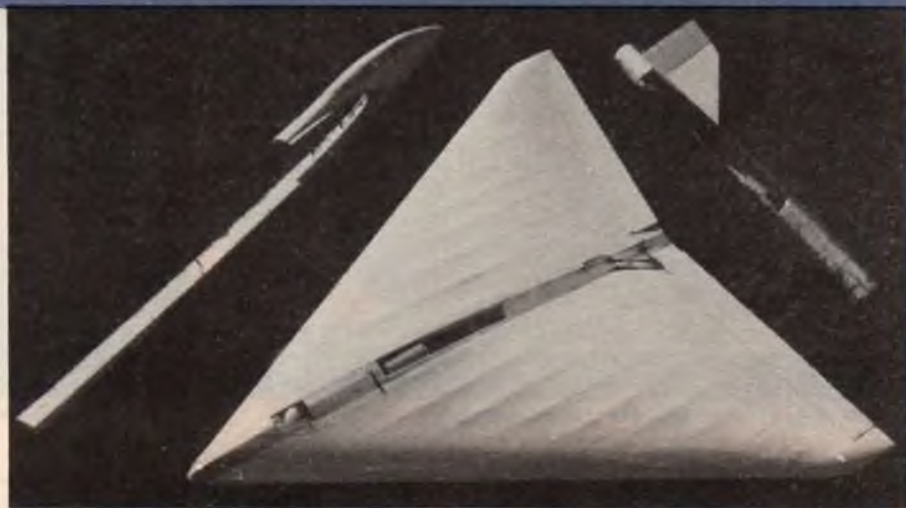
**S**oaring along the rugged coast of Southern California is an exhilarating experience. The vast expanse of ocean, scalloped cliffs, and sky, invite you to weave them together with the harmonious patterns of your responsive model sailplane.

The precise feeling that a powered ship gave, was something that drove me to experiment to see just how close one could come with a slope soarer. Dissatisfied with both the price tags and design of most advanced kits, I began researching and finally building my own ships. I first experimented with a few conventional designs, including some with wing loadings that could only be measured in pounds per square inches. Then the concept of the delta wing lured me into a great deal of research and testing, with the Stormfighter 2 as the end result.

#### Characteristics of SF2

SF2, and deltas, in general, have certain flight characteristics that are unique to them which makes them much easier to fly than one would imagine. They can handle a lot of wind without having to weigh a ton, with exceptional penetration in strong wind. The delta is basically a flying wing with the elevons acting as the tailplane.

SF2 performs very fast rolls that track precisely, and has a basic stability in flight



*Stormfighter 2 major components disassembled.*

that is almost comparable to conventional dihedral. This stability exists in both upright and inverted flight, and even allows SF2 to be flown with rudder alone. Way back, when the radios were quite simple affairs, powered deltas flew successfully with rudder only, at least as long as the radio worked all right, according to the old timer who told me. This stability gives a predictable honest flight in spite of the wild and racy appearance. Once, to find out how great this inherent stability was, I constructed a delta without a fuselage. I continually kept reducing the rudder area, ending up with so little area, that it was really nothing more than a keel about 1" high on a 36" span model. Only then did it display the familiar heart thumping flight characteristics some of us have perhaps helplessly witnessed now and then --- but it was still flyable!

The onset of the stall in this and all deltas is very slow. So slow, in fact, that one has to

watch closely for it. It will not display the usual nose-up peak, but, rather, will lose airspeed, become sluggish at the controls, and the nose begins to point up. At the onset of the stall the lift seems to break down gradually from the tip inward. This stall pattern in deltas comes in very handy when landing in a small area, as I do (30 to 40 yards). With some practice this delta can be made to mush down in a nose-up attitude, barely even flying. All one has to do is to keep the controls alive, watch for turbulence, and keep up minimum airspeed.

Wind tunnel tests have been made on various delta wing shapes by modelers in Germany (if you read German, here is the book: R/C Deltamodelle by F.H. Leisten, Neckar Verlag). They discovered that the delta wing has an elliptical lift distribution, meaning that it gives a very small amount of induced drag. It can be as much as 10% less than a conventional swept back wing. This is why I was able to design SF2 with a back

#### STORMFIGHTER 2

Designed By: Eckart Salomon

##### TYPE AIRCRAFT

Slope Sailplane

##### WINGSPAN

43 Inches

##### WING CHORD

Root 37 1/2"

Tip 7 1/2"

##### TOTAL WING AREA

778.4 Sq. In.

##### WING LOCATION

Mid-Wing

##### AIRFOIL

Semi-symmetrical

##### WING PLANFORM

Delta

##### O.A. FUSELAGE LENGTH

52 Inches

##### RADIO COMPARTMENT AREA

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

##### VERTICAL FIN HEIGHT

9 3/4 Inches

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

5 3/8 Inches (Avg.)

##### REC. NO. OF CHANNELS

2-3

##### CONTROL FUNCTIONS

Elevon, Rudder Optional

##### BASIC MATERIALS USED IN CONSTRUCTION

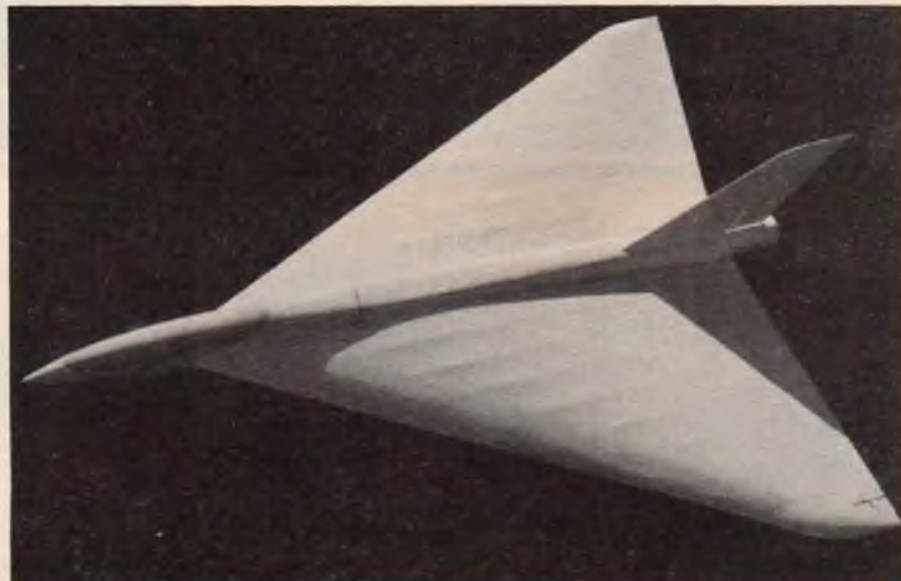
Foam, Balsa, Ply.

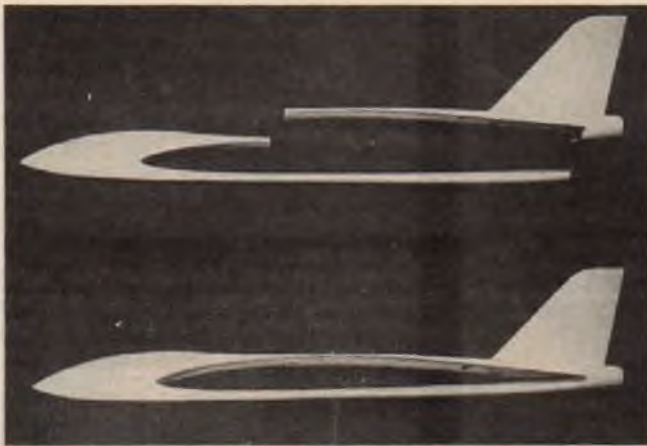
Fiberglass, Hardwood

Wt. Ready To Fly ..... 48 Oz.

Wing Loading ..... 9 Oz. Sq. Ft.

*SF 2 ready for the slope.*





*Side view of fuselage and vertical assemblies.*



*Nose section showing canopy trim and wing fillet.*



*Rudder and fin with hinge pin partially installed.*



*Method of installing rudder on fin.*



*Steering arm and swivel link for rudder control.*



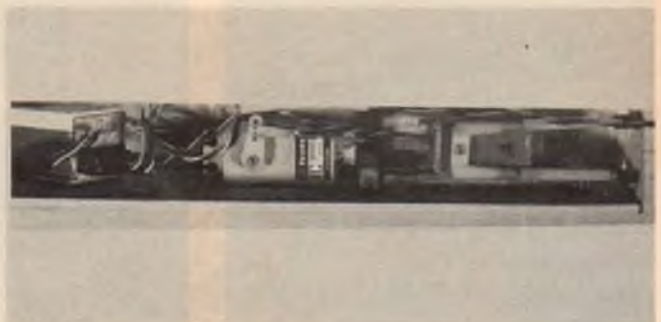
*Elevon linkage and screw to secure bottom fuselage to wing.*



*Servo connection to rudder horn.*



*Elevon mixer arrangement.*



*The original model used a combination of radio gear. Litco receiver, Futaba servo for elevator, and an EK servo for ailerons.*



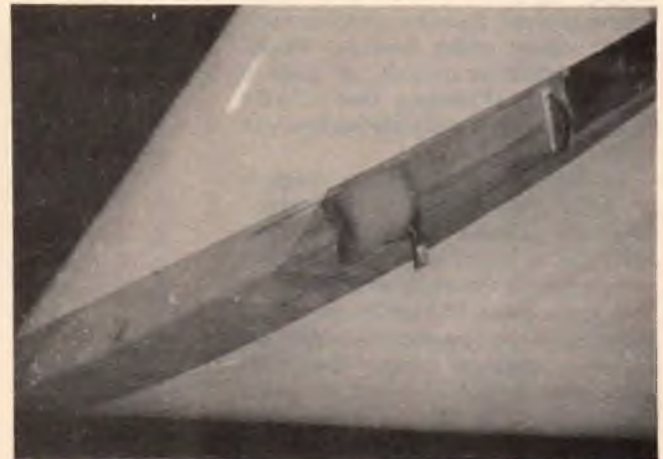
*Close-up of mixer details.*



*Battery compartment. Foam packing removed for clarity.*



*Switch and charging jack in wing bottom.*



*Forward front wing section, note battery compartment.*



*Long screw pulls top and bottom fuselage snugly against wing.*



*Long screw was made from book binder screw and post.*

sweep of 27°. A conventional wing that is swept back like this does not give sufficient lift for a soarer. It has to be a delta. So I got both: Sufficient lift for the slopes, and the speed performance of a very pointed wing.

Speed is one of SF2's strong points. If the wind really blows, the fun begins. With increasing speed, the handling and tracking improve. The delta without fuselage that I mentioned had a wing loading of slightly under 6 oz./sq. foot, and it flew in 25 mph winds with good penetration. Above that,

however, it became marginal, and ballast was needed. SF2 has a wing loading of around 10 oz./sq. foot which is plenty for a lot of wind. I flew SF2 in 40 mph winds without ballast, and didn't feel the need to add any ballast. Above that you can add as much lead as you dare, but be ready for some high speed passes that will make the old adrenalin flow. Now if you have a good slope, and a nice storm, SF2 will behave much like a power plane. Its speed, profile, and response will surprise and please you.

Flying SF2 is not for beginners. But if you can handle ailerons reasonably well, you won't have any trouble. However, don't fly it in a storm until you have become familiar with its characteristics. Otherwise you may end up distributing this beautiful ship all over the landscape. The building instructions are not meant for beginners either, so I'm not going into every detail. The design is straightforward, and anyone with some building experience should be able to follow just from the plan.

There are several innovations in this design which allow for smooth flight, compact disassembly and, lastly, quick repair, if such a thing is ever necessary for you! With the last point in mind — the main criterion in my designing it, apart from flight performance and pleasing looks, was strength. SF2 is the result of my coping with a very small landing site, heavy turbulence, and a short attention span during downwind approaches. That's why in its construction I suggest using heavy glass cloth combined with epoxy. This combination gives toughness and strength to the fuselage. Unless you often punch holes into buildings, or drill for oil on your site, you'll get by with minimum repair work from some pretty wild "landings." Even cartwheels are of little concern, when the wingtips are glassed, unless your friends happen to watch. Parts that cannot be made strong without adding excessive weight, like the rudder for instance, are made to pop-off instead of breaking. That's why the rudder is only butt glued to the fuselage with small fairings.

As much as is practical, the design is modular: two main fuselage parts, removable elevons and rudder. Any broken parts can be easily replaced or cut out without ripping the whole thing apart.

It needs about 15 mph to get going. Below this it can't do much more than stay airborne, scratching around. Except for spins, which deltas don't do well (it's part of their heritage), the SF2 can do just about anything you have the nerve to try, especially after you get in tune with it. Its pleasing looks in the air and on the ground will be the center of everyone's attention.

For those of us who are bitten by the power bug, it is quite easy to modify SF2 for power, and it has been done. Depending on engine size and wing loading, you have a range from docile to as hot as you can get. If there is interest, I may crank out a follow-up on the power conversion of SF2.

#### Wing:

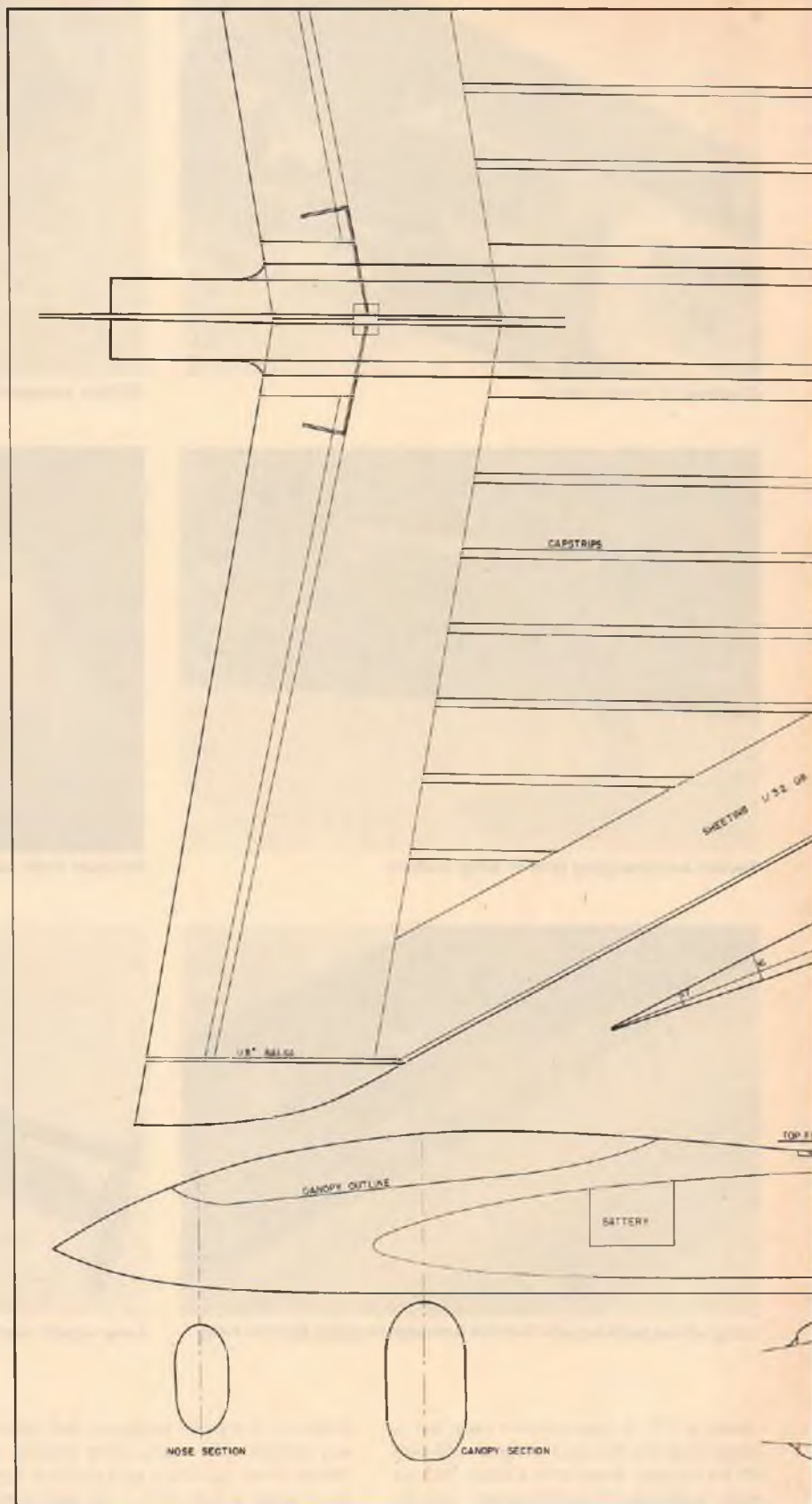
Let's begin with the wings because they form a sort of jig for the building of the fuselage. A portion of the leftover foam after cutting the wing is used for the fuselage.

(1) Take your chunk of foam and cut out the wing outlines.

(2) For airfoil templates I use formica or a similar plastic laminate. Formica is very thin, strong, and resists the heat of the cutting wire. The thinness helps to give very little distortion when cutting at the wing tip.

(3) Place the templates at the root and tip ends of the wing blanks, and space them in a way that will leave enough room for the bottom and top parts of the fuselage later. Also make sure that both templates are the same distance from the bottom of the foam blank. Measure from the centerline of the template. Attach the templates with Scotch Brand double face adhesive tape. Make sure that no tape sticks out beyond the edges, or your cut won't be true to the template.

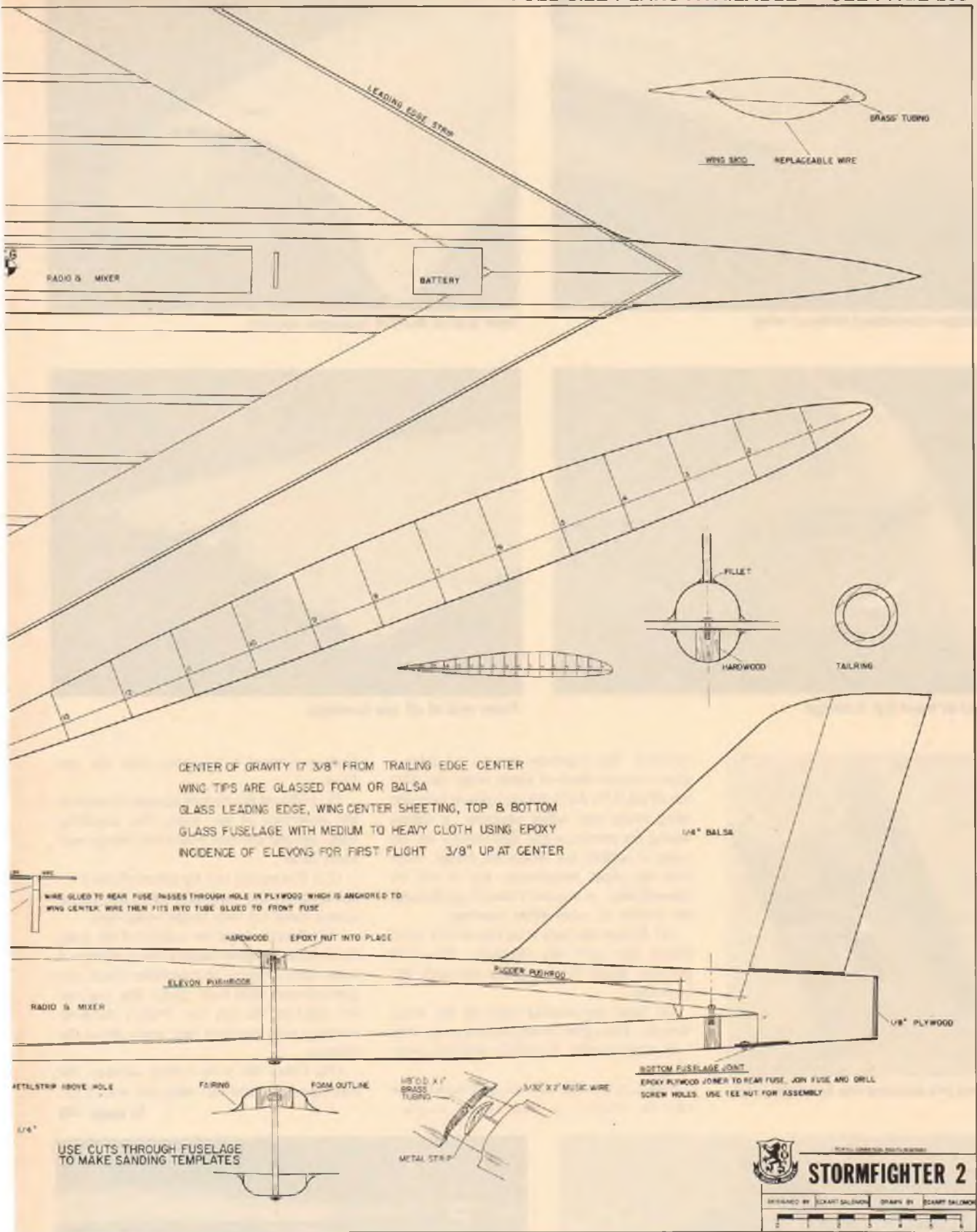
(4) Place weights on top of the foam blank. Always start your cuts from the



leading edge to avoid distortions due to wire drag. If you do get some distortion towards the trailing edge it's okay, since the airfoil is pretty straight there, but the leading edge is critical. Have your wire just hot enough to

cut, otherwise you'll burn out too much at the small wingtip. I prefer Sig nichrome wire, because it is so thin and doesn't radiate too much heat like the thick wires.

(5) Sand the wing halves with 120 grit



paper using a sanding block, and then join them with foam cement. Don't use epoxy. Foam cement is much easier to sand and, later, when you carve out the radio compartment, you don't have to chisel

through the epoxy!

(6) Mark the position of the sheeting and capstrips on the joined wing with a light colored felt tip pen. A dark pen will show through a light colored covering later. If you

prefer, go ahead and fully sheet the wing with either 1/64" ply or 1/32" balsa. But it's not really necessary for strength, unless you plan to motorize your delta later.

(7) Using 1/32" balsa, sheet the wing as



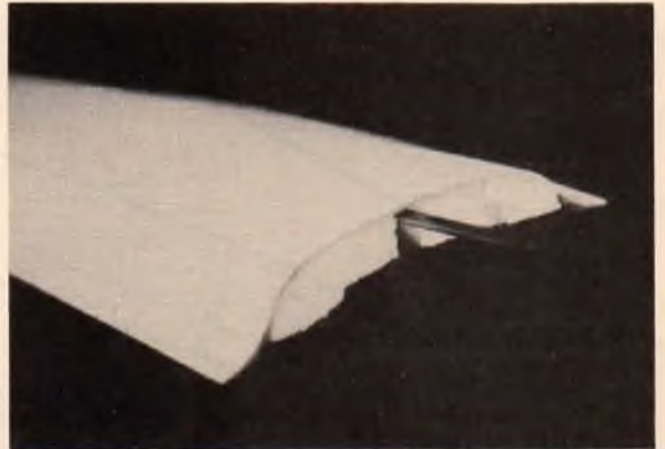
*Aft fuselage assembled without wing.*



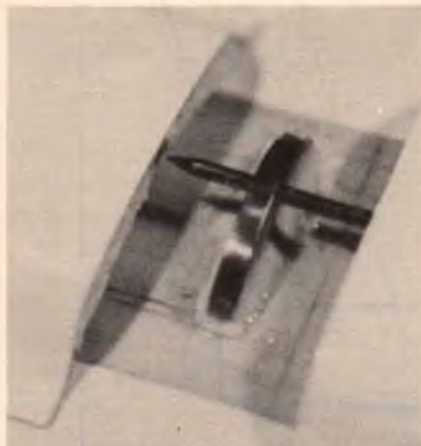
*Rear end of bottom fuselage section.*



*Rear end of front top fuselage.*



*Front end of aft top fuselage.*



*Alignment pin secures top fuselage joint.*

outlined. The capstrips can be cut from a glue-covered sheet of balsa when the glue has dried. Use the foam cut-offs to keep the wing shape true while sheeting. It seems wrong for proper stress distribution on the wing to simply lay down the center sheet with the grain lengthwise, but it will be glassed later, so we don't have to go through the trouble of cross-grain sheeting.

(8) Secure the caps with Zap or Hot Stuff where they join the sheeting. This will prevent them from poking through the covering.

(9) Sand the leading edge of the wing straight. Then glue in the leading edge strip with aliphatic glue. Carefully sand the entire wing.

(10) Cut out the elevons and bevel their inside edges to the right angle.

Contact-cement balsa strips over the raw foam.

(11) Mount the elevon linkage flush with the underside of the wing. Put matching tubes into the elevons where the linkage will enter them.

(12) Cut out the two tip airfoils from 1/8" balsa; epoxy the wing skid tubes into them. Epoxy these tip foils to the wing tips.

(13) Rough shape the outline of the wing tip blocks and epoxy them to the wing tips. I used some leftover polyurethane foam and glassed them with 6 oz. glass. But you can use balsa for the tips too. Protect the wing sheeting with masking tape while doing the shaping.

(14) Glass the wing center section, the leading edges, and the wing tips with 2 oz.

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*Note strip of aluminum epoxied to top of fuselage retainer.*

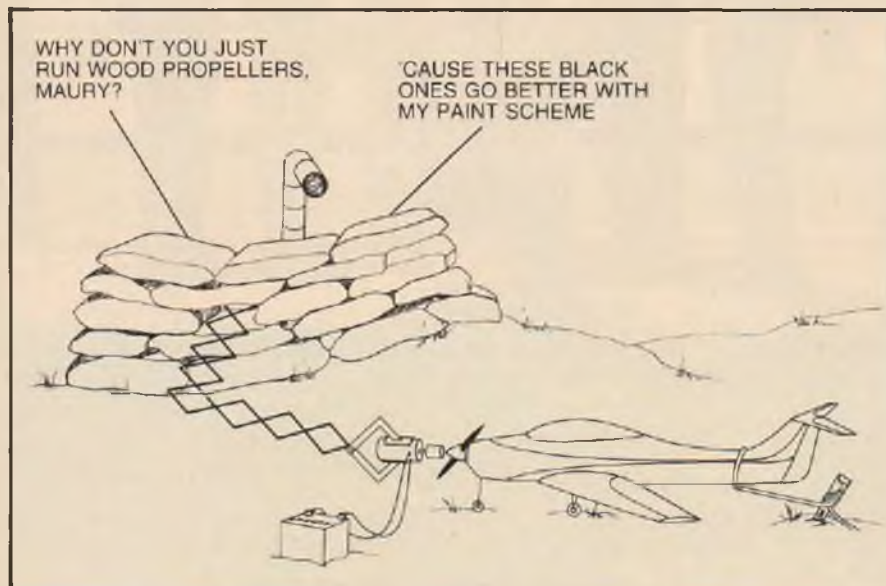
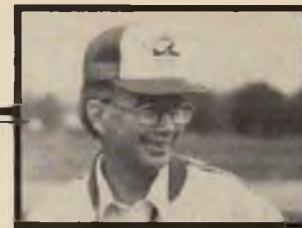


*Antenna exits wing. Wire tip skid is also shown.*



# FLYING LOWE

Don Lowe



**A**s I write this column, I am sitting in my motorhome in a campsite at Eglin Air Force Base in Florida. The site is right on Chotawhatchee Bay off the Gulf of Mexico — and it's beautiful. The team from Wright Patterson AFB and I are here conducting another RPV (Remotely Piloted Vehicle) flight test program — tough duty! We will be here about a month so ye editor will get this in handwritten copy — hope he can read it!

I would like to cover a couple of items before we get back to the business of making expert pattern fliers out of you.

I have had a couple of inquiries concerning water cooled engine installations. Since I have had no experience with this I can't really offer any help at this point. I know that some adventuresome modelers out there are going this route — so we would appreciate your inputs on this subject from your experience. There are a number of fine water cooled engines on the market, intended primarily for boats. There may be an advantage for some applications where the engine is buried or cowled in a fashion to prevent adequate direct air cooling.

I've also had inputs on my suggested "goof of the month club." Here's one from Ray Abadie of Puerto Rico. I'll let Ray tell it in his own words:

Dear Mr. Lowe,

Down at my local club in P.R. (Southern RC Modelers), we often carry out exhibitions in different towns of the island. The date for one of these was rapidly approaching so a friend and I decided to

help our club's secretary (Freddie) get an airplane ready for it. So we went through the usual radio, engine, etc., installation in a hurry. Barely made it so the test flight was to be conducted an hour prior to the exhibition.

Well, the aircraft had a 3 line tank set-up so we filled it up and tried to start. After a few minutes of hand flipping and harsh language we resorted to the old faithful electric starter . . . to no avail. We tried blowing through the overflow, etc. We couldn't get a drop of fuel out of the line. Oh God! We had added a bulkhead aft of the tank. So we made the required intervention and proceeded to strip the poor thing's guts. Finally at the tank, we opened it. Fuel lines okay; so what the . . . Wait a minute, a "holeless clunk." What a surprise! After all, such things are not supposed to happen.

Well, a bit of epoxy and patience, accompanied by a few smart remarks and laughs was all it needed. Afterwards it flew beautifully.

As Confucius once said, "A holeless clunk will take you to the bunk (in an insane asylum, that is)."

Very truly yours,

Ray F. Abadie

Thanks, Ray. I must say that I've never heard of a holeless clunk. I believe that Confucius (or somebody) also said that if it can happen, it will happen and at the most inopportune time. So guys — another thing to check as you construct and assemble your pride and joy.

I recently completed and have been flying a Phoenix 8 with buried pipe. Theoretically this is a better aerodynamic set-up, but it

also introduces other problems. As the old story goes, you never get something for nothing! The P-8 was not designed for this installation, however, it worked out pretty well, except the tank ends up rather low and cramped. To make the engine run properly, I'm using a Perry pump and pipe pressure with the pump regulator backed way off. I also installed a ST-60 mag carburetor in the Max .61 engine to get a smaller venturi and the set-up runs pretty well. I can detect slight leaning and enriching in positive and negative G maneuvers, however.

A point to be made here is that it is very important to get the vertical location of the tank as near centered on the carburetor as possible. You can place the tank quite far aft and it won't lean except on very prolonged vertical flight. The critical thing, however, relates to positive and negative G's associated with looping type maneuvers. This induces far greater inertia and therefore more apparent fluid head or weight effect on the fuel than does a non-accelerated vertical climb.

I also learned about pipe installations with this set-up. I initially used a conventional pipe, header, and silicone coupler arrangement. Imagine my surprise when on about the sixth flight I heard this sudden increase in noise. I quickly dumped the power and landed. The silicone coupler had split and the exhaust was dumping inside the sealed off fuselage section. No damage, although the skin was pretty hot due to the quick action. I might add that the noise increase was somewhat muffled by the buried installation — so tune your ear to the normal noise level and act accordingly!

My fix was to custom fit a header section (copper plumbing) over the pipe inlet so that it's a good mechanical fit. I then slipped a silicone seal over that. So far — no problem. Even if the seal were to split, the exhaust would be largely contained by the mechanical header/pipe fit. I have found that the P-8 is somewhat faster with the buried pipe, so less horsepower is needed.

Speaking of horsepower, I have had inquiries concerning why we need so much horsepower in our pattern ships. Obviously we don't need near the horsepower we have to merely fly. We use it because it makes maneuver performance easier and more precise. It cleans up everything, particularly vertical pulls. It also greatly improves rolling maneuvers since far less control (rudder and elevator) is required to keep it "on a string." I used to feel that I didn't need a tuned pipe to be competitive. Now I feel that you can't be competitive without one and a strong engine to go with it. For

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# THIRD ANNUAL LADY BOATERS REGATTA



*Trophy winners: (L to R) Cathle Galbraith, Judi Fisher, Dot Prather, Diana Semler, Pat Pottol, Janice Fish, Judy Prigley.*

**A**gain this year, the Riverland recreational facility at Kingsburg, California, was the site of the Annual Lady Boaters Regatta. This unique event, conceived by John E. Brodbeck and sponsored by K & B Manufacturing, has become a significant event for the lady drivers in the R/C boat racing circuit.

Amid beautiful scenery and with pleasant weather, the regatta was extended to a two day affair this year. The first day was devoted to Enduro racing whereby the drivers' scores were derived from the number of laps accomplished in a five minute time period. Sunday's racing was Oval heat racing with the points being awarded in the order in which the drivers crossed the finish line after completing five laps. The Grand Champion award went to the driver with the highest point total of the two events. This year's Grand Champion was Diana Semler who won 1st Place in both the Enduro and the Oval races.

Most of the drivers had entered the previous regattas and were noticeably more competitive and aggressive than before. After competing with the guys for a year, the ladies were running a tighter course and a bit heavier on the throttle, like wide open. All of which made for more exciting races and there were a lot of close finishes.

Observing the emotional aspects of the racing by the ladies was probably the most interesting activity for the spectators. The excitement and enthusiasm after winning a race was a display of joy that is fun to watch. The frustration of the boat stopping dead in the water or cutting inside a buoy can bring out various degrees of anger or disgust. At the beginning of a race, the outward show of determination could do little to hide the obvious knee-knocking nervousness that they all experienced. Those lady drivers are indeed a lively group.

John Brodbeck has committed to the 4th Annual Lady Boaters Regatta in 1982. For lots of boating excitement and fun, lady boat enthusiasts should plan to attend. □

## DIANA SEMLER IS THE 1981 GRAND CHAMPION



*The lady drivers were each given tee shirts, ever try to get this size lively group to pose prettily?*

**BY DICK TICHENOR**



*Some of the ladies listened to their pit crew, others did their own thing.*



*Myrtle Coad (driver on right) was driving in her very first race and did quite well.*



*Grand Champion Diana Semler took home the big hardware.*



*A bit of pit action to get Mom Coad's boat ready for the next race.*

**THIRD ANNUAL LADY BOATERS REGATTA**  
Kingsburg, California — May 2 & 3, 1981

**Grand Champion**  
**Diana Semler**

**Enduro Event**

1. Diana Semler
2. Cathie Galbraith
3. Judi Fisher
4. Pat Pottol
5. Janice Fish

**Oval Heat Racing**

1. Diana Semler
2. Judi Fisher
3. Cathie Galbraith
4. Dot Prather
5. Judy Prigley



*Bobby Tom tried to explain to his wife, Ellie, why her boat wasn't winning.*



*The ladies had fun socializing between races. Pat Crews and Deb Wiechman enjoyed a laugh over something.*



*This scene was repeated many times over the weekend.*

# POWER BOATING

## Howard Power



**A** few months ago I described the process for making rear bearings with a full complement of balls and no retainers. This was done because normal ball bearings were not staying together when high rpm operation was needed. The retainers would break and this caused all sorts of bad things to happen inside the engine. By eliminating the retainers we stopped spreading metal throughout the motor at high revs but, because the balls ran up against each other, the bearings tend to wear quickly. The 3.5 cc engine bearings lasted quite a long time but when you put full complement bearings in 7.5 cc engines and larger, bearing wear is a major maintenance problem. If you wanted to operate at high revs you had to replace the rear bearings quite often when any radial play in the crankshaft was found.

You can now stop making those full complement bearings because Dick McCoy has just released an answer to our problems. He is producing a bearing that has, what I believe is, a nylon or teflon ball retainer. These bearing retainers should not break even at rpm approaching 30,000. Because the balls are no longer rolling up against each other, the bearing is very free, smooth, and the wear problem is greatly reduced. To my knowledge he only makes one size bearing, but luckily it fits almost all 3.5 cc and 7.5 cc boat racing engines. See your favorite dealer and ask for part No. Mc 104. The bearing lists for \$15.00 but is well worth the money. Dick also has available a neat bearing puller which costs \$8.95. This



allows you to remove the bearing without heating the case. Heating the case too much will damage the plastic retainer and make the bearing more difficult to remove since it falls apart when the retainer melts.

The response to this column has been very gratifying. Many of you have been writing with your questions. I have a tendency to get behind in the answers so please understand any delays that might occur. If you want a personal answer quickly be sure to enclose a stamped,



self-addressed envelope with your letter so I can whip out your answer easily.

*Dear Mr. Power,*

*I have never raced an RIC boat. I have a DV-10 by Dumas with an Enya .09 in it. I am only interested in making this an awesome little boat. I want it to go as fast as it can.*

*Could you explain to me how I could possibly make the engine crank out very high rpm's for when I want it to go fast. I am at a disadvantage because I don't know much about engines and how to crank out more than normal rpm.*

*I have read your articles in RIC Modeler and read one in the February '81 issue in which you described to an amateur how he could get 21,000 to 22,000 rpm out of a K & B 3.5. I was wondering if I could do the same to my Enya. If so, please give me details to get this boat engine to crank out high rpm, and possible ways to minimize the wear on crank and bearings.*

*I would like to get this boat going this spring as soon as weather permits. So if you would please reply to my letter personally as soon as possible I would appreciate it. I would not be asking this special request except there are not any boat club members around here who I could ask. Since I enjoy your columns in RIC Modeler very much I thought you would be the best person to ask. Thank you very much.*

Doug, your Enya .09 engine is typical of the good sport engines available for the model boater. They start and run great, and give good service as long as you use them within their design rpm range. There are modifications that you can make on any engine which will result in higher-than-design rpm operation. However, when you do this there is no guarantee that the materials in the motor will stand the added stress. In general, small, plain bearing sport motors like the Enya, O.S., and Fox engines will not respond well



# PIT STOP

## Gene Husting



Lafayette, Louisiana was the site of the 3rd Annual Cajun Gran Prix on the Hub City Ford parking lot.

### 3rd Annual Cajun Gran Prix and Future of R/C Car Racing

**B**ob Murphy, who owns Shamrock Imports in New Orleans, the USA importer for OPS engines, as well as distributor for K & B engines, boats, planes and R/C cars, has been the sponsor of this Annual Cajun Gran Prix for 3 years. While we were in Florida, Bob invited us to come and race in Louisiana and enjoy some real Cajun hospitality. How could we refuse?

With 112 entries, this Cajun Gran Prix is one of the major 1/8 racing events of the year. Hosted by the LAPS club of Lafayette, the race was held on a parking lot of Hub City Ford dealer in Lafayette. Race Director Paul Verger, wife Suellen, Charlie and Claudette LeBlanc and all the LAPS members deserve a big thanks for a very efficiently run race. Everything went on time as planned and the Cajun hospitality couldn't have been better.

The track was a drivers course, with inside as well as outside boards, rubber covered in the corners, with the asphalt about average traction and fairly smooth. We arrived Friday about noon, and spent the rest of the day practicing. I think my main

accomplishment on Friday was driving the center of the track and saving the car. I let other guys test the track, and I saw the track winning, so I played it safe.

Saturday was qualifying and after the 1st round of 5 minute heats Curtis Husting was leading with 15 laps and 28 sections. Arturo Carbonell looked like he had found his old form and was 2nd with 15.14 and Rick Davis right behind with 15.06 The next round Arturo turned a super fast 15.97 which stood as TQ. Rick Davis held 2nd spot with 15.78 and Bill Jianas right behind at 15.75. The most consistently fast driver in the 4 rounds was Rick Davis with 15.06.



Arturo Carbonell had his car working in qualifying grabbing Top Qualifier spot.

### CAJUN GRAN PRIX RESULTS

#### "A" MAIN OPEN

Place & Name	State	Qualify	Manuf.	Motor
1. Bill Jianas	CA	15.75	Associated	K & B
2. Arturo Carbonell	IA	15.97	Delta	Picco
3. Dana Smeltzer	CA	14.60	Associated	K & B
4. Curtis Husting	CA	15.29	Associated	K & B
5. Joe Tassilo III	FL	15.29	Delta	Picco
6. Bill Gardner	LA	14.76	Delta	OPS
7. Chuck Moon	FL	14.60	Delta	Picco
8. Jim Miguel	TX	14.99	Rocket	Picco
9. Rick Davis	MI	15.78	Associated	Picco
10. Paul Verger	LA	14.94	Delta	OPS

#### "A" SUPER STOCK

1. Ivan Bourdier	LA	13.04
2. John Lucido	TX	13.89
3. Louie LeBlanc	LA	13.46
4. Floyd Clark	TX	13.25
5. Martin Zeller	LA	12.95
6. Terry Riley	TX	13.45
7. Joe Messina	TX	13.07
8. Gerry Brown	LA	12.98
9. Bill Keller	OH	12.94
10. Michael Bolline	KS	12.92

#### "B" MAIN OPEN

1. Freddie Rapuana	LA	14.12
2. Johnny Holmes	TX	14.11
3. Bailey Whitley	TX	13.99
4. Mike McCormick	TX	14.47
5. Joe Sullivan	TX	14.47
6. Dan Dowdy	MO	14.01
7. Ken Campbell	IA	14.48
8. Charlie LeBlanc	LA	14.03
9. Gene Husting	CA	14.18



The Main Event belonged to Bill Jianas, in the middle, with Dana Smeltzer 3rd, on the left, having an exciting race with Arturo in 2nd place.

15.78, 15.74 and 15.39. The only other driver to turn all 15 lap heats was Curtis Husting.

But if you want to really talk about being consistently fast, that honor goes to John Lucido, from Texas, in the 38 car Super Stock class. John was not only Top Qualifier in Super Stock with 13.89, but he also had the 2nd, 3rd, and 4th fastest times, won every qualifying round and was the only driver with four 13 lap qualifying heats. And most of these heats he had to come from behind to win. 2nd spot went to Louie LeBlanc at 13.46 with Terry Riley right behind at 13.45. Incidentally, John

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Bench racing following a race is always interesting, as here we find Dana Smeltzer telling Mike Hess how he almost beat Arturo, as Arturo and Jianas are wondering if that's the same race they were in!

# SILENT POWER

Jim Zarembski



**T**here was quite a bit of activity in the Silent Power category at the 1981 Toledo R/C Expo held last April.

Several manufacturers are adding electrics to their lines and the types of systems available are ever increasing. We were blessed with fantastic weather at the Toledo Show and took advantage of it with several impromptu flying sessions attended by Charlie Parker of Parker Planes, Bob Boucher "Mr. Astro Flight," himself, and several interested modelers.

We all watched Charlie Parker put his Lil Joule through its paces. This newly released kit uses balsa and spruce for most of the airframe but is unique in that the entire canopy and turtle deck is a vacuum formed piece. The model weighs in at a scant 27 oz., ready to fly with an Astro 05 with (8) .55 AH cells. This translates into a wing loading of 14 oz./sq. ft. with a wingspan of 37" and 285 sq. inches of wing area. Controls used were aileron, elevator, and motor on-off.

Since we saw the prototype Lil Joule in April, Charlie has redesigned it to accept a 6 cell 1.2 AH pack for use with the Leisure Electronics or Astro Flight XL05 systems. These systems will add 2 oz. to the RTF weight but will increase duration to 7 to 10 minutes depending on prop selection.

I have been flying a prototype Lil Joule and have found it quite responsive. It's a graceful smooth flying electric aerobatic model. And, best of all, it looks great in the air.



Charlie Parker with Lil Joule with Jim Zarembski at Toledo.



Charlie Parker's Lil Joule.



Airtronics designed their new Olympic 650 (to be featured in RCM's new sailplane book) with the electric powered modeler in mind. The plan shows the installation of an Astro 05 as an option. Of course, I'm prejudiced but I feel the electric Olympic 650 with its spinner in place looks sleeker than the straight sailplane version. The Airtronics' crew was extremely excited about another new addition to their family of kits. The Sagitta, the Skymaster and the "Kitty." Now you're probably asking what the devil a "Kitty" is. Well it's a little different than anything Airtronics has marketed in that it is almost ready to fly.

The Kitty is prefabricated from lightweight injected molded foam plastic and is factory painted a nice shade of cub yellow. The vital statistics are as follows: Wingspan, 51"; wing area, 227 sq. inches; length, 30"; weight RTF, 25 oz.; radio, 2 channel; price, \$99.95, which includes the motor and flight batteries.

Powered by a pylon mounted geared electric motor unit, the average flight time for the Kitty is in the 5 minute range. Designed specifically for the first time radio control pilot, this model features a very stable planform which results in excellent flight performance.

A separate charger is available for recharging the 5 cell .55 AH flight battery in 15 minutes from your car's cigarette lighter and retails for \$19.95.

Preproduction prototypes of a small Piper Cub and a Britten Norman Islander were also seen in the Airtronics' booth. These are both to be powered by the same geared Mabuchi motor used in the Kitty, and using

the same injection molded foam material.

Hobby Lobby International of Brentwood, Tennessee, introduced three geared electric motors featuring folding propellers. These motors, drives, and props are manufactured by Carrera in West Germany.

The small system A is designed for small models and sells for \$24.58. It requires six .55 amp hour cells. The system B is designed for sailplanes of around 100" wingspan and up to 2½ lb. airframe weight. The system is available for \$69.06 and requires 7 to 10 1.2 AH cells.

Both systems A and B include a nice injected molded fuselage cowling which should be easily adaptable to a number of existing sailplane designs.

Hobby Lobby's largest system C is designed for large gliders with a 4 lb. airframe weight. This system uses 10 to 12 1.2 AH cells and is the same system used in the Carrera Optimus. This system will sell for \$91.98.

Astro Flight announced at Toledo that it will be producing several new exciting electric systems.

A new motor, the Astro 035 will be offered and should fill the gap between the 020 and the 05. The 035 system will be powered by a 6 cell .55 AH nicad pack and will turn a 6/3 prop at 12,000 rpm. And, best of all, the system's weight will be less than 9 oz. The system price including batteries will be about \$40.00.

A new XL-05 system has been designed around a 6 cell 1.2 AH pack. XL stands for extra long and refers to flight duration, not motor length. The prototype's for this

system tach out at 12,500 rpm with flight time from 7 to 10 minutes using a Cox gray 6/4 prop. The XL-05 will be in the \$70.00 price range and will be released late this summer.

A new XL-075 is also planned. This system will use eight 1.2 AH cells and will turn a 7/4 prop at 13,000 rpm or an 8/4 at 11,000 rpm. The system weight is 21 oz. with power duration from 7 to 10 minutes, depending on the application. The XL-075 will be available early this fall for about \$80.00.

The trophy winner at the 1981 Toledo Expo for electric powered aircraft was Allen Vanneste of Utica, Michigan, with an original 05 powered sport ship. Tom Kwiatkowski of Toledo, Ohio, was second with a nicely finished Mini Jacket and Keith Shaw of Ann Arbor, Michigan, was third with his newly designed Shrike.



Miss Weak Signals and Wayne Yeager looks on as Bob Hisey of the Toledo Weak Signals presents Al Vanneste with his first place electric powered model award at Toledo.

### Flaps or Spoilers?

I have been using a subminiature SPDT lever switch for some time with 05 size systems. Radio Shack sells an Archer switch #275-016 which seems to work well when mounted directly on a servo using 1/16" mounting tape.

Only about 3/16" of throw is needed to activate this switch. Why not use the rest of the servo throw to operate spoilers for an electric powered sailplane? How about flaps for that fast flying (and landing) sport model? The following sketch should convey the idea. Do your own engineering.



Tom Kwealkowski's cream and transparent red Mini Jacket from RCM plans.

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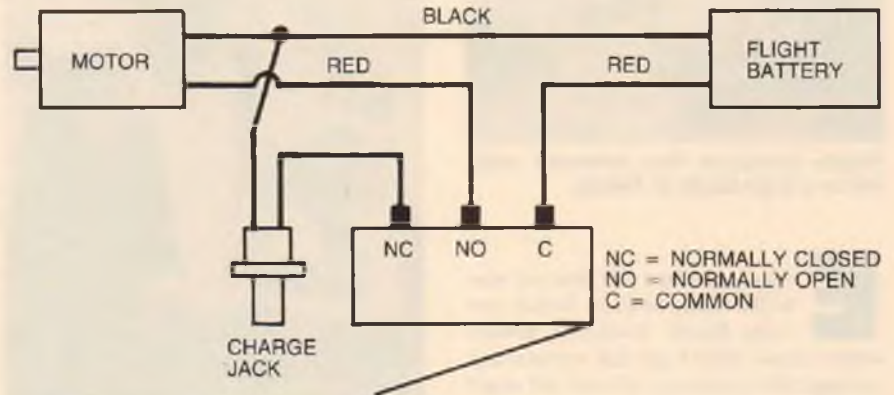


FIGURE 1

USE MOTOR ON-OFF SERVO FOR SPOILERS OR FLAPS AS SHOWN

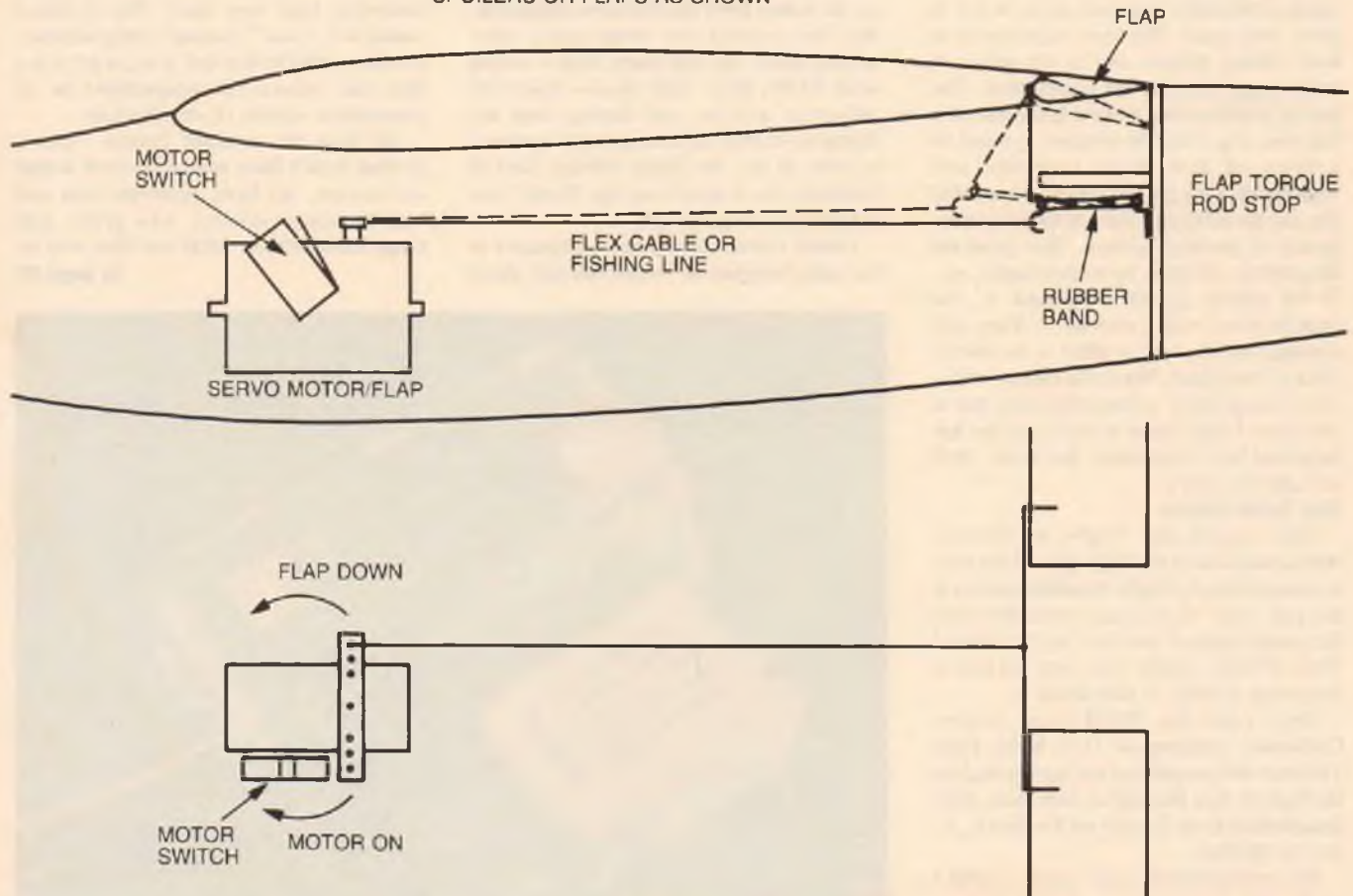


FIGURE 2

# RADIO SPECTRUM

Jim Oddino



*Futaba displayed their extensive radio line in a huge booth at Toledo.*

**E**very year about this time we take in the trade shows in Toledo and Long Beach. Everyone always wants to know what I saw that was new and exciting. My experience tells me not to get my hopes too high as far as seeing anything radically new, but I always hope to hear about someone working on something that will be a giant step forward. Unfortunately I suspect progress will be relatively slow in as much as the radio equipment we have now is pretty darn good. The trend seems to be to keep adding gadgets and to cut prices in order to get ahead of the competition. The buying public seems to have fallen into this trap also. They seem to compare systems on a basis of how many switches and adjustments they get per dollar. I hope that one day the trend gets back to looking at the quality of the basic system. How good are the gimbals, the pots, servo mechanics, etc. If the public doesn't demand it, the manufacturers won't provide it. They will continue to cut costs in order to be able to offer a lower price. We could end up with a lot of inexpensive systems but none that is first class. I don't mean to imply that this has happened but I sure detect the trend. Well let's get on with it.

## The Trade Shows

Once again the flight to Toledo represented one of the highlights of the trip. It started when the flight attendants met us at the gate. Any of you guys remember how the airlines treated you back in the 1950's? Well if this flight was any example American Airlines is still doing it.

This year the RCM crew (from California) consisted of Dick Kidd, Dick Tichenor and myself and we were joined on the flight by Lee Renaud of Airtronics, John Brodbeck of K & B and John Brodbeck, Jr. of Cox Hobbies.

The conversations were super. I hadn't really paid much attention to the business end of the hobby so it was really interesting to hear from three outfits that have been



*Sandy Mullen shows the new unique radio for cars and boats from Kraft.*

extremely successful; and get their thoughts on the hobby from the business standpoint. We also covered just about every other subject under the sun from what's wrong with RCM, how little Radio Spectrum influences anyone, and dealing with the Japanese, to how we were going to get back in time to see the Space Shuttle land at Edwards. As it turned out the Shuttle was delayed just long enough.

I wasn't aware of any new companies in the radio business at Toledo but just about



*World Engines' Expert Series of radios shown at Toledo.*

all of the old ones were showing something new.

Let's start with Futaba. They were showing a new G-Series. I'm not sure what the "G" is for but the transmitter is in a kind of gold anodized case. Sounds like where Kraft started about twenty years ago. I'm not sure the jury is in yet on anodized vs. vinyl transmitter cases but I know there were some good reasons for going to vinyl. However, the new metal boxes with silk screening look very nice. The G-Series comes in 5, 6 and 7 channel configurations. It is interesting to note that you can get it in a dual rate version (K designation) or an exponential version (E designation).

All have the standard Futaba "open" gimbals which have adjustable stick length and tension. All have electronic trim and built-in trainer systems. List prices will range from \$350 to \$400 and they will be

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*New unit from RAM which they call a battery backer. See text.*



available in July 1981. I thought the appearance of this system was excellent.

TABLE I

Features	FP-7FG/K FP-7FG/E	FP-6FG/K FP-6FG/E	FP-5FG/K FP-5FG/E
Servo Reverse	6	6	5
Dual Rate K	3	2	2
Exponential E	3	2	2
Mixing	2	—	—
ATV	3	—	—

I also got to look inside Futaba's new J Series receiver which is extremely small. This is made possible by some unique packaging with a number of mother/daughter board combinations, and a flat pack decoder chip. I'm amazed at the way the Japanese companies tool up for new equipment at the drop of a hat, which brings us to **Airtronics**. It was actually at the MAC's show in Long Beach that Lee Renaud showed me their latest top of the line system with all the bells and whistles. I'm not sure what the plans for this system are as far as availability, but it looks like it could rival the Futaba J Series, and the JR Unlimited Series. The servos use coreless motors and metal gears. The amplifiers are set up in the Japanese tradition of extremely tight deadband which is made possible with very short minimum pulses. Lee said he would send over some equipment for our evaluation so I'll hold off on discussing this equipment in detail. However, if you want to dig out my discussion of the Sanwa servos in the May 1976 issue, you will get a pretty good preview of what I'm sure I'll find in the **Airtronics'** servos.

I said at the time I was very impressed with the way these servos were set up and with the new coreless motors, performance should be even better. This is because the coreless motor will respond to a shorter minimum pulse which means you can really tighten up on the dead band without oscillations. Once again, we'll tell you more in a later issue after we get some hands-on experience. As far as the rest of the **Airtronics'** line, I guess the customer response has been much better than Lee had expected. He said he wished he had ordered more radios, because the demand has exceeded the supply. Apparently the Japanese order just enough parts when they receive an order and so it is not easy to call in and say double my order and get any response. The reason for the popularity I'm sure is the fact that the equipment looks good, has the exponential and servo reversing features and is very reasonably priced. However, they will be getting plenty of competition from **Hobby Shack's** new Cirrus 850XLC. This is a seven channel system with dual rates, servo reversing, ball bearing servos, etc., and will sell for

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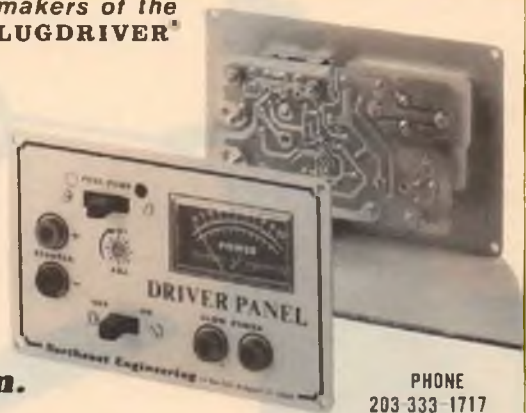
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INDIAN CITY RADIO CONTROL CLUB

PRESENTS

## GREATER MICHIGAN MODELERS SHOW & EXPO III

MICHIGAN'S LARGEST MODELING EXPOSITION  
MANUFACTURERS · STATIC DISPLAYS · SWAP SHOP

October 2, 3, 4, 1981

West Eight Mile Artillery Armory  
Oak Park, Michigan

(Suburb of Detroit)

\$239.99. If that is more than you want, the **Tower Hobbies System 4**, a four channel system for \$149.95 or six channels at \$169.95 is about as low a price as you will ever see.

Tower was also showing the **Isotronics Master Series** which is a seven channel with dual rates and servo reversing which was being advertised at a special price of \$279.95. Isotronics features a five hour burn-in of their equipment which is designed to find marginal parts at the factory rather than let the customer find them. This has proven to really pay off in military equipment and I'm sure the same applies to R/C equipment. They had previously sent me a set for evaluation, so we'll report more on it later.

One of the most enjoyable things at a trade show as far as I'm concerned, I alluded to earlier, that is the discussions with the guys engineering new equipment. I had quite a discussion with **Butch Lanterman of World Engines**. I had made a big fuss over the fact that the Novak receiver and the Kraft FM receiver was using a balanced mixer which I felt gave a performance edge, but had failed to mention that World Engines was also using this chip. I thought that they had discontinued its use but Butch corrected me. He also mentioned that he has overcome the oscillator problems that others have experienced by working with the crystal manufacturer. They have also been working on a new top of the line system using a transmitter case and gimbals engineered by O.S. in Japan. We also talked at length about the effects of the new FCC regulations. Butch is thinking in terms of frequency synthesizers in both the transmitter and receiver and crystal filters in the receiver. Sounds like an expensive but neat way to go. Everyone decided it is best to let the rules stabilize first. I had never looked close at World's big S-16 servo before but, if you want something big enough for your Quarter Scaler, it sure looks like it ought to handle any model.

Speaking of servos, **EMS** is sure not letting any grass grow under their feet. They also offer a servo they call the **EMS Eagle** which uses the S-16 mechanics. They designed a new servo amp to handle the 2.5 ohm motor (yes that means stall currents on the order of 2 amps) that uses an external bridge with Ferranti ZTX 650 and ZTX 750 series transistors. These are guaranteed at 2 amps and have extremely low saturation voltage which means the power goes into the motor and not into heat in the transistors. The data sheet shows a  $V_{CE}$  (SAT) on the order of .15 volts at a current of 600 ma. This is about one third the value that has been typical in previous servo amps and therefore I predict the Ferranti's will become the new standard for first class servo amps. EMS is using this heavy duty

servo amp in their EMS-1511H and EMS-20H servos also. A very subtle improvement that most people won't appreciate but I do and I take my hat off to them.

EMS is also building a receiver which is very small but otherwise quite conventional. The price looks right at \$59.95 for the 8 channel version.

For those of you who might still be wondering what happened to Proline, the answer is yes, **Ace R/C** has purchased Proline Electronics. They will provide parts and support a network of service centers for repair of existing Proline radios. They also plan to produce a line of radios under the Proline label and plan to make certain modifications. Their formal announcement said they would build a transmitter with the Proline gimbals and the Silver Seven encoder. They also plan to switch the receiver and servos to positive pulse. In conversations with Tom Runge and Fred Marks it became obvious that they hadn't really had time to work out all the details but I'm sure they will recognize the many good features in the Proline equipment and try to retain them. I've been flying with a set of the Custom Competition gimbals which are really precise when it comes to repeatability. I think I do detect a difference in the feel between left and right and up and down. I'm sure this is a tough problem on a single scissors set-up but most of the other manufacturers seem to have solved it. I think the Proline gimbals would be the best if they could overcome this one problem.

I understand there was a little panic in the modeling world when Proline was sold for a second time within the last year. Apparently quite a few guys tried to sell off their Proline equipment. Personally, I think this would be a big mistake, particularly if your equipment is working well. There are a number of service centers so you should not have any trouble keeping it going for a long time. Those of you who have the older Competition Six transmitters with the half shot encoder, might want to consider updating it with the Silver Seven encoder.

Ace had a converted transmitter in their booth at Toledo and it looked very good. You need to change to flat battery packs but you retain the good mechanical elements and the RF section. So, if any of you guys still want to unload your Prolines at a low, low price, let us know. Maybe we'll get rich making conversions.

I believe I mentioned in an earlier column that Ace was working on a receiver based on the Siemens balanced mixer. I asked Fred Marks how he was doing and he indicated that he had run into the same trouble that others had. Namely, making the local oscillator work without special crystals. He said he now has come up with an external network which does the job. We'll be looking forward to the results, because I think the balanced mixer does contribute to making a better receiver.

Bob Novak of **Novak Electronics** was doing a land office business at his booth. I guess a lot of guys wanted to take a first

hand look at the receiver I had recommended back in April. It still looks pretty good to me. Bob overcame the oscillator/crystal problem by running the oscillator at half frequency. Sounds like this might cause some degradation but Bob says he has had no problems with sensitivity or noise with this set-up. His servos have become kind of standard with the electric car guys. I guess the cars really beat up servos and need something really quick and the Novak servos fill the bill. Of course those traits aren't undesirable in a boat or plane either.

**Kraft** (I guess they dropped the System in their name when they got their new logo) was showing their Gold Spectrum Systems and a new K-Line Series. I had seen a few of the Gold Spectrum Systems at a contest earlier in the year but hadn't really had a chance to see what was inside. One of the transmitters at the show had a plastic back so I got a peek. I was disappointed that they had used wire wound pots instead of the good (and expensive) conductive plastic pots that are used in the KPT-7C. I was also able to detect that the electronics is entirely different from the 7C, so don't ask me any questions about adding mixers and aileron/rudder coupling, etc. One feature of the Gold Spectrum which I suspect will become a must on all the top of the line type equipment is the ability to independently set the left, right, up and down, etc., end travel. My first reaction was that it was just another complication, but on second thought it might be worth it.

The K-Line Series is a Japanese import which is priced to sell with the other imports. They have a conventional two and four channel system and a special pistol grip type three channel transmitter for cars. The nice thing about it is the fact that it is all self-contained and weighs only 1.6 pounds. It has servo reversing, adjustable steering limits, and a single sided throttle trim. You can adjust the amount of rotation of the steering wheel and the transmitter does have a plug-in module and provisions for plug-in crystals. The servos were also impressive in that they were small, fast and strong with good resolution. This was probably one of the sharpest radio packages at the show and I guess there is no reason you can't use it on boats and aircraft too.

Before I forget, I wanted to mention that Kraft has a new receiver with the Gold Spectrum Series, that uses the Signetics NE 5045 decoder. They've loaned us one for our evaluation so we'll let you know how it looks.

I spent a little time with Sid Gates of **Royal Electronics**. Royal was ahead of their time with the Omega Transmitter which had most of the features that are now becoming standard. However, Sid is thinking about coming out with a new model. He is working with Dave Litt of Da-Ca Products on a new gimbal assembly. Da-Ca is currently manufacturing the metal gimbal originally built by Bob Dunham. Sid supplies the pots which I understand are

# TOLEDO 1981

BY FRANK TIANO

**T**oledo, Ohio; a nice place to visit. Especially when the famed Weak Signals of Toledo hold their fantastic Radio Control Expo. This year the dates were April 10th through April 12th and, once more, the Weak Signals proved why their R/C show is the Granddaddy on the family tree of trade shows. I don't have to tell you how big of an affair this show is, you probably already know. I don't have to tell you that almost everything offered for the radio control enthusiast was there, you probably already know that too. But, unless you attended this Expo, now in its 27th year, you probably didn't know that this particular affair was one of the best in a number of years. Unless you were in Toledo you couldn't have known that, for the first time in a long time, almost every manufacturer there, released some sort of new product. As usual, the aisles were chock full of people from 9:00 a.m. till closing. If you have even a hint of claustrophobia, this was definitely not the place to be the second weekend in April!

A quick tour through the two large display areas was simply out of the question. It took almost two full days for me to find out what was what. And after I thought I had made a note of everything, I'd spot still another product I somehow had missed. With 292 booths in operation it was easy to miss a few things. For a report that may hold 50 or so pictures, I found myself with 7 rolls of film at 36 exposures each. If this show gets much larger, someone will have to come out with a separate magazine for the Toledo show coverage alone! Aside from the various manufacturer's booths, there were aisles and aisles of display models as well as the famed swap shop. One large area was reserved to display the beautiful prizes for this year's static display winners. These prizes, sponsored by various firms, included JR radio systems for 1st placers and a new color TV set for the contestant who would win "Best of Show." This show has proven that it is definitely worth building a model for. With the groundwork all laid out, let's take a mosey through the aisles and see what's new and exciting.

Unless one had a vision impairment, the Tower Hobbies booth just couldn't be missed. They brought a whole plane load of pretty girls just to hand out their special fliers that had a bunch of "Toledo Show Specials" that the modeler could purchase up to two weeks after the show. They also displayed their brand new 4 and 6 channel radios that retail for less than \$200. Not too far from the Tower booths, K & B had a nice display featuring their new 7.5 marine, inboard racing engine. This powerhouse is slated for August delivery.

Top Flite had a large display area featuring their new FabriKote covering material and a brand new Piper J-3 Cub. The Cub can be built as a regular J-3 or as the clipped wing version. Some new colors for their MonoKote were also shown. Circus Pink is just one of the new shades.

Speaking of Circus Pink, Jerry Nelson, Don Sobbe, Tony Bonetti, and others, manned a beautiful booth showing all of Circus Hobbies new line of imported kits, radios and engines. They have also taken over the Webra distributorship for the U.S.A. and have a new line of accessories as well. The new JR radio that they offer is fast becoming one of the more popular radios in the country.

Bill Hinnant came up from Virginia to show his redesigned Laser 200 from Mallory Models. The fiberglass fuselage is a work of art and the ship is a true 1/4 Scale rendition of Leo Loudenslager's famous aerobic ship.

Custom Model Products drove in from Brocton, Massachusetts, with their ready to be released Geni, intermediate trainer. The ship features eight hour assembly time and very nice wood for only \$59.95.

Roush Mfg. slipped in from Sandyville, Ohio, with their well-known Kioritz 2.4 cuber and a display of the new Kioritz engines that feature 3.9, 4.8, and 5.6 cubic inches of displacement and yielding anywhere from 5.5 to 8.5 horsepower. Prop sizes all the way up to 24/16 are recommended! They also have numerous items for the Quarter Scale enthusiast such as exhaust manifolds, velocity stacks, machined hubs, and more.

Kress Technology from Lloyd Harbor, New York, showed us some new style fuel tanks that may be used for glow or gas engines. Called the Simplstopp'r, these tanks are bright orange in color and come in a variety of sizes ranging from 1 1/4 oz. to 16 oz. A special stopper is available for use with diesel fuel or gasoline.

Dave & Al's Scale Products drove over from Akron, Ohio, to show their expanding line of scale accessories. Now available are cockpit kits for almost every plane in the world as well as some interesting decal sheets, canopies, wheel wells, wheel pants, display bombs, fuel tanks and much, much more. Some cockpit kits are available for the 1/4 Scale ships too.

T & D Fiberglass Specialties unveiled their new 1/4 sized Christen Eagle that weighs in at 13-16 pounds, depending on the engine used. A .90, Quadra or twin can power this ship. A semi-kit is available now.

Cass Engineering flew in from New Jersey with their version of the Christen Eagle designed for straight .90 power or one of Cass' new twin drive units that allows the use of two .40 engines for smooth, dependable power.

Hobby Shack had a very impressive booth featuring their new Quick Built Series of scale and sport aircraft where most of the work is already done for us. A beautiful large scale Tiger Moth and Citabria were also on display. The Moth was a work of art. One of their catalogs could be a worthwhile investment because this outfit sure has a bunch of stuff that I didn't know was available.

Midwest Products Co., out of Hobart,



**Bob Gorham and the Cricket, this new concept has everyone talking.**



**Sandy Mullen shows us the new Kraft K line radio.**



**H.P. now offers new car racing engines. Very good workmanship.**

## 1981 TOLEDO R/C EXPOSITION DISPLAY MODEL COMPETITION AWARDS

### Best of Show

George Rose      Curtiss P-6E

### Directors Award for Achievement

Gary Conley      F-Mono

### R/C Sailplane

1st      Otto Heithecker      Whirl Wind  
2nd      Ken Bates      Merlyn III  
3rd      Bob Sowder      Andromeda II

### MonoKote

1st      Ken Bates      Merlyn III  
2nd      Larry Miller      1936 Quaker  
3rd      Heiman Cholewinski      Duelist

### Electric Powered Plane

1st      Allen Vanneste      Original Design  
2nd      Tom Kwiatkowski      Mini-Jacket  
3rd      Keith Shaw      Shrike

### Old Timer R/C

1st      Tom Botkin      Miss America  
2nd      Tom McCoy      Lanzo Record Breaker  
3rd      Gordon Pearson      Bull Pup

### Sport Biplane

1st      G.R. Thomas      Pulsar Bipe  
2nd      Fred Deschamps      Original Design  
3rd      Dean Wann      Krier Kraft

### Best Finish

1st      Eric Meyers      Pole Cat  
2nd      Bert Brian      X-Terminator "Color The Sky"  
3rd      Gene Siejak      UFO (Moon-Raker)

### Precision Scale Plane

1st      George Rose      Curtiss P-6E  
2nd      Weldon Smith      Bell RP63G King Cobra  
3rd      Joseph Vineze      Lockheed P-38L

### Military Stand-Off Scale

1st      Vito Tomco      Sea Fury FB Mark II  
2nd      Dennis Bryll      P-47 Thunderbolt  
3rd      Roger Brennom      P-61 Black Widow

### Original Design

1st      Stanley Hueston      "Miss T" Racing Hydro  
2nd      Richard Sprague      Double Ganger III  
3rd      Don Sobbe      VRC-40

### Pattern Plane

1st      Paul Clements      Skynight-6  
2nd      Bert Brian      X-Terminator  
3rd      Gene Siejak      UFO (Moon-Raker)

### Non-Military Stand-Off Scale

1st      Terry Williams      Starduster Too  
2nd      Joe Murray      D.H. Tiger Moth  
3rd      Hank Likes      Spirit of St. Louis

### Working Vessel

1st      William Schaub      Shelley Foss  
2nd      Skip Temple      Cinquer River Push Tug  
3rd      Bill Daniels      Joseph Medill Chicago Fireboat

### Military Scale Boat

1st      Bob Cline      Melvin Destroyer  
2nd      Bob Pace      Coast Guard Cutter  
3rd      Gary Bussell      German E. Boat

### Sailboat

1st      Steve Torda      Scratch Mahogany Sloop  
2nd      Ken Bates      Emma C. Berry  
3rd      D. Tschan      Drum Beat

### Competition Boat Mono

1st      James Chronick      Chubasco  
2nd      Tonya Morris      Yellow Tiger  
3rd      David Warner      Love Dove 17

### Pleasure Power Boat

1st      Bob Cline      Gorche Foeke  
2nd      Robert Noble      Thomas Edison Stern Wheeler  
3rd      Walt Johnson      Dauntless Commuter

### Competition Boat Scale

1st      Dick Majors Schmidt      Miss Budweiser U-1  
2nd      Jerry Badgero      Miss Circus Circus U-31  
3rd      Charles Roberts      Miss Supertest II

### Competition Boat Hydro

1st      Ronald Walker      Black-Rushin  
2nd      Buck Seofield      Night Wing  
3rd      Kent Volmerding      Bandit II

### R/C Car

1st      Frank Pupello      CRC Chemicals Car Truck  
2nd      John E. Cary      McLaren Indy Car "CAMZ"  
3rd      Rick Jordan      Datsun 280ZX



**K & B's new .40 outboard Marine engine, soon to be released.**



**Top Flite's new Piper Cub. Covered in FabriKote naturally.**



**Jet Hanger Hobbies' KFIR from their Mirage kit. Smaller wing, different details.**



**Jet Hanger's very new Corsair for their Turbax ducted fan unit, their next big release.**



**Soni-Clean is the only way to clean your dirty engine parts; or your wife's jewelry. Works very well.**



**Don's Custom Models' new Tomahawk for large gas engines. Very pretty and very complete.**



**Aero-Marine has the answer for total power; two Quadra engines coupled inline for the maximum performance.**



**R/C Kits' new 1/4 Scale Chipmunk for gasoline engines. Pretty.**



**Dave Platt's 1/5 Scale Spitfire for super .90 power or small gas jobs. About 20 pounds, flies great.**



**Behrens Plan Service's newest company offering large scale construction drawings featuring safe, light structures.**



**House of Balsa booth showing their new T-tall version of their popular 2 x 2 glider. 2S version has stretched wing.**



**Cass Engineering's Christen Eagle for .90 or their exclusive twin .40 power drive system.**

Indiana, showed a couple of new sport ships as well as a cute little all foam, ARF, J-3 Cub for .09 to .15 engines. With a retail price of only \$45.95, the new kit should be a winner.

Dave Platt hitch-hiked up from Florida with his not-so-new large scale Spitfire and his brand new 1/4 Scale Great Lakes Trainer. The Spitfire we all have seen by now, but the Great Lakes is really something to see. If this kit features the same quality as the rest of Dave's line it should be outstanding. The word is that Dave's large retracts for 1/5 Scale models

have been refined and redesigned for larger models and will now withstand much more abuse than ever before.

After taking a little break for some of the wonderful food offered at the show and a small bottle of Milanta, I walked around a bit more and found the High Point Products' booth. High Point makes that great prop balancer we all know about (cause you read about it in RCM) and have just added a new set of mounting blocks that allow us to balance props with a diameter of up to 24". A new balancer for boat props and some new, strong landing gears were also shown.

In the same area of the arena I ran into Bud Nosen's booth and saw what a Big Stik looks like. Alongside the Stik was his new Corsair intended for small G.M. 4 cylinder engines. Really, the Corsair is Quadra powered and is very handsome.

A new company, Ancco Mfg. Co., from Minneapolis, Minnesota, is making the nicest set of retracts ever for the big, big models. They come with scale tires and wheels that are 6 1/2" in diameter and feature shock absorbing struts. The units are all metal in construction and will retail for \$159.95 with the wheels and tires selling for



Coverite's new Gee Bee "Flying Barrel" will be released soon; for .90 power, exact scale.



Pica Products' Jungmelster .40-.60 power Stand Off Scale. Good flier, easy to build.



Custom Model Products' new concept in intermediates. This trainer goes from docile to aerobatic with a change of control surface throws.



Bob Holman with just one example of one of the fine fiberglass fuselages he now offers.



Executive Design offers a new Monocoupe, 1/4 Scale, for .60 engines. Very light, very scale.



Byron's very impressive booth. Beech Bonanza and the offshoots; Beech T-34 Mentor and Turbo versions.



Hank and the new Sig Mustang. Features more scale outline and more washout for better handling.



Tower Hobbies' booth sure was long. It was more womanized than manned.



Robart's new jig for setting up chopper blades. Works well.



World Engines offers the Tartan in single or twin cylinders; ignition or glow.



The Balsa USA booth was one of the largest there. Biggles outside booth include their J-3, Sopwith Pup and new Fly Baby biplane. All reasonably priced direct only.



Just some of the prizes offered to the competitors in static display categories.

\$29.95 extra. These are very professional units and shouldn't be overlooked. A set that will rotate while retracting will be available for the new Nosen and the Nick Ziroli Corsair.

While I was on that side of the arena, I stopped in at the Squadron/Signal Publications booth and saw what new releases were available. A new book on the P-51 Mustang will be out soon as well as some reading material on tanks, armament and ships. Their catalog holds a wealth of information for the scale builder and collector alike. Their "In Action" series is

widely accepted documentation and will soon include some WW I aircraft too.

Heading back over to the other side, I stopped in at the World Engines display. They must have been burning an awful lot of midnight oil because there were no less than a dozen new items shown. A newly designed Wankel, a gorgeous new O.S. Pylon .40, a gear driven O.S. .61, an O.S. 4 cycle .40 and an in-flight needle valve adjuster were just some of what I saw. A new line of radios along with a Tartan twin in both ignition and glow were also there. That's just some of what we saw on Friday

and Saturday. The next day I would try and see the rest but by the end of the day on Saturday I was really bushed.

Back at the hotel a bunch of us sat around and made plans for the evening meal while shooting the bull. Bob Violett stopped over at the table and told us about his almost ready F-86 and John Brodbeck Jr. told us about the engine he was designing for it. Through the grapevine we also heard about a few more top secret items that will be released in the near future. Don Dombrowski said that his F-86 will be shipped in July followed by his new 1/4



**MRC's Rough Rider, off road racer, really neat. Waterproof.**



**Bill Hinnant from Mallery Models and his 1/4 Scale Laser. Super glass work. Uses Cass twin drive for ultimate performance.**



**Herb Clukey from Flyline Models and their newest release, Monocoupe Spirit of St. Louis to follow. Very detailed.**



**Hobby Shack showed their new giant scale Citabria and Tiger Moth.**



**Bud Nosen Models new Corsair. Very large. Ancco retracts, Quadra engine.**



**Bob Dively Models' Gnat for ducted fan power. Impressive.**



**Dynathrust props have now been tested at over 12,000 rpm's without a failure. Almost unbreakable props for the gas jobs.**



**If it makes noise, Tatone has a silencer for it.**



**Marty Barry spread the word at the Circus Hobbies booth.**

Scale Pietenpol. The long awaited P-38 is almost a reality from Don's House of Balsa company. The only hang-up is waiting for John Jr. to finish the new K & B .11 engine.

Bob Walker and Bart Fury, the two lunatics who own and operate Robart Mfg. decided that we should go out for a couple of cokes so we grabbed Jim Simonian from Semco mufflers and hit the street. By 5:00 a.m. Jimmy had designed a new muffler for a Yamaha. Bart had solved the crises in Ireland. Bob Violett had been an accomplice in rear-ending a friend's car. Bob Walker had lost the left hand mirror from his van. Brodbeck got lost. Dombrowski turned Jewish. Dick Tichenor had acquired 8 hours sleep (cause he had enough sense not to go with us). Joe Z. got sick, and yours truly thought about the next day which was approximately 2½ hours away.

Somehow we all made it the next morning, or is it the same morning? We all returned to our prospective locations in preparation of the doors being opened up for 5,000 more people. It took only a few minutes before I realized that my flash wasn't working but it didn't make any

difference since I hadn't loaded the Minolta with film anyway.

Byron's Originals was my first stop. This booth was one of the longest at Toledo and one of the best attended. Movies were being shown every half hour and almost everything they manufacture was on display. There was a new Beech Bonanza, a T-34 Mentor in both regular and turbo form, their new Mustang and, of course, the old reliable Pitts. Byron's products are finally available through your local hobby dealer at fair prices. They do have an outstanding line.

Next I stopped in at Behrens Plan Service from Far Rockaway, New York. Jerry Behrens has come up with some very good plans of the Travel Air 2000 and 4000 aircraft for Quadra type engines. He claims that his designs are light, strong and safe. The airplanes on display in his booth sure were good looking to say the least. I never knew he was capable of such fine work.

Next to Jerry's booth was Fiberglass Master of Bayshore, New York. This outfit makes fiberglass cowls and pants for almost every major kit sold in the country. They displayed fiberglass cowls for Jemco kits,

Top Flite, Sig, Stafford, and others. From the looks of their booth, if they don't have the cowl you need, probably nobody does.

R/C kits from N. Canton, Ohio, gave us a look at their new 1/4 Scale Chipmunk and their previously shown big Grumman Tigercat. The Chipmunk is pretty nice but the Tigercat is awesome to say the least. Two Kioritz engines power the monster.

Speaking of large models, Barron's Scale Plans previewed their new 1/4 Scale Stearman. The ship features 2500 sq. inches of area and a 24 pound weight. It was definitely one of the prettiest large ships on display.

Well-known Wendell Hostetler also showed some new aircraft built from his plans. The Curtis P6E Hawk is the newest offering for 2-5 horsepower engines.

Back in the other room again we found Don Dombrowski from House of Balsa. Don's newest kit, the 2 x 2 has been selling so well that he now offers a stretched wing version of the glider for \$39.95. To follow in a few weeks will be a T-tail and butterfly tail version of the same ship. The new 2-S Standard Class glider will retail for under

**text to page 68**



Vortac's new Manual Choke for the Quadra type engines. Same outfit that offers that great bomb release.



Gayle Broberg from Du-Bro Products with their 1/4 Scale pilot.



Roush Mfg., the Kioritz sales and service, is also offering this amazing engine in even larger versions of 5 c.i.



Let the good times roll with the new Kawasaki 5 cuber from C.B. Associates.



Annco Mfg. displayed possibly the strongest, neatest set of retracts for large scale aircraft ever. Shock absorbing.



High Point Products has long legs for their balancer to accommodate large diameter props.



Don Typond tended the Petit booth filled with the Hobby Poxy materials.



Barrons Plan's latest is a 1/4 Scale Stearman.



Ace R/C has an endless line of electronic goodies for the R/C "do it yourselfers."





The variety of products continues to grow with Dave Brown Products.



Gemini Models has a 56" span Super Champ, quite nice.



Curtiss P-6E in 1/4 Scale is the latest plan from Wendell Hostetter.



Harry Higley & Sons have an improved smoke system.



Semco mufflers come in all shapes and sizes.



J.M. Glascraft's 1/2A glass fuselages are unbelievably lightweight. Caudron on right flies on .010 engine.



Quarter Scale Stampe SV4B from Svenson.



K & H Glass Products makes all sorts of fiberglass cowlings.



The 1/8 Scale S.E.5A kit shown by Minicraft Models is museum quality, over 700 pieces in kit.

\$40 while the T and V tail versions will be a couple of bucks more. Their 1/4 Scale Pete is almost ready for release as well as their beautiful F-86.

Another Don, Don's Custom Models, has a gorgeous Piper Tomahawk for 1/4 Scale use. This is the nicest done Tomahawk this writer has seen to date and it certainly seems worth the \$225 price tag.

No show would be complete without Larry Wolfe from Jet Hangar Hobbies. Larry has come out with a new, smaller wing for his Mirage so you can make it a KFIR. Also on display was his brand new Corsair, also intended for Turbax power.

Soni-Clean flew in from Brooklyn, New York, got mugged at the airport before they left, but managed a respectable booth. Their new parts cleaning machine is even better than their old one primarily because it's about one and a half times larger. The unit retails for less than \$40 and no serious modeler should be without one. It removes gunk from your junk almost in a flash.

Other than Kelli and Ami Vall, whose pictures came out under-exposed, one of the prettiest girls found at Toledo was Gayle Broberg at the Du-Bro booth. Gayle helped

display all of her dad's new products, but particularly interesting was the new 1/4 Scale pilot. This has got to be one of the most realistic figures for large models that I've seen to date. Should be ready by the time you read this.

Also ready by this time is the new MRC, Tamiya, Rough Rider, off road racer. This little waterproof, mudproof, almost breakproof vehicle features 4 wheel independent suspension and oil filled shocks. It's one of the meanest, neatest R/C cars around and it goes like the dickens. Retail is going to be around \$150 almost ready to roll.

Another neat product was introduced by the boys from Robart. They finally have come out with an incidence meter for helicopters. This little jewel gives a direct read-out of blade pitch angles. I know that it works perfectly because we measured the slope on Bart's nose and it matched the angle shown on his birth certificate exactly. Look for a fantastic new scale modelers ruler in the very near future as well as a dynamite new carb that features a pump, automix and carburetor all in one unit. Besides being a beautiful work of art, it

takes up no more room than a conventional carb.

Around the corner from the Robart booth I caught Hank Pohlmann and the Sig booth. There, in living color, was the new Sig Quick Built P-51 Mustang. The new kit has been redesigned to a more scale appearance and features retracts and flaps as an option.

Upon leaving the Sig area, I heard a high pitched scream and found none other than Dave Brown on the floor, rolling in laughter. It seems that someone had used some of Dave's fantastic Mix-A-Matic epoxy and proceeded to glue his retracts in the down position, permanently! Actually, Dave has a terrific line of adhesives, motor mounts, retracts, covering material, fuel pumps and starter packs.

Across the way, John Gorham was demonstrating why his Cricket helicopter was one of the best values available today. Besides being reasonably priced, every part of the Cricket is available in case of a misfortune. I've never really been into choppers but this little machine could certainly change my mind.

Next to John's booth we found Sandy to page 96

# RCM PRODUCT REVIEW

## Pica Products WACO YMF-3



**D**igging into the kit box of this Golden Era biplane treats one to carefully planned packaging. A large quantity of good quality sheet balsa, neatly stack-wrapped, is surrounded by ample strip stock, bagged accessories and an enormous injection molded cowl. Four rolled plan sheets and a detailed construction manual complete the box contents.

### Construction:

The YMF-3 begins with matching die-cut sheets to reference drawings on one of the plan sheets. This completed, the instruction manual, 5 minute epoxy, Elmer's Carpenter Glue, and Goldberg Super Jet took the construction to covering stage in roughly forty hours.

All wood in our kit was of proper density for location on the model. Minor touch-up was required on some die-cut pieces. Supplied strip balsa stock exceeded construction requirements sending us into a frenzy, worriedly re-scanning the plans. During a telephone call to Pica Products for additional review information the surplus wood was explained. The conversation revealed their procedure to assure ample material is provided in case of mis-cuts, shipping damage or hobby shop rash.

Construction of the Waco is straightforward with no kinks or surprises. The fuel tank box is fabricated as part of the motor mount which, in turn, keys the fuselage crutch.

### Engine:

A K & B .61 and Kraft 12 oz. tank installed easily during the fuselage construction. Exhaust goo slips to scale outlet through Tatone's manifold and silicone tubes.

Upper wing rigging is accurately accomplished by using the provided jig. The wing seat is a curved cut while eyelets are soldered to piano wire cabane struts. Final assembly consisted of gluing

## SPECIFICATIONS

Name .....	WACO YMF-3
Aircraft Type .....	Scale Biplane
Manufactured By .....	Pica Products 2657 N.E. 18th Street Miami, Florida 33180
Mfg. Suggested Retail Price .....	\$89.95
Available From .....	Both Mfg. & Retail
Wing Span .....	60 Inches
Wing Chord .....	9 Inches
Total Wing Area .....	950 Square Inches
Fuselage Length .....	45.0 Inches
Stabilizer Span .....	20 Inches
Mfg. Rec. Engine Range .....	.45 to .61
Recommended Fuel Tank Size .....	12 Oz.
Recommended No. of Channels .....	4
Rec. Control Functions .....	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage .....	Balsa and Ply
Wing .....	Balsa and Ply
Tail Surfaces .....	Balsa
Building Instructions on Plan Sheets .....	Yes
Instruction Manual .....	Yes
Construction Drawings .....	Yes

## RCM PROTOTYPE

Radio Used .....	Kraft KP5CS
Engine Make & Displacement .....	K & B .61
Tank Size Used .....	Kraft 12 Oz.
Weight, Ready to Fly .....	8 Lbs.
Wing Loading .....	19.42 Oz./Sq. Ft.

## SUMMARY

### WE LIKED THE:

Detailed plans, wood quality and parts fit. Overall ease of construction and sequence in instruction booklet.

### WE DIDN'T LIKE THE:

Cowl bump decals didn't fit.

bumps on the cowl, joining and mounting wheel pants and fabricating interplane struts.

### Covering:

The reviewed model was finished with Insignia Blue and Cream Super MonoKote. Blue panels on upper and lower wing surfaces were masked and sprayed with Pactra Royal Blue. The cowl and wheel pants were also sprayed with the same paint. Mylar kit decals were applied then all was sealed with a spray coat of Pactra Formula-U.

Finishing touches have Robart wheels providing rollability while Harry Higley's 2 oz. prop nut dresses Williams Brothers 1½" dummy engine. Driving this machine is a modified Williams' pilot. Approximately 55 hours had accumulated to this final stage.

The previously mentioned telephone call was to check out unspecified control surface movements. Pica's helpful folks provided the following: Ailerons: 1/2" each direction; Elevator: 1½" each direction; Rudder: 1½" minimum each direction; C.G. location: slightly forward of plan for first flights.

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# SCALE VIEWS

Claude McCullough



Still More On Smoke

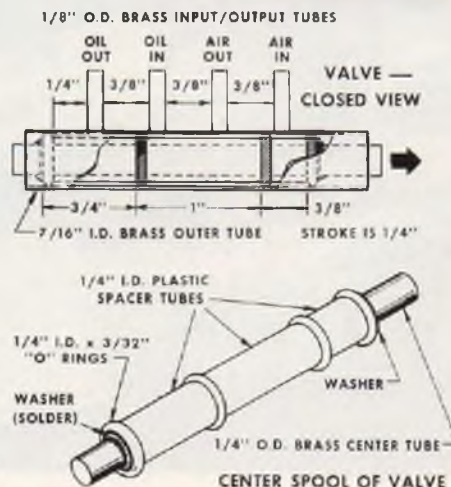
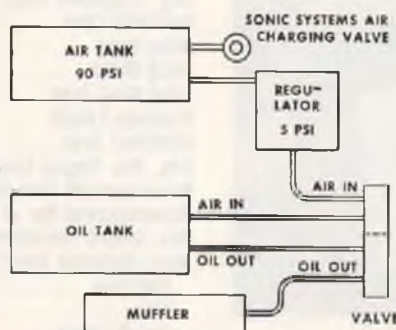


Don Harris' Roper 3.7 powered "Half Breed" blowing smoke. Photo by Claudia Balassi.

In the April Scale Views we had comments by Bill Altenhofen, team manager of the Bloomington, Minnesota Blue Eagles RC Flying Team, about the smoke system developed and used by Jim Miller and Sherwood Heggen. Now we have the diagram of the system in Jim Miller's Quadra powered aircraft. The homemade valve can hold more pressure than commercial valves. The "O" rings must be compatible with petroleum, such as Buna "S" rings. The pressure regulator is by the C.A. Horgren Company of Littleton, Colorado, part number R04100RGKA, available from companies listed in the yellow pages under Gauges and Gages. Pump up the tank with a Sonic hand pump. Put in a pressure gauge temporarily to set the regulator to 5 lbs. psi. Air charging valves and lines are also from Sonic.

"High Flight," the newsletter of the International Miniature Aircraft Association, has some arresting pictures of Don Harris' Roper 3.7 powered "Half-Breed" putting out dense clouds of smoke on the ground and in the air. It is

## BLUE EAGLES RC FLYING TEAM SMOKE SYSTEM



plain to see that he has the smoke situation under control. Since ordinary diesel fuel is used for fluid, the secret of his smoking success is in the design of his special double-chambered stainless steel muffler, fed by an electric fuel pump. It puts out fantastically, even at idle. The fuel hits the red-hot inner tube and is completely vaporized. Several column correspondents have suggested variations on this theme, but it looks like Don has made a practical application. Versions of the muffler are offered for either inverted Roper 3.7's or inverted Quadras. Price is \$39.95 plus \$2.50 postage from Don at 23668 Shadow Dr., Auburn, California 95603.

as can be unearthed. The major items of coverage were the Scalemaster's Color Guide and Federal Standard FS-595a Colors in the September 1980 issue and the Methuen Color System in the May 1981 issue. With the Methuen coverage we commented that although the Munsell Color System is the internationally recognized ultimate, it was so expensive that a less costly source such as the Methuen book was a more practical standard for widespread general use among scale modelers. For example the "Munsell Book of Color — Glossy Finish Edition" sells for \$499.00. It features 1,488 removable color chips. The Matte Finish Edition has 1,277 additional permanently mounted chips for \$399.00. Individual chips go for \$1.20 each, not a bad price for a serious scale model project. The problem is that you must have the exact Munsell number first.

### The Munsell Color System



As regular readers know, Scale Views has been trying to present as much material relating to color proof and standardization

Despite the high costs involved, it would really be a great service to scale if some way could be found to have access to a Munsell set of chips. One of the big drawbacks of the cheaper Methuen system is the non-availability of individual chips, probably because they are printed (though well done) rather than painted. Maybe if we could get enough scale builders to join the National Association of Scale Aeromodellers (NASA), it might have sufficient funds in the treasury to be able to afford to purchase a Munsell set. A volunteer could be given the task of matching and locating Munsell numbers for submitted color samples. Individual color chips could be made available to the members.

Pending realization of this pipe dream, let's come down to earth. Is there an RC modeler out there who works for a company, publisher or lab, that has a

Munsell set and would volunteer for a one-time-only job of color matching? The purpose of this assignment would be to establish the correct Munsell number for Olive Drab. As explained in the September 1980 column, the 30487 chip in the current edition of FS-595a is not correct for World War II aircraft, because they changed the shade and left the number the same in 1964. This is the worst gap in WW II color documentation and should be plugged. Since the September column appeared I have had several pleas about what to do about this problem from builders working in aircraft of the era who are able to document all of the other colors used by getting FS-595 chips but can't authenticate the most common color of them all. So, if a volunteer Munsell-matcher can be located, I propose to send him my copy of the rare early edition of Federal Standard FS-595 Colors --- which does have the proper shade of Olive Drab over the number 34087 --- and it can be used to select the Munsell number to duplicate it. With the number in hand, I will, in turn, keep a supply of chips on hand and supply them at cost to any Scale Views reader who needs an Olive Drab chip, along with an authenticating note. (Buying in quantity will be necessary because the Munsell company has a \$25.00 minimum order policy.)

While on the subject of the Olive Drab situation, I have compared my 1956 FS-595 edition No. 30487 chip to the Sealemaster's Color Guide and find that they did an excellent job of matching. They made their own chip for this particular color so as to correct the problem with the later edition FS-595a Olive Drab chip. I have compared them both to the Methuen color system book and I make the proper Methuen number to be: 4 F 3. Incidentally, the 1956 30487 chip shows some commercial finishes sold as Olive Drab are a bit off, either too light a brown or too green.



**The Munsell Catalog has a wide variety of color standard materials.**

If someone is interested in taking the plunge, a catalog is available from Munsell Color, 2441 N. Calvert St., Baltimore, Maryland 21218. In addition to the chip books, they have a number of other color related items, including charts and devices for measuring color perception of the human eye. As I have noted before, one of the problems in color judging is the fact that different sets of eyes work differently, even

if they are not considered to be "color blind." Maybe we should check out the eyesight of color and markings judges!

### Color Mixing Guides



**Grumbacher's Guides: color compass is \$4.80, color computer is \$2.30.**

Now that we have some sources of authentic color chips, it becomes necessary to do hand color mixing to match them. The first time I tried this, my background consisted mainly of 6th grade elementary art classes that had pounded in the information that red, yellow and blue were the primary colors and mixing them together would produce other shades. And so it will! **Thousands** of shades. By the time I got the desired shade, I had a gallon and a half of dope for a model needing only a third of that at most. In a way it turned out okay, for some years later, after a pretty complete crack-up, the surplus was handy for a refinishing job after repairs. But it taught me a lesson. Use small quantities to establish the formula for the desired shade and then repeat the process for the full amount. Don't get in a hurry. Add color to a mix in small quantities. Once you've gone too far it takes a lot of another color to reverse the shade direction.

It is hard to guess what effect a particular color will have on a mixture, so to avoid a lot of trial and error, my advice is to go to an art supply store and buy some sort of color mixing guide. A couple are shown in the photo. These are by Grumbacher, the art brush people. The Color Computer is probably the most directly useful tool in visualizing the effect of additives but I also found the Color Compass booklet treatment handy as well. There is a chart on the back of the Color Compass case that gives a very good idea of the effect of adding white or black to "pure" colors. Other art companies make similar guides and there are some good books on the subject as well. A quote from "Color Compass" makes it clear that there are no magic formulas: "Color mixing can only be learned through practical application and experimentation but a knowledge of color theory will give the beginner a basis for such application and experimentation."

### Turn Blue

It is reassuring to have "standards" but every once in a while there is some slippage. For example: When the F-18 Hornet was unveiled to public eye and camera it had a

"Wow!" white-blue-and-gold paint job that was soon seen worldwide in many an aviation magazine. Plastic kits came out, complete with decorative decals. But then the arguments began among modelers about just what "FS" numbers had been used. None of the blue chips in FS-595a really matched the blue trim on the Hornet. Finally it was discovered why. After the art department at McDonnell-Douglas had designed a public relations dream of a scheme, someone dropped by at the local Ford auto dealership and picked up a supply of Metallic Blue. I guess that would be considered an "FD" number instead of an "FS"!

### Quadra Choke



Jerry Gardner of Gardner-Burrell (60005 Cliff Dive, Ft. Smith, Arkansas 72903) has sent in a sample of their new Choke-Ram Inductor for Quadra engines. It's an ingenious little device that solves the problem of starting a Quadra buried in the cowling of a scale model. The nylon control arm for the butterfly valve can be adjusted to various positions or moved to the opposite side to suit particular installation requirements. An operating wire can be run out to a convenient location or the valve can be hooked to a servo. Jerry says they have been able to start a choke equipped engine in under 10 flips when cold and less when warm. Power gain from the ram air inductor feature has been measured on a tach at around 200 rpm. Price is \$14.95.

### Darned Good Airplanes

Dave Reid D.G.A. Designs (135 East Main St., Phelps, New York 14532, phone (315) 548-3779) writes to announce the availability of plans for some interesting Quadra powered airplanes. The 1930 Davis D-1-K aerobatic parasol is 90.5" span, the 1933 Kinner Sportster Model K low wing is 117" and the more recent Stitts Playboy SA3A aerobatic homebuilt goes with an 88" wing. All will be fully flight tested prior to plan sales. They expect to have scale documentation photo packs for these and other airplanes soon. Another service should be of interest, for I often get asked where plans can be duplicated. They will

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Best of Show Award winner was this gorgeous 1/4 Scale Curtiss F-11 C-2 Goshawk by Dick Enos.

# 1981 MODEL AND CRAFT SHOW

The Eleventh Annual Model and Craft Show (MACS), held at the Long Beach Convention Center, Long Beach, California, is the largest consumer hobby show held in this country. The show encompasses all phases of modeling and includes a wide variety of crafts. Naturally, RCM's interest is primarily in the radio control portion of the show which is being presented in these pages.

Most impressive is the vast space available and the complete modern supporting facilities at the Convention Center. The show management is adamant in their policy of having no aisles less than 16' wide. This consideration contributes immensely to the convenience of the attending public.

The exhibitors range from the very small through the largest in the hobby industry. Our coverage is a random sampling of the displays; it is physically impossible to include all the exhibits.

RCM congratulates the MACS management for conducting the ultimate in trade shows. □



Super detailed Douglas SBD Dauntless by Jim Meister.



Sopwith Camel by D.B. Baker.



A pair of 1/4 Scale Mitchell Flying Wings by Claude Brown.



Henry Strucks' 1940 American Ace 54 by Don Adams.



*The Meyer Brothers' Hughes Spruce Goose was an attention grabber.*



*Beautiful UFO by Dennis Milliken.*



*Israeli Skyhawk A4D by Don Johnson.*



*Randy Wisley displayed his Flying Fleas.*



*Col. Bob Thacker's famous OMAC-1.*



*Ercoupe 415-D in military colors by Rich Westlake.*



*Don Adams' 1/4 Scale Rearwin Sportster.*



*Marco Gonzalez built this original Flying Saucer.*



*Half scale Heath Parasol by Bob Baker and George Johnson.*



*Jet Hanger Hobbies' Mirage by Bert Ayers.*



*Sky Dancer, gullwing sailplane by Chris Johnson.*



*Porsche 936, 1/8 Scale, 4 cyl. horizontal 2 cycle engine, by Bill VanLeeuwen.*



*Schweizer TG-3 Trainer, builder unknown.*



*Beautiful Deep Vee by Rick Smith.*



*Helicopters of all types are popular in California.*



*Irwin Ohlsson's Widgeon III.*



*Don Adam's Dallair Sportster has Technipower 5 engine.*



*Sleek Supermarine S5 by David Johnson.*



*Bucker Jungman by George Crocker.*



*Scale hydro powered by 4 cyl. engine, builder unknown.*



*Simitar 540 by Bill Evans.*



*Bill Stullick's ME BF 110 C-3.*



*Water cooled 4 cyl. engine in scale hydro.*



*Skyhawk A4D by Bill Mueller.*



*Fairey Swordfish by Gary Brownstein.*



*One of the many super nice ships displayed.*



*Deception, pattern entry by Ken Wilson.*



*Jaguar slope soarer by Lawrence J. Hargrave.*



*D.H. 82A Tiger Moth by John Pahlow.*



*Bristol M1.C Fighter by Harry Apolian.*



MAC's official greeter was Talking Bear.



Futaba's radios were nicely presented.



K & B showed the first production prototype .40 outboard.



Goldberg's Eaglet uses a "quick to build" concept.



Hazel tended the huge Sig booth.



Circus Hobbies now has the Webra engine distribution.



Lovely Yoko Dunham presented dozens of Playtron goodies.



MRC's electric off-road cars are hot items.



The Bonanza Series are the latest from Byron Originals.

## HELI-CENTER WEST



One of the many helicopters shown was John Gorham's Cricket.



Jet Hangar Hobbies showed the fuselage to the upcoming twin ducted fan, swing wing F-14 Tomcat.



Chuck Hayes presented a complete line of new engine mounts.



A new kid on the block, the Omni radio from Kraft Orange County.



Parma covers the competition R/C car field.



Mark Smith has released the Mini-Bird.



# AIRTRONIC



*Dave Shaddell is happy about the Airtronic's radios.*



*Pactra has finishing materials for all model projects.*



*House of Balsa has T-tail, V-tail and long wings for the 2 + 2.*



*Associated R/C Cars displayed their prize winning machines.*



*The ARF P-51 is the latest item from CMI.*



*Bridi Hobby has their usual line of great planes.*



*Jet fighters with propellers by Westcoast R/C Products.*



*High performance sailplanes from Pacific Sailplanes.*



*The latest Signature Series from Kraft Systems.*



*L.R. Taylor has the equipment you need for electrical supply and service.*



*Delta is a big name in R/C cars.*



*Michele Dustman demonstrates for Cockpit Control Systems.*



*Polks displayed a R/C submarine with a transparent hull. See it?*



*A Dremel craftsman amazed the public with the Dremel tools.*



*Svenson kits are highly detailed.*



*Hobby Shack has a constant stream of new kits from Pilot, all excellent.*



*Al Green and Ed Blum from Tower Hobbies with new radios.*



*Then there is a big bunch of Prather competition boats.*



*Dumas boat kits are world renown.*



*Marie Williams shows us the Cowboy (airplane, not Tom).*



*Astro Flight products are silent, not Bob Boucher.*



*Bob Novak has all sorts of radio stuff.*



*Bob Martin R/C Models provides molded sailplane replacement fuselages.*



*Circus Hobbies has an interesting line of kits.*



*Caltronic Laboratory displayed a complete line of sturdy machine tools.*



*If your radio is sick, Authorized Radio Control Service can make it well.*



*Estes, the rocket people, are now into electric R/C aircraft.*



*Thorpe is an R/C race car specialist.*



*Proctor Enterprises had a Curtiss Jenny on display.*



*Bob Holman has fiberglass fuselages for some of his plans.*



Royal Products' foam cutter made this variety of shapes.



A scale modelers scale and chopper blade angle meter were shown by Robart.



Technipower was there with the 5 and 7 cyl. running radials.



MRP stands for Model Racing Products, that says it.



Joe Martin's Sherline tools are dandy.



More goodies from Royal Products.



The gang from Westcoast Marine and their racing hulls.



Kraft Spectrum radio systems.



Scale Propeller Crafts has kits for ME-109E and A-1H Skyraider.



An excellent balsa stripper was demonstrated by Windsor Propeller Co.



Twinn-K has car racing accessories.



Eldon J. Lind Co. has the Duplicator, a precision hand sanding tool.



Precision Model Products are kitting the Challenger sailplane kit.

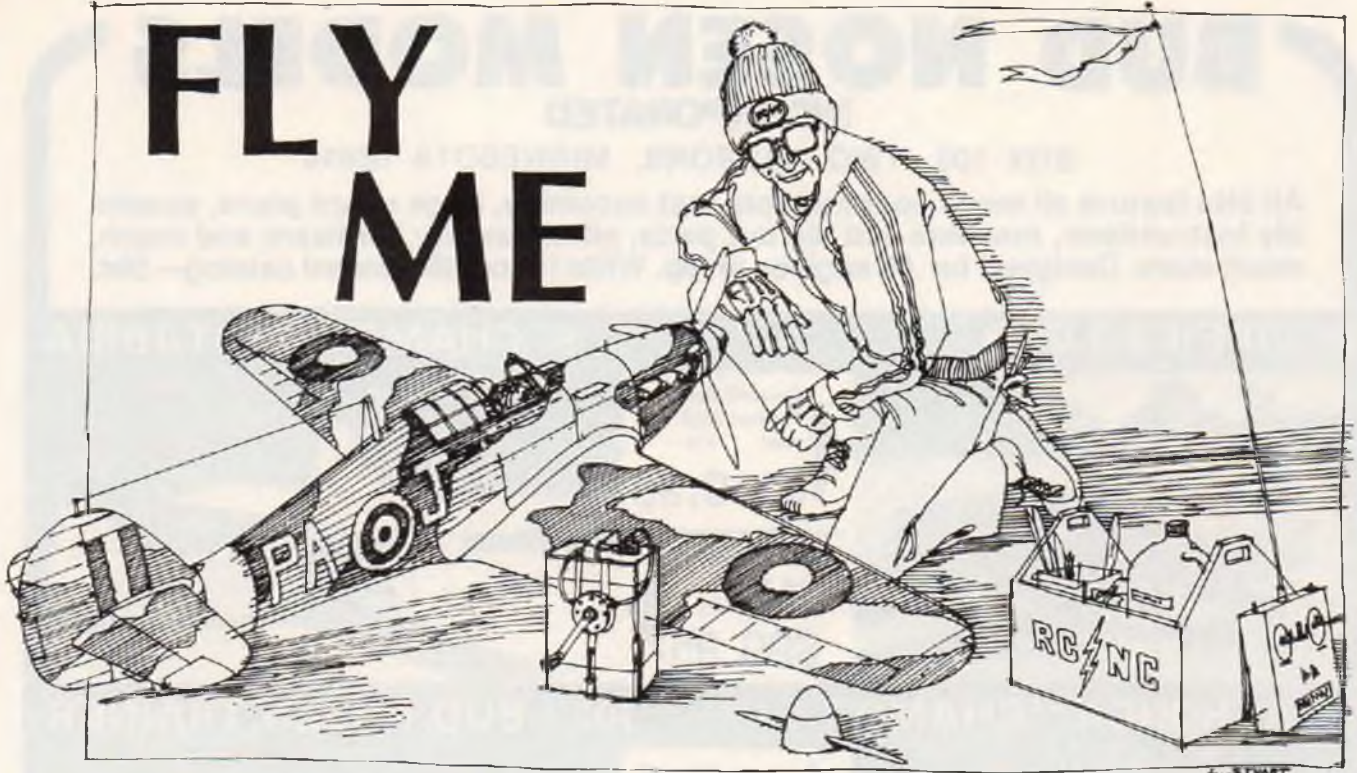


Kalmbach Books has a variety of model oriented books.



And so we attended another trade show.

# FLY ME



I couldn't sleep. I was tired but I just couldn't get to sleep. Perhaps I was too tired. I was wound up from too much business pressure and too much family responsibility. So I just laid there, body still but mind going a mile a minute. Restless. Perhaps if I took a walk, or, better yet, went for a drive, it would help me relax. Then maybe I could get some sleep.

I got dressed and got into the car. It was a warm summer night with a full moon and a clear sky. The air felt good on my face as I drove out of town.

I drove along the freeway until I came to the river highway. Before long I approached the turn-off to the club field. I wondered what the place would be like at night. It's secluded, peaceful and quiet, and full of fond memories. So I turned off the main highway and drove to the end of the county road to my model airplane club's flying field.

There, in the still night, was the old flying field. It had been a long time since I had been there. Somehow I just hadn't found the time to keep up with the hobby of flying radio controlled model airplanes anymore. That was too bad. It was such a wholesome diversion.

I could see the whole field in the bright moonlight --- the taxiways, the outhouse, the picnic grounds and, of course, the miniature runways. How I wished that I was still active in the hobby! I resolved to make an attempt to simplify my lifestyle so that I could have time once again to fly model airplanes.

I shut off the car motor expecting total silence to follow. But instead I heard a very low humming sound coming from outside the car. I got out and looked around. What I saw in the middle of the field was an

By David P. Andersen

airplane. How could someone forget their airplane? As I walked toward the plane I noticed that there was a transmitter left behind too. I picked it up. It was a Kraft Gold Spectrum transmitter.

There was no sign of anyone around. There was just a transmitter and an airplane --- no car, no field box, no people --- nothing. I called, "Anybody here?" In spite of the fact that it was obvious that I was quite alone.

That was strange, and stranger yet: the airplane's motor was still running. The plane was resting there, engine ticking over, as if it were awaiting clearance for take-off.

With the transmitter in my hand I walked up to the plane to examine it.

"Fly me," a voice whispered.  
"Somebody there?" I responded with a start.

Nobody answered. It must have been a rustle in the tree leaves, I reasoned.

The plane was a precision scale Hurricane and I recognized the sound of an O.S. Max .61 side mounted in its cowl. The plane was magnificent --- panel lines, camouflage color scheme, complete cockpit detail and just a bit of weathering.

I moved the left stick of the transmitter back and forth. The tail of the airplane sashayed in response to the tailwheel. "Fly me." I thought I heard a voice whisper again.

I tried the other controls --- ailerons and elevator. Then I inched the throttle up just a little bit. The engine crackled into a fast idle and the plane began to move along the ground. I stepped back to the edge of the grass and steered the plane along the ground

until it came to the end of the runway. With full left rudder I turned the plane around and stopped it.

"Fly me. Fly me."

I advanced the throttle slowly and applied a little right rudder and full up elevator. The plane began to accelerate. As it picked up speed I eased off the elevator and applied more right rudder. The tail lifted off the runway. More throttle. As the plane rushed by me it became airborne and assumed a shallow straight climb.

Oh what a sweet sight in the summer moonlight! Those elliptical wings shadowed against a half lit sky. I throttled back and approached the field for a slow fly by. The moonlight flashed off the propeller as the plane leveled off at ten feet of altitude. I flicked the retract switch and watched first one gear leg fold outward and backward, then the other gear leg. I could hear the swish of the propeller blades over the hum of the throttled-back engine as the sleek fighter plane cruised directly over the center of the runway.

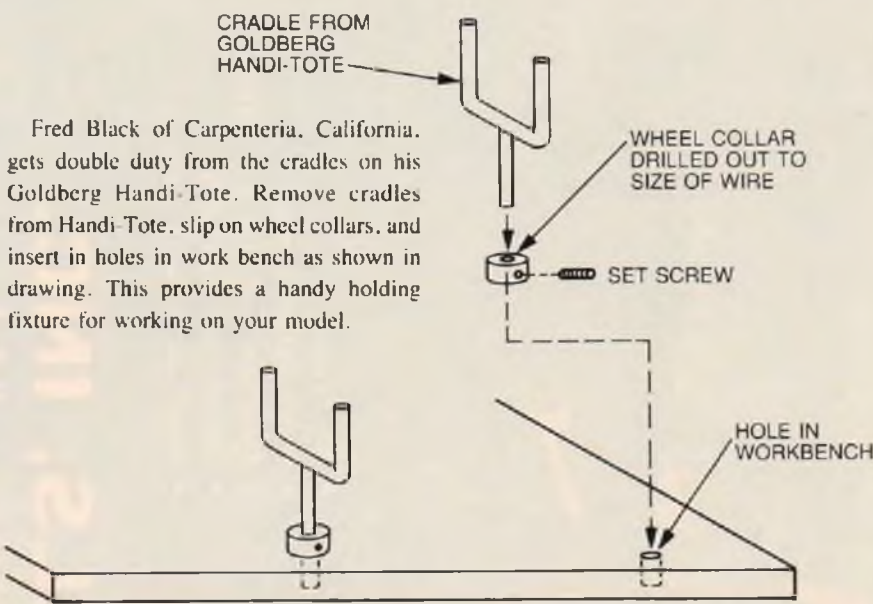
I advanced the throttle and she shot forward. Turning around downwind I decided to try a loop. When the plane became centered before me I pulled back on the elevator. The nose came up and the occasional four-cycle of the engine became a solid two-cycle as the powerful engine slowly arched the plane up and over onto its back. I throttled back to idle and the plane glided downward, leveling out once again at about ten feet of altitude above the runway.

After a straight flight out from the loop I used both rudder and aileron to turn the plane quickly around in preparation for a slow roll.

"The next maneuver will be a slow roll."

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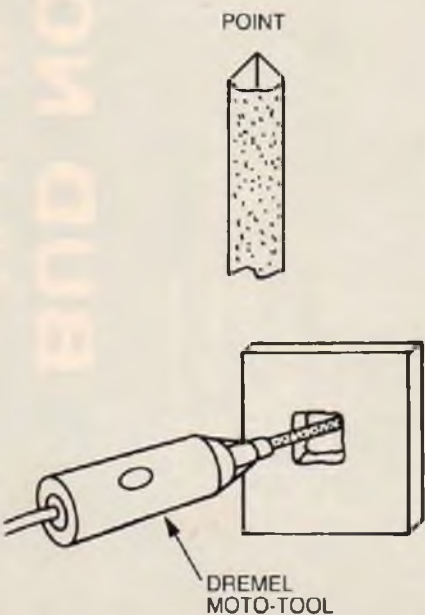
# FOR WHAT IT'S WORTH



SIMPLY REMOVE CRADLES FROM WORKBENCH AND REPLACE IN HOLES OF HANDI-TOTE TO GO FLYING

Fred Black of Carpenteria, California, gets double duty from the cradles on his Goldberg Handi-Tote. Remove cradles from Handi-Tote, slip on wheel collars, and insert in holes in work bench as shown in drawing. This provides a handy holding fixture for working on your model.

This handy item was submitted by James McCoul of Warren, Michigan. Jim has a new cutter for the Dremel Moto-Tool. It is cut from a round steel wire that is covered with tiny bits of carbide. The wire is sold in hardware stores and is used as a hacksaw blade for cutting bricks or glass. Cut off a 1 1/4" long piece, sharpen one end to a point with four flats. (Like the point of a nail.) This is to make it easy to push the cutter through the wood that you need to cut a hole in. This new cutter acts like a rotary file. See sketch.



Glider guiders should find this suggestion from Kent E. Pyle of Clinton, Missouri very helpful. While flying gliders, Kent finds the Ace adjustable strap, part #60K11, very handy. If you were born without three hands, you can use it to hold the transmitter while you adjust and or hook up the towhook. Or you can even use it to hold the stretched line, just hook it to the split ring in the top of the chute, while you change the trims or whatever on the transmitter. If you will run the strap over your neck and one arm, it won't choke you while you are hooked to the stretched line. Try it, it's almost as handy as having that third hand.

For those who desire a tinted canopy and can't find one the right size, a can of VHT Windshield Tint does an outstanding job. Obtainable in any speed shop and in a variety of colors, just spray the inside of the canopy and presto, it looks like a factory job. This idea was submitted by Bob E. Long of Bolling A.F.B., Washington, DC.

A neat solution to a sticky problem was sent in by Peter von Stackleberg of Regina, Saskatchewan, Canada. A small 3" paint roller (used for painting edges and trim) is a handy item when applying glass cloth and resin to a wing or fuselage. The roller makes it much easier to spread the resin over a greater area, without pulling the cloth

around the way a brush does. The result is less resin used, a more even surface without runs or brush marks, less time spent on sanding and a lighter finish. The rollers sell for less than a dollar and should be able to take numerous cleanings before having to be replaced.

One of the hardest jobs in finishing a control surface is making a straight and thin trailing edge. A method that proved successful involves scribing a deep centerline along the trailing edge with a Goldberg Hinge Line Marker. Lay a string (regular kite string) firmly in the scribed line and Hot Stuff in place. This gives a very definite line to cut or sand against. The finished edge is very straight and dent resistant with a thickness no more than the diameter of the string. This idea was submitted by Herbert Wills of Dallas, Texas.

After using liquid masking film for partial areas, it doesn't always peel off completely. Fragmented pieces usually remain around the perimeter of the area masked. These pieces can be easily removed by dabbing with masking tape --- it's better than scraping them off with a knife since that will damage the finish. This idea submitted by Jerry Kavis of Pittsburgh, Pennsylvania.

Jack Harvey of Hixson, Tennessee, tells how he solved a sanding problem. Many times Jack found sanding a small model with a sanding block to be a problem because the block bumps into the tail section or some other part. He solved this by cutting a piece of sandpaper about 4" x 4" and sticking it to his four fingers with a piece of 2" wide double stick indoor/outdoor carpet tape, you know, sticky on both sides! This works great for curved fuselages, too.

The following is submitted by E. W. Buddenberg of Burlington, Kentucky. Many fliers who use MonoKote or other similar coverings, have experienced the problem of repairing dents, bumps, or bruises to their finishes. Mr. Buddenberg has found a good way to solve these problems, and it works on all finishes including painted. His wife is an RN and she brings home disposable hypo syringes. Simply draw some water into the syringe, insert the needle under the skin of your ship

# FOR WHAT IT'S WORTH

or even into the balsa, and inject a few drops of water, then take your sealing iron and apply heat to the area and — presto, instant repair.

This idea was sent in by Robert G. McLean of Wayne, Nebraska. Worn out TV cabinets, the console type, can make an excellent compact workbench for someone just entering the hobby. Bob uses one for his secondary workbench. He can build the fuselage on top of the old TV while building the wing on his primary bench. Many of the big old TV's are worthless trade-ins and many dealers are glad to get rid of these. The cabinets are surprisingly sturdy. Remove the TV and related components and you also have a nice storage area for hobby related supplies.

Horrace Cain of Buffalo Grove, Illinois, developed this tuned pipe fully adjustable rear attachment.

(1) Bend brass strip to roughly fit around end of pipe and around brass tube slide.

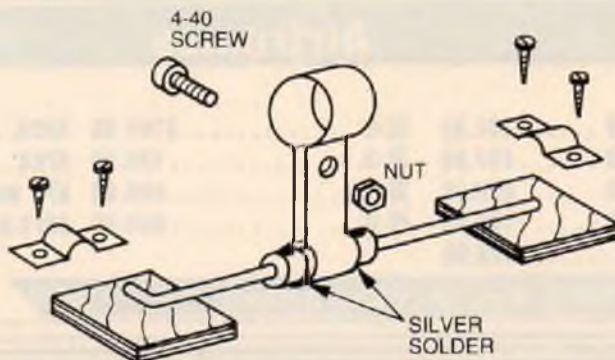
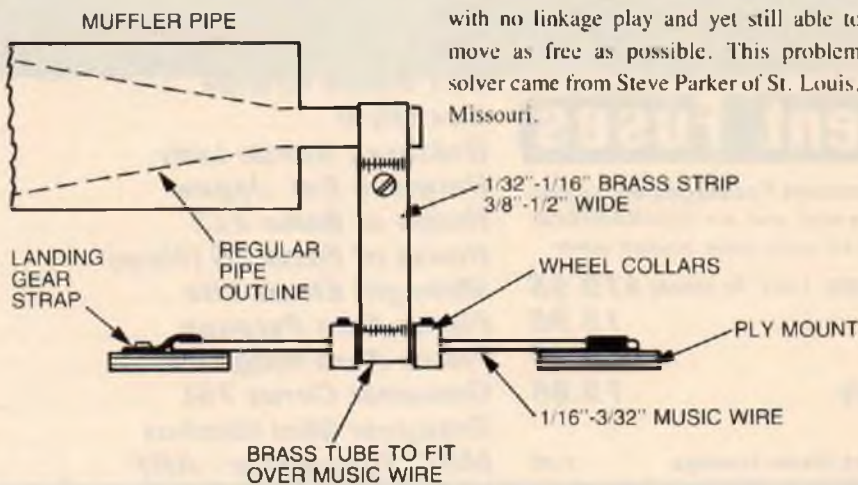
(2) Silver solder brass strip to tube and to gear retainers. Gear retainers lock slide in place.

(3) Mount as shown or as convenient. Mount may be internal with brass strip exiting through slot.

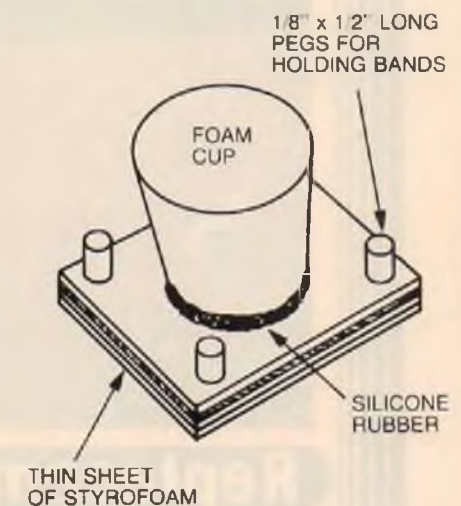
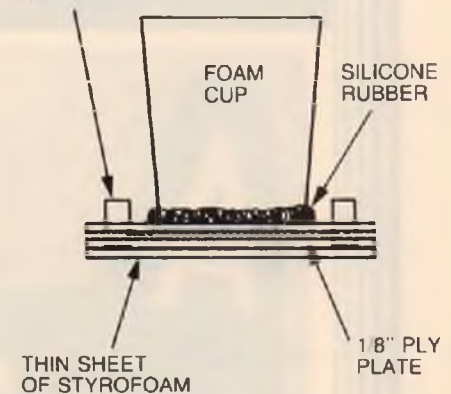
(4) Pipe easily adjusted in length. Ideal for field adjustments when changing props, fuel, etc.

(5) Very simple and works well. Pipe firmly secured fore and aft, and cannot sway side to side. See sketch.

By using Du-Bro Snap-On ball links, it is possible to eliminate minor misalignment and linkage play when setting up the control surfaces of many scale aircraft. The installation of flaps is one example where you often have four or more ball link connections driven by one servo. Many times, however, an occasional ball link will be somewhat tight. An easy way to free-up a tight ball link without causing any linkage play is to gently insert the beveled end of a 5/32" landing gear wire or steel rod into the open end of the ball link. Doing this once or twice is usually enough to free-up even the stickiest ball link: leaving your connections with no linkage play and yet still able to move as free as possible. This problem solver came from Steve Parker of St. Louis, Missouri.



1/8" DOWEL  
DRILL PLY  
AND GLUE  
DOWELS



Al Alman of Arlington, Texas, submitted this problem solving idea. The biggest problem during egg drop fun-fly's is that the egg all too often is knocked out while taxiing or taking-off. Al found that by gluing the foam cup to the ply base with silicone rubber, and then gluing a thin foam padding to the bottom of the ply base, the egg almost always stays put. Also, attaching the foam cups to the airplane presents a problem. Al found that by drilling 1/8" holes in all four corners, and then Hot-Stuffing 1/2" long pieces of 1/8" dowel in place, vertical to the base, rubberbands can be easily attached and the cup mounted with ease, either on the hatch, top of wing, or, in the case of low-wingers, the cup on the wing root nestled against the fuselage. See accompanying sketch.

**Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.**

## SHOWCASE '81

from page 87/86

\$4.39; 1/4 x 1/2, 10 pcs. for \$2.50; 3/8 x 1/2, 10 pcs. for \$3.40; 3/8 sq., 10 pcs. for \$3.10; 1/2 x 1, 5 pcs. for \$3.25.

36" Triangles: 1/4 x 1/4, 10 pcs. for \$2.50; 3/8 x 3/8, 10 pcs. for \$2.80; 1/2 x 1/2, 10 pcs. for \$3.20.

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Now, Associated's new #3770 Timer Switch can be used to automatically time your charging time up to 15 minutes when used with either the #3734 4-cell charge cord or the #3736 6-cell charge cord which come in the car kits. Just set the Timer Switch up to 15 minutes, and you can leave and the Timer Switch will shut off the charge automatically at the time you specify, and then will go to automatic trickle charge. Priced at \$19.00, it is available from local hobby stores or direct from Associated Electronics, Inc., 1928 E. Edinger, Santa Ana, California 92705. Phone (714) 547-4986.

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In celebration of their 10th Anniversary year, Robart is offering a Transmitter Frequency Control System to R/C clubs at their cost. The heart of the system is the control card, shown here upon which each flier enters his name and frequency. The cards are then attached to spring-type

clothespins and clipped on the transmitter antenna. Club officers should contact Robart, 310 No. 5th St., St. Charles, Illinois 60174, for complete instructions and price of quantity lots at cost.



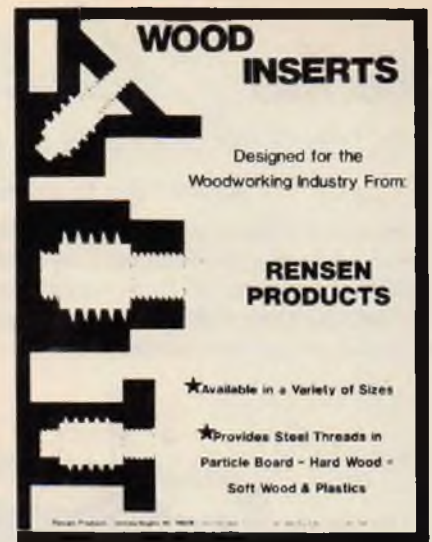
### DU-BRO HEAVY DUTY HINGES

These heavy duty hinges are perfect for 1/4 Scale applications or for any airplane where maximum strength is needed. The dimensions are 3/4" wide x 1 1/8" long x .040 thick and features a removable .047 brass cotter pin. If one wishes, an .047 diameter wire can be used through all the hinges instead of the cotter pins. Either way, your control surfaces can easily be removed if necessary for safe transportation or repairs. These rugged hinges are built to take the heavy loads required by today's bigger and faster airplanes. From Du-Bro Products, Inc., 480 Bonner Road Wauconda, Illinois 60084. Available from normal retail outlets.



### HEAVY DUTY 4-40 BALL LINK

This could be the perfect control linkage for 1/4 Scale airplanes. These hefty links feature a 4-40 threaded steel ball with locknut, and a heavy duty nylon socket molded with a hex shaped end that can easily be adjusted by using a 1/4" end wrench. To complete the set, a brass coupling sleeve is included to accept the 4-40 threaded stud and a length of 3/32" music wire. (Not incl.) These are soldered together to create a strong and simple coupler. These heavy duty ball links can also be used for R/C car steering linkage and airplane strut attachments. From Du-Bro Products, Inc., 480 Bonner Road Wauconda, Illinois 60084.



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### SCALE VIEWS

from page 71/70

make one or more copies of your original drawings. I assume that these would have to be made on tracing paper or other translucent drawing medium. For further information on D.G.A. Products, send them a self-addressed stamped envelope.

### Banner Headline

An effective and crowd pleasing stunt for a scale contest or an air show is towing a banner. Jim Lasik, of the Spirits of America Show Team (Lima, Ohio), has developed some very successful lightweight banners. Made from rip-stop nylon, a banner with 12" high letters and 20' long weighed only 6 ounces compared to 16 ounces for a similar effort made from cotton cloth. The cotton required extra work such as double stitching the edges to keep them from unraveling. Rip-stop nylon will not unravel, so needs only to be cut to shape with scissors. Jim uses 36 pound test braided fishing line for a 25' towline and the top and bottom edges of the sign. A pocket is sewn into the first and last letters to take pieces of fiberglass arrow shaft that serve as spreader bars.

He feels that lifting the banner off the ground on take-off is too hairy (though it has been done), especially on a windy day. His towplane is equipped with a sign bay that is opened by full left rudder movement. It

to page 92



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### SCALE VIEWS

from page 90/70

makes an impressive display as the sign unfurls during a fly-by in front of the crowd of spectators. After the demonstration the sign is released by full right rudder movement and dropped. The secret of his success is the 3/4 oz. rip-stop nylon material. It is used for full size sailboats, hot-air balloons and hang gliders. Available in a rainbow of bright colors. Jim gets it from Jim Grant of Sailrite Enterprises, Inc..

Route 1, Columbia City, Indiana 46725. (219) 244-6715. A catalog is available with a great variety of weights and colors. Seconds at about 1/3 cost of top quality material are available if bought in quantity. The regular material is available in any quantity. Basic material on making and towing signs appeared in the September 1976 issue of Model Aviation in an article by Fran McElwee.

#### Wacko Over Wacos

The list of Waco factory 3-view drawings in the April Scale Views brought cheers from Waco fans. One of those who sent for some was James Austin (Menasha, Wisconsin). When his plans came back

from the Smithsonian, along with them was a new list of Waco drawings with many more added to those noted in the column. Some of them: PBA, UBA, PLA, ULA, KAA, IDA, TBA, SFB Mailplane, ODC, BEC, UEC, S3HD, WHD, RNF, JYM. There are additional drawings covering those in the April list. Particularly interesting are renderings for specialized types such as a list of models on floats, the UBF with an airship landing trapzoc, the QDC equipped as an ambulance with skis, etc. There are so many that we don't have space to list them here. You should be able to get a copy by writing to: Aircraft Drawings, National Air and Space to page 96

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## SCALE VIEWS

from page 92/70

Museum, 3904 Old Silver Hill Road, Suitland, Maryland, 20023. If you can't pry it out of them (they are sometimes far behind with correspondence), send me a self addressed stamped envelope and I'll forward a copy of the list that Jim Austin sent to me. My address is Box 40, Montezuma, Iowa 50171.

In the April Scale Views there were some errors in the chart listing. The Waco HTO was listed as 2710 and should be 3710. The last two entries should be 2581/2582 and price is .30e for both. They come as one sheet. The plans (H size) listed as \$1.05 are now \$1.20 per our latest information from the National Air and Space Museum.

## WACO YMF-3

from page 69

### Radio:

This model, with a Kraft KP5-CS and KP-1411 servos installed per plans, required 4 oz. of nose weight to place C.G. ahead of plan. Flying weight was 7 lb. 4 oz.

### Flying:

Flying the Waco YMF-3 requires little attention once airborne. Ground handling is easy but lots of rudder work is necessary during take-off and landing. Slow or fast flight is positive and predictable with stalls coming straight and mushy. Full aerobatics, tail biting snaps and flat spins are easy with this biplane. Power off sink is rapid so first landing approaches should be close in.

To improve windy flying characteristics, 12 oz. of weight was added. The handsomely performing model now weighs 8 lbs. even. Control surface throws proved right on.

### Conclusion:

The Pica Products Waco YMF-3 Golden Era biplane is a pleasure to build, fly and just look at.

## TOLEDO

from page 68/60

Mullen and the new line of Kraft radios for cars as well as aircraft. The new car/boat unit is very compact and can be purchased for less than \$220 with 3 servos.

A little further down the hall we found Jim Simonian from Semco Mufflers displaying all of his new wares. As fast as a new engine comes out, old Jimmy boy is tooling up to make a muffler or an adapter to fit it. Some new larger styles will be released soon as well as some special application models for restrictive cowls.

The new Kawasaki 3.15 giants from C.B. Associates is claiming 32 pounds of thrust at 6200 rpm's on a 24/8 prop. The sucker weighs almost 8 pounds and spits out 4



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horses. It's a pretty good sized engine.

Something else of pretty good size was the Balsa U.S.A. booth which took up almost one complete aisle. They really went Gung-Ho and brought along almost their entire line of low priced, quality kits. Newest offering is their Fly Baby Biplane for Quadra power. If something smaller is wanted, look into the new Taube, Stand-Off Scale WW I ship, that retails for less than \$25 and flies great on a .35-.60 engine. Only 3 channels are needed for very stable performance.

If something even smaller turns you on, the Spirit of St. Louis from Flyline Models just may be your cup of tea. How they pack in so much detail in an .020 sized exact scale ship is beyond me but they really do. This ship has a 35" span and retails for \$28. The kit includes a full set of decals, Wms. engine cylinders and top quality balsa.

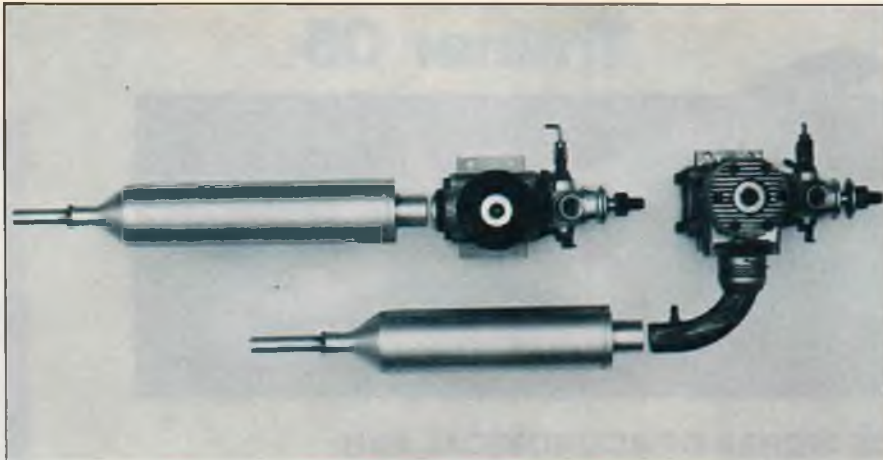
And smaller yet was the two ships shown by John Fotiu from JM Glaseraft. He had a new sport model called the Shark for .010-.020 engines and a Caudron racer for .020-.051 engines. The Caudron really caught my eye and I tried to weasel the prototype out of John but to no avail. There's no prices on these two little ships yet but I'm sure they'll be reasonable. The fiberglass fuselages are so light that they almost float away if you're not careful!

After leaving John's booth I took another look around and realized that I could never get everyone into an article of this size. There was just so much more than I have room to tell you about. Besides, my two typing fingers are starting to ache from all this work.

One thing is for sure, I would be remiss if I didn't mention all the beautiful static models on display throughout the show. However, I must, because I neglected to write down the names of all the builders of all those beautiful models. I did notice Vito Tomeo's Sea Fury, a prize winner, and Eric Meyers' new Polecat, another prize winner, and I couldn't help notice my good old friend, George Rose from Lakhurst, New Jersey, and his World Competition Curtis P6E Hawk. George finally was the recipient of the Best of Show award as well as first place in Precision scale. For his efforts he went home with a new JR Radio and a brand new color TV set. The model and the man both deserved these awards.

Once the awards were given out I had a few minutes to take a quiet tour through the aisles once again to see if I had missed anything. Everyone was breaking down their booths by this time but a few items were still visible. For instance, I caught a glimpse of Bob Holman packing away his new .90 sized plans for the more popular WW II fighters, and there was the Carl Goldberg booth with their 12' high artistic structure completed solely of balsa and Jet glue. I noticed that Bob Davis from Davis Diesel has a head for almost every engine offered in the country and that Dynathrust Props are now offered in even bigger sizes. Ohio Superstar's new Kraft Super Fly is

to page 100



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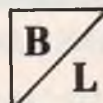


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**TOLEDO 1981**

from page 97/60

amazing at 20 pounds and fully aerobatic and Sonic Systems new large sized retractors are fantastic. I don't see how anyone could break these units if they tried. There was more and more and more. There were gidgets and gadgets, thingamajigs and things, new fangled this and that's, things that make noise when you want them to and things that were so loud that you must wear earmuffs. There were big planes and small planes, big engines and bigger engines, small radios and smaller radios, new gizmos, new ideas and new concepts. And, imagine, all these things under one roof in the city of Toledo, Ohio.

Our congratulations should go to the WEAK Signals for bringing all those people from all those places together for one of the best weekends in R/C history. Everything any of us could ever want was on display that weekend. If it wasn't there, we don't need it. That's why Toledo is called TOLEDO. □

**RADIO SPECTRUM**

from page 59/54

used in high quality stereo equipment in Japan. Ace has been offering these metal gimballs also, but I assume they will switch to the Proline type now.

We tend to overlook the Royal equipment out here on the West Coast but I have received a couple of letters from readers recommending the Royal receivers. One of these days we'll get back to the mail bag and pass on some of the comments.

Circus Hobbies, importers of the JR line of systems, had their booth across the mall from the RCM booth and they too seemed to have a huge crowd around all the time. As I mentioned last month, I think this is the best looking equipment around. I also have run more tests on their coreless motor servos and am impressed enough that I'm about ready to put one in my airplane. Don Weitz has been flying with two servos on ailerons and then been making use of the flaperons which allows flap/elevator coupling like control line while still retaining the normal aileron control. He thinks this has helped many of his maneuvers. Of course you can switch it out when you want. We'll be telling you more about the JR systems in future issues.

Cannon R/C Systems continues to feature the really small stuff. They claim the world's smallest servo which weighs less than half an ounce. Consumer Hobby Corp. (CHC) also had a booth, but I must admit I didn't realize they had their own line of equipment until after the show and I heard

to page 110

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4-40 x 3/4 SOCKET HEAD CAP SCREW	20
4-40 x 1 SOCKET HEAD CAP SCREW	20
6-32 x 1/4 SOCKET HEAD CAP SCREW	15
6-32 x 1/2 SOCKET HEAD CAP SCREW	15
6-32 x 3/4 SOCKET HEAD CAP SCREW	15
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## RADIO SPECTRUM

from page 100/54

some guys talking about them. Litco also continues to produce a very reasonably priced line of airborne equipment in both completed and kit form.

MRC showed quite an array of systems. I was most impressed with the Model 805 transmitter which features open metal gimbals similar to the old Proline and Kraft Signature gimbals. They also showed a special car racing transmitter system which consists of a unit that mounts on your belt

and then a choice of a pistol grip or a twin grip control handle.

As you can see there are still a lot of R/C systems on the market so it will continue to be difficult when it comes time to pick one.

Before we quit I thought I'd mention some of the electronic accessories I saw. RAM which stands for Radio Controlled Models has a device called a battery backer which senses low or intermittent voltage from your primary battery and switches to a back-up battery. This could be a small 100 mah pack or even an alkaline pack. If it switches it sounds an audio alarm to warn you that you are on the back-up pack. We'll run some tests on this unit and report in a future issue. I'm sure this will be a popular

item especially in the big high value Quarter Scale stuff.

Some of RAM's other products include a dual servo setter, which senses loss of signal or low battery power and moves two servos to preselected positions, an audio battery alarm for transmitter or receiver, an audio flight timer that can be set at anything from 37 seconds to 20 minutes, and something they call a Go Box. The Go Box is basically idiot lights to be used instead of a meter. I had quite a discussion about the pro's and con's of a meter vs. an LED on the transmitter with Butch Lanterman of World Engines. No doubt a bright LED will get your attention, especially if it is blinking.

to page 112



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**RADIO SPECTRUM**

from page 110/54

but I'm afraid guys just have to have a meter on their transmitters even if they never look at it.

There were a number of glow plug/starter panels. DA Enterprises has a thing called Glo-Start II. Sonic-Tronics has a Vari-Pulse Power Panel and Northeast Engineering's unit is simply called a Driver Panel. All have meters to monitor the plug current. I still like the CD Enterprises unit which has self-contained batteries and doesn't tie you to your tool box. It has become the standard for competition fliers here on the West Coast.

Another item that is worth mentioning is the MEN C-50/4 automatic R/C system charger. I guess this has been a real hot seller and I'm a little surprised at its success. It makes a couple of claims I don't agree with. It claims to fast charge, but it actually takes about an hour and a half and then it says it makes all other chargers obsolete. Well I submit that there are times when I really want to charge a lot faster and I probably won't have 110 VAC available when that time comes. Therefore, it seems to me a slow charger for charging at home and a real fast charger for charging at the field is a better combination. Any comments?

Well, my Number 2 pencil is getting kind of short (bet you haven't heard that excuse) so I think I'll knock it off for this month. Please note Mr. Kidd that you didn't have to do any schematics this month. □

**SILENT POWER**

from page 53/52

Finally, I'd like to remind you again about the Keystone R/C Club's Electric Fly on Sunday, September 20, 1981 (rain date — Sunday, September 27, 1981) in Hatfield, Pennsylvania. For information,



Keith Shaw's nice looking Astro 020 twin Shrike uses five 1.2 AH Sanyo batteries.

contact Bob Kopski, 25 West End Drive, Lansdale, Pennsylvania 19446.

Until next time, good flying.



Electric Models at Toledo.

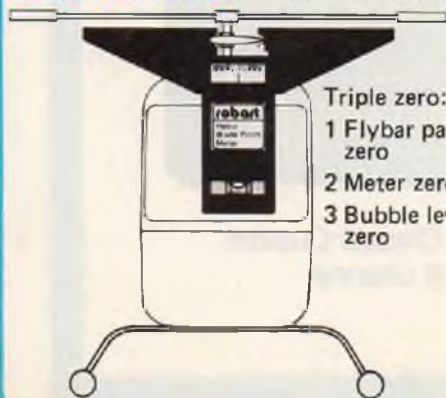


Charlie Parker with 075 powered sport pattern ship at RCM booth.

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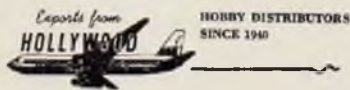
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## PIT STOP

from page 51

Lucido's Super Stock time was good enough for 22nd place in Open Class, meaning he beat 63 Open class cars. That should tell you something.

Sunday was Main Event day. I ended up in the "B" Open Main and continuing servo problems from some new servos I was trying, retired my car early. But Freddie Rapuana from Louisiana, had no problems as he raced to a rather easy win by 3 laps over Johnny Holmes from Texas, in 2nd and Bailey Whitley from Texas, in 3rd.

The Super Stock "A" Main was next and gave the spectators a very close exciting race to watch. Thanks to local TV coverage, there was quite a few spectators on hand. Although John Lucido was in a class by himself in qualifying, Ivan Bourdier from Louisiana, found some new horsepower and Ivan and John raced the whole main together with Ivan winning in 54.32, John right behind in 54.23 and Louie LeBlanc 3rd at 53.23.

The "A" Open Main drivers were presented to the crowd, 5 minutes practice was run and then the cars were lined up for the start. Paul Verger jumped in the lead with Arturo Carbonell right behind. Paul held the lead for 2 laps till his carb came loose, then Art took the lead with Bill Jianas in 2nd and Rick Davis in 3rd.

The first pit stop was at 20 laps with Art still in the lead, but Jianas was now only a couple feet back. Two more laps and Jianas took the lead. In the next few laps Rick Davis passed Art and started closing on Jianas. Then Dana Smeltzer passed Art for 3rd spot. Jianas was leading, but Rick was now right on his tail, looking for a place to pass. Then at 29 laps Rick blew a clutch taking him out.

Jianas now had about a 3rd of a lap lead over Dana. Then Dana hit the boards and Art took over 2nd. Dana caught Art and in a side by side duel, lasting many laps, passed Art again. Meantime, Jianas was slowing down as Dana and Art were gaining on him. With 2 laps to go, Dana was pulling away slowly from Art, then he got stuck in the boards again. Art took over 2nd and was closing on Bill who was slowing down. Curtis Husting was right in front of Bill, unknowingly holding Bill up. Bill finally got by, just as the PA announced, stop your cars. Art had closed to within 10 feet in second and Dana followed in 3rd with Curtis in 4th. A more exciting race you couldn't have asked for.

### The Future of R/C Car Racing

I'd like you to think a little bit about the future of R/C car racing. I'm sure we all want it to continue and grow, as it has done in the past. I know it will, if we all use our heads and do what is right for the R/C car sport as a whole, instead of what might benefit us individually and to heck with anybody else. There will always be those two lines of thoughts and so let me give you an example of how easy and quick it can be to kill a wonderful car hobby.

I'm sure you're all familiar with slot cars. I'm not referring now to the HO size, but to 1/24 scale, which became incredibly popular in the 60's. In the Los Angeles area alone, there were over 60 slot racing centers and growing. Now, there probably isn't 6 left. Why? How could this happen to something so popular?

There are many reasons why it died. Too many people jumped in and opened a slot shop, without even knowing the first thing about slot cars. Half of them were doomed to failure before they opened. But the remaining half should have prospered. Very few prospered for very long. Again — Why?

I'm convinced the major reason 1/24 slot car racing failed — was because of cost. The racers that wanted to win at any cost, had their way, and in a couple years they managed to kill their own sport. How did this happen? It was quite simple. A **very important point** to remember in any sport, is that **the beginners are the most important segment of that sport**, whether it be football, baseball, bowling, slot cars, R/C cars or any other hobby and or sport. It's true, the fans only care to read about the Experts or Pros in any sport and this is natural. The experts or Pros inspire us to do better in our sport and keep our interest going. We definitely need the Experts and Pros. But the beginners are equally as important. Ask yourself — what would happen to baseball if there were no more Little Leaguers to go on to play High School baseball, or College baseball or Minor League baseball, and so there would soon be no Major League baseball! This will never happen — you say, I hope not, but it did happen with slot cars, which was approaching the same popularity as baseball with our younger generation.

And it happened quite simply and quickly. In the beginning, when slot cars started, we were all beginners. The cost of a complete 1/24 scale slot car, with motor, was less than \$10.00 and the best controller was less than \$10.00. Racing was relatively inexpensive. Cars and motors would last for hours. Competition was close and exciting. Racing was growing and new slot racing centers opened up everywhere. It continued to grow for about 5 years. Then the "win at any cost" racers took over. There were no cost restrictions on motors or chassis. As long as the Pro class racers had what they wanted, to heck with the beginners was the prevailing attitude. Wonderful! Chassis cost

to page 118

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### PIT STOP

from page 115/51

\$125.00 each and motors jumped to \$200.00 each and as if that wasn't bad enough, the motors were only lasting one lane change, or 5 minutes, which meant every racer needed 8 motors for a main event, plus additional motors for practice, qualifying and heats! It wouldn't take Einstein to figure out how stupid this whole thing was — and yet it happened! How many new people or beginners do you suppose were entering the slot car hobby when they found out it would only cost them

about \$1,000.00 to be competitive, to begin? Slot car racing died as fast as it began. Now, those same youngsters that used to put their quarters into the timers to run 15 minutes on a slot track, are putting their quarters into Space Invader machines.

Which brings us to our favorite sport — R/C cars. Is it going to die? **No way!** Thank goodness, there is enough of us in R/C cars who remember slot cars and are bound and determined not to let it happen again. There are still racers around who only care for themselves. They know of this super battery pack that is only available to themselves. Or they have access to this incredible electric motor that was designed for NASA and used in the space program that they and only they

can get. When you ask them what are all the other racers supposed to use, their standard answer is "That's their problem." Wonderful! Slot car thinking all over again.

Fortunately, ROAR (Radio Operated Auto Racers), 12008 Welland, Cumberland, Indiana 46229, the USA National Organization for R/C cars, as well as other organizations around the world, have rules limiting the cost of racing, as well as classes guaranteeing everyone equal access to parts.

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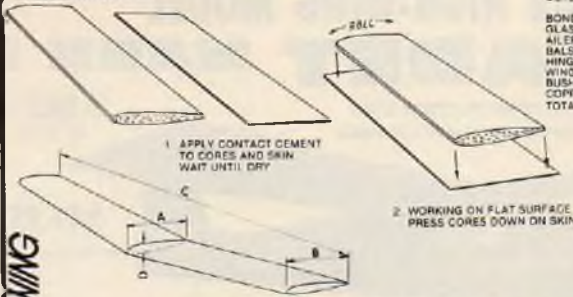
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ABOVE CORES COME WITH CONSTRUCTION PLAN SHOWING HOW SKINS ARE GLUED ON AND ALL METHODS OF INSTALLING LINKAGES, ALIERS, SERVOES, ETC.

addition, in all classes batteries are limited to 1.2 volts and 1.2 amp hours and cost not exceeding \$6.50 per cell. ROAR approved stock motors cannot cost more than \$15.00 and modified motors cannot cost more than \$50.00.

Stock class cars are limited to ROAR stock motors. Chassis can be modified and ball bearings used in chassis, not motor.

Modified class cars can use modified ROAR motors with ball bearings, modified chassis with ball bearings. These are the basic rules. There are other rules defined in the ROAR rules book.

Does ROAR care about beginners? Definitely! As an example, here in Southern California all three classes are run at the

weekly club races. A beginner, who has just bought a new car, runs in the Production class. This class is for beginners only. As soon as you win 4 races you move out of this class into your choice of Stock or Modified class.

All races including qualifying and mains are 8 minutes long. At club races the winners of the Production and Stock classes have their stock motors opened up and de-wound to make sure they're legal. They're then given a new stock motor. At larger Series or Regional races the stock motors are identified and given to the racers by the race directors. This is the fairest method we've found. Every effort is being made to keep the racing costs down and

availability of parts equal to everyone. This puts the emphasis on winning on car preparation and driving skill where it should be.

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to page 122

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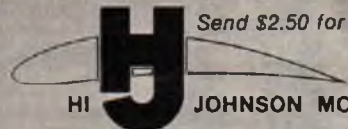
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**Hi Johnson's wife, Midge, wishes to express her appreciation for the kindness and thoughtfulness extended to her and her family by all of Hi's friends.**

**Donations to the Hi Johnson Perpetual Trophy fund (sanctioned by the A.M.A.) may be sent directly to Mrs. Marion Johnson, 11015 Glenoaks Blvd. #18, Pacoima, CA. 91331.**

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## NOVAK ELECTRONICS

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## PIT STOP

from page 119/51

ROAR acted wisely and in time last year to form a new Super Stock Class, with the following basic restrictions. Chassis must be Production chassis not to exceed \$400.00. No independent suspension cars allowed. Engines not including carb or heat sink, cannot cost more than \$140.00. Carb bore cannot be larger than .200. No nitro fuel. Weight 5 1/2 lbs. I predict that it will be this class, that in time, will be the largest 1/8 class. I suppose we need the Open Class of cars, but most racers only have a budget that allows them to run Super Stock. If the sport is to survive, we must have a class of racing that the majority of racers can afford — Super Stock.

## POWER BOATING

from page 50

to rpm requirements we associate with racing engines. These engines are relatively inexpensive and do their intended jobs very well but are not suited to maximum performance operation. In other words, if you try to modify your Enya for higher rpm you will break it. As my grandmother used to say to me, "You can't make a silk purse out of a sow's ear. Sonny!"

If you are interested in high performance I would suggest that you invest in a new racing type ball bearing motor for your boat. I would suggest the Bavarian Precision Products HB .12 Marine engine or a Super Tigre X-11 R/C engine which has a single rear bearing. These motors will develop all the power you will need without modifications.

If my mail is any indication, there is a lot of interest in large boats that are powered by twin engines. The next two letters concern twin powered deep vees. Although I have some experience with a twin .65 powered hydro I am afraid that I don't know of anyone who is currently running model deep vee twins. If there is anyone out there who has had such an experience I would be most interested in hearing from you. Send us some pictures, technical data of your running gear, and any good or bad results that you may have had.

Mr. Power,

*The construction of my 3-D 48-SS with twin modified OPS 65's is in the final stages, but now what props to use? I've talked to a lot of my R/C friends and they recommend about 10 different types. At \$6.00 to \$10.00 a prop this could get quite expensive.*

*I've got to find the right combination before the NAMBA NATS. I would be very thankful for any help or suggestions on this problem.*

Mike Allen  
Amarillo, Texas  
to page 124

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## POWER BOATING

from page 122/50

I'm not surprised that you are getting conflicting advice concerning picking the best props to use on your boat. Since I have never run such a boat I can only give you a place to start on your search for the right prop. I am assuming that you are using a hardware set-up similar to the one used by the manufacturer except that you have twin struts. These two struts should be set at a depth equal to that recommended by 3-D for

their single prop boat. Measure the distance from the bottom of the vee, not the bottom of the hull at each prop location. You should then try propellers that are one size bigger than those recommended for the single screw set-up. For example, if the single screw boat runs best on an Octura 1455 prop, use 1460 props for the first try on your twin boat. I am afraid that you will only find the best set-up by trying several possibilities.

Dear Mr. Power,

*I would be very grateful if you would tell me if the following project is practical.*

*Boat: Deep Vee, along the lines of a Cigarette racer, say 60" long by 20" beam. Less beam if possible.*

*Power: Twin marine .90's.*

*The biggest question is the location at which to place the props. If it will work, could you please give some ballpark figures on distances — prop tip to hull, prop to rudder or transom, and whether to use parallel drive or angle. Thank you very much.*

Respectfully,  
Gordon H. Gosch  
Orlando, Florida

For several years I have been dreaming about the ultimate deep vee design. I think that a twin screw boat with contra-rotating props to eliminate torque is an essential feature on any such project. This

to page 128

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### POWER BOATING

from page 124/50

requirement of opposite rotation leads, however, to considerable difficulties. Very few props are available for right hand rotation so you will have to build propellers using Dee Hughey's Dial-a-Prop system. If you use a single engine, a gear box must be designed to turn two drive shafts. If you use a pair of engines, the left engine has to have its intake timing altered to allow clockwise rotation. In addition, it may be necessary to gear the shafts together to keep both props at

the same speed when the boat is turning. Since most deep vees roll into a turn, the decreased depth of the outside prop may cause over-revving of one engine due to decreased load on the shallow prop. For this reason I suggest that the angle of the vee be kept as shallow as possible. I would use parallel drive struts located at the stern in an outride configuration. A single wedge rudder could be mounted on the hull centerline such that the blade leading edge is just aft of the propeller trailing edges. The strut depth probably should be deep to minimize any prop walking effects of the shallow prop in a turn. I would suggest a depth of 1" to 1 1/4" measured from the bottom of the vee to the centerline of the

prop shaft for your .90 boat.

Your project is a bit on the awesome side of reality. I would suggest that you consider scaling down the engine size to twin .40's and use one of the new commercial .60 to .90 sizes hulls to work out the many, as yet unsolved, problem area details. This will save you lots of time and headaches, not to mention money.

Dear Mr. Power,

As a result of reading your column in RCM, and those of some others, my latest boat is a Dumas Pay-N-Pak. This is a long way from R/C planes going back to 1959.

Pay-N-Pak by Dumas — a helluva lot harder than planes.

to page 130

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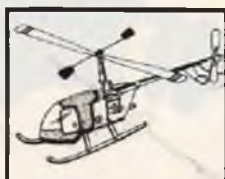
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*Fox .29 engine — new.  
Octura cooling clamp.  
Dumas power train including nylon prop.*

*Du-Bro muffler. Cowl cut out to fit and sealed (?) with GE Black sealant.*

*Hobby Lobby 5 — about eight years old and still great after several crack-ups (all my fault) and checked by Hobby Lobby last spring.*

*Help needed: So far none of the articles I've read cover how the boat should sit in the water:*

- (1) Engine not running.
- (2) Slow moving.
- (3) Medium speed.
- (4) Full bore.

*Also, do the boats always move clockwise? Is an airscoop a good idea to get air to the engine? If so, where, what, and how?*

*As a retiree, the cost of an electric starter, battery, charger, etc., is out of the question. Any way to easily wind a string (cord) starter to the flywheel pulley? Or is there no easy way?*

*Will it be possible for you to write a short article for beginners covering what I've asked and any other problems not covered? Not having run a boat before, there are probably plenty that will come up when the Pay-N-Pak gets wet.*

*I'm not interested in competition (who's to race?) so this is not for full bore speed. Just some fun.*

*Sincerely,  
S.C. Carson*

*Jim Thrope, Pennsylvania*

From the description of your first boat I would guess that you have a very good chance of success. I would, however, like to caution you to a possible problem area. Your choice of an aircraft motor with bushing crankshaft bearings can lead to trouble. Motors of this type are designed to be used with an air propeller that pulls on the crankshaft. In the typical boating application the thrust load is a push. If you use a plain bearing engine in a boat you must be sure that the propeller thrust load is not transmitted to the engine crankshaft. Failure to do this results in lots of friction caused by the thrust washer contacting the front engine housing. After awhile the drive washer and the front housing wear to the point that the clearance between the crankshaft drive pin and the rear case housing decreases and the drive pin proceeds to wear its way through the backplate. All this backplate metal is not healthy for the fits inside your motor. In addition, boats encounter vibratory loads produced by contact with the water at speed. These loads are transmitted to the heavy flywheel and, therefore, to the crankshaft bearings. You will find that bushing crank

bearings quickly wear out causing premature engine failures. I therefore, always recommend that engines with ball bearing supported crankshafts be used in boats.

You don't need to worry about how your boat sits in the water when at rest. You should only make sure that if it is full of water and stopped, that it won't sink! Most boats, when floating, don't sit level. For example, your hydroplanes will probably run better if you add weight inside the front of the left sponson. This weight helps counteract prop torque and helps prevent blow-offs. Some model hydros don't do too well at slow speeds, steering is bad and the nose may even become submerged which turns your hydro into a submarine. You should launch your boat and get on plane as soon as possible. Your boat should be trimmed at high speed. You adjust the planing attitude of the hull by adjusting the prop angle and depth. Increasing the strut depth brings the stern up. Increasing prop angle has the same effect. At maximum speed the hull should ride level with only the sponsons and the prop touching the water.

We race our boats in a clockwise direction because prop torque helps the boat turn in that direction. It is possible to turn left but most hydro designs are set up to turn very well to the right and, therefore, don't turn so well to the left.

Boats do not need airsecoops to help cool the engine. Water cooling is more than adequate. If you have a fully cowled engine you should make sure that the motor doesn't ingest its exhaust gasses and that adequate air can reach the intake. A scoop directing air into the intake is not a good idea. As boat speed picks up, the ram-air effect leans out the carb mixture which makes consistent needle valve settings very difficult to achieve.

The easiest way to start boats is with an electric starter. You can, however, with practice, start your engine with a starting cord. You can make such a cord using 1/4" diameter nylon ski rope about 24" long. Make a handle from a 4" long piece of 3/4" dowel, phenolic, or aluminum round stock. Drill a hole in the middle of the handle and insert the rope after you knot one end. The motor is started by placing the rope under the flywheel in the groove. By flipping your right wrist you can pull the motor through compression while using your left hand to maintain tension on the cord. During this process you will, of course, need someone to hold the boat down on its starting stand. As I remember, this starting process produces great biceps, as well as callouses on your hands.

Well, this will have to do it for this month. Send all your questions, comments and photos to the address at the end of this column. Remember to include a self-addressed, stamped envelope if you want a quicker answer than those published in this column. Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955. (408) 394-1200. □

# NORTH AMERICAN P-51D MUSTANG



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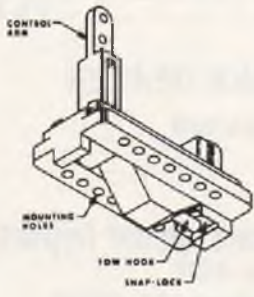
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**FLYING LOWE**

from page 47

you pattern fliers who haven't gone this route — you're missing something. Don't be overly concerned about tuning that pipe — a little experimenting will find the correct setting. To be safe, leave it on the long side and don't go for "all the gusto."

We have been hitting the safety theme a bit and I thought you would be amused by the cartoon sketched by friend Ken Bonnema. The point is, blades can come off of any kind of prop, however, I have had some bad experience with some of the nylon/glass filled variety. Don't use a wood prop that has suspicious grain structure through the hub area on your super snorter Schnuerle .60. Similarly, never put your body in the plane of prop rotation when running the beast at high speeds! Also, it goes without saying, keep your fingers out of the prop — it's hard on props and even harder on your hands!

**Looping maneuvers** — Let's talk a bit about how to perform loops. As with most maneuvers, loops are balanced right in front of you and the judges. Inside loops are entered by calling the maneuver after you are absolutely straight and level, hesitate for at least one second or about 100' and make a definitive pull up right dead center in front of you. Concentrate on keeping the wings level all the way around and the loop shape absolutely round. You will have to play the elevator to keep it round as the speed changes and gravitational effects change. Basically you will need to increase elevator on the bottom and decrease it on top. The size of the loop is a variable as a function of the speed of your ship (and power) — basically, make them not too tight and not horrendously big. Play with the size until they are comfortable and the top of the loop doesn't exceed the 60° frame criteria. Concentrate on keeping the three loops exactly the same size and in the same track. When you exit, make it definitive and exactly like the entry. Concentrate on coming out precisely level and give it the same one second or 100' of exit that you gave the entry — and then call "complete."

If you have no wind, which you never have in a contest, it should be easy. If you have significant head wind or cross wind, it gets to be difficult. With head wind, you will have to loosen up the elevator on the way up and tighten it up on the backside to keep the loop round. With a cross wind, things are much more difficult. The best technique is to apply a little downwind rudder to correct the yaw into the wind and at the same time slightly bank into the wind — this is a "slip" — a common cross wind technique. The faster you fly and loop, the less influential the wind will be. You will simply have to play with your own technique to make the best looking loops. Suffice it to say, that with a cross wind, it is impossible to keep the aircraft heading and

to page 134

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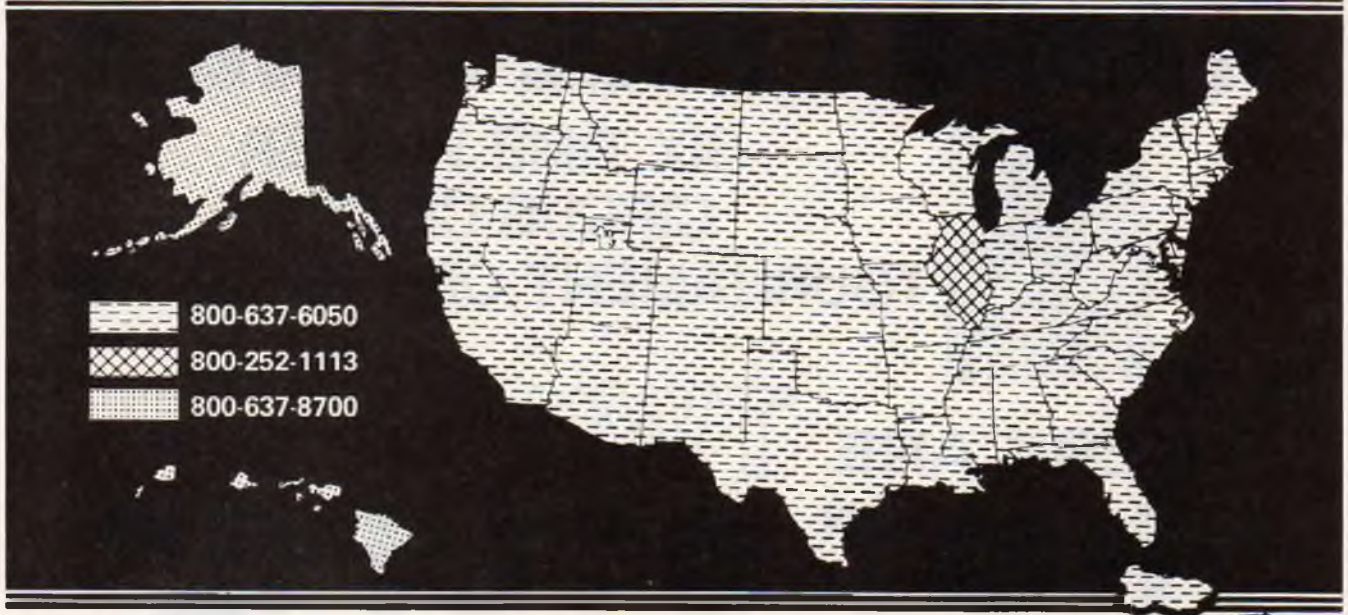
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### FLYING LOWE

from page 132/47

attitude absolutely perfect and stay in the correct ground track without drifting. Work with it to keep the corrections as small and smooth as possible for the best overall appearance. Three loops in a cross wind are far more difficult to do properly than three rolls. Outside loops employ the same basic technique. Call the maneuver: roll inverted; hold for one second or 100'; and pitch up right in front. Similarly, exit level — do not zoom like so many do. Your exit technique is very important since this is the thing freshest in the judge's mind — he will really

zank you if your exit is bad! For both inside and reverse or inverted entry outsides, put the bottom of the loops not more than 100' high. Putting the bottoms excessively low seems to bother a lot of modelers when exiting outsides, since they usually zoom to higher altitude before rolling out. Make your entry and exit roll smooth and not excessively fast — also at the same roll rate. Blending a little rudder as in a slow roll will help the technique also.

Let's now look at the Immelmann turn family. This a neat set of maneuvers since it combines loops with rolls and is very pretty when properly done; first the simple Immelmann. Enter this maneuver from a fairly low altitude since you will exit high. It

is generally desirable to keep the bottoms of maneuvers low when possible since this will allow the whole maneuver to be better presented with less apparent distortion. As with most other maneuvers, enter from absolutely straight and level flight; call maneuver; give it one second or 100'; then pull up directly in front of you. Execute a smooth half inside loop and half roll out on top the instant the ship is level inverted. Do not hesitate to roll on top and do not lead the roll before the ship is level. You should start the roll out precisely over the point directly in front where you entered. The tricky part here is to roll out without allowing it to dip or lose altitude. It will help to use a little top rudder after you start the roll to keep the

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nose up. Also, a lot of horsepower and airspeed helps here. Rolling out left will also probably make the half roll cleaner due to torque assist. After rolling out, give it one second or 100'. exit and call "complete."

The techniques for the double Immelmann and reverse double Immelmann are similar. The first half of the double Immelmann is exactly like the simple Immelmann. After roll out on top, hesitate one second and then execute a half outside loop, rolling out on bottom the instant the ship reaches level flight. Be careful not to zoom up on the bottom as you roll. It's probably best to place the bottom of the double Immelmann a bit higher than the single Immelmann so that you don't get

ground fright on roll out.

You will also have to be careful that the down elevator you are holding for the half outside loop isn't held and gives you a "humpy" roll out. The reverse double Immelmann is very similar to the double Immelmann. It is initiated from the top with a push to a half outside loop followed immediately by a half roll. After a pause of one second, an inside half loop brings you back to the original altitude followed immediately by a half roll to upright flight. The difficult part of these maneuvers is properly blending the half loops and half rolls.

Well, that's enough for this time. We'll continue some of this next time.

## STORMFIGHTER 2

from page 46/40

glass. If you fly recklessly, dogfight, and/or don't like repairs, use heavy glass on the tips.

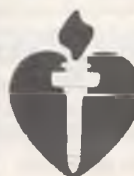
(15) Sand the whole wing careful, putty, sand again, and cover with your favorite heat shrink. Don't hinge the elevons yet.

### Fuselage:

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the mid-section which was formed by strips from the wing cut-off, and the tail.

(16) From the four leftover foam cut-offs from the wing, cut off strips 1" wide from each root section. Glue the matching tops and bottoms together with contact cement.

(17) Cover the center of the wing with Saran Wrap, taping it down at the edges.

(18) Mount the foam sections on the wing with pins.

(19) Rough shape the nose and tail. Then make the tail ring and epoxy it into place.

(20) Using contact cement, glue the nose and tail sections to the middle sections of the fuselage on the wing. The reason I'm suggesting contact cement for this is because if you use epoxy you will have a hard time sanding the joints when shaping the fuselage because they are so much harder than the foam. Strength here is not critical because it will all be glassed later.

(21) Draw middle lines on the top and bottom of fuselage with a felt tip pen. This will be your center guide line for shaping.

(22) Push a piece of paper between the fuselage and the Saran-covered wings to protect them from sanding through. Using 120 grit sandpaper and a block (along with the templates cut from the fuselage outlines if you are not used to freehand shaping). Take your time and shape the fuselage. Don't sand your centerlines away, keep the profile. When you are almost finished, take 220 sandpaper and do the final surfacing without a block, using the paper folded double. Blow off the dust, and you are ready for glassing.

**Glassing:**

A very good way of glassing is described in RCM Dec. '77, in Scott Jenkins' article on his Wasp W21. But if you are interested in my epoxy method, read on:

(23) Cut 6 oz. glass cloth roughly to shape. Place it over the fuselage top, so that it reaches about halfway down the nose and tail. Let it stick over on the Saran covered wings at least 1/2". This will be the base for the wing fairings. Be sure to first remove the paper that protected the wings from the sanding.

(24) Mix enough epoxy to do the fuselage top, and brush it over the cloth. For this I use an epoxy that is liquid enough for brushing: Polycon 11 along with Polycon 300, mixed in equal parts. It is available from: Yale Enterprises, 4031 Pacific Highway, San Diego, California 92110. If you can't get this one, get your yellow pages and call up some adhesive dealers and, if you're still stuck, use Hobbypoxy or a similar slow epoxy warmed in hot water. After brushing the stuff on, roll thick double toilet paper over it to soak up the excess and to press the glass to the foam. Watch for the areas that are lifting. Push them down with the brush you are using, and blot the excess off again. When this coat has cured, flip the whole thing over and do the same to the underside in the same manner.

(25) Sand the entire fuselage with 80 grit. Now glass the entire fuselage once, as outlined in Step 24.

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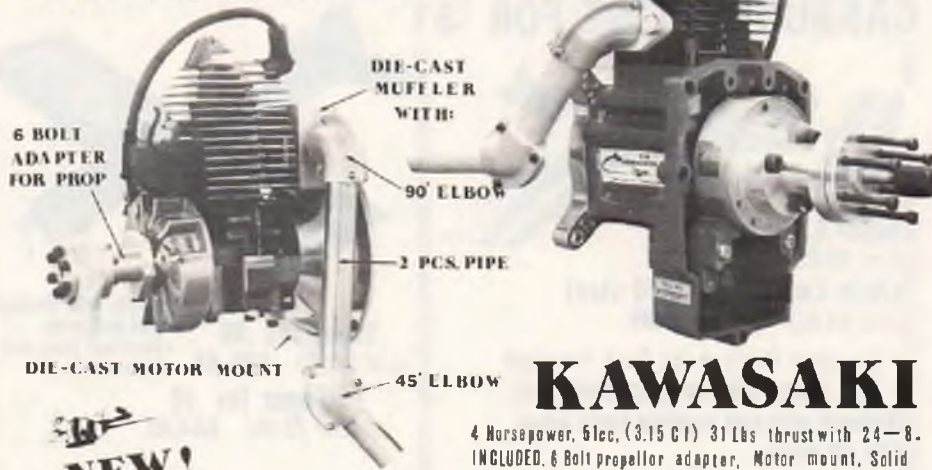
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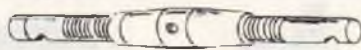
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### STORMFIGHTER 2

from page 136/40

(26) Brush on another coat of epoxy without glass. If you want to, you can tint this coat with epoxy colorants. The color will show imperfections better.

(27) Repair any goofs with resin mixed with micro-balloons in a putty-like consistency. Put on one final coat of resin. It should now be extremely smooth. The fuselage will weigh about 10 oz. with the rudder installed and painted, which is kind of heavy — but then we're not building a floater either.

(28) Separate the fuselage from the wing. Make cuts according to the plan, and be careful. Trim the fairing with a razor saw and sand the edge round.

(29) Look at the pictures and the plan showing the two fuselage joints, and make them. The bottom of the fuselage is attached to the wing with a screw. There are pieces of wood embedded in the fuselage to receive the screw. In the pieces of wood are Tee-nuts.

Now is the time to decide about the rudder. If you have a third channel it will be worthwhile to have rudder action. Look at the pictures of the rudder linkage and hinge system. I used aluminum tubes, piano wire, and a nose wheel steering arm. But if this is too much, just use an external control horn and a MonoKote hinge. Note how the rudder comes apart too.

(30) Put wing and fuselage together. Sand where the vertical fin will be. Mark the position. Butt glue this fin to the fuselage with epoxy. When this has cured add a generous fairing of resin and micro-balloons. This will give that added strength for inverted landings!

(31) Mask off the rudder, and you are ready to paint the fuselage. I used Ditzler acrylic lacquer, as always. The canopy was airbrushed in. Everything was then top coated with clear acrylic lacquer for looks and easy scratch repair.

(32) All you have to do is to hinge the elevons with MonoKote, or whatever you like. Seal the hinge gaps with thin plastic sheet strips (I use mylar for that). See Roger Sanders' article on his Windfreak RCM November '78. If your servos are a little weak, skip it.

(33) Cut out the radio and battery compartments. Epoxy the mounting board into the radio compartment opposite the antenna entrance. Cut holes for the pushrods where they should exit the sheeting. Poke a hot wire through, and hope it'll exit into the radio compartment at the right angle. You can use a long ruler to guide your angle. Put the NyRods in and secure with epoxy.

(34) Install the mixer. If you prefer commercial units, go ahead. Mine has extremely little play, and it won't cut down on travel. Make it from scrap as shown in the photos. A little oil in the runners will

keep it in shape.

(35) Tape down the antenna where it exits the wing tip, or use heat shrink to iron it down. This will look neat and it's functional. The inertia of landings will otherwise push it into the radio compartment, messing things up.

#### Trimming and Flying:

The Center of Gravity is most important in a delta. If it is off just slightly, you'll think you have an absolute turkey. So put it exactly where it is marked on the plan. Later on you can fool around with it a bit to suit your style. Also, no two wings are built alike, so yours may even require a slightly moved C.G. — but be careful. If you move the C.G. too far out front, your SF2 could enter a terminal dive; the control surfaces can't handle the forward momentum of the nose heavy airplane. This seems to be a peculiarity of deltas and flying wings. Move the C.G. too far back, and the ship starts to tumble about like a leaf in the wind. To avoid such unpleasant surprises move the C.G. a little bit at a time. The ideal C.G. position is reached when SF2 recovers slowly on its own from a shallow dive.

Check also for the proper up-incidence of the elevons. . .

Select a day when your slope is at its best. Wind speed about 20 mph or, better still, 25, to be absolutely on the safe side. When SF2 evolved I realized that it would be hard to launch with one hand, especially in strong wind. But I wanted a clean ship without a fat handle bar belly. So I put a neck strap on my transmitter. One hand holds the rear end of the fuselage, while the other one steadies everything by holding the wing at the leading edges. Then push off, following through with the hand at the rear. For the first flight it would be best to have someone to launch it for you. When you are ready, have him give it a good horizontal shove right into the wind. Let it pick up speed, and then go ahead with the trimming. On a new ship I always have excessive travel on the controls just in case.

Having enough airspeed is vital. SF2 can fly slow, but since the stall commences at such a slow rate, and is hard to detect, it'll just keep flying and suddenly you may find no control response. All you can do then is to give full down, and hope you have some airspace below to pick up speed. Once you become familiar, you'll be using this delta stall behavior to your advantage for pinpoint landing approaches and slow fly-bys.

So, keep up your airspeed! And good luck to you as you enter the world of deltas. □

#### SUNDAY FLIER

from page 39/38

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When the flag is dropped at the far end of the course by the assigned flagman, the racing pilot's pitman says "Turn." The plane turns and comes back. At the near end, most pilots can judge their own speed and turn without help. If a "cut" occurs at either end, the racer has to fly an extra lap. Seldom can that happen and still have the racer win, so it's a good idea to let your caller, or pitman, tell you when to turn.

The race consists of a specified number of laps, which will depend on the conditions. This year each race was eight laps, or sixteen lengths. And the race is completed at the end of the last lap when the racer turns and goes back in the direction in which the race started. Many of the races were won on that last turn, they were so close.

Naturally, when racers are flying at high speed on a closed course, which is a figure eight, mid-air collisions will occur. Several happened this year, but strangely enough they were "bunched." Mick Carlin was nicked by Rich Spicer in one race, and part of his ailerons torn away, then, on the next lap, they collided solidly on a turn and both hit the beach. Too bad; it eliminated Rich's Super Nova, and he had to go to his backup. Even so, before that happened he achieved the fastest time in a prior race to get the trophy. Then his backup crashed!

Jerry Krainock's 10' speedster was doing great until he overbanked on a turn and hit the hill. Then, when he went to his backup plane, he got into a race with me (before that I had already lost my canard in a crash and was flying my old "Superdude") and I flew right through his backup job. That was the fifth midair for the superdude, but it survived once again. Nothing like a hard spruce leading edge reinforced by fiberglass.

There were other unusual incidents, semi-tragic in some cases, and comical in others. In the latter category, Bud McCrary offered to launch my canard racer, the "FasDassel" (pronounce it any way you like) in the first race. He gave it a mighty heave, and, in doing so, his hat flew off and lodged securely on the leading edge of the main wing of my plane, which was at the rear of the fuselage, since it is a canard. The plane wobbled around due to the asymmetrical drag and I finally got it on the ground safely. Everybody was looking and laughing. There was still time for a relaunch, and I yelled, "Get it and throw it in the air!" Bud did, and I completed the race. Some of the less disrespectful guys, noting that I wound up in last place, opined, "Should have left the hat on the wing!"

In another race, a short time later, Peter Hatchett, from England, was tooling along at high speed and a shot rang out. His airplane went out of control and crashed. At first we thought there was a man on the beach, shooting at the planes, but that did not turn out to be the case. Instead, Peter lost command of his plane for some unexplained reason, and the "Shot" turned out to be some guys aiming "bottle rockets" at the planes. Bob DeMattei, the Contest Manager, went down to the beach and

caught them in the act. Bob is about 6' 3" and weighs around 250 pounds. Gently, but firmly, he convinced them to knock it off, or ---. And they did.

After seven rounds of intensive racing, Gerry Arana and Gary Ittner were tied for first place. Gerry had won all seven of his races, and Gary had won six and placed third in the other, but we were allowed to throw out our worst race, so Gerry and Gary had six official first places. In the flyoff, the wind was perfect, and Gerry Arana loaded up his "Grand Boss" to the limit, and easily won. Gerry now has two legs on permanent possession of the RCM Trophy.

The official results are listed below, but in my book, everyone who competed was a winner --- even I was. Case in point; Gerry Arana was my pitman in the three races I won. When the last race came along, I went to him and said, "Hey Gerry, how about pitting me?"

"Can't do it. I'm racing against you."

"Nuts!" I exclaimed. "How will I know where the best lift is to get the greatest speed?"

"Easy," said Gerry. "Just follow me!" And that's the best I could do.

Along with all the others. To which we all chorus. "Wait till next year!"

Plan to come, if you can. The RCM Slope Races are, to me at least, the most exciting event there is in R/C racing.

Once you've seen them, I'll bet you'll agree.

#### RCM 1981 SLOPE SOARING TROPHY RACES RESULTS

- 1st Place — Gerry Arana\*
  - 2nd Place — Gary Ittner\*
  - 3rd Place — Roger Sanders
  - 4th Place — Paul Gerrard (Eng.)
  - 5th Place — Larry Pettyjohn
  - 6th Place — Bill Robinson
  - 7th Place — Joe Wurtz, Dave Katagiri, Richard Gerrard (tie)
  - 8th Place — Ken Willard, Ed Holder (tie)
  - 9th Place — Lewis Clark, Jim Rengert (tie)
  - 10th Place — Casey Goeller, Karl Chulick, Peter Cyr (tie)
  - 11th Place — Greg Smith
  - 12th Place — Joe Newland
  - 13th Place — Rich Spicer, Don Zacharie (tie)
  - 14th Place — Gerry Wolfram
  - 15th Place — Peter Hatchett, Jerry Krainock, Mick Carlin, Alex Bower (tie)
  - 16th Place — Blair White
  - 17th Place — Bill Drum
  - 18th Place — Joe Dial
- \* Fly off for 1st Place  
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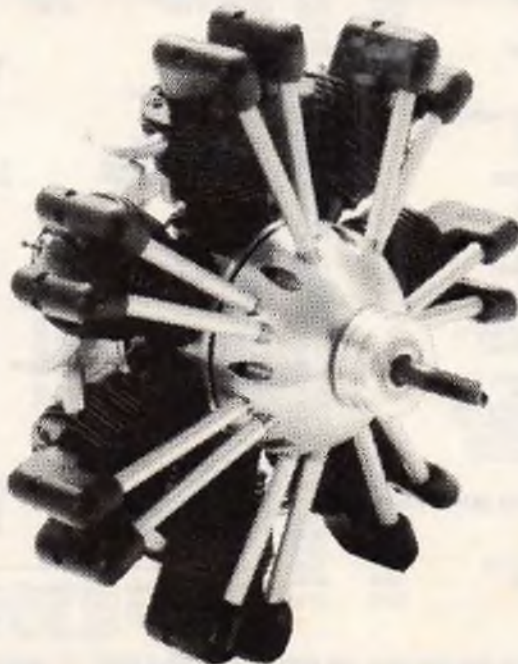
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HERE'S HOW

from page 37

door is up.

As the landing gear begins to retract, tension is taken off the nylon string thereby allowing the spring to act on the bar. As the spring pulls on the bar, it opens the wheel door allowing the wheel to pass through. Once past the door, the wheel tire hits the bumper wire forcing the bar up, loading the spring, thus closing the wheel door and locking it in the up position. In actual sequence, everything must work to perfection and this is where the tinkering comes in. After all, tinkering is part of our hobby and, believe it or not, some of us really enjoy it.

If you want to add more realism to your P-51, why not try out Octavio's idea. You are bound to hear some favorable comments from the guys on the flight line when you flip the retract switch.

GIVE IT A WHIRL

from page 36

spin he had ever seen with a helicopter. "Did you really mean to do it?" (Inverted spin — is that what it was?) "Well, John," I said. "... no, but even though I'm not sure how to start one, I think I now know how to recover from one."

The word soon got around and despite my protests every year thereafter the commentator would state over the public address: "Now here's John Gorham who will again perform his famous inverted spin." What would you do? Well, up to now it's worked out okay each time except the time when I decided not to fly for one particular session and I left the flying to some of my team. One of them loyally decided that he **must** do the inverted spin in my absence since it was expected of us. So he did it — the helicopter was duly put on its back and it spun and spun right down to a bank of ivy near the flier's feet. Some superb throttle jiggling at the last minute had saved the machine. Would you believe — it was absolutely undamaged!

How about the time when Bob Pinto and Johnny Simone Jr. were shooting autorotation after autorotation landings on a small island out in the lagoon. And what about the time when Larry Jolly flew his helicopter from Catalina Island (30 miles offshore) to land on the terrace of the "MAC's" show just as it was about to open. And the time when 'Big Ernie' Huber

to page 146

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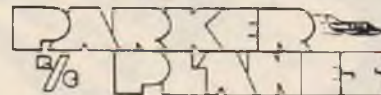


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## GIVE IT A WHIRL

from page 144/36

flew his Jet Ranger inverted in several superb demonstrations finally hovering inverted right at water level — actually a little below because the tail rotor blades hit the water with the result that the Ranger slowly sank below the salty waters. Boats and 'Big Ernie' duly rescued it, of course. 'Big Ernie' is also famous for a previous year when his Ranger went in the water during practice flying. Ernie quickly stripped to his pants and dived in and quickly rescued his chopper.

Most years a favorite trick for the fliers was to fly down to water level and just 'kiss' the skids on the water. Landing on a 2' square raft of polystyrene foam was also a favorite spectator item one year (especially

when one flier only landed one skid on the raft and the rest in the water). Another year I sent two helicopters to the bottom — once through radio failure, the other time the tail rotor blades just touched the water and tipped the machine over. Each time a faithful young helper, Mike Cummings, waded in up to his chest and rescued the choppers.

Now we come to the bridge! The bridge joined the paved area to an earth "island" in the lagoon. It spanned 15' or so, was arched and had its highest point about 6' above water level. It became a matter of pride to fly under (and, hopefully, through) the bridge. Most times it worked fine. One year, however, a young flier, who shall be nameless, flew under the bridge okay but the helicopter didn't come out the other side. He also dived in the water to retrieve his chopper (remember the water is salty — do you know what salt does to aluminum?).

Now to the 1981 show. The fliers this

year were probably the most scintillating group to ever put on demos at one place. Johnny Simone Jr., Kim Tucker (John Tucker's son), Mike Mas, Larry Jolly, Hubert Bitner, young Curtis Croker, Richard Keppel and Robert Gorham (four national champs among this lot!). Then there was Dave Nieman visiting from England who did a great job flying the scale Hirobos at each session, and Dieter Schluter who only watched the flying this year. Oh, I flew, too. Only one difference this year — **no water!** The lagoon had been drained and the bottom was a 'sea' of mud! Some building project apparently. Didn't stop us though. We did all the same things and more. This is one of the times when manufacturers all work hard together to give the public a great flying show: "Crickets," Mantis's, Horizons, Hirobos, Heli-Boys and Rangers. There was also a special flight demo by Mike Mas. We had some group "Cricket" flying by Richard

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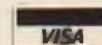


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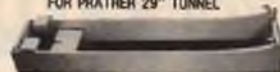
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Keppel and the two Gorhams (three R/C helis in the air at the same time).

Ah, now the bridge. Well, it was easier this year because the water (mud) level was lower. So we all duly flew through — even my scale Hirobo 'Iroquois' when through. Dave promised it would be okay! It was interestingly enough this year there was very little "spectacular" flying — just lots of very professional smooth flight demos by top fliers. No inverted flight, no inverted spins, even no autorotations — well, well! The crowd seemed to enjoy it all immensely just the same. Can't wait 'till next year — the apartment buildings will be built by then and maybe we can rent one and all of us fly in through one window and out the other side!

Talking of shows, I attended the Japanese Hobby Show in Osaka again this year. This trade show takes place in the International Hotel in Osaka. The exhibitor's booths are situated on three floors of the building —

each floor has about 40 to 50 booths. As you would expect, R/C helis are very popular in Japan. Manufacturers such as Hirobo, KKK and Kalt all have very exotic booths and many beautiful finished models. Not much new this year though — yes, the Japanese can and do fly inverted. Otherwise, from what I have seen, their flying is much more sedate and close-in than ours. I did not see any fliers who had such a wide repertoire of flying maneuvers as many of our top fliers. After the show I visited the Hirobo plant to discuss some new future business arrangements. This year was very different, however, for two reasons. First my visit coincided with an R/C helicopter flying meet sponsored by Hirobo. Sensui, who was national helicopter champion, drove in from Tokyo, and Dave Nieman and his wife Brenda from London, England, were there. We had a fantastic day of flying in a very informal fashion. Yes we had a few crashes but mostly a lot of fun. I took along a

"Cricket" which was flown by both Japanese and British fliers (recognize it in the foreground?). Then we all swapped models and flew as best we could since the Japanese fly "Mode I." Later, we were all taken to a Japanese "retreat" hotel for our last night — no phones or noise — just a lot of peace and tranquility. We should have some of these over here.

Next I traveled in the "Bullet" train to Tokyo, mostly at about 160 mph — took five hours to do about 400 miles. I visited the Futaba plant in Tokyo as a guest of our own York Daimon of 'Futaba U.S.A.' Bumped into several well-known U.S. and German modelers when at Futaba. Seems like at this time of year everyone is traveling somewhere. Finally, I flew back to the U.S.A. to participate in the "MAC's" show. All of this activity as a result of the R/C helicopter movement — what a life.

Next month we'll get back to some more technical "stuff" for the beginner. □

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## SOARING

from page 35/34

landing well until I got rid of spoilers! I found that I was attending to the spoilers with such concentration that I was losing heading accuracy. Dave Wright, a member of the 1981 Canadian Soaring Team, writing in Model Aviation Canada, November 1980, hit the nail on the head.

"Now here's the biggest 'secret' or trick to spot landing. This is something that all the really excellent spot landing 'pros' either know because they've studied it and reasoned it out, or because they just do it instinctively. Let's assume you've flown the rectangular circuit described above and are all set up on the final approach with 15 seconds left. At this point it is absolutely critical that your aircraft is headed exactly into the wind. The easiest way to do this is for you to stand directly upwind of the spot so that you, the wind, the spot, and your plane are all in one straight line. The secret: The most critical part of your landing is your plane's track across the ground. By this I mean its 'sideways' displacement from your intended line to the spot. This track across the ground is far more important than worrying about your 'fore-and-aft' distance from the spot. If you've been having trouble landing, you probably won't believe this until you get out and try it. Once you're out practicing seriously, you'll discover that every time you have your final track lined up perfectly, your distance won't be far off. Watch all the landings carefully at the next contest you attend. You'll see that 90% of the landings are botched because the guy on the sticks tries to make a last minute correction for a sideways (i.e., Track) displacement from the spot, and in so doing stalls the plane, falls short, cartwheels it, etc.

Take an hour one evening and, using a short hi-start, practice 20 landings, doing nothing but concentrating on your track across the ground. Don't give up after 3 or 4 or even 6 or 7 failures. Try it at least 20 times. Within a few evenings of doing this, those ten Level II landings in a row will be a snap. As a last note on landings, if you want to do yourself a monumental favor, either dump your polyhedral/rudder ship for one with a shallow V-dihedral and ailerons, or cut the wing at the polyhedral joint, making it into a V-dihedral plane and then add ailerons. The difference this makes to your ability to Track down the spot in gusty, windy or turbulent conditions can only be described as dramatic. The polyhedral airplane has such an incredibly large amount of side area (hold your plane at right angles and look at it from beyond one wing tip) presented to the wind, that any minor gust, veer, turbulence, etc., will have it drifting off to the side. When that happens you're forced into fighting it back toward the spot from a sideways displacement and that causes you to blow your distance."

to page 150

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### SOARING

from page 148/34

Well things were quite all right until he said to dump my polyhedral/rudder ship! Dump my Paragon? — Never — I'll just quit landing in the wind!

Howzat!

### SOPWITH PUP

from page 33/24

end of the hatch back to the stabilizer which is also olive drab. The sides of the body and

underneath portion of the wings, body and stabilizer are cream. To get the right shade, I mixed yellow and orange in very small amounts to flat white. By the way, all colors are flat. If you can't find flat colors, flatten them yourself by adding a little talcum powder. It won't change the color, but it will flatten the finish. The sides of the front part of the rudder are also cream. Blue, red, and white stripes are painted to the top and bottom of the elevator as well as to the movable part of the rudder. The wheels are painted red, white and blue as can be seen from the photos. When the 17" diameter roundels are painted on, it makes for a classical looking Pup. All wood is stained a light fruitwood like the Pup of the

Shuttleworth collection, and was then clear doped. Letters on the rudder and body are the rub-on type and a flat lacquer spray to set them. Just like on the full scale Pup, the roundels are hand painted.

#### Controls:

I ran the control cables (45 lb. test steelon leader) from the rudder and elevator to two 3" bellcranks which pivot on a 1/8" wire axle. The axle runs from side to side and is positioned in the area behind and below the pilot's seat. That way, you can install a functional control stick if you desire. Use crimp sleeves to fasten the cables to the horns and bellcrank. Tackle shops have what you need. The cables do not have to be

to page 166

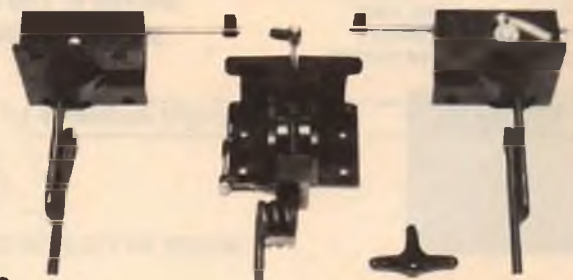
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I called aloud.

At full throttle I moved the aileron stick about a quarter of an inch to the left. As the wings began to roll I began to feed in a little right rudder followed by about a quarter of an inch of down elevator. When the wings became vertical I started to ease off the right rudder but continued to apply more down elevator. The rudder stick passed from right to left as the plane reached inverted flight. Continuing to roll, I slowly released the down elevator and applied more left rudder. The elevator reached neutral as the wings became vertical again: the nose being held up by the rudder alone.

At last the plane assumed upright flight, and I released the aileron control. In joy of what I had just done I shouted, "maneuver complete," and laughed aloud. What a thrill to fly such a splendid airplane!

I imagined that I was flying in the FAI Scale Internats. I called double stall turns, and a touch and go, and did the required figure eight. The plane responded to my commands with a smoothness and a steady stability that was unlike any airplane I had ever flown. My final maneuver was a split-S and landing --- commonplace during the Battle of Britain. I explained to the judges.

The beautiful Hurricane streaked before me in a high speed pass, then pulled up at a forty-five degree angle and rolled inverted. The nose dropped as I retarded the throttle and the plane arched over as I pulled back on the elevator and snapped the retract switch. By the time the plane leveled out I could see that both landing gear legs were down. I began the flair at about twenty feet of altitude. She slowed and settled in for a soft three-point landing.

I felt exhilarated yet relaxed. I enjoyed the moment of a feeling of accomplishment. Putting the transmitter down where I had found it, I walked back to the car. Glancing back at the Hurricane as I got into the car, I paused.

It was resting there where I had found it, engine ticking over in a low idle. What an airplane! What a flight. I thought as I got into the car and drove home.

Once again I experienced that relaxed contentment I had known so many times before when I used to fly R/C. The satisfaction that comes from a good flight is a joy I had not experienced in a long time. I felt so contented that when I reached home I got into bed and I immediately fell asleep.

The next morning my wife asked me if I had slept well.

"Oh yes," I replied. "I feel very refreshed."

"I thought you must have slept soundly by the way you were snoring," she said. "And you said the funniest thing when I rolled you over."

"You rolled me over so I would stop snoring?" I asked. "What did I say?"

"You almost shouted at me. You said in a very loud voice, "Maneuver complete!"



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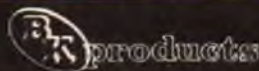
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### SOPWITH PUP

from page 150/24

drum tight; in fact, they are better with a little slack. This is not a pattern ship but a lazy, Sunday flyer that is slow to respond and gentle.

#### Flying:

The Pup is much like any other big biplane in that it is a rudder machine. You must coordinate ailerons and rudder to slowly turn this big bird --- but what a turn! It is every bit as majestic in flight as it is on the ground. What a crowd pleaser! Even though construction is long and somewhat complex, flying the Pup is a breeze. It was described as one of the best, most classical planes of its period. I can agree with that completely. When you fly this model, all other activity seems to cease. It casts a spell

out on the flight line. I would estimate that it takes-off at 25 mph, flies at 20 and lands as fast. When you see a giant like this nearly hovering in a breeze, you just stand in awe. I've been tempted to fly it with my Sopwith Pup (see the photo) but I'm afraid the SPCA would press charges for cruelty to Sopwith Pups! □

### BIG IS BEAUTIFUL

from page 23/22

instruction booklet is really well-done with over 50 good photographs, well-reproduced to help you in construction. The model I saw is fitted with an Easteraft Lectra-Start and there is plenty of room for it. A good looking and well-designed kit from a new outfit. I hope they have a few more up their sleeves as they will be good ones if the Voyager is a sample of their work.

The names Tony Lombardo, Dom Palumbo and Al Wolter are no strangers to aeromodeling and this triumvirate have come on the market with a lovely little Monocoupe 90A in Quarter Scale. Span is 90" and the design is specified to fly on a .60 although the cowl has been deepened to take a .90 if you wish. At \$99.95 from Executive Design Corp. 1167-B New Highway, North Amityville, New York 11720, this little sweetheart will be anything but an Amityville horror. The price is sure right and the model I saw at Toledo looked very good indeed. It had obviously been flown a good deal and I suspect it's as much of a fun machine as the trio named above suggest.

Midwest Products are into the big market place with a couple of offerings which many of you will find interesting. First, they are offering really superb spruce sticks in aircraft grade spruce and at 72" lengths which is cut to their Micro-Cut finish. Sizes

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range from 1/8" x 1/2" right up to 3/8" x 1 1/2" and prices from \$1.20 to \$4.30. This is really nice stuff and not much more weight than balsa for a very significant increase in strength. Those of you who are regular readers know that I have long advocated its use in the construction of large models and now we have a convenient source for this valuable material.

For example, if you are building one of Bud Nosen's Citabrias, it will make a much stronger model if you change all the main longerons in the fuselage to spruce in the same size as the balsa originally supplied in the kit. There is a small cost involved to do this, but you will save the balsa, and the cost will not be too great for the very significant increase in strength in the fuselage.

Midwest's second offering is Pappy De Bolt's Quarter Scale Wittman's Tailwind. I had heard that Pappy was in the process of building his first Quarter Scale model and had a letter from him not too long ago

describing the model. I had the opportunity to talk to him about it in Toledo and to see the prototype.

The original Tailwind was noted for its simplicity of construction and the model emulates this simplicity. The original design accomplished its performance by good design, the W-10 model of the original includes an aerodynamically improved wing and this has been carried through to the model. Construction is straightforward and should not be a problem for anyone with kit building experience. The model is very strong, due to its rugged construction and uses a standard R/C package for control and can be transported in a compact car. Wings, tail, and landing gear can easily be removed for storage or transport. While not a particularly "pretty" model, the Tailwind looks like a good introduction to Quarter Scale and Midwest's reputation for quality should assure a sound performer. (P.O. Box 564, Hobart, Indiana 46342.)

A new company has appeared, small, but with some good ideas. They call themselves D.G.A. Designs and have adopted the motto "Darned Good Aeroplanes." I'm sure Benny Howard would have been upset at the softening of his original interpretation of D.G.A. which he used to describe his designs.

The new D.G.A. will be showing the first of their designs at Rhinebeck this summer which will be a Davis D-1-K. The model will use a Quadra for power and will span 90.5". Following behind the Davis will be a Model K Kinner Sportster and a Stitts Playboy SA3A. The Kinner will span 117" and the Playboy 88".

D.G.A. will also offer a plans copying service and will be stocking some "custom" supplies although these were not delineated in the material I received from them. If you are interested, drop them an SASE for more information. (135 East Main St., Phelps, New York 14532.)

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Hobby Shack had their new kits on display at Toledo. Their Decathlon was the one used in their recent ads in the magazines and it is very nice indeed. It appears to have been flown since the ad pictures were taken as it is no longer quite as pristine as the photographs show it. Designed to be flown on a .90, this is a most complete kit, even including the seats for the cabin. At around 13 pounds, it should perform well.

The Pilot kit for the Tiger Moth was also shown, built-up but uncovered, and it, too, looks good. The material appears to be of excellent quality and the construction is good. Again, this one doesn't need a Quadra.

I managed to buy one of Don's Custom Models' Piper Tomahawk kits at Toledo and have been after it since I saw the bird fly last October at Las Vegas. It is both a good looking model and a fine performer. The glass work is excellent and the material in the built-up wing is great stuff. Fine looking, great flying model. I am looking forward to getting at the building of it.

Balsa USA's new offering was on display at Toledo, a 1/3 Scale Fly Baby and it looks great. They did a nice job on their booth at Toledo by building a rustic shed in the arena. Once they had placed their three biggies along the roof line, it made a pretty striking display. The Cub, the huge Pup and the new Baby on the block are pretty impressive birds and, while I have not had time since returning from Toledo to look over all the material in the compact kit box, it looks pretty great.

Accessories also received a good deal of attention at Toledo this year. In addition to the Giezendanner Retracts which are in the works, I saw two other samples of retractable gear which are showing promise of being what we have long needed, a gear with some sort of oleo type mechanism to absorb some of the landing shock when we don't make real "greaser" landings.

Aneco Manufacturing Company (the same Aneco that used to produce the servo by the same name) has a good looking gear and P-51 style wheels which are very compact and light and the machine work has been done with skill. The mechanism has been designed to be very simple. The gear was designed to be used with the Nosen P-51 and P-47 but would fit into any low winged airplane so long as you are willing to do a little redesign work to accommodate them. These are air operated and the cycle is typically faster than prototypical retraction cycles. Restrictors can be used in the system to slow it down a bit. The weight of a two gear system (less wheels) is 2 1/4 pounds and the price is to be \$159.00 for a set of two and the P-51 wheels are \$29.95 per pair extra; scheduled to be available July this year.

The nicest feature of the gear is that the leg is spring loaded and has a working scissors that looks great. Springs can be changed to accommodate different weights of models, which is a good idea and they look very nice indeed. (P.O. Box 23089, Minneapolis, Minnesota 55423.)

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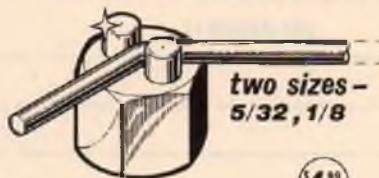
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## BIG IS BEAUTIFUL

from page 169/22

Cliff Bennett of B & B Specialties showed his line of accessories for the Quadra and other large engines. I liked his Quadra muffler so much that I bought one on the spot. After getting back and looking at the motor mount he makes, I am wishing I had done the same for the mount. Bill also makes prop adapters (6 bolt), throttle linkages, and ball links: all of which are good looking products. His good looking muffler is also available for the Kawasaki, Kioritz, Roper, and Hustler engines. Bill also does the machining to the Kawasaki engine that lightens it a bit and makes it look a great deal better (reported here earlier). Other accessories for the Hustler and Kawasaki are available. For more details, write Cliff at 14234 Cleveland Rd., Granger, Indiana 46530.

Those of you who have not yet found larger batteries for your large model's receivers now have a source for both 1200 mah and 2000 mah batteries at Great Lakes Radio Control, Inc. (18701 Southampton, Livonia, Michigan 48152). The 1200 mah pack sells at \$22.95 and the 2000 mah at \$41.95. The 1200 pack is lots of protection and the 2000 is added insurance. As mentioned here in the past, the standard 450 or 500 mah pack is minimal for a large model. I have found that my packs in that size are getting pretty slim after a couple of flights and to fly a third one on them is all but suicidal. If you haven't gone to larger packs, here's your chance to do so and highly recommended by yours truly. The added loads of our larger control surfaces eat batteries alive and if you are still flying with the small packs standard with most of our radios, you are flying on borrowed time!

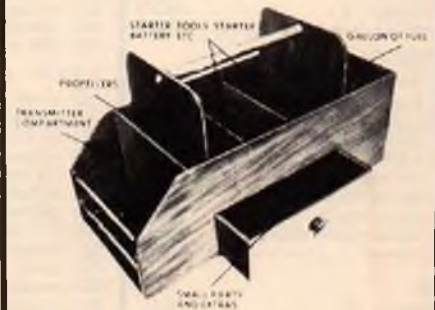
These packs are available with most system connectors and the 1200 pack adds only about 2.5 ounces of weight over a standard pack. The 2000 mah pack gives over twice the capacity your transmitter will have and is available with a standard lead length of 12', longer sizes available on request.

K & H Glass Products (16 Quincy Terrace, Mason City, Iowa 50401) has a great looking Quarter Scale J-3 cowl and cylinder heads out for the Sig and Nosen Cubs. This neat accessory makes all the difference in the world to your J-3 Cub and adds significantly to its appearance. My old Cub looked pretty bare without the engine in its proper place and my new Balsa USA version is going to have this one up front. If you saw the pictures a couple of months ago of Bob Nelitz' big 1/3 J-3, you'll appreciate the difference made by the engine's appearance in the appropriate place. Price on the cowl and cylinders is \$23.38 and it's worth it. They are fiberglass, as are all of K & H's cowls, of which they have a wide assortment, mainly for the Nosen models.

to page 178

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### BIG IS BEAUTIFUL

from page 176/22

Drop them an SASE for a complete listing; included are a set of glass cowls for the Nosen 310 at only \$18.37. (Looks as if they are taking their pricing from Sears!)

If you have been looking for a comprehensive listing of sources for Miniature Aircraft, then you need a copy of Bill Wilbur's Miniature Aircraft Directory, 1981 issue. This 60 page compendium of interesting and informative information is yours for \$10.00 from Data Resources (6

Laurel Avenue, Kittery, Maine 03904) and is worth every cent of the price. It lists all kits available and coming, a total of 241 plans and many sources of materials and information plus some suggestions as to good prospects for model subjects. Bill has done a stellar job on this and has gathered information from many sources in order to be able to put in one place almost everything you ever wanted to know about availability and didn't know who to ask. I provided Bill with some of the information he has used and by the look of it, so have many others. An excellent source material for the Big Is Beautiful builder and will become an important reference work for anyone interested in larger models. Mine is now

part of my desk and I know I'll be relying on it for quick access to many of the things I need.

Those of you who are WW II addicts, insofar as aircraft are concerned, will be pleased to hear that Bob Holman has recently released a gaggle of WW II Warbirds in plan form. The following items are now ready for shipment and may be ordered immediately: Mk I Spitfire, span 72", 1/6 Scale; Mk IX Spitfire, 90" span; P-51 B or D, 1/6 Scale, 75" span; P51 B or D, 1/4 Scale, 99" span; F4U-1, 75" span, just under 1/6 Scale; FW 190A4, 80" span; P40 E, 75" span; Hawker Hurricane, 80" span, 1/6 Scale; P47-D, 75" span.

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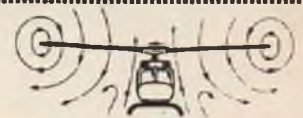
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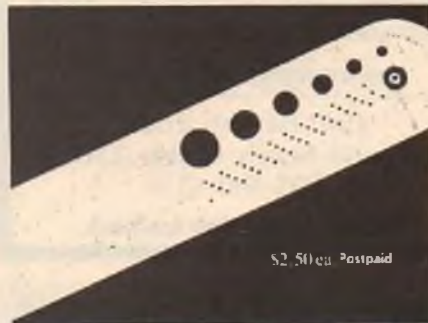
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## BIG IS BEAUTIFUL

from page 178/22

These have all been either enlarged, or scaled up from the well-known Brian Taylor plans with all the quality indicated by Brian's name being on them. Some accessories, such as cowls and canopies are available, and some of these will be kitted in limited numbers. For more information, drop Bob Holman a line at P.O. Box 741, San Bernardino, California 92402.

Fred Eastman, of Eastcraft and the Lectra Start system, has a new and very complete catalogue, price list, and data sheets out on his wares. Send him a lonely

back at P.O. Box 25, Irwin, Pennsylvania 15642, for the package. If you have been wanting to add the realism of self starting to your model, Fred's listing will tell you all about it, complete with pictures and prices.

I'm not going to suggest to you that the above column is a comprehensive list of all the new and good things at Toledo. It would take a lot more space than this to provide a complete listing of all the items shown. Those listed are my impressions of this year's Toledo extravaganza and do not necessarily indicate what was best or most valuable. They're the things that caught my eye and I liked what I saw. To the guys in the Weak Signals Show organization --- my thanks for an excellent job, well done, and

for their great hospitality. One of the major highlights of my year!

See you next month.

## GARBO ZENITH

from page 14

contact shelf covering in the color of your choice will fix that. All in all, a very nice building machine --- not the five hours as stated in the kit, but a week of well-planned evenings should have you in the air by the weekend.

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The metal parts are anodized in gold finish and the PVC plastic parts are usable as they come in the box. We chose to add some color trim to the canopy. After testing various types of paint, RS Perfect enamel was used on the canopy and wood.

#### Engine:

For the power plant, one of the O.S. Max .45FSR engines was selected since we wanted the power of a Schnuerle ported engine and the recommended size being in its range. The engine mounting blocks are already predrilled for the O.S. Max .40/.45FSR series. The fixed pitch helicopter design depends on the engine's ability to accelerate the main rotor head and tail rotor to control altitude. Hence, the faster the acceleration, the quicker the response. The Max .45FSR is a beautiful match for the Zenith. Its reliability under this load condition is most welcome as there is no glide to a landing feature with helicopters during power failure. The use of the Max will require you to procure a helicopter muffler, due to the vertical mounting, or a 90 degree rotator from World Engines. The starting belt supplied with the kit was used at first, but we recommend that you procure one of the Prather Products' boat/helicopter starting belts (15") instead.

#### Radio:

Radio installation is simple and World Engines' S-11 servos, a fairly large unit, fit in rather nicely with no extra effort required. World Engines' Expert II 2 stick transmitter was used with no electronic mixers on it or the helicopter for tail rotor mix. The only piece of the radio installation which required any real work was the throttle, but this is always a problem in helicopters due to the vertical mounting situation for the engine. A bellcrank under the throttle was installed so that there was no modification to the throttle arm for a different actuation mode. No real problem though.

#### Flying:

The Zenith proved to be an excellent trainer. The machine can perform the maneuvers required to train the new helicopter pilot from initial hover through flying around the sky in a manner similar to fixed wing aircraft. There were no aerobatics tried with the machine and we encourage any potential customers to fly the machine in the fixed pitch mode until such time the purchase of a collective head modification is made. World Engines now has this new head available along with a new Augusta 109 fuselage.

In checking the C.G. no special weights were needed to put the C.G. location right under the main rotor shaft. The see-saw has an initial angle of attack milled into the

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aluminum material but it was found that it was necessary to increase the pitch angle to 3½ degrees to give a lift-off main rotor speed of 1500-1600 rpm. We were able to trim out the cyclic and tail rotor functions in only one flight. The cyclic control is responsive without being so sensitive as to discourage the new flier. The built-in stability in the head allows the student to make a few mistakes without a major disaster. The distribution of mass and the long skids also help in de-sensitizing the tail rotor allowing throttle changes without violent changes in the vertical axis.

The tail rotor bearings were coming out of their sockets on each flight until we discovered the two set screws on the bottom of the rear tail rotor block. When these were tightened, no further problems with the tail rotor developed. It is recommended that you use some Loctite on these set screws to prevent them from backing out due to vibrations in the machine.

**Conclusion:**

All in all, the Zenith will make an excellent helicopter for someone looking for their first helicopter. The expert flier will find satisfaction in the same manner that the expert fixed wing flier finds with a sport airplane. Garbo and World Engines have combined to make a price breakthrough in the field of R/C helicopters which should cause more people to look seriously at this part of R/C modeling. □

**CUNNINGHAM ON R/C**

from page 12

no more care than do the more ordinary model. Of course, under construction, you need to design for larger loads, both the gross weight and the flying loads, but this is not a problem. The servos that we normally use are quite adequate, the control horns and hinges that are normal items in the hobby shop are adequate, all of the fittings from Kwik Links to ball joints are adequate, and the method of servo hook-up via pushrods (though I recommend that you use spruce pushrods with antiflex fences built into the fuselage) are the normal type. Fuel systems, and tanks are no different than normal. I use Kraft 16 ounce tanks and these give good flight times. What I'm attempting to tell you is that you can build larger models, and still do it with methods that you are used to using. This is in no means a slap at the chainsaw powered type of aircraft but rather

to page 186

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a method whereby modelers can give large aircraft a try with the idea that if they like the larger than normal, they can move into the area of ever larger models, with a bit of experience under their belts.

As in the gas powered category, there are not many kits offered yet, but given time the kit manufacturers will move more into this type of aircraft. You don't need to wait, however, you can scale up your favorite model to a larger size, and power it with a larger engine. Several factors you need to keep in mind. First, you want a finished aircraft that still maintains a good weight to area ratio. Total wing area in feet divided into the total weight in ounces should not exceed 30. I know that many of the larger models exceed this factor by quite a bit, but they are using more available power. Keep the total weight at 16 lbs. or less for a .90 powered aircraft, and you will have a nice flying aircraft. I have found that my .90's work best running 14/6 props. I would like to use larger props, but they tend to load up the engine too much and do not fly the models as well as do the smaller ones.

The airframe for this type of aircraft can be very similar to the type that you are accustomed to building. At high strength points, though, balsa must give way to spruce or pine. I use ponderosa pine for all of my large models, either gas powered or glow powered, and find that it works very well. If you don't have a table saw, or a band saw, I'll bet that someone in your club does have one, and will be glad to help you rip up a couple of boards. A couple of 1 x 8 pieces 6' long will give you enough material for several aircraft. I usually make all of the main fuselage longerons from 1/4" x 3/4" pine. Just rip the pine board, which is really 3/4" thick, into a number of 1/4" wide pieces. For wing spars on large aircraft I use 1/2" x 3/4" pine with 1/4" balsa webbing between the spars for the main spars, and 1/4" x 3/4" with 3/16" balsa webbing for the rear spars. On .90 aircraft I use 1/4" x 3/4" main spars with 3/16" webbing and 1/4" x 1/2" rear spars without webbing. This makes for a very strong, yet flexible, wing, and one that is not very heavy.

Rather than sheet balsa tail surfaces, you can build them up like a wing section, with a pine main spar and balsa ribs. Of course, the movable surfaces can be all sheet balsa, sanded to the shape that you want. Wing ribs can be sheet balsa, or foam board, or built-up. I've found that bucks can be saved by eliminating the sheeted leading edge on larger wings and using 1/4" balsa spars to carry the covering material around the leading edge of the wing.

If you want to try a larger type aircraft than the ones that you normally fly, do it, it's fun and easy. Say, for example, that you would like to have an Ugly Stick with a 7'

wing span rather than the normal 5' wing span. Get out your handy pocket calculator and scale it up. Just increase all the dimensions by forty percent. For those of you who are a bit rusty in math, if you want to scale something larger, take the desired wingspan, in this case 7', and divide by the normal wing span, 5'. This gives you an answer of 1.4, or the scaled-up aircraft is 1.4 times larger than the original. Okay, the chord is 13" normal, so scaled-up gives you a new chord of 18.2". Total wing area would then be 7' (84") x 18.2", a total of 1528 square inches. This is going to give you a pretty good sized Ugly Stick, but one that a .90 will handle. It will not fly "crazy" but it will fly well. 1528 square inches is 10.61 square feet. If your finished aircraft comes out weighing 14 lbs, you will then have a wing loading of only 21 ounces per square foot, a very acceptable wing loading. If it comes out at 16 lbs, total weight you will have a wing loading of 24 ounces per square foot, still a very super wing loading. This is the factor often overlooked when designing an aircraft.

A very nice flying aircraft with no marginal flight characteristics can be designed by providing the proper wing area to carry the weight of the finished aircraft. Power then makes the difference between a soft flying aircraft and one that will do almost everything in the book.

An aircraft that is too heavy for its wing area will have to have a much higher take-off and landing speed. Power can over-compensate for this, but power isn't much help if you're slowing that aircraft down for a landing, and suddenly she lays over and dies. Take, for example, our scaled-up Ugly Stick, carrying 1528 square inches of wing. Suppose that you really like to build strong and that, because of this, you're going to stick a really powerful gas engine in the nose. That gas engine weighs 5 lbs, just by itself, so you have to build a lot of muscle and weight into the tail to counterbalance the engine, plus provide enough strength to carry all of the resulting weight.

When you've finished the bird, you heft it on the scales and sure 'nuff, you've accomplished your goal, you've built a big airplane, tipping in at 27 lbs. Not too far from the actual happenings of many home-built 1/4 Scale type of aircraft. Let's see what we have in wing loading, 10.61 square feet of wing area and 432 ounces of weight gives us a wing loading of 40.71 ounces per square foot. With enough power it will fly, but it will not fly really well, and landing speed will have to be kept high just to be sure that this aircraft doesn't stall out on landing.

Before all of you modelers get up in arms and decide to dash off a letter to me telling me that I'm really a bum for downgrading chain saw type aircraft, let me assure you that I'm not. I like 'em. I enjoy building and flying them. But no matter what type of aircraft you build, you must consider the overall weight and wing loading, and I'm

to page 192



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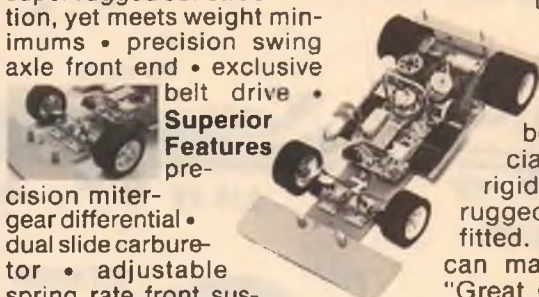
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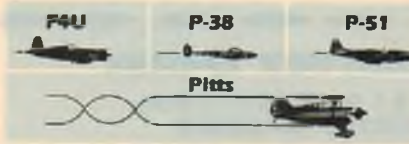
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also saying that for big airplane fun and games, don't overlook the .90 size engine. Sure, fuel is expensive, a lot more than gas and oil, but if you find that it's hard to purchase fuel in your area without mortgaging the farm, consider mixing your own. Both the Webra and the O.S. are designed to run on no nitro fuel, as nitro is not available in Europe. You can mix your own fuel with methanol and Klotz oil. Try contacting the drag racing group in your community and find out where they buy their mixings.

'Nuff for this month. No matter what type of R/C aircraft you fly, enjoy it. Nothing beats that beautiful spring day with your bird up on high, answering your commands. It's great!

## ENGINE CLINIC

from page 11/6

Dear Mr. Lee:

I have a problem that I hope you have an answer for.

I cleaned a couple of my engines with rubbing alcohol in a small ultrasonic cleaner. It did a reasonably good job, but I decided to go a step further. That was my mistake! I replaced the alcohol with "409" household cleaner and water and dumped the parts into that solution. It seemed to do some additional cleaning but when I started drying the parts I found that the aluminum crankcase had turned to a very dark gray color. I have tried everything I can think of to bring it back to a "like new" color but nothing seems to help.

Do you have any secrets that might cure this condition? Your help would be appreciated.

Sincerely,  
Norm Friedman  
Beaverton, Oregon

Your "409" contains chemicals that will etch or stain aluminum. As you found out (the hard way) it should never be used in an ultrasonic cleaner. I am sorry to have to say but I have yet to find any solution that will remove corrosion stains from aluminum — and I have tried everything I can lay my hands on over the years. I have tried all the commercial ultrasonic preparations with no luck in getting black stains off of aluminum. The best all around cleaner for use in an ultrasonic cleaner that I have found is automatic dish washer detergent. I use Cascade myself. It will clean most gunk off of engines including light rust and will make aluminum die casting sparkle like new. It will not help the dark corrosion stains, however. I once talked to a sales rep. for the

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## ENGINE CLINIC

from page 192 6

Branson line of ultrasonic cleaners and he confided that Lemon Joy worked as well as any of their packaged cleaners. However, I tried Lemon Joy and found it darkened aluminum. Cascade will not do this. For best results be sure the water is very hot and the ultrasonic cleaner has been turned on for an hour to de-gas the water.

In last month's column I ran two letters from fellows who had been using O.S. .60 Four Stroke engines inverted with no problems. Some months back I had expressed the thought that running the engine inverted might cause loading of the crankcase. Our final letter this month pretty well dispels the existence of any problems. I thought any of you anticipating using the O.S. 60FS, or any other four stroke engine for that matter, might like to read about Mr. Grant's experience with the O.S.

Dear Mr. Lee,

In reference to Mr. Turdik's letter and your response in the February 81 issue of RCM, I have an O.S. .60 four cycle mounted inverted in a Goldberg Skylane.

I ran the crankcase drain line up through the cowling and the exhaust points straight down. I start the engine with the airplane inverted and excess oil from previous flights can drain off.

In actual operation it appears that most of the excess fuel in the crankcase blows out because after every flight I have unburned (pinkish color) fuel on the cowl of the Skylane and there is way little drainage when I invert the ship.

Incidentally, one of the greatest things about this engine is how quiet it operates. On a slow fly-by with 1/2 flaps my Skylane sounds neat. Also, I get 25 minutes on 10 oz. of fuel and I am putting in a smaller tank to avoid hogging the frequency pin.

If my comments are not of general interest for your column, perhaps you would be kind enough to forward it to Mr. Turdik.

Very truly yours,  
Clifford M. Grant, Jr.  
Columbia, Maryland

□

## FROM THE SHOP

from page 4

The boy was Ira Hassad. By this time the project was well along and the Herald Examiner arranged to make their formal announcement of the project. Everyone was assembled at the flying site with the reporters and photographers. This was Ira Hassad's big moment and, to insure good performance, he screwed the pressure relief valve to give a little extra power. The plane flew beautifully, but when it was flying

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overhead, it happened --- there was an explosion, and then a conference, and it was decided to abandon the project as being too dangerous. Some prototypes had been made but the project was never actually committed to production.

So it was in the early days of our hobby: win a few, lose a few.

★

Our April 1981 issue cover by Bill Shaub featured his Dumas Shelley Foss tugboat and lovely Miss Cindy Hassold Field. In a conversation with Bill's wife, Nancy, we were rather amused when she told us of some of the misery involved in setting up for the glamour photo that we used.

Nancy's first chore was to find a suitable young lady to model for the photo. After making the necessary arrangements with Cindy, Nancy then selected the swim suit, a very sensitive task. The major consideration on the selection was to find a modern swim suit that would not offend our more conservative readers. We feel that Nancy showed excellent taste in her selection.

Then, it seems that Nancy and Paul Roke were recruited to stand neck-deep in the water and pull on underwater guy lines to hold the boat and the float in position for the photos. Trying to maintain footing and to satisfy Bill with boat angles, etc., wasn't easy. Nancy's words to us were, "Would you call that dedication and true love?"

★

Here is another engine expert satire from SIRS, newsletter of Sentral Illinois Radio Society, Ed Pike, Editor.

**Engine Infirmary**

*Dear Chinn Lee,*

*I wonder what you have to say about engines with left sided exhausts?*

*Gene Babin*

Dear Gene,

The whole story of which side of a model engine to place the exhaust port can now be told. Over the years some engine manufacturers went for the right side, while others preferred the left side. During the late 1940's and early 1950's almost all engines had a left side exhaust. Since that time the prevailing trend has been to the right side.

In 1976, a world conference of model engine designers was called. Its purpose — to decide once and for all the problem of where to place the exhaust port — to set a standard for all manufacturers to follow.

The delegates upon reaching the conference site, immediately split into three groups. Those on the right side of the convention center favored right side exhausts, and those on the left side favored left side exhausts. Dividing those two groups were the middle of the roaders, who had no preference and merely wanted a standard to adhere to.

to page 202



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### FROM THE SHOP

from page 198/4

The proceedings of that meeting have only now been declassified. After three days and nights of around the clock meetings, the conference was deadlocked. In an effort to seek a compromise, the middle of the roaders proposed that all engines have a dual exhaust. That motion was soundly defeated.

Then, an unknown delegate addressed the assembly. In a fit of desperation, he uttered those few words that was soon heard around the world. "I know not what course others might take, but as for me, blow it out the rear end." At that very point in time was born the bold and far reaching concept of the rear facing exhaust.

The conference broke up with no decision, but produced a third alternative. Today when you buy an engine, you can pay your money and take your choice.

Remember you read it here first.

Chinn Lee,  
2-Cycle Disciple

From Dope Can, newsletter of Suburban Aeroclub of Chicago, Byron Sauriol, Editor, comes the latest additions to their club dictionary:

C.D. — Certified Dummy.

C.G. — A designer's arbitrary longitudinal balance point, usually decided by a flip of a coin.

CHICKEN STICK — A tool used to test wooden props for cracks.

DEAD STICK — An excuse to land anywhere but the runway.

FIGURE 9 — The final maneuver in a certain aerobic pattern flight.

GLITCH — The cause of a crash when explained by the pilot.

IMPOUND AREA — A place where transmitters are tested for drop resistance.

PATTERN CONTEST — Mental therapy for frustrated scale modelers and fun-fly losers.

PIT AREA — A maximum security sight for the incurably insane.

PILOT ERROR — The cause of a crash when explained by anyone else but the pilot.

RANGE CHECK — A test to determine how far a pilot can walk backwards without falling down.

RETRACTS — An expensive tool for shortening props, can also be used to kill engine.

TAIL DRAGGER — A post contest C.D. (see above for def. of C.D.).

WING — An excessively wide hatch cover for the radio compartment, designed by kit manufacturers to contact the ground upon landing in such a way as to put extreme torsional loads upon the fuselage structure, leaving the nylon bolts intact.

Can't remember where we heard it but the scheme behind the latest postal rate increase was explained as 3¢ for delivery and 15¢ for storage.

On that note, we will see you next month. □