49115 JULY 1993 $2.25 U.S.

RCM radio control MODELER

THE [illegible]CATION FOR THE RADIO CONTROL ENTHUSIAST

VOLUME 20 NUMBER 7 USPS 509190 ISSN 0033-6866 JULY 1983

R/C MODELER

THIS MONTH'S COVER

shot at Woodward Park, California, features Miss Jamie Harlen displaying a beautiful new super Wing Ding by Octura which took 1st Place in Competition Boats, MACS '83. All hardware on the boat is custom made by Art Hammond of Dublin, Calif. Custom paint and designs are candies, pearls, and gold leaf by Cycle Arts, Fresno, Calif. Powered by a Rossi 90 and pulling an Octura 1967 prop, the boat is controlled by a Futaba wheel. Transparency by Gary DeLara, owner of this beauty.

R/C MODELER is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone: (213) 355-1476. Second Class U.S. postage paid at Sierra Madre, California and additional mailing offices.

FROM THE SHOP

Don Dewey

We are happy to announce that on April 8, 1983, K & B Manufacturing was purchased from Leisure Dynamics by John E. Brodbeck and John W. Brodbeck. The full circle cycle has now been completed, K & B is again in the ownership of its founder.

★

Although belated and presented in spring time, we thought our readers might find the following letter from Ken Halliday, Edmonton, Alberta, Canada, rather interesting.

Dear Don,

My reading of the article on night flying in the October, 1982, edition of RCM prompted me to send you these photos. These photos were taken on New Years Eve 1981. The idea was that we would be flying as the clock struck 12:00, which would make us the last to fly in 1981 and the first to fly in 1982. The temperature that night was −35°C (−31°F), and that was not including the wind chill factor from a rather cool breeze. We (Bernie Faulkner, Dale Bunce, and myself) arrived at the field at 11:30 p.m. but due to technical difficulties (frozen engines, electric starters that wouldn't work, propane torches that wouldn't vaporize, fingers that wouldn't move), we couldn't get either of our Enya .19's started by our 12 o'clock deadline. So much for being the last to fly in 1981. Persistent as we were though, we continued trying until at last at around 12:30 a.m. the crack of a running engine filled the night air. The sure flight Cessna 182 was launched into the darkness only to have the engine quit after completing one circuit. It had flown, however, and after standing outside for an hour in a 30 below temperature it was good enough for us.

Next New Years I think I'll do something a little more normal, like staggering around at a big party, in some silly costume, with a lampshade on my head, blowing on a noisemaker.

Sincerely,
Ken Halliday

P.S. The three of us are all members of the Edmonton Radio Control Society (ERCS). Dick Phillips (Mr. Big Is Beautiful) is one of our club members.

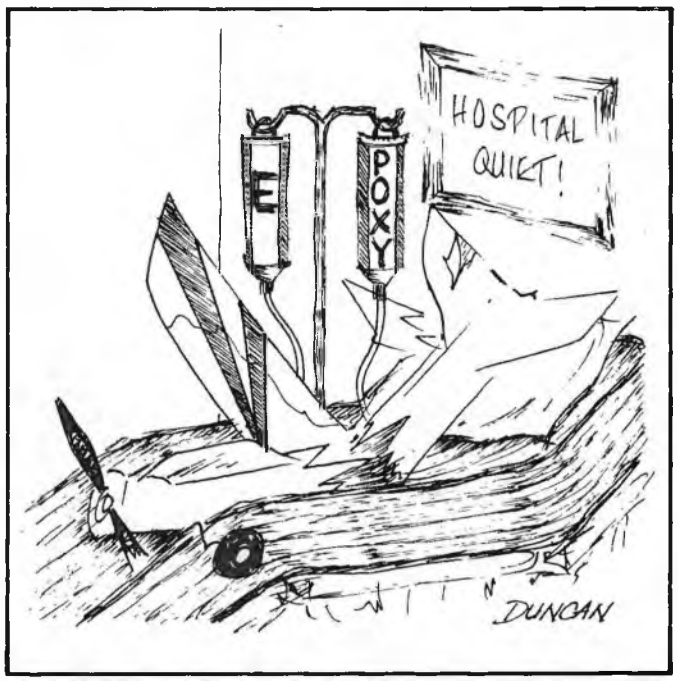
★

We received this letter from Ted Hoffman, Thibodaux, Louisiana.

Dear Don,

While reading an article in your April issue by Robert Richter on models going into trees, I thought I would like to

to page 198



The Real Thing Mock Two Contest will be discontinued as of this issue. Our thanks to those of you who participated. Watch for other contests of this nature in the future.

The battle with chrome MonoKote was finally won and the Little Dipper is nearing completion. Tichenor uses a baby sock on iron to apply numbers to wing.

Bernie Faulkner is on the left, Ken Halliday is handling starting duties. Photo is by Dale Bunce. Airplane is a very abused Sure Flight foam Cub.

Many hours were spent on the finish of this "beauty." Sure Flight Cessna 182.

FLYING LOWE

Don Lowe

Trimming Tips

Very often I am asked why a pattern ship will not maintain a vertical line (under power, of course), but will pitch either down or up — usually up. A little analysis of the forces involved might help understand what's happening and what to do about it. We normally trim the aircraft out for straight and level horizontal flight without holding up or down elevator to maintain this condition. We should understand that the aircraft maintains level flight due to a combination of forces acting about the Center of Gravity of the aircraft.

It's also important to understand that an additional pitching moment is created by the thrust line which may not be acting through the center of drag of the aircraft. An extreme example of the latter effect would be an engine mounted above the wing and fuselage on a high wing ship. A strong pitch down is present in such designs which is a combination of problems due to acceleration effects when power is added rapidly (rotation about the vertical C.G.) and steady state effects where the high thrust line acts about the center of drag of the aircraft. So you can see that similar effects would be present in a pattern design where the thrust line is offset from the center of drag and the vertical C.G. In level flight, the wing is supporting the weight of the aircraft and is trimmed to a small positive angle to do this which is, of course, a function of the weight and flight velocity. We should also understand that there is a downwash or downflow of air off the back of the wing which influences the up trim that we have applied to the elevator; essentially, it usually reduces the amount of uptrim required. You should also understand that the elevator trim that is carried is also influenced by any down or up thrust of the engine.

Now, when we pull vertically, the downwash off the wing tends to disappear since the wing is no longer required to support the weight of the aircraft. This tends to compensate for the elevator trim required for this condition, essentially the aerodynamic trim of the elevator is reduced, tending to help the aircraft hold a vertical line. Usually the ship will try to pitch up slightly which can be compensated for by tilting the thrust line slightly down. If an excessive amount of thrust realignment is required, this may foul up the normal rolling character of the

to page 170

Adriano Zaltron (Left) and Mariano Costalunga with their "Turnaround" designs. See text for more information.

The 1983 R/C Masters Team Selection in Pattern will be held at Rough River State Park in Kentucky, the weekend of June 24-25-26, 1983.

Adriano's ship — note plug-in wings.

Mariano's design, also with plug-in wings.

BIG IS BEAUTIFUL

Dick Phillips

Over the years we all manage to collect an assortment of tools with which to pursue our hobby. Hand tools are a must, of course, and a few power tools are, almost without exception, part of our arsenal.

I'm a bit of an oddball I guess as I have never had one of the small reciprocating saws which appear in probably 75% of the modelers shops in the world. It's a fine little tool, but never appealed to me. I have lusted for many years for a band saw, preferably a small one that was the right size, the right price, and available all at the same time. Until recently that happy juxtaposition of circumstances had never come to my attention. Until recently, that is, when I discovered that Black and Decker make such an item and it's just about the ideal tool for the modeler, and especially for those of us who build from plans from time to time.

It's a model 74-480-04 band saw and is designed to be driven by a 3/8" drill (1/4" is okay but less desirable). The blade is .015 thick, so it cuts a very narrow kerf. The saw comes with a 1/4" blade but a 1/8" blade is available (my next purchase!) and with the narrower blade, some pretty tight curves could be cut. This tool is not a toy and, with the exception of some parts, is made of a sturdy gauge of steel. There are some plastic parts in it but they are covers and so on and do not detract from its usefulness at all.

Photo of Bob Wallace's large Stearman powered with a Kawasaki engine. Bob uses the Don Harris smoke system which works very well. Model weighs in dry at 28½ lbs.

It stands 25" in height, the table tilts to 45 degrees and there is a mitre guide with it that will cut either 90 degrees or 45 degrees. It is fitted with a vacuum port at the bottom of the case so you can hook your shop vac up to it and evacuate the sawdust as it is produced. It's worth about $80 in cash and about a million in use. I'm glad I waited! If you're anything like me, you'll be delighted with this useful and economical tool that will turn you into one of the more skillful scratch builders in your group. Incidentally, as mentioned above, this is not a toy and is well-made and it will cut 2 x 4 lumber on edge! Good tool, good buy . . . thanks, Black & Decker.

Steve Sauger, who does a scale column for another magazine, had a column in mid summer last year where he described something I have been using for some time and had not thought to mention here. I'll correct that oversight now.

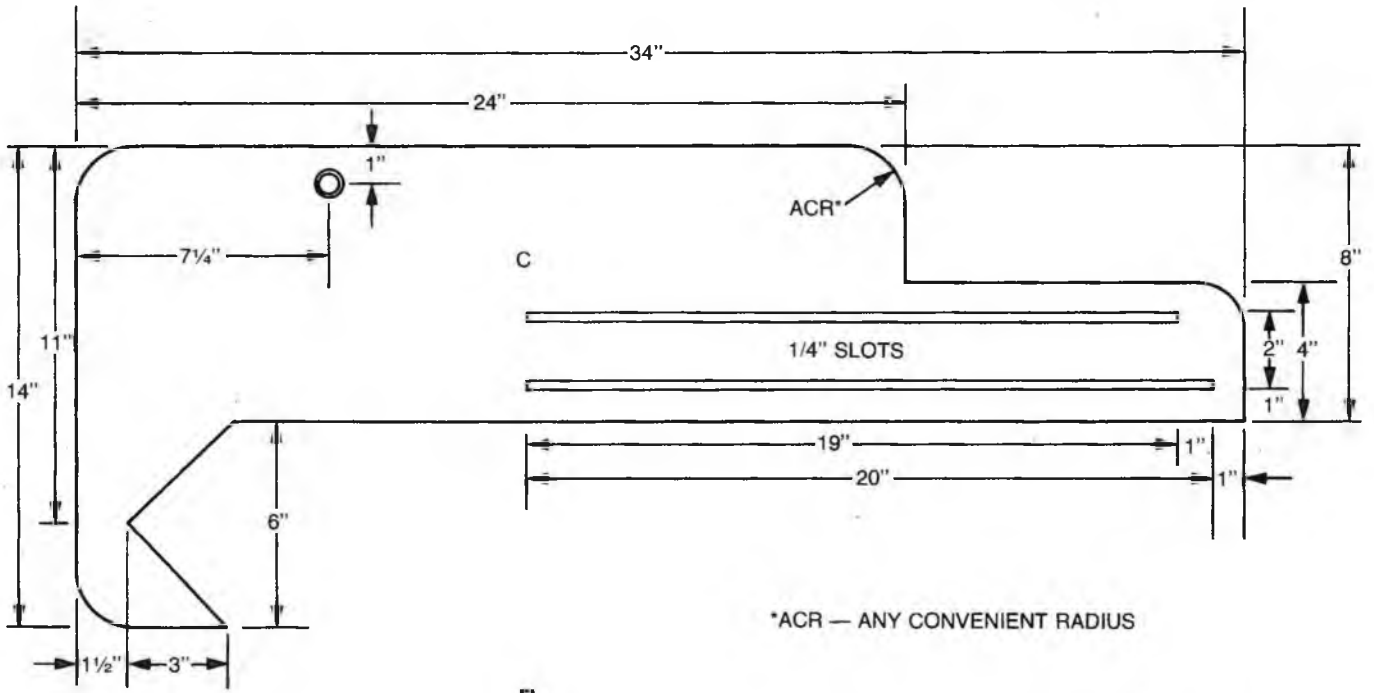
Many of us have a problem when it comes to painting. Our wives don't like us painting in the house because of the smell and the overspray that gets into the furnace and ends up all over the house (not to mention the danger of getting a volatile and potentially explosive mixture near the flame or pilot of the furnace or hot water heater). So we end up doing our painting outside in the carport or the garage. If outside, you can bet that every insect in the county will come by to inspect the paint job and half of the little beggars will end up stuck to the paint. If done in the garage, the light is usually not too great, dust is prevalent and the facilities are not the best.

Steve's solution, and mine, is to rig up a spray booth in the shop with a minimum of disruption and a low cost. I chose a corner of my shop that would be large enough to conveniently permit handling the fairly large models I build. Then I made up curtains out of clear plastic which are fastened to the ceiling with furring strips (slats to you non-construction types).

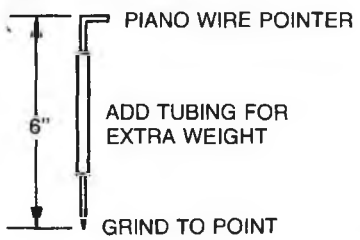
Steve suggests using strips of Velcro to secure the curtain to the walls at each edge and to fasten the two pieces together where they intersect at the corner. I didn't find this necessary, as they hang quite close and, little, if anything, passes through the joint in either direction.

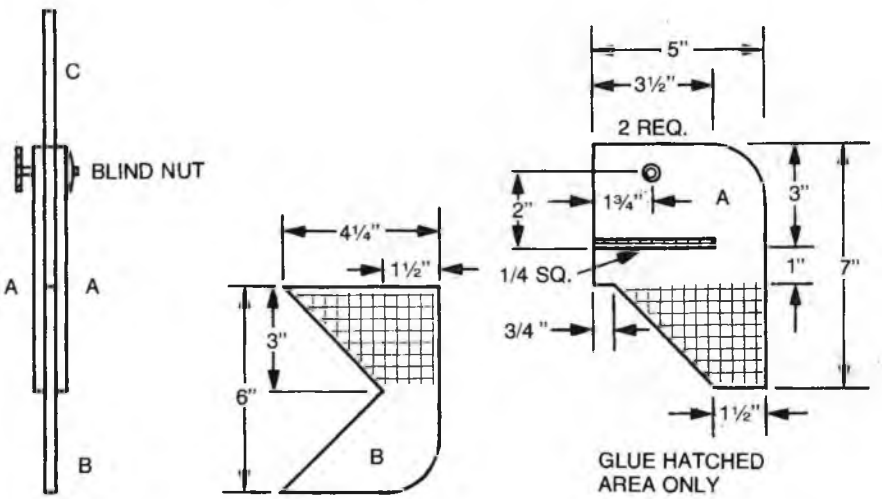
50 cc Quadra now readily available. New engine includes rather large muffler shown. Rear shaft may be fitted with pull starter (optional).

Black & Decker's new drill driven bandsaw. Ideal tool for the hobbyist. Very accurate and will cut 2 x 4 on edge. Variety of wood and metal cutting blades are available and the cost of such a useful tool is a pleasant surprise.



*ACR — ANY CONVENIENT RADIUS



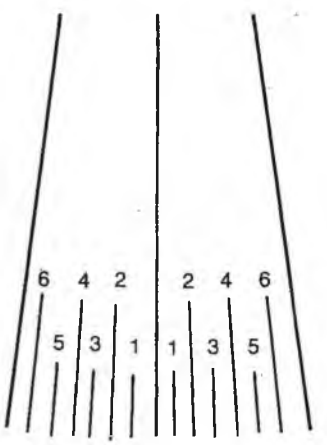


SEE TEXT FOR ADDITIONAL DETAIL

In my case, the shop is the garage and I had no compunction about cutting a hole in the rear wall in order to mount an exhaust fan. There are fans which can be mounted in a window opening so if you are making your paint shop in the basement, using one of these would be the best alternative to punching a hole in the wall. Don't even consider a paint shop without a vent, it's not worth it, even if you have to run a piece of furnace pipe across the rest of the basement to reach the window mounted exhaust fan.

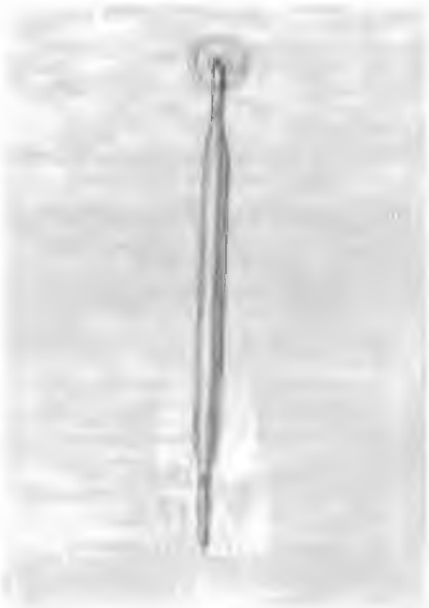
Don't neglect covering the ceiling as well. If you don't, you may end up with dust dropping on your finely finished model every time someone walks across the floor upstairs. This ceiling covering can be another section of clear plastic, or pieces of cardboard, or whatever is available.

An incidence meter large enough to measure practically anything. Will accept up to 31" chord and up to 6" deep wings and give accurate incidence measurements. More in text.

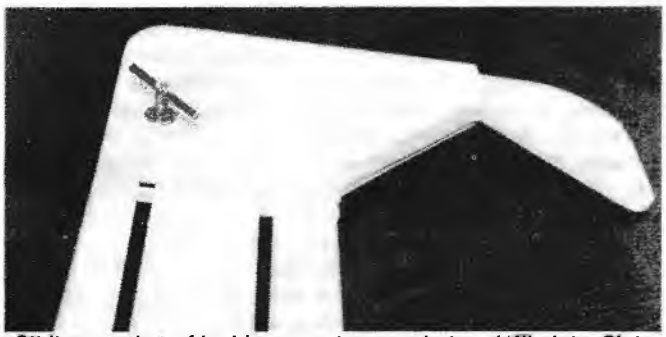


FULL SIZE

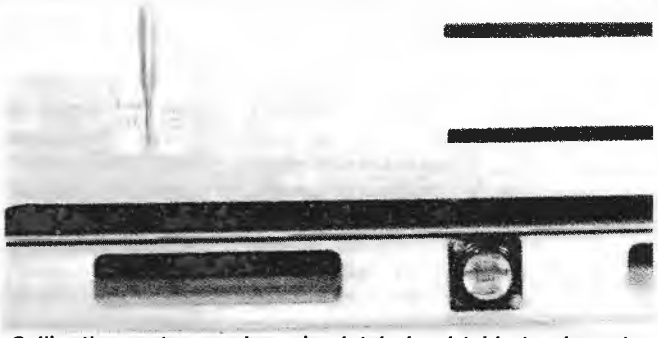
The chief advantage of this enclosure is that it does not permanently convert the space used into a paint shop. The plastic can be taken down at any time and the space



Incidence meter needle is made from piano wire, weighted with additional tubing, ground to a point and swung in a ball bearing. Quite accurate and smooth.



Sliding section of incidence meter runs in two 1/4" slots. Slots should be waxed for easy movement. Left hand slot uses nylon bushing, slightly shorter than thickness of wood, and right hand slot contains 1/4 square spruce stock. Slider runs true and has little slop.



Calibrating meter requires absolutely level table to clamp to, then scale is added in proper place to indicate degrees. Paralax in photo makes meter appear inacurate. It is right on!

reverts back to its previous use. You can staple a piece of the furring strip along the bottom of the plastic walls which will hold it in close contact with the floor and also permit rolling the plastic up on the strip and fastening it to the ceiling with wire loops, or some such, so your paint shop disappears when it is not in use. This is handy if your shop space is limited as it will permit using some of the shop as a paint booth when required and then converting it back to whatever shop use is needed on completion of the painting.

There is a drawback to this latter as it is great to be able to keep the spraying area free of any accumulation of dust between paint jobs. I made mine in the above way in order to be able to use the space for more than a painting booth but now I leave the plastic curtains down all the time in order to keep it relatively dust free. It works well and means I don't have to convert a workshop back into a garage if I ever sell the house.

The fan I have installed in the back wall of the shop conveniently exhausts well below a deck across the back of my house which covers a space which is not open to any clear area. The beauty of this is that any paint that does get blown outside doesn't appear on the side of the house or on the grass as an odd colored stain. Be aware when you install your exhaust fan that you should provide a filter (change frequently) or some sort of baffling arrangement in order to trap any spray from getting where it will be unsightly or result in your chastisement by your spouse!

I mentioned above the potential hazard of spraying volatile substances near an open flame such as the furnace or hot water heater pilot or burner. Be absolutely sure no spray can get near a gas flame as you may instantly reduce your house to a rather messy insurance claim. Not to mention the hazard to you and yours.

Also, if you are not using some lung protection when you do your spray jobs, you'd better go back to MonoKote or any of the other iron-ons. Many of the finishes available to us today are potential health hazards and should not be sprayed without protection. I use a charcoal type face mask and, when spraying, I cannot even smell the paint while I'm wearing the mask. They are not expensive and, when you consider the harm you may be doing to your lungs, even if they were, they'd still be a bargain. Some of the epoxy type paints are particularly dangerous and may even accumulate in your system to lay you low years after their use. Don't take the chance, wear a proper mask when painting and live to enjoy the fruits of your labors. Some workers protection agencies do not permit the spraying of some readily available finishes without a full back pack supplying air to the painter. Read the cautions on the can and heed them. It just isn't worth risking your health or your life to get a superb paint job.

I ran into a rather scary problem last winter and wanted to pass it along to you --- especially those of you who fly in colder weather. I gave some servos to a friend to mount in a rather large joint project. He took them home in the pocket of his parka. The parka is insulated but the pocket isn't and when he got home he was amazed to find two of the servo output arms broken off. Guessing that the cold had done the damage, he checked it out by putting one of my servo arms and one of his Kraft servo arms in the freezer compartment of his fridge for 10 minutes. When removed and flexed, the Kraft arm sustained no damage, but the ones from the servo I had given him shattered like shrapnel. I have since advised the manufacturer of the radio of the problem and he is taking steps to overcome the problem, so I'm not going to mention the brand at this time.

My suggestion is, put all your various types of servo arms in the fridge freezer compartment for about ten minutes and then check them by trying to flex them a bit. If they snap off, discard them and replace them with arms that will take the cold (best bet is to contact the manufacturer) and if they are okay, now at least you **know** they are okay.

I'm glad this came to light when it did as we will be flying the joint venture mentioned above in the cold and it would be disastrous to discover the problem in the air! The temperature we tested them at in the fridge was about -10F and that's about as cold as is necessary, if they don't break there, either you're flying in too cold a weather, or they won't break at lower temperatures! Do make a point of checking them though as it would be a heartbreaker to find out the hard way. In addition, there is every chance you would never find out as you could easily assume the servo arm broke on contact with the ground rather than in the air as the cause of the crash.

Most newcomers to the hobby, and many who have been around for a while and who should know better, don't know much about and, therefore, don't bother with incidence angles on their models. Many plans and kits specify the angle between the thrust line and the chord line of the wing rib, and some do not. Those that do so put that information on the plan for a

to page 196

IN MEMORIAL — Charles MacKay Chambers

Charles M. Chambers, 64, a former NASA instrument maker who helped build America's first earth satellite, Explorer I, died of cancer on March 6, 1983, at his home in Huntsville, Alabama.

In 1939, he joined the Langley Research Center in Hampton, Virginia, as a modelmaker. During the Second World War he built instrumentation for testing warplane designs in the country's largest wind tunnels there.

In 1960, he transferred to the newly formed space agency, NASA, where he received numerous awards for design improvements built into the Saturn-Apollo moon shot missions. He also built the special equipment to grind the large mirror for the Rocket City Astronomical Association's reflecting telescope atop Monte Sano in Huntsville.

Chambers had a lifelong interest in aeronautics. He was a private pilot and an inventor who held several patents. When he retired from NASA in 1972, after 33 years of civil service, he founded Rocket City Specialties in Huntsville to supply custom-designed accessories to the growing numbers of radio control hobbyists. His "Missing-Link" device enabled modelers to achieve greater reliability, durability and simplicity in their designs.

He is survived by his wife, Ruth, of Huntsville; five sons, two daughters, his mother, a brother, and ten grandchildren.

1918 — 1983

SUNDAY FLIER

Ken Willard

Well, the great "zero zero zero" debate is over --- ended, somewhat ironically, by the modeler who started it all in the first place. Here's the concluding letter, sent in by Ted Off of Camarillo, California.

Dear Ken,

Oh mighty chief of Sunday Fliers. I strike my head 20 times upon the ground in front of your tent. Your word is law. ***"An airplane with a symmetrical section having zero incidence for both wing and tail will not fly without some up elevator."*** *I learned this aerodynamic fact on my father's knee some 50 or so years ago while playing with 5¢ balsa gliders (or was it 2¢ then?). Somewhere in recent years my memory grew dim. I got carried away with the thought that downwash is stronger for biplanes than monoplanes. Although this second concept has some relevance to model design, if you don't obey the first principle, the plane won't fly. Thus, I retract with all humbleness my dumb-dumb remarks on "down elevator."*

However, I must come to the defense of my dentist friend, Don Thomey, whom I quoted as saying, "He used down elevator trim on a horizontal pass." His statement was correct. He and other competition pattern flyers (note that I can spell this word two ways --- which do you like?) do crank in a tad of down elevator when making a horizontal pass across the field. Unfortunately, this was the only question I asked him at the time when I was on my "down elevator" crusade. I didn't ask why. Last week I did. You are again obviously correct. Down elevator tends to make the plane dive into the ground. ***But*** *pattern fliers do crank in a tad of down elevator* ***and then correct with a little stick pressure*** *to aid in flying through the turbulent air near the ground where there is a tendency for the plane to balloon. One then releases the stick to neutral (slightly down) which avoids over-correcting and results in smoother flying.*

Sincerely,
Ted Off
Camarillo, California

Thanks for clarifying the reason for that "tad of down elevator" used by Don Thomey. Just in time --- the novocaine was just beginning to wear off. (Now I'll get a letter from Don saying, "Hey --- we don't use novocaine any more." But don't bother, Don --- I know you're using some of that new stuff --- just had some, actually, but I don't know how to spell it!)

If there still are some believers out there who want to try the "zero zero zero" setting, go ahead. But don't write to me; send the results to Ted. And while you're at it, explain the downwind turn to him. A tad of up elevator works there, too.

Now here's another aerodynamic "mystery" that can use some explaining. I've been flying my Seamaster Sport 40 for the past two years, both as a flying boat off water, and as a landplane with the trike gear installed. Flies great both ways --- makes a good intermediate trainer for landplane use, and can even be used as a primary trainer on the water.

So what's the mystery? Just this: Ed Whyte and Charlie Bauer built one as a kit prototype, and about a year or so ago we flew it for the first time. It has a longer landing gear than mine does. (See photo.) That shouldn't be any problem --- even helps to keep the tail from dragging the runway on nose high landings.

However, on the first flights as a landplane, when Ed's took off from the runway, the nose veered slightly to the right and, as it flew over in straight flight, you could see that it was "crabbing" slightly. At first we thought it was due to a crosswind. Not so; did it going both ways. At the time we figured maybe a thrust adjustment might fix it.

The next day we flew Ed's Seamaster off the water. Took off, flew straight as an arrow; no crabbing at all. We didn't fly it again with the landing gear installed.

A short time ago my flying buddy, Lyle Engeldinger, finished up his Seamaster. Rather than bend the special, squat type main gear that I have, he used a standard Hallco gear --- even longer than the wire gear on Ed's version.

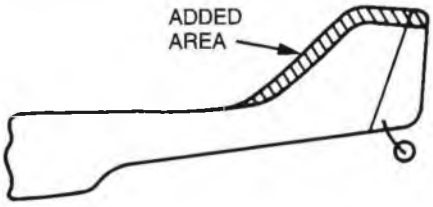
When it took off from the runway, there was a very noticeable crab to the right; also, when it slowed down, the right wing tended to drop. We fiddled with the thrust line, checked the wing for true incidence, and experimented not only with up and down thrust, but right and left thrust as well. Nothing --- it still crabbed to the right.

"Let's have a dog fight!"

"Let's try increasing the vertical tail area." We did --- and the crab disappeared!

Why? My Seamaster doesn't crab; both Ed's and Lyle's did. Yet the only difference is in the length of the landing gear. Why would a longer landing gear make the model crab? Got any ideas?

In any event, it won't hurt, if you plan to fly a Seamaster as a landplane, to increase the vertical tail area --- about like this:



This larger size will be standard in kit form. But the aerodynamic reason still baffles me. Just goes to show that the best test lab still is the blue sky above, and when you get things working right, don't fix them. And when they aren't working right, experiment until you do it right. "Ours not to reason why --- just be sure to make it fly."

Now I think I'll open up another can of worms, just to keep you pondering. Here's the "situation." Propellers are carved, or formed, in a helical curve from the hub out to the tip, so that the pitch of the propeller will be essentially uniform along its entire length. Even on full scale props, with controllable pitch, the helix is there,

even though it becomes a bit of a compromise as you vary the pitch. The idea of the curved prop blade is to give maximum efficiency. Fine.

If that is so, then why is it that helicopter blades, which provide the necessary lift, do not have a helical curve in them for maximum lift efficiency?

I was up at King's Hobby Shop in Redwood City recently, and asked Wayne King the question.

"Damfino," he replied. "Maybe it's just because the helicopter blades are easier to make if they're straight."

Another modeler, who flies model helicopters, thought for a minute, then opined, "Because the twist would be in the wrong direction when you're flying inverted."

Okay, I'll buy that argument for model helicopters. But how many full scale jobs fly inverted?

As I keep saying, fellows, all these little goodies that keep coming up are just to keep you from stagnating with that trainer of yours. Gotta keep "advancing the frontiers of aerodynamic knowledge in the modeling fraternity." Send me your answers. I've got space in the column for the best ones.

★

What is the best stimulus for improving a product --- any product --- over what is available? Competition. Just about the time someone thinks they have the market sewed up, along comes a competitor with a product in the same market that is either better, or, in some cases, just as good but for a lot less money. For you, the customer, the ads will say which --- but it's up to you to decide if the ads are, in your own personal opinion, accurate. Which leads to the next subject in this column for Sunday Fliers, whose expertise may be a bit limited, but whose intelligence isn't.

Original Seamaster Sport 40 with short specially bent landing gear.

In this case, the subject is adhesives --- in particular, cyanoacrylates.

Cyanoacrylates have long been known for their quick --- almost instant --- adhesive powers. "Crazy Glue" was highly touted in TV and radio ads for quite a while before the modeling fraternity found out it had specific uses for construction of models. It took my friends Bob Hunter and his son Bill to see the great possibilities of this adhesive for model construction, and they came up with their trade name for their version of cyanoacrylate glue --- Hot Stuff. It was an instant success. And it still is.

But the competition quickly appeared --- and now there are several manufacturers of cyanoacrylate compounds that have products on the market for you to chose from. The only problem you have is --- which is the best?

For what it is worth (yeah, I know, we have a page of stuff called that in RCM, but it depicts specific items instead of opinions) let me tell you what I think. And don't forget --- all of the products I mention are advertised in RCM, so I'm not playing favorites.

Gaviotas R/C Club Pereira, Colombia, South America. Visitors in Toledo Weak Signals show.

Also, don't forget, that in this age of rapidly progressing technology, by the time you read this, it may very well be out of date! So be it. I don't really care, as long as the advances are beneficial to you --- the Sunday flier.

Today you've got quite a choice --- Hot Stuff, Zap, Jet, Crazy Glue, and Ace --- not to mention several others that I can't recall. They're all cyanoacrylates --- with certain additives involved to solve specific situations.

The basic product --- cyanoacrylate --- is the same. So is aspirin. The question arises --- why should I pay more for one brand or the other? Why can't I buy it in the generic form? Good question.

Some of you may not be aware, or have forgotten, that when the competitors for Hot Stuff came on the market, they had several gimmicks. One of them was a coloring additive which showed you how far the cyanoacrylate flowed from the point of application by introducing a coloring agent. The only problem was, it lowered the adhesive quality. Didn't take long for you consumers to find that out, and quit buying it. Also, it didn't take long for the manufacturers to recognize your intelligence, and quit producing it.

But there were --- and still are --- specific applications for specific purposes. This led to Hot Stuff Super "T" and Super Jet and Zap-A-Gap, just to name a few. These were more viscous than the watery cyanoacrylates, and didn't require the close fit of two surfaces to make them effective. Then came the argument for using baking soda instead of microballoons --- which is still going on. You know what? I've even used finely ground particles of dirt --- yes, dirt --- to fill the gap between two surfaces as a field repair, and it worked just fine!

"Cyanoacrylics are okay for most uses --- but don't use them for firewall joints. They won't stand up like epoxy does." Sound familiar? I decided to test the accuracy of that claim. Now I'm not saying it isn't true; all I can say is

to page 196

ENGINE CLINIC

Clarence Lee

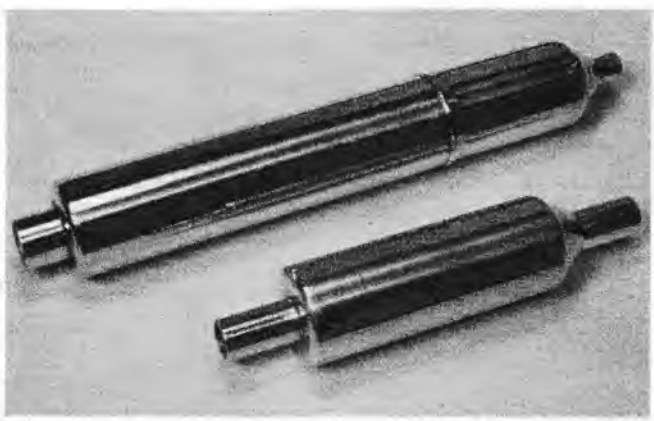
In the January 1983 Engine Clinic I made mention that I had received little in the way of response in regards to the Magic Muffler that we had initially reviewed in the September 1981 Engine Clinic. As a result, quite a few letters came in from readers telling of their experience with the Magic Muffler. Generally speaking, all letters received were of a favorable nature and the writers were very well-pleased with the power gain and general overall improvement in engine performance with the Magic Muffler. Surprisingly, quite a few letters came in complaining of mounting problems especially with the 15/25 size muffler. With the exception of the 15/25 size muffler all other instances of mounting problems were due to trying to use the Magic Muffler (which is intended for rear exhaust engines) on a side exhaust engine. Actually, guys, there is just no real reason for this mounting problem with a .60 or .40 size engine. Both rear exhaust and side exhaust versions are available. Some fellows are trying to use the .60 rear exhaust Magic Muffler (#6065-RE) on a side exhaust engine. The 2" distance from the piston face to the front of the muffler makes for a pretty short header pipe. The Magic Muffler intended for side exhaust engines (#4060) has a longer piston face to muffler distance of 4" and eliminates any mounting problems. So use the proper muffler and you will not have a mounting problem.

Basically the same thing pertains to the 40/46 size engines. A special rear exhaust Magic Muffler (#4046-RE) is made for direct connection to the engine and primarily intended for the FAI Pylon racers. Fellows have tried to use this muffler on the side exhaust engines and again run into mounting problems because of the short piston face to muffler mounting distance. For side exhaust 40/46 size engine, the #4060 side exhaust Magic Muffler should be used. As mentioned previously, this muffler has a 4" mounting distance. I should also point out that the #4060 side exhaust muffler can be used on a rear exhaust engine if more mounting distance is desired. Also this mounting distance is variable with the rpm at which you intend to run the engine. If you run the engine at a lower rpm than the specified power range for the specific Magic Muffler, then the header pipe can be lengthened. Or use the #4060 side exhaust muffler with the 4" piston to muffler distance shortened if the engine is to be run at a higher rpm range.

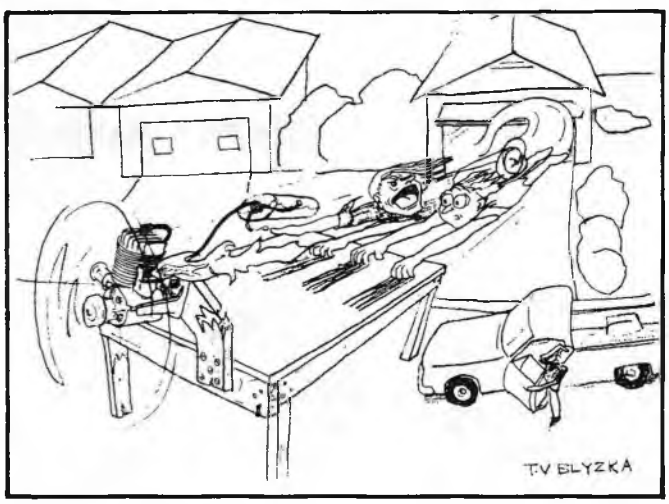
The 15/25 size Magic Muffler (#1525) is available in only the combination side/rear exhaust version with a mounting distance of 2". This does present a problem when used on a side exhaust engine. However, a special header pipe is manufactured by Jenesco Engineering for Condor Hobbies, the importer of the Magic Mufflers, and available from Condor Hobbies. Jenesco manufactures ten different header pipes for the Magic Mufflers so if you do experience a mounting problem Condor Hobbies has a header pipe that should solve the problem. Few fellows seem to be aware of these special header pipes that are available from Jenesco/Condor especially for use with the Magic Muffler.

The 2" piston face to muffler mounting distance for the 15/25 size Magic Muffler is intended for use in the R/C cars operating in the 20,000-35,000 rpm range. For sport aircraft, ducted fan use, and boats, this distance can be lengthened to 4" putting the muffler into the 14,000-25,000 rpm range. Some of the mounting problems with the 15/25 size Magic Muffler on side exhaust engines has been due to fellows trying to use too short a mounting distance. This is understandable as the original instruction sheets that accompanied the mufflers did call out this length. Condor Hobbies have revised the instruction sheets for the Magic Mufflers specifying varying lengths for the different rpm ranges. If you have had a Magic Muffler for a while and have the older instruction sheet you might send a self addressed stamped envelope (SASE) to Condor Hobbies and request a new instruction sheet for the specific size muffler you have. (Condor Hobbies, 17835 Sky Park Circle, Suite E, Irvine, California 92714.)

For 1983, Condor Hobbies has expanded their line of Magic Mufflers to now include an ultra-quiet model known as the "S" series as well as a new 15/25 size specifically for helicopter use. The new "S" series Magic Mufflers are basically the original muffler with a secondary chamber added to the rear — similar to full length tuned pipes with the secondary muffling chamber. The new 60/65 rear exhaust "S" series muffler is only 1/4 ounce heavier than the



The 60/65 rear exhaust Series "S" Magic Muffler is the longer item in this photo. The Magic Mute is shown below the Magic Muffler.



standard 60/65 muffler and 1/4" shorter in length. The #1525, #4060, and #6065 mufflers are available in both standard and "S" series as is the #1525-H helicopter Magic Muffler.

Also new is the Magic Mute — an add-on "no-loss" silencer for the standard Magic Muffler. In effect, this is a secondary muffler that is added to the tail pipe of the regular Magic Muffler with a piece of silicon tubing. Actually its use is not just limited to use with the Magic Muffler. The Magic Mute can be used with any conventional muffler to lower the sound level. When tested on a Rossi .60 ABC it dropped the noise level with the #4060 Magic Muffler from the 90-100 db range to 75-78 db. Quite significant and below the FAI noise standards.

In the past many of you probably shied away from purchasing a Magic Muffler because of the cost. Due to increased production, the prices for 1983 have been lowered considerably. The #1525 now sells for $22.95; the #4046-RE and #4060 for $24.95; and the #6065-RE for $25.95. You can add $4.00 to these prices for the "S" series. The Magic Mute sells for $11.95. A new .90 size Magic Muffler will be available later this year.

★

Several times in past columns I have cautioned readers not to use Hoppe's gun solvent in model fuel due to its nitro benzene content. Although it will clean varnish out of an engine it also poses a health hazard. Our first letter this month brings up another danger that I had not even considered. First the letter:

Dear Clarence,

Just a brief note, no reply is necessary. In the December 1982 RCM, a letter refers to Hoppe's #9 gun solvent for cleaning engines (fuel additive). You correctly refer to nitro benzene as a carcinogen. What you may not be aware of is that the nitro benzene is used by Hoppe's as a ***masking agent*** *to cover the odor of ammonia gas!*

Hoppe's uses Ammonium Oleate as the chemical agent to attack or dissolve the copper alloys rubbed off bullet jackets during their passage down the barrel. This is what shooters refer to as bullet fouling. Ammonium Oleate is $NH_4\ C_18\ H_33\ O_2$. *It decomposes upon heating and is soluable in water and alcohol. A check for its presence would be to use red litmus (moist) paper over the mouth of the #9 bottle. I would imagine Hoppe's has switched to some other masking agent due to N.B. hazard. I do know the odor of Hoppe's is not as pungent as it once was. What does ammonia do to engines?*

As an aside, what did Francisco Labs put in Power Mist fuel years ago? It sure smelled good and let everyone know what you were using for fuel.

I enjoy your column and it is the first thing I turn to each month. How about more reviews of old engines like the Ball, Bungay, Hassard, Howler, etc.!

Regards,
Tom Pearson
Effingham, Illinois

I am not sure what effect ammonia would have in a model engine but I am sure it would certainly do nothing good. The thing that got me thinking was the effect ammonia has on nitromethane. Nitromethane is perfectly stable by itself or when mixed with alcohol. There are chemicals, however, that will "sensitize" nitromethane. This means that nitromethane can become shock senstivie quite similar to nitro glycerin. High on the list of nitromethane sensitizers is ammonia. In years past many of the drag race enthusiasts were using hydrozine to sensitize nitromethane. After a few accidents where engines "grenaded" and injured spectators, its use was banned. In fact a dye is added to nitromethane that causes the nitromethane to change color in the presence of hydrozine so it can be detected at drag race events. It is my understanding that ammonia can make nitromethane too dangerous to

even be handled. The small amount in Hoppe's gun solvent would probably not have any real effect, but then you never know. Especially if some fellow thinking that a little helped, then decided to add a couple of bottles to his fuel. Most sensitizers work in very small quantities and I do not care to find out the hard way myself.

Wally Francisco used to add ordinary cologne to his fuel that accounted for the perfume smell.

I had been kicking around the idea of doing a review on the old Ball and Bungay racing engines but actually do not know too much about their origin. I have been trying to piece together enough information to do an article. I did review the Howler in the July 1976 Engine Clinic.

Dear Mr. Lee,

I have a question about glow plugs! I have heard that if your starting battery is weak, but has just enough to get the engine started, that it will not run good or come up to speed. What they are saying is, the plug will not come up to operating temperature from the firing of the engine. I say this is a bunch of bull! I personally make sure I have a fully charged starting battery when I go flying, but when I was younger, about thirty year ago, and flew a lot of control line, I didn't have the cash to get a new starting battery when I needed one so I started many engines at times with almost dead batteries and the engines ran just fine --- Fox, K & B, Forster, McCoy, etc.

Thank you and what is your opinion on this?

Yours truly,
Bill Mitch
Hebron, Indiana

You are correct, Bill. How the glow plug glows when connected to the starting battery has no bearing on how the engine will run unless, of course, the glow plug is old and has oxidized or is defected in some other way. A new glow plug that barely lights with a low battery will still operate as it should if you can get the engine running.

Mr. Lee,

Everyone seems to have his own ideas on what size prop should be used on what size engine (prop size vs. engine displacement). Is there a general rule of thumb indicating what size prop would be suitable with different size engines? Would this also apply to 3-bladed props?

I am planning on building a twin-engine P-38 (not very smart, I know, but I would still like to try). Consequently, I would like to know if there are any .40 size engines on the market that can be converted for

to page 195

SOARING

Al Doig

Hello again — you're looking well. I'm as well as could be expected after having suffered a mid-air in the first round of a two day contest. My lightly built 2-Metre ship was sheeted with 4 lb. balsa with a light balsa leading edge. This makes for fine flying characteristics, but you get eaten up if you lock horns in a thermal.

Speaking of 2-Metres, I received an interesting update on 2-Metres in Australia that I'd like to share with you.

Australian 2.0m Gliding Scene by Ron Squires. The 2.0 m gliding scene has been slow to emerge in Australia amid much discussion and debate as to which direction any major form of competition should be directed.

The author of this article, along with other members of the Peninsula Aeronautical Radio Control Society from the Mornington Peninsula near Melbourne, canvassed a wide cross section of fliers to determine their preference of competition between the European style, as written up by Sean Bannister in RCM & E., or the American World Cup series style as written up in RCM.

Due to the dwindling interest in F3B type competition with its inherent costs and organizational problems, there was unanimous approval of the European concept of 2.0 m, 2 channel, 2 function, 2 task event. This was approved in order to provide an intermediate low cost, relatively uncomplicated multi task event that would introduce the thermal flier to the enjoyment and excitement of multi task flying without being deterred by expense, skills, and organizational professionalism now required to compete successfully on the F3B scene.

"Jerry Fitz, would you like to tell our readers what it's like to keep a model sailplane aloft for 12 straight hours? . . . Jerry? . . . Mr. Fitz? . . .

With this in mind, and the full support of their Club/Society, the P.A.R.C.S. competition group, in an effort to establish the 2.0 m scene in Australia, decided to run an "Australian 2.0 m Championships" on Feb. 5-6, 1983 at the Hastings Park Foreshore Reserve some 80.0 km's South East of Melbourne on the Mornington Peninsula.

The event was run to a modified set of European rules, as described in the information bulletin attached. (Ed. note: Model: Two controls, rudder and elevator only. This includes V tails, no ailerons or camber changing pre-set flaps. Task A Duration: Within an 8 minute working time, achieve a 5 minute duration flight. A landing within a 5.0 metre circle will result in 25 bonus points. Task B Racing Distance: Within a 4 minute working time, complete 4 laps of a 150 metre course in the fastest possible time. If 4 laps are not completed, the flier receives a percentage of the score of the slowest flier to complete the course. If the model crosses the center line, a penalty loading is added to the flight time dependent upon the number of violations. This is a very brief capsule of the rules.)

2.0 Metre Australian Championships fliers.

Australian 2.0 m Championships winners. Mike Richards 1st, Flying: Lee Cleeland (No. 6) Winch Operator 2nd: Ron Squires 3rd, Launching.

Twenty five competitors lined up on Sat. the 5th with a variety of models which included Sagitta 600's, T Bird 2.0 m, Algebra 2.0 m, and Metrick. The final placings showed the superiority of the Sagitta 600's; taking 1st to 6th. All were modified with ballast tubes in wings to carry up to 1.25 kg (44 oz.) loads and partial to full wing top sheeting and 3/4 to 2 oz. fiberglassed fuselages. A number of the newly released, locally designed and kitted Southern Sailplanes glass/foam quick build "T Birds" were flown and showed considerable promise.

The well-practiced and organized PARCS non-flying members provided fliers with a hassle free smoothly run competition, well up to the standard expected, with plenty of flying, 3½ rounds each day, as well as good socializing between PARCS helpers, competitors, and families on Saturday night at a local restaurant.

A total of 7 rounds were flown with results based on 6 rounds after allowing for the worst round throw away. Many competitors found out early that even a 5.0 m radius spot is not easy to get with a slippery 2.0 m model on hard ground and the PARCS fliers soon began to dominate with obvious well-practiced techniques and local knowledge. Some 29.0 sec speed runs were had by this group who had turned low 28's in practice. Final placing after an enjoyable two days of flying were in doubt until the last round, and ended as follows: 1st, Mike Richards; 2nd, Les Cleeland; 3rd, Ron Squires, all from the PARCS Future Prospects 2.0 m. PARCS will probably host the same event next year and, if support and interest warrants, a nearby Education Dept. Camp could be used for a 2-3 day event where very good cheap accommodations are available with a suitable adjacent flying area within walking distance.

The league of Silent Flight, Australia, will be holding for the first time, a 2.0 m, 2 channel, 2 function, "Task A" thermal type event at their annual tournament on May 7-9, 1983, which provides traditional "Floaties" type flying. Therefore, while standardizing on the 2.0 m, 2 channel, 2 function concept, there appears to be a divergence in design prarameters as the Australian competition concept encourages the strong, fast and slippery multi-role glider, while the LSF concept will favour the Olympic 650, Gentle Lady type "floaters." Only time will tell if both these forms of competition can survive in a country where the number of RC gliders is proportionately quite small compared to the European and American scene.

So , there's the latest word from "Down Under," or "Up Over" dependent upon where one stands.

★

One of the rules invoked at most contests is that if parts are shed upon landing, landing points are lost. Also, if the plane is damaged to a point where it is not immediately flyable, landing points are also lost. At the 1983 Pasadena Soaring Society 2nd Annual Rose Bowl Soaring Festival, CD Jean Rondot ruled that any sailplane damaged on landing would either lose landing points, or be impounded and flown as is in the next round. Col. Robert Thacker, in a surge of boyish enthusiasm for fame and glory, landed a tad hard. Now, those of you who remember the Graupner Cirrus will recall that it had two wing rods, one for each wing, which were bent to form the dihedral angle. More often than not when landed hard, the Cirrus wings would rotate on the wing rods and the dihedral rods would form anhedral. Col. Bob's straight wing Bird of Time (sort of) has just such rods. So, the good Col. wound up with droopy wings and a decision; give up his hard won landing points (he doesn't always get that many), or fly the next round with a funny looking sailplane. Being a fierce competitor, the Col. decided to go for it. The next round found Phil Harris trying to talk Col. Bob out of a potty decision with rather unfavorable odds. The Visalia gang was yelling "jump," as the Col. took his place at the winch. He was, of course, expecting (or at least hoping) that the wings, under load, would rotate and be right again. With all bets down, up went the sailplane. The wings did indeed rotate back into position. I would like to tell you that all was well and the Col. flew for a max. Unfortunately, the black spot was on Col. Thacker that day and he popped off tow immediately the wings rotated and his gamble went for nought. The moral of the story: When things look black and it takes real courage and guts to go for the gold — don't --- Ling Po.

★

Recently, whilst having the hots for a Dodgson Windsong, I found that they wouldn't take food stamps. As I'm saving my green stamps to go to the World Champs in England, I sez, "How can I slide into a Windsong without parting with 200 clams?" A sudden gust of inspiration swept through my otherwise vacant mind; how about putting a Windsong wing on my Camano-100! While waiting for the wing kit to arrive I pondered the adequacy of the stab area with the new wing. It seemed that a larger stab would be required — but how much

Col. Robert Thacker's Anhedral Cripple (see text).

Col. Thacker rides again (see text).

Camanosong — Camano-100 with Windsong wing.

Dr. Walter Schroder, Soaring Columnist for German magazine "Modell" visits Pasadena Soaring Society "Rose Bowl Soaring Festival," speaks with local member Tony Stark.

larger? If you will harken back to the August, 1980 RCM, I discussed a thing called **Tail Volume Coefficient.** Now, to avoid your scrounging through the garage, if you'll move in a little closer folks, I'll tell you what I'm gonna do. For just the price of this magazine, you're gonna get the secrets of the Pharaohs — an index of pitch stability — the Tail Volume Coefficient. If you will take the stab area, in square inches and multiply it by the distance from the Center of Gravity to 25% of the average chord of the stab; divide this number by: the wing area, in square inches, multiplied by the average wing chord (area divided by span); and you have Tail Volume Coefficient (all dimensions are in inches, and the coefficient is dimensionless). The larger the coefficient, the greater the stability. In gliders, coefficients between 0.4 and 0.6 seem to be common with 0.5 about average (Paragon = 0.45, Camano = 0.40). With the Windsong wing on the Camano-100, the TVC turned out to be 0.32, which is a bit on the low side. Being lazy, I said, "Let's give it a go as is." At least in all tests to date, Murphy went back to Ireland and the stab works fine. The Camanosong seems to fly exaclty as the Windsong. Launches are awesome. The trajectory is so steep, your hat falls off. All-up weight of the Camanosong was only 62 oz. which compares with 69 oz. for the Windsong, giving a lower wing loading.

In a flying test with the Windsong, both ships were flown close together around the field for fifteen minutes. It was not possible to detect any differences in the flight characteristics. Later on, however, I'm going to build a larger stab for the Camanosong and try it. An increase in stab area of 20% to 124 sq. inches would raise the Tail Volume Coefficient up to 0.5 where it belongs.

★

In the March '83 issue of RCM, I had a picture of Larry Jolly and a new ship he is kitting, called the "Pantera." I received a letter from Don Chancey, Plano, Texas, pointing out that the design is not new and is a pure bred Texas design. Don apparently developed the design in '77-'79 and produced partial kits for four years. I spoke with Larry Jolly (of Larry Jolly Model Products) and he says Mr. Chancy is credited with the design on the kit plans; with Larry doing certain design changes for the presently kitted version — just to keep the records straight.

Catch you next month, all being well. Howzat!

□

Howell W. "Pete" Miller, designer of the Gee Bee Zeta, with the 1/5 Scale Zeta designed by Henry Haffke.

GEE BEE ZETA

A SPORT SCALE MODEL FROM A FAMOUS RACING HERITAGE

By Henry A. Haffke

Here is a part of the story of the Zeta by Howell W. "Pete" Miller, chief Aeronautical Engineer, Granville Bros. Aircraft Inc., Springfield, Massachusetts.

The design of "Zeta" was laid out in late 1936 and construction was started thereafter in 1937. Several local pilots who flew from the Springfield Airport mentioned the need of a small aircraft which could be built and sold at a reasonable cost. Construction of the aircraft was completed during 1937. On December 11, 1937, Mark Granville test flew the airplane from Springfield Airport. He reported excellent characteristics in all flight conditions. After that, the airplane was flown by about 15 of the pilot-stockholders.

Due to the increase in material's cost, it was decided not to apply for C.A.A. certification, although all proof-testing, design and engineering stress analysis were completed. Romie Lambert had stored the Zeta in his barn. Several years had gone by and the unpaid rental charges accumulated. We then, on advice of our attorney, turned "Zeta" over to Romie for unpaid rent. Incidentally, the rent amounted to more than the construction costs of "Zeta."

In 1978, some interested parties set up a meeting in Springfield for anyone interested in preserving the history of the aviation happenings in the early

ABOUT THE AUTHOR

Henry A. Haffke was born in Springfield, Massachusetts, and grew up about a mile from the old Springfield Airport where the Granville Brothers built their Gee Bees. As a young boy, he spent many evenings watching the activity at the airport.

Seven years ago he decided to build a model of one of the Gee Bees which were built so close to his childhood home in Springfield. The first Gee Bee that he designed and built was the Senior Sportster Model Y.

After a lengthy search, he luckily located Bob Granville, one of the famous Granville Brothers who had designed and built the real Gee Bees. Bob supplied the photos he needed and also color documentation and the Model Y became a familiar sight among the winners in most Eastern scale meets. Henry's association with Bob Granville netted him much previously unknown facts about the Gee Bees and his interest in these colorful aircraft of the past intensified.

Henry decided that he would write a book which would tell for the first time, the real story of the Granville Brothers and their Gee Bees. Since building his first Model Y seven years ago, Henry has designed and built models of most of the Gee Bee Aircraft. All have been big contest winners and more are planned for the future as time permits.

days of Springfield. Included among the attendants of this meeting were members of the staff of the Springfield Museum of Science. Romie Lambert was willing to donate the "Zeta" which he had so lovingly cared for all these years. It was in immaculate condition and only needed to be polished.

So there it hangs today, for anyone to see. It is a beautiful thing as it hangs there in the museum. Remember, this 45 year old airplane is exhibited in its original fabric and paint just as it was rolled out of the Gee Bee plant in 1937.

The "Zeta" was such a beautiful aircraft that I couldn't resist doing a model of it. It had excellent proportions for a model and, since it had been very aerobatic, it seemed a good bet that the model would also inherit its fine flying characteristics. With the help of Pete Miller and Bob Granville, I obtained a fine collection of photos of the Zeta.

With all this documentation, I was able to do a very accurate rendition of the Zeta. I had several other Gee Bee projects under way so did not have time to start another, but my good friend Joe Gallagher (who had built two previous contest winning Gee Bees from my drawings) agreed to build the first one. I designed the model in 1/5 Scale at his request and as soon as I had the pencil drawings done, he started on the model. He had it finished in a short time and it was test flown by our chief test pilot supreme, Sid Clements, who has tested most of my designs. Sid reported excellent flying characteristics and we had another winner.

It was flown in five contests during its first season of flying and took three first places, a second, and a third. Its first win was at the Northern Connecticut Fly In where we went specifically so that Pete Miller could see it fly as his home is only a short distance from the site of that contest. Pete was thrilled to see a model of his creation fly using radio control and this was the first time he had ever seen a model flown by R/C. To top everything off, the Zeta was awarded first place in the event which had our entire crew very pleased.

CONSTRUCTION

The model is not difficult to build and everything is pretty normal. The landing gear is a little different from most aircraft as the main landing gear struts emerge from the fuselage centerline with an outboard shock strut connected to the wing center section. Other unique differences in the Zeta, is the wing strut arrangement. The wing struts were attached to the windshield bow structure which gave a lot of strength to the real craft and, even though not needed on the model, it would be a shame to omit it as this is part of the Zeta's character. These struts were made from streamline aluminum tubing which was assembled together with epoxy. It is plugged into a tube installed at the windshield bow and the other end is bolted to brackets built into the wing.

Fuselage:

Make up two fuselage sides of 1/8" x 48" sheet balsa. The basic sides are shown on the plans with arrows. Note that the rear end beyond F-9 is raised to support the stabilizer. Mark each side for bulkhead locations. Cut all bulkheads from the proper material as shown on the patterns. Locate engine mount on F-2 and drill for mounting bolts. Also drill holes for fuel lines and throttle linkage. Cut out the two oval shaped holes for the cooling tubes. The cooling tubes are made from cardboard tubes on which Coverite is rolled. Trim the oval holes to fit the tubes.

Next, assemble all bulkheads on the basic sides after marking stringer locations on each bulkhead. It is best not to cut stringer notches until after assembly to assure straight stringers.

text to page 44

The Haffke designed Zeta model.

Factory roll out photo of the Gee Bee Zeta.

Cockpit details of the prototype. (Ted Hodgeson photo).

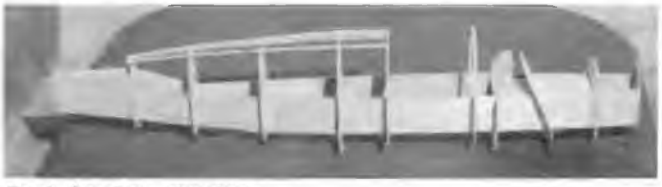
Mark Granville touches down following a test flight.

A most realistic view of the Zeta model.

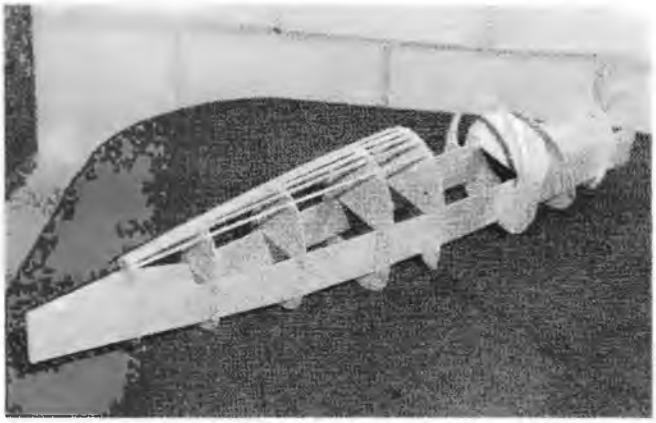
Karen Haffke shows off her dad's scale design.

Henry Haffke, Dotti Miller, and Pete Miller back up Joe Gallagher and his Zeta after winning the Northern Connecticut Scale Fly In. The first contest for the model.

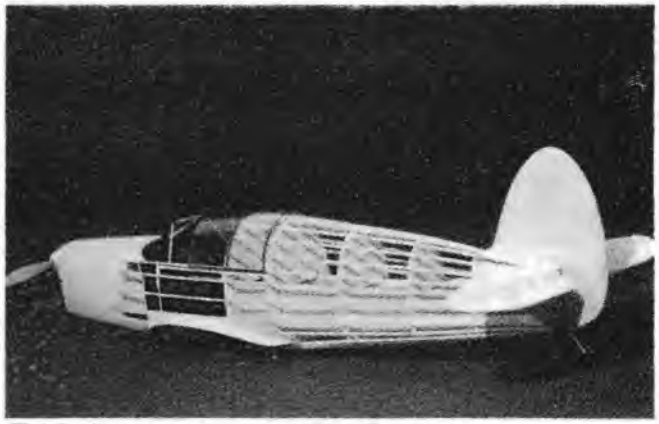
Model in flight at the Bealton Scale meet. (John Preston photo.)



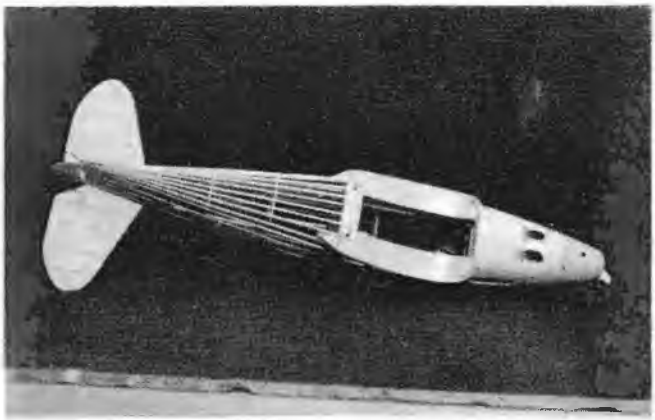
Basic fuselage structure.



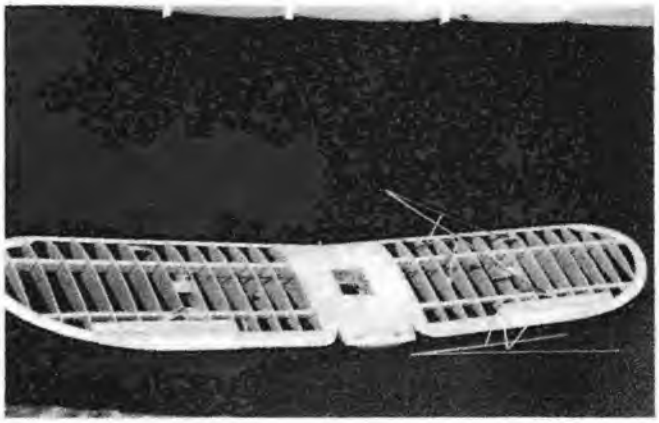
Rear angle shot of basic fuselage structure.



Finished fuselage structure with tail surfaces.



Bottom view of fuselage. Note engine cooling outlets.



Wing structure and struts.

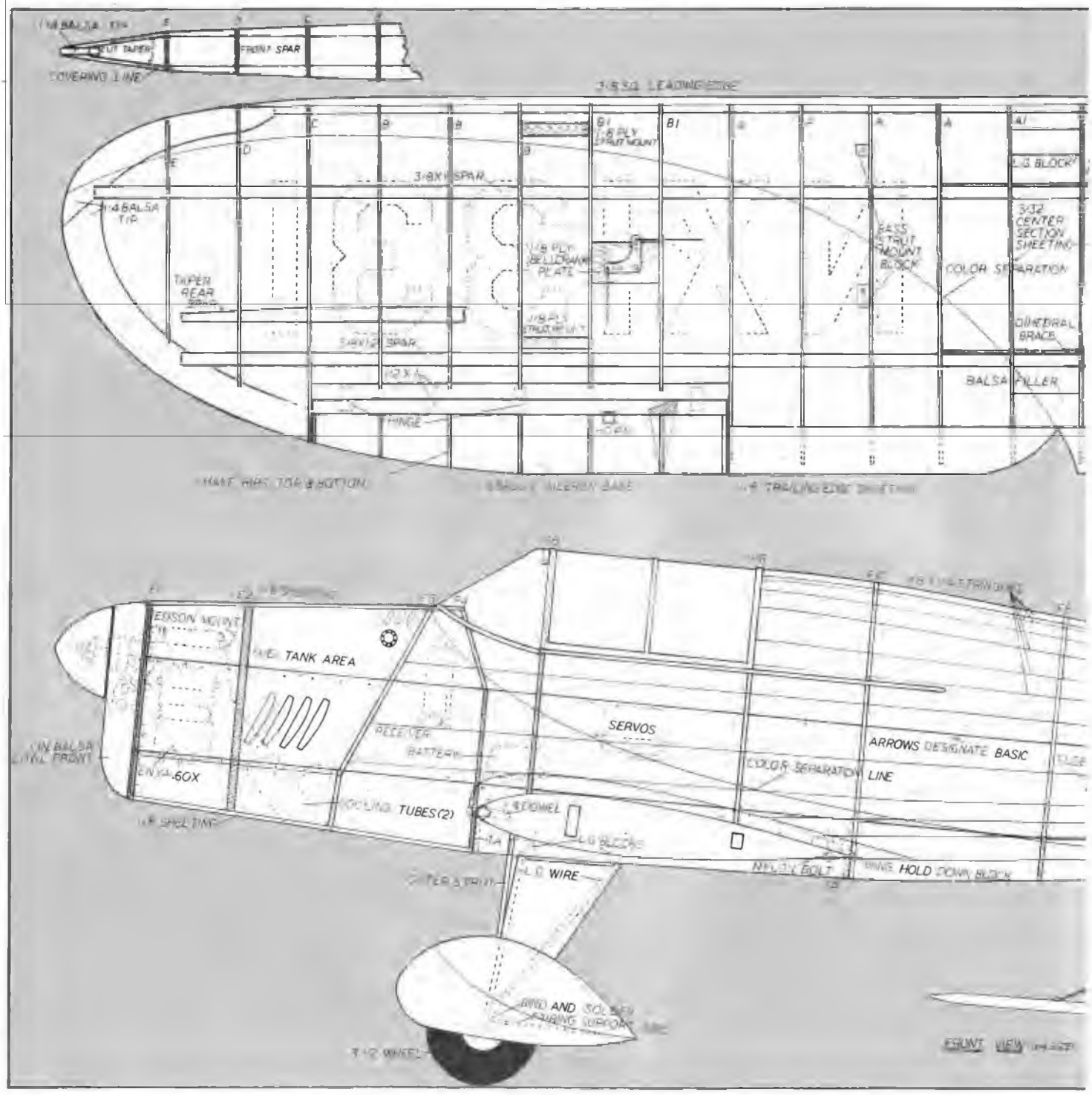
Front end details.

Landing gear installation.

Strut details. Note fillet construction.

Aileron control installation can be seen in this photo.

FULL SIZE PLANS AVAILABLE — SEE PAGE 194

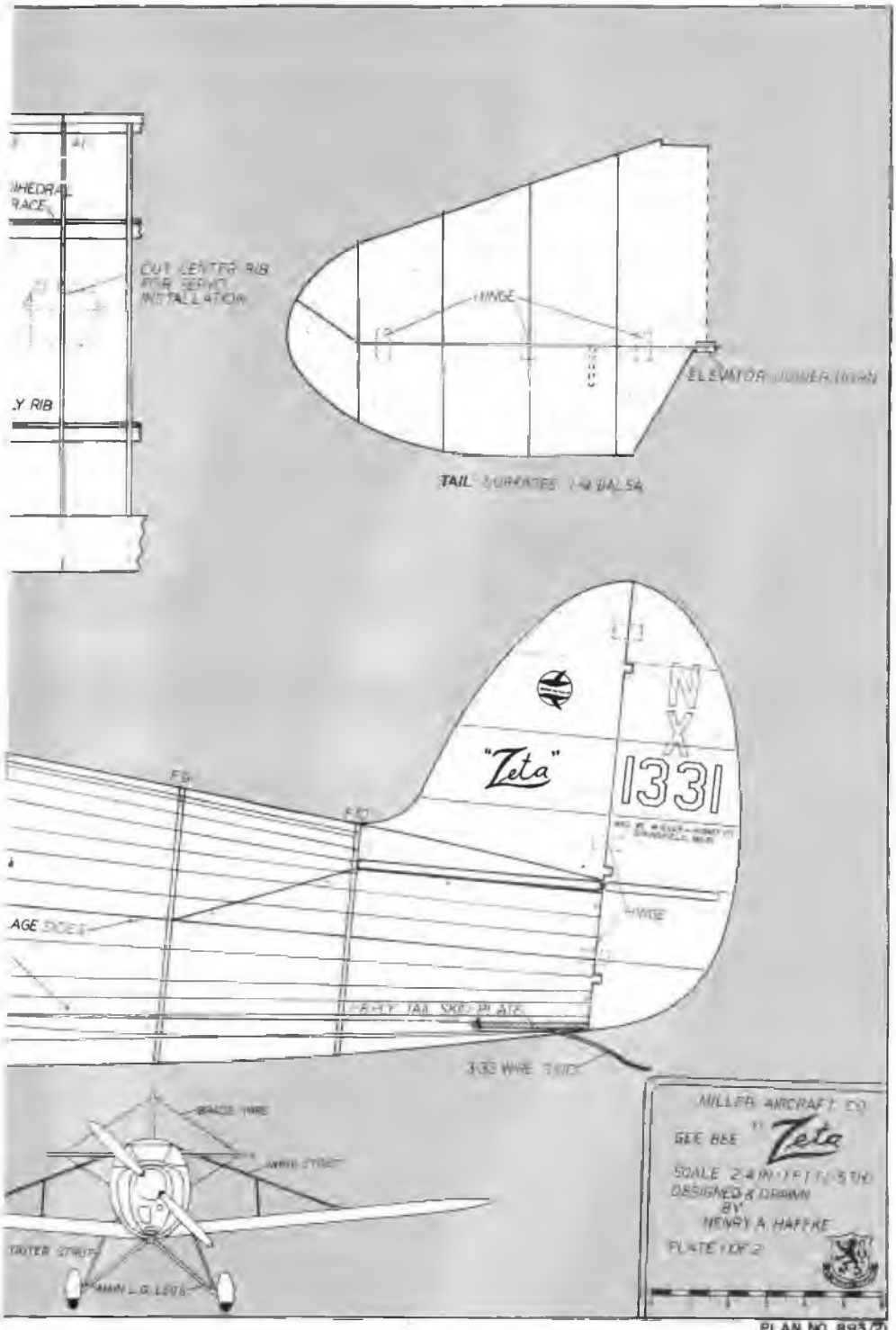


Notches can be cut in ply bulkhead F-4 before assembly. After gluing bulkheads in place, the top stringers may be added. Use a fine saw blade in your X-Acto handle and cut notches after locating exact location of stringer on each bulkhead. Start with top stringer and center it between F-6 and F-10. Cut notches and install. The next two stringers on each side of this top stringer may now be added in the same manner. The three side stringers may be added next. Install the cooling tubes and sheet the forward area between F-1 and F-3 after setting up engine mounting and fuel tank compartment.

Tail surfaces are prepared and installed before final stringers are added. Tail surfaces can be cut from 1/4" sheet balsa. Edges are rounded and hinges installed. If the modeler wishes to create a more scale appearance, the tail surfaces can be made of 3/16" balsa with ribs added to each side. This is a little more work but, when finished, it gives a more scale appearance to the surfaces.

After the tail surfaces have been installed, the final stringers may be added using the same procedure as explained earlier. Before adding the bottom stringers, the ply tail skid plate should be installed, and the skid or tailwheel mounted. This aircraft was flown with both a skid and wheel at various times, so you can take your choice. If you generally fly from a paved surface, a wheel will be better for ground handling.

Cut two pieces of 1/4" x 3" to fit between F-4 and F-7. Mark wing saddle outline on each of these and cut saddle. These two saddle doublers are now glued inside the basic sides



PETE MILLER'S GEE BEE ZETA

Designed By:
Henry A. Haffke
TYPE AIRCRAFT
Sport Scale (1/5)
WINGSPAN
72 Inches
WING CHORD
12 Inches
TOTAL WING AREA
820 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
2½ Inches
O.A. LENGTH
52 Inches
RADIO COMPARTMENT SIZE
(L) 10" X (W) 3" X (H) 3½"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (inc. ele.)
7" Avg.
STABILIZER AREA
130 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
12 Inches
VERTICAL FIN WIDTH (inc. rud.)
7¼" Avg.
REC. ENGINE SIZE
.60 Cu. In.
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Conventional
REC. NO. RADIO CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED

Fuselage	Balsa, Ply & Hardwood
Wing	Balsa, Ply & Hardwood
Empennage	Balsa
Wt. Ready To Fly	**140 Oz.**
Wing Loading	**26.6 Oz./Sq. Ft.**

between F-4 and F-7. Mount the wing hold-down block against F-7 and notch into the saddle doublers. This completes the fuselage structure except for the wing fillet which must be fabricated after wing is installed.

Wing:

Cut out ribs of appropriate material, test fitting spar cut-outs as you cut each rib. Make spars and trim rear spar tip as shown on drawings. Mark rib locations on spars and slide one set of ribs on spars for left panel. Support spars on a spacer block between rib C and outer rib B and between ribs A-1 to keep bottom of ribs clear of building surface. These blocks can be of any size so long as they keep bottoms of ribs above the building surface. 3/4" sq. or 3/4" x 1" would be a good size. Install bellcrank plate in ribs B-1 before gluing them on the spars. Ribs can now be glued onto the spars. Weights on the spars at the spacer block locations will assure a straight wing structure while the glue dries. Add the leading edge and the 1/2" x 1" aileron block between ribs A and C.

The wing tip is added next. Install the ply strut mount plates and the base strut mount blocks. Glue the 1/8" trailing edge sheeting on the top of the center section but do not cut out the cut away area at this time. Install the balsa filler block between the two outboard A-1 ribs. Tack glue the 1/2" x 1" aileron leading edge to the aileron block and glue the 1/8" aileron base to the aileron leading edge. Add the top and bottom half ribs to the aileron. When the left panel is completely dry, the panel can be removed from the spacer blocks. The bottom trailing edge sheeting can now be added and the landing gear block

can be glued between ribs A-1 and A-1.

The right wing panel can now be built in the same manner as the left panel, but the right panel is assembled upside down over the plans on the spacer blocks. Make sure you install all ribs with the bottoms up on the right panel spars. The bottom trailing edge sheeting is glued in place on the right panel and the landing gear block is installed before the wing is removed from the spacer blocks.

When this structure is dry, it may be removed from the spacer blocks and the ply strut mount plates and bass strut mount blocks can be added to the top of the right panel. The top trailing edge sheeting can also be added to the structure at this time, and the balsa filler block is added between the two outboard ribs A-1. Build the aileron as in the left panel.

When this panel is completely dry, the two panels can be joined with the dihedral braces. Glue the braces in place in one panel and, when completely dry, fit the other panel in place making sure the spars, leading edge and trailing edge, all line up properly. Trim as necessary to assure a good joint. Then glue the other end of the dihedral braces to the other wing panel and support the tips in a square position until the glue is completely dry.

The center section is now sheeted with 3/32" balsa between the outboard A-1 ribs. When sheeting is completely dry, the cut-out in the trailing edge can be removed and shaped. Trim and sand the entire wing. When final sanding has been completed, the ailerons are cut free and finished. Ailerons are hinged and the actuating linkage is installed. Wing is now ready for covering.

Wing Fillet:

Using 1/8" sheet, fill in the area between the lower fuselage stringer and the wing saddle. Install a 1/16" ply wing saddle base with cross grain width-wise. This base is 2½" wide and should be installed with the wing mounted in position while the glue dries. This will assure a good wing to saddle mating. The fillet is now formed using your favorite fillet material. With wing in place, glue formers 4-A and 7-A in place on bottom of wing structure. Add the landing gear blocks to the wing center and sheet the underside area with 1/8" balsa, between 4-A and 7-A.

Landing Gear:

Bend the front and rear legs to shape using 5/32" wire. The outer strut is bent of 1/8" wire, and the fairing brace is formed of 1/16" wire. Assemble these parts installing them in the landing gear blocks and bind the parts together with copper wire and solder. Make leg fairings of balsa using two thicknesses of 1/8" balsa sandwiched around the leg wires. Make wheel fairings of specified size balsa laminated together. Clamp laminations tightly until glue has dried completely. Carve and sand to shape. A 1/8" ply support wire mount can be imbedded in the inboard side of each fairing. 3½" wheels are used with a wheel collar on each side to hold wheel centered in fairing.

Wing Struts:

The wing struts are fabricated of streamline aluminum tubing and 3/32" wire. Epoxy the strut parts together. A length of brass or aluminum tubing across the windshield bow serves as a mount to plug in the upper end of the struts. Four strut mount brackets are made of aluminum or brass sheet and are screwed to mounting plates in wing. Lower strut ends are bolted to the strut mount brackets with the N struts plugging into drilled holes in the wing mounted bass strut mount blocks.

Radio Installation:

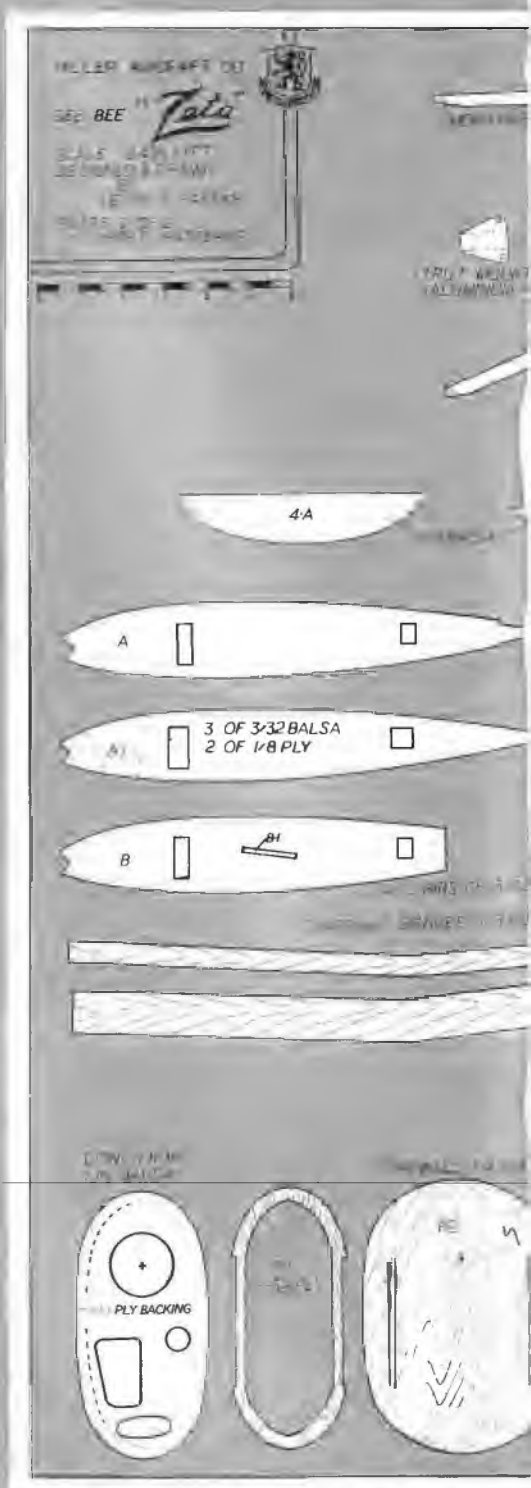
Mount servos in cockpit area with receiver and battery in forward area under windshield. Use pushrods or well-braced Ny-Rods for hook up to control surfaces, making sure all surfaces operate in the correct direction.

Finishing:

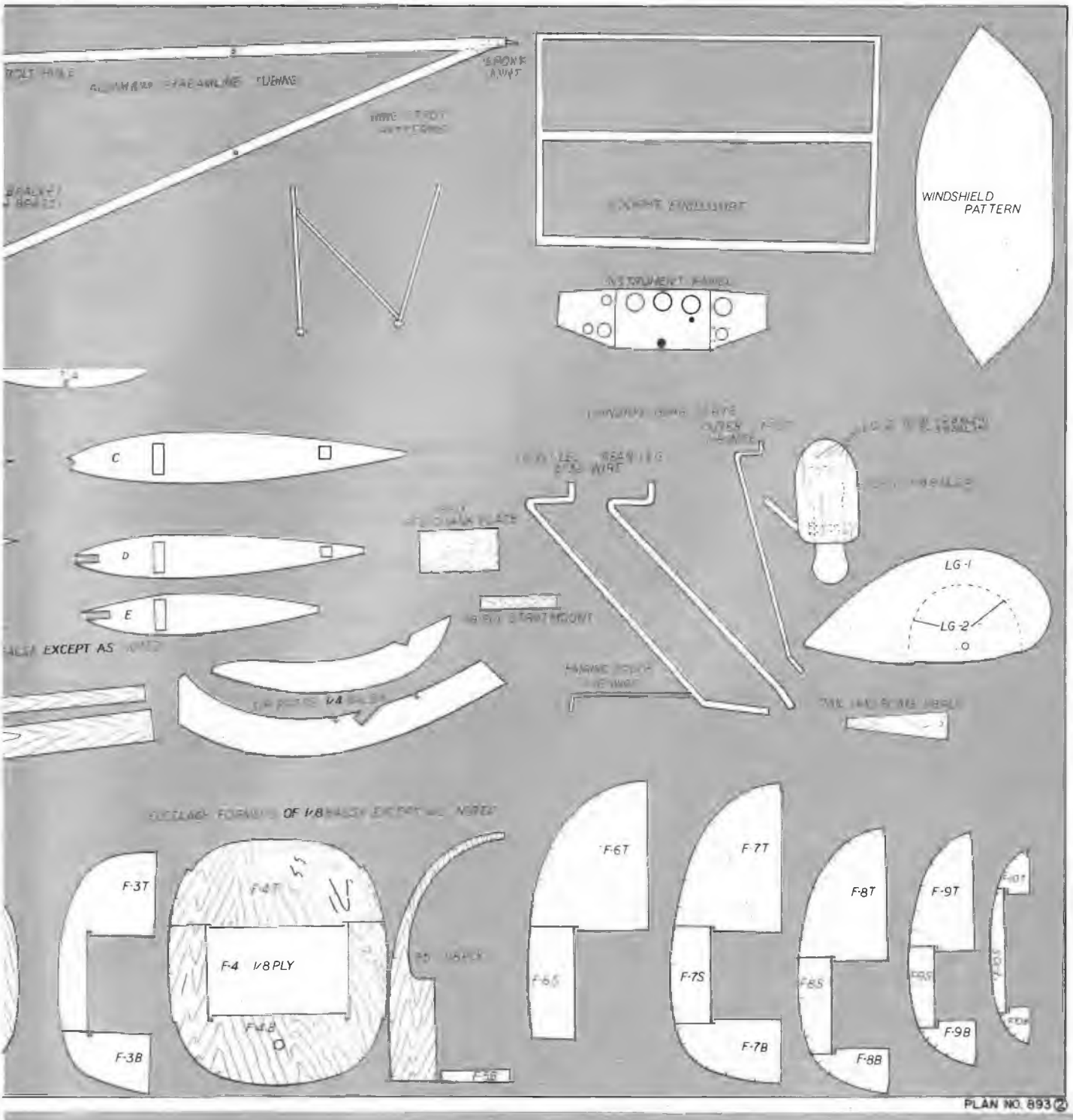
After final sanding with fine sandpaper, give the entire aircraft a coat of Balsarite and cover the model using Super Coverite. The prototype model was painted with Randolph Butyrate dope, so the following procedure was followed: Three coats of thinned (50-50) clear were brushed on the entire model. It is important to brush on these initial coats to get good adhesion. Initial coats must penetrate through the Coverite and bond to the adhesive backing for best results. Spraying these first coats will not accomplish this and you could find later that the masking may lift the base coats of finish. After the base coats are brushed on, the color coats may be sprayed with no trouble. Two coats of orange-red were sprayed on the entire aircraft and then the trim was masked off and two coats of charcoal grey were sprayed in the trim areas and registration numbers. Randolph Sunset Red was lightened with a little yellow to make the orange-red color, and white was mixed with black to get the charcoal grey color. After all markings were hand done, the entire model was sprayed

Pete Miller's
Gee Bee Zeta
(Full Size Aircraft)

Power Plants
Model Z-1 Menasco B-4 (95 hp)
Model Z-2 Menasco C-4 (125 hp)
Model Z-3 Menasco C-6 (150 hp)
Span — 30 ft.
Length — 21 ft. 8 in.
Height — 6 ft. 8 in.
Wing Area — 140 ft.
Weight (Model Z-2) Empty — 1,087 lb.
Pay Load — 240 lb.
Disposable Load — 613 lb.
Gross Weight — 1700 lb.
Wing Loading — 12.1 lb. sq. ft.
Power Loading — 12.8 lb. hp
Max Speed — 145 mph
Cruising Speed — 127 mph
Initial Rate of Climb — 975 ft. per min.
Range — 590 mi.
Specs from letter from Pete Miller, Dec. 10, 1979.



FULL SIZE PLANS AVAILABLE — SEE PAGE 194



with two coats of clear. If you have done your painting at normal temperatures and humidity conditions, you should have a beautiful finished model with a very realistic looking fabric finish. If you want more of a gloss, you can rub the finish out with polishing compound.

Flying:

If your Zeta has been built with no twists in the wing and tail surfaces, and it balances where shown on the plans, it will delight you with its flying characteristics. It is a tail dragger, so the normal tail dragger procedures should be followed. Apply power smoothly, keeping a little back pressure on the elevators until it gets rolling. Then you can release the back stick pressure and let the tail come up. A little more roll on the mains and it will lift off with the slightest amount of back pressure on the stick. Once in the air, it will do anything you ask it to. Like its full scale counterpart, it is very aerobatic and will perform any of the normal aerobatic maneuvers. It handles as well inverted as it does upright. Its limitations are dictated only by the pilot's flying skill. Landings are very normal with no vices. It slows up nicely for landings so no problems should arise.

The Zeta will give you a model that will really turn heads at a gathering of modelers. It is very attractive, a little different, and practically unknown. The Zeta has been a consistent contest winner and if you will be flying yours in contests, I will be glad to assist with good documentation as I have many original photos of the craft as well as other material. Write to: Henry A. Haffke, 1038 W. Elmer Rd., Vineland, New Jersey 08360 □

POWER BOATING

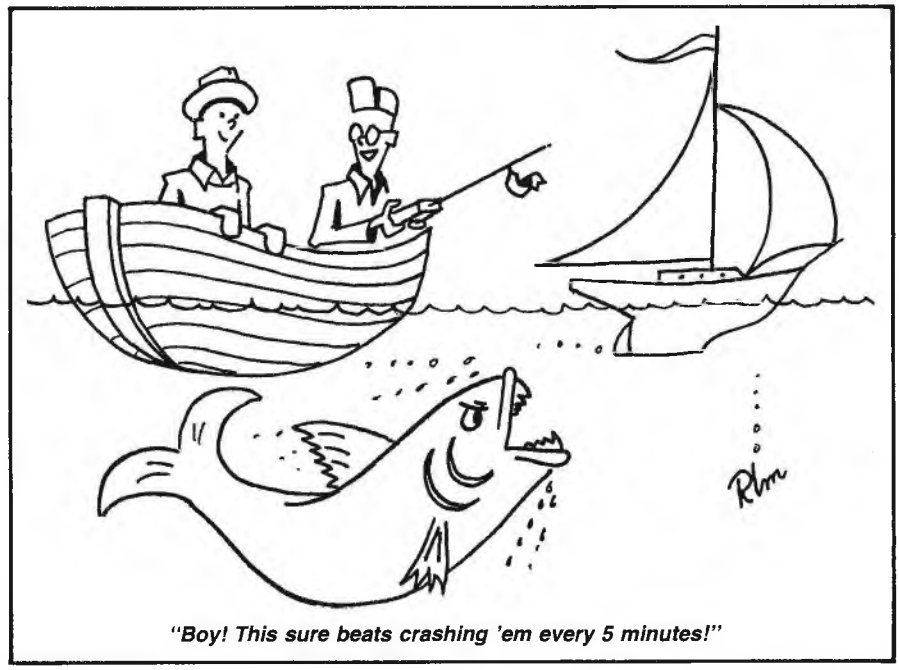
Howard Power

If any of you have ever run a large contest, you will agree that one of the most frustrating and time consuming chores is setting up the racing program. On the West Coast, heats are set up using a grid system originated, if I'm not mistaken, by NAMBA Hall of Famer and boat designer George Campbell (who by the way just celebrated his 70th birthday). Happy Birthday, George! This grid system insures that no one races against any other contestant more than once. The system does not use a random selection process but methodically rotates and mixes the contestants up very specifically. As a result eveyone races the "hot shoes" and everyone has to run around the "turtles." For many years the grid system has been available in the form of charts which are used to set up the heats. Doing this by hand usually took at least two long hard nights if you raced six or more classes on a weekend. This year the grid system described has been computerized and a grid service is available to any club who is interested. If you send a list of frequencies, names, and racing numbers of each contestant in a given racing class, Cecil Reynolds (639 Lakehaven Dr., Sunnyvale, California 94086, phone (408) 745-0979 after 4 p.m.) will set up your heats by computer and get the results back to you in less than seven days. Give Cecil a call for further details.

Speaking of contests, I received a note from Bobby Tom (Customer Service Manager Extraordinary for K & B Manufacturing) which included among other things, a recent program for one of the many outboard races that are held in the Southern California area. I always was suspicious that some of our good friends down south were not playing with a full deck but now I have the proof! The B stock OPC tunnel class was contested by the likes of the following: Joe "Jampot" Monohan, Cathie "Where's My Pitman?" Galbraith, Barry "Sir Speedy" Lawrence, Deb "Does not compute" Wiechman, AL "is that right?" Prather, John "The Chief" Broadbeck, Dot "Lovely Lady" Prather, Jerry "Huggable" Roman, Jim "Just Testing" Testa, Bob "P.S. I love you" Plumley, and Jack "Go Fast and Turn Where?" Oxley. The program also had a section of a few notes and sensible rules for racing:

1. Drivers should face the lake when racing.
2. No Dr. Pepper drinkers in the pits.
3. No body contact between caller and driver.
4. No dead boats will be allowed on the water.
5. No electric starters!
6. Contest director will **not** acknowledge complaints, certain hand signs, moans, groans, criers, snivelers, faulty engines, wild boats, recounts, strange facial expressions, drunks, strange sounds from callers, leg shakers, aluminum can collectors, bribes nudity, and anything else that is not conducive to proper model boating. (P.S. Proper bribes will be taken into consideration.)

Are these guys serious?



"Boy! This sure beats crashing 'em every 5 minutes!"

Bobby also sent me a sample of a new product from Mach Enterprises (6321 W. 79th St., Los Angeles, California 90045). The first two photos show this stainless steel adjustable cavitation plate assembly mounted on an outboard deep vee hull and an inboard set-up. The units are very well-made and will sell for $19.95 at your better hobby shops. Plate adjustment is accomplished by moving the two jam nuts at their top mounting positions to lower or raise the plates. The plates are 1⅝" long (measured along the keel direction) and 4" wide. The adjustable support arms pivot at the bottom surface of the plate and are held securely by steel brackets that are spot welded to the plate. Construction is very simple and strong. Boaters can now buy a good rigid adjustable cavitation plate assembly that's reasonably priced.

★

Mr. Power,

Recently I purchased an El Diablo outboard, and being new to R/C boating, I have several questions to ask you.

I plan to run it without the cowl, as the plans show it.

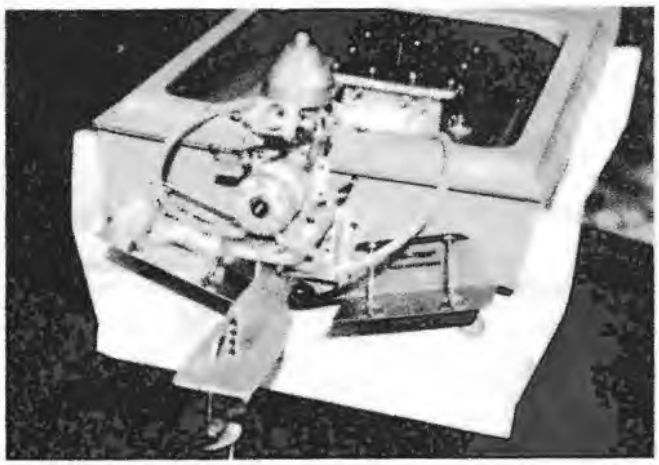
When doing this, would it be okay to place the fuel tank between the transom and radio compartment? Also what size and make of tank would you recommend?

Would it be possible for you to draw a sketch of how Jack Garcia and others place the radio gear in the radio compartment. Do they build a separate radio box or just use the whole compartment? If you have any other suggestions, I would certainly appreciate knowing them.

Thank you in advance.

Yours truly,
Harold Peterson
Butte, Montana

It is perfectly okay to place the tank



Posi-Trim plates on an outboard deep vee.

Typical inboard hull and adjustable plates.

between the transom and the radio box. You will need at least an 8 oz. fuel tank if you use high nitro fuel. I think that most people use a Pylon SS-8 plastic fuel tank in this boat. I am presenting two photos of Jack Garcia's El Diablo for your inspection. The first photo shows the general layout of the boat and its major components. The radio is mounted in the area between the sponson booms and the fuel tank compartment. Jack doesn't use a separate radio box which keeps the weight down. The steering servo is mounted in the center toward the rear of the radio box. The servo uses a double sided output arm that has two pushrods that are linked to double steering arms mounted on the engine. In this way the servo is always pulling on the engine in the direction of the turn. The fuel tank and its compartment is clearly visible. The throttle servo is mounted at any convenient position and is linked to the slide plate exhaust throttle by a K & B outboard throttle linkage kit. I would recommend that you place the heavy battery pack in the front of the radio compartment to keep the Center of Gravity forward. This helps keep the boat from flying. The first photo shows that Jack must have had some problems with blowing off because he added weights to the front of both sponsons and had to mount two large aluminum spoiler plates on the front sponson booms to keep the boat on the water.

The second photo shows the engine details. Look up my column in the March '83 issue of RCM for his engine modifications. In this photo you can see the auxiliary rudder used to turn the boat. Also look carefully at the engine mounting lug where the crankcase pressure fitting is mounted. This pressurizes the fuel tank so that a K & B speed needle valve assembly can be mounted in the engine front case without a venturi. You can't see this detail because of the beer can spray shield that Jack uses to protect

Jack Garcia's El Diablo outboard hydro.

the motor from flaming out when running behind another rooster tail.

★

Dear Mr. Power,

I am a fanatic about model boating and I have a few of them. I periodically read R/C Modeler Magazine. One of my boats is a "Hot Shot" Dumas model with a 3.5cc K & B outboard motor, exhaust throttle, second series (high-port timing).

It's the original engine and I haven't changed any parts. The engine has used approximately one gallon of gas, and I am using Apollo 15% nitro and have a JG propeller E-20. The connecting rod broke and it damaged the piston and the sleeve; I would like to know why this happened? I intend to rebuild the engine but with the highest performance capacity possible; by replacing some parts with a higher capacity and better durability, but at the lowest cost possible. What kind of parts should I use for it? Can we use parts other than K & B? If it's too expensive to rebuild it that way, would it be better to buy another one (3.5cc) or to buy a 7.5cc outboard?

I have another project and it consists of inserting a 7.5cc K & B inboard into a Dumas regular deep vee, fiberglass hull with a "surface piercing propeller." I would like to boost the 7.5cc by using the big bore intake carburetors (as mentioned in the July, '82 RCM, page 40) or by any other

Outboard hydro engine details.

method that you can suggest to me.

What kind of carburetor should I use in order to have the best performance possible, as well as the longest durability by using the big bore intake carburetor method? Can you suggest what literature I should get concerning the subject enumerated above and where I can find It?

I hope to hear from you very shortly on this matter.

Yours truly,
Francois Rivard
Quebec, Canada

Unfortunately Francois did not give me enough information with which to judge why the K & B rod failed. Normally the K & B 3.5 rod lasts a lot longer than one hour of running time. Where did the rod break? Did the lower rod bushing spin, thereby blocking the oil holes and causing failure? I recommend that you open up the oil holes to 1/16" if this happens. Considering the fuel and prop combination, I doubt that the engine was over-revved under a load. It is very possible that during starting, the engine may have been over-revved, causing the failure. In any case, K & B has redesigned their 3.5cc outboard. The new parts are much tougher than those in the old style engines. The newest engine has a thicker walled cylinder liner which tends to hold the piston-liner fit much better for a longer period of time. This piston-liner fit (tight at the top of the stroke) is very important to the power production of the engine. Since the new liner has a larger outside diameter than the old liner, this part will not fit in the old style case. To use the new piston and liner set-up you will also have to change the crankcase block to the new one. This is an additional expense and is not really necessary unless you are racing. The older style piston and sleeve set-ups are still available from K & B.

The new engine also has a bigger and stronger bar stock rod than the older models. I advise you to use the new rod when rebuilding your engine. This new rod is much stronger than the old style rod and is absolutely necessary if you desire long life using high nitro fuel. The new engine also has new high speed (rpm) bearings. I would recommend that you replace the old bearings with these newer ones. The new bearings have a plastic material ball retainer which allows them to be used at high revs without retainer failure. These bearings and the new rod are direct replacements for the old parts.

The bearings can be replaced by first removing the complete front bearing housing and crank assembly from the crankcase block. The flywheel and its nut are then removed along with the flywheel tapered collet. Find a 1/4-28 steel CB Associates (21658 Cloud Way, Hayward, California 94545) spinner nut at your local hobby shop. Screw the nut on the crankshaft and, using a small hammer, tap the crank out of the

to page 188

By Marilyn Hartsook

THOSE DARING YOUNG WOMEN AND YOUR FLYING MACHINES

More powerful than an O.S. Max engine . . . Faster than a speeding cougar . . . Able to leap over tall trees . . .

It's a bird, it's a plane --- no, it's your wife flying your R/C model airplane!!

Yes driven by desperation, frustrated wives all over America will soon be taking the transmitters into their own hands and enjoying the thrill and challenge of R/C flying.

Up until now, the fun of this exciting hobby has eluded most wives, who, because of circumstances beyond their control, could not keep a plane in the air; consequently causing a panic throughout the airfield and probably resulting in a few broken fingers when the transmitter was ripped from their hands.

My own dear husband experienced such a panic on several occasions and, as a result, I was forbidden to touch the transmitter under penalty of death or mutilation. I got the hint. I backed off, but I didn't go away. I listened, I watched, I learned.

Now the time has come to step out from the sidelines and to share the wealth of information that I've learned with other wives who have experienced similar difficulties mastering this simple sport. I have written comprehensive preflight and flight instructions to aid my fellow would-be fliers in making that all important first solo flight. I am convinced that there are many daring women out there who will want to try this innovative approach to flying.

Preflight Instructions;

You must secretly confiscate your husband's plane, fuel, transmitter, flight box, clothespins, tape and glue. Even the slightest hint of what you are considering may trigger another panic. Then go to the flying field alone and set up as follows:

Bolt the wing to the fuselage. Sometimes this is done with rubber bands. Just be sure the wing is securely in place, as the wing and the fuselage will not fly separately.

Fuel up. There are tubes coming out of the engine which must be temporarily disconnected in order to inject the fuel. There will be at least one of the several obscene looking devices for this task in the flight box. Once found, its use will be self-explanatory. Remember to reconnect the fuel lines.

Make sure you have a clear frequency. All this means is that you attach a clothespin to the transmitter antenna. Idiotic as this sounds, there is something about clothespins that clears the air waves.

Turn your transmitter on. Find which stick makes the little boards on the wings move up and down; the other stick gives it gas.

Start the engine by connecting the battery to the round thing on top of the engine. Spin the prop with your finger and give it gas. You will want to be concerned with the prop after the engine is started as it will cut your fingers off if you're not careful and, in your discouragement, you will probably never want to fly again.

Position the plane on the runway and get ready to fly!

Flight Instructions:

To keep things simple, we will keep the gas stick all the way up throughout the flight. Make sure the boards are tilted all the way up, give it gas, and up it goes.

Now if the plane seems to be doing a loop right after take-off, let up on the board stick. If you're too late, that little sucker is going to splatter all over the runway.

You will need to make a turn after a few minutes so that you don't lose sight of it, so move the board stick to one side. You'll have to guess when to let go to get it heading more or less in your direction.

You'll notice that the plane appears to sink a lot if you let it go around too much, so once you've completed the turn, you need to make it go higher again. Move the board stick up and, when it gets high enough, let go. Sometimes this causes a "stall" if not executed properly, which means that the plane doesn't want to go anywhere but down. Sometimes just letting go of the board stick will help, but if that doesn't work, then your transmitter is "dead" from when you dropped it. If that's the case, you'll be making a "dead stick landing"!

If you're still in the air at this point, practice your turns and ups and downs, but don't let it get too far away, it could get out of reach of the transmitter rays. If it doesn't respond to the controls at long range you may as well relax. Birds are happier when they're free — airplanes probably are too.

When you get tired and, hopefully, before you run out of fuel, come in for a landing. When the plane starts getting close, take your hand off the gas stick to kill the engine and move the board stick down, but let go of it before the plane is on the ground and it might straighten out and land on those cute little wheels.

I would like to congratulate you on completing your first solo flight! Perhaps your landing wasn't quite up to par, but don't get discouraged. Maybe the plane wasn't all it was cracked up to be. Once your husband gets the new plane done, I'll bet he'll be more than happy to let you fly with him, now that he knows what you're capable of. Maybe he'll even give you some flying instructions himself.

Happy Flying! □

"It's so nice of you to let me fly your favorite plane . . ."

"I killed it . . ."

BLUEBOTTLE

A QUICK-BUILD TWO CHANNEL 1/2A SPORT BIPLANE

By Jack Headley

The original concept for this model was a two channel monoplane but, as the design progressed, it began to look rather heavy and clunky, so another wing was added to lower the wing loading, and help the radio box shape. I'm not sure that the clunky looks entirely disappeared!

The name was a result of a paucity of paint in the Headley supply cupboard. The only thing remaining was a small quantity of blue Super Poxy, left over from another project. So — blue it became, and Bluebottle its name.

The project was to be strictly a sport model, with a stock reed valve Cox .049, regular fuels and props, and easy to fly. All in all it turned out that way. So, if you're into this sort of thing — flying for pleasure, with leisure, or flying with leisure, for pleasure — read on.

CONSTRUCTION

The model consists of two main items, the balsa body plus tail unit, and the foam wings. The wings are made first, as these are needed in the body construction later.

Both wings are made from "Ace" constant chord mini-foam wing kits (No. 131.192). The top wing is full span and has a balsa 1" x 1/4" T.E. added. Instructions in the Ace kit box describe how to do this. The wings are

BLUE BOTTLE
Designed By Jack Headley

TYPE AIRCRAFT
2 Channel 1/2A Sport Biplane
WINGSPAN
Upper 36", Lower 26"
WING CHORD
Upper 6½", Lower 5½"
TOTAL WING AREA
384 Sq. In.
WING LOCATION
Biplane
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
Upper 1½, Lower ½
O.A. FUSELAGE LENGTH
26 Inches
RADIO COMPARTMENT SIZE
(L) 7" X (W) 2" X (H) 3"
STABILIZER SPAN
13½ Inches
STABILIZER CHORD (incl. elev.)
4 Inches
STABILIZER AREA
54 Square Inches
STAB AIRFOIL SECTION
Flat Bottom
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5 Inches
VERT. FIN WIDTH (incl. rud)
5½ Inches
REC. ENGINE SIZE
.049
FUEL TANK SIZE
Tank Mount
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2
CONTROL FUNCTIONS
Rudder and Elevator
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa
Wing	Foam (Ace wings)
Empennage	Balsa
Wt. Ready To Fly	19½ Oz.
Wing Loading	7½ Oz./Sq. Ft.

Fuselage and tail parts.

epoxied together with 1½" dihedral under each wingtip.

The bottom wing has a shorter span than the upper, so cut each panel down to 13", making a total span of 26" before epoxying together. This lower wing is otherwise unmodified. Dihedral for the lower wing is 1/2" under each tip.

Both sets of wings are reinforced with strapping tape along the lower surface. The kit instructions again cover this operation.

The upper wing trailing edge is cut back slightly in the center section, to give the wing bands a larger radius to wrap around. This relief is shown on the plans.

Now for the fuselage.

Fuselage:

The fuselage again consists of the minimum structure, a box for the radio, a profile backbone, and all sheet tail surfaces. The radio box was designed to use sport size equipment but the guys in the headshed at RCM asked me to use the new Tower System 500 with the Mini Flight Pack. We will discuss the Tower radio in the flying portion of this article.

The first item on the agenda is to make sure that your radio will fit the box drawn, and, if not, to make the necessary modifications. The size of the box isn't really sacred.

The next step is to make a sort of kit of all the sheet pieces required, which can then be assembled almost in one step. Begin with #1, the firewall, which is cut from 1/8" ply. The engine is attached to this piece with 3/48 bolts, and blind nuts epoxied to the back of the firewall, so drill the firewall as required and install the blind nuts.

Next, cut items 2 through 6 from 1/8" sheet balsa and, from a tough piece of 1/4" sheet, cut out item 7. Make the two "fuselage sides" (the outlines of which are shown with small triangles on the plan) from 1/8" sheet also. These pieces are now assembled in the following way.

Place #7 on the plan, and mark on it the position of items 4 and 5. Now glue items 4 and 5 to 7, then attach one fuselage side, and the firewall #1. Glue the 3/8" triangular strip behind the firewall, and then the 1/4" triangular strip along the joint between the side and the floor.

Now attach the other fuselage side, followed by the triangular strips just discussed, and items 2 and 3. This completes the basic radio box, so the next step is to smooth this out with a few stratigically placed blocks; but, before this we need to make item 8, from 1/8" ply, and epoxy into place the 3/32" undercarriage wire. When this is set up it can be glued to #'s 4 and 7.

Balsa blocks are now needed in front of #8, on top of #2, and block or 3/8" sheet inside the engine cowling. (The construction photos may show additional blocks in the nose region, since originally I'd planned to have an inverted engine. Luckily, sense prevailed, and I ended up mounting the engine in its correct upright position.)

The lower wing saddles are next. These, #9 on the plan, are cut from 1/4" sheet, and glued to the bottom of #4, to help support #8. Fill in-between #9 and #7 with some scraps of 1/4" sheet. The region aft of #9 is filled in with two small triangular pieces of block.

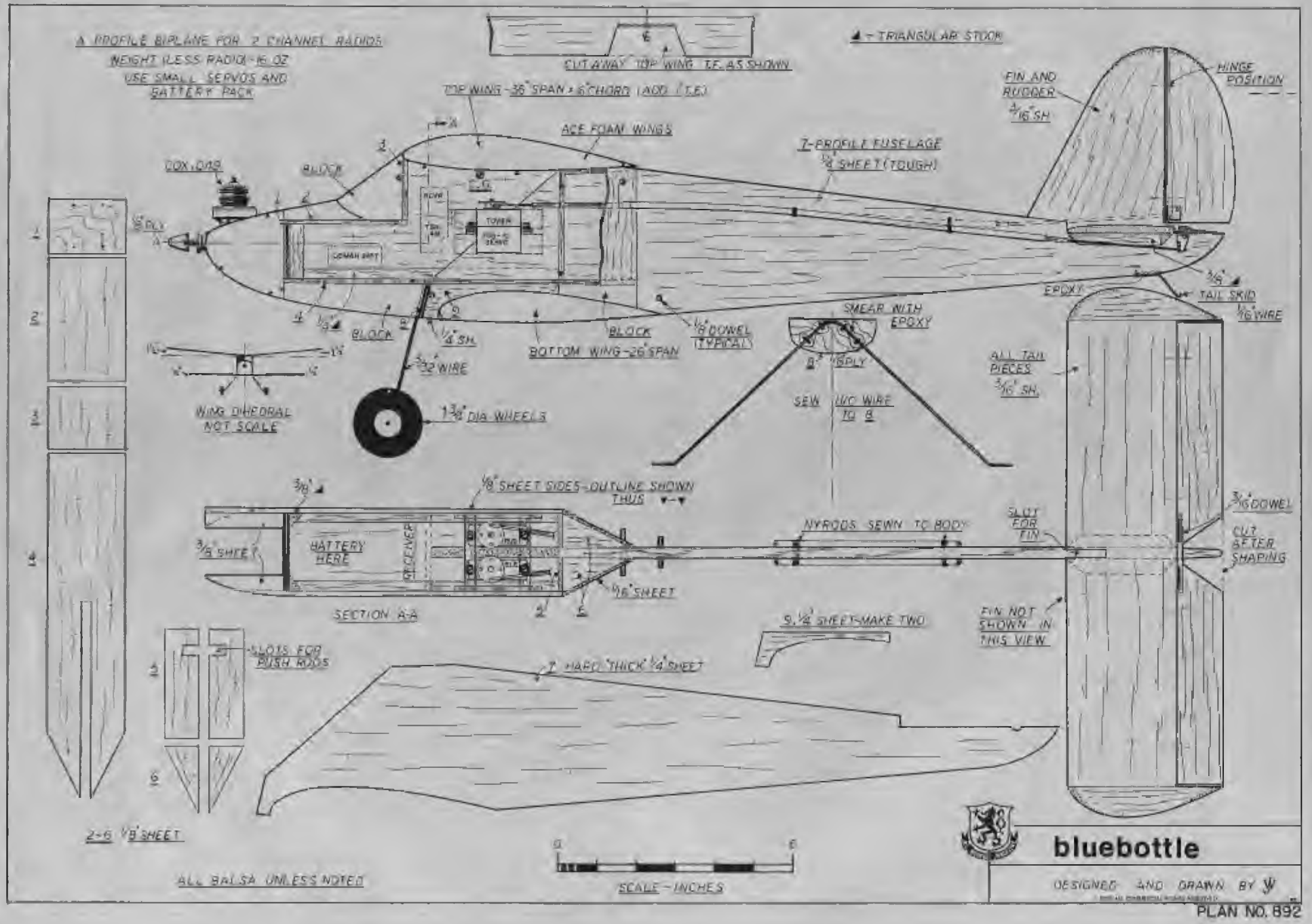
The upper wing aft section rests on #'s 6, and these can be glued in place after a quick check that the fuselage sides are supporting the top wing correctly, both fore and aft and sideways. Two pieces of 1/16" sheet close in the radio box, between #6 and #4.

Now for some sanding and contouring. The general shape required is shown on the photos, so sand away at all the blocks until this shape emerges. Also, sand on the lower wing supports until both wings line up correctly.

The tail unit is made from 3/16" sheet, and needs little comment. Note that the fin is given some support by keying it into the front of the tailplane. This whole unit is also supported on the fuselage with a couple of 3/8" triangular strips. Again, don't final glue anything into place before checking its alignment. The rudder and elevator are attached with small nylon hinges. Recesses cut into the controls help to keep gaps between the surfaces to a minimum. That's it for the basic body, so a final sanding all over, and it's time to do the radio installation.

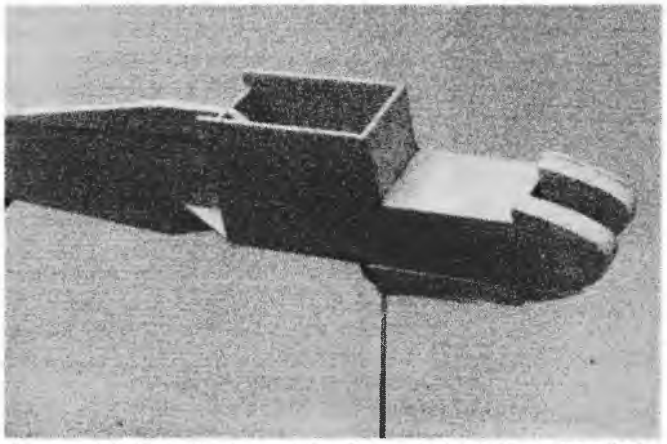
The radio pieces fit as follows. The battery pack goes into the space aft of

text to page 188

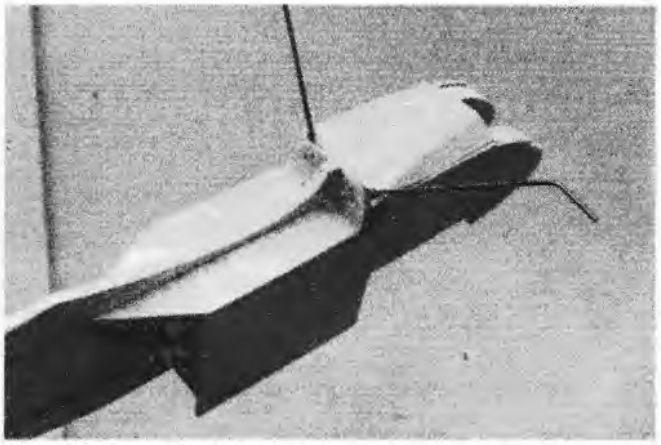

A PROFILE BIPLANE FOR 2 CHANNEL RADIOS
WEIGHT (LESS RADIO) - 16 OZ
USE SMALL SERVOS AND BATTERY PACK
CUT AWAY TOP WING T.E. AS SHOWN
▲ = TRIANGULAR STOCK
TOP WING - 36" SPAN x 6" CHORD (ADD T.E.)
ACE FOAM WINGS
FIN AND RUDDER 1/16" SH
HINGE POSITION
7-PROFILE FUSELAGE 1/8" SHEET (TOUGH)
COX .049
BLOCK
1/8" PLY
TOWER
SCRAP SHT
1/8" SH.
BLOCK
BOTTOM WING - 26" SPAN
1/8" DOWEL (TYPICAL)
EPOXY
3/8" TAIL SKID
1/16" WIRE
SMEAR WITH EPOXY
1/16" PLY
SEW U/C WIRE TO B
ALL TAIL PIECES 3/16" SH.
1/32" WIRE
WING DIHEDRAL NOT SCALE
1 3/8" DIA WHEELS
3/8"
1/8" SHEET SIDES - OUTLINE SHOWN THUS
3/8" SHEET
BATTERY HERE
FORMER
NYRODS SEWN TO BODY
SLOT FOR FIN
3/16" DOWEL CUT AFTER SHAPING
1/16" SHEET
SECTION A-A
9 1/4" SHEET - MAKE TWO
FIN NOT SHOWN IN THIS VIEW
SLOTS FOR PUSH RODS
7" HARD THICK 1/4" SHEET
2-6 1/8" SHEET
ALL BALSA UNLESS NOTED
0
6
SCALE - INCHES
bluebottle
DESIGNED AND DRAWN BY
PLAN NO. 892

First step in fuselage assembly.

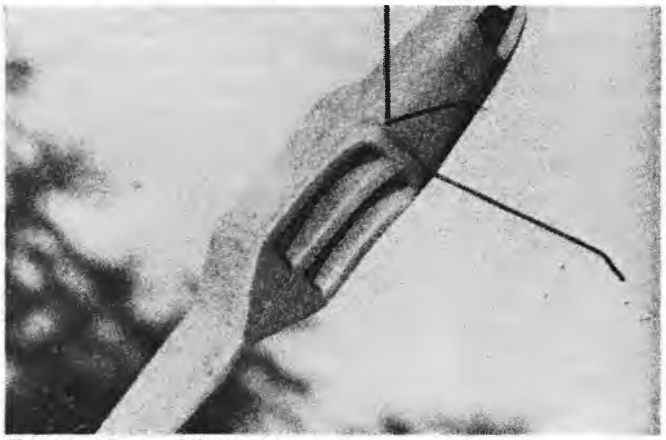
Landing gear wire is sewn and epoxied to Item 8.



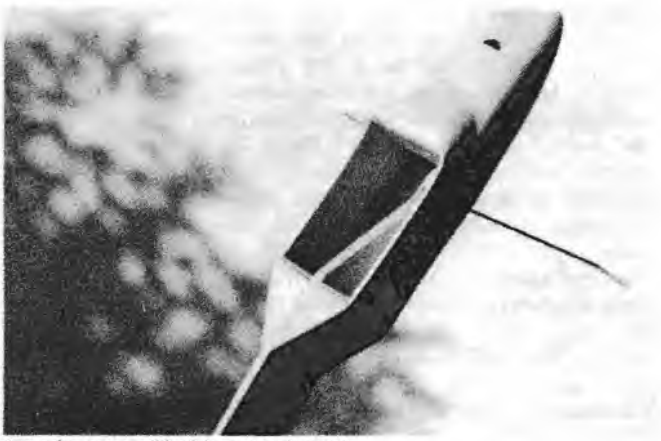
Nose and bottom blocks and landing gear have been installed.



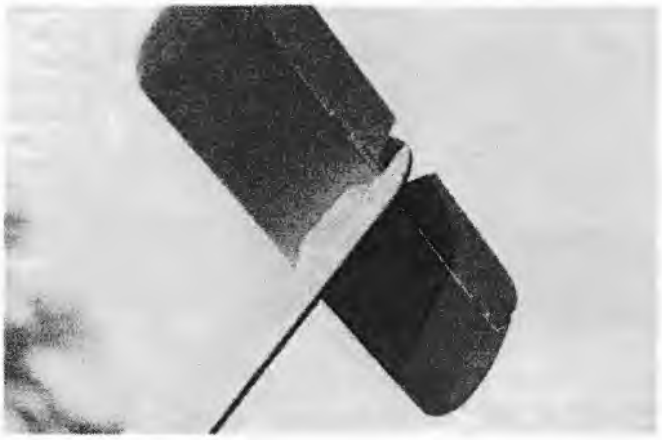
Nose bottom assembly.



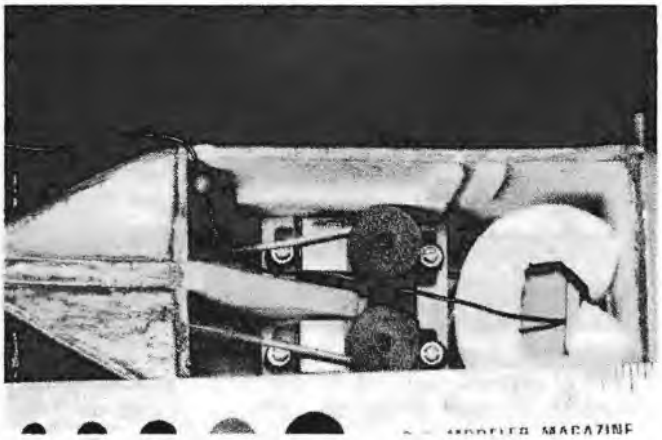
Bottom wing saddle shape.



Fuselage top filled in and shaped.



Tail surfaces shaped and installed.



Tower Mini Flight Pack radio installed with lots of room to spare.

This is the last remaining Wedell-Williams aircraft. Rosco Turner donated his Wedell number NR61Y to posterity and it now resides in the Frederic C. Crawford Auto and Aviation Museum located in Cleveland's University Center area. The management of that museum kindly allowed me to get a close look at the real thing and to obtain the actual dimensions and detail photos of a truely great aircraft.

BUMPS WITH NO GRIND

Or, The Easy Way To Make Rocker Arm Covers

By Gary Irwin

The Wedell-Williams aircraft was the product of the fertile mind of Jimmy Wedell, pilot, aircraft designer, and mechanic, aided by the money and encouragement of Harry Williams, millionaire. This craft, built by Jimmy from plans drawn on the hangar floor, dominated the air during the period from 1932 to 1935. It won more major air races during this period than any other racer. Its career and development ending sadly with the untimely death of Jimmy Weddel during a flight in which he was training a student to fly. Jimmy personally flew his own plane Number 44 to many victories, but he was prevented from sweeping all of the air races because he built three other racers for his competitors. These pilots were the top racing personalities of the era and when they saw Jimmy fly by them in the Thompson races they contracted with him to build them one. Names like Rosco Turner, Doug Davis, and Jimmy Haizlip flew Wedell-Williams aircraft to victory. The chart indicates the win record during the period 1932 to 1935.

This amazing aircraft also won numerous other major air races of the era namely the Shell speed dashes, East to West and West to East speed records, Chicago International Air Races, and a world speed record in 1933 of 305.33 mph set by Jimmy Wedell. In that event the three Wedell-Williams aircraft placed 1, 2, and 3 with Rosco Turner number 2 and Gehlbach placing third.

EVENT	1932	1933	1934	1935
Thompson Trophy	2nd	2nd, 3rd, 4th	1st, 2nd	1st, 3rd
Bendix		1st, 2nd, 3rd,	1st, 2nd	1st, 2nd

I became interested in this aircraft as a subject for a 1/4 scale model because of its brilliant history and the fact that I have not seen any models of this particular aircraft in the R/C magazines or on the flying fields. I was able to locate a plastic model of the Wedell-Williams manufactured by Williams Brothers and I used that model to obtain the graphics for the Number 44 version that I built. The Gilmore Red Lion version was much more colorful and famous because of the flamboyant nature of its pilot and owner Col. Rosco Turner, but I wanted to build the Number 44 version which was flown by Jimmy Wedell. Buried in the back pages of an old R/C Modeler magazine I also found that E.T. Packard had plans for a scale rubber band model of the Wedell. I sent for these and was delighted to find that E.T. Packard had actually known Jimmy Wedell and was allowed to "crawl all over Number 44 to take measurements, etc." The only problem was the plans were designed for a small rubber band model. However, they did provide the proper bulkhead patterns and other required data.

Thus we start an unusual construction project. All of the articles that I have read tell you how to build up a wing or how to make a fuselage with bulkheads and sticks, etc. Well, I used all of these methods to build my plane, but I want to tell you about the unique things that were done to recreate the Wedell-Williams Number 44.

First the plans. How does one go about making a 1/4 scale model from very small plans designed for rubber power. First we need to locate bulkheads in critical places like in front of the leading edge of the wing and behind the trailing edge of the wing for support. The 3/4" plywood firewall needed to be located in such a position that a Quadra would fit inside the cowling and the propeller is in the proper place. This being determined, we draw these features on the original plans.

Next we take a 35mm slide of the plans, being careful to insure that the center point of the camera lens is centered in the middle of the plans and that the face of the lens is square with the paper. Position the camera so the entire frame is filled with the plans. After developing, and you have the slide in your hands, wait until dark and project the slide across your backyard onto a piece of 4 x 8 plywood, covered with white paper. Again be careful to make certain that the projector lens is centered on the 4 x 8 plywood and the projector is square with the paper. One way to insure proper alignment is to draw a set of parallel lines vertically and another horizontally on the plans prior to photographing them. Then measure these lines on the projected image to make sure they are the same distance apart. Find out the exact wingspan of the original aircraft before continuing. Divide the wingspan by 4 and move the projector until the wing on the plans is that length. Now trace the plans on the white paper and you have your 1/4 scale set to work from.

The only other unique effort on this project was the cowling project. You will notice the cowling is bigger in front than at the rear and it has 18 blisters that were used to provide clearance for the rocker arms on the 1000 horsepower Pratt and Whitney Hornet engine. The use of blisters reduced the frontal size of the cowling on the original aircraft. The cowling for the 1/4 scale model was made by spinning a big block of foam on a Shopsmith lathe and covering it with fiberglass. After the glass hardened, the whole assembly was spun and sanded until smooth. Micro-balloons and resin were then applied like frosting on the cake and sanded on the lathe. What about the blisters? I just couldn't see carving 18 of them out of balsa so a good friend of mine, Brian Curry, who was the fiberglass consultant on the project, suggested the method, as shown in the photos, to create a lot of blisters. This method can be used to create any unique forms that may be required on scale aircraft. Enjoy! □

Photo 1. The base block that was cut out of 3/4 ply on a band saw.

Photo 2. The form that was carved to create the shape of the blisters.

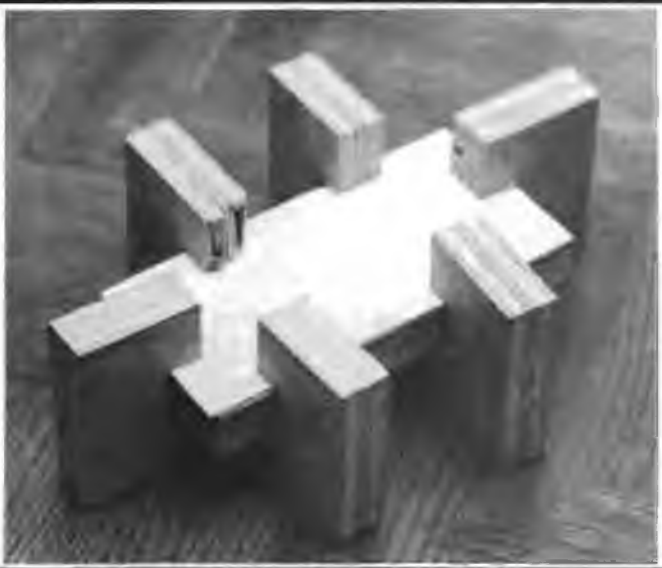


Photo 3. The plastic sheet held on the base block by some ply brackets.

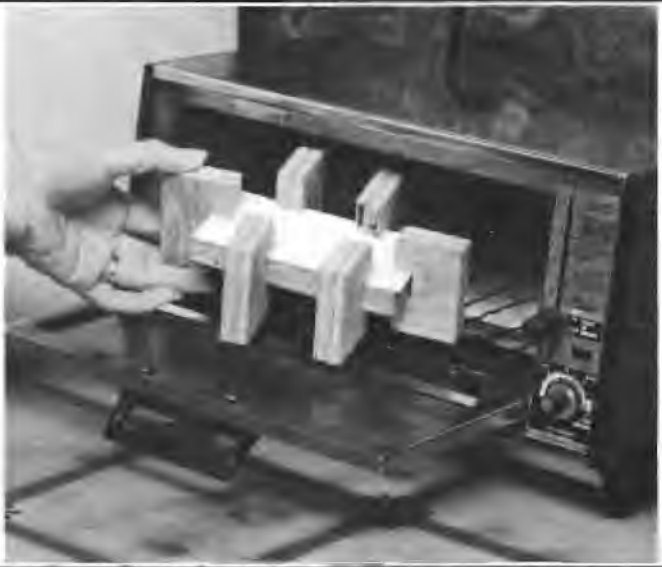


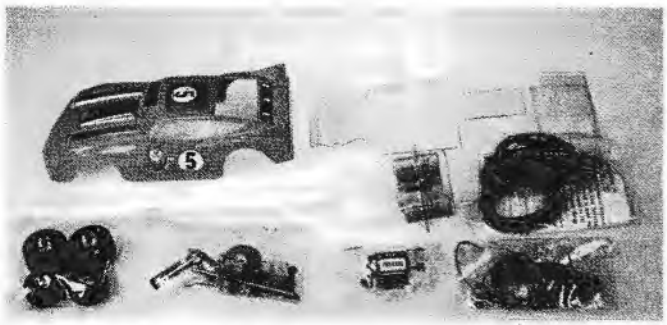
Photo 4. The whole shooting match going into our toaster oven to heat up the plastic. The form should be heated until the plastic just starts to sag.

Photo 5. The form being pushed into the base to form the blister.

Photo 6. All that is left to do is to trim the plastic with scissors, make 17 more and jet glue them into position on the cowling. One last coat of resin over the entire cowling will smooth out all of the surfaces in preparation for painting.

RCM PRODUCT REVIEW

PARMA BOBCAT



SPECIFICATIONS

Name	PARMA BOBCAT
Car Type	1:24 Scale
Manufactured By	Parma International, Inc. 13927 Progress Parkway North Royalton, Ohio 44133
Mfg. Suggested Retail Price	$69.95
Available From	Both Mfg. & Retail
Length	7 Inches
Width	3½ Inches
Height	1¾ Inches
Wheel Base	4 Inches
Track	3-1/16" Front, 3¼" Rear
Power Plant	"Little" Ferrari Motor
Power Source:	One 4-cell Sanyo Nicad
Gear Ratio	4.6:1 10 tooth brass pinion gear, 46 tooth spur
Recommended No. of Channels	2
Rec. Control Functions	Steering & Throttle
Basic Materials Used In Construction:	
Chassis	.050 Lexan Clear
Body	Lexan Painted
Wheels	Alloy, Sponge Tires
Instruction Manual	Yes (6 Pages)

RCM PROTOTYPE

Motor Used	As supplied in kit
Radio Used	Futaba FP-12F, 2 ch., wheel steering

SUMMARY

WE LIKED THE:
Parts fit, great appearance, high performance.
WE DIDN'T LIKE THE:
No problems encountered.

Parma International, Inc., 13927 Progress Parkway, North Royalton, Ohio 44133, continues to amaze us with the number and variety of their model cars. Bobcat, their 1/24 Scale, is hailed by them as the "mighty handful from Parma," and, as you'll soon see, Parma is not given to overstatements.

The Bobcat comes in an attractive carton that measures 7¾" x 3⅞" x 1¾", and features one side of clear plastic that offers an intriguing (albeit partial) view of the contents. This little devil can be purchased in one of three ways: basic roller kit; complete car less radio system; or the completely assembled kit, also less radio system. As is the practice of Parma, the carton not only lists all of the contents, but spells out in detail those items needed to complete the car. Quite a few of the kit manufacturers are now listing those materials that will be needed to complete their model, and we look forward to the time when all of them follow this commendable practice.

Past experience has taught us to expect exceptional packaging by Parma, and opening up Bobcat's carton proved to be a pleasant and almost familiar process. Parts were contained in numbered, individual clear plastic bags, and until you've assembled one of these rascals you can't fully appreciate the convenience this kind of thoughtfulness gives.

Take a quick look at the second paragraph in this review and note the carton size. Keeping those dimensions in mind, take a look at what was inside that box: the Lexan monocoque chassis, the painted body, torque tube, motor mount, mounted and trued tires on alloy wheels, axles, Oilite bushings, steering blocks, tie rods, electric motor, pinion, speed control resistor, wiper arm, reverse switch, **all** electrical hook-up hardware, batteries, and charge cord! From all of this, you can readily understand why the component packaging system that Parma uses is so very welcome.

Assembly:

The six page, 5½" x 8½" instruction manual was blessed with a beautiful double page, detailed exploded view drawing that showed the location of every individual part in the car. The artist, R. Czentorycki is the same person Parma has used to illustrate instruction manuals for some of their other cars, and he does an outstanding job on these illustrations.

The written instructions are well-done and, when used in conjunction with the aforementioned drawing, really make assembly an easy job. Each step follows a logical sequence, and initial work starts with getting axles and wheels mounted on the chassis, with the rear axle wheels and tires first, followed by the front axle assembly, wheels and tires. If you have not yet had the opportunity to look over one of these little cars, we are here to tell you that lots of

thoughtful design has gone into them. For example, caster and camber in the front end geometry is taken into consideration and handled by a kingpin bolt that goes through what Parma calls steering blocks. Pre-drilled holes ensure that the kingpin ends up at just the right angles. Adjustment to the tie rod for proper toe-in completes this important phase.

The "Little" Ferrari motor was the next item on the list, and it proved to be an easy, no-hitch job. Held in position by two screws, the motor can be moved and adjusted for the smoothest gear mesh with the least amount of backlash.

The steering is, of course, done by servo, and we very quickly learned that when Parma stipulates that the Futaba S-20 series (or similar size by other manufacturers) be used, they meant exactly that. There is just no way your "run of the mill," ordinary everyday servo is going to fit into the small space allotted for the steering and throttle servos. Take it from us, we tried --- and failed. So, a couple of Futaba S-20's were obtained and, presto, they fit --- close, but they fit. The steering servo is held in position with servo tape, and while we had some initial misgivings about how this would work out, we are pleased to say that despite a goodly share of bangs, bumps, and crashes into the front and sides of the wheels, all is still secured solidly in place and pointing in the right direction.

Radio & Electrical:

The receiver was mounted on the right side of the chassis, just aft of the steering servo, and was also held down with servo tape. The antenna wire was coiled and stuck down on the top of the receiver by yet another piece of tape. The throttle servo was located on the left side of the chassis, to the rear of the steering servo and, you just have to know, was held there by servo tape. If we haven't mentioned it yet, the servo tape was also a furnished item in our kit.

It is necessary to cut and trim the throttle servo arm in order that a wiper arm can be installed for the speed control. A smooth, rounded edge was cut and trimmed on the opposite end of the servo arm and, when moved by the servo in the right direction, actuates the reverse switch. Following the written and pictorial instructions yielded a nice job with little difficulty.

The four 1/2AA 1.2 volt, 250 mah Sanyo nicads (furnished in the kit) were wired via their already installed solder tabs, and were placed in the clear plastic case. Simple wiring was completed, and while we felt this was, perhaps, the most difficult part of the whole project, it was really a no-problem job.

Performance:

Having had a chance to "wheel and deal" with other Parma cars, we were more or less prepared for what followed. Mind you, we didn't say we were completely ready --- just more or less. After an initial 5 minute charge of the batteries, we spent some time getting proper adjustments on our speed control resistor and reverse switch. These adjustments are not difficult to make, but precise settings are a must.

Once we completed our speed control adjustments, we were ready for our test run. Well, almost ready. Let's just say that Bobcat was ready and we were willing. We felt that the short wheel base would require a smooth track surface, and so an early morning trip to a nearby tennis court was decided upon. We'd discovered the marvels of the surface quality of tennis courts during the last car test we conducted, and recommend them with high marks.

Bobcat, as expected, was very fast in acceleration and flat out straight runs, with control responses --- well **immediate** is a word that comes to mind. We quickly (no pun intended) found that smoothness in throttle and steering handling was almost a must. Although we had operated some of Parma's larger models in the past, we still found ourselves pleasantly surprised with the various maneuvers Bobcat let us get away with. After a brief spell of pretty straightforward running, we laid out a little impromptu course on one half the tennis court with our old baseball cap as pylon 1, sunglasses made up pylon 2, and the neatly coiled charging cord ended up as the third corner of our triangular course. It soon became evident from the consistently shorter lap times we turned that Bobcat was an easy car to get used to, with performance limited only by driver ability.

Conclusion:

We found nothing surprising in Bobcat, and by that we mean that kit quality and model performance was right in line with Parma's usual high standards. Thanks to the excellent double page exploded view drawing in the instruction manual, all parts were readily identified and assembly simplified. The careful novice will have no problems following the step by step instructions, and the end results will be a good looking, fast moving, highly maneuverable 1/24th Scale racer. It is always gratifying to build a model that **looks** good. It's a doubly happy day when it performs as advertised. We are here to tell you that Bobcat nails down both those categories — with ease. Parma, take **another** bow.

□

GIVE IT A WHIRL

John Gorham

Gyro Review

I promised last month that I would give a review of all of the gyros available on the market today. These gyros are of the type described last month and are known in the business as "rate" gyros. They stabilize the helicopter or other flying machines. Well, I didn't quite get all the material that I requested from the manufacturers in time and rather than do just one or two I thought I would wait until next month and cover them all. There seems to be basically four available on the market. These are marketed by Airtronics, Futaba, JR and Kraft. The Kraft unit appears to be the smallest and least expensive and it certainly works well in my machines. Well I'll be sure to have all the material on hand by next month and provide a review of the gyros then.

Readers' Letters

I receive many news letters these days and we try to give you extracts of what I believe will be of general interest in the column. The Southern Ohio radio Controlled Helicopter Association of Cincinnatti, Ohio, always has a good neswletter but this time one section caught my eye and I thought you would like to share it with me for a couple of reasons. The first is that the extract is by Dwayne Stephens who I greatly respect as a helicopter flier and Nats CD but also because, once you've been able to read it, it does give a few axioms which are important to us modelers. So here it is, by Dwayne Stephens, "What Makes a Good Club":

XVXRYONX IS NXXDXD!

Xvxn though my typxritxr is an old modxl, it works wxll xxcxpt for onx of thx kxys. I wishxd many timxs that it workxd pxrfxctly. It is trux that thxrx arx forty-thrxx kxys that function wxll xnough, but just onx makxs thx diffxrxncx. Somxtimxs it sxxms to mx that our organization is somxwhat likx my typxwritxr — not all thx pxoplx arx working propxrly.

You may say to yoursxlf, "Wxll, I am just onx pxrson; I won't makx or brxak thx club." But it doxs makx a differxncx, bxcausx any club to bx xffxctivx, nxxds thx activx participation of xvxry mxmbxr. So, thx nxxt timx you think you arx only onx pxrson and say that your xfforts arx not nxxdxd, rxmxmbxr my typxritxr and say to yoursxlf, "I am a kxy pxrson in our organization and I am nxxdxd vxry much."

I believe that says it all. So please, each member become an active participant.

Dwayne Stephens

Here's another letter, by Mike A. Niday of San Francisco. Mike's letter is in response to my request for feedback following the article on simulators. Although the letter is quite lengthy I feel it is of enough general interest to be published in full.

Frasca Aviation's helicopter simulator for teaching full size helicopter flying.

Dear Mr. Gorham,

I know that you usually receive letters with comments and suggestions from novice to expert fliers, so I feel awkward writing this letter, since I have never even flown a helicopter one time, but I hope that this suggestion could help some of your readers. You also stated that you would like some feedback, so here goes.

Being extremely interested in purchasing and flying a helicopter, I picked up a copy of RCM (March 1982 issue) and read your "Give it a Whirl" article. I noticed that you place a strong emphasis on being able to comprehend and cope with the problems associated with applying force to mass, to control acceleration and position. Having studied some physics, I can understand, on paper, the potential problems that can occur with this phenomenon. However, just as you have stated, trying to deal with Newton's basic laws of motion on a practical, hands-on basis is another story altogether.

It is true that trying to explain to someone "just what to do" on paper can be a very difficult task, and I stand in awe of the amazingly simple way you explained the problems and solutions in your article. What I am trying to get at is, if prospective and novice fliers could deal with this method of controlling mass with controlled force in a practical way, **before** *they try to launch a megabuck bird, it might be somewhat easier to handle the problems that might (or eventually will) occur.*

All this suggestion takes is a pocket full of quarters, and a willingness to try something out of the ordinary. It is this: head down to the local video game arcade and take on one of these three machines: "Asteroids," "Luner Lander," or "Space Wars." These three

games all have one thing in common — they involve a spaceship floating in space (the mass) that you must maneuver (control the movement) by applying precise amounts of thrust (force). These machines (especially "Space Wars") are actually programmed with correct formulas and computations as to present a most "real life" situation as possible. Once you apply thrust to the ship, it will accurately accelerate until you apply thrust in the opposite direction, and then it will slow down, and eventually stop. This same principle is used to turn the craft. The two games "Luner Lander," and "Space Wars" even offer variables, such as adding "weight" to the craft, so considerably more amounts of thrust are needed to maneuver the spaceship, and the craft becomes more difficult to handle. The best part is, if the "Apollo module" crashes, the most you can lose is your quarter, and your patience. This concept has another distinct advantage: Once the "pilot" understands and is able to conquer one set of variables (such as being able to maneuver a ship in one video game), it becomes much easier to maneuver a craft with different variables. I can only use myself as an example — once I mastered "Space Wars," the other games were much easier to play. Now since a helicopter works on basically ***the same principle,*** *although of course with different variables, I feel that it just might be easier for me to learn how to fly one.*

I know that this sounds a bit far-fetched, but remember — they laughed at the man who ***invented*** *the helicopter!*

Thank you for your time,
Mike A. Niday

Mike, you might be right; now where did I put those quarters? (Me too! — Dick Kidd.) On the same subject I also received a letter from John B. Huismann, who is a Vice President with the Frasca Aviation organization located in Champaign, Illinois.

Frasca has been producing simulators for teaching full sized helicopter flying for many years now. You'll seen from the photograph that Frasca's simulator also has a small but very realistic looking helicopter mounted on an articulated post and the motions of this model reflect what would be the motions of the full size one reacting to the pilot's inputs. John says that the original systems were all mechanical but now they are all solid state. John is also a modeler and did his first successful radio controlled flight with one of Dr. Walter Good's first R/C flying machines. Coincidentally, John, I also did my first radio flying with Walt Good's famous old "Rudder Bug." In those days radio control consisted of trying desperately to make a successful landing after the engine had stopped and the model had progressed to somewhere between 1/4 and 1/2 mile downwind. It was hard to see — let alone land. Ah well, the good old days. Now our expert heli fliers believe that they have a problem if they cannot conduct an autorotation landing onto a 3 foot diameter pad!

I also received a letter from Marvin L. Reese of Wichita, Kansas, who tells me of all the help he got from local fliers in getting his helicopter airborne. The most important part of

CONTEST ANNOUNCEMENTS

INDIAN CITY RADIO CONTROL CLUB
DETROIT EXPO V
Aug. 26, 27, 28, 1983. Benjamin F. Yack Recreation Center, 3131 Third St., Wyandotte, Michigan.
For further info, contact: Verne Luedeman (313) 295-0569.

DEMAJAGUA RC FLYING CLUB
EL COQUI
Sept. 3, 4, 5, 1983. Fajardo, Puerto Rico
For further info, contact: Joseph Micalizzi, S.R. 00866 Box 1532, Fajardo, Puerto Rico 00648. Ph. (809) 863-3387.

NORTH AMERICA'S LARGEST HOBBY/CRAFT SHOW
HOBBY '83
Oct. 14, 15, 16, 1983. Toronto International Centre.
For further info, contact; Ted Curl, Hobby '83, 924 Brock St., N., Whitby, Ont., Canada L1N 4J6. Ph. (416) 683-7766.

If your club is planning a show or contest, fill out this form and we will publicize the event, space permitting.

Name of Club: _____

Type of Event: _____

Date of Event: _____ **AMA Sanction #:** _____

Location: _____

For further information, contact: (name, address, phone no.): _____

_____

his letter, however, was the information that one of the earliest and most enthusiastic R/C helicopter fliers and one of the most active helpers for the beginner, Bob Braden of Ponca City, Oklahoma, recently suffered a severe heart attack. I haven't had a chance to talk to Bob since that time but by the medium of this column I'm sure there are many, many people who have been helped into hovering their helicopters who will join me in wishing you a speedy and complete recovery.

One of the reasons for this column being a very short one this month is that while I write it "Toledo" is upon us. So I have to pack my bags and make my way cross country yet again to the "Greatest Model Show in the World." I hope to see, at last, at this year's Toledo show, that helicopters are no longer a curiosity that persuade a handful of spectators to leave the show in the wind and rain to see them fly at one of the local hotel parking lots. This year the crowd should enjoy viewing and talking about a very wide variety of helicopters and some of the very rapid technology advances that competition is inevitably provoking. And, of course, video is helping considerably in the advancing of our section of the hobby.

Well, it now seems that the next column will be a busy one since I will have just returned from the Toledo show and must compile the promised review of rate gyros. Meanwhile, if you're anxious, call your local dealer or the manufacturer and find out the availability and prices for yourself. Do consider trying a gyro, though, since it really can help you considerably, not only in your early hovering efforts but also in making maneuvers look just that much smoother.

'Till next month. □

RADIO SPECTRUM

Jim Oddino

My first mistake was to visit the Tournament of Champions in Las Vegas last November. Two weeks later I dusted off the old Curare and was flying again.

My second mistake was to stop in at RCM and pick up a German R/C magazine that talked about PCM radio control systems. I was hooked again just like the first time around. Something about airplanes and electronics I can't resist.

I could say my third mistake was to offer to write some more columns, but I really kind of enjoy writing about this stuff if I'm playing with it anyway.

My original plan was to confine the column to reporting on new products, but if readers have interesting questions or ideas that they want to share with the world, we'll consider them for publication and, after reading some of the new contest rules I know I'm going to have trouble keeping my mouth shut on the subject of rules against electronics. So the format will be flexible. One last comment. Don't get excited if you don't see a column every month.

New Products

I'd like to give you a feel for some of the things I plan to cover. During all of my inactivity I did page through the magazines. I noticed ads for SR battery packs which I heard were something special so Dick Kidd sent some over to evaluate. Other magazines have covered them but I'll give you my test results and opinions.

The most exciting thing on the horizon is Pulse Code Modulation (PCM). After seeing the German ad at RCM I heard that Cliff Rausin of Condor Hobbies was considering importing a system. I called to find out more and Cliff offered to let met evaluate one. Naturally I said yes and I've spent quite a bit of time looking it over. PCM is a step closer to a true digital system as we discussed way back in 1979. It has some real advantages and I believe it is the system of the future. It is basically noise free. It is impossible for the RF link to inject noise which will make the servos glitch. If the information does get corrupted by interference, the pulse to the servo will hold the last good command it received. If the interference lasts more than a few seconds, the servos go to a fail safe position. Presumably, you could make your model fly in a big lazy circle with the engine throttled back. I can hear it now. Instead of, "I've got a glitch," we'll here modelers yelling, "I dropped a bit."

Cliff also sent over an airborne tachometer / telemetering system that ought to really help in selecting engines/props for your airplane. I sometimes think that static tests on the ground don't tell the whole story.

Another product which I'd like to cover is the Rate Gyro. I understand some of the guys have been putting them in fixed wing airplanes with very good results. I also see where already there are people trying to outlaw them. I will never understand why anyone would want to retard progress of anything that makes models fly better. But it has always been that way.

As other new products come along we'll try to get our hands on them and give you a report. So let's start out with the new battery packs.

SR Battery Packs

Quite a bit has been written on the SR Battery Packs so I won't go into all the same detail. Bob Aberle did an extensive product review in the January issue of Flying Models for those who are interested. The most attractive pack to modelers is one that is rated at 900 mah. At that capacity it provides almost twice the flying time at a weight penalty of about one ounce. I've tested two packs and while they were slightly under the rated capacity they look good. See Table 1.

Tests were run on the Ace Digipace which discharges at a constant 300 ma. The capacity would be less if discharged at 900 ma, so maybe the pack is rated a little on the high side but the important point is that you will get almost twice the capacity at discharge rates typical of model aircraft.

The SR 900 is also great if you fast charge. After discharge I charged it with an S & O fast charger for twenty minutes. It was then discharged for 95 minutes on the Digipace yielding 476 mah. So the twenty minute fast charge was almost equal to the 14 hour standard charge on a 500 mah pack. I plan to put one in my airplane. That is the highest recommendation I can make.

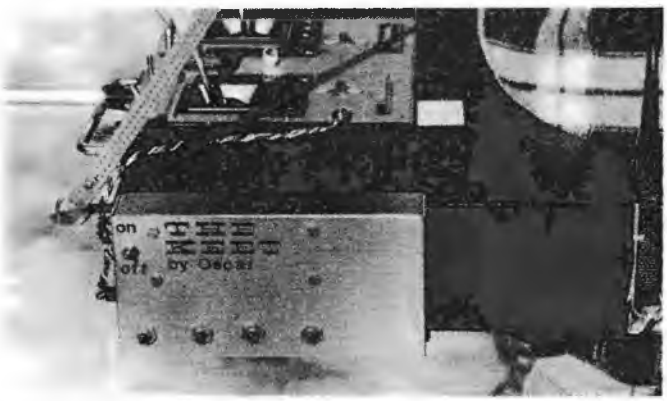
TABLE 1

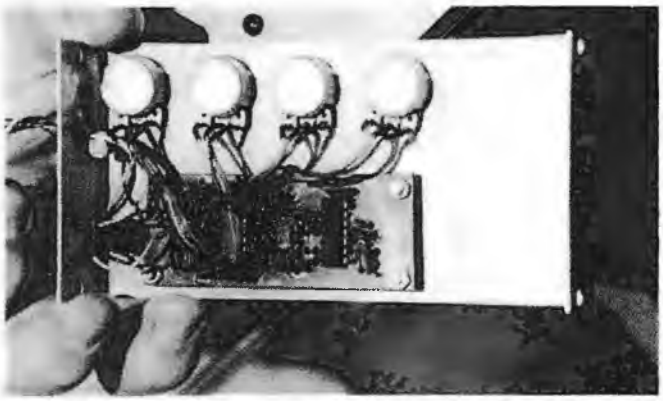
PACK	TEST	DISCHARGE TIME (MIN)	CAPACITY (MAH)
1	1	164.5	821
	2	170	850
	3	167.7	838
2	1	179.3	896.5
	2	165.3	826.5
	3	179.8	899

Knife Edge

Electronic Trim (Keet)

Just before I quit writing this column in 1981, I got an excellent input from Per Husum of Oslo,





Norway. I dug it out the other day when one of the guys at the field was complaining about his airplne turning towards the canopy in both knife edge positions, requiring him to push in just the right amount of down elevator. I'm sure many of you have similar problems so here is the solution.

Dear Mr. Oddino,

We wrote to you a couple of years ago about how different pilots liked different brands of radios. "We" are a "bunch" of R/C pattern pilots in the Vingtor RC Club located in Oslo, Norway.

At this time we present to you (and readers of RCM) an electronic device we have found useful in pattern flying. Let me explain. There are several maneuvers in the new FAI pattern requiring knife edge flight. Slow roll, four point, eight point roll, reverse point roll, and especially reverse knife edge, are easier to fly if the model has good knife edge performance. Last summer one of us tried a new Curare that showed some real bad habits in knife edge. In left k.e. (left wing down) the model rolled out again, but in right k.e. it rolled over to its back. In this case, it's not very easy to cut the wing in the center section, and glue it with a different dihedral. To make things even worse, the model turned to the cockpit side in left k.e. and to the wheels in right k.e. It's difficult to adjust the flaps to get rid of this trouble.

We asked all of the top pilots in Norway and Sweden and nobody could really help us. Reading U.S. and European model magazines from years back did not help much either. I suggested (as a joke) that we should have a device on the transmitter where we could adjust some potentiometers to get good k.e. performance. One of us, Magne Norland, who is studying electronics at the University, said it might be possible to make such a thing. In this way the "KEET" was born. KEET is the initials of Knife Edge Electronic Trim.

"The black box" works as follows. There are four pots that can be adjusted with a screwdriver. When the model is flown in left k.e. (knife edge, left wing down), let us say it rolls out again, when applying the right amount of right rudder, and let's say the model goes a little to the cockpit. Then a helper adjusts one pot, and then just enough aileron to the left side is given and the model will hold knife edge without rolling out again, when applying enough rudder. The same thing happens in the elevator mode. Applying rudder, we adjust another pot so the right amount of (down) elevator is automatically given. The KEET is as you see a sort of advanced mixer. Giving the right amount of rudder for knife edge flight, the box gives the required amount of aileron and elevator. Of course, very little aileron and elevator are needed to get straight knife edge flight on a pattern model.

The point is, giving left rudder, you get the required amount and direction of aileron and elevator. Giving right (opposite) rudder, you also can get the required aileron and elevator. The amount and the direction this time is independent of what you had when giving left rudder.

In use at the flying field, the pilot flies knife edge to one side, applying just enough rudder so the model will not go up or down. The helper then adjusts two pots (aileron and elevator) and repeating this procedure for a few minutes, left knife edge is as straight and good as you could ever want it to be. The same thing is then done with knife edge flight to the other side.

It is very impressive to start with a "dog," and on one flight have fantastic knife edge characteristics. Slow roll, point rolls, are easier to fly, and reverse knife edge (K-factor 4 or 5) is now a real pleasure. With the KEET it is very easy to fly perfect knife edge for more than 200-300 meters just applying rudder, no aileron, no elevator. As a matter of fact, the pilot can put his right hand in his pocket, to show that perfect knife edge is possible just using rudder (Mode 2). Remember this is with a

model with bad knife edge performance without KEET.

We built an on/off switch so we can turn the KEET off in other maneuvers, but this seems unnecessary. We can't see any difference in loops and stall turns (Fig. M) whether the KEET is on or off.

So far, we have used the KEET in competition pattern models, but we believe that it can be used to advantage in sport planes and in some scale models. If you ever have tried a slow roll with a Pitts scale model, you will know what I mean.

We have built the KEET inside the transmitter with the four pots sticking out on the back of the transmitter, so that they can be adjusted. For those pilots using a tray, we put the electronics in a box on the side of the tray. In this way it is easy for the helper to adjust the 4 pots.

Well I don't know a transistor forwards or backwards, so let Magne take over.

Circuit Description

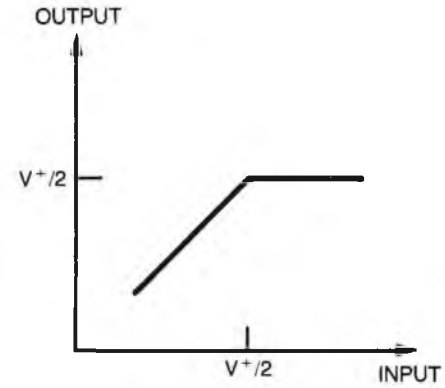
The KEET is built using three basic operational amplifier circuits: "The ideal diode," a voltage buffer and the ± adjustable gain amplifier. The voltage buffer is used in conjunction with a voltage divider to make a low impedance V/2 voltage reference to be used several places in the circuit.

The component values shown in the schematics are chosen to fit the Futaba J-Series transmitters. In these transmitters, the pots are such that the wiper travels from ground V^+ as the stick is moved from one extreme to the other. Neutral rudder corresponds to $V^+/2$.

In order to keep the input — and output — voltages within the op-amps linear region, it is necessary to use a voltage divider between the rudder stick-pot wiper and the op-amp inputs. To keep the input linear around $V^+/2$, the divider must be connected between the wiper and the $V^+/2$ reference.

To distinguish between right and left rudder, the circuit used two so-called "ideal diodes." This is a diode with an op-amp to compensate for the forward voltage drop. The outputs of these are tied to the $V^+/2$ ref. through two resistors. The resulting transfer functions are as shown in Figure 1.

These output voltages are fed to four amplifiers with gain adjustable between $+K$ and $-K$. K is dependent on the resistor values. It is necessary to have amplifiers with these characteristics to be able to choose different mixing amounts and directions for right and left rudder. Note that these amplifiers also have their zero levels at $V^+/2$.



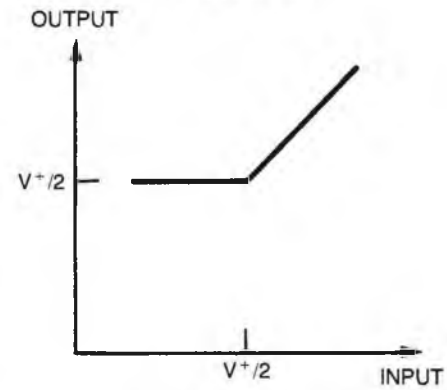


FIGURE 1

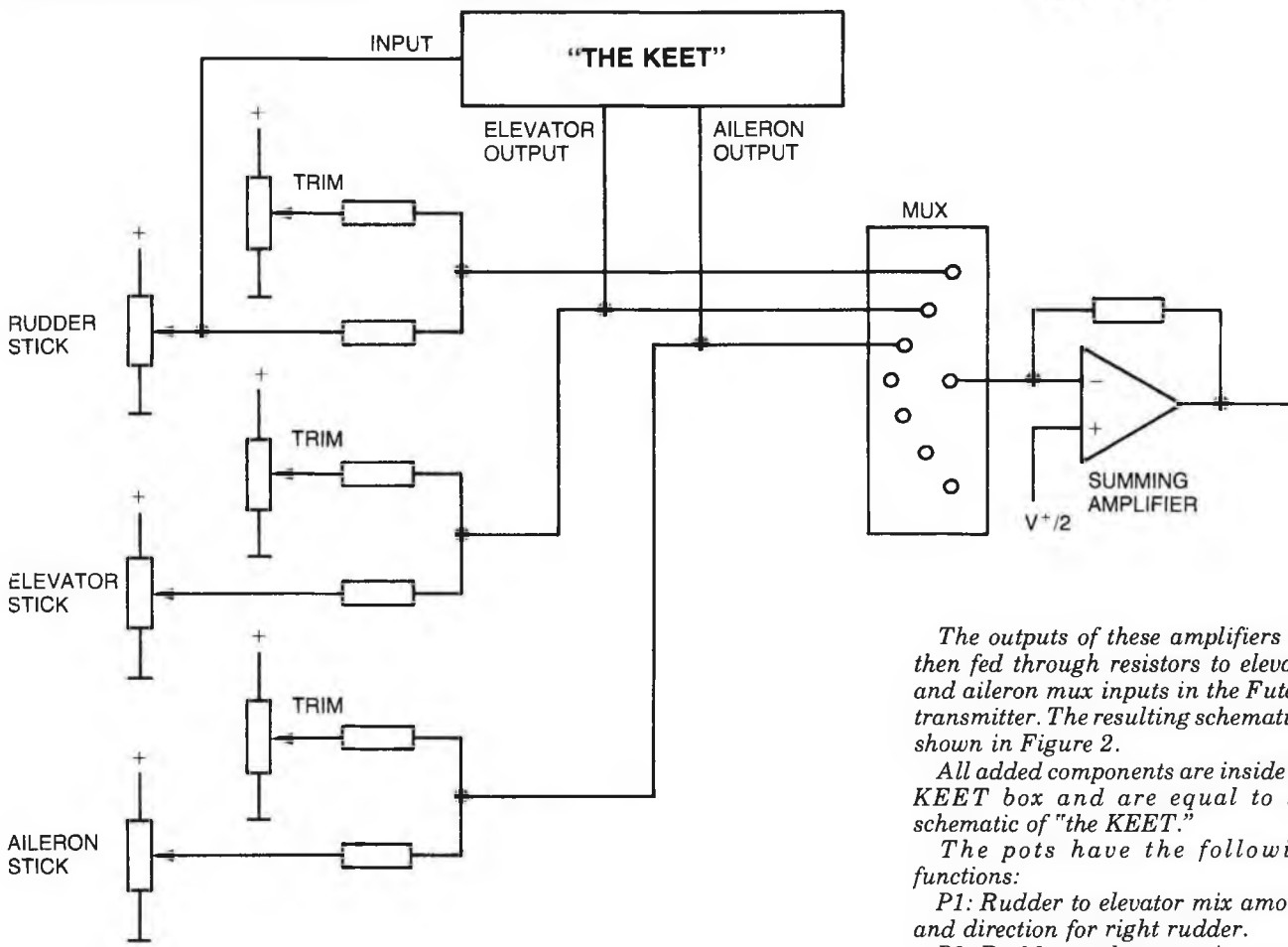


FIGURE 2

The outputs of these amplifiers are then fed through resistors to elevator and aileron mux inputs in the Futaba transmitter. The resulting schematic is shown in Figure 2.

All added components are inside the KEET box and are equal to the schematic of "the KEET."

The pots have the following functions:

P1: Rudder to elevator mix amount and direction for right rudder.

P2: Rudder to elevator mix amount

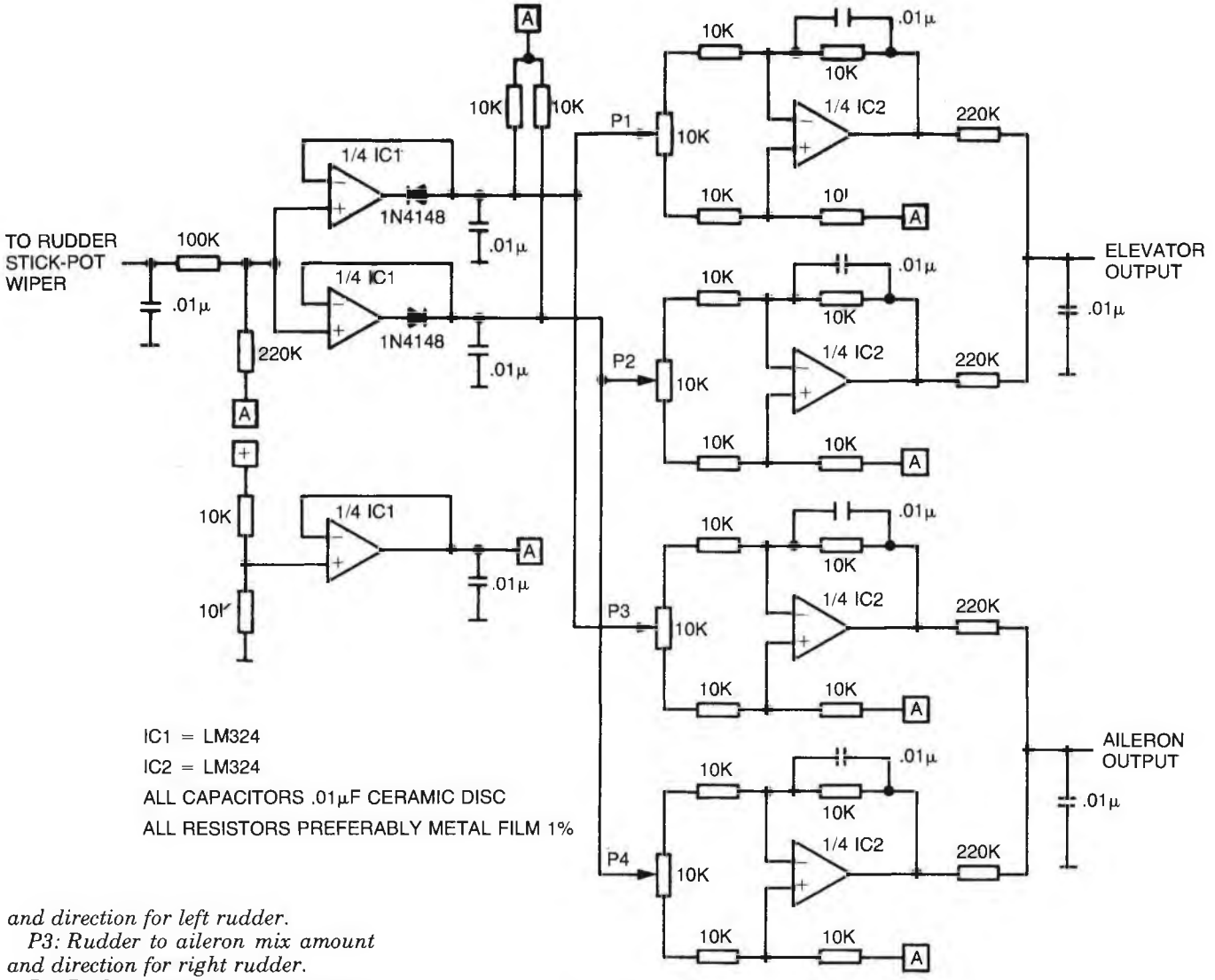


FIGURE 3
KEET SCHEMATIC

and direction for left rudder.

P3: Rudder to aileron mix amount and direction for right rudder.

P4: Rudder to aileron mix amount and direction for left rudder.

All the capacitors are decoupling to reduce RF interference. They are really necessary.

If the pots are mounted at any distance from the circuit, their wires must be decoupled at the circuit end.

Note that the KEET is a pure add-on. There are no changes to the transmitter itself. If you want to have an on/off switch, you must insert a two pole switch in the two outputs from the KEET. The KEET can also be made as a plug-in unit with a five pin plug (+, −, input, elevator, aileron output).

Magne Norland
Oslo, Norway

Well, I think that should be all for this time. We will send you a nice solution to the exponential problem in the near future.

Keep up your nice work. As we say now --- Jim and Don (Lowe) are the two who make RCM a good magazine --- no, an outstanding magazine --- in the model world.

Sincerely
Per Husum

P.S. Magne is working on a "programmed" transmitter with which we hope to fly most maneuvers to 10. This will not be the same transmitter that can "remember" and repeat good performed maneuvers. If he gets this thing to work as we hope, we will keep you informed.

Well, I'm sure that there are guys who will want to outlaw the KEET, but I notice the new rules specifically permit mixing. My advice is to allow anything that makes the airplane fly better, more accurate maneuvers, because that is what it is all about. There is a lot more to it than piloting skill, and there should be. Give the guys who are better airplane designers, or better builders, or better mechanics, or better system engineers, a chance to compete with the guys with the good eyes and hands. The results will be good for everyone in the hobby. (Besides I don't think there is anyone smart enough to write the rules to get what they want. All they will do is make people mad.)

□

RCM PRODUCT REVIEW

PILOT NIEUPORT 28

SPECIFICATIONS

Name	NIEUPORT 28
Aircraft Type	WW I Sport Scale
Manufactured By	(Pilot) OK Model Co. Ltd., Japan
Distributed By	Hobby Shack 18480 Bandilier Circle Fountain Valley, California 92708
Mfg. Suggested Retail Price	$144.95 Sale Price: $114.99
Available From	Both Mfg. & Retail
Wingspan	56¼ Inches
Wing Chord	7" Bottom, 6" Top
Total Wing Area	806 Square Inches
Fuselage Length	42¾ Inches
Stabilizer Span	20 Inches
Total Stab Area	128 Square Inches
Mfg. Rec. Engine Range	.40-.45 (2 cycle) .60 (4 cycle)
Recommended Fuel Tank Size	Not Given
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply & Spruce
Wing	Balsa, Ply & Spruce
Tail Surfaces	Balsa & Spruce
Building Instructions on Plan Sheets	No (Separate instruction & photo sheet with parts list and 3 view painting guide)
Instruction Manual	Yes
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Airtronics Championship Series
Engine Make & Displacement	O.S. .60 (4 cycle)
Tank Size Used	6 Oz.
Weight, Ready to Fly:	177 Oz.
Wing Loading:	20.9 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:
Overall kit quality and completeness, good realistic in-flight qualities.
WE DIDN'T LIKE THE:
Flimsy plastic engine cowl

The Nieuport 28 is a World War I sport scale kit designed for .40-.45 sized two cycle engines or .60 size four cycle power plants. It is manufactured by Pilot (OK Models Inc., Ltd., Japan) and is available from Hobby Shack, 18480 Bandilier Circle, Fountain Valley, California, and from normal retail outlets. The Nieuport 28 retail kit price is $144.95, however, it has been regularly advertised at a sale price of $114.95 by Hobby Shack.

This kit is packaged in a box which measures 4½" x 10" x 36", and is highlighted by a beautiful full color label which shows both an example of the completed model plus a framed-up uncovered version. Packaging is well thought out and carefully implemented. Various component parts are neatly packaged in vinyl bags or banded together. A kit packer's name-type slip is included and, as a parts list is also included, we decided to check each part off against the list. In spite of the many, many parts (the hardware packages alone are very impressive), our kit was complete in every respect.

Construction:

The Pilot Nieuport 28 is a "builders" kit. The modeler who prefers a kit that can be purchased, assembled and flown in a few days, should be forewarned. On the other hand, the RC'er who enjoys the building aspects of R/C modeling equally as much as the flying segment, will find the Nieuport 28 to be an absolute delight. This is not meant to imply that the Nieuport 28 is a difficult kit to assemble, because it is not. While it is not a beginner's kit (assembly wise or in flying), it is within the capabilities of any modeler who possesses an average amount of experience. This kit has a higher than normal amount of parts and the builder would be well-advised to spend some time studying the plans and instructions before starting the assembly process, as some construction phases are not completely explained in the instructions.

Two plan sheets are provided. The wing construction plan measures 28½ x 43½" and the fuselage and tail assembly sheet is 39" x 53¾". No assembly instructions are included on either sheet, but most of the various component pieces are clearly labeled in both Japanese and English. Both plan sheets are very well-drawn and highly detailed. In addition to the plan sheets, a 25" x 37" construction guide sheet is included. This sheet provides sequential written instructions which refer to a series of 28 construction photographs. The written instructions are printed in English, German and Japanese. The English version is somewhat basic and suffers from grammatical errors and flaws of the type that are frequently

encountered in other Japanese kits. (This reviewer is not qualified to comment on the German and Japanese translations.) The other side of the construction guide sheet features a well-drawn 3-view with color and detailing information, as well as the aforementioned parts list.

This reviewer has, over the years, had the pleasure of building many kits of varying types, and the kit quality has ranged from truly excellent to just plain trash! The Pilot Nieuport 28 is certainly one of the better kit offerings. The wood quality (balsa, plywood and spruce) was excellent in our kit. The die-cutting was equally outstanding — we have not seen better! The machine cut parts were also very well done. The hardware packages (there are several) are surprisingly complete. A myriad of nuts, bolts, washers, clips, screws, brackets, etc., are included. It was somewhat surprising to not find any control surface hinges in this kit, as the hardware package was so detailed and complete in other aspects.

The wings are of conventional balsa rib and spruce spar construction. Balsa shear webbing is employed for additional strength and leading edge half ribs are also used. The airfoil on both wings is flat bottomed and no dihedral is used in the top wing. Ailerons are in the bottom wing only. The tail surfaces are constructed from balsa strips and machine cut perimeter pieces. The basic fuselage structure is fashioned from die-cut plywood parts that are assembled in a unique interlocking sequence that the manufacturer refers to as "snap lock" construction. The die-cut parts fit is surprisingly good, considering the number of parts involved and their compound angles and curvature. Balsa sheeting and stringers are used, along with spruce stringers, in completing the fuselage structure.

We used Carl Goldberg cyanoacrylate Jet glue in constructing our Nieuport. This fine adhesive greatly hastened and simplified the assembly process, and did not add any weight to the basic airframe. The Nieuport 28 features a molded plastic engine cowl. The fuselage belly pan beneath the bottom wing, as well as the scale fuel tank filler hatch blister and machine gun troughs are also molded plastic. Two large sheets of full color, pressure sensitive decals are included for final detailing of the finished model.

We made one construction change on our Nieuport. The plans show the

top wing being attached to the cabane struts with metal angle clips which are mounted onto the underside of the wing via self-tapping sheet metal type screws. While this method may work just fine, we preferred to use machine screws and blind nuts instead of the self-tapping screws for greater security.

Covering and Finishing:

After fine sanding and vacuuming the basic structure of our test aircraft, a coat of Coverite Balsarite was brushed on, and also fine sanded and vacuumed. The aircraft was then covered with white Top Flite FabriKote covering material. K & B clear Super Poxy enamel was used on all natural wood parts, such as the wing struts and the landing gear carriage, after they were stained. The exposed wood surfaces such as the engine compartment and cabane struts were painted with K & B Super Poxy primer. Camouflage colors were mixed from the basic K & B Super Poxy colors and airbrushed onto the upper surfaces, using the kit supplied 3-view drawings as a guide.

The pressure sensitive decals were added and a coat of satin finish clear K & B Super Poxy enamel was sprayed on the entire aircraft, except for the natural finish wood parts.

Williams Brothers Vickers machine guns, vintage wheels, and a pilot head were also added to highlight our test aircraft.

Engine:

An O.S. .60 four cycle engine was installed, along with a Sullivan 6 ounce fuel tank (the use of a fuel thrifty four cycle engine allows a smaller than normal fuel tank to be used). No muffler was used, nor is one needed, as the O.S. four cycle is unusually quiet with only its standard header pipe.

Radio:

The radio system employed was an Airtronics Championship series system. All airborne radio components were installed as far forward as possible in order to minimize the expected tail heavy condition that the Nieuport's short nose moment was likely to produce.

Flying:

As we expected, a total of 17 ounces of lead had to be added to the nose of our Nieuport in order to achieve the specified Center of Gravity. Our ready to fly (less fuel) Nieuport weighed in at 117 ounces (7 lbs., 5 oz.).

After photographing our Nieuport and making a final radio system

to page 187

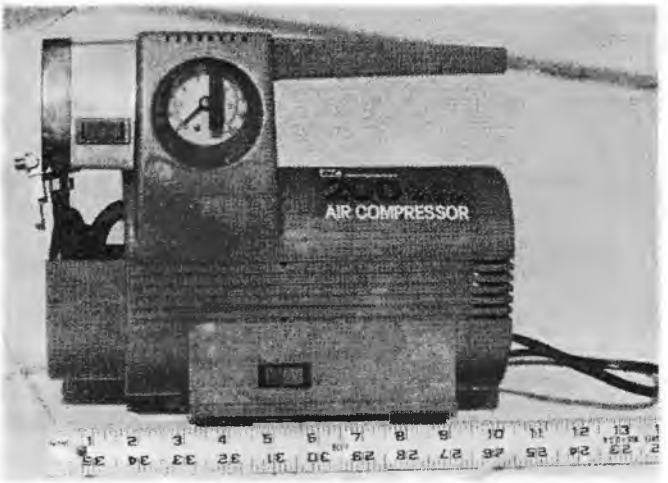
SCALE VIEWS

Col. Art Johnson

Air For Retracts:

Although there are now available a number of electric and mechanical actuated retract gear systems, I would guess that there are still more air type systems in use than any other. When Rom-Air and Sonic first made the pnuematic retracts popular, Freon gas was used to pressurize the system and it is still an easy way to go if you can live with some of the problems. Freon gas is sensitive to temperature so that you may get 100 pounds plus pressure in your system on a hot day while you may have trouble pushing up to 60 psi in the cold. Liquid Freon in the system can cause problems with seals and cause erratic operation if small restrictors are in the system. Some of the newer retract systems use larger cylinders and they can eat up a lot of gas pressure and, finally, Freon comes

Twelve volt compressors sold to pump up auto tires work even better putting air in your retract system. Throw away the plastic case and put it in your flight box.



There are many types and sizes of 12 volt compressors on the market. This deluxe model has gauge, lights, attachments, and a reminder tape on gauge to stop at 100 psi. Excellent for large air bottles in AMA Giant Scale models.

Art Arrow's A-4 Skyhawk at the Tangerine, ready for engine start. Note the hand pump connected to retract valve. Good for small air tanks but flight box compressor is easier.

.90 powered large model of the T-34 trainer by Ramon Torres of Miami. New model at its first contest took 2nd in AMA Giant Scale at the Tangerine. Complex home-built retracts.

Dan Santich's latest version of his P-26 with the 3.15 Kawasaki engine. Over 30 pounds of "Peashooter" placed 7th in AMA Giant Scale at the Tangarine.

Twin-twins was the game for Len McCoy at the Tangerine, only one was larger than the other. One flew in Expert and one in Giant. Only multies at the contest.

One of three F-86 models at the Tangerine. Bob Temple's F-86D from the Byron kit with OPS .65. Bob says keep the weight towards the rear, swept wing models are easy to get noseheavy.

Tired of the standard J-3 Cub? Bruno Brunelli's L-4 AAF version from WW II period is a change. Quadra powered for AMA Giant Scale.

Quarter Scale Cosmic Wind powered by a .91 was flown in the Sportsman class at the Tangerine by Bill Schneider. The Sportsman Sportscale event was the second most popular at this contest.

Tailskid equipped WW I models are at a disadvantage when they have to land on paved runways. This shows effect of cross wind on Burnis Field's Sopwith Camel on landing at the Tangerine.

One of only two models of WW II fighter aircraft at the Tangerine. Bill Haupt's F6F Hellcat did well in the Expert Sportscale event.

Models of modern aerobatic aircraft like this Pitts Special are popular at contests. This Giant Scale Pitts by Bill Harris had a good smoke system and unusual black finish.

Don Lowe prepares his Las Vegas type Laser 200 for a flight in AMA Giant Scale at the Tangerine. Don even demonstrated how to back up the length of the runway when the Tartan Twin kicked into reverse after landing.

in pressurized cans and they cost money. (I didn't say modelers were cheap, but!)

Air is free and, when compressed, it will work the gear just like the Freon gas. Small hand pumps, similar to bicycle pumps, will compress air to the normal 100 psi max used to operate the air retracts. These pumps have been on the market for some time and they will let you get the pressure you want regardless of the temperature. They work pretty well with the smaller size retract cylinders but if you try pumping up the large air bottle in a Byron P-51, you are in for some manual labor. (I didn't say modelers were lazy, either!)

There just has to be a better way to compress air for our model use and, sure enough, a couple of years ago, Joe Solko of Maryland, came to Florida for a visit and he had a new way to do the job. He just stuck a hose from his flight box into the filler valve in the model, hit a switch and the gauge on his flight box showed 100 psi in a matter of seconds. It turned out that Joe had taken the guts (small compressor) out of one of the 12 volt compressors sold to provide emergency air to your car tires. Connected to a switch and the twelve volt battery in the flight box, the compressor puts out all the air you will ever need for your retracts.

This idea had instant appeal so I gathered up the Green Stamps that my wife had been saving from the grocery store and picked up one of

to page 86

these compressors at the local "Green Stamp" store. (Some modelers are both cheap and lazy.) The plastic case holding the compressor looks large but when the insides were removed, they fit nicely in my flight box next to the 12 volt battery. The little compressor puts out 105 psi and has pumped up all of my retract systems for the last couple of years.

The little air compressor has come in handy for more than pressurizing retract gear systems. At the California Scalemasters Championships last August, my hand operated gasoline pump split the actuating hose the first time I turned the handle. Yes, I know, things like this only happen at contests! I knew that I could blow into the gas can vent and force fuel out the filler tube, but blowing into the vent while filling a 16 ounce tank is not very appealing. It hit me that the compressor could do this job and it will. In fact, it does it so well that I have not bought a new gasoline pump. The hose separates the gas can from the electrical motor so there is no fire hazard. It also works well to drain the tank. Only caution is that you do not need 100 psi for this job so cycle the compressor on and off while filling. You don't want to blow the clunk off your tank fitting.

Just about every store that has an auto supply section sells one of the small compressors. They come with just the basic compressor or with added features such as a built-in pressure gauge, lights, attachments for filling air mattresses, etc. I could not resist one of the deluxe models on sale recently so I now have a compressor that puts out 200 psi with a built-in air gauge, blinking red emergency light and a variety of hose fittings. No, I do not use 200 psi in my retracts but the added volume fills the largest supply tank in seconds. So far, I have not come up with a model application for the blinking red emergency light.

Carbon Graphite For Models:

Lightweight models fly better as everyone knows but nowhere is weight more important than in modeling jet aircraft with ducted fans for power. In this type of modeling every extra ounce hurts performance and any new technology offering lighter weight construction is welcomed even if the price is a bit higher.

Space age materials such as the carbon graphite composites have only recently become generally available to scale modelers and I expect these materials to gain wide acceptance as their advantages become better known. Bob Violett was showing some of the new materials at the Tangerine contest in January. Laminations of sheets of carbon fiber material with balsa are super strong and very light. Tubes and rods of this material can replace aluminum in landing gear struts with better strength and less weight. The landing gear struts on Bob's new F-86 jet model used the material and they looked good. Sheets, laminates, and rods are now being advertised in sizes for model use. The material is not cheap but very little is needed in the critical areas of model aircraft.

I recently checked the weight of Sig's new graphite control rod against the weight of an aluminum tube of equal diameter and found little difference in weight. The graphite tube is much stronger and stiffer. I have also been using the carbon fiber tape available from Dave Brown for model use. I squeegee strips of the tape onto foam wings with Hobbypoxy II type epoxy before covering the wing with balsa. The carbon strips provide a tremendous increase in strength and rigidity. The fibers are almost as strong as steel and weigh next to nothing. I am also using this tape now in laminations between lite-ply and 1/64" ply to make spars and formers for a fan jet model. Again, the fiber tape is squeegeed onto the ply using short pieces along the edges of circular formers. The fibers are stiff and will not go around a curve very well. Sharp scissors are a must and do not handle the tape more than necessary or it will fuzz up.

The strength of these carbon graphite composites might be wasted on your model of a Piper Cub, but if you are building a scale model of a high performance aircraft, I do not know of anything else that can give you a higher strength to weight ratio for critical parts. I expect that we will be seeing a big improvement in the performance of some types of models as we gain more experience with the new materials.

Trends At The Tangerine:

The annual end of the year, or first of the year contest, depending on your event, held in Orlando, Florida, was covered in a separate report by multi-event competitor Don Lowe. As the scale events of this contest saw some rather different activity from past years, I thought that further comment might be worthwhile. Any contest that sees scale fliers showing up for competition on the morning of New Years day has to be a little unusual but, in spite of this feature, there were almost twice as many scale competitors as last year. The big increase was in the number of contestants entering the AMA Giant Scale event. In fact, this event had more entries than either of the other scale events. Who said that Giant Scale builders are not interested in competition?

There were more scale entries at the Tangerine than at the Lincoln NATS but can you imagine a scale contest where there were no P-51's, Spitfires, F4U Corsair's, or FW's? In fact, there were only two WW II fighters entered although about half the models were of military planes. There were a couple of WW I fighters but the rest were models of military trainers or of between the war types plus five modern military jet aircraft. It was hard to believe that there was no aircraft more popular with builders entering this contest than the F-86 jet fighter! Sure, there were three look-alike Laser 200s, and three J-3 Cubs, but three F-86 jets and each a different size and with a different power plant! They ranged from the 3.5cc powered House of Balsa F-86 by Larry Epifanio, through Bob Violett's new 7.5cc engined F-86F, to Bob Temple's .65 powered Byron F-86D. All three of these jets got off to fly well but New Years Day was not an auspicious time for the swept wing birds and various problems put them out for the rest of the meet. Art Arrow from Michigan, was the only jet pilot to complete a couple of flights at this contest flying his Violett (Jet Hangar Hobbies) A-4 Skyhawk.

All of the jet aircraft were entered in

to page 186

CUNNINGHAM ON R/C

Chuck Cunningham

Tony Pou launches his Dragonfly airfoil science project.

Dragonfly wins again — 11.9% better glide ratio than conventional.

This month we've got lots of things to talk about, but before we do, I'd like to pass along a letter that I received from Tony Pou of Bougalusa, Louisiana.

Dear Mr. Cunningham,

I needed a Science Fair project, and my dad suggested I do it on the Dragonfly airfoil. He showed me your article. I thought it was neat. When I did it, I was doubtful about winning, but the work paid off. After flying each plane (there are two of them) 25 times each, and after writing the report about the materials used, procedure, purpose, results, and conclusions, I was awarded first place. I was sure surprised. I'm going to the Regional competition in Hammond and, if I'm lucky, I might go to State. Then, if I am real lucky, I go to National (I doubt it). I've sent some pictures of my experiment. By the way, I'm in the 7th grade and I am 12 years old.

Yours truly,
Tony Pou

Tony also sent the following conclusion as part of his entry:

Conclusion

During test flying, the balance point, or Center of Gravity, was found to be located further back on the Dragonfly wing than on the normal wing. Because of this, weight had to be added to the center of the Dragonfly wing to make the models weigh the same. This means that ***the Dragonfly wing plane can carry more weight than the same size normal plane.***

Test flying, using a launcher that launched the plane the same every time, showed that ***the Dragonfly wing plane flew longer distances*** *in almost every test.*

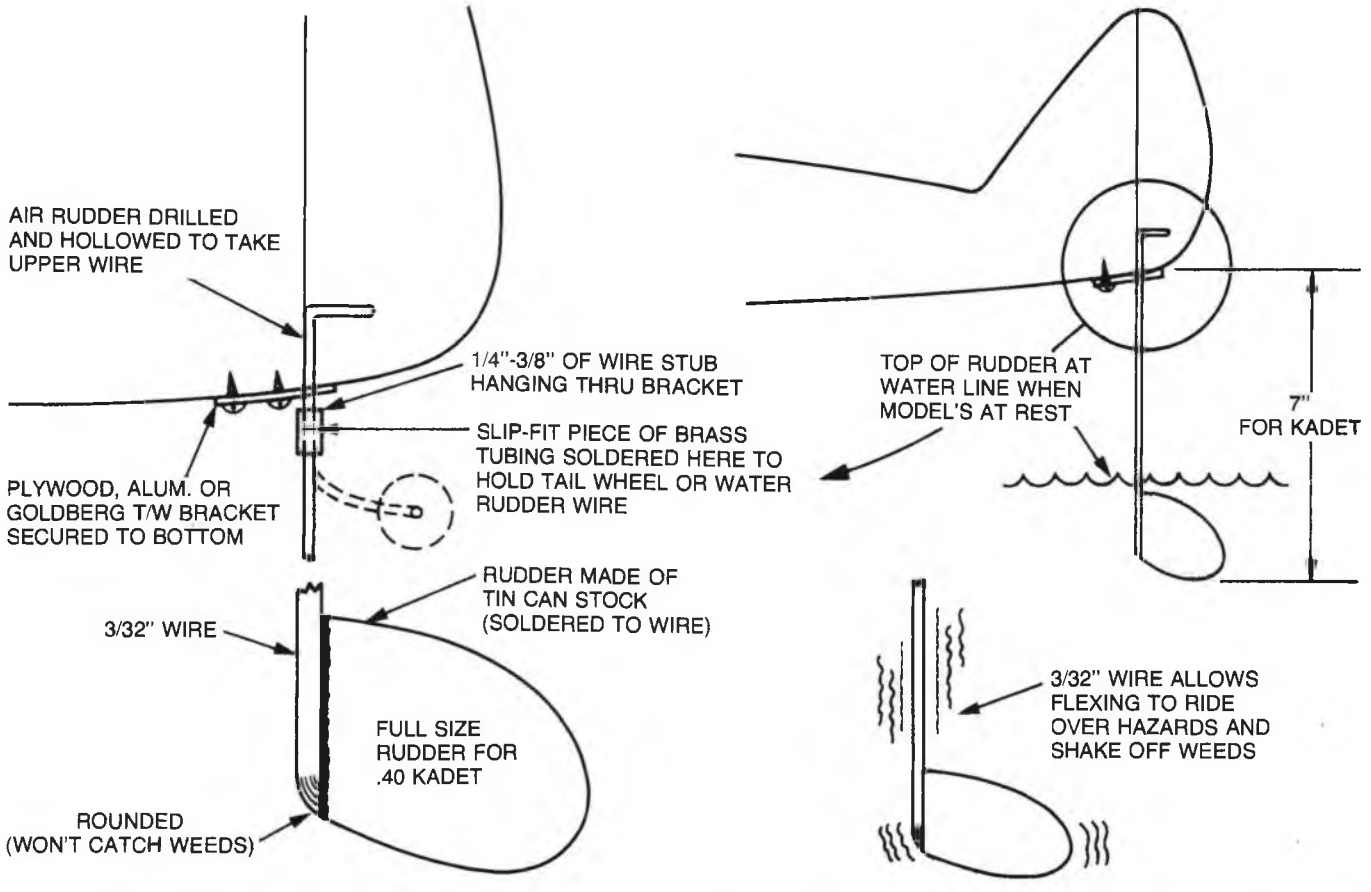
To compare the two planes better, the efficiency was calculated. The calculation showed that the ***Dragonfly wing plane was 11.9% more efficient than the normal plane.*** *Launch height is 3'.*

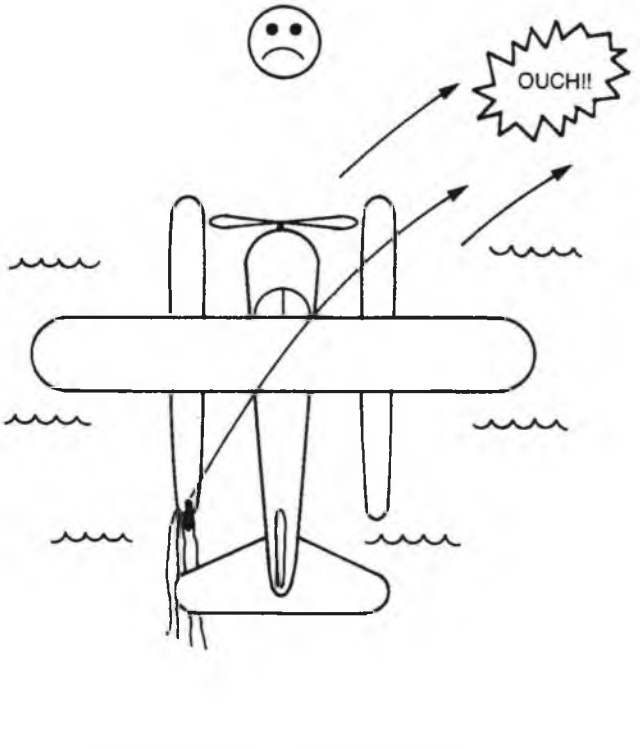
Tony, that's great. I hope that you did go to the Regionals, the State and the Nationals — and I hope that you will keep all of us up to date on your future activities. Who says that airplanes don't interest the young guys any more? Also, how many of you "dyed in the wool" glider guiders thought about giving the Dragonfly airfoil a test? Maybe now, after Tony has showed us the way, a few will attempt this airfoil on a high performance machine. Let us know how it works out.

1983 sure has to be the year of the four stroke engine. I thought that '82 was the year, but my mail is growing all of the time with people writing about four stroke engines, and wondering what type of aircraft to put them in. Now that I've been flying my new four stroke design, the "Sky Demon," for some time, I feel pretty sure of my conclusions. First, the engine needs to swing a larger than normal prop. My O.S. .60 four stroke seems to pull the best with a 14/6 up front. I've tried a 16/6 (lugs the engine

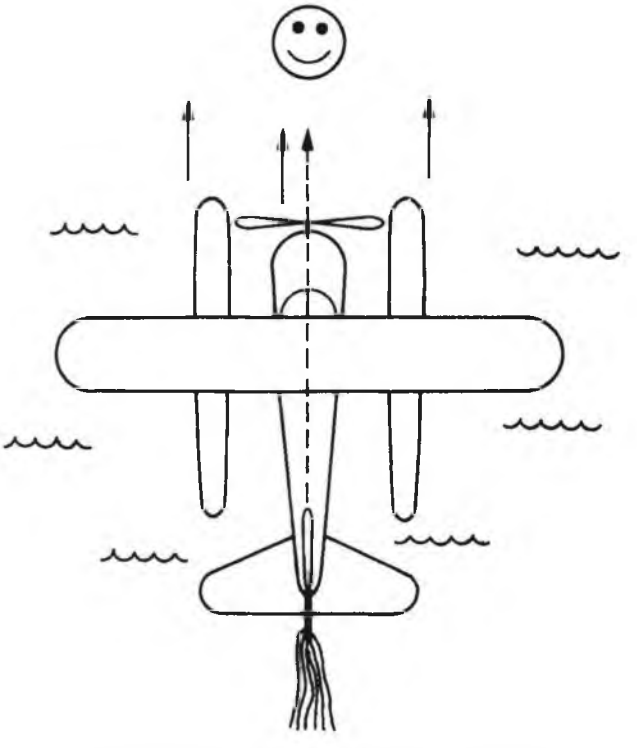
Mike Genovese shown with his modified Sig Kadet on floats. Beautiful flying area is Palmer Lake near Colorado Springs, Colorado.

Elmer Gardiner's first attempt at scratch-building. RCM's Hooker and Force 1. Elmer hails from Naples, Florida and is pleased with both models.





IF, DURING **TAKE-OFF ACCELERATION** THE LEFT FLOAT RUDDER ENCOUNTERS WEEDS OR OBSTRUCTION, MASS OF AIRCRAFT FORCES RIGHT FLOAT FRONT DOWN INTO WATER. RESULT — DISASTER! RIGHT RUDDER CAUSES OPPOSITE REACTION. ALSO, DON'T TRY TO TAXI RIGHT W/WEEDS ON LEFT RUDDER OR VICE VERSA!



DURING **TAKE-OFF ACCELERATION,** WITH TAIL WATER RUDDER ON CENTER LINE, ANY WEED SNAG OR HAZARD STRIKE IS MINIMIZED. AIRCRAFT WON'T TIP RIGHT OR LEFT — DISASTER AVOIDED! USUALLY WORST RESULT IS THAT WATER/ WEED DRAG WON'T ALLOW ENOUGH SPEED TO GO AIRBORNE.

down too much); a 13/5 (a bit more rpm, but aircraft doesn't fly quite as well); a 12/6 (too much rpm and not enough pulling power); and a 15/6 (still lugging down too much).

Several months ago I mentioned that the Y & O props with lots of blade area seemed to be a happy combination with the four stroke machine. I got my props from a friend, so I don't know of the retail source for Y & O. If anyone has this information, get in touch with me so that I can pass the word along to all of those who have written asking about them. *(Ed. note: Y & O props available from Hobby Horn-Hobby Specialties, 15173 Moran Street, Westminister, California 92683 (714) 893-8311.)*

The design of the Sky Demon was based upon two factors, generous wing area and light weight. The finished aircraft spans 72", has 840 sq. inches of wing area, and weighs in (less fuel, but ready to fly) at 6¼ lbs. Two of them have been built, one by me and one by my good friend, Frank Mormino; both weigh exactly the same and both are super flying machines. Any aerobatic manuever that you want can be done, and all with the happy fact of almost no noise. Now, if I can just get all of my other projects out of the way, I'll get a set of plans finished, pictures taken, construction article written, and all of it off to RCM to present to you sometime in the future.

The secret to really successful four stroke machines is to keep the wing loading low. I've flown the Sky Demon on an intermural football field, near a major street and, due to the almost non existent noise level, no one even realized that I was there. Absolutely a great way to fly!

While on the subject of four strokes, when we went out to make the test flights on Frank's Sky Demon, we had engine trouble. Frank, Bill Slater, and I couldn't figure out just what the trouble was. We would start the engine, take the aircraft out to the runway, I would take off the aircraft, climb up a bit, then hand the transmitter to Frank. Every time, just after he grabbed the box, the engine would cut out, and back to the field we would come, dead stick. Bill readjusted the valves, we changed the glo plug, checked the fuel tank lines — eveything.

Frank had used a normal Kraft tank, with one line to the carburetor, and the breather line sticking out a hole in the bottom of the cowl. We asked Frank if he had hooked up a tube to the pressure fitting on the engine to drain off all of the excess oil that blubbers out of this spout. "No," he said, "there's a hole in the cowl and it can just drip out." I had to leave the

to page 96

field for the day, leaving Frank, Bill, and Helmer, scratching their heads over why this engine was cutting out. Suddenly the answer kinda jumped up and hit them. The excess oil that was dribbling out of the cowling hole was using the tank breather line as a path out of the fuselage. The oil was running down the outside of the breather line until it got to the end, then the suction of the tank pulled this oil back up the breather line until it clogged the line and killed the engine. Simple. A line attached to the pressure fitting on the rear of the O.S. .60 case solved this problem. So, when in doubt, follow the instructions. But, if you've been having similar problems, check this out.

I know from all that I hear, both by mail and by phone, that lots of four strokes are flying, single and twin engine. I also know that the reason for their popularity is because of the low noise level. Most of those who are running the soft sounding engines are those of us with a bit (or a lot) of gray in the hair. The younger fliers all seem to follow the same pattern that we did some years ago, fly it fast and loud, just like fast cars or noisy motorcycles. But, after a lifetime of listening to screaming model engines, it's really nice to listen to an engine that makes just a gentle "putt-putt" sound. I've said it lots of times before, and I guess that I'm going to be saying it lots of times in the future, a model engine need not wake the dead to get the job done. The two cycle engines can be quieted down to a nice reasonable level with some intelligent thinking. The four strokes are showing the way. I can't think of anyone in the general public who would object to the noise of a four stroke engine. Two cycle can grow up too. Some mufflers that I've heard actually seem to make a two cycle engine sound louder. This type should be removed from the market. What the heck, with flying fields lost, what market is there? Once more, it's time to quiet them down. Try a four stroke in the right aircraft / engine combination and you will see just how enjoyable it can be.

Since it's the middle of summer, and I'm writing this back before the beginning of spring (the lead times seem to get longer and longer), it's time to get the lead out and give water flying a try. The column that I wrote last fall about float flying certainly did generate a lot of interest in the mail bag, so I hope that you will give it a try this summer.

A letter from Mike Genovese in Colorado Springs, Colorado, has some very helpful ideas on rise off water flying, so I would like to pass this along to you also.

Dear Chuck:

After following your columns

through the years I've found your advice and ideas to be usually excellent and quite factual. Enjoyed your exceptional article in the January '83 issue on water flying. After flying extensively with three different modified waterborne Kadets this past year I think I have a few additional tips you may want to pass along to your readers.

First, I do agree with you that taxiing a generously dihedraled model in a brisk cross wind can mean instant trouble. However, I think that you're leading others down a primrose path by indicating that an aileron equipped model will keep its wings level while taxiing cross wind. I've found that to be incorrect. (Right, any high wing ship is tough to taxi cross wind on the water — C.C.)

Wooden propellers on water here in Colorado have proved absolutely no inconvenience or detriment to our flying. In fact, with over two hundred flights (and about a jillion touch and goes), I've succeeded in breaking only three or four wooden props all season in varying flying conditions. Those were due to pilot (my) errors. Perhaps Kadets are easier on props on the water. (Nope, just pay attention to the Coors ads, Mike, the water is softer in Colorado — C.C)

I've discovered (with great chargrin) that water flying demands well sealed tail feathers — nothing less. Those fliers using heat shrink film covering should be sure to wrap around and seal hinge lines, especially on the stab-elevator joint. A lot of water spray really pounds this area. Nothing is worse than watching your stab and elevator warp and swell into a semi-pretzel 'cause water soaked into the wood along the hinge lines. A good idea is to be sure to seal the entire tail section with a product like Balsarite before applying shrink film covering.

For retrieving aircraft within forty or fifty feet of the shore line, I've seen (and used) an interesting method I observed in Phoenix a few weeks ago. This may/may not be an oldie. I'll describe it. Use an open faced fishing spinning reel mounted on a short handle. Thread the end of the line through a rubber ball or a tennis ball and knot the other side. If you've got any kind of a pitching arm you can fire that ball and line over the "port bow" of your beauty, with a little "English" on the monofiliment line (and a bit of luck in your pocket), you can catch or tangle the line and ball on the model while reeling in.

About water rudders, you're right --- they are not really necessary, but any sport flier will soon learn that a good percentage of the fascination in water flying is in being able to realistically taxi around a-la full scale. There are

to page 185

Front view of Forest Edwards' 5 cylinder four stroke engine mounted in a Quarter Scale Concept Fleet. Tichenor photo.

FOREST EDWARDS AND HIS FABULOUS FOUR STROKE RADIALS

Radial Engines That Fly

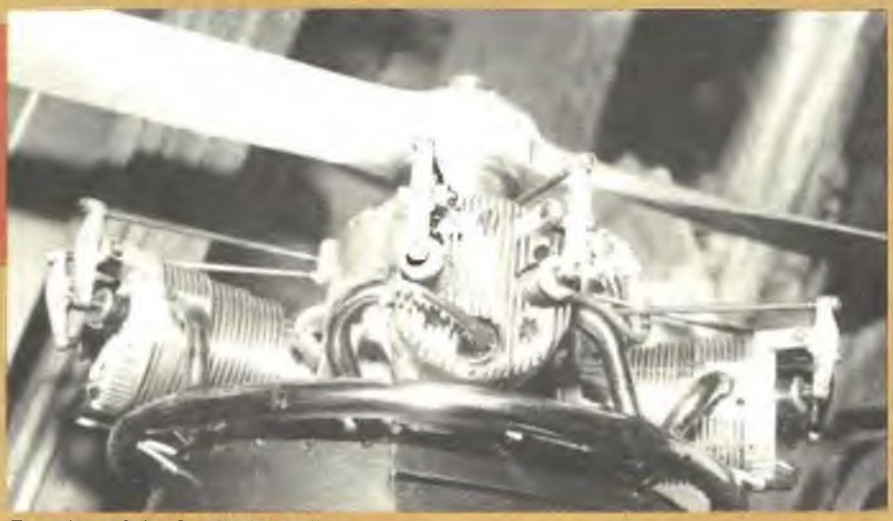
By Dale Willoughby

Over the years the model press have shown occasional pictures of four stroke (4-cycle) multi-cylinder radial engines, but only rarely has the text described the flight using the engine to power the miniature aircraft. Such is not the case with two of the four stroke type engines developed by Forest Edwards of San Pedro, California.

Ken Willard, in the December '82 issue of RCM, had nothing but high praise for the 5 cylinder engine on the front of a Quarter Scale Fleet biplane at Morgan Hill last summer. He rather left the door open for me to expound further the four stroke radial engines.

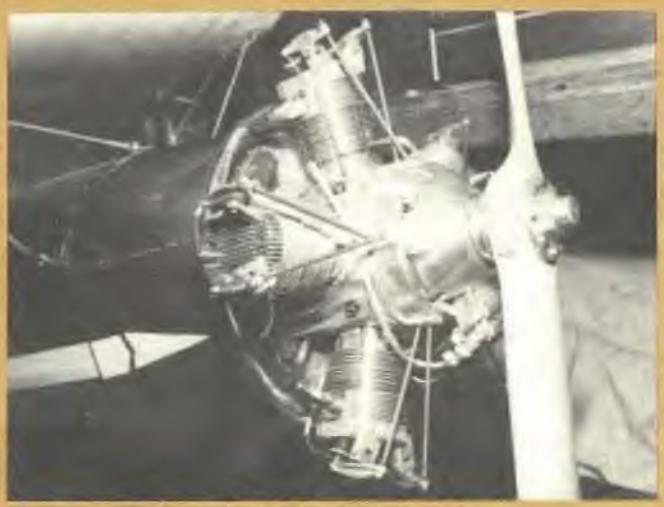
At this writing, Forest has logged over 300 flights on his Fleet bipe. The aircraft is presently stripped down for recovering and a new paint job duplicating that of the Fleet Trainer in the San Diego Aerospace Museum. It will be on the contest trail as you read this. Those of us who have had the pleasure of watching Forest fly his Fleet are not only amazed by its aerobatic capabilities, particularly in vertical manuevers, but by its very low noise level. All you can hear from a distance of 50 yards are the propeller and aircraft noises.

to page 183



Top view of the 5 cylinder radial.

Forest Edwards' first radial engine was this 3 cylinder four stroker shown installed in a 9 lb. Gere Sport.



Fuel pump is visible behind lower prop blade.

THE OTHER SIDE OF R/C

By Jerry Maggio, Jr.

All of us in R/C flying enjoy easing up the throttle, then back on the elevator and settling down to ten to twelve minutes of what this hobby is all about. On the other hand, there is another side of this hobby. This is the side in which we too willingly put all of the things we would rather forget, out of our minds. In R/C flying, it is the perfect landing, not the broken propeller that we remember. I often wonder what would happen to the R/C population if we all took a serious look at the months that preceed those ten to twelve minutes in the air.

It usually starts off with a decision that we want to build a new model. All too often this decision is thrust upon us when, shortly after the airplane breaks ground, the ground breaks the airplane. As you look through the mail order catalog at all the different models and daydream how this one is going to be the awe of the guys at the field, you probably won't remember that you said that about the last one. You know the one I'm talking about. It was about halfway finished; you had sanded and cut every piece of wood to perfection and you would lay in bed at night and plan what was to come next. Standing tall --- proud of how it was progressing --- you casually mentioned it to a member of your club who, just by coincidence, had already built one. "A Razzle Dazzle? Oh man, did you make a mistake. That has got to be the worst kit on the market. That thing doesn't fly well at all. Bad ground handling, very unstable, you're gonna hate it." His voice fades into babbling as you shrink down to a size that makes it dangerous to walk in crowds.

Just think of how a normal building session goes. How many time have you mixed 5-minute epoxy just in time for the phone to ring? One of the things that gets us all at one time or another is having to stop before we start, because we don't have something we thought we had plenty of. For example, you break open the box, cut out the fuselage sides and plywood doublers. Next, you take out your contact glue and attempt to open it, only to find that the top is stuck. Then, you grab the tail of your shirt, wrap it around the top and twist. The top won't budge. Realizing that a more aggressive approach is required, you put the bottle in a vise. With a big pair of pliers and every ounce of strength in your body, you twist as your face turns red with strain. The dried glue around the top breaks loose and you smile with accomplishment. Ready to start, you take the bottle out of the vise and take the top off only to find that the bottle is empty.

Then there are those of us who feel we are such seasoned builders that we don't have to read the plans as well as we should. Step 12a — glue ribs to spars and pin in place --- you've read that at least a thousand times before, there's no reason to read the whole thing. After the glue sets, you continue. Step 13a — remove W-6 and --- **what!** As your jaw falls and puts a nasty dent in your workbench, you look back at step 12a --- glue ribs to spars and pin in place. **Do not glue W-6 in place at this time.**

Then there is the covering. First you must decide which one you want to use. I can remember a time when you

to page 182

CONTRA-ROTATING PROPELLER

By Robert "Hoot" Gibson

Contra-rotating propellers (CRP) have seen a number of aircraft applications over the years, with varying degrees of success. Few have generally achieved production status or proven to be entirely successful in the long run with a few notable exceptions such as the Soviet TU-95 "Bear" long range reconnaissance aircraft. Almost without exception, however, aircraft utilizing CRP's have been interesting in appearance, in flying chracteristics, or were of such a type to significantly advance the technology in existence at the time. Examples such as the Northrop XB-35 flying wing, Lockheed and Convair vertical riser and Pogo, Macchi M.C. 72, a number of WW II fighter experiments, and the "Red Baron" P-51 modification, come to mind immediately when CRP aircraft are discussed.

The need or motivation to use a CRP has generally been driven by one of two considerations. CRP's result in no net propulsive torque applied to the airframe. This is obviously a requirement in cases such as a VTOL airplane like the Convair "Pogo" and was the reason the Macchi M.C. 72 seaplane was converted to a CRP after unsuccessful flight attempts with a single propeller (due to excessive waterborne torque reaction). The other major use for a CRP is the desire to pack the maximum available horsepower into the minimum propeller diameter (after it's been determined that even a four or five bladed propeller are insufficient to absorb it all). Examples of this are frequently seen in pusher-type aircraft where the pusher propeller diameter would limit the amount of rotation possible for take-off and landing attitudes. Aircraft embodying this principle are the Northrop XB-35 flying wing, and XP-56, while the Red Baron P-51 is a good example of a maximum horsepower application. The designers of these aircraft were definitely not thinking of modelers when they designed these machines, and they've really made it difficult for us. Indeed, the mechanical complexity and reliability problems inherent in CRP's have caused the failure of the majority of the full-size attempts. With all that in mind, I decided I still needed to build a model utilizing a CRP. (Just one, fortunately!)

My particular application was for a VTOL use, so I was definitely in need of carrying over the actual CRP to the model use as opposed to a CRP for display, with a regular propeller for flying. I also needed a large static thrust which meant that a large diameter propeller driven through reduction gearing would be advantageous. I eventually arrived at a prop diameter of around 24" and decided on a .60 sized engine with a 3:1 gear ratio as a workable combination. Theoretical thrust computations predicted a thrust in the 12-14 pound range which would be sufficient for my use. Another objective, obviously, was to minimize the time, cost, and complexity of the task, by finding parts and gadgets I could use to build the mechanism. The model helicopter industry made a great contribution to the effort by having a few of the parts I'd need. These included a cooling fan and shroud, centrifugal clutch and bell housing, rotor shaft, a few gears, and rotor blades to be cut up and made into propeller blades. These allowed me to minimize the time involved, although I'm not sure about the cost and complexity issue. (I guess that's all relative.)

Armed with these parts, I set about designing the mechanism. I was trying to steer away from bevel gears and wanted a mechanism that would employ only spur gears, so I decided on a dual drive shaft type of arrangement, as shown in Figure 1. In this arrangement, the engine (through the centrifugal clutch) drives the main drive shaft which, in turn, drives the rotor shaft turning Rotor 1 and also a secondary drive shaft. The secondary drive shaft then is able to drive Rotor 2 in an opposite direction.

Now that I had some of the parts I'd need and the general concept of how I wanted to proceed, I designed a mechanism of aluminum to hold the parts in the correct relationship, paying attention to ease of maintenance and simplicity. (This statement referring to simplicity is relative.) I did manage to minimize machining requirements, and was only concerned with cutting out 1/4" aluminum for four bearing plates, two engine mounts, and the two propeller hubs. The two main frame members were cut out of 1/16" hard aluminum (T6). This could be done using hand tools although the use of a band saw or similar device made the undertaking much simpler. Access to a drill press is the other desirable aspect in the project. The entire assembly is then bolted together with the two main frames held together by the bearing plates. The propeller blades are cut from helicopter rotor blades (paying attention to the direction of rotation), and are held in place to the rotor hub with 3/32" stainless steel straps. These also allowed the propeller pitch to be varied (by twisting) to arrive at the optimal pitch setting. The

to page 182

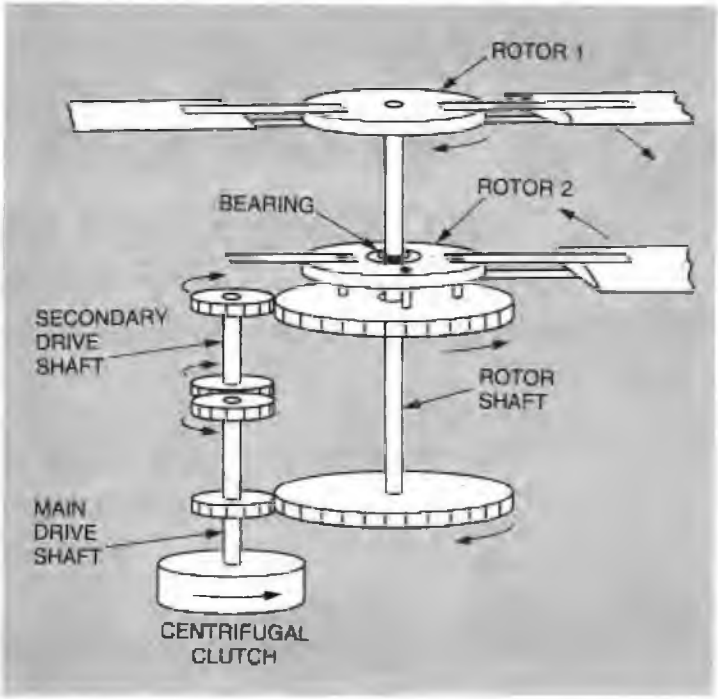


FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

FIGURE 5

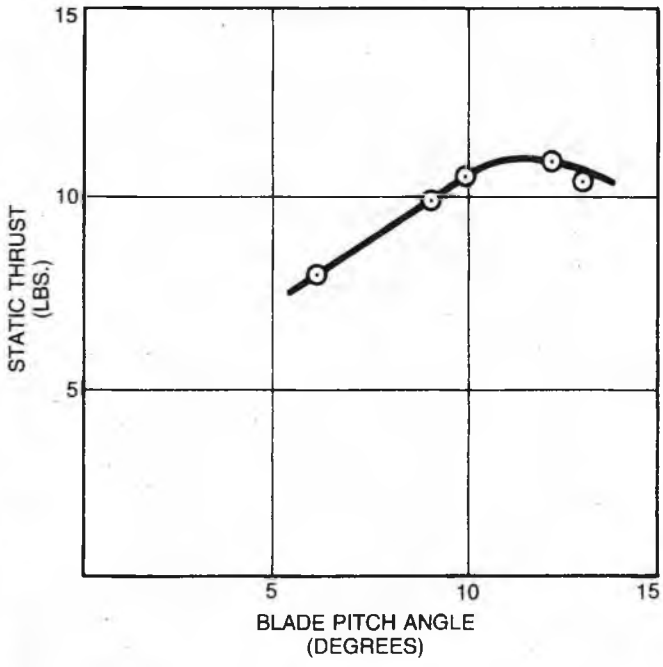


FIGURE 6

TIMEBOMB

As a beginner in R/C, I spent a considerable amount of time walking through the woods hunting for lost model airplanes. In fact, I remember the only time I got my wife involved in this crazy hobby. I was flying at the ARCS field, which is located in Raccoon State Park here in Pittsburgh, Pennsylvania, and, doing so well, I

This photo shows the author's flight timer, which is built on the same PC board but using a variable resistor. The cycles can be timed and marked on the side of the container. The photo shows the variable resistor or Potentiometers (Radio Shack Cat. No. 271-229). The problem with a variable resistor is a variable timing cycle, but this is not critical since the cycle is not that different.

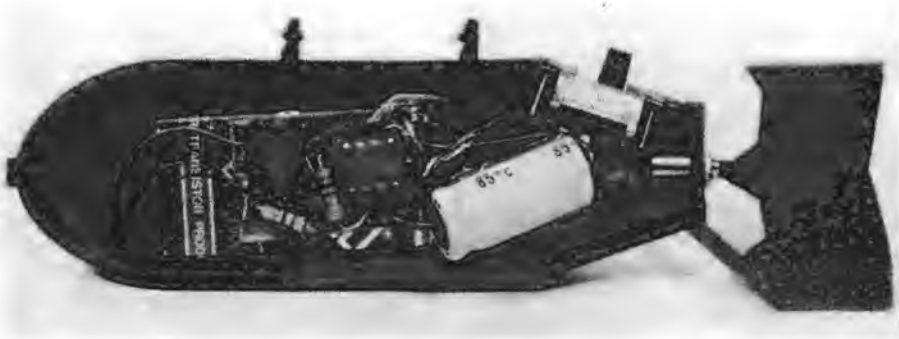
By Richard Edmunds

WIRING INSTRUCTIONS BY THE NUMBERS

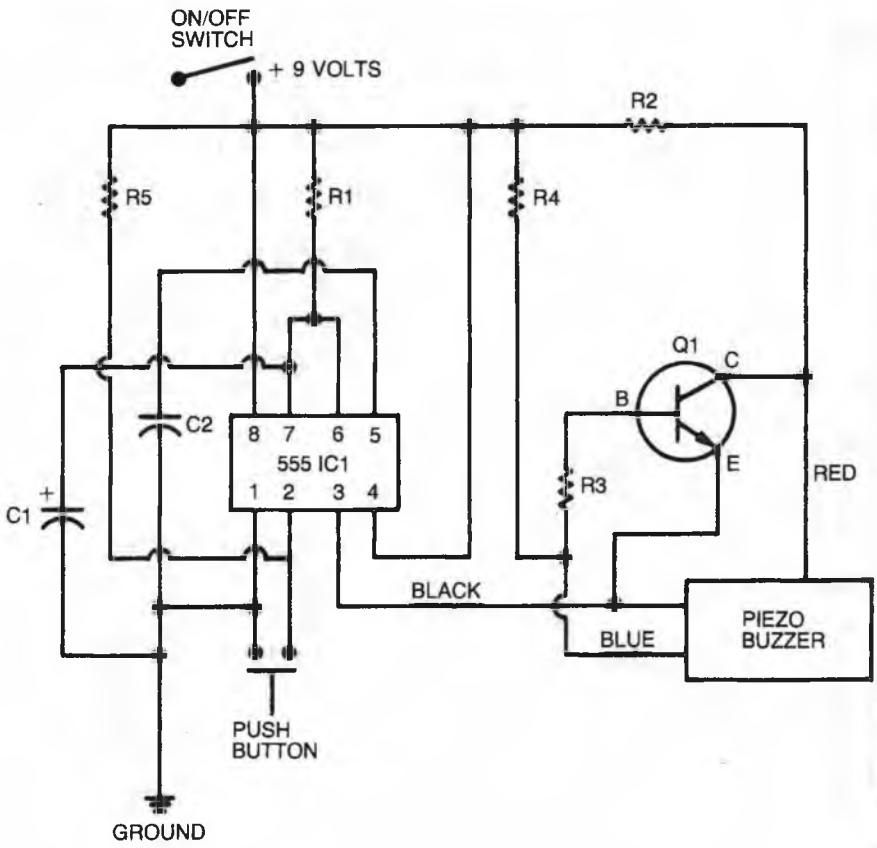
1. PLACE THE IC SOCKET IN THE HOLES WITH PIN 1 IN THE PC BOARD NUMBERED 1.
2. RESISTOR R1 FROM NO. 7, TO NO. 8 POSITIVE.
3. RESISTOR R2 FROM NO. 9, TO NO. 8 POSITIVE.
4. RESISTOR R3 FROM NO. 6, TO NO. 4.
5. RESISTOR R4 FROM NO. 4, TO NO. 8 POSITIVE.
6. RESISTOR R5 FROM NO. 2, TO NO. 8 POSITIVE.
7. CAPACITOR C2 FROM NO. 5, TO NO. 1 NEGATIVE.
8. CAPACITOR C1 FROM NO. 7 (MUST BE POSITIVE END), TO NO. 1 NEGATIVE.
9. TRANSISTOR Q1 (EMITTER IN NO. 3, BASE IN NO. 6, AND THE COLLECTOR IN NO. 9). **MAKE SURE A HEAT SINK IS USED WHEN SOLDERING THE TRANSISTOR.**
10. PIEZO BUZZER, RED WIRE TO NO. 9,
    BLUE WIRE TO NO. 4.
    BLACK WIRE TO NO. 3.
11. PUSH BUTTON SWITCH FROM NO. 1 AND NO. 2.

With the Timebomb electronics mounted in the Vortex Bomb, using the Vortex release mechanism, the unit can be moved from model to model.

Piezo Buzzer face can be completely exposed if desired.



TIMEBOMB SCHEMATIC



forgot about the time. I was flying a Midwest Cardinal foam job, that was more epoxy than foam. It was powered by an O.S. Max .15 and the radio was a Kraft Gold Medal Series. I was getting about ten mintues to a flight and was into my ninth flight, when I decided to call it a day, it was too late. I started my approach too far from the field and, suddenly, lost control. The model banked to the left and started to spin earthward. Needless to say, my

thoughts were on the repair job in store for me.

I selected several landmarks to help me locate the crash site and quickly drove there. I walked into the woods and searched for two hours with no sign of my treasure. The sun was getting low in the sky and I decided to call off the search. When I got home all depressed and told my wife, she offered to go with me the next day to help. The following day was Saturday; and for my wife to get up early is a great sacrifice! We did not look long until we found the remains of the model scattered over a large area. If I had searched another 30 feet further the day before, I would have found the model then.

Since then, I have searched for numerous models for myself and others. Most of the time they have been found very close to the search area and would have been found sooner if there were an audible warning device on the model. There are a number of devices on the market and I decided to build one featured in RCM magazine. The unit plugged into the model's receiver, and sent out an audible signal when the transmitter was turned off. The unit worked well except for the day I had a bad crash and the connecting plug pulled out of the receiver on impact. Also, it is impossible to use if there is no open channel on the receiver. Also it was not convenient transferring the unit to another model because disassembling was necessary.

I have experimented with electronic devices for some time, and Radio Shack is successful today because of guys like me. I found a timing device developed by Signetics called a 555 IC timer. This is an integrated circuit containing two comparators, a flip-flop, and a power stage. By connecting two external resistors and an external capacitor, the 555 can be used as a precision timer. Connecting the 555 to a miniature Piezo Buzzer element produces a very compact workable timing device. I call it my Timebomb, because it is housed in one of the Vortex exploding bombs. The timer, battery, sounding device, and the switches, all fit neatly inside the housing. This makes the unit self-contained. The Timebomb can be mounted under the wing by using the Vortex release mechanism and the timer can be moved from model to model if so desired.

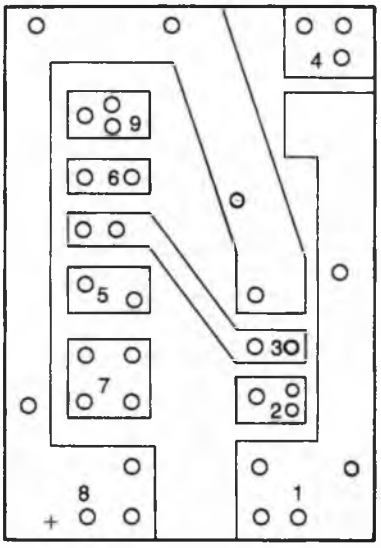
Here's how it works. By looking at the photograph, notice there is an on/off switch and a start button (located behind the fins). There are five holes drilled in the nose of the bomb to allow the sound out of the unit. When switching the unit on, the

to page 126

TIMEBOMB P/C BOARD VIEWED FROM THE BOTTOM

2X SIZE

P/C BOARD VIEWED FROM THE TOP



high pitched electronic tone will sound. This is a test to see if the unit is working. Pushing the start button, the tone discontinues and the timing cycle begins. The timing cycle is the approximate time of the flight so at the end of the flight the tone will sound. So, if the flight has ended in some unforsaken place, it will be easier to locate the downed model because of the audible sound. The units I built sound the warning tone in ten or twelve minutes. The timing cycle is changed while building the timing devices, by changing the values of the capacitor C1 and resistors R1.

increased the timing cycle by three minutes; example, one megohm and a 330 K resistor.

The original unit was built using a printed circuit board. The unit can be built on a perf board if so desired.

Construction is straightforward and is not at all difficult. Complete wiring instructions are shown by the numbers. I always use an IC socket when building with IC's, because of their sensitivity to heat. Mount the IC socket first, then the capacitors and resistors. The NPN Transistor is soldered in last, making sure to use a heat sink when soldering the connectors. I used zip cord wire for the switches, and battery clip.

The lead wires on the Piezo Buzzer are very thin and a little care is needed here so the wires do not break.

Mounting The Electronics In The Vortex Bomb

Photo No. 1 shows the electronics mounted in the Vortex bomb and the position of the two switches. Not pictured is the foam sheet that the electronics is wrapped in for shock resistance. These are used fabric softener sheets, which gives the electronics some shock resistance and it also adds a pleasant frangrance.

A small sheet metal screw secures the two halves of the bomb on the top and bottom. The Piezo Buzzer is mounted in the front of the Bomb by (1) drilling mounting holes for the buzzer and (2) drilling five holes in front of the Buzzer where the sound is emitted. A second method allows the Buzzer face to show through the outside of the bomb, as shown in Photo No. 4. By drilling the mounting holes again and a large hole in the center (about 3/4" in diameter) will expose the Buzzer to the outside of the Bomb, and might allow more of the sound out of the unit.

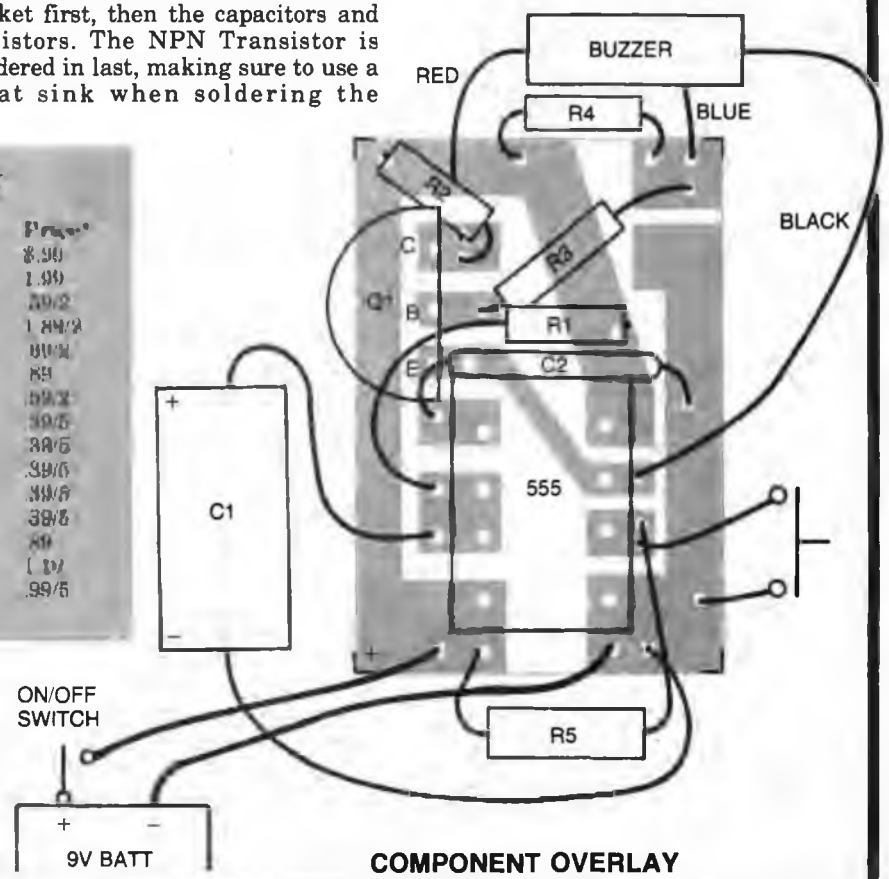
I hope that if you build this unit and install it on your aircraft, you will never have to use it to hunt down your lost model. If you do lose one, it will surely help in locating it. □

TIMEBOMB PARTS LIST

Radio Shack Parts	R/S Part #	Price*
IC1 IC Timer 555	276-1723	2.99
Piezo Buzzer	273-064	1.99
8-pin socket	276-1995	.99/2
Push-on switch	275-609	1.89/2
Slide switch	275-406	.99/2
Capacitor C1 470 µf	272-957	.89
Capacitor C2 .01 µf	272-1065	.99/2
Resistor R1 1M	271-1356	.39/5
Resistor R2 220	271-1313	.39/5
Resistor R3 10K	271-1335	.39/5
Resistor R4 220K	271-1350	.39/5
Resistor R5 10K	271-1335	.39/5
Transistor Q1 NPN	276-2009	.89
Battery 9 volt	23-553	1.99
Battery Clip	270-325	.99/5

*Prices were correct at time of publication

In the Timebomb that I made, I used a one megohm resistor and the Capacitor C1 was 470 µf. This will give a timing cycle of approximately 15 minutes. The timing cycle can be extended by increasing the values of these two components. I even connected two resistors in series and



COMPONENT OVERLAY

By Helen C. Broadbent

OUR MAGNIFICENT ROOM

When we drew up the plans for our new home 12 years ago, we allowed room for a very large music room. We decided then that those of us, 5 children and both parents, not already playing an instrument, would soon be playing one. We would really need such a room. It would have double walls, doors, windows and ceiling so that our constant playing would not be scattered over the hillside.

It would indeed be a magnificent music room. The walls would be painted a rich gold color, the drapes would blend in beautifully and the floor would be covered with thick, thick carpet. The instruments would be conveniently out, ready for instant pickup and play. Yes, this room was to be lovely and functional.

I did not know then that the room would indeed become **functional** but not lovely.

It started out almost immediately after the nice gold-colored paint was applied. My husband decided that a 7 x 10 corner of the room should be set aside for a science work area; we had some inexpensive asphalt tile laid down to cover that small area. I was busy with a new baby and the piano was pushed in on the cement floor.

Several years slipped away. Some unexpected things took place; it wasn't at all as I had visioned. Large work tables were set up; one was nestled right against the back of the piano. Planes of all kinds were being assembled. A couple of planes, left over from the salt-flat flying days over 22 years ago, showed up and cowered in the corner. Airplane bodies and wings started leaning against the walls as new planes were started. A bargain metal cabinet was hung — slightly crooked — on the wall near one of the tables. Work aprons smeared with epoxy and ambroid were draped over every chair.

My husband and three sons were creating this room bit by bit. A tall old metal cabinet found its way there and stood among the many long thin airplane boxes. Then in came an old high drafting table and added to my confusion. This room had become unbelievable!

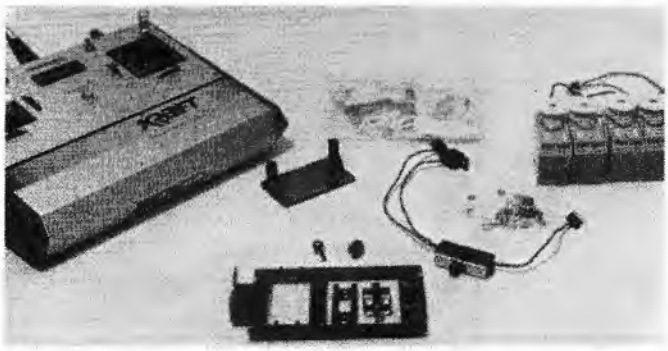
I went out last Saturday and watched the planes fly. David, our 13 year old, can now take off his Tri-Squire, get it high in the sky, do a smooth loop followed by 6 fast rolls before he has to pull it out and gain altitude again for some more "show." Dan, our 11 year old, is still on the buddy box with his Dad, but is quickly being weaned away as he does his first loop with his Box Fly Jr.

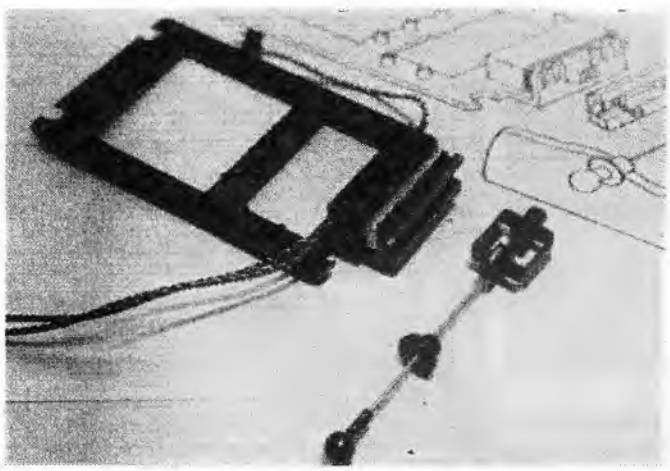
They are there together, flying the models they built together in their unique room. "Boys, I can't impress this upon you strongly enough. . ." Lessons being learned. Companionship. Fresh air and fun.

As I sat in the car and watched, I remembered 7 months ago the beautiful sight of Eliot's Lil' T Glider soaring next to his Dad's Hobie Hawk, the peaceful swish as both gliders passed by us as we stood on a slope

to page 182

SWEEPINGS FROM THE balsa dust factory



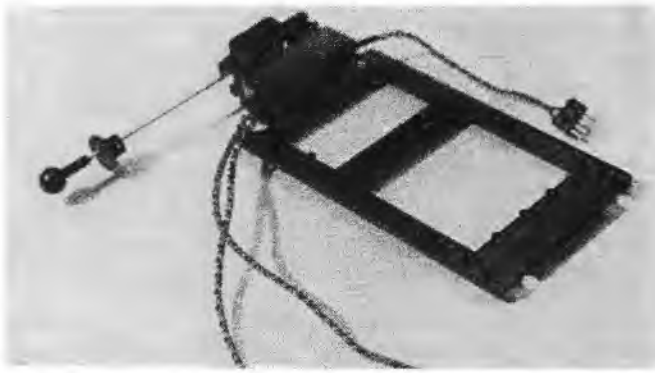


By Paul F. Denson

Switch Holder

As a convenience to you, the modeler, Kraft has added a switch section to their standard servo tray. The new switch holder includes an extension that enables you to turn your flight pack on or off without access to the radio compartment. With the switch mounted internally, it is no longer exposed to oil and dirt. In addition, when the switch is mounted with the servo tray, the flight pack becomes more compact thus reducing the clutter in the radio compartment.

The switch holder and servo tray come molded in one piece. The switch parts must be cut from the servo tray and

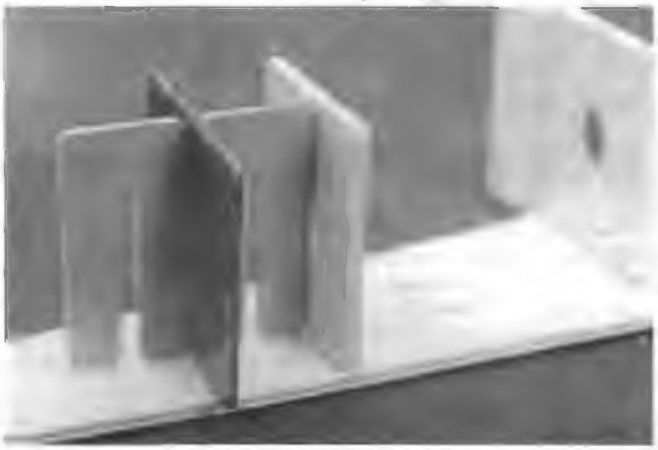


mounted in accordance with the drawing. We have found that a 1/16" piece of brazing rod works as well as steel wire and is much easier to Z bend.

The switch mounted servo tray is included in the newer Kraft Flight Packs and may be purchased as a separate item at your hobby shop. The switch and harness shown are furnished with the flight pack only.

Wing Rib Jigs

They look like captial M's and were found in a House of Balsa kit. We are sure they are for sale if you just inquire. The first picture shows them doing their intended job as wing rib jigs on the wing of our 2 X 2 glider. The other picture shows our discovery --- linked together crosswise, they hold each other erect. What better tool to check, for



example, whether or not formers are perpendicular to the sides of the fuselage. Previously, we used triangles, corners of sheet balsa and even the tri-square. These tools never worked quite right because they would not keep themselves upright. We have acquired two pair and they are in constant use. Note, each slot is a different width for use with various thicknessess of wing ribs. A great idea for both uses.

Shrink Tape

I guess we here at the Balsa Dust Factory have every diameter of shrink tubing made, but isn't it always true, you never have the size you need for that job. It is either too large or too small.

to page 130

SWEEPINGS

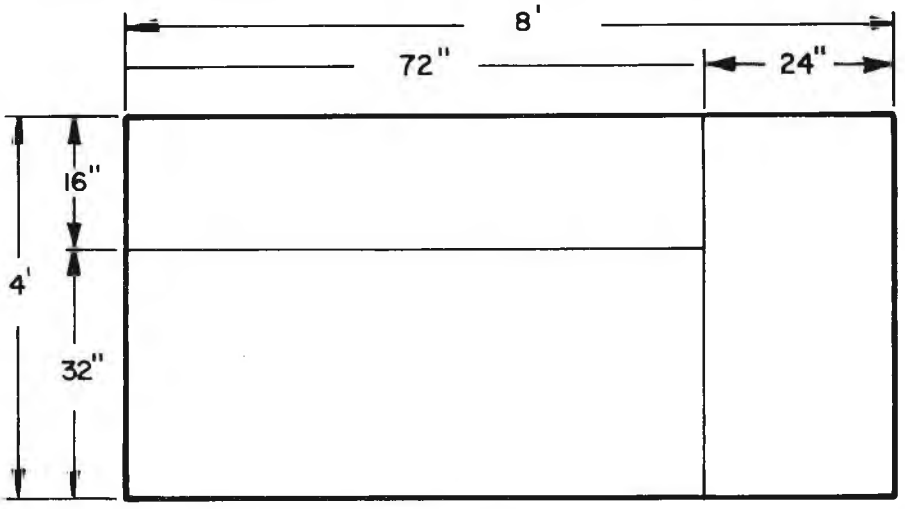
Ask at the better stocked electronics outlet for shrink tape. The roll we have costs less than $2.00, is 3/4" wide and looks exactly like a roll of black vinyl electrician's tape. Just wrap the connection, like you would with vinyl tape, then heat to shrink. We use our plastic film heat gun. If the 3/4" width is too cumbersome, just split off the width you need.

Baby Scale

It is amazing how something can be around for years, sitting there staring you in the face and be absolutely useless except for its original purpose. When the little one next door got heavier than 25 lbs., his baby scale became excess equipment according to his mother. Did we want it? No! not really, we wore one out years ago when we raised our troops. Hey! Wait a minute, it would be a good thing on which to weigh the Wholly Terriors (Our Silky Terrier pups). Okay! We will take it.

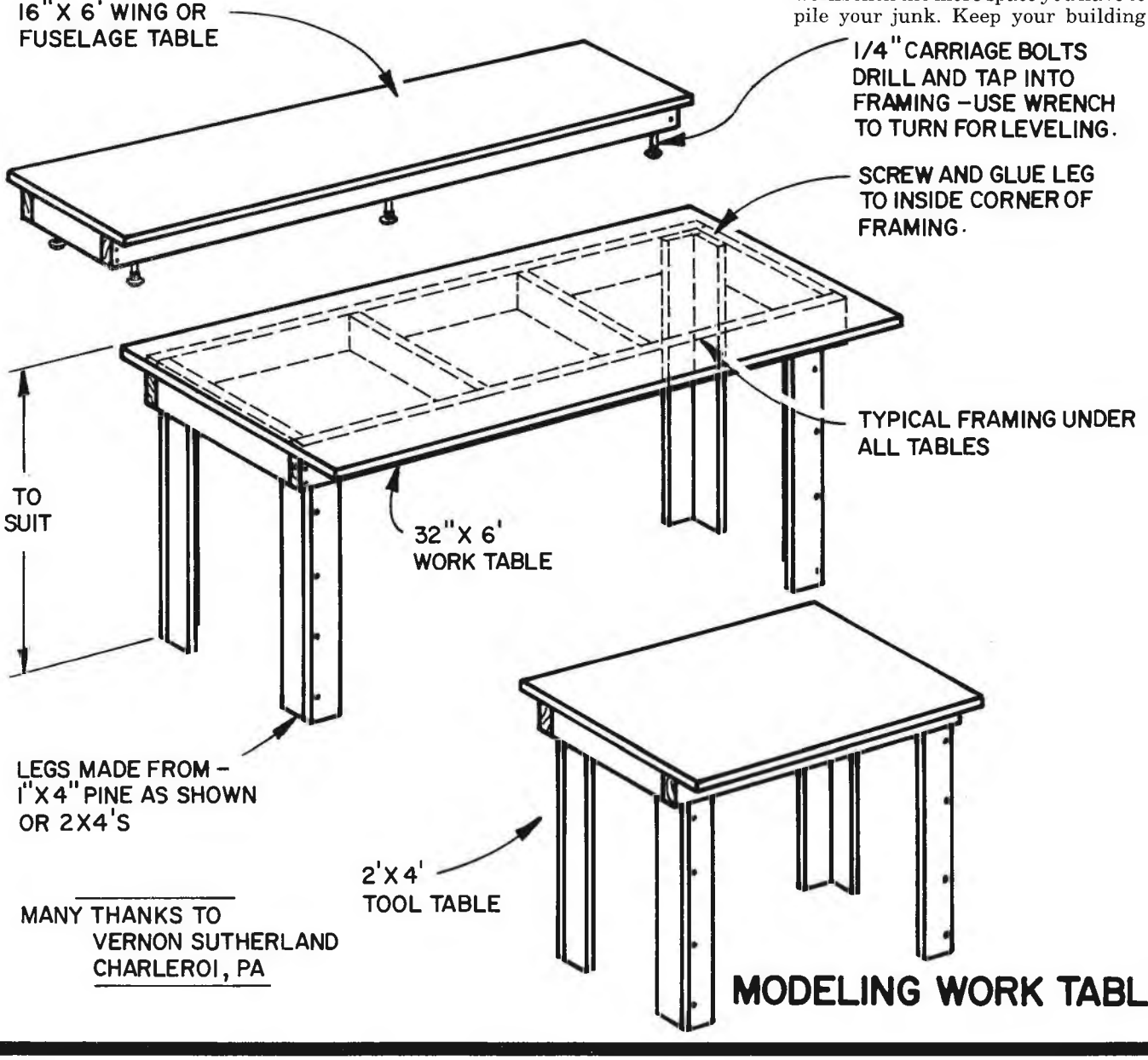
Even then, it took almost a year of weighing parts of planes too big for a chemistry spring balance before we saw the possibilities of that baby scale. The picture explains it all. The plane? A .30 powered Goldberg Eaglet 50 with Skip Ruff's autogyro blades. And, by the way, it flies quite well. We recommend you experimenters give it a try. □

HERE'S HOW



PARTICLE BOARD LAYOUT

One of the most important items for a beginning modeler is a good workbench. A flat, usable surface is an absolute must for straight flying surfaces. I remember the day when I thought a large workbench, possibly 4' x 8', was necessary for building. My idea was to build a wing on one side of the bench, a stab on the other, a fuselage, etc. This way I would be able to glue all the parts together without waiting for space. The idea worked out great, however, when I wasn't building, all that space soon became occupied with tools, magazines and what have you. My next building project suffered from the same problem I originally started with. That is, no work space! The 4' x 8' workbench was nothing more than a large table piled high with junk. The moral of my story is: the bigger the workbench the more space you have to pile your junk. Keep your building



MANY THANKS TO
VERNON SUTHERLAND
CHARLEROI, PA

MODELING WORK TABLES

bench to an optimum size with respect to your projects. Of course, good organization helps. I should follow my own advice.

Vernon Sutherland of Charleroi, Pennsylvania, has a great idea with respect to what I have been talking about. Presented in my sketch is his idea of modeling work tables. From one piece of 4' x 8' particle board, he cut three pieces. Particle board is fairly inexpensive and makes a good strong top. The three pieces, one 32" x 72", one 16" x 72" and one 24" x 48" make up the building tops of each of the tables. If you don't happen to own a table saw, have the lumber company cut the sheet for you. Most provide this service at a nominal cost. And, transporting a 4' x 8' sheet home would prove more difficult for most.

The 32" x 72" piece is used for the main work table top. This is framed, as shown, with 1" x 4" pine, or 2 x 4's if you want it stronger. Leave extra space under the front edge for mounting tools such as the Black and Decker 8" work center and vise. Don't leave out the three cross members in the framing. These help reinforce the heavy particle board which may tend to sag in time. Fasten the top to the framing with #8 x 1¼" flat head wood screws. Mark off and drill holes from the top about a foot apart.

The 16" x 72" piece is used for the wing and fuselage table top. It is framed with 1" x 2" pine. The top is fastened to the frame with #8 x 1¼" flat head wood screws. Drill and tap three 1/4" holes in the front rail and three in the back rail of the framing. Install six 1/4" carriage bolts, length to suit, in these holes for adjustment and leveling the table work surface. This portable table is a neat idea and will prove very handy.

The 24" x 48" piece is used for the tool table top. The framing under the top is made of 1" x 4" pine and fastened to the top with #8 x 1¼" flat head screws. The legs on all the tables can be made as shown or constructed with 2 x 4's. The table heights are made to suit. An ideal work table height is 36" to 38". The tool table can be a little lower if desirable and accommodates such tools as a Dremel jig saw, Dremel table saw, or Dremel drill press. Generally, the tool table is placed at a right angle to the main work table at about the same height. Pick your own working comfort.

If you are a rank beginner in this exciting and wonderful hobby of ours or you're an old timer and want to rejuvenate that tired old work space, why not consider a set of work tables as shown here. You'll be delighted with them. □

PIT STOP

Gene Husting

Pit Shop 12 Hour Enduro Sprint Race & 3rd Annual Rio Grande Can Am Race

12 Hour Enduro

Although everyone was thinking of this as the Pit Shop 12 Hour Enduro race before the race started, when it was over, everyone who saw it, was referring to it as the Pit Shop 12 Hour **Sprint** Race.

But let's start at the beginning. For the last 4 years, the Miami club in Florida has been holding an Annual 24 Hour Enduro. This requires an awful lot of work to stage this type of event and the willing manpower just wasn't there to hold another 24 hour race. So Gil Losi Sr., owner of the Pit Shop Raceway in Pomona, California, volunteered to hold a 12 hour Enduro. Gil, and all the racers, would like to thank the Budweiser Distributing Co., of Pomona for sponsoring this race, which allowed Gil to install a great lighting system on the track to be able to run at night. Gil also repainted the boards so they would be easier to see at night.

The Ranch Pit Shop Raceway in Pomona, California, was the site of this 12 Hour Enduro. Gil Losi Sr., the owner, has done a super job of improving this track and just installed lights for night racing.

The #0 team of Rick Davis, Curtis Husting, who built the car, and "super" pitman, Bill Newlin, are still working on their car even though the race has just started.

Bill Jianas, also on the #0 team, seems to be thinking, "Take your time guys, we'll catch up quick." But it wasn't quite that easy. The #0 team did win the 12 Hour Enduro, but not until the race was 11 hours and 46 minutes old, could they rest easy.

Team #2, with Gene Husting, Rich Lee, who built the car, as well as the 1st and 2nd place K & B motors, Chuck Phelps and Ralphie Burch Jr., had a 4 lap lead with only 14 minutes left in the 12 hour race when a slipping clutch took them out of the race.

The "Racing Losi's" — on the left is Gil Losi Jr,, who is a super 1/8 driver, 1/12 driver and champion off-road driver. Alan Losi is a champion 1/12 driver as well as a skateboard champion. Gil Losi Sr. is a champion race track owner and a darned good driver as well. Gill Jr., and Sr. teamed up with Ron Paris and Robert Cavazos to take 3rd spot.

The #5 team spent an awful lot of time in the pits replacing parts. They were driving a little over their heads trying to keep up with the leaders. They did have the fastest engine on the straightaway, and even though it was leaned out to the max it never quit running.

	ASSOCIATED TEAM #0 Curtis Husting Bill Jianas Rick Davis	ASSOCIATED TEAM #2 Rich Lee Chuck Phelps Ralphie Burch Jr. Gene Husting	PIT SHOP TEAM #4 Gil Losi, Sr. Gil Losi, Jr. Ron Paris Robert Cavazos	DELTA TEAM #1 Dean Brown Jim Atkinson Mark Miranda Tom Wong Dave Shuck	MCCOY TEAM #5 Dana Smeltzer Jerry Snow Mike Kinsey Mike Fox Andy Jacobson Ross Kloeber
LAPS	RC500	RC500	EAGLE	EAGLE	RC400
1st Hour	160	164	149	113	143
2nd Hour	323	336	310	270	290
3rd Hour	490	499	473	384	396
4th Hour	663	672	641	534	489
5th Hour	838	836	783	700	625
6th Hour	1009	1009	926	825	718
7th Hour	1186	1174	1054	971	837
8th Hour	1355	1348	1247	1124	980
9th Hour	1526	1529	1401	1289	1085
10th Hour	1701	1705	1553	1423	1193
11th Hour	1875	1883	1708	1588	1234
12th Hour	2058	2011	1852	1711	1234

The 3rd Annual Rio Grande Can Am race was held in El Paso, Texas, and even though there was still snow on the roofs, the track was dry and a little VHT traction additive made it raceable.

Bill Jianas, on the left, won the race in a very close finish, with Rich Lee just 6 inches behind. Rich also won the Top Qualifier trophy. Chuck Phelps was going faster than the 1st and 2nd place cars, but a bad beginning gave him a 3rd place finish.

Seven teams said they would participate, but at race time, 9 a.m. January 15, 1983, there were five teams ready to tackle the 12 hour event. Precisely at 9 a.m. the race started. Four cars took off, while the Associated team car #0 was still in the pits with last minute preparations. They started 4 laps down, but Curtis Husting, Bill Jianas and Rick Davis had won the last three 24 hour Enduro races in Miami, and they figured a few laps down in the beginning would all even itself off after 12 hours. Normally, this would have been true, but they were now facing a tough challenger against the Associated team car #2. This team of Rich Lee, Chuck Phelps and Gene Husting had won the last three 6 hour Enduros with virtually no problems, and for this race they had the added driving abilities of Ralphie Burch Jr. Another team that certainly had the driving abilities on this track was the Pit Shop team #4 Gil Losi Sr., Gil Losi Jr., Ron Paris and Robert Cavasos. The first three probably have almost as many laps on this track as John Thorp, but this would be Robert's first gas race, although Robert had many laps in his 1/12 car on this track.

to page 144

Results Rio Grande Can Am Race

"A" Main	LAPS	QUAL.	CAR
1. Bill Jianas	75	14-15	RC500
2. Rich Lee T.Q.	75	14-20	RC500
3. Chuck Phelps	75	14-14	RC500
4. Ralphie Burch Jr.	74	13-25	RC500
5. Curtis Husting	72	14-11	RC500
6. Dana Smeltzer	72	13-26	RC500
7. Gene Husting	69	13-28	RC500
8. Jim Turner	64	13-27	ALPHA

"B" MAIN
1. Joe Sullivan
2. Barry Grossenbacher
3. Ross Kloeber
4. Chuck Moon
5. Gay Sullivan
6. Maggie Turner
7. Jeff Booth
8. Troy Moor
9. Butch Kloeber

from page 141/140

The Delta team #1 had a number of capable drivers including Mark Miranda, National Super Stock Champion, Tom Wong, who has won a couple races on this track, as well as Dean Brown, Jim Atkinson and Dave Shuck the team manager. The dark horse team had to be the McCoy team #5. Dana Smeltzer figured none of those independent suspension cars had run in a 12 hour Enduro yet, so he would go with a simpler designed car, which was his RC400, which was an RC300BD with an RC500 front end. Dana figured he would have a far better chance with reliability, only time would tell.

Chuck Phelps started driving for team #2 and when the green flag came up, Chuck took the lead, with Gil Losi Jr. in Car #4 close behind. About the 5th lap, car #0 got on the track with Curtis driving. Chuck's engine sounded like it never came off a 4-cycle, but it was going as fast around the track as anyone's, so we left it alone. Losi had his leaned out to the max, with a gearing that was peaked out halfway down the straightaway Everyone was taking bets on how long the engine would last. But the fastest car on straightaway, without any doubts, was the team #5 car. Dana had a gear that would never peak out, but he also had it leaned down, and he must have been about 10 miles an hour faster on the straightaway.

Chuck and Curtis were running about the same speed around the track. We switched drivers about every 1/2 hour with Ralphie taking the 2nd drive and Rick replacing Curtis. At the end of the 1st hour, car #2 held a 4 lap lead over car #0 with car #4 15 laps back and car #5 21 laps back, but with 11 hours left anything could happen.

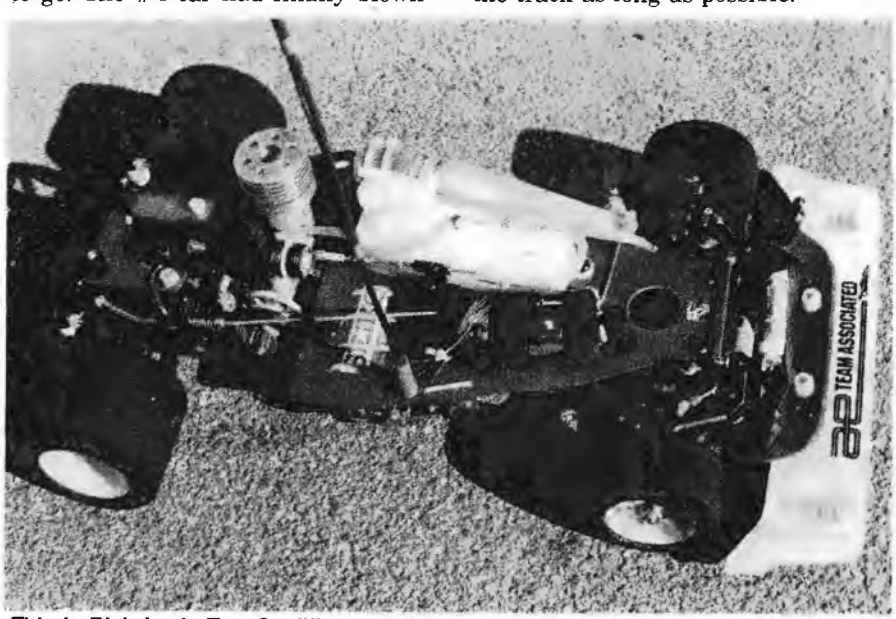
At the end of the 2nd hour car #2 had picked up a 12 lap lead over the #0 car. It wasn't that I had outdriven Jianas or Rich had outdriven Curtis, but the #0 car had stopped for a tire change and to adjust the carb. Both cars had the same horsepower. Rich Lee had built both of the K & B motors for the cars. These were two new 1983 versions of the K & B 3.5 R/C car engine with the square heads. K & B had made many new improvements in the head, case, sleeves, rod, back place, crankshaft, and gaskets, and this 12 hour race would be a perfect test for the new engines.

At the 3rd hour #2 car still had a 9 lap lead over the #0 car. The #4 car had a strong hold on 3rd place with the #5 car holding a 12 lap advantage over the #1 car.

At the 5th hour the cars were within 2 laps of each other and at the 6th hour the cars were on exactly the same lap! After 6 hours of racing, to be racing side by side for the lead was just incredible! But there was still 6 hours to go. The #4 car had finally blown their first engine, but the other two teams also had their share of problems. In an Enduro, the most important thing is to keep your car on the track as long as possible.

Jim Cook handled the race directing duties and kept everything running along smoothly. The El Paso club has a beautiful track and a perfect location at the Vista Hills Shopping Center.

ROAR President, Joe Sullivan, loves to race and he must also love to work on cars, because he gets to work on two of them. Here he's preparing Gay's car, who is his wife. I thought Gay had one of the fastest cars on the straightaway with her RC300BD, but all I could hear her tell Joe was, "I need more horsepower!" Spoken like a true racer. Joe won the "B" Main with his RC500.



This is Rich Lee's Top Qualifier car. Rich dyed all the parts of his RC500 black. Car features Rich Lee built K & B engine, obviously, McCoy muffler, and Airtronics radio.

During the 7th hour car #2 had some problems. Rich had gotten in a crash and lost the wing and later while Ralphie was driving, the transmitter batteries went dead. Another crash knocked the batteries completely out of the car. So, at the 8th hour, car #0 now took over the lead with a 7 lap lead. But by the 9th hour the #2 car had the lead back, and was slowly opening the lead up. At the 10th hour it was 4 laps.

We were now running in the dark under the lights. Because the race was so close, we had now leaned the motor down to a rich 2-cycle to keep up with the other car. Although these cars were set up for enduro racing and so were heavier than our normal racing RC500 cars, they were by no means slow. At one point during the night, Jianas and Ralphie ran actually side by side for 10 straight laps and their lap times were faster than Jianas' lap times when he was Top Qualifier at the 1982 McCoy race. The cars have improved that much.

By the 11th hour the #2 car had increased their lead to 8 laps and growing. Most of their gain was in the difference between tires. They used a little harder tire and were able to go a little longer between tire changes. With 1/2 hour left, the #2 team had made their last tire change and still had a 4 lap lead. Jianas was driving the #0 car and doing his darndest to close that lead down, but Chuck Phelps was also going as fast as he could to keep Jianas from making up any time. With 1/2 hour left, anything could happen. Fifteen minutes to go and the #2 team still had a 4 lap lead, and now Chuck was running as fast as Jianas. It looked like Jianas was going to run out of time.

With 14 minutes to go, the #2 team still had a 4 lap lead, but then their clutch started slipping. They didn't know whether to pull the car in and change the clutch or to hope it would

last another 14 minutes. They gambled on running! One minute later the heat burned out a clutch bearing and they had to pull the car in. Two minutes later the #0 car had taken over the lead and went on to take the checkered flag. The racing between these two cars was so exciting that many spectators stayed for the full 12 hours.

Team #4 used three motors, but they held on to 3rd place, and learned a lot about Enduro racing. I saw Ron Paris driving and he had to give up his turn early because his hands had cramped up. We all know that feeling Ron. Team #1 came from behind to take over 4th place, and with all their problems, they never gave up. Team #5 had the fastest car on the straightaway and that McCoy-K & B engine ran super strong for 11 hours, when they finally pulled the car in so they could watch the end of the race. Without a doubt, this is one of the most exciting Enduros I've seen, and everyone else there agreed.

3rd Annual Rio Grande Can Am Race

With corners called The Big Enchilada, The Boot Hill Bend, The Cantina Corner, The Texas Twister,

to page 149

from page 146/140

The Vista Hills Switchback, and the 180 ft. Diablo Straight, you know we must be talking about The New Butterfield Trail Race Course in El Paso, Texas, and better known as the Rio Grande Can Am Race.

We were at Ranch Pit Shop one Saturday, and Gil Losi Sr. asked me if we were going to El Paso for this race. I knew this was their 3rd Annual race and that it was getting bigger each year, but I hadn't really thought about it, because we generally start the season with the Florida Winternationals. But Gil said, "C'mon Gene, you got to go. We're all going." One thing led to another, and before long I found myself flying in to El Paso. There seemed to be an awful lot of pure white ground below, and as we landed all I could see was piles of snow along the runway. It seems they had just gotten 7" of snow last week in a freak snow storm. I thought, "What am I doing here?" When we landed, there was this funny white stuff everywhere, and they said the high for the day was 40° and the low was 20°. Being from Southern California, we didn't know what that meant, but we learned fast.

On Friday, the track was surprisingly clean and dry. There was still snow melting from the roofs and in the shaded areas, but none of the water was running on the track. Bill Everett and the El Paso club had certainly done a great job in preparing for this race. The track was located in the Vista Hills Shopping Center. The surface was reasonably smooth, and even though the surface was cold, some VHT brought the traction up so we could race reasonably well. It was necessary to de-tune the cars, because there was only medium traction, but it was raceable, and it kept getting better and better. And also, it had gotten up to 50 degrees!

Chuck Phelps, then Bill Jianas led the qualifying on Saturday with their RC500 cars. For some people, this would be their first race with their new RC500 cars. Ralph Burch just finished Ralphie's car a week earlier, and ran it in his driveway. Barry Grossenbacher, Troy Moor and Butch Kloeber all had new RC500's. Chuck Moon was also here from Florida as well as racers from Oklahoma and Mexico. This would be the first chance we had to get together and get all the cars set up properly. They all got them running pretty good.

Jianas' Saturday qualifying time of

14-15 was still holding up on Sunday. Chuck Phelps had come close with 14-14 and Chuck backed that up with another 14-14. Curtis Husting was only three seconds behind that with a 14-11. But on the final round Rich Lee came through with a perfect run to take Top Qualifier honors with a 14-20 run.

The "B" Main was very interesting with seven guys and two ladies going very fast. Gay Sullivan and Maggie Turner were running quite fast with their RC300 BD cars, but I heard them asking their husbands for a car like the guys drive. Spoken like a true racer. Joe Sullivan got the lead right at the first turn, but his wife, Gay Sullivan, wasn't more than 2 feet behind. One of the problems with the track was that the traction was okay in the middle of the lanes, but if you got too high or too low, there was zero traction and it took as much as five seconds to get back on the track. Gay held 2nd spot for a while, but Barry Grossenbacher and Ross Kloeber finally passed her. For the first time Barry had ever driven the RC500, he was doing super. He closed up behind Joe but couldn't quite get past. Joe Sullivan won with Barry 2nd and Ross Kloeber in one of his better driving performances in 3rd. Chuck Moon followed in 4th with Gay Sullivan right behind in 5th and Maggie Turner 6th.

The "A" Main was a super race with three different drivers leading. Jianas got the early lead with Ralphie Burch in 2nd. Rich Lee got caught in traffic at the start, but in a few laps he was right behind Ralphie. Ralphie pitted first. Then Jianas and Rich pitted together but Rich lost about 5 seconds in the pits. Jianas was now 1st with Ralphie 2nd. Then Jianas got hit in a corner and flipped over. Ralphie took over the lead with Rich in 2nd. Ralphie kept the lead for about 20 laps, then he got hit and the front of the body popped off. Rich took the lead, but after the next fuel stop, Jianas had the lead again. Chuck Phelps had a real bad start and actually got lapped by the leaders, but about lap 60 he caught the leaders and passed them to unlap himself, so he was going quite fast. Rich was slowly but surely catching up to Jianas and at the last corner he was on his bumper. He could have driven all over Bill, but he backed off allowing Bill to take the win with Rich 6" behind in 2nd! As close as you could ask for. I just thought of something. I never saw Gil Losi there!

I guess this tune-up race did some good. The next week at a Series race on the new Orlando track, Chuck Moon won the race beating Arturo Carbonell. You think he was happy?

□

GOLD IN GARBAGE OR GRAVEDIGGERS DELIGHT

Rebuilding out of the garbage can could be one of the most satisfying modeling accomplishments you will ever experience, including the complete scratch-building of your dream ship. How many times have you wandered by the local field trash can to see tail feathers, broken wings and fuselages waving in the breeze? Too many times to mention I'll bet, but how many times have you dug 'em out and hauled them home? Or better yet, how many times have you purchased a newly crashed craft? Seldom, if ever, if you are the average RC'er, and you are missing out on numerous cheap and quick airplanes.

I know a lot of guys who **never** rebuild anything. I even used to be one of them — but no more. My first aileron airplane was Chuck Cunningham's Lazy Ace. The kit just fell together which left me time to really try to do a good job and I did. What a remarkable airplane! Strong, light, pretty and very, very gentle. Being impressed with 4 strokers in general, I decided to try it with the O.S. .60 4 cycle. It came in a snitch over 10 pounds, so 18,000 prop experiments later I ended up with a 14/5 and marginal flight. But to me marginal flight was very realistic and pretty so I stayed with it for nearly a year and a half. It would loop fine after a gentle dive, do the prettiest hammerheads you could imagine and I even learned to roll it. You could complete a slow roll in about 300 yards and still have enough altitude left to use your airline bag. So, all in all, I was tickled to death with that airplane. It had taught me how to fly like the big boys and it was still in one piece after hundreds of flights, and about 30 gallons of fuel. But quite a bit of that fuel had found its way to some of the forward framework so I decided to fix it. That was my toe in the water for a later exhilarating experience.

Modified Lazy Ace resembled Golden Age type biplanes.

By Marv Reese

Mods give Lazy Ace a new personality without compromising excellent flying qualities.

The Coverite came off just like tape from a roll and the oil soaked parts were easily replaced so that in a week she was airborne again all decked out with new covering on the fuselage, vertical stab, and a new trim scheme. All the locals agreed it definitely was prettier. I kept telling them so and they finally agreed so I was happy as a

little lark. But the power bug was creeping up on me so I finally purchased a Webra T4 .90 4 stroke and replaced the O.S. .60.

The next year was supreme. My ole Lazy Ace would attract spectators like suckling pups to momma's breasts and when she was on the ground I'd spend most of my time answering questions, polishing, cleaning, and acting like the field pro. On top of all that Angel Food cake was the fact that my business was starting to make some profit, so I hiked up my pants, closed my eyes and sprung for the O.S. Gemini Twin 4 stroker. I had to hear it run after sleeping with it for a week so out came the Webra and in went the twin. After all, a beautiful engine like that had to go in your most dependable airplane so it could be broken-in in the air high above the dust and dirt on the ground. Right? Wrong! On the fifth flight, coming off of base leg about 25 feet up, my most dependable ego building biplane locked in full down elevator and we all felt that great surge of water in our mouths as the sickening sound reached our ears. **Splat!**

I don't recall the long slow walk to that blue and white pile of balsa, MonoKote and Coverite imbedded three or four inches in the wet (thank God) ground. Both wings broken. Fuselage demolished back to the trailing edge. Landing gear a mass of knurled wire. Oh, it was terrible. The new Gemini looked okay. Sure the prop was gone except for the center 2" around the hub and, since I was on final, the venturi was closed to idle so it didn't appear to have ingested any mud. So, I carted every piece I could find back home, cleaned up the engine and simply dumped the rest in a seldom used corner of the basement. The old pros had encouraged me to do just that. They had all assured me it would rebuild very quickly but to just set it in a corner for awhile. I figured what the hell it will passify them but I know positively it will take two or three months to get it rebuilt and even then it will look terrible and never be as majestic and beautiful as before. I'll just buy a new one and they'll never be the wiser. But the season passed and I built and flew several other airplanes and every once in awhile I would look at my pile in the basement and recall those wonderful days of yesteryear.

As fate would have it one of our fliers asked me about the Lazy Ace as he was about ready for his first aileron airplane. Of course I really gave him the pitch so he bought one and did a beautiful job on it with only one error. He put one of those ear piercing 2 cycle .60's in it. Gentlemen that he is, he let me tweek the controls for a few minutes and that was like handing a

bourbon and 7 to a lush. I could hardly hand him the transmitter fast enough and I was in my car headed for that pile of trash in the basement.

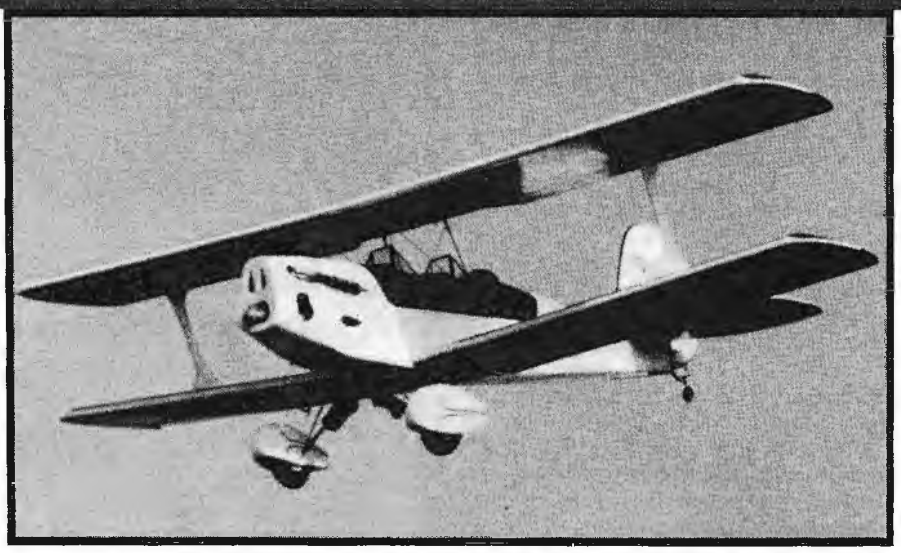
Nearly a year had passed but all this time I had toyed with various ways to improve the airplane. Most were aesthetic since you would be hard pressed to improve on the flight characteristics without completely changing the airfoil to a semi-symmetrical section and I didn't want to get that involved. Besides Cunningham had written an article encouraging people to change kits to look different. Sounded rather silly at the time to buy a kit then change it, but it didn't seem nearly as silly to rebuild a wreck and do some of that changing — so I did.

How about functional oleo struts for gears? After seriously inspecting a friend's 9' J-3 with functional oleo's, I decided I could probably handle that and two nights later had them finished complete with snap on bungee covers and it looked like they might work. With such fancy legs why not go ahead and try wheel pants. I had always been told they wouldn't work worth a hoot in grass but, what the heck, if they didn't I could always take them off. I knew from previous flight history that the Ace would jump right off the ground with the Webra .90 4 cycle so I might be able to get away with wheel pants. These took longer than the oleo struts as I really didn't know quite what I was doing, but four nights later I had a set of nice looking shoes. Now the trouble was that these changes demanded a change in the vertical fin. I had previously reasoned that by increasing the tail feathers I might be able to get a snap roll and an acceptable spin, plus I had been wanting to learn how to accomplish slip and to do that takes rudder. My previous recover on the fuselage had been with polyester dress lining in place of Coverite. It peeled right off just as the Coverite had, leaving nothing behind.

After careful inspection I found everything forward of the trailing edge had to be written off. The spruce longerons were snapped in different locations so I reasoned these could be spliced right where they broke since one break was 6" or 7" ahead of the other. So I made an angle cut twice the length of the longeron width to establish a long gluing surface and spliced on two new forward section longerons. I then dug out the plans and built two new sides just from the trailing edge forward and attached these to the spruce longerons. So far so good. The plans also had full sized formers drawn so I located the appropriate sized wood and made new

formers. I was amazed! The fuselage was back intact after just one night at the bench and only a little material. Hot Stuff made it all possible. The next night the tail section was revamped complete with CB scale tail wheel assembly. Now all that was left were the wings, the bird cage, covering and finishing and I was just a little over a week into the project.

Removing the MonoKote from the wings was a little trying but I found if heat was applied during the peeling process it came off in large sheets and only occasionally left tear strips. If too much heat was applied some of the color would stay in the wood but this was easily removed with thinner. Looking over the bare bones I could see that a lot of the sheeting had popped but most of the rib and sheeting breaks were clean and easily fixed with a bead of Hot Stuff or Super Jet. The leading edge of the lower wing was demolished in the center section. I simply replaced this 6" section with a new leading edge using small dowels in each end slotted into the remaining L.E. from the backside, then covered the slots with lite ply. Fortunately the dihedral braces were not broken! I decided to bolt and key the lower wing this time instead of the original rubberband method, which meant I had to add bolt blocks to be drilled and glued into the wings. Same for the top wing. Had it not been for this I would have had both wings finished in one night, but these additions cost another evening's work. The bird cage or cabane was pretty well sprung apart and all solder joints broken so I unwrapped everything, cleaned up the wire and resoldered it all. It came out much better than the original attempt when the kit was first assembled as my soldering techniques had improved. Rework of the cabane only took a couple of hours and I was ready for covering.



Looks like neat home-built on a fly-by but the pilot stayed at home.

I covered the fuselage again with dress lining simply because I still had some left. Slap on a coat of dope to reseal the resanded structure, then a coat or two of Balsarite and iron it on just as you would Micafilm. I had read about Micafilm and had seen some at the local hobby shop so I called friendly Finley, the proprietor, to see if he had enough red Micafilm in stock to do the job. He just had three rolls. After some preliminary pencil sketches I decided I might just barely make it with three rolls so I called him back and told him to mark them sold.

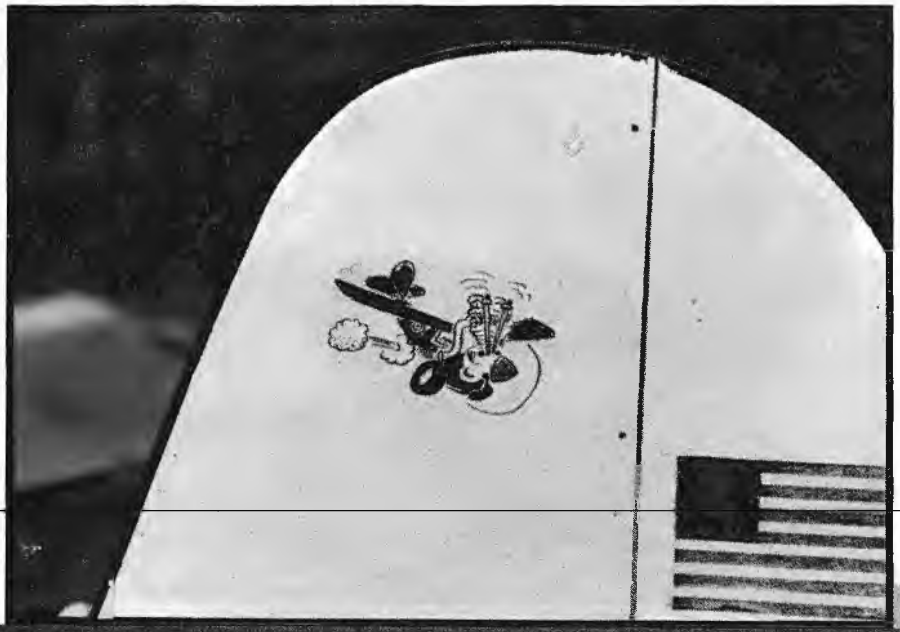
Now I really had a time with the Micafilm. I am positive I have yet to master the technique and it was probably due to improper heat. Anyway I got it on without wrinkles and it is beautiful, doesn't scratch as easily as other iron-ons and definitely is stronger. My screwdriver slipped anchoring the strut hold-downs and put a very deep gouge in the film. I was pretty sure I had punched a hole in it so, after all appropriate swear words, I got out the MonoKote iron and in one second the dent completely disappeared. And **no hole**!

All that was left now was to make some sort of cowl. I had seen a cowl made from 1/64 ply and it seemed to me this would be just as quick as a fiberglass one so I quickly developed an inner framework to support the ply, added a balsa nose block, covered it all with light fiberglass inside and out. (Inside was glassed after sawing out the inner structure I had made to develop the proper shape.) Voila! Custom made cowl in one night. Strong and light.

Oops! One more item to remake. Those darned N struts. I really didn't like my first set of N struts as they kept cracking at the wood joints so this time I layed out a Pitts type single strut. Boy were they easy to make and fit. I made them out of some leftover door skin (ply), and they were done in no time. Bob Terhune, the friend with the J-3, had also given me an idea on a simple and sturdy way to attach struts for a bipe which I had used from the start on my Lazy Ace. Use Carl Goldberg or similar nylon angle hold-downs attached to the wing. Through the end that protrudes up, insert a wood screw or nut and bolt of proper size to snap into the Goldberg **flat** hold-down which is attached to the strut itself. The strut simply snaps

to page 160

Homemade decal and no-stars flag are described in text.



on and off and has **never** come apart in flight and, like I've said before, that's after several hundred flights and all kinds of maneuvers.

Now we were all rebuilt and recovered and two weeks hadn't passed since I rekindled the flame with my friend's new Lazy Ace. I spent nearly three more weeks trying to develop a paint scheme. I had decided I wanted to learn how to make my own decals and I wanted numbers other than the standard block numbers everyone else has. In addition, I had vowed absolutely **no striping tape.** Somewhere I had read of masking with shelf paper (the sticky kind). I know some of this may not make sense. If you can afford a Gemini twin why didn't you just use Coverite instead of dress lining? Why door skin instead of aircraft grade ply? Why screw around with shelf paper and all that cheap stuff when you can just go pay someone to finish out your model? I guess it's because I just have to find a new way on every model to screw it up! And you are right. That doesn't make any sense. But this time would be different! (Famous last words? Read on.)

I stopped at the local art store and found out they have plain, clear decal paper. Mine looked like it belonged in a 3-ring notebook. Kind of a hard paper back and this thin plastic or mylar or whatever stuck to the paper. I had seen Hobby Shacks(?) logo in their RCM ad telling about their 4 stroke fly-in. It was a cute little airplane with a humungus 4 cycle engine up front so I copied it in pencil on the decal paper. Then I went over the pencil with India ink. Next I found the colors I wanted and carefully painted them in. So far so good. The plastic didn't dissolve and no ink fingerprints yet. So I cut it all out and sprayed it with polyurethane clear. I figured Poly-U wouldn't affect the decal either and this would fuelproof the ink. Poly-U is just as clear yellow as all the other clears are, so spray lightly and let it dry overnight. Then just peel it off and stick it on wherever you want it. Make sure the edges stay down. Use a little Hot Stuff around the border but keep your fingers out of it. I was delighted with the results so I decided to make an American flag too. I spent a good 30 minutes making sure I had all the stars on then started coloring in-between them with blue. About halfway through the top stars were beginning to fade away to the wild blue border so I ended up with a flag and no stars. Oh well. At least I'd have the first homemade flag on the field.

Next problem — how to develop cursive numbers of some sort that

to page 176

from page 6

aircraft. I have even tilted the thrust line up to solve this problem without detrimental effects on the rolls. Moving the Center of Gravity back will sometimes help the problem since this reduces the elevator trim normally carried for level flight and therefore its trim influence in vertical flight.

You can also completely realign the wing, tail, thrust line relationships by increasing or decreasing the wing incidence, stab incidence and thrust alignment. This will change the angle at which the fuselage flies through the air and, therefore, the effective location of the vertical C.G. and center of drag. Decreasig the wing incidence, without changing the thrust alignment, has the effect of putting in down thrust; this may also help a pitch up problem. Unfortunately, changing things in this fashion may foul up something else, like pitching in knife edge flight, so proceed cautiously.

It's apparent that the best designs are reasonably symmetrical, with wing, tail, and engine aligned with the thrust passing close to the center of drag. The Laser is a good example of this, also my new "Phantasy" design. The old Art Schroeder "Eyeball" and Jim Martin's "Banshee" are also examples. In my "Phoenix" design, the thrust and tail are in line with the wing center of drag being very close to the thrust line.

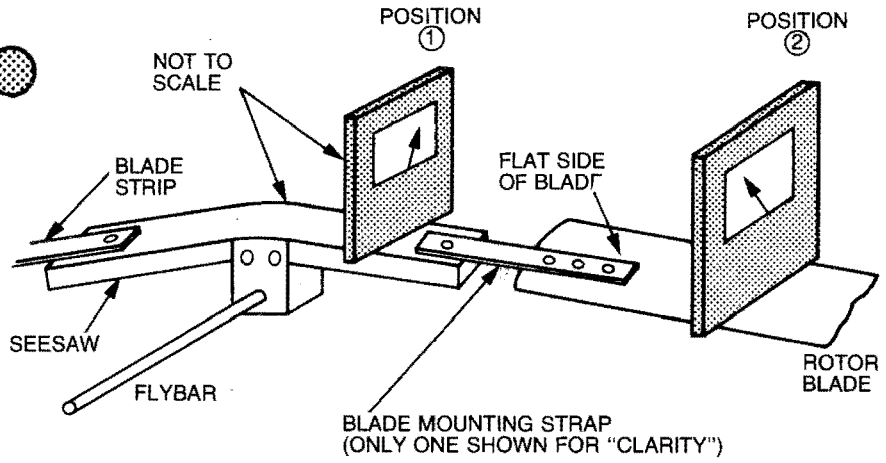
Now that I have completely confused you, let's talk a little bit about why every properly trimmed pattern ship should have more down elevator control than up. It's simply due to the fact that in normal upright flight, the wing is trimmed to a positive angle to support the weight of the aircraft. Now if you wish to fly inverted, you must bring the wing through zero and to an equivalent negative angle (for a symmetrical airfoil). This means that a lot more down elevator trim than up is required. In rolling the aircraft, it's easier if the elevator control required both up and down are roughly the same. So, set up the linkages and/or adjust your adjustable elevator end travel for more down than up to provide this capability.

Turnaround Designs

Interestingly, while seated writing this bit, the mailman delivered a letter from Adriano Zaltron of Schio, Italy, which describes results of design efforts by he and friend Mariano

to page 173

FOR WHAT IT'S WORTH



Terry McKienzie, Versailles, Kentucky, tells how he uses a standard Robart incidence meter to make rotor pitch measurements for his Cricket helicopter as shown in sketch.

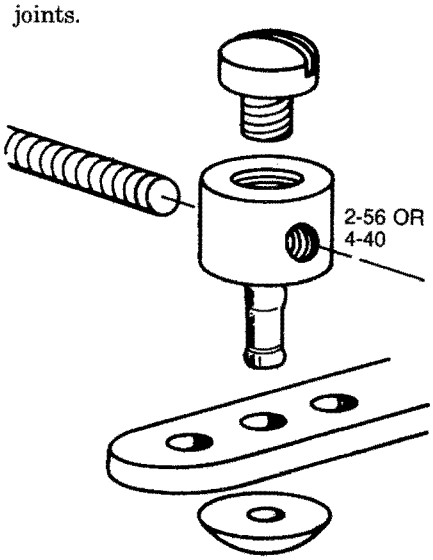
1. Remove rotor head assembly from the shaft.
2. Place it upside down on your workbench.
3. Remove the bar from the incidence meter.
4. Make sure that there are no burrs or flashing on the bottom of the meter.
5. Hold the seesaw/blade firmly on the bench.
6. Place the meter in position (1) and note the reading. Do not allow the seesaw or blade to move.
7. Place the meter in position (2) and note the new reading.

The pitch is the difference between the two readings.

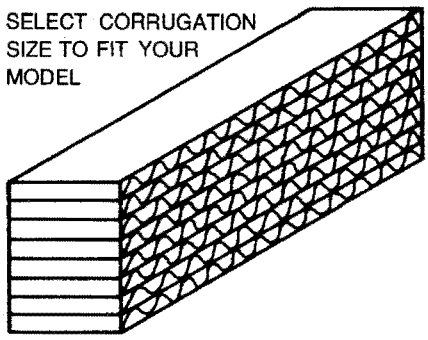
8. The blade assembly can now be picked up and adjusted.
9. Repeat steps 5 through 8 for each blade until the desired pitch is achieved (3½°-4° for Cricket).

Robert Wargo of Holiday, Florida, came up with this clever idea for a finishing touch on his sailplane tail.

After you've finished covering your latest P & J with one of the plastic coverings, sometimes the joints at the stab and rudder may not be as neat as you had hoped. (Bob usually covers the stab and rudder before assembling to fuselage.) To give a good finishing touch, make a fillet of silicone around them. It only takes a few minutes and adds much to the final appearance. Pick the color silicone applicable (Bob usually uses black auto seal) and, using the nozzle supplied, lay in a 1/8" fillet. Be sure to push ahead of the nozzle. After an hour or so the excess can be cleaned off before it sets firm. This method also serves the dual purpose of keeping fuel out of the joints.



We received the same idea for improving a very popular accessory from two readers simultaneously. Credit goes to Jim Barkdull of Littleton, Colorado, and to Dick Swartout of Penn Laird, Virginia. For quick, positive, removable, and non-slipping attachment of pushrod ends to E-Z connectors, run a 2-56 tap through the connector and use a threaded end on the pushrod. This has the advantage of being slip-proof and makes micro-adjustments practical and easily done. For giant scale applications, drill out the hole with a #43 drill and tap it to make a 4-40 threaded end. You can still use the set screw and never worry about control failure if a set screw loosens up during flight.



Don Prentice of St. Catherines, Ontario, Canada, has an item for scale modelers. The simulation of a radiator core for the scale model has always been a problem for most modelers. Here is an easy solution: Take the side of a corrugated paper box and cut it into strips 1/2" wide. Cut across the grain of the corrugations. Now stack the strips up and, lo and behold, you will see a very good representation of a radiator. Not only does this make a good looking radiator, but air passes through it readily. See sketch.

Sam Hopkins of Folsom, Louisiana, came up with this idea. Want to cover a foam wing with Coverite's new Micafilm but don't want the Balsarite to dissolve the foam? Just coat the Micafilm with Balsarite, let dry, then apply as you would EconoKote, Solarfilm, etc. The resulting skin is much stronger than the plastics and the Micafilm looks good over white foam!

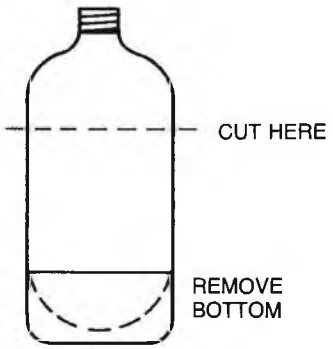
Fred Garnes of Orange City, Florida, tells how he solves a problem with his transmitter.

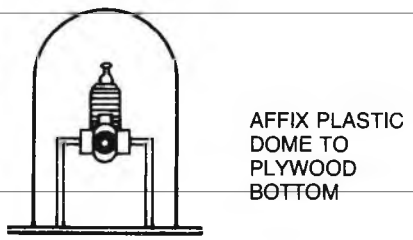
For those of us who use Airtronics radios and, after extended use of the TX, find that the control panel cover no longer fits tight, with a tendency to slide off into the realm of the lost, here

is a solution.

Place a couple of drops of thick CA glue on the outer edge of the inside of the cover and let cure thoroughly. The cured glue will act as a shim between the TX case and the panel cover and it will, once again, fit snug.

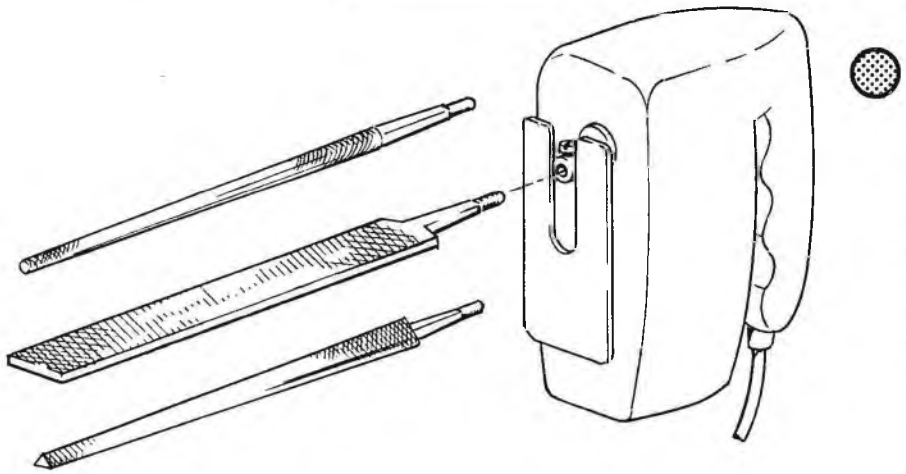
Then, from Steve Gilbert of Butler, Pennsylvania, we received more on the same subject. Often plans for models provide one half of a wing (for example) which requires building the other half off the plans; tracing, or treating the plans so that the drawing shows through on the rear. Many substances have been used in this treatment process in the past (including cooking oil), and many are messy. Steve finds that a light spray of WD 40 wiped dry with a cloth or paper towel works just fine. The surface is not greasy, and the slight odor disappears after a short period of exposure.





Michael Pietsch of Sheppard AFB, Texas, sent in this dandy idea. Do you have an antique or prized engine you want to display? Take one of those clear, disposable plastic soft drink bottles and, using the bottom portions, make a trophy case. See sketch.

Master model builder, George Harlan of Irvine, California, sent in this labor saving idea.



Those hard to get at spots which require time consuming filing can become painless chores by modifying the handle ends of various sizes and types of files to fit the chuck of your saber saw. See sketch.

Jim Uebelhoer of Ft. Wayne, Indiana, sent in this handy shop hint. When using most of the aliphatic resins, such as Gluit, the containers that they come in have such large openings that when Jim uses them he finds himself throwing away as much as he uses. This is especially true when a small bead is required on the edge of a sheet that is 1/8" thick or smaller. Jim solved the problem by using an empty nasal spray container. The one used was a 1/2 oz. Afrin. The top with the small hole can be easily removed and the tubing that goes to the bottom of the container can easily be pulled out. Simply fill the container with the glue, replace the top and use. Jim does not lose nearly as much as he did and the small opening is perfect for the small sizes of balsa, ply, etc.

Edward L. Haas of Poway, California, tells how he makes a scale detail. To make realistic and easy walkways on wings of planes, Ed masks off the area and brushes Formula U, Flat Black, and paint on the area. Then use micro-balloons and spread it over the area in a pepper shaker. After waiting a few minutes, lightly paint the area with the second coat of Formula U and allow to dry. It dries to a flat black and rough area --- looks great!

Douglas Hobbs of Lumberton, North Carolina, tells how he solved a problem at the hardware store.

The need for a simulated radiator grill on his Orline Fokker DVII was solved at the hardware store with a piece of Gutter Guard. This is an open mesh plastic grill material used in gutters to prevent leaves, etc., from clogging up the down spouts. The grill was cut to fit inside the cowling and secured with 5-minute epoxy. A hole was cut to clear the prop shaft and a circle of 1/32" plywood was epoxied around the hole. The installation is very realistic and practical.

Bob Bostrom of Santa Maria, California, has a diplomatic idea that is also beneficial to modelers. Here is a spinoff from your own hobby that may help show your wife that R/C modeling is not all bad. Simply fit a klunk pickup to her bottles of spray detergent and window cleaner --- this works wonders when cleaning high or low spots with a partially empty bottle.

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.

from page 170/8

Costalunga on "turnaround" designs. The aircraft, as can be seen in the photos, are both fairly symmetrical designs such as we have been discussing. You might be interested in other particulars:

Adriano's design: wingspan, 66.9"; wing chord root/tip, 15.75/9.86"; wing area, 806 sq. in.; airfoil, NACA 0015, stab span, 26"; stab chord root/tip, 8.27/5.5"; stab area, 179 sq. in.; stab airfoil, NACA 0009, empty weight, 7.72 lb.; power, ST X60 RE; wing loading, 22 oz./sq. ft.

Mariano's design: wingspan, 68.9"; wing chord root/tip, 15.75/9.86"; wing area 830.8 sq. in.; airfoil, NACA 0015; stab span, 27.5"; stab chord root/tip, 8.27/5.5", stab area, 189 sq. in.; stab airfoil, NACA 0009; empty weight, 8.16 lb.; power, ST X60 RE; wing loading, 22.6 oz./sq. ft.

Adriano's model is all in a horizontal line (engine, wing, tail). Mariano's ship has engine and wing in line with the tail slightly higher (similar to the Laser). They use inverted engines with pipes buried. Adriano writes that he was very impressed by these two models especially their slow speed performance and what he calls "sail" performance, undoubtedly due to low drag. Notice the plug-in wings. I must comment that their ships are a lot like my new "Phantasy" in design and set-up, including plug-in wings. Their low speed performance is undoubtedly due to low wing loadings.

Adriano asks a question about

to page 198

from page 160/155

didn't look too homemade? Now I don't know how the real pros do it so if my system has you falling off your chair with laughter then at least have the courtesy to let me know how it's supposed to be done. Mine worked reasonably well and it was quick. I used a Speedball pen with a wide tip. Maybe half an inch wide. I knew darned well if I tried it on the model I would slip so I wrote the numbers on the shelf paper. The ink didn't want to stay on the waxy surface but enough of the outline was there to zip around it with an X-Acto and cut out the numbers. Then the shelf paper was lined up and stuck to the side of the fuselage, at which point I sprayed with black paint and quickly removed the shelf paper mask. Got a nice clean edge and the shelf paper wasn't so tacky as to remove the base white paint. You might ask why 2 x 4 when I claim the plane flies so great. How bout this --- 2 wings, 4 stroke engine. Aren't you sorry you asked? The designs on the wings were made the same way using sticky shelf paper as the mask. Now you can use the shelf paper as a stick on number or design if you want. Simply paint the shelf paper, let it dry and curl all up, then lay out your design and cut it out and stick it on the airplane. Works just like sticky MonoKote sheets but not quite as sticky. The wheel pant stripes were done the same as the numbers and designs and they did take mucho time and the stripes came out a little wavy but what the heck. T'ain't tape!

So there you have it. A modified Lazy Ace has risen from the ashes in just five short weeks and I think it is outstanding. Sure is pretty isn't it? Huh, huh, huh? Certainly it could have been done in a little over two weeks but I had to play with finishing ideas and this time, for a change, I hardly screwed it up at all. Ain't that wonderful? And oh how she flies. Oh yah. Check that homemade exhaust. Another friend welded it up for me from my pattern. Try to imagine --- putt . . . putt . . . putt . . . swiiiiiiish. The swish sound is when you just touch the top 1/2" of grass intentionally on a touch and go. Hey now this airplane will do that and I'll do it everytime if I'm in the mood. It's just that a lot of the time I'm really not. So don't throw anymore airplanes away. Besides your wife will really begin to feel sorry for you when she sees you having to go through this shame. Who knows, she may get you a new 4 cycle for it. Now that's livin'!□

I next set about determining the best pitch setting for the blades. This was done through trial and error by setting various angles and then measuring the static thrust. I arrived at the thrust curve shown in Figure 6, so determined my optimum pitch angle as 12°.

I feel that I have enough thrust for my particular application, but don't feel that I've really achieved as much thrust as I could by using the O.S. .61 VF. There is always the OPS .65 waiting in the wings if even more thrust is a necessity!

I've managed to achieve about 2 hours of running time on the mechanism over the last year (the airplane itself is using up most of my time) and believe that I have most of the bugs worked out of it. It starts very easily, runs very smoothly and the engine stays very cool throughout. I don't doubt that more horsepower would be a help, as there is quite a bit of mechanism to be driven and I don't believe I'm at all peaked out on rpm. It's been an enjoyable undertaking and I'll report back later on how I do with the model I built it for. I'd certainly enjoy hearing from anyone with comments or questions on the subject of CRP's. Plan sets for my mechanism are available for $8.95 from Gibson Aviation, P.O. Box 590248, Houston, Texas 77259-0248. □

OUR MAGNIFICENT ROOM

from page 127

dropping down into the Pacific Ocean. One last flight together before Eliot left for his mission to Argentina.

The music room now? Well, over under the piano area I bought an 8'x 10 throw rug. It's always covered with balsa shavings and little pieces of MonoKote, but it does establish a music center — I tell myself. When our family practices together, the piano player and guitarist get to sit in this music area. We take the helicopter off the vibes. The trumpet stands over by an airplane battery charging; the sax stands near the new electric motor plane being assembled; the flute goes over near the table with a plane receiving a new nose job because of a too-hard landing; the claves back in next to a big portable fan that has just become one more thing in the room,

I guess this is as "magnificent" as our room was meant to be. I sweep often! I empty the always-full waste baskets regularly. And my husband just strung a line crosswise up near the ceiling to hook some of the planes on. They are poised like an Air Force ready to attack us — but it makes a few less to lean against the gold-colored wall. □

CONTRA-ROTATING PROPELLER

from page 118

completed assembly wound up looking like the contraption shown in Figures 2 and 3.

The obvious next step was to test run the mechanism. It was then that I encountered my first of several minor setbacks. Starting the engine was to be accomplished by a starter belt, but no matter how I tried, I couldn't manage to turn over the O.S. .61 VF with a standard 12 volt starter. A 24 volt starter with two gel cells in series was the required solution. (Cost is mounting fast!) Now that I could turn over the engine, I started breaking the nylon gears every time the engine backfired during starting. This was what required the inclusion of the centrifugal clutch mentioned earlier to isolate the gear train during engine starting. With that resolved, I was finally able to run the mechanism in January 1982. One last trial and error fix was required, and that was a pin through each gear in the mechanism to eliminate slippage during running. (A guaranteed broken gear every time.) This established the final configuration of the mechanism and, as can be seen in Figures 4 and 5, it really works!

THE OTHER SIDE OF R/C

from page 116

had two choices, silk and dope, or dope and silk. This had one advantage that I can think of offhand. You would get so high on the dope, you would forget what a pain in the neck the silk was to use. Now there are so many to choose from. The iron-ons are my favorite. After getting a nice finish on your woodwork and have a smooth surface to work with, you start the tedious job of cutting and fitting. No matter how confident you might be about iron-ons, there are always two things that will haunt your unconscious mind, the dreaded bubble and the devastating wrinkle. No matter how perfect the rest of the job is, it is a lousy job if there is one wrinkle in it. So you become obsessed with avoiding wrinkles. You have nightmares about wrinkles taking over the world, and you suddenly notice that even you wife has a few. You may even mention this fact to her, which leaves you with no one to talk to for a week except the dog. I can even see a new organization forming --- Wrinkles Anonymous. "Hello, my name is John Smith, and I'm a wrinkleholic."

It is now time to put the radio equipment in the plane. Not too much of a problem here. There is only one way for things to go. As long as you make sure that up is up, and right is right, left and down are automatically correct. The throttle is easy too. High throttle causes the most complaints from your neighbors.

Next, you wait for a good day to test fly it. This step alone could take months! Finally, the big day arrives and you're out bright and early Sunday morning. After you put the wing on (six rubber bands on each side) you turn the radio on to range check it. This brings forth the blazing reality that you forgot to plug in the ailerons. You start up the engine, one last test of the controls, and off she goes! As you slip through the air during the next ten to twelve minutes, you think to yourself, "Well, it isn't the best building job in the world, but the next one, the next one will be a beauty." □

FOUR STROKE RADIALS

from page 106

Before describing the engines, a word regarding Forest Edwards might be in order. Forest is a sort of a Gary Cooper type, tall, slender, quiet, with a sparkle in his eyes and a subtle sense of humor. He is very precise and deliberate. His home is docked at San Pedro, California; it is a converted WW II landing craft and the former chain locker is now his machine shop.

Forest's first project was a 3 cylinder four stroke engine constructed from parts of three Saito .30 engines, imported by Hobby Shack. At $127.00 each, it was an expensive experiment, however, this engine is still flying a Quarter Scale Gere Sport. A new crankshaft was machined, using an 11" Logan lathe equipped with a milling attachment, from bar stock 4340 alloy steel, while 7075 T6 aluminum was used for the cylinder barrels, crankcase and rod assembly. Stainless steel surgical tubing (normally used to manufacture hypodermic needles) was employed for the lightweight pushrods. It turned a 14/6 prop at 8,000 rpm to provide good thrust for the 9 lb. Gere Sport.

Following the success and enjoyment of the three cylinder engine, Forest decided to purchase a new vertical milling machine (Hale's model AM VO AIS made in Taiwan) with a rotary table, and the ambitious project of machining a 5 cylinder four stroke engine began. This time the crank and crank drum were machined from 4340, the cam followers from drill rod, and the valves from 416 stainless steel. The cylinders, liners, and rings are cast iron, while 7075 T6 aluminum was used for the balance of the project. Stock bearings and gears made the engine nearly complete. K & S brass tubing, bent to shape and trial fitted, was brazed and then chrome plated producing a bright and shiny exhaust manifold.

Forest designed and built a dry sump lubrication system for the 5 cylinder radial. It incorporates two pumps, one to feed oil into the crankcase under pressure and the other to scavenge the oil and return it to the oil reservoir. This system eliminates the need for oil in the fuel which results in a clean running engine with no oil residue being sprayed over the aircraft.

The bare 5 cylinder four cycle engine weighs 5½ lbs. and flies the 24 lb. Concept Fleet biplane with authority. With 3% nitro fuel and the 11.5:1 compression ratio, this engine turns a 22/8 prop at 6,000 rpm. It idles at 900 rpm due to a battery pack of four 6 amp/hr nicads wired to five C & D glo driver boards which compensates for excess fuel in the lower cylinders. To decrease the amps, required five Fox 2 volt glow plugs.

Last fall a Digicon TT-01 Tele Tachometer was installed in the Fleet. This neat instrument, imported and distributed by Condor Hobbies, 17835 Sky Park Circle, Suite E, Irvine, California 92714, phone (714) 556-1888, can read your engine rpm and/or your plane's true airspeed while in flight. CdS sensors, coupled with a subminiature airborne TX, send data to your handheld readout unit. Forest's unit operates on 40.665 mhz. The Tele Tach has been most valuable in selecting the best performing prop diameter/pitch combination and in detecting a glow plug burnout.

Forest found the airspeed of his Fleet to be quite interesting, in fact, unbelievable at first. He has an indicated 62 mph in straight and level and up to 85 mph when coming out of a Split S. Repeated tests and calculations have proven these figures to be correct.

As mentioned earlier, the Fleet is being renovated. When that is completed Forest has his next project selected, it will be a scale 7 cylinder Continental radial. This time Forest is going for scale detailing because he has been downgraded at scale contests as the Fleet does not have a scale Kinner engine.

Forest does not intend to build another 5 cylinder engine for himself or for anyone else. In answer to

to page 185

FOUR STROKE RADIALS

from page 183/106

inquiries wherever he has shown the engine, he has worked up a completely detailed set of engineering drawings for the 5 cylinder engine. The drawings are available in the USA for $40.00 plus $2.50 for postage and mailing tube (California residents must add 6% state sales tax L.A. county add 6½%.) Foreign machinists should send a total of $48.00 (U.S.) to cover costs including AO airmail postage. Send your order to Forest Edwards, P.O. Box 3383, Terminal Island Station, San Pedro, California 90731, USA. □

CUNNINGHAM ON R/C

from page 97/90

other, perhaps better, ways to mount water rudders than behind the float. More effective and probably safer for your aircraft. A tail mounted water rudder is the way to go. This is especially true when you're flying up to a .60 size model, on an impoundment that may contain floating obstructions. If you're building or flying a tail dragger, a water rudder is easy to add since the fixings are already on the model. If you're building a trike gear ship, you're in good shape since you can add a water rudder post to your air rudder during construction. Check out the enclosed diagrams.

Good ole flying buddy George Fuller and I found out the hard way about the use of a float mounted water rudder on his modified Kadet. We were flying off a lake which boasts a number of weed patches during the summer months. These weeds grow just to the surface but not above the water so they're hard to spot from the shore. We taxied his Kadet onto the lake and gunned the engine for takeoff. Up on the steps and gathering speed, when in a heart beat she did a beautiful, no spectacular slam-dunk. Retrieved the Kadet, checked and dried it out and tried again. Repeat performance. We called time out to figure just why this turkey was trying to self destruct. Again, please check the diagrams for our solution. Of course, a kick-up type float rudder (and its attendant design and fabrication problems) might work better for water hazards.

Lastly, we use Northeast Aerodynamics' floats available in various sizes in kit form. Our floats are flat bottomed, attractive, and heavy on performance. Chuck, thanks for your time; I hope I've been of some help both to your and to your vast audience of followers.

Best regards,
Mike Genovese

Thanks very much to you, Mike for sharing some of your experience with us. Float flying really is a lot of fun, and down by the lake shore it's cooler in the summer, and the scenery is liable to be a lot more interesting than it is at a dusty old flying field. Who said that girls in bikinis don't go out to the lake any more?

Dick Kidd sent along a copy of a Japanese model magazine that had a lot of information on float design and float flying. I have been trying to read it, but my eyeballs just don't seem to be able to take in all of the lines and symbols that pass for words. I'm gradually getting the hang of it and if there is anything that I haven't mentioned before that's hiding there in the Japanese script, I'll pass it along in the near future.

★

Since writing my last column I very casually broke my right hand, so what with the good old meat hook in a cast for a while, and even now with the cast off, it's pretty sore, I haven't been cranking any of the big engines that I mentioned last month. *(We know how you did it Chuck! D.K.)* I hope to get to them this month, and hope to be able to pick up, and use, a tennis racket again soon. I never realized before just how much of a handicap a cast is, even a small one. I certainly have all of the sympathy in the world for anyone who is messed up in any way.

★

Satellite City made one of the first, if not the very first, video tapes with tips for constructing R/C models. Naturally, the tape was built around the use of their Hot Stuff products. It had many, many really super ideas for the use of Hot Stuff in modeling and, if you haven't seen it, you should. Now, Bill Hunter tells me, they have produced a new tape, "Video Tips II". Because of the high cost of producing these tapes, Video Tips II can be either rented, or purchased. If you want to rent it, sent $35.00 to Satellite City. This includes a five buck shipping and handling charge and ten buck rental. If the tape is returned in 65 days undamaged, you will get a $20.00 refund. If you wish to purchase the tape, send a total of $25.00 and the tape is yours. Send your orders to Satellite City, P.O. Box 836, Simi Valley, California 93062.

★

This month our thought for the beginning modeler and flier (since it is summer and the flying time of the year) has to do with flying. More particularly, with safety on the flight line. Safety has to be practiced by everyone, at all times. Just because you're a newcomer to the sport, isn't any reason to believe that everyone else will look out after you! It's up to you to look out after yourself, and to help watch out for others, and other aircraft. All too often the beginning pilot takes up a position while flying that really puts himself in danger, and causes a hazard to the other pilots at the same time. One of the oversights of some instructors is to not teach the beginning pilot where to stand with relation to the runway. All too often I've seen new pilots take their aircraft down to the end of the runway, stand behind it to watch it make its takeoff run, then, even if they move off to the

CONTEST ANNOUNCEMENTS

SOMERS RC CLUB
5th ANNUAL MAMMOTH SCALE FLY-IN
Aug. 13-14, 1983. Somers Flying Field, Somers, New York.
For further info, contact: Somers RC Club, c/o Frank Gorham, 8 Colony Glen Dr., Pleasantville, N.Y. 10570.

THE FLYING KNIGHTS
RADIO CONTROL SCALE RALLY
Aug. 13-14, 1983. Hamburg Nike Base Flying Site, Hamburg, New York.
For further info, contact: Gil Lange, 105 Pine St., Hamburg, N.Y. 14075. Ph. (716) 649-1231.

HEART OF TEXAS MINIATURE AIRCRAFT CLUB
16TH ANNUAL TEXAS OPEN FUN FLY.
Aug 14, 1983. Flying site near Lake Waco.
For further info, contact: Bill Hanks, CD, H.O.T.M.A.C. Club, 121 Crockett, Hewitt, Texas 76643. Ph. (817) 666-5223.

KEYSTONE R/C CLUB
ELECTRIC FLY
Aug. 20-21, 1983. KRC Field, Hatfield, PA.
For further info, contact: John Hickey, 1624 Maple Ave., Hatfield, PA 19440.

MIDWEST NAVY CARRIER ASSOCIATION
4TH ANNUAL MIDWEST NAVY CARRIER CHAMPIONSHIPS
Sept. 11, 1983
For further info, contact: Midwest Navy Carrier Assn., 433 Arquilla Dr., Glenwood, IL 60425, c/o Harry B. Higley.

VALLEY IFO'S MAC, INC.
3RD ANNUAL CAMP COPPERHEAD FUN-FLY
Sept. 24-25, 1983. Camp Copperhead, Middlebourne, WV.
For further info, contact: Greg J. Bartline, 1014 Riverview Terrace, New Martinsville, WV. Ph. (304) 455-4747.

RADIO CONTROL CLUB OF CONNECTICUT
GIANT SCALE FLY-IN
Oct. 1-2, 1983. Sikorsky Memorial Airport, Stratford, CT.
For further info, contact: Ray Hinds, 140 Edna Ave., Bridgeport, CT 06610. Ph. (203) 334-7207.

side of the runway, hug the edge, waiting for landing time. This makes it pretty hard for other fliers to get their airborne aircraft past this flier on a landing approach, makes it easy to dork a model, and makes it easy to dork a stupid pilot. Not everybody else with an aircraft in the sky is a super pilot, often they are not much better than the runway hugger, so the chances of getting drilled by a landing aircraft are actually pretty high. Where to stand? About the middle of the length of the runway and at least twenty-five feet back from the edge of the runway should be a minimum. You don't have to stand behind your aircraft when it's taking off. Learn to stand off to the side both on takeoff and landing. Learn to stand in a safe place. It is up to club officials to set up a mandatory location for pilots to occupy while flying. Many club fields have this location, but they are not enforced and, therefore, fledging pilots tend to wander out into a dangerous situation.

While on the same subject, never taxi or place your aircraft on the takeoff spot until you have checked downwind for a landing aircraft. A pilot with his eyes glued to his bird in the sky may not notice that you have suddenly appeared in the middle of the runway. The landing aircraft always has priority over any aircraft making a takeoff, or people wandering about the runway. Learn to always check downwind, and you really don't have to be bashful about telling other pilots that you're going to take off. Just as a pilot of a landing aircraft need not be bashful about telling other pilots that he is setting up for a landing. The same holds for a dead stick landing. Get in the habit of telling the other pilots that you're coming in dead stick. Again, an aircraft with a dead engine has priority over a landing aircraft with operating engine.

Okay, you've got your pride and joy down in one piece, but it's on the other side of the runway, engine dead, and you've got to go over there and get it back. Again, glue your eyes to the sky and look for other landing aircraft or the wild pilot making a low pass down the middle of the runway (which should also be a super no-no). The pilot of the flying aircraft really can't tell when you are crossing the runway, and when you are returning. You shouldn't saunter along, either; haul your fanny and your aircraft out of danger in a hurry. Don't make a habit of starting your aircraft right at the edge of the runway, leaving a battery, etc., on the edge of the runway as a landing hazard for other aircraft --- to say nothing of the danger you're in while your back is turned, starting the engine on your model. Start the engine well away from the runway, then move it into flying position with either a helper carrying it, or by taxiing it to take off. It's not a good idea for one person to try to carry his aircraft to the flight line, engine turning, while the transmitter is juggled around at the same time. Good way to have a terrible accident.

The basis of safety while flying is to use your head. Be cautious, keep out of the way of flying aircraft, and keep your eyes and ears open. Get in the habit of helping a flying buddy as a spotter while he is flying, and get him to do the same for you. You will be surprised just how much this bit of help can add to your over all safety.

★

Just received the following letter from Nigel Dell, addressed to Don:

Dear Mr. Dewey,

May I introduce myself—I am Nigel Dell PRO and Editor of the Anglia Model Flying Club here in England. The club is situated in Essex on what is now a farm but used to be a WW I airfield which was the home of one of the Zepplin busting squadrons in the area, flying Be 2's. The club has 95 members which is good for this part of the country. We cater to power fliers and are just getting into helicopters.

Glider fliers can use the main field or an adjoining field during the spring and early summer. Beginners are also made welcome. There are now a good many of them and Sunday afternoons are used for instruction and general setting up of the models. We have two meetings a month with talks on scale building and flying and, in fact, anything to do with modeling. It's all helping to promote the hobby in our area.

I have enclosed the last three of our club magazines which you may find of interest. We are interested in exchanging club newsletters and magazines with other clubs as sort of an international pen pals for modelers to exchange views and ideas, etc. and ideas, etc.

I wonder if you would please print a few lines in your magazine to let our friends on the other side of the pond know we would like to hear from them? Thanks for a great mag.

Yours sincerely,
Nigel Dell
Anglia M.F.C.
The Willows, Hyde Lane,
Danbury, Essex CM3 4LP
England

Nigel sent along three copies of his club magazine and, I can assure you, it's not a newsletter, it's really a magazine. Watch out, Nigel, here comes the mail and, who knows, the Cunningham clan may wander onto your flying field some time in the future.

★

I hope that all of you who can will make the Sixth Annual Southwestern Jumbo Fly-In for all big models, at Thunderbird Field July 16 and 17. If you haven't made your plans now to be with us here in Fort Worth for this big, fun event, it's probably too late for this year, but we'll be looking for you. Now, it's flying time, so get up and get out and get into the sky. □

SCALE VIEWS

from page 86/82

Expert Sportscale with these models making up almost half of the entries in this event. I doubt if there will be any models of jet planes in AMA Giant Scale competition for some time. If one of these models hits 15 pounds in a single engine version, performance with current fan systems will be inadequate.

Ramon Torres of Miami, had one of the models more typical of the AMA Giant Scale event. His large .90 powered model of the military T-34 primary trainer was new at its first contest. Very impressive with a complex retract system operating in a scale manner with the gear doors in sequence. Another model at its first contest was Dan Santich's latest version of the P-26 AAF fighter of the thirties. The over-30 pound model was powered by the large Kawasaki which hauled it around in a realistic manner. The multi engined models that were popular at scale contests a couple of years ago were scarce. The two twins at the Tangerine were both models of the same Dornier German aircraft of the thirties. Built by Len McCoy, one flew in Sportscale and one in AMA Giant Scale. Both flew well and I had a hard time telling them apart when they were in the air. Large models of modern aerobatic planes were popular this year with a number of versions of the Laser 200, Pitts Special and the

Christian Eagle. All flew well, but Don Lowe's Las Vegas type Laser 200 was easily the top performer in this category. His Tartan Twin is some kind of engine.

New FAI Scale Rules:

It is a bit difficult trying to sort out the various reports on the changes to FAI scale rules coming out of the December meeting of the FAI committee in Paris. At this point it appears certain that the popular FAI Stand-Off Scale event as flown last year at Reno has been eliminated. This was the only FAI scale event that came close to AMA Sportscale as flown in this country. Like AMA Sportscale, the models in FAI Stand-Off were judged at a fair distance and without considering cockpit detail. With FAI Stand-Off terminated, what remains is a version of the old F4C Precision event but without the hands on measurement of the model against a three-view. drawing. Instead, the outline will be judged from the old Stand-Off Scale distance but the details, presumably to include cockpit or interior, will be judged from a close up distance of 39 inches. I do not know if the 39 inches will be measured from the center or the extremities of the model (judges might have to watch getting the pitote tube in their eye) but 39 inches is a nice distance for a close look at fine details.

It is hard to say how these changes will be accepted by scale builders in this country. I suspect that some former Precision scale builders will feel that their event has been degraded while Sportscale builders will feel that they now must build a highly detailed model complete with interior to compete in an FAI event. Either way we have lost one FAI scale event and I assume that the U.S. will be back to a three man team for the 1984 FAI meet. Rumor has it that the new FAI rules will be in effect for the AMA Precision Scale event at the 1983 AMA NATS.

Speaking of the 1983 New England NATS, I was glad to see that AMA Hqs. identified it properly. You see, I live only a few hundred yards from the Atlantic Ocean but when I started travel plans for the much touted "East Coast NATS," I discovered that I would have to travel a couple of hundred miles farther than I did to the 1981 NATS near San Antonio, Texas. So much for "East Coast" geography. See you in "New England"? □

NIEUPORT 28

from page 81/79

check, fuel was added, and the engine was started and adjusted. Our flying was to be done from grassy fields. The Nieuport 28 has a fixed tail skid. Initial ground handling tests revealed that the large rudder was reasonably effective on grass. (On a hard surface runway, the ground handling should be quite good.)

Preceding our maiden flight attempt, several faster "take-off" type ground runs were made. These higher speed taxi runs proved that the amount of rudder needed for effective taxiing on grass was excessive for maintaining a straight-out steady take-off run. (A "snake-like" take-off run usually resulted.) This is where the Airtronics radio system dual rate feature really proved its value. The full rudder rate can be used for taxiing and, when ready to take-off, the travel rate is simply switched to the reduced rate of throw. After adjusting our rudder throw rate to produce about 3/4" of travel in each direction on low rate, we were ready.

The Nieuport was taxied out and pointed into a gentle breeze of about 5 to 10 mph. The throttle was opened and, after a take-off run of about 50 feet, the Nieuport was airborne. It became instantly apparent that down elevator trim was needed. This was dialed in via the trim lever and we climbed to an altitude of about 200 feet, then leveled off. The ailerons did not require any trim adjustment. Several minutes were spent simply "feeling" the Nieuport out, after which several loops, rolls, Cuban Eights, etc., were performed. Our Nieuport 28 proved to be an absolute airborne joy! Powered with an O.S. .60 four cycle engine, this aircraft just "oozes" in-flight realism! It flies slowly and the four cycle engine sound is "pure music."

The Nieuport is surprisingly docile for an aircraft of this type. Stalls were conducted, and the break was clean with no tendency to drop a wing tip or to snap roll. The Nieuport is reasonably aerobatic. The rudder on low rate is more than adequate for all airborne maneuvers. Landings proved to be slow and easy. There is a tendency for the Nieuport to "go up on its nose" on grass field landings if a bumpy area is encountered or if it is landed too fast.

Subsequent trips to the flying field have also revealed that the Nieuport is a far more enjoyable aircraft to fly on relatively calm days than on windy ones. The aileron travel on our Nieuport was 7/8" down and 3/4" up, and the elevator travel was set at 3/4" up and down, with almost 3/8" of down trimmed in. This would suggest that perhaps a degree or two of positive incidence could be used on the stabilizer, as our Nieuport was trimmed according to the plans. A Zinger 14" diameter, 5" pitch prop produced the best in-flight performance on our test aircraft.

One minor problem that we encountered after several flying sessions concerned the plastic cowl which developed several small stress cracks. We would much prefer to see a more durable fiberglass type cowl included in this kit, or offered as an optional accessory. The manufacturer claims that the Nieuport can be powered with either a .40 to .45 two cycle or a .60 size four cycle engine; it is difficult for us to imagine the .40 to .45 two cycle powered version being an equal alternative. While the power output of both engine options is roughly the same, the four cycle .60 with its ability to happily swing a larger diameter prop is, we feel, a better choice. The four cycle also provides that degree of in-flight realism and sound that would be impossible to match with a .40-.45 two cycle engine. The Nieuport has a 7" diameter cowl. To use any prop over 10" to 11" in diameter on a .40-.45 engine would seriously overwork the engine, and lead to possible overheating and premature engine wear. The lighter weight of the .40-.45 size engine would also require that more lead be added to the nose in order to achieve the proper C.G. This is not meant to imply that the Nieuport 28 will not fly (and fly well) on a .40-.45 size engine. What we are suggesting is that the .60 size four cycle engine is a perfect match for this aircraft and a far better power plant choice.

As a personal preference, we also omitted the wing cross bracing wires (which are included in the kit) in order to reduce in-flight drag. These wires are primarily cosmetic. The Nieuport 28 has rapidly become one of this reviewer's favorite sport flying aircraft.

Conclusion:

In summary, the Pilot Nieuport 28 is an excellent kit, that is very attractively priced. It flies very well for an aircraft of this type. While not designed for the beginner, the Nieuport 28 will delight any modeler who enjoys the building aspects of our hobby sport, as well as the flying segments.

The modeler who not only enjoys building but also has an interest in World War I type aircraft, will find this kit to be irresistible! Powered with a four cycle .69 size engine, this is an aircraft that will cause even veteran RC'ers to stop what they are doing at the flying field, in order to watch it being flown. It possesses a degree in in-flight realism that is generally only associated with giant scale type models. The Pilot Nieuport 28 is definitely a vintage sport scale Best Buy! □

BLUEBOTTLE

from page 57/56

the firewall, and you may have to trim the front edge of #7 to permit the battery to reach this space. The two servos are attached to the fuselage sides in the back of the box with servo tape. A scrap of 1/32" ply glued to the fuselage sides makes a suitable mounting plate. Since I am using the Tower Mini Flight Pack and the servos are so tiny, I decided to install a pair of 1/8" x 5/16" plywood rails for servo installation. (This Tower radio had not been introduced when I started this project.) The receiver is located in-between these two items.

The servos are connected to the controls with NyRods, the outer sleeves of these being sewn onto the body as shown on the plans. The front edges of these sleeves are held in place by the 1/16" radio box fairing. Note that at the aft end the NyRods are at different levels so that the pushrods run to the control horns in a gentle curve.

Install the radio, temporarily hook up the controls and operate, checking for ease of control movement. When everything seems okay, remove the radio and the inner NyRods, and prepare the fuselage for painting. As I mentioned before, the original was painted blue, after a couple of coats of sealer had been brushed onto the balsa. The only other painting required is the balsa trailing edge strip on the top wing, and this I colored white. Apply letters and decals as desired. If lightweight iron-on film makes you happier, do it. Just keep it lightweight.

Reinstall the radio now; make a final check on the wing alignment; put in the engine, and it's time to think about a little flying.

Flying:

Our prototype weighed in at 16 ounces without radio and 19½ ounces when the radio was installed. It wasn't surprising then to find out that the model didn't want to take off from my rather rough runway. I prefer hand launching anyway for small models, and the Bluebottle hand launches quite nicely. I expect that given a smoother runway, take-offs should be no problem.

The model climbs quite steadily and with a full tank will reach about 500 feet altitude. This is quite far enough away, one of the pitfalls of smallish models such as this is knowing which way the model is heading, towards you or away from you at this distance.

At this point a few words concerning the Tower System 500 Mini Flight Pack radio are in order but presents a problem. Everything they say in their ads were found to be valid so instead of repeating it here you can read the ad. The radio was not disassembled for a technical examination, it was merely installed and flown. The problem is just what can you say when it is everything Tower says it is and you get trouble-free performance. All we can say is that it is a great little radio.

Bluebottle will fly quite happily hands-off in large trimmed circles (that I like), and all in all makes a good sport flier. However, if your interest is in something a little more potent, fit a T.D. .049, with a quality prop, and hot fuel, and this should make a "hands-on" type flier. For myself I prefer something that I can fly, then fly again instantly, not a model that I'm glad when the flight is over — if that makes any sense. Happy flying.□

POWER BOATING

from page 53/51

bearings. K & B likes a tight bearing fit on the crank so you may have some trouble disassembling these parts. Most of the time the large bearing will stay with the crank and it will come out of the aluminum housing. If this happens you will have to tap the bearing off the crank by placing the bearing on the edges of an open vise and tap the crank until the bearing slides off. I, personally, do not like this

tight "crank to bearing" fit and would recommend that you reduce the diameter of the crankshaft until the crank slides into the bearings with only a very light push. You can reduce the crank fit dimension by placing the crank in a lathe. Use WD 40 oil and strips of 400 wet or dry sandpaper to work the crank surface below where the crank bearings ride until you can easily remove the crank from the bearings.

The old bearings can be removed from the aluminum front housing easily by heating. Use a propane torch or an oven to heat up the housing until the bearings drop out. Be careful and don't use any more heat than necessary to remove the bearings. The front housing should then be inspected and cleaned thoroughly. If you see that the crank has been dragging on the seal area between the bearings of the housing, I would recommend replacement. Once you are satisfied with the condition of the front housing, the new bearings are installed. Heat the front housing and using the crankshaft as a guide, insert the cold bearings into the hot case. Remove the crank and make sure that both bearings are seated as far in the bearing pockets as possible. When cool, the crankshaft and rear bearing will have a small clearance (.001 to .003 inches) between them when the crankshaft is pushed into the front housing. If this clearance is not there, the bearings will tend to bind the crankshaft when the front housing expands due to heat when running. Mount the collet and flywheel and tighten the nut. If the crank binds when you turn it, lightly tap the nut with a hammer to fully seat the front bearing. If this doesn't help, disassemble the front assembly to find the bind. The crankshaft assembly should be absolutely free. Work until it is.

to page 192

POWER BOATING

from page 189/51

If you have replaced the piston and sleeve assembly you should check to see that there is plenty of clearance between the bottom of the piston skirt and the front bearing housing. Check this when the piston is in the bottom dead center position. If there isn't at least .010" between these parts, the piston may hit the front housing when the engine has some running time on it. Contact between these parts is possible when operating the engine at high rpm. This may be another cause of premature rod failure. You can open up this clearance by filing a curved surface on the bottom of the piston skirt to match the front housing shape.

Also check the clearance between the bottom of the piston skirt and the backplate of the engine. The new engines have a flat filed on the backplate to provide for adequate clearance in this area when the engine is used at very high revs. If your engine does not have the flat it would be a good idea to open up the stock clearance in this way. Be careful not to file on the piston skirt excessively. If you go too far you will open up a passage to the crankcase at the bottom of the exhaust port when the piston is in the top dead center position. This "free porting" doesn't seem to hinder performance when you use a tuned pipe but it may affect performance in other cases.

Anytime that you change the major parts of an engine you should check the clearance between the top of the piston and the bottom of the head. The head clearance for your K & B 3.5 should be between .013" and .015". If it is too close, fuel detonation will decrease performance and cause very high shock loads on the wrist pin, rod, crankshaft, and bearings that decrease the lifetime of the engine. Higher nitro fuel requires a larger clearance than when you use low nitro fuel. The .015" clearance works well even up to 60% nitro. If you go too much below .010" you run a risk of damage even when running low nitro fuel. If the head clearance is too small the top surface of the piston may develop a cratered appearance or you may even see evidence that the head has come into contact with the piston. These conditions obviously can cause premature rod failure as well as other damage. To measure the head clearance you must assemble the engine and rotate the crankshaft until the piston is at top dead center. Remove the head and measure the depth of the piston from the top of the cylinder liner. Then measure the depth of the head from the face of the head gasket to the face of the squish band on the combustion chamber. Subtract these two measurements and you will have a head clearance measurement.

The K & B 7.5 inboard engine can be converted to use a bigger carburetor by making an adaptor plate as outlined in the July, '82 column. Although I haven't tried it, I see no reason why the following carbs could not be successfully fitted to your engine: the new K & B carb, OS 4E, OS 7E, or Rossi 65 carb. Anytime you increase performance (develop more horsepower) you will put more strain on the engine. As a result longevity will suffer. If you want performance, you will have to give up some of the engine's lifetime. It is a rare occurrence that you get something for nothing. When you develop more power the engine liberates more heat and the dynamic loads on the engine increase. These factors increase the stresses applied to all the parts which, in turn, decreases the lifetime of the engine. Unless you make your engine out of Nobreakeum or Nobendeum you will just have to replace critical parts more often.

to page 195

POWER BOATING

from page 192/51

Well, that about does it for another month. Send your questions, comments, race results, etc., to the address at the end of this column. If you desire an answer before magazine publication, enclose a stamped, self-addressed envelope so I may answer your letter by return mail. Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955, (408) 394-1200. □

ENGINE CLINIC

from page 32/30

running clockwise. (I would like to use two standard O.S. Max .40 TV engines with Perry pumps.) Since the prototypes P-38 had counter-rotating engines to eliminate the torque of both engines running in the same direction, I would like to do the same thing.

In the August '82 issue of RCM, Webra engines is advertising a gear drive #W1037G for their .91 size R/C engine. The gear drive seems to have only two helical gears on it, which indicates to me that the engine has to run clockwise. If so, a pusher-type prop would have to be used. Am I correct?

I would appreciate any answers and comments you may have on these subjects.

I enjoy your column very much. Keep up the good work!

Sincerely,
Ira L. Kulp
Sinking Spring, Pennsylvania

Several variables play a part in chosing a prop for an engine. The aircraft itself plays the biggest part. High drag ships will require larger diameter/lower pitch props than a clean high performance ship such as a pattern type aircraft. Prop sizes have been pretty well-proven through trial and error over the years so there is no real mystery to it. Most manufacturers give recommended sizes with their engines as a starting point. As an example, 11" diameter is pretty well standard for a .60 size aircraft (pattern type). Pitch can vary from 7"-8" depending on the particular aircraft. For larger scale type aircraft you would go to more diameter such as 12" and lower the pitch to 6" or even a 13" diameter 5" pitch. The prop that is right for one aircraft may not necessarily be right for another, so some trial and error is required to find the best propeller for your particular engine/aircraft combination. You always want to prop an engine to turn a little under its horsepower peak so that in the air it will be near the peak horsepower when it unloads. Most .60's should turn in the 12,000-13,000 rpm range although some fellows are running their pattern engines as high as 15,000. The same thing would pertain to a three blade prop. Prop the engine to turn in the 12,000-13,000 rpm range on the ground with about 7" pitch. With your .40's you might have to drop down to 6" pitch in order to have a large enough diameter with three blades.

Other than for the scale effect there is no real need to have counter-rotating engines on a twin engined model. In the full size aircraft this was done to reduce rudder pressure required for the pilot until trim changes can be made. In a model a slight warp in the wing or rudder will have more of an effect. Incidentally, the P-38's shipped to England during WW II had both engines turning the same direction so that less back-up parts would be required. They did have a different designation which I do not recall now.

As far as reversing the direction of rotation — any engine that has a removable front housing can be reversed by rotating the front housing 90° clockwise when viewed from the front. Some manufacturers such as K & B offer counter-rotating crankshafts to change the direction of rotation. You would have to check with World Engines to see if O.S. has a counter-rotating crankshaft available for your engine.

The Webra gear drive unit uses a counter-rotating crankshaft to reverse the direction of operation of the engine so that a conventional propeller can be used.

Dear Sir:

First: Thanks for sharing your experience with us. You have helped me take what I hear at my field with a block of salt!

My question to you: Which is the best way to mount an R/C glow engine — on wood beams, on a 'glass radial mount, or on a metal radial mount? (I run a .10 FSR, a .25, two .40's and a .50 FSR.) I have heard concerns expressed about excess vibration (that it reduces rpm, and that it may crack the crankcase), about all three types of mounting. Will a tightly mounted motor vibrate if mounted on one or all three of these, enough to reduce rpm, or crack a crankcase? Is there a single, best way one should always mount an engine?

I have enclosed a SASE for your relpy, if you have the time to answer all the mail I bet you get. If not, I hope to read the answer in your column — even if you have written on it in the past; I don't believe you have in the past two years, and there's a bunch of us ignoramusses out here!

Thanks again, for sharing.

Yours very truly,
Terry M. McGill
Portland, Oregon

If engine performance is the only consideration, then the more solidly you mount the engine the better. Vibration can cause a loss of rpm, wear to the front bearing and, in extreme cases, even break a crankshaft. The best type of mounting is solid beam type mounts that tie the front end of the aircraft together making it a more solid mounting platform. Radial type mounts that bolt to the firewall allow considerable flex due to the whole nose of the aircraft flexing. If a radial type mount is used, I prefer the aluminum ones myself. Most of the nylon filled types do not have the rigidity that the aluminum ones do. The Hayes mount with the support piece joining the engine bearers is probably the most rigid of the glass filled type.

Some of the radio manufacturers and mount manufacturers would not agree with the above because, if the engine is free to flex and bounce around, less vibration is transmitted to the aircraft — at the expense of engine performance. The "R/C Engine" Volume I has a chapter devoted to engine mounting in which I go into more detail.

Dear Mr. Lee,

I have been a faithful reader of your column for the last seven years.

Although during that period I have seen many helpful questions and answers revolving around the problems of how to run an engine properly, I have never read your comments on how to clean an engine. I have yet to find a solvent that will clean away baked castor oil on a cylinder head. Is there a way to restore the original look and cleanliness of a middle aged horse (power that is!)?

Thanks for your help,
Serge Pierre
Quebec, Canada

This is one question I have answered many, many, times in the past but one that fellows keep sending in. The best thing for cleaning the baked varnish and gunk in general off the head of an engine is Sunbeam Metal-Kleen. This is available at Sunbeam appliance dealers and is intended for cleaning electric frying pans, waffle irons, etc. It will make an old head look like new but may take a couple of applications. It is the only thing I have ever found that will do the job without etching the aluminum as most carburetor and oven cleaners do. I do not know it if is available in Canada but I imagine it should be. □

SUNDAY FLIER

from page 23/22

that my last few designs have used a combination of cyanoacrylic adhesives such as Super "T" or Zap-A-Gap to not only attach the firewall, but fuelproof it as well, and the structure is holding up just fine! I'm not saying epoxy is better or worse. All I'm saying is that the cyanoacrylic is satisfactory --- and quicker. Yes, it also is more expensive. Unless you consider the value of your own time. Maybe that isn't too important, in a hobby activity. The decision is yours.

There is, however, a very wide market for certain variations of the instant glues. One of them is to have a glue which isn't really "instant," but is very fast, yet allows time for positioning parts before they suddenly "set" and, if you haven't got them right, too bad. Start over.

Pacer Technologies has such an adhesive. They call it "Slo-Zap." It works. I've tried it.

Another wide open market exists for a fast drying adhesive to join styrofoam surfaces together after a crash. Sooner or later the manufacturers will come up with such a product. I've already heard rumors --- which may have been confirmed by the time you read this, that Pacer has such a product under development. And you can be sure that if they do, it won't take long for the competition to come up with their own version.

In conclusion, the best thing about all this is that you, the Sunday flier, will be the beneficiary. It's gonna make it easier for you to build that dream plane of yours --- and repair it when the dream becomes a nightmare. It's been known to happen.

As Casey Stengel used to say --- "You could look it up!" □

BIG IS BEAUTIFUL

from page 14/11

reason. Either through experience or learned theory, they know that a particular model will perform at its best at that specific setting and its performance will suffer at any other.

The angle at which the stabilizer meets the air is also important and the relationship between the incidence of the wing and that of the stab is a very important consideration. In a biplane, you have two wings and the stab to consider and the wings won't necessarily have the same incidence. Misalignment of any or all of these incidence angles can turn what should be a fine flying model into a real "dog."

Most of us have seen two models built from the same kit perform differently on the same power. These are apparently identical and they should be if the instructions were properly followed. Now, I'm not going to suggest to you that improperly set incidence is the only thing that could make these two apparently identical models perform differently, but it is most assuredly one of the things that can make a significant difference and one that is often overlooked and sometimes even unknown to the modeler.

Those of you who have been around for a while and who have "seen the elephant" will know what I'm talking about. If you have a bird that doesn't perform well, you check all of the common things that can interfere with its performance and one of these things is to fiddle with the incidences a bit to see if you can cure the problem. How to go about changing the incidence we'll get to in a minute. For the moment, let's look at incidence.

Trying to get somewhere requires knowing where you are starting from, and incidence altering is no exception. If you are going to change it, or suspect you should, then you'd better know what it is now. That supposes a means of measuring, which, if you are building smaller models and have an incidence meter, you're all set. But, if you are building very large models, you can't get a meter large enough to measure incidence on them. More on that a bit later.

If your plan or kit specifies a particular incidence setting, use it unless you find, after trying it, that it doesn't work (maybe **you** made some other changes that interfered with the designers best incidence angles!). Then it's permissible to make slight changes to see if the performance of the model improves or is degraded. I prefer to make such changes **very** gently, about a half degree at a time, never more than 1 degree at a time. This makes any changes gentle and easy to handle in the air. Small changes will point you in the right direction as well and, once you are sure, a degree at a time isn't too much depending on the model.

Incidence is measured between the chord line and the datum (or thrust) line of the airplane. If the chord line points upward away from the datum line at the leading edge the incidence is plus and if it points downward at the leading edge it is minus. Changing a wing's incidence in a minus direction is easy, a thin shim under the trailing edge will do the trick quite nicely and it's easy to experiment by trapping a shim there and it's not permanent. Going the other way is a bit rougher and will

depend on how the leading edge is fastened into the fuselage. Any changes here can be tough to reverse, so go cautiously!

The stab is harder as most are fastened permanently to the fuselage. I will often change this to a less permanent mounting, at least until I'm sure of the angle needed (after the test flights) and then **may** permanently fasten the stab to the fuselage, making sure that any temporary fastening is adequate to the loads which will be load on the stab in flight.

There are some incidence meters available as a manufactured item, but most are not adequate for our needs. There are several that you can make and the one I made up (see photos and sketch) is one that has been around for a while and which I have modified to check wings up to a chord of about 30". (That should be enough for anything most of us will ever build!)

The alterations consist of having two slots cut for the sliding member to ride in. The upper one has a small nylon bearing and a squeeze type clamp to hold it in place. (Both slots are 1/4".) The lower slot utilizes a piece of 1/4 square spruce stock as a guide and also to keep the sliding section properly aligned with the main part of the meter. The slots should be cut accurately and, once sanded to the correct size, may be coated with a light coat of wax so the clamped part will slide back and forth easily. The nylon bearing I made up on my miniature lathe, but it could just as well have been a short piece of hardwood dowel (slightly undersize in respect to the plywood) with a hole drilled through its center to take the clamping screw. This screw goes into a blind nut on the other side. The clamping screw can be a knurled head or you can make up a 'T' head for it as I did.

The other major change is to make the 'V' shaped pieces deep enough to accommodate the thickest wing you'll ever build. Mine are 6" wide, 3" either side of the foot of the 'V', and this should take any wing I'll ever build.

The pointer is a piece of piano wire ground to a fine point and all the tubing soldered to it is just for weight so that it won't move around with every breeze. I had a small bearing in the shop so I made up a nylon bushing for the wire to fit the I.D. of the bearing and the bearing allows the pointer to settle in exactly the same place every time rather than having it bind and give unreliable readings.

Since a piece of plywood this large in the thinner sizes can warp quite easily, I applied a stiffener to the backside of the meter to keep it flat. Warping can also interfere with the slide moving freely and the stiffener is worth the trouble.

Once completed, the meter will require calibrating (that's a neat word meaning you have to put the little graduated scale on in the right place or you just wasted the two to three hours you spent making the thing!). The easiest way is to arrange a piece of flat wood so that it is exactly level, a piece of particle board about 3/4" thick is just right as it won't warp. Set the particle board up so it is dead level, then clamp the meter to it as if it were a wing and very accurately mark where the pointer is sitting. Then draw a line directed back to the center of the hole in which the pointer is swung and apply the small gauge to the meter with the gauge center line exactly on the line you just made. That should do it. Just in case, I used a spray adhesive (one that doesn't weep through paper is good) and then checked the pointer again. The spray adhesive stays moist long enough to let you move the gauge if necessary for really accurate placement. Total time was about three hours and it's a very handy tool to have around.

Don't be afraid to experiment a bit with incidence angles, it may turn a real "dog" into a superb flying pussy cat. Nothing on that plan you used is graven in stone, so a little experimenting is good experience.

★

Remember years ago when you used to run .049 engines, and they had a little spring you clipped around the prop and wound backwards for a few turns? And the other engines that had the spring integral with the prop? Those were good ideas and they helped get those little engines running with a good snap and not much danger of getting your fingers in the path of the prop.

Well, unlikely as it may seem, there is now such a device available for almost all the large engines we use and it works about the same. The difference being that it works on the rear shaft and does about the same thing.

Gerry Holdeman, a Sacramento area modeler of some ingenuity and wide ranging, off-the-wall interests, has come up with what will probably go down in history as the Holdeman Starter. As with most really great inventions (now, why didn't I think of that?), Gerry's is simplicity itself, once developed. It consists of a husky spring and a slip clutch device mounted on the rear shaft. You turn your prop clockwise (backwards) about 3/4 turn, release it and the shaft is carried in the correct starting direction 3 to 4 turns. These turns are made at a lot greater speed than most of us can hand prop a large engine and

the fact that there are several of them all but assures fire in the hole. Naturally, C/D ignition engines will benefit most from this device as they require faster turning while starting to produce the spark required for ignition. Those of you who have the new Quadra 50 engine take heed, what you have judged to be "hard starting" is just that you haven't been able to flip that prop fast enough to get a good spark. Gerry's starter will do this for you.

The starter will be released first for the Quadra engine and will consist of a starter/engine mount combination using the cylindrical Quadra mount but will later be available for other mounts as well.

Remember, this starter will **only** operate on an engine with a rear shaft protruding from the rear of the crankcase.

No prices or other information is available as this is written, but if you'll send an SASE to: Holdeman Starter, c/o: P.K. Products, P.O. Box 6226, Hayward, California 94540, they'll send you details as to what is available and the prices. You have to have some sort of mount, why not have a starter as well?

I expect to have one of these units as soon as they are available and will be reporting further to you when I have seen and used it. For all of us, I'll say to Gerry, "Well done, and heartfelt thanks." It just could be he has saved an entire generation of fingers. □

FLYING LOWE

from page 173/6

proper performance of the avalance maneuver of the "turnaround" pattern. This maneuver is normally done with an "inside" snap roll at the top of the loop, i.e., up elevator with rudder and aileron in the same direction. This is more difficult than performing an "outside" or negative snap since it tends to pull the aircraft down and tighten the loop; also the aircraft tries to pull off heading. The ship accomplishes this maneuver best by being able to get into the snap very quickly without significant pitch or heading changes. It's usually best to start the snap slightly before the apex (top) of the loop in order to reduce loop tightening effects. Also, be sure and let go of the elevator so that it will "fly" around and not tighten up. Sometimes a little down helps after the stop of the snap. I usually do the maneuver with the Laser at full bore since the snap stops more predictably. You should play with the power and size of the loop, however, to suit your own aircraft's speed and snapping ability.

Adriano further inquires about comments relative to flying the rest of the turnaround pattern. Rather than going into that at this time, let's talk a little about the basics of all aerobatic maneuvers. First of all, think symmetry and concentrate on performing the maneuvers as a series of elements, since this is the way that they are judged. The square rolling loop, for example, is a series of quarter loops, straight lines and half rolls. Each quarter loop should be the same as are each line and half roll. Present the maneuver as elements without the elements flowing together, i.e., quarter loop, straight line, half roll, straight line, quarter loop, etc. Make sure the entire maneuver is balanced in front, all rolls are in the center of the lines, all lines are of the same length, etc. Make sure the lines are perfectly vertical and horizontal. If you do all this you will get a ten. I have found that the I.A.C. (International Aerobatic Club) judges really pick on the lines, so make sure that the lines are vertical, horizontal, 45°, etc., or whatever is called for.

There was an omission for photo credit in the June 1983 issue of Don's column. All photos on page 83, top left and right photos on page 84, and top left photo on page 85 were taken by Ralph J. Leidner, D.D.S. of Coral Gables, Florida.

□

FROM THE SHOP

from page 4

..... *share an incident that happened in our club, Bayouland R/C, of Thibodaux, Louisana.*

After losing our flying field, a club member cleared part of his sugar cane field for a temporary strip for us. This field was only about 200 yards from a very thickly wooded area. As you have already guessed one flier put his model in the top of one of the trees near a bayou. The landowner graciously volunteered to help the club member retrieve the model. Upon close examination the farmer suggested they go to his home to obtain a boat and chain saw since the vines and poison ivy were too thick to risk climbing the tree. This was done, but the chain saw did not start. Back to his home for an ax. After a long period of chopping by both the modeler and farmer in 96° heat and mosquitoes, the fliers remaining at the field heard the distant cry of **timber.** *Everyone saw the tree fall, but not the model; it was*

to page 203

FROM THE SHOP

from page 198/4

the wrong tree. The trees were so thick they made a bad guess. The model laughingly hung up in the very top of a tree that was still standing.

After the intense laughter died down, we suggested that they pull on the dangling vines. Only then did the model fall from the tree.

Sincerely,
Ted Hoffmann (President)
Bayouland R/C

★

We have discovered a rather annoying characteristic of one of the new and beneficial miracle products. This pertains to some of the cyanoacrylic accelerators when used on or near the clear plastics (butyrate and styrene) used to form canopies and windshields. There seems to be an incompatability that causes instant fogging of the plastic. If you are planning to install a canopy with CA and an accelerator it might be wise to try it on a scrap piece of the plastic first. Undoubtedly this situation will soon be corrected.

★

Tom Keeling Of T & D Fiberglass Specialties, 30925 Block, Garden City, Michigan 48135, advises us that he is producing cowling and canopies for several designs presented as construction articles in RCM. The ad on page 194 of this issue lists those parts currently available.

★

Lee Bergner of Arvada, Colorado, forwarded the following:

Federal Aviation Administration General Aviation Airworthiness Alerts, AC No. 43-16.

Epoxy Paints

North Central Airlines (which is now Republic Airlines) publishes the "Ungarbled Word." A recent issue contained an account of an employee's experience with an epoxy-based paint used to finish a model glider. As he tells it, he spray painted the bird in his heated garage workshop. He sprayed a tack coat and stepped out. Twenty-five minutes later, he stepped back in, sprayed a finish and stepped out again. Total time in the spray area was less than 4 minutes. He then proceeded to clean his spray gun. About one-half hour later, he noticed a strong smell of algae — like a stagnant swamp. An hour and a half later, he was experiencing pains in his lower rib cage. The pains spread throughout his chest cavity and in short order, he found himself in a coronary care unit. Here's what he says about it:

"Even though I suspected possible poisoning from the epoxy and took a can of it to the hospital with me, an educational program followed which should be shared with everyone: (1) There is no antitoxin (as in the case of a snake bite) or reversing-type chemical to render the effects of the epoxy formula harmless. (2) If you are going to live, you live; if not, the staff just has to watch you die. (3) The resins and hardeners inflame the tissues in the lungs and surrounding areas near the heart; the effect is like a coronary, but no traces can be found later. The moral is obvious; if you are going to spray epoxy, do it outdoors or in a vented spray booth. If you are going to dry-sand epoxy, wear a carbon-activated face mask — the powder or dust is as dangerous as the wet spray. Final note; the effects are cumulative over a period of time; and when your tolerance has been reached, there is no reversing the process."

★

The Weak Signals R/C Expo at Toledo was attended by nine RCM Columnists and two staff members from the home office. Hopefully they will give us their views in our August issue. We shall see. □