

October 1970 75¢

# RC MODELER

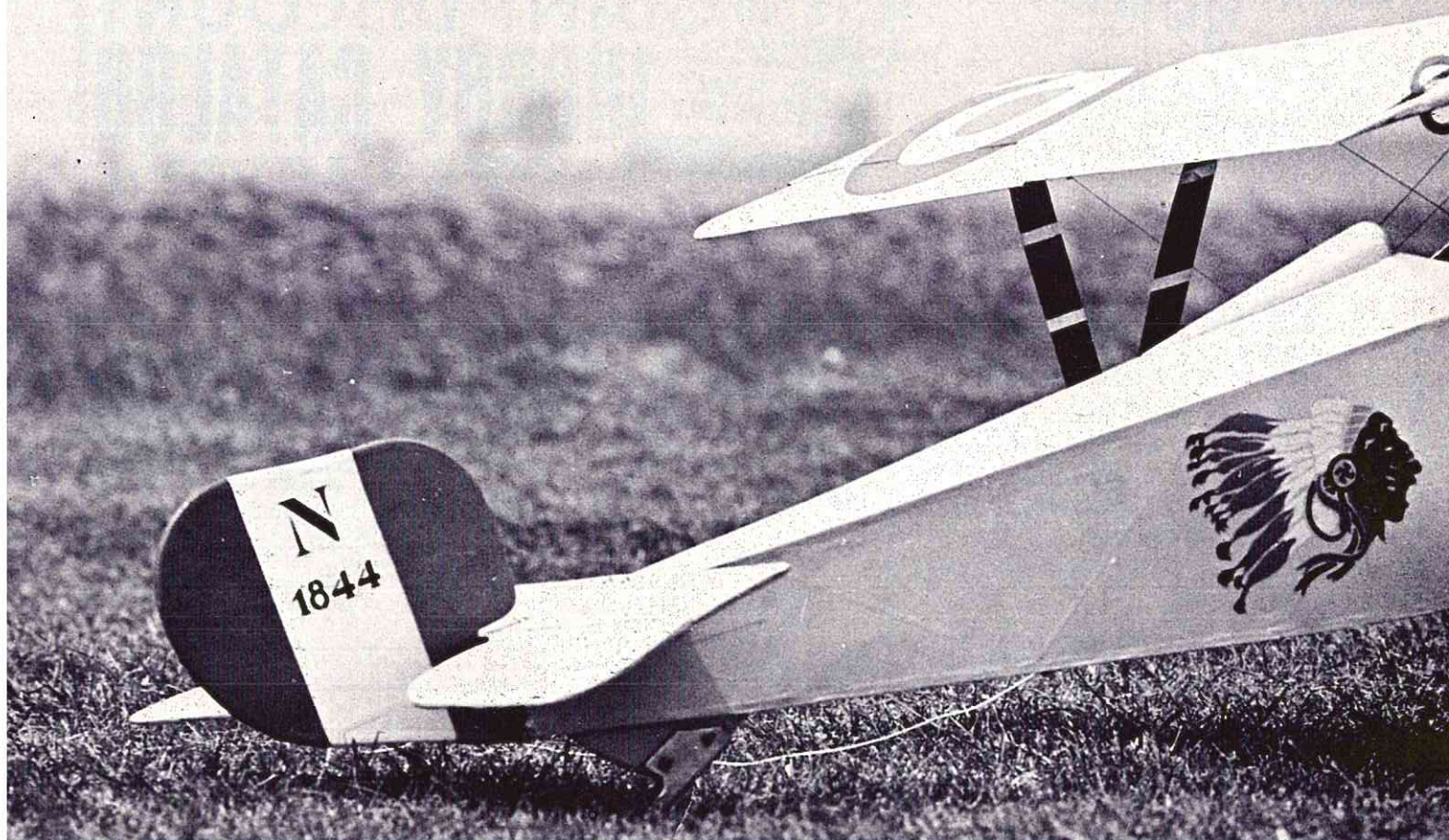
THE WORLD'S LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS





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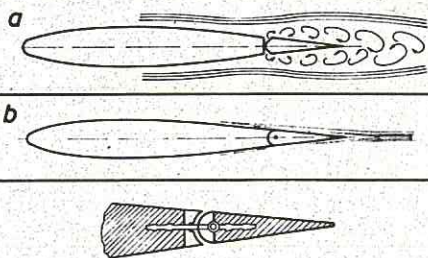
**COVER:** Terrie Webb of Oxnard, California, with Lou Proctor's float-equipped Antic. Proctor's 7 lb. plane uses a Webra .60 for power. Kraft radio. Floats weigh the same as the Antic's original wheels. Plane flies beautifully. Ektachrome transparency by Tom Roe.  
**FRONTSPIECE:** Percy Jacobs of the NLRMFC built this spectacular V.K. Nieuport. Merco .61 power, homebuilt digital equipment designed by Jim Edwards. Photo by Henry J. Nicholls.





# VIEWPOINT

BY: DON DEWEY



CONTROL SURFACE FAIRING  
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FRANZ KAVAN - 8500 NÜRNBERG  
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By Ken Galbreath

Occasionally I have an idea that sounds good to me. When this happens everyone suddenly develops the same idea at the same time. This one has been no exception.

In a past issue of R/C Modeler there was an editorial on training and safety. One or two of the other hobby magazines have also recently mentioned this same subject, and my own club, the Thunderbirds are having their problems with interference at the field. Yet, I think I've come up with a method of conducting pilot training and safety training that may sound like something out of science fiction until you think about it and apply it. As modelers, with as much as six or seven hundred dollars flying around on the end of a very fragile string of radio waves, we owe it to ourselves to be as proficient as possible. To let luck play any part in the control of so much time and expense is not in keeping with the image we want non-modelers to have of us. Which means most of us must fly a lot more than we have time for. We should find some form of practice that we can carry around and use when the opportunity arises. I think I've found such a method.

'Psycho', loosely defined, means mental. 'Cybernetics', loosely defined, means the ability to communicate with machines - understanding them and operating them so they accomplish a task for us. Psycho-Cybernetics then, very loosely defined, is mentally training ourselves to communicate with machines. Now before you decide I'm a little strange, let me tell you what all this has to do with flying an R/C model.

Suppose you want to learn to do the "Rolling Double Half-Hitch". You read the description of how the maneuver is accomplished, then you commit the airplane and get zapped as soon as you leave straight and level flight. Because you had no idea how to put the description into the transmitter sticks and have it come out right on the control surfaces.

Now, suppose you use psycho-cybernetics. As you read the description of the maneuver, you move each

control stick in the direction and amount described. You do this until someone can name the maneuver and you can automatically make all the correct stick movements in order. You have conditioned your mind to communicate with the transmitter.

O.K. - back to the field. I assure you that those first few maneuvers won't be perfect due to wind, aircraft speed, and over/under control - but you won't wipe it out either. Even though it may be ragged at the edges, you'll be able to do the maneuver and have an airplane left over when you're finished. All of us have enough imagination to sit around the office and make-believe we are moving sticks on a transmitter and doing maneuvers. This is the key. Mental conditioning. Practice with a transmitter at home. It is the same key that helps people stop smoking. Granted you'll crave tobacco the first few days, but the real trick is to keep from reaching for a cigarette. If you can make yourself not reach, by the second or third day, you'll stop reaching. The habit isn't broken but you've planted a pattern that gets stronger each time you don't reach. Learning to fly is the same thing in reverse. Imagine each movement and before you realize it you'll be doing them by reflex. And you'll never be a really good pilot until you can fly by reflex action.

Now let's do a simple flight to see how this big word operates. Either sit or stand and hold your transmitter. No need to turn it on. Close your eyes and imagine your plane on the runway, idling. Get it fixed in your mind. Now ease the throttle stick forward and watch it pick up speed. It's attained flying speed so ease in a little up-elevator. Off she comes. Not too much - keep the nose down a little. And use that stick to keep the wings level. Fly it straight out. Now - about fifty feet off the ground (altitude is what airplanes always need) ease the stick left a hair and roll her into a left turn. A little back to hold the nose up in the turn - ninety degrees - now roll her out straight and level. Keep a little back pressure on the stick to maintain a shallow climb. Now ease in some left stick while holding the back pressure and you've got a ninety



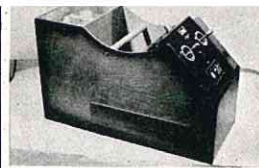
degree climbing left turn. Straight and level and you're downwind for landing. Now pull the power off and ease the stick forward to get the nose down. Airspeed is as important as altitude. Set up a gradual rate of descent. Maintain the forward pressure on the stick and ease in left stick. Ninety degrees and you're base for landing. Hold the nose down and turn on final. You're a little slow so blip the throttle stick forward and off again. Now you've got it made. Hold your forward pressure on the stick and keep the wings level. Over the end of the runway about two feet off the ground. Now while keeping the wings level, start releasing your forward pressure and when it levels out, add a little back pressure. The nose eases up and she plops on. A very simple flight you say, but analyze it. You have used the basic stick movements necessary for most maneuvers and obtained the feel of the plane.

Repeat this same flight over a few times until you can honestly say you've got it. Then do the same flight but throw in a stall or bad takeoff. Correct it. Keep it up until you can do it automatically. When you're learning to fly instruments in a full size plane they give you "unusual attitudes". This means the instructor gets the plane into some hairy positions then you have to correct by instruments only. It helps your control proficiency like you can't imagine. Get someone to stand behind you and while you're "dry-flying" they can call out things like "spin", "stall", "snap-roll", "engine failure"—you get the idea. Do it until you can correct every time and admit honestly if you lost it or recovered.

By now you've decided I'm squirrely, but think about it. You use this all the time. When you're on the job and the company comes out with a new technique, you spend time thinking about the right way to do it. You learn by this means.

So, let me make a proposal. Why doesn't some club make up a training plan using this method. Say five hours of "dry-flying" and two hours "actual" before soloing a beginner and turning him loose on the field. A test at the end of five hours "dry" would show if he was ready to do the real thing. I'm sure it would work and after it was perfected, almost any beginner would pay ten dollars if he knew he was going to learn to fly and not cream his first plane and radio. This

(continued on page 80)



### NEW! Hobby Lobby Assembled & Finished Field Box \$19.95

We did quite a bit of shopping before selecting this particular field box. The box has a beautiful toned and rubbed fuel-proof finish and all joints are keyed. It stows a gallon of fuel, props, starting battery, tools, and holds your transmitter in a handily accessible position.

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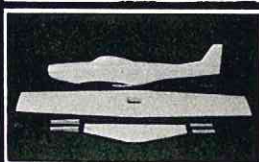
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R. R., Pittsfield, Mass.

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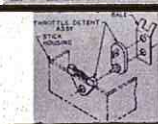
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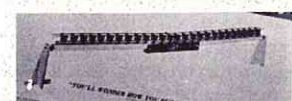


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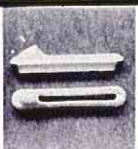
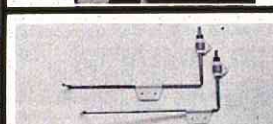


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60, Enya 09, 15,  
60, STG60, Veco  
61, K&B, 40RR.



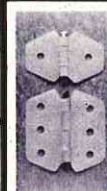
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# THE MODEL WIFE

BY HORTENSE STEED

Do you ever become fed up with defending your husband's hobby? It started with us soon after we married. Seems everyone thought it was high time we settled into the serious Rut-of-Making-a-Living. Having a little fun while making a living was frowned on by many people then and some still frown on it.

We lived in a small apartment and the workshop was the kitchen table, which was hurriedly cleared after the evening meal so the models could be brought forth, the X-Acto set laid out and the shavings fell gently to the floor. If a neighbor came to borrow a stick of butter, or some such thing the next morning, she found me sweeping up a mountain of soft balsa shavings and she looked as if she thought me a little whacky to go about it in such good humor.

Later, when we girls got together for coffee, I often found myself explaining my husband's hobby while the girls pitied "poor me". Ah, but they don't have fond memories of trying, time after time, to make a plexiglass cockpit cover by heating it in the oven until it was just the right temperature to be stretched over a wood block without any bubbles forming. And the great feeling of triumph when we finally got a few perfect ones!

We moved to a rented house and there we had a small back porch, enclosed with windows, which became the shop. Soon it was crammed full and I had to stand in the kitchen to talk to Doss. The man next door became interested in models after kidding Doss for a full month about playing with toy airplanes. He gave it a fling and learned to respect a modeler's ability, patience and knowledge in short order. In fact, he gave it up as it was too demanding for his patience. His wife never changed her view that modeling was a waste of time and money. I think he sort of envied us

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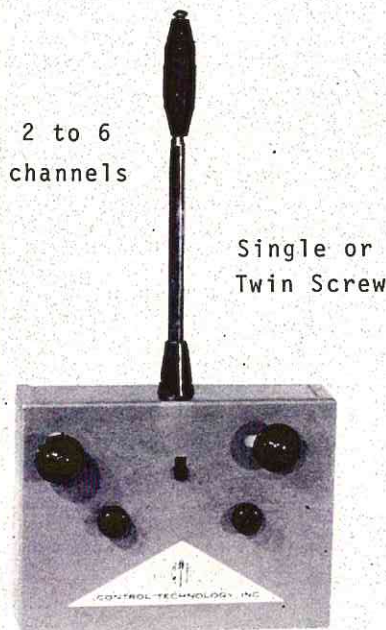
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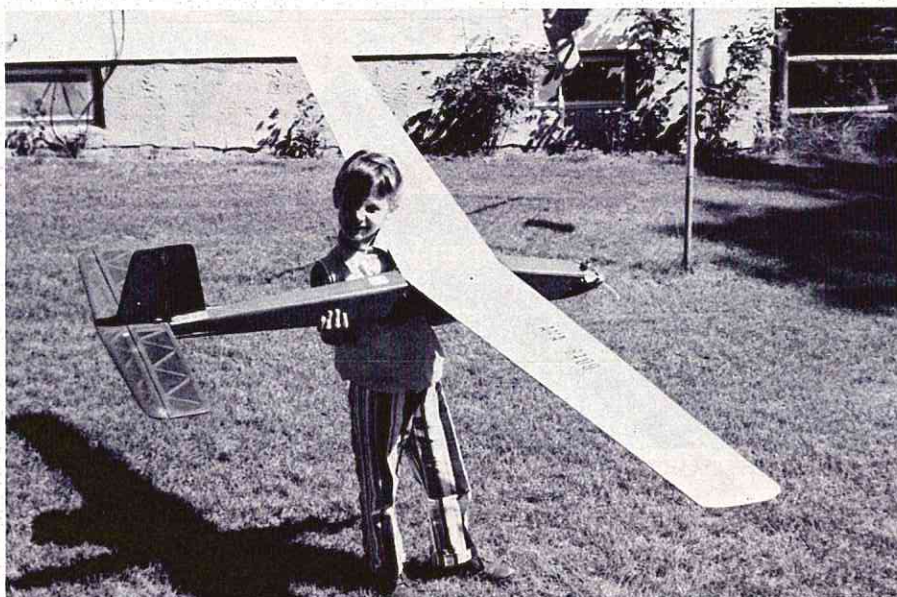
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# CUNNINGHAM ON R/C



In the July 1970 issue of RCM we started a short series entitled R/C Glider Design Made Easy. In this article I promised that "next month" I would take a look at control systems, thermal seeking etc. . . Please accept my apology for not following up this promise in the August issue. By this time you know that I have been missing from the pages of RCM for several months. I feel that I owe you an explanation for this back sliding on my part. First, there was a great amount of work that needed to be accomplished in order to get ready for the National Fun Fly Championships; second, was the great amount of work to do on a project that was assigned to me by Uncle Don; and third, the need to take a little vacation from writing. If you haven't tried it, you can never guess how hard it is to sit down each month to write a sustaining column. Anyhow, with most of these reasons behind me, it's time to get into gear and start to work once again.

As we said several months ago, there is a great deal of interest building up around glider flying in this country. While I was on a visit to the RCM

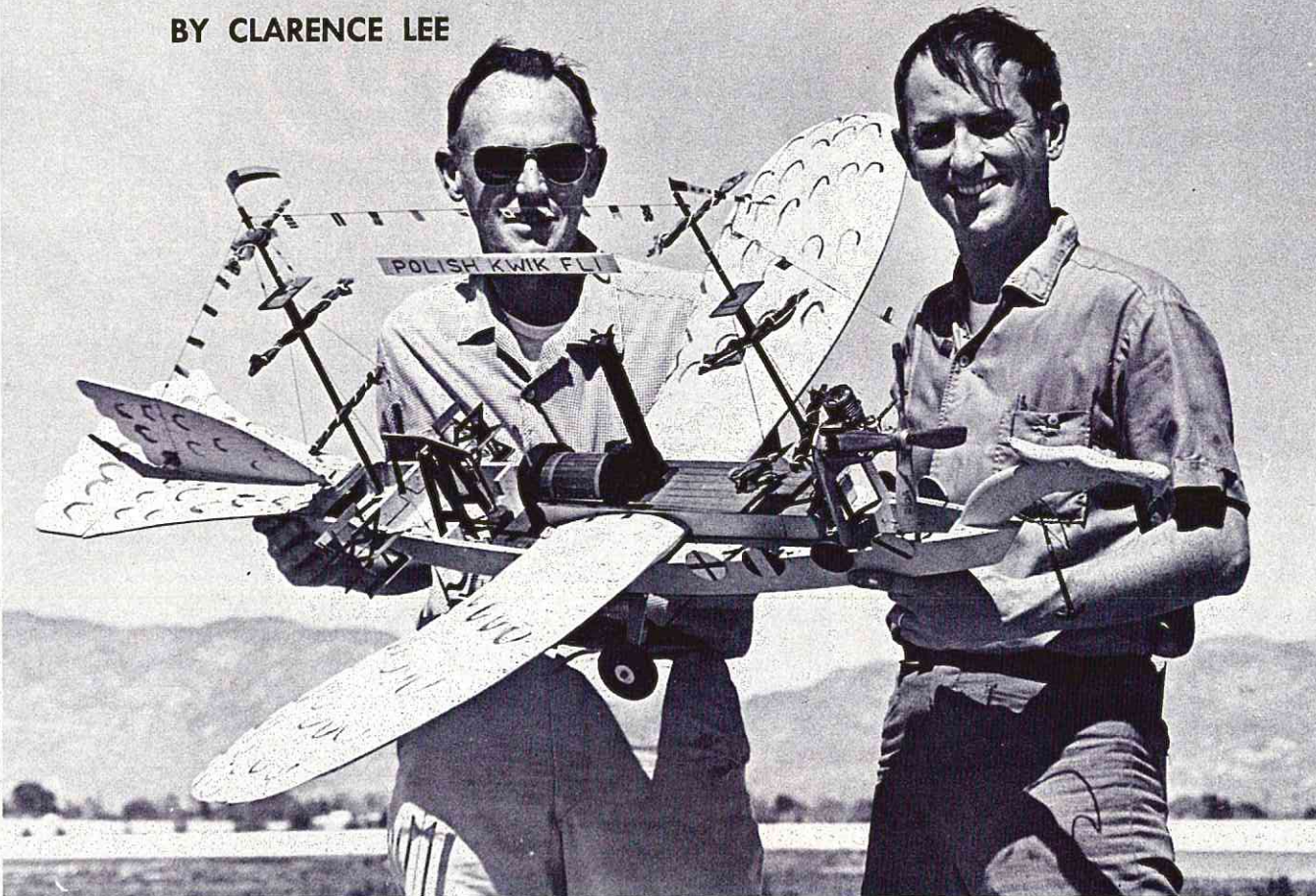
offices this spring I was treated to a few hours of slope soaring by my good buddy, Bill O'Brien, RCM Special Project Editor. Slope soaring is not available to us mid-America types from the wilds of Texas, and so it was with a great deal of interest that I met Bill on top of one of the high outcroppings that abound in the Los Angeles area. Bill's good friend, and now mine, Bill Davidson, had rigged up a collection of gliders to show me how they flew from the slopes. Early in the morning we started out with Don Dewey's glider called the "Snake". The Snake has a Thermic wing, a tough Italian poplar fuselage, and an original tail section. It has a very light wing loading and will fly in almost any breeze. I got my feet wet with this glider, and learned several basic facts of slope soaring. The first is that if you have the right type of hill condition, you sure don't need an engine in the nose! When you pitch a glider off of the edge, it goes straight up, just like it was on an express elevator. The nose doesn't go up, the entire aircraft just rises up. The Graupner "Cirrus" glider

(continued on page 66)



# ENGINE CLINIC

BY CLARENCE LEE



The following letter was sent to Associate Editor, Ken Willard and, in turn forwarded to me by Ken. I am running the letter for two reasons. First I have been receiving quite a few letters asking the same or similar questions, and second — Ken gave a very good answer that makes my writing chore somewhat easier.

Dear Mr. Willard:

Why has no one yet come out with a reliable and efficient model turbojet engine? It would open up a whole new field of modeling. Just think of it! A scale U.S. Navy Phantom Jet that really was a jet; no ducted fans, no props.

It seems, on the surface anyway, that it would be relatively easy to machine a small engine of this type employing a centrifugal flow compressor with an axial flow turbine. And if more power were needed, maybe even a small after burner could be designed into the engine.

Yours sincerely,  
Carl Fox, III

Dear Carl:

Thanks for your letter. However, it more properly should have been sent to Clarence Lee, our RCM engine expert. So, I'm sending it to him, along with a copy of this letter, for his opinions, which may or may not agree with mine.

The way I see it, the true turbojet, when scaled down to a size satisfactory for our

use, just doesn't put out the necessary thrust. They have been brought down in size enough to be used in some target drones, but the weight is still up in the 40-60 class.

Seems that it has something to do with the mass flow requirements. For example, in your model plane, the prop turns at anything from 10,000 to 17,000 rpm, to get the thrust required, as compared to prop speeds of 2200-3400 in full scale jobs. Turbojet fans rotate at speeds around 25,000-35,000 in full scale, and would have to hit 75,000-100,000 in a little job. And the friction buildup just can't be overcome using our present technology.

Anyway, Clarence should be able to give you a better story. He'll probably expand it into a whole column, because the same question has been asked by other modelers. And it is a good one.

Best regards,  
Ken Willard

I would like to add to Ken's explanation by saying that the power-to-weight ratio is of great importance with the size engines that we are using. The miniature two cycle engines that we are using have the highest power-to-weight ratio of any internal combustion engine. Some of the .60 displacement engines used in u-control speed are well over two horsepower per pound, and some approaching

three. As a comparison, an automobile or aircraft engine that develops over one horsepower per pound is considered extremely powerful. One of our .60 size engines develops close to seven pounds of thrust. A turbojet engine that would develop seven pounds of thrust would be too large and heavy for our models. One that would weigh in at one pound, or less, would not have the necessary thrust to do the job, as Ken has said.

Our two cycle engines are also about the simplest form of internal combustion engine in existence. The only one that I can think of that is any simpler is the ram jet which requires only a reed valve and combustion chamber. Although a full size turbojet engine is far simpler than a full size conventional aircraft engine, the reverse would be true in our case by the time you added the accessories that it would take to make it operate. Then too, how about the heat problem? I hate to think about the amount of insulation that would be required to keep those plastic servos from melting.



While we are on the the subject of new means of propulsion, my old buddy, Nate Rambo, has come up with something truly new and revolutionary. Who needs turbojets or Wankels? However, control yourselves, gang. As Nate says, there are still a few minor refinements to be made.

Dear Clarence,

After considerable deliberation, I have decided that RCM should have the honor of unveiling my latest masterpiece, the "Polish Kwik Fli". It is only fitting that it appear in your column in view of the technical breakthrough reflected in its power plant. No doubt you are overwhelmed by being selected as the columnist to announce the magnificent machine.

From the enclosed picture your readers can readily grasp the fundamental design approach which has been applied. This truly remarkable concept involves a deviation from the conventional internal combustion engine in the nose. Instead it has an external combustion engine in the tail. The revolutionary power plant and its constantly variable pitch propellers are married to the airframe in such a way as to insure unparalleled results.

Surely this model and its engine will bring a flood of mail from your excited readers. However, it must be made clear to them at this time that the details of the machine require minor refinement. As regrettable as it seems, plans and building instructions cannot be made available at this time.

Nathan H. Rambo, III

\*\*\*\*\*

Dear Mr. Lee:

I am writing to you concerning an Enya 29. This engine has been running one hour on the bench, and then flown another two hours. I run this engine with a 10-6 and I modified the hatch on a Tauri, so the needle valve and the center of an 8 ounce are in line. I must takeoff in a complete 4 cycle and after 5 minutes it leans into a very good 2 cycle. At a full tank of gas it will not idle even though the air bleed is fully opened. On a nearly empty tank a rich idle is obtained. Please tell me if I must live with this or if I have an "unusual" engine. I also do not know why Veco does not tell you why an engine runs bad if sent back for repairs. I know many people would like to know if damage was caused by himself (running too rich, lean, dirty fuel, etc.).

Kenneth Newbury  
Indio, California

You don't have an unusual engine Ken. You just have your tank mounted too high and are using too large a tank for a .29. 6 ounces should be plenty. You never want the center line of the tank even with the needle valve in an R/C model. If you do, the first half of the tank will be gravity fed, and the last half depends upon suction. This causes too much change in the needle setting, and the gravity feed, when the tank is full, will load the engine up at idle. The best tank position is with the center line approximately 3/8" below the needle valve. You will still have some gravity feed with a full tank, but the problem will

not be as severe. If you cannot get the engine to idle lean enough with the air bleed wide open, enlarge the air bleed hole. A lot of fliers seem to be hesitant about doing this, but it is the only solution.

Very few manufacturers will send back a letter explaining what work has been performed on an engine - or radio for that matter. Modelers do not realize that the repair business is a losing proposition. A manufacturer can seldom charge for the time actually spent on the engine. Most manufacturers consider themselves lucky if they break even on repairs. If a letter of explanation was sent with each repair, it would require several people full time just to do this, which would only add to the cost. It would take qualified personnel, and it is more important that the qualified person repair the engine, not spend his time writing letters.

\*\*\*\*\*

Dear Mr. Lee:

I have a problem which may not even be a problem at all which I discovered after my last flying session. I mounted a Perry carb on a Super Tigre .56 and, true to your report on this fine product, the idle was lower and very dependable. But while cleaning the engine I noticed that the idle mixture disc had moved completely out of the range that it controls! So very carefully I tried moving the disc even further toward the prop and found it would move much more easily than usual, and would rotate a full 360° in either direction. Is this a trait of this carb, or perhaps a defect in my particular one? The engine still runs and idles well, but I do not like the idea of the idle disc turning by itself!

As a side note, do you know that there are some modelers who are using the idle disc to regulate the high speed, and the high speed screw for idle? I wonder if they read the directions on their Fox .59's . . . .

Sincerely Yours,  
R.J. Davidson

There is nothing wrong with your Perry carburetor Mr. Davidson. The idle mixture disc is free to rotate the full 360°. Rotating the disc back and forth has probably worked some oil into the O-rings and lubricated them so that the disc moves a little more freely than it should. Let the engine set a little while and I think you will find that the mixture disc will stiffen up.

\*\*\*\*\*

Dear Mr. Lee:

I belong to the R/C club here in Verona, Italy. There are two Americans and about forty Italians. The Italians have helped me a lot. I managed to get 160 flights with only one crash on my fourth flight attempting to land my Falcon 56, OS19, EK Logictrol 4 channels.

I am building a Mirage III by Topp Manufacturing Co., Germany. It is a Delta

wing, rear engine mount with a Webra 61RC blackhead. Now the only reverse pitch propeller I can find is a 10 x 6 and I feel I need an 11 x 7 or 11 x 8, but try to find one, they just don't make them! One of my Italian friends told me to rotate the front mount causing the engine to run in the opposite direction. I have never heard of this. Can it be done? Will it hurt the engine? In which direction do you rotate the front mount? What would its final position look like?

I would appreciate any help you can give me on this problem. At the present time I am planning to use a 10 x 6 reverse pitch propeller, do you think it will work?

Sincerely,  
Edward D. Omiccioli  
APO New York

You can reverse the direction of rotation of your Webra .61 or any other front rotor engine that has a removable front plate by rotating the front plate 90° counter-clockwise when viewed from the front. How well the engine will perform depends on the crankshaft timing of the particular make of engine. Some will run almost as well as they do in the regular direction and others will lose a little on the top end. The engine will look a little strange, but if it is side mounted, the carburetor will be either sticking straight up or down depending on which way you mount the engine.

The 10-6 is not enough propeller for your Webra. An 11-7 is about the minimum size that you should run, and it will really wind up with this.

I have had many letters from RC'ers wanting to know where they could get left hand propellers in sizes larger than 10-6. If anyone out there knows of a source, let me know so we can pass the word on.

\*\*\*\*\*

Dear Mr. Lee:

I am an old time modeler - dating back to the Brown Jr. and G.H.Q. engine era. I stopped modeling in the late 40's - marriage, home, kids - you know the story. About 2 years ago I was attracted back to modeling by R.C. I am absolutely amazed by the POWER and reliability of the modern 60. I have always liked power and flew the old Atwood, Hornet, McCoy, etc.

I need your help!

I would like very much to build a small, 55"-60" w.s., twin 60 powered R.C. model. It would be most desirable to have counter-rotating engines - in fact - mandatory. Is it possible to rotate the rear cover plate and carburetor on a 60 and convert it to counter rotation? I believe some of the fellows did this in the late 40's to fly clockwise U-control speed.

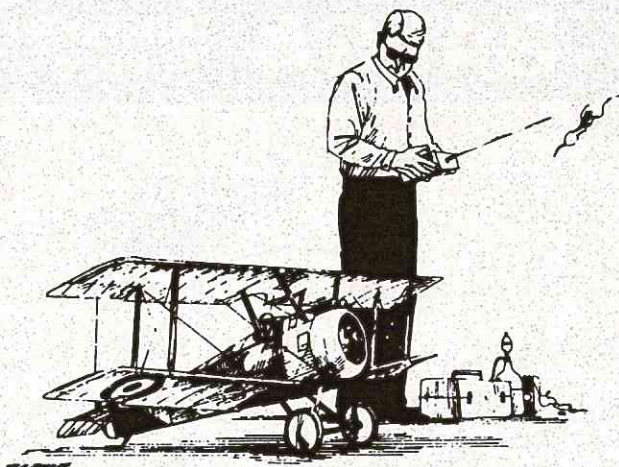
Great column and improving magazine - keep up the good work.

Thanks for your help.

Yours truly,  
Curt Voyles  
Columbus, Md.

You can reverse the direction of rotation of a rear rotor engine by  
(continued on page 77)





by DAVE PLATT

(Designer — Top Flite Models)

# SCALE IN HAND...

With apologies to anyone who may have been waiting for our canopy-moulding feature this month, we're going to postpone that discussion until a later time. At present we're making some further experiments in this area, and it will be better if the feature is written when all these other avenues have been explored.

In casting around for a replacement feature, it was decided to offer any help we can in the matter of making scale propellers. A few letters have asked about this, and from these, and several personal discussions, it would appear that, for many modelers, the carving of props is regarded as some kind of mysterious rite to be practised only by those versed in magic spells.

Then again, several modelers claimed that so long as they made flat blades and joined these at the root they managed to get through, but the getting of the "twist" in a controlled and predetermined manner left them stumped.

If any of these comments sound familiar to you, read on. Because we're going to come right out and flatly say that carving props is one of the easiest parts of a whole model! The element of mystery or chance is exploded in one very simple and essential rule: **Carving an accurate propeller is all a matter of have a correctly-cut "blank" from which to make it.** In making this "blank", we ensure everything about the prop will be correct except its actual section. Diameter, pitch, twist, side view and front view, all result automatically. Before going on to the stage-by-stage recipe, let's talk for a moment about materials. A scale prop will not be used for running the engine, and thus need only be made of balsa. And for quite awhile, that's all this writer ever used. However, several problems arose from balsa props, among them a great willingness to chip

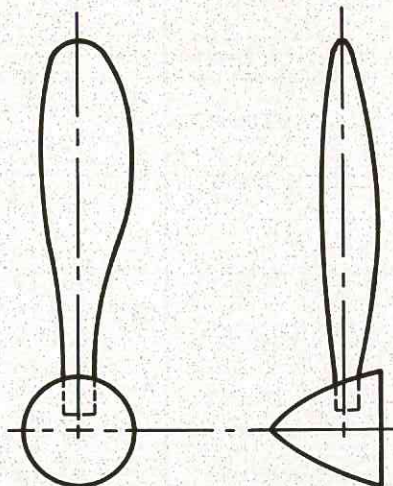
at the edges, a proneness to break if (should say **when**) some clown tries to flick over the engine on this prop, and the extra time consumed in covering the blades and filling them before color doping.

After suffering these problems beyond the frustration point, we went to using bass instead. Bass is an exceedingly friendly wood to carve and takes very small extra effort over balsa. When the prop is carved, no covering and very little filling is required prior to doping. Best of all, the prop is strong enough to turn the engine over without breaking and does not "fray at the edges" with constant handling.

For those who never yet made a prop, though, we'd advise still using balsa for the first few efforts, if only because it is more readily found and does carve faster. Later, when your results justify it go to bass wood.

Alright; let's get to the method.

1) Scale up the side and front views of one blade from your small drawing. Take care to make the drawing right! You now should have a picture something like Fig. 1.



2) Paste these views onto cardboard and cut out shapes with scissors. Hold-

ing these against a somewhat oversize block of wood, draw round the shapes as shown. Repeat for the number of blades required. See Fig. 2.

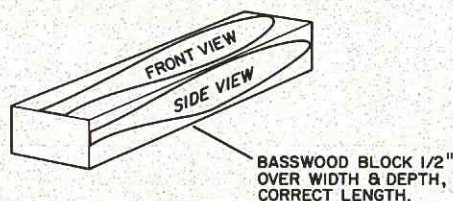


FIGURE 2.

3) Cut out the blade shapes, using a bandsaw for preference. When both views are cut, you have what is known as a "blank", it should look like Fig. 3.



FIGURE 3.

4) Making sure that your prop is to be right or left-handed (we show R.H. here), draw a line about 1/8" away from the front face on the appropriate side view. See Fig. 4.

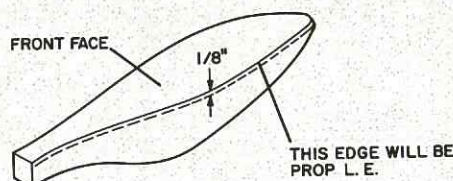


FIGURE 4.

5) Turn blade upside down and carve between drawn line and far corner. When a ruler can be held against the blade at any point and show a straight line, you are done. See Fig. 5. Sand well.

(continued on page 69)





Dr. Brown's Invictus is not only unusual in appearance, but easy to build. Aerodynamically sound, it will do the complete AMA and FAI patterns as well as the more conventional multi aircraft.

# INVICTUS II

Undefeatable . . . . or, if you prefer, unbeatable. If you're good, this twin boom pusher will make you even better.

By J. Anthony Brown, M.D.



## INVICTUS

*It matters not how straight the gate;  
How charged with punishments the  
scroll;*

*I am the Captain of my fate;  
I am the master of my soul.*

*William Ernest Henley*

Invictus — it means undefeatable, or if you prefer, unbeatable. That is the way I feel about this design. I am delighted to see the present trend of multi design aircraft finally swinging away from the super-modified TaurusKwikFlyOrionAstrohog and toward more creative ends. During the past year or so many new and fascinating designs have come out; however, I feel that many of them suffer from one of two faults: They are either a bit too difficult to construct, except for the more ambitious builders, or they are really not good stunt pattern aircraft. I believe this design cures these two faults and still remains creative. Let's face it. It is about as different as you can get! And I guarantee you it will stand out on any flight line!

It all started several years ago when a fellow Chicagoland R/C member, Bob Halvorsen, and I were flying pusher deltas around the Windy City skies. I was satisfied with the pusher engine concept, the sleek military nose, and the ease of construction, but let's be honest — you can seldom, if ever, get a delta to spin, snap roll or knife edge. So this present design evolved. I wanted to retain the pusher engine, sleek military nose, and still have a ship that would be truly different, aerodynamically sound, and do the complete AMA and FAI pattern as well as a standard multi ship. After the

first test flights, I realized (with knees shaking) that this beauty had exceeded all my expectations. First of all, she is beautiful to behold in flight. With the swept wing and twin booms it looks more like a real jet than anything I have ever seen. Spins, snap rolls and knife edge flight are extremely smooth and easy to perform. The rolls are axial without a trace of yaw. She is an extremely easy aircraft to fly and is quite fast. Interested? Read on, McDuff!

The stab was placed on top for two reasons. First, because I thought it looked good, but mainly to get it away from the prop blast just sixteen inches away. This does not seem to adversely affect the axial rolls at all. The fin area may look a little large, but it is in keeping with this type of design. At first glance the linkage problem may look like a nightmare, but bear with me. It's quite quick and simple if you use cable inside of teflon or nylon tubing. If you use bellcranks or Nyrods you're on your own. The choice of engine and tank are up to you. The prototype used a Super Tiger 60 with a German made 11 x 7- $\frac{3}{4}$  pusher fiberglass prop. Notice I use the past tense. The prototype finally joined an elite group: The German Mid-Air Club. I think I cried for two days.

The Super Tiger 60 is more than adequate as this ship should weigh out no heavier than 5- $\frac{3}{4}$  to 6 pounds dry. I'm sure a good .45 would do the job. A standard tank put in backwards has worked well with the Super Tiger, although theoretically, a balloon tank should be better.

There is plenty of room inside the

### SPECIFICATIONS

SPAN: 58"

LENGTH: 49"

WEIGHT: 5 $\frac{3}{4}$  lbs. dry

WING AREA: 600 sq. in.

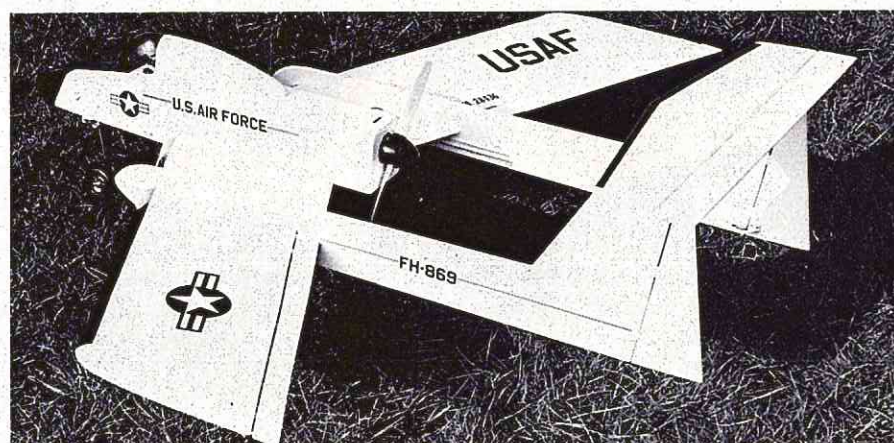
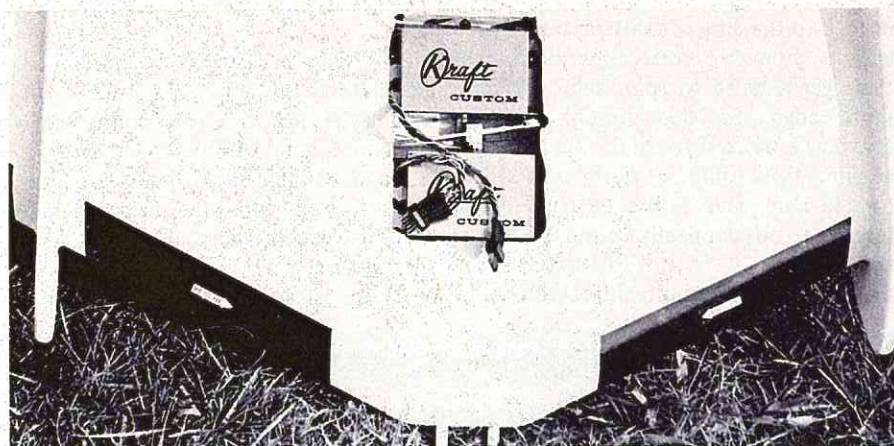
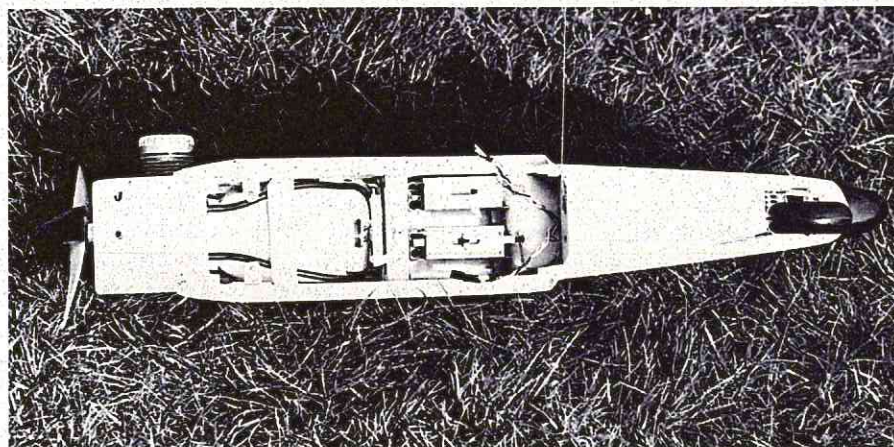
SWEEP: 50° total. 25° each panel.

AIRFOIL: 15% fully symmetrical constant cord.

POWER: 45-61







fuselage for any radio gear on the market. In fact, with the new small, lightweight gear, a few ounces of lead may be required in the nose to put the CG where it belongs at twenty-five per cent of the mean chord. Do not — I repeat — do not make the first test flights with the CG any further back. Mine spins and snap rolls with this setup, so leave it alone.

The fuselage is made removable for ease of transportation and to facilitate getting at the radio gear. The integral wind and boom-and-stab assembly will fit nicely into any standard car trunk. There are no hatches except for a small area just in front of the nose wheel assembly which you can use for a few ounces of lead ballast if necessary. The prototype required four ounces. The present model required none. Still interested? Then on to construction.

### CONSTRUCTION

As you have guessed by now, I am strictly a "Kwik Fly" type construction man. I believe in maximum achievement with minimum effort. A glance at the plans will indicate that construction methods used are very simple and quick. Anyone with a minimum of building experience should have no trouble with basic construction. If you should have any difficulties drop me a line: J. Anthony Brown, M.D., 1347 Lamont Avenue, Thousand Oaks, California 91360.

The one important thing to keep in mind during building is the sequence in which to do things. The wing should be built first. It is the most time consuming, contains most of the control linkage, and you will need it in order to mate the booms and fuselage. A built-up wing is shown. A foam wing could certainly be used, but the linkage problems would have to be worked out; so again you're on your own.

If you do not have a wing jig, and I don't, block the leading and trailing edges up high enough to get the ribs off the board. Both wing panels can be built separately and completely sheeted, except for the center sheeting. Add the wing tips and rough shape. Next, join the panels together on a flat surface. No dihedral is needed with all that sweep — add dihedral braces and bottom center sheeting. Using a sharp razor saw cut off the center leading edge section and add the 1/16 inch front plate. Now reinforce the center section with three inch wide fiberglass tape. Don't worry — the fuselage will cover this. The front part of the

*(continued on page 85)*







# 1970 A.M.A. NATIONALS

A record heat wave, threatening thunderstorms, or a rock festival riot couldn't keep the modelers away from Chicago and the 1970 Nationals as the AMA and the US Navy once again staged the world's greatest model-extravaganza. Some 1200 contestants, including a few from other countries, let models do the 'talking' and records once again tumbled in the intense competition.

Jim Kirkland, the 1963 National Aerobatic Champ, came from Valpariso, Fla., to "keep the young guys honest" and ended by giving a field of 95 D pattern event fliers a solid flying lesson. He headed the qualification list and was never behind during the 6 rounds of the finals. A fellow Gulf coaster, Jim "Doc" Edwards was 2nd followed closely by Phil Kraft who logged the highest single flight total of the D Expert competition. Serious pattern flying appeared to be best represented by Kirkland's flying buddies of the southeast as 5 of the top 7 places were claimed by the Gulf Coast fliers.

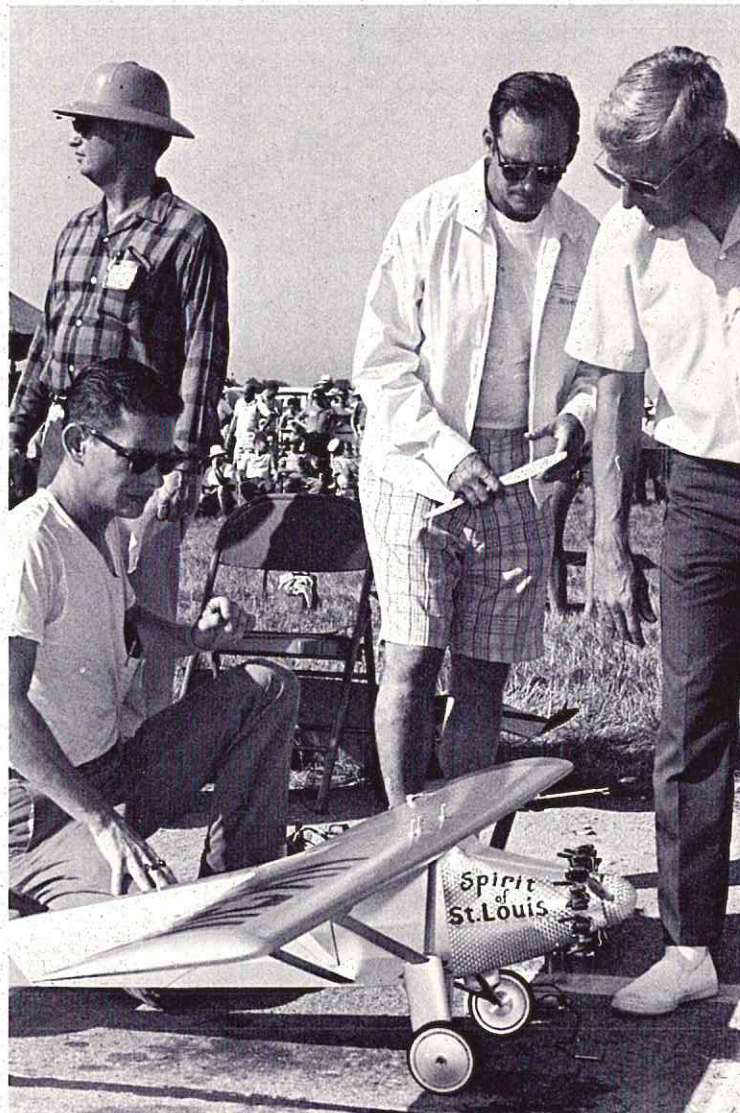
California fliers held their grip on the racing competition with Bob Smith winning Formula I and Larry Leonard continuing his winning ways in Formula II. Scale flying seemed to become a midwest event as Ed Ellis of Dearborn, Michigan topped an outstanding group of modeling gems in that event.

Here's the list of winners. Complete details will be presented next month . . .

**D PATTERN:** (1) Jim Kirkland, 14,140; (2) Jim Edwards, 14,045; (3) Phil Kraft, 14,025; (4) Jim Whitley, 14,000; (5) Larry Leonard, 13,890. **FORMULA I** (1) Bob Smith, (2) Al Sager, (3) Vern Smith, (4) Larry Leonard, (5) Bob Upton. **FORMULA II:** (1) Larry Leonard, (2) Ed Keck, (3) Vern Smith, (4) Austin Leftwich, (5) Telford Violet. **SCALE:** (1) John Ellis, Spirit of St. Louis; (2) Bud Nosen, P-47; (3) Bill Graham, Liberty Sport; (4) Bill Bertrand, Fokker D7; (5) John Ross, Volksplane. **CLASS A SOARING:** (1) Mark Smith, 2739; (2) Bob Andris, 2215; (3) Rick Walters, 2148; (4) Sam Crawford, 2136; (5) Bud Pell, 1742. **CLASS B SOARING:** (1) Walt Good, 3480; (2) Jack Hiner, 2445; (3) Dan Pruss, 2282; (4) Sam Crawford, 2259; (5) Mark Smith, 2229.



Jim Kirkland and the "Intruder" took a solid victory in the 1970 AMA Nationals. DX winner used a Pro-Line radio and a Lee-Veco engine. Retractable gear a must. 7 lb. ship had KDH retracts, Silence-Aire muffler. Only 140 points separated first through fourth place winners. Quality of flying outstanding.

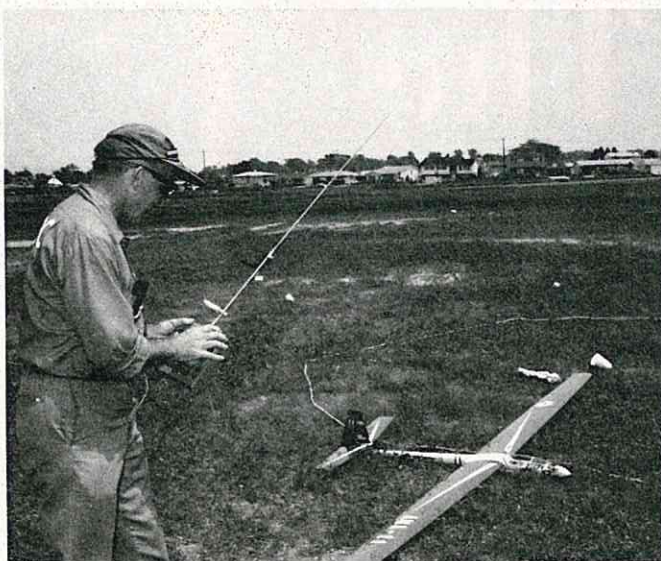


Top scaler, Ed Ellis of Dearborn, Michigan (r) receives help from Bill Bertrand (c). Ship, an immaculate Spirit of St. Louis was fully scale and well detailed. Solid flier. Bjondsen and P-47, second; Bill Graham and Liberty Sport, third. Official U.S. Navy photo.

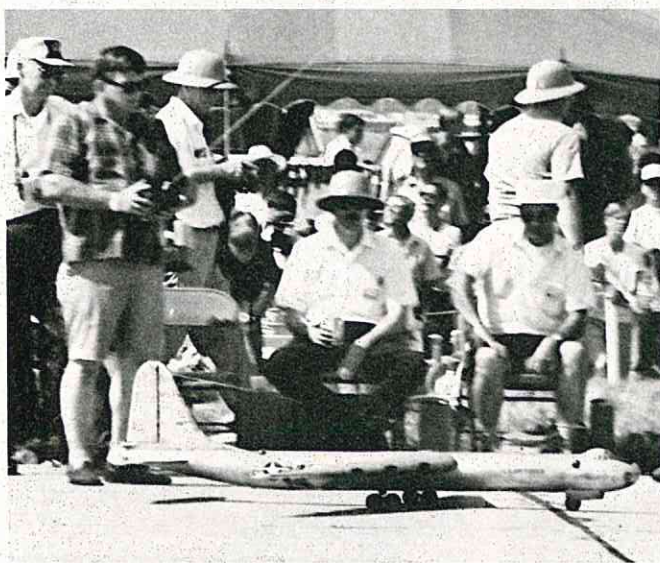




Larry Leonard and stretched Minnow were tops in Formula II. Qualified at 1:48.9! Jeff Bertkin crewed.



Dr. Walt Good just misses circle during B glider event at 1970 Nats. Walt outdistanced large field of soarers in Class B provisional event.

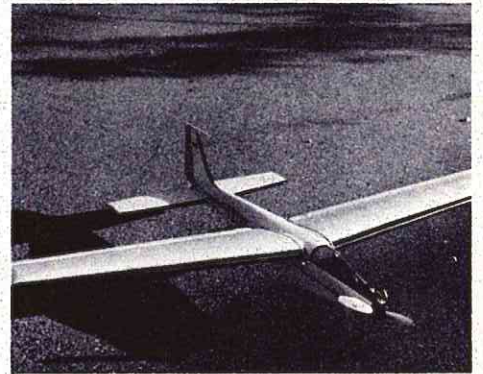


Above, left: Highlight of 1970 Nats was initial flight of Walt Burgin's B-36: Record audience roared as the 18½ lb. ship lifted off. ½" scale, 6 Enya 15's powered Walt's monumental ship. Logictrol II radio. Official U.S. Navy photo. Above: Another scale sensation. Suzann Bowie, 1970 Miss Model Aviation guards Ken Drummer's 19 lb. super-creation. Flew 4 times with 6 Enya 19's. Logictrol II, ½" scale, balsa frame. Based on Jap. Kayto kit. Suzann, Continental Airlines stewardess.

Bill Bertrand readies ¼ scale Fokker D-VIII. Placed 4th. O & R Compact engine power, 14½ lbs. Orbit radio. Emil Cafarelli helped.



# The Ply Pair





BY OWEN KAMPEN



The 46" plymate is designed for sport flying with a .15 to .19. The racy open cockpit aircraft has been flown with Rand Dual Pak and mini-digital. The Skyraker is a distinctive design that utilizes the Webra .20 with an option on engine size up to .40. Both models utilize the one-piece "folded" plywood fuselage construction technique.

Two previous RCM articles by this author, the "Plyguy" Oct. 1968, and "Windsong" March 1969, featured the use of 1/32" birch plywood for fuselage forming and, while both demonstrated exceedingly strong, reasonably light curved structures, the constructions were admittedly a bit difficult for one pair of hands. Here then, after over two years of development, is a new construction method guaranteed to produce results faster than anything short of a plastic almost ready to fly job. While the approach is unorthodox, it has been used successfully on several designs, two of which are presented here.

While quite different from each other in appearance, each is constructed by the same basic fuselage forming method, which with the advent of Devcon Five Minute Epoxy can be largely accomplished in a single evening. Like most "obvious" ideas, this one took a long time coming, and, in retrospect, it is now difficult to understand why the "obvious" wasn't obvious in the beginning.

As can be seen from the step by step photos, the method is simplicity itself, with the actual forming taking about as much time as it takes the glue to dry. No special skills or equipment are needed and the result is a sturdy, light, one piece shell which can be adapted to a variety of applications.

Sheets of 1/32" birch ply 1' by 3' or 1' by 4' are available from Midwest Products or Sig Mfg. Co., and cost about sixty cents a square foot which compares very favorably with balsa at today's prices. Other advantages include quicker finishing since the ply requires less filling and doping to achieve a high gloss finish. There is also a structural gain which is a by-product of the ply, itself, as the three crossgrained wood layers really resist splitting to a degree that must be seen to be believed.

Long life with a minimum of repairs and maintenance is the net result. You fly more — fix less!

Now let's look at the Plymate and Skyraker as flying machines, for essentially the "method" is really only a means to an end. Along the way some personal observations which have been gathering dust waiting for an appropriate moment for voicing will be thrown in for free, not in the spirit of controversy as such, but rather to stimulate some thought through a sharing of ideas.

The 46" Plymate is a sort of grown up "Skampy" with the general lines of

a racy open cockpit sport job, designed to take a lot of abuse and come back for more. The prototype was flown with a good Max .15 which was excellent for general sport flying, although takeoffs were a bit lengthy when the grass was long. Install a good .19 and the result is something else. There is enough wing area to take a .19 without producing a wild one which only Phil Kraft can tame, but for general sport flying the .15 is adequate.

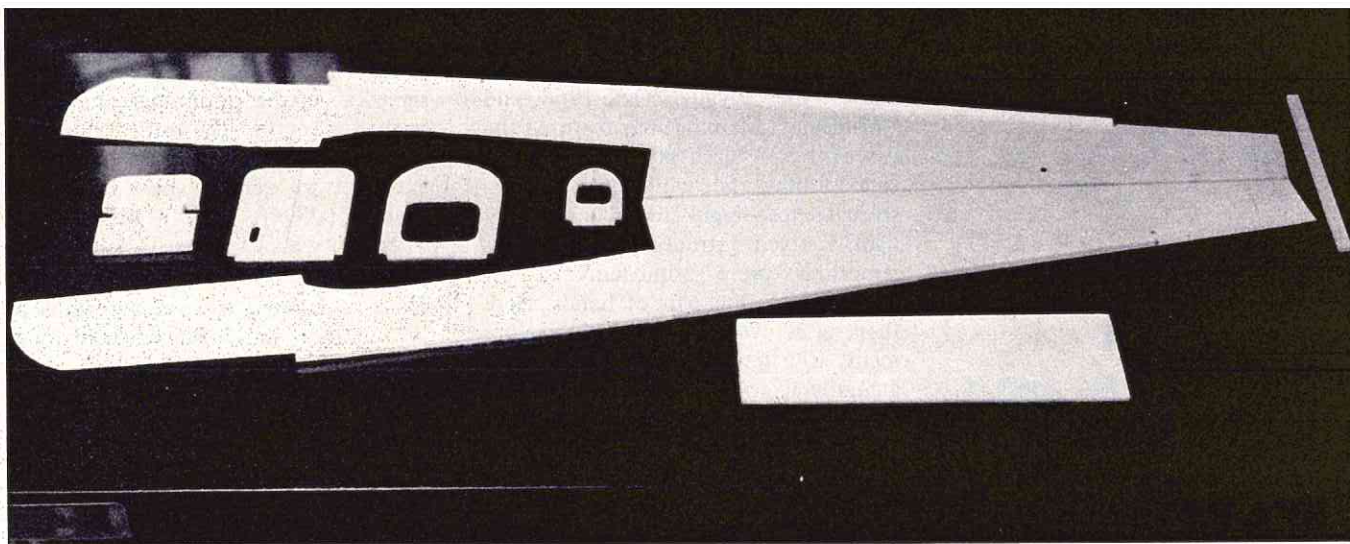
The original was equipped with a Rand Dual Pak now manufactured by Ace R/C. This fast-rate pulse-proportional system is about as good as you can get in a single channel rig, offering full proportional controls on rudder, elevator and motor through the output of two Rand servos. In the past there was some interaction of the elevators when a motor change was signaled but this has been beautifully solved with the introduction of the new ACE Commander fast-rate transmitter designed by Don Dickerson. Now full elevator control is available during motor control operation thru a bit of ingenious design which permits a small amount of signal to be transmitted to the decoder when the normally full-on or full-off signal is triggered by the motor control buttons. Four adjustable trim pots, a handsome vinyl case, and an adjustable Rand Control Stick make this a really respectable piece of electronic equipment. The whole airborne package is also from Ace R/C. Note: Other receivers may cause problems, so don't mix components.

The alternate option of small proportional gear is obvious and permits the addition of strip ailerons. Either system will do the job and you'll find the "Plymate" a rugged, dependable performer. Taildragger flight is really fun after a raft of tricycles and the plane has a nice sporty look. A season of rather rough treatment and it still looks like new.

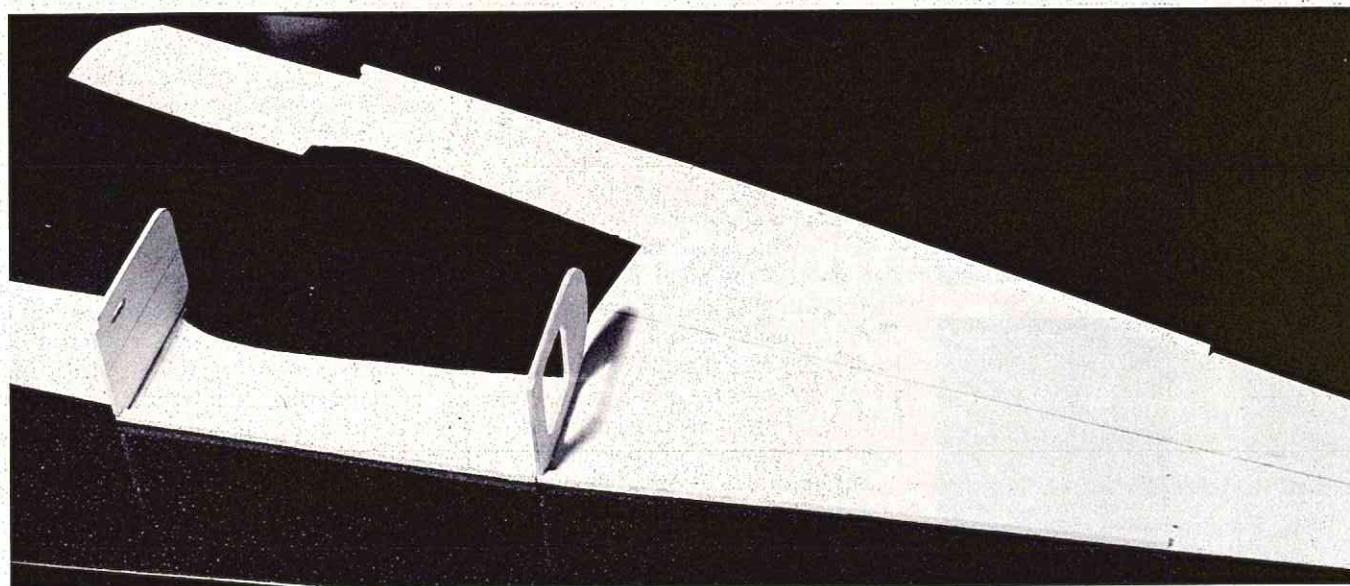
The "Skyraker" design has been built and flown in .02 and .09 sizes as well as this .20 version, and all have flown as well as the distinctive appearances would indicate. In this day of power and more power, designs tend to show a sameness, and even those with less than optimum qualities will work reasonably well by packing in more punch up front. As a modeler for whom design offers the challenge, the test has been to see how much can be achieved from how little. Here is

(continued on page 83)

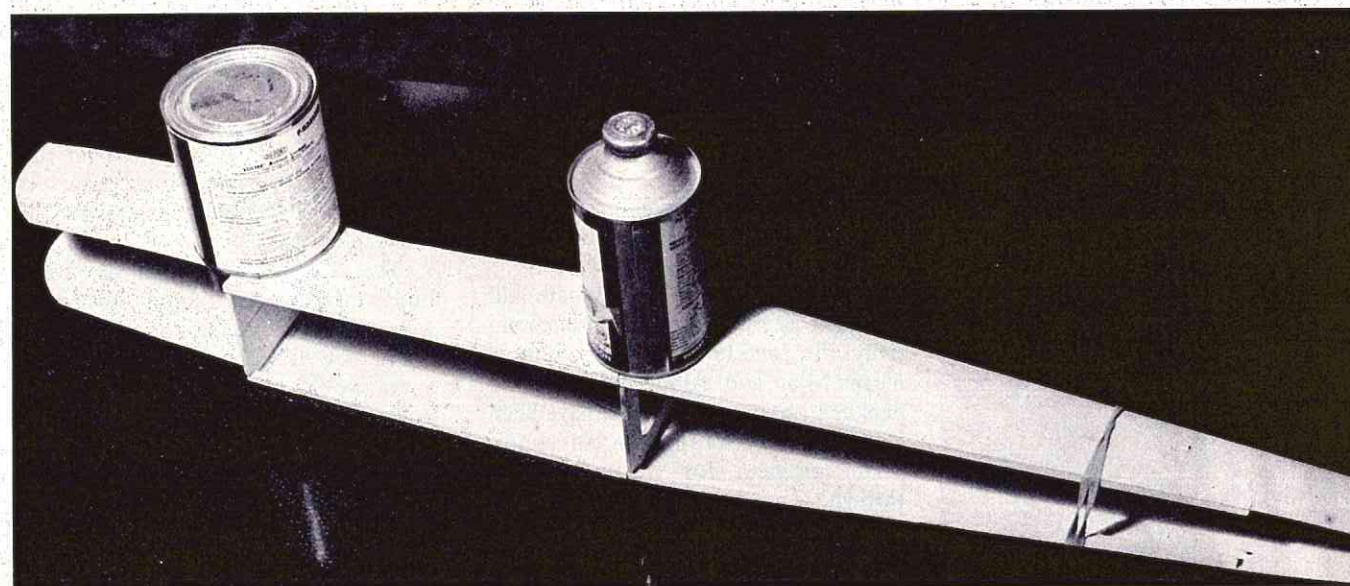




Here are the seven basic ply pieces cut out and ready to go. The longerons are already glued to the fuselage blank. Formers have been tested for proper fit. (See plan notes.)

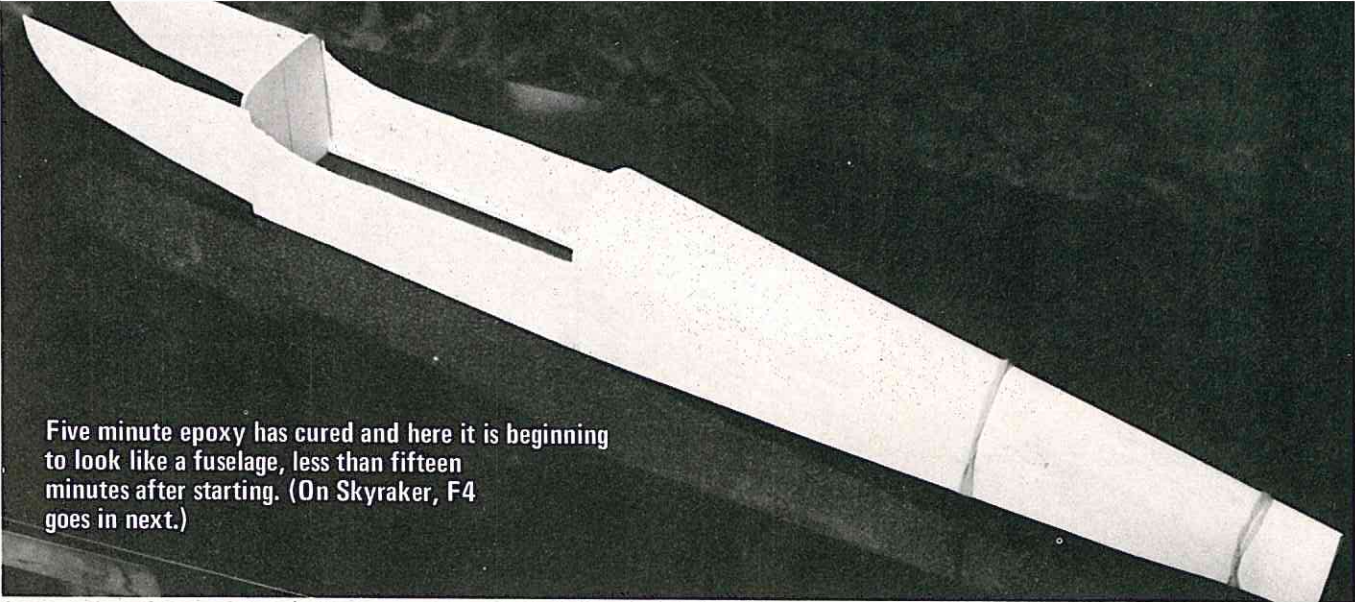


Formers F2 and F3 are in place at right angles to the fuse bottom and square to the blank.

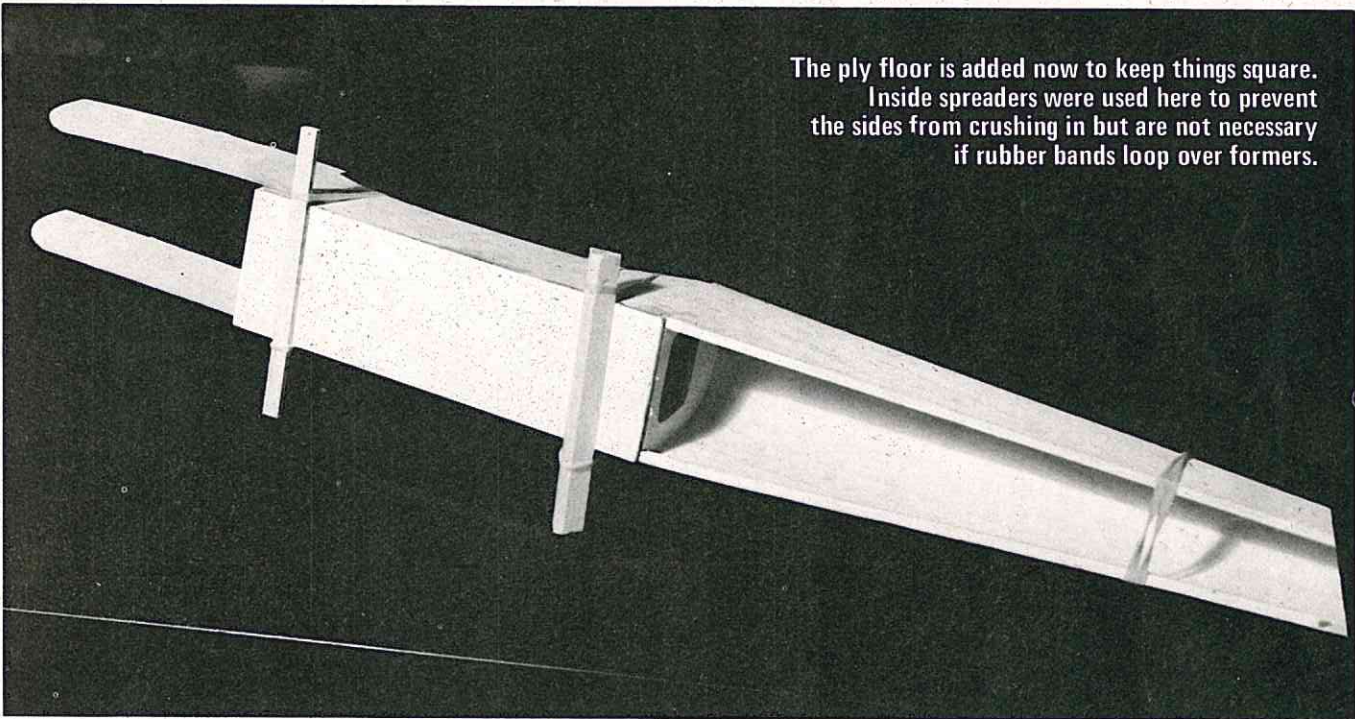


A sponge is used to moisten the outside of blank along the center where the blank is to be bent. Former fit should be finally checked before gluing. Weights hold it all while drying and a rubber band around the tail section keeps the blank from spreading. The longerons lock-fit into the former notches.

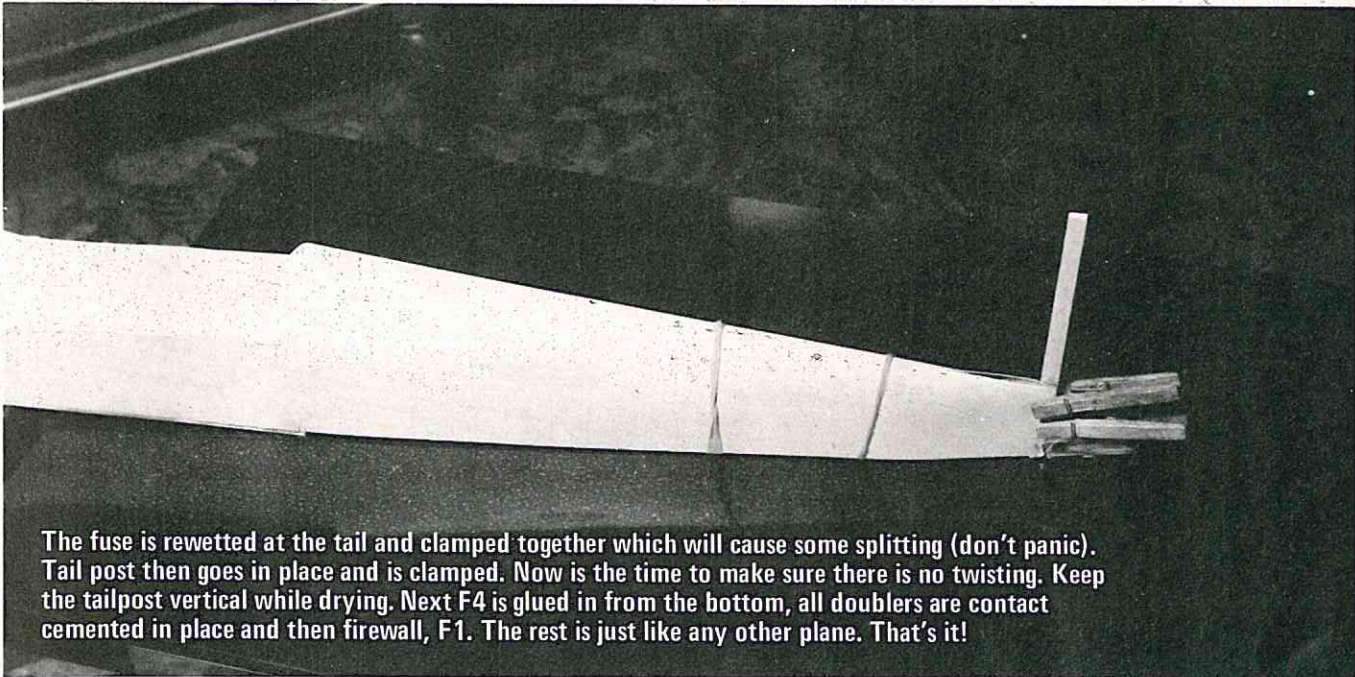




Five minute epoxy has cured and here it is beginning to look like a fuselage, less than fifteen minutes after starting. (On Skyraker, F4 goes in next.)

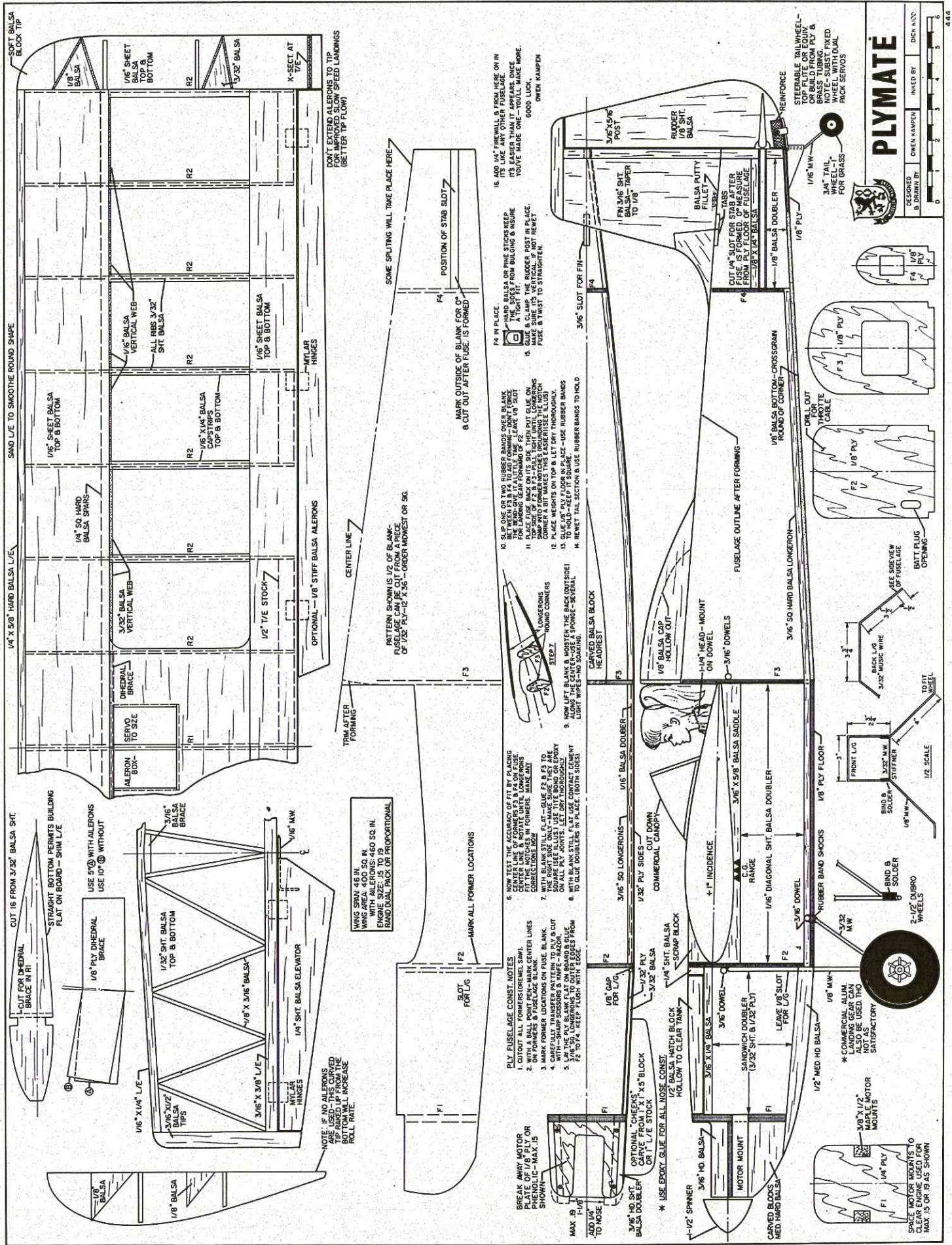


The ply floor is added now to keep things square. Inside spreaders were used here to prevent the sides from crushing in but are not necessary if rubber bands loop over formers.

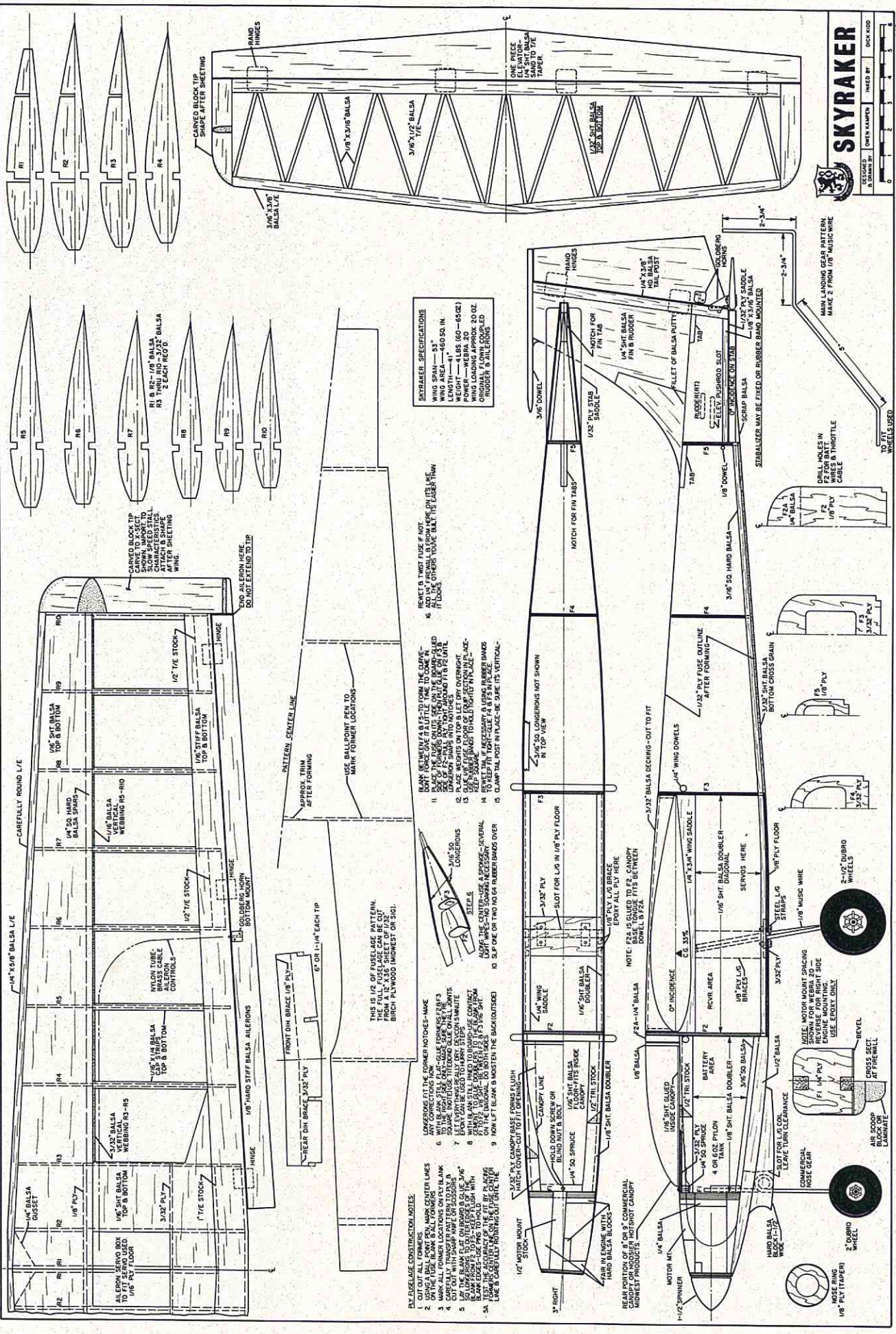


The fuse is rewetted at the tail and clamped together which will cause some splitting (don't panic). Tail post then goes in place and is clamped. Now is the time to make sure there is no twisting. Keep the tailpost vertical while drying. Next F4 is glued in from the bottom, all doublers are contact cemented in place and then firewall, F1. The rest is just like any other plane. That's it!









**SKYRAKER**

DESIGNED BY: [Logo]  
 DRAWN BY: [Logo]  
 CHECKED BY: [Logo]  
 DATE: [Logo]

0 1 2 3 4 5 6 7 8 9 10

INCHES

0 1 2 3 4 5 6 7 8 9 10

FEET



# THE WIDGET

By DAVID A. RAMSEY



**F**or over a year and a-half I have been flying Galloping Ghost very successfully, having built a few kits and a number of planes built from plans. For sometime now, I have wanted a plane that was of my own design, one that was attractive and a good flyer. I wanted a plane that incorporated all the features that I have enjoyed in other planes I have flown. Although my idea for a design was only to be for Galloping Ghost equipment, the R/C Modeler Magazine Design Contest pushed the design into reality and also made it big enough to accommodate the new micro-miniature proportional systems.

Some of the characteristics of the plane were that I wanted it to be stable and a smooth flyer, but give it the necessary pushes, and it would become acrobatic. (These pushes are only necessary with Galloping Ghost.) I wanted to be able to take my hands off the controls for a second and not have the plane fall out of the sky. It would also have to be fast at high motor, and have a nice glide at low throttle.

Since I am using Galloping Ghost to control my plane, there are certain compromises that will have to be made. The plane would not have a steerable nose gear, and the elevator throw would have to be cut down in order to get rid of the gallop and looping tendency while going through motor control. Since I am limited in ground handling due to the drag of a steerable nose gear on a Galloping Ghost plane causing too much battery

drain, I designed the fixed nose gear of the plane to be shorter than it might normally be. This shortening of the nose gear lets the nose of the plane be lower on the ground than it is when it is flying. The idea behind this is, that the nose of the plane will lift as the plane begins its takeoff, and the ship will then only be riding on two wheels. This will make it easier to steer with the rudder than if it was on three wheels.

The problem of the low motor loop was solved by incorporating a reducer. This is used in the Widget and enables the plane to maintain level flight while going through motor control. While reducing the elevator throw, I maintain enough elevator to aid in penetration, looping, and flaring for landings.

The size of the plane was determined by the ready made foam wing I had chosen. The two reasons I chose this type of wing were because of its simplicity of construction and it had a semi-symmetrical airfoil, which I have found very successful in maintaining turns, not to mention its penetration ability.

I chose the low wing because I felt it made the plane more maneuverable as well as enhancing the appearance of the plane.

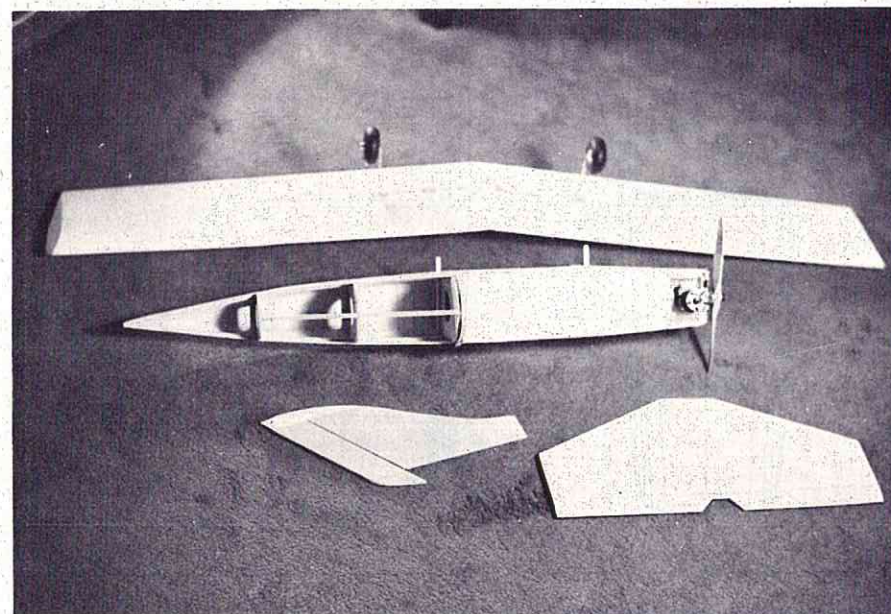
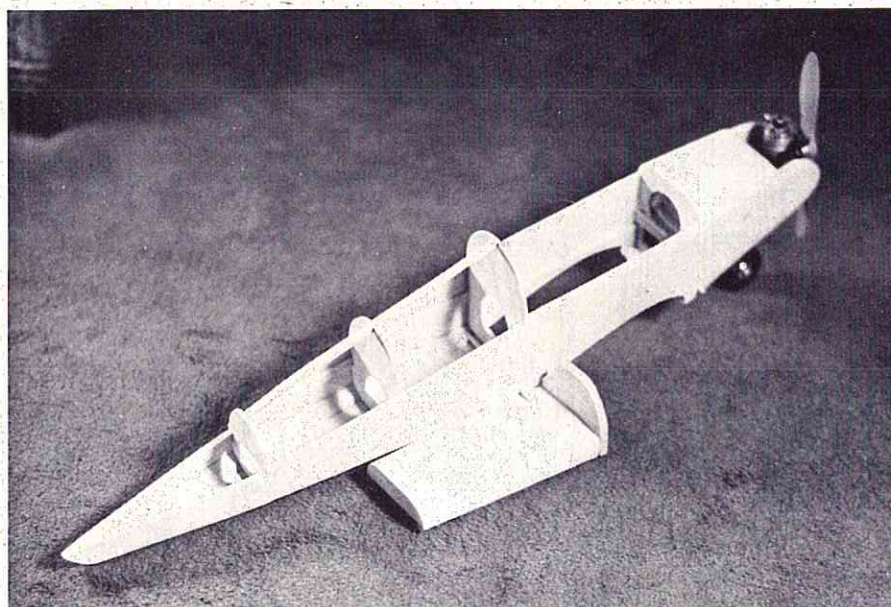
Both the nose and the stabilizer moments were shortened. The latter for the reason that while reducing the elevator area for Galloping Ghost, the tail would become more sensitive and the plane would fly faster. The nose moment was shortened to compensate

FOR GALLOPING GHOST,  
OR SMALL DIGITAL  
PROPORTIONAL, THE  
WIDGET IS AN  
ATTRACTIVE 44" SPAN  
LOW-WING DESIGN THAT  
IS IDEAL FOR SMALL  
FIELD SPORT FLYING.  
34 OUNCE WEIGHT  
WITH MIDWEST FOAM  
WING AND O.S.  
MAX .10.









for the reduction of the tail. The stabilizer was raised so that its lower surface rested on the thrust line. I chose to have a flat stabilizer since I have found it very effective and easy to trim if its incidence is set at 0-0.

### FLIGHT TESTS

The first flights were made on June 23, a beautiful clear day with winds averaging 8 miles per hour. The plane was fired up and the controls were given a final check.

On the first flight the plane was hand launched and it immediately headed for the ground, I pulled full up and the Widget climbed at about a 40° angle into the air. I let the elevator come back to neutral and the plane still continued to climb but at a slower rate. Full down was used for the rest

Here are some conclusions after flying the Widget: Hand launches must be very fast, so that the plane does not drop when thrown. The Widget, in a glide with no power on, is very sluggish and hard to turn. While the Widget is in this condition, full down must be held in order to build up speed and thus maintain control of the plane. When landing the plane it should be flared at the very last moment, because of its floating ability.

The Widget floats through the air very nicely, and fly-bys can be accomplished very easily since, at low motor, the plane loses very little altitude unless full down is held. High throttle is easily attained since there is no interaction when going to high motor. The climb rate of the Widget is very rapid.

### CONSTRUCTION

Fuselage construction was begun by cutting out all fuselage frames, fuselage side panels, doublers and wing triplers. The fuselage doublers were aligned over the fuselage side panels and epoxied in place. The next to the last fuselage frame (F5) was used to position the 1/8" x 3/8" longerons. I felt that these longerons would give more than adequate strength to the tail and yet maintain lightness. The 3/8" triangular strips were glued in position at this time.

When the fuselage sides were dry, the position of each fuselage frame was marked on each side panel. F2 and F3 were glued between the fuselage sides to form the "basic box" of the fuselage. Once the frames (F2 and F3) were squared up between the fuselage they were pinned in place. Wing triplers were also added at this time. When



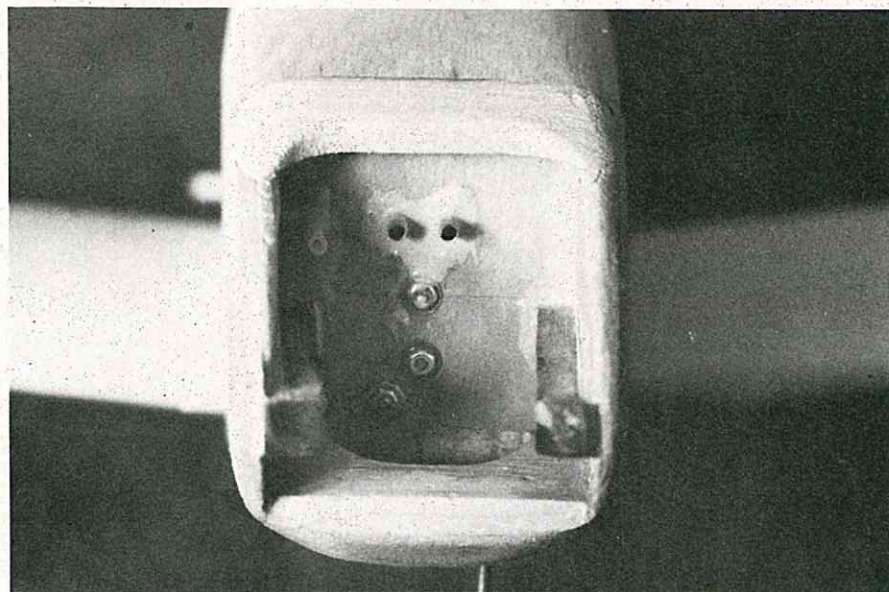
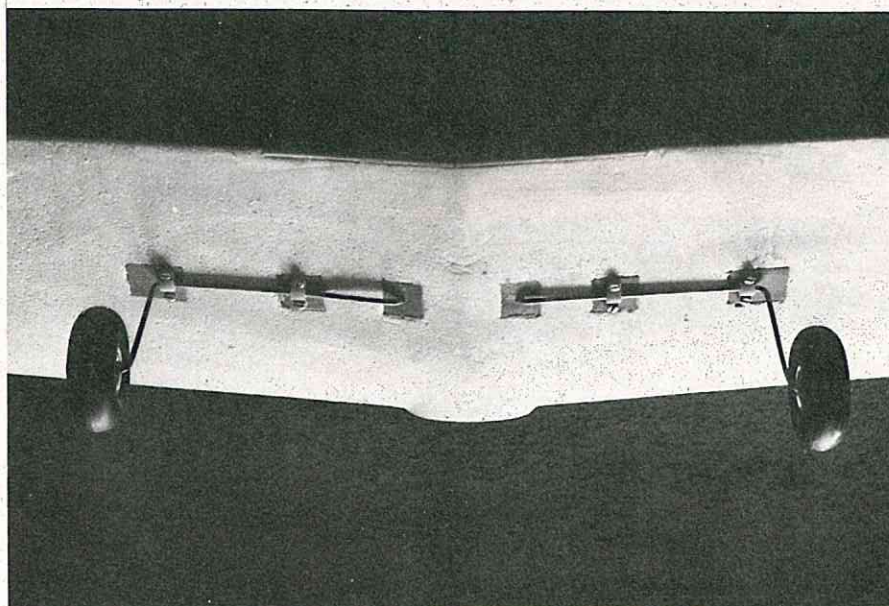
the previous steps had dried the fire-wall (F1) was glued in position with the fuselage sides squeezed and held tightly around the firewall with both rubber bands and pins. Epoxy was used for a strong joint. The 3/8" x 3/8" hardwood motor mounts were also epoxied in place, and the alignment was given another check. When everything was dry, frames 4, 5, and 6 were glued in place, the fuselage sides were pulled together, and held in position with rubber bands and pins. When the fuselage was dry, steam was used to ease the tension at places along the fuselage where it was pulled together over the frames. The next step was to install the spars along the tail of the fuselage and then sheet the tail with 1/8" x 1/4" balsa strips.

The forming of the wing fillet was begun by first covering the center section of the wing with wax paper. Next, the basic shape of the fillet was cut from 1/32" balsa and glued to the fuselage and conforming to the shape of the wing. Before the base of the fillet was glued to the fuselage, the wing was rubber banded in place. The fillet, itself, was made from Epoxylite. Because of my preference for a rubber band mounted wing, the fillet is not as effective as it could be, since a correct fillet continues past the trailing edge of the wing. If Cam-lock fasteners were used the fillet would have been made in this manner.

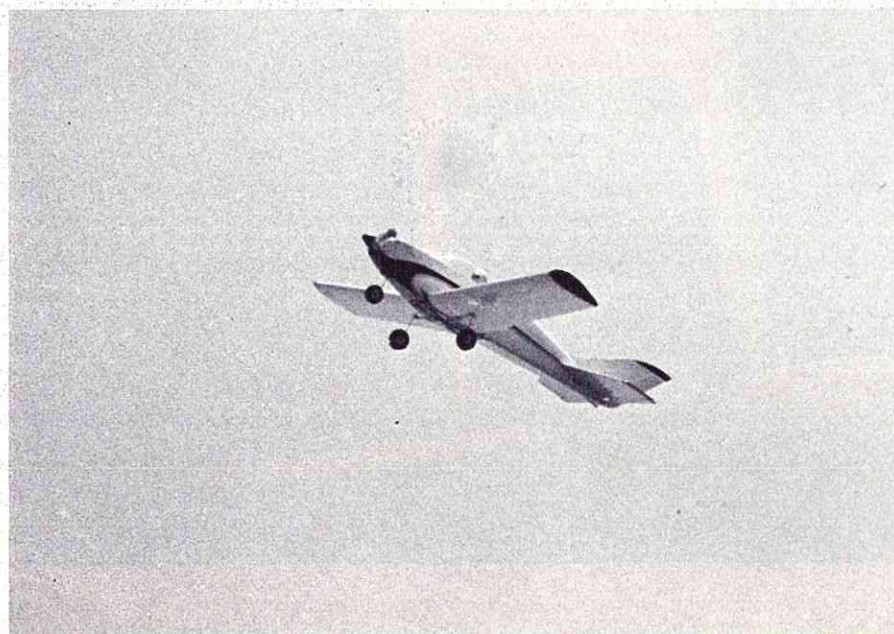
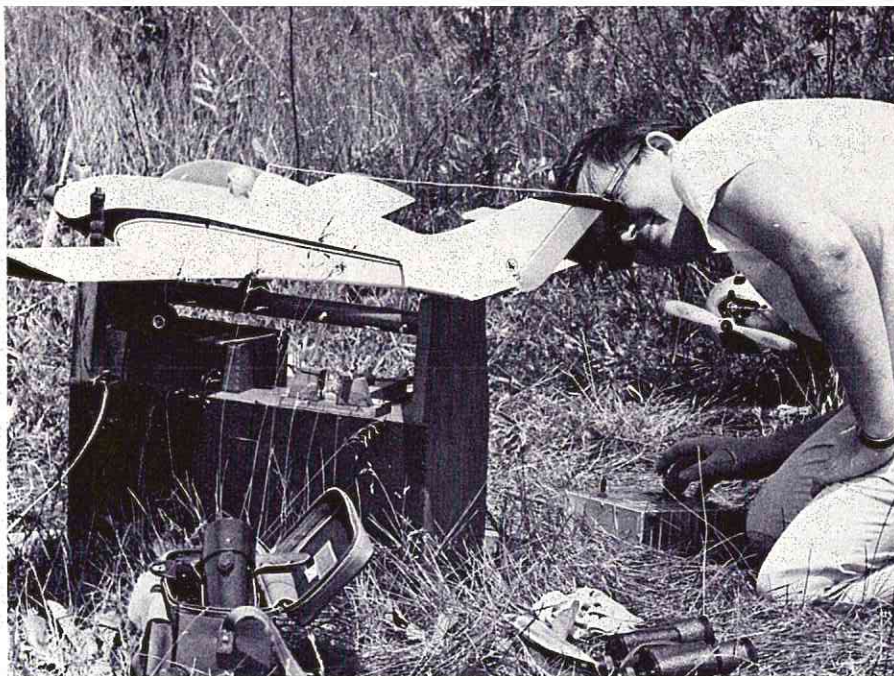
The OS Max-10 was pre-installed in order to locate the throttle cable and tubing. After drilling holes for the tubing, the throttle tube was epoxied in place. The nose gear was installed behind the firewall. The 2 oz. gas tank was fitted in place, and holes drilled in the firewall for the fuel line tubing. The gas tank was glued in position with epoxy around the tubes holding the tank in place against the firewall. This method of installing the gas tank isolates the tank, battery, and radio compartments from any gas leakage. The gas tank is fairly simple to remove at any time by twisting the brass tubes and thereby breaking the epoxy bond, and the tank can then be withdrawn from the fuselage.

All fuselage blocks were installed with the exception of the hatch and the tail blocks. The hatch block along with the head rest, was then put together and fitted.

Due to the holes cut in F2 for the gas tank and batteries, a 1/8" x 3/8" piece of plywood was glued behind that frame between the holes to stiffen it.







The stabilizer was built directly over the plans and sheeted with 1/16" soft balsa. The elevators were cut from 1/4" x 1/2" trailing edge stock and joined together with a 1/8" dowel. Small brass washers were epoxied in place where the control horn would be mounted to act as stiffeners. Nylon hinges were used to hinge the elevator to the stabilizer, and 1/16" wooden dowels were used to hold the hinges in place.

The fin and rudder were cut from 1/8" balsa, and nylon thread hinges used to fasten the rudder to the fin. The bottom piece of the rudder was made with a piece of plywood to act as a stiffener for the rudder control horn.

Before going any further I temporarily installed my GG actuator. Pushrods were made, installed, and pushrod exits cut. The actuator and pushrods were then removed.

Next, the stabilizer was sanded and glued in position. The tail blocks were sanded to shape and glued in place supporting the fin in the middle.

The wing was of a ready made type, available from Midwest, or the wing used in the Testors Skyhawk can be used. If the Testors wing is used, the airfoil notch in the fuselage will have to be changed in order to accept that wing's airfoil.

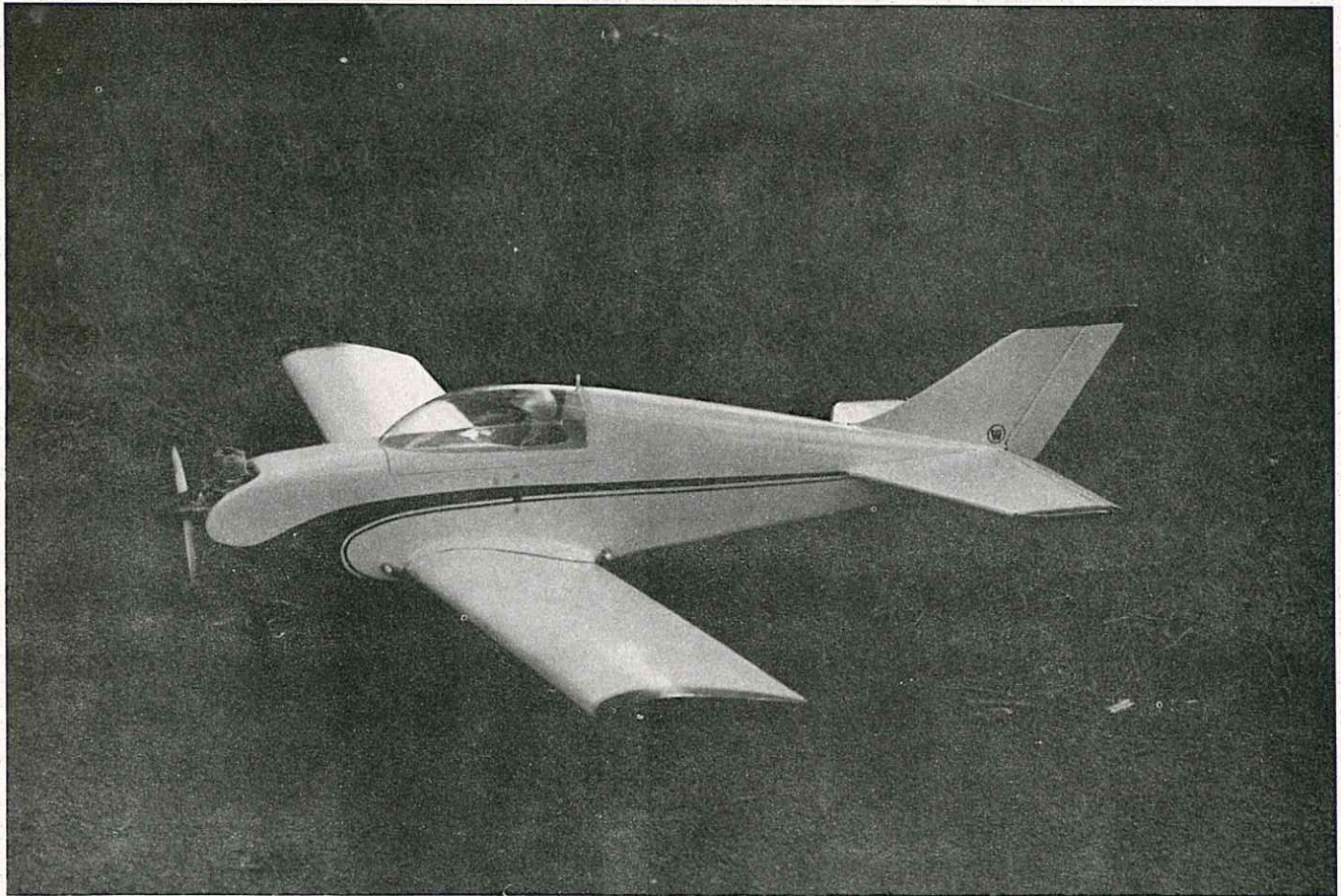
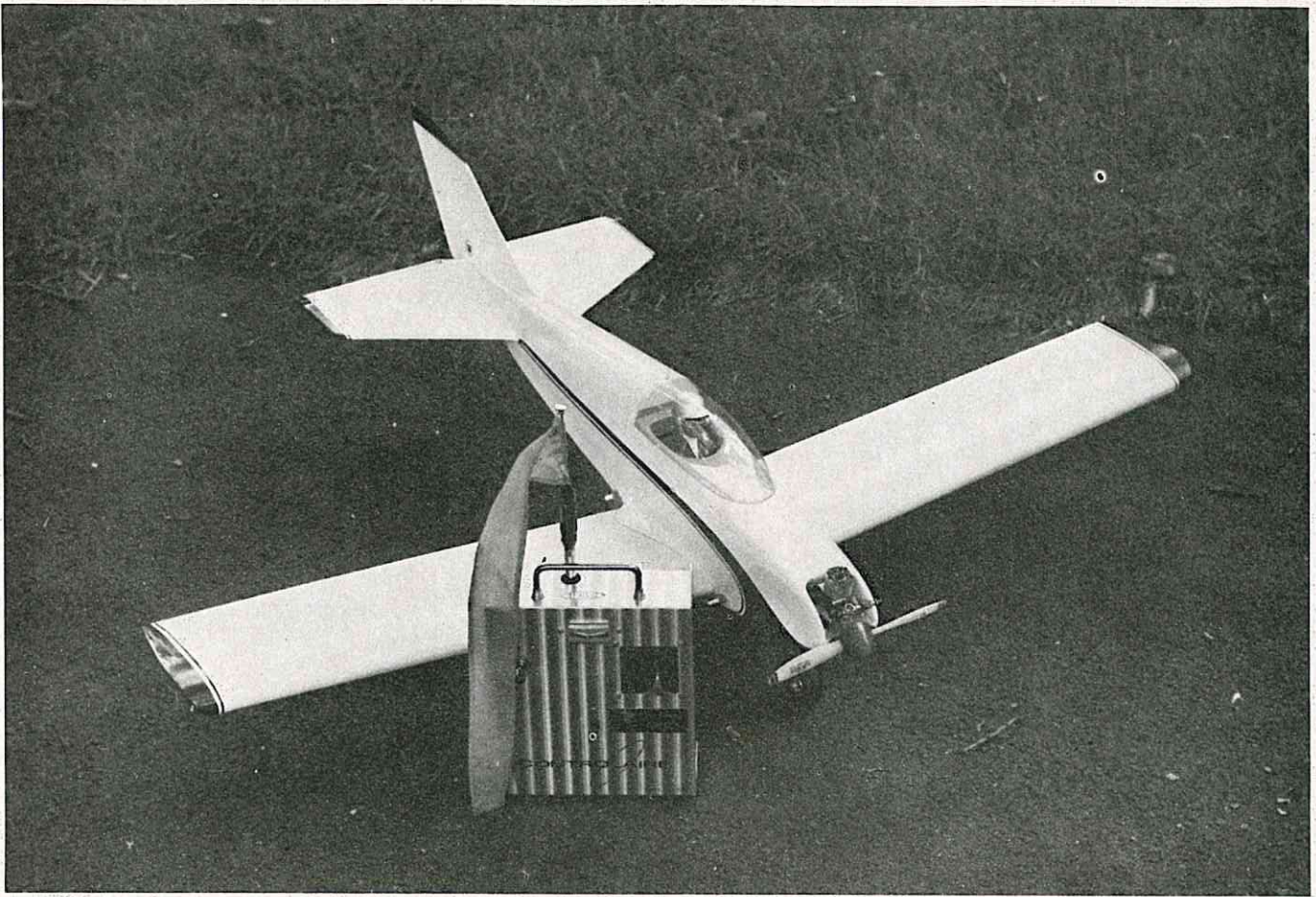
Before the wing was finished the main landing gears (3/32" wire) were bent to shape. The gear was located 1/2" behind the center of gravity. Each gear was mounted on three 3/4" x 3/4" x 1/2" thick hardwood blocks, which were glued into slots cut in the wing. Each gear was mounted to these blocks by use of Midwest landing gear brackets and 1/2" self tapping panhead screws. 1/8" dowels were epoxied to notches cut in the trailing edge near the root of the wing to protect the trailing edge from the pressure of rubber bands.

The finishing of the wing was done in the following manner: The wing was first sanded with fine sandpaper to remove all flashing and all shiny areas. White glue will not stick if the wing is not sanded. To cover the wing I used medium but dense tissue paper, the type that is supplied in Carl Goldberg kits.

Next, Elmers glue thinned about 50-50 with water was applied to the wing then, while the glue was still wet, I laid on the wet tissue. After the tissue had been pulled tight and the air bubbles worked out, I applied a

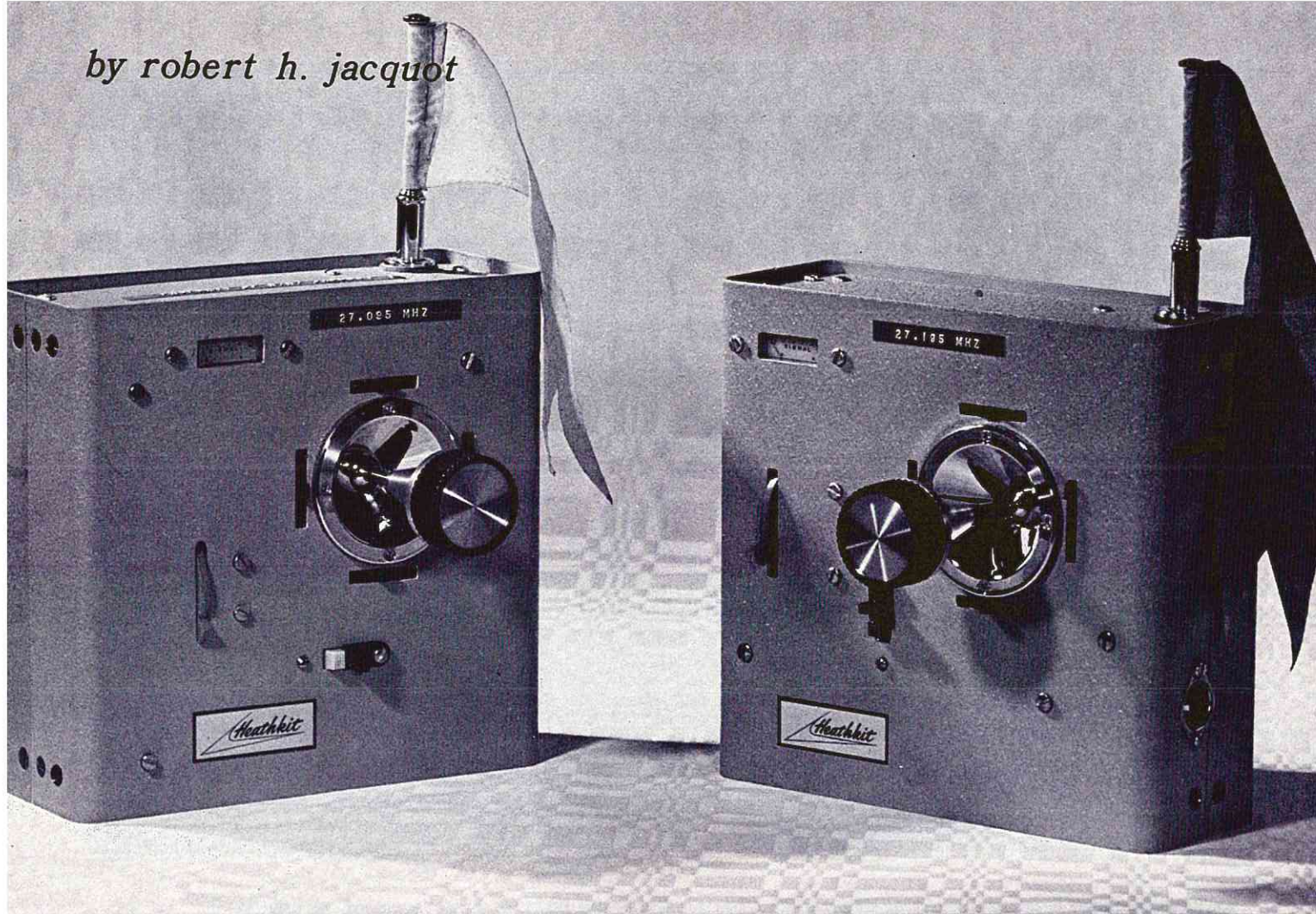
*(continued on page 76)*







by robert h. jacquot



The only outward difference between the converted GD-47, on left, and the GD-19, on right, is the slight differences in switch and meter locations. Both units are very functional and beautiful.

## SINGLE STICK HEATH

### *A Short, Do-it-yourself Article on the Conversion of the Heathkit Transmitters to Single Stick Configuration*

"The new Single Stick Heathkit?" Well — yes and no! These two modern looking transmitters are certainly Heathkits, but just an old reliable GD-47 and a new GD-19, both face-lifted and modified to take the Kraft 3 axis stick . . .

There seems to be a growing number of flyers that prefer the single stick to the two stick configuration, for a number of reasons, mine being that it more nearly simulates that of the real aircraft and, besides, I've never been too good at rubbing my stomach and patting my head at the same time! Therefore, in my uncoordinated state I need a control that I can handle with one hand . . .

This conversion started out as an

exercise to determine the feasibility of converting the GD-47 at low cost . . . the results were so successful that I built and converted a new GD-19 as well, and it has succeeded far beyond my expectations.

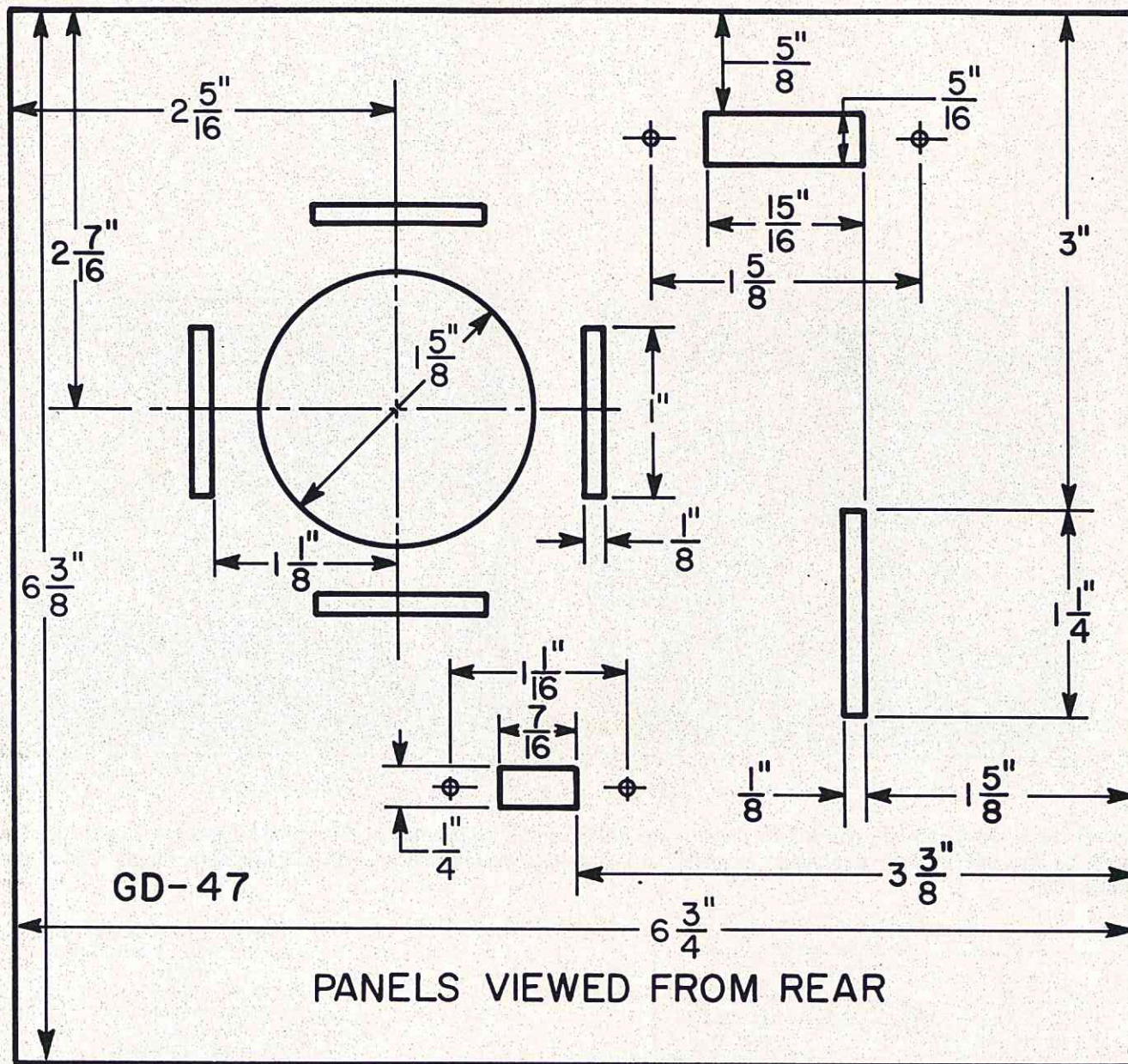
The conversion is really relatively easy to do and involves hardly more than cutting a few holes for a new front panel and connecting up the potentiometers on the new stick in place of those on the old sticks.

Due to the large round battery of the GD-47 it becomes necessary to relocate the encoder board along one side to give clearance for the larger 3-axis stick. This is not necessary on the GD-19 because with its flat battery there is so much room that about all

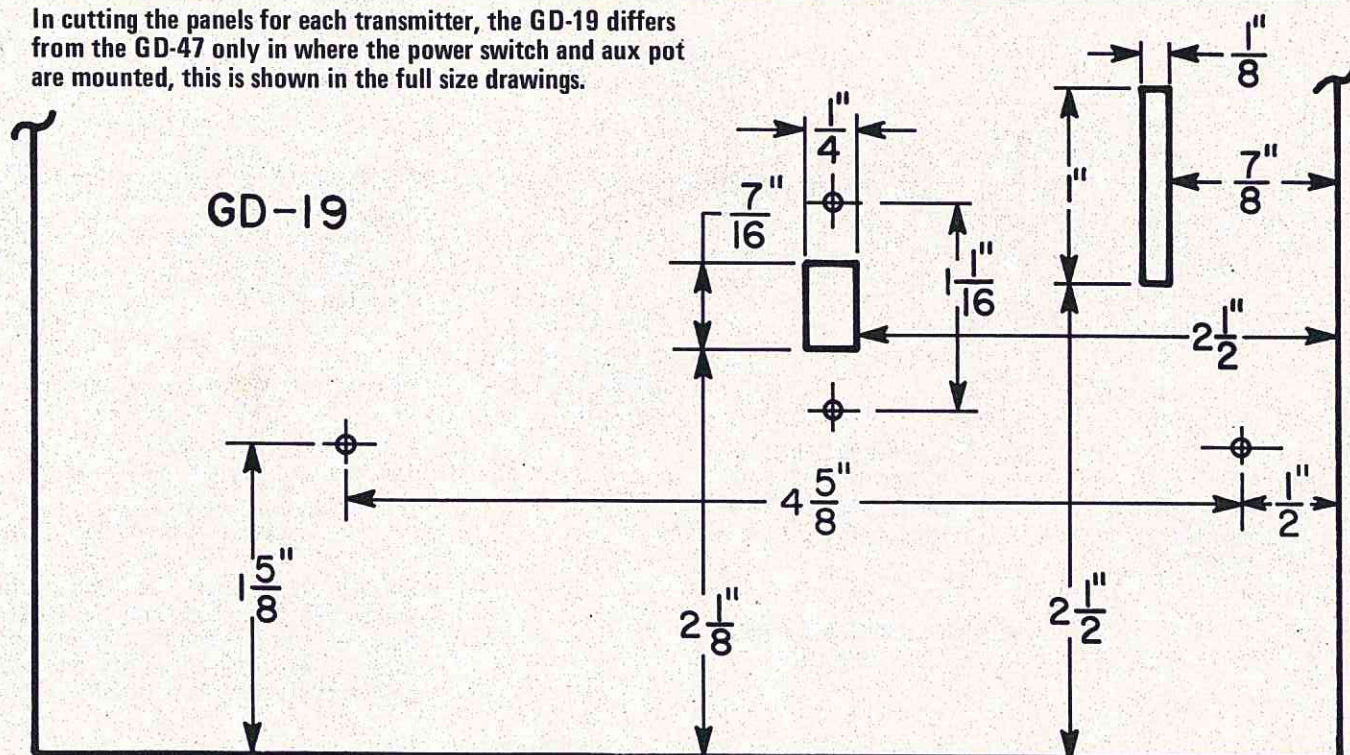
that has to be juggled are the locations for the meter, the power switch and, of course, the throttle pot. The accompanying drawing shows hole locations for my two transmitters, but there is nothing firm or critical about these positions and they can be located according to your own wishes.

One of the very nice features of working with Heath products is that they will supply replacement parts at a very nominal cost. In making the new front panel, a replacement back panel was ordered (they are identical in size) and cost about 70¢. The holes were cut out using drills and files, working carefully so that the finished product would be as attractive as a factory built job. The largest monetary outlay

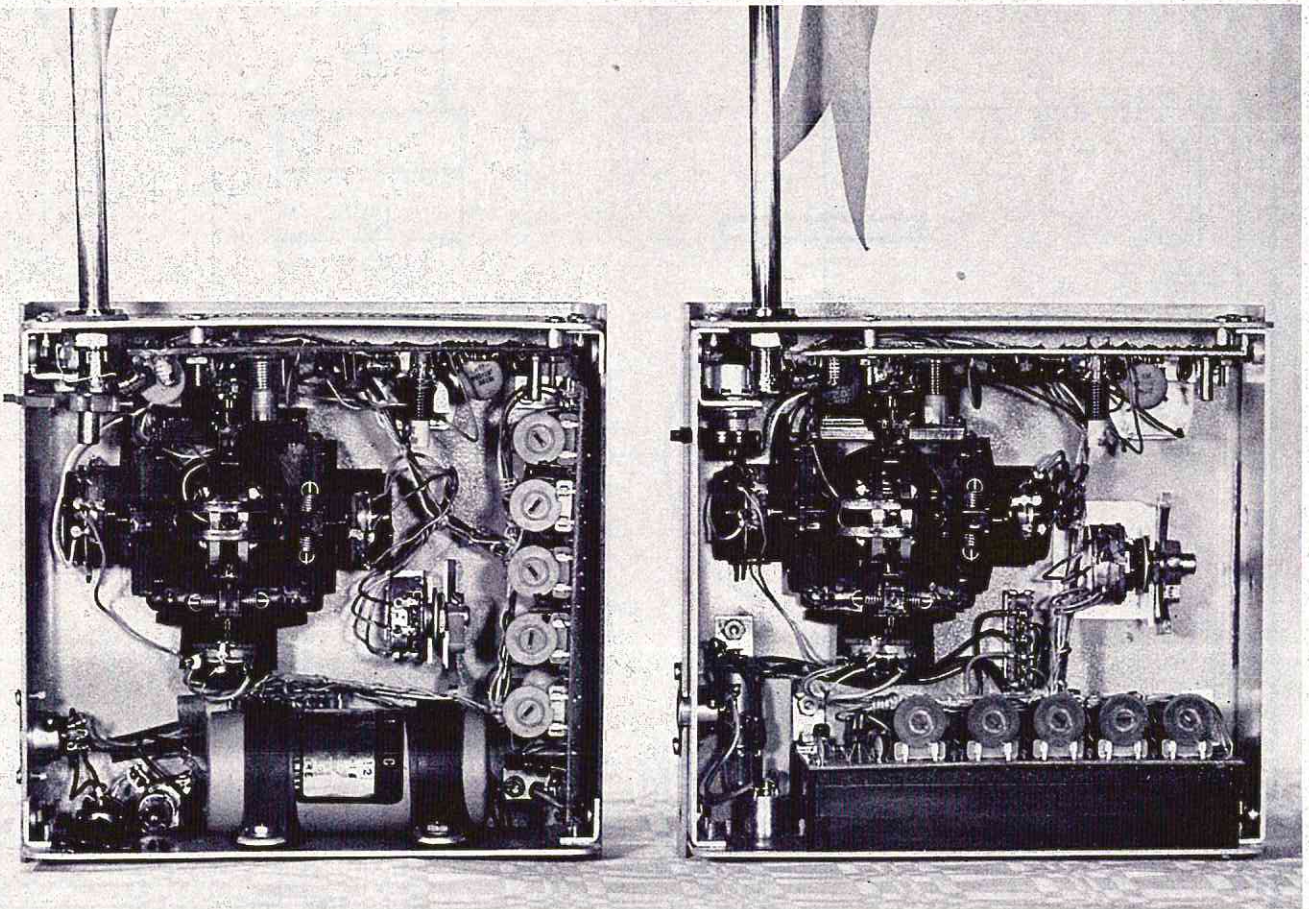




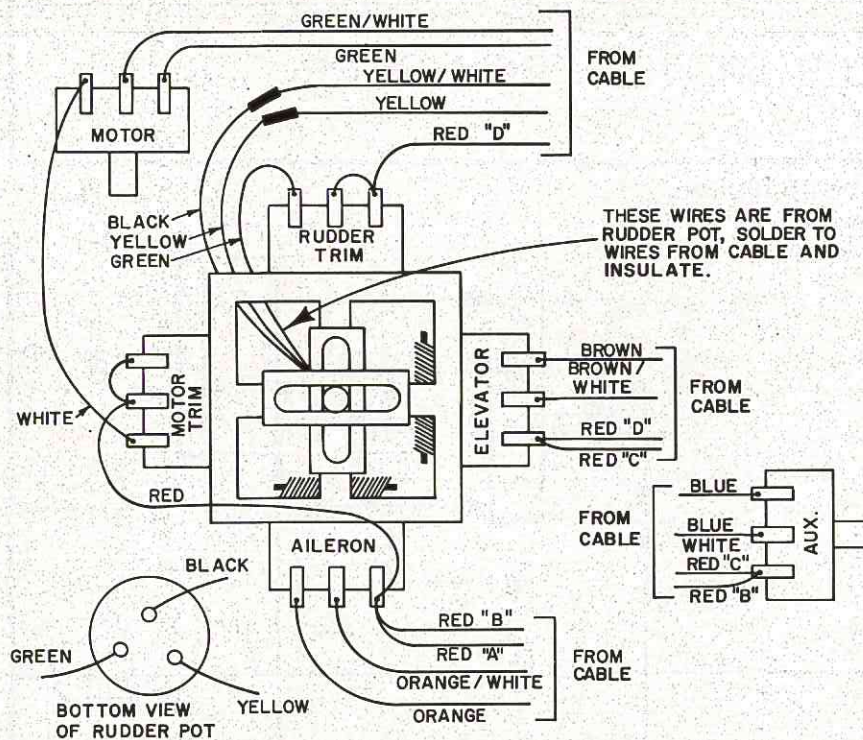
In cutting the panels for each transmitter, the GD-19 differs from the GD-47 only in where the power switch and aux pot are mounted, this is shown in the full size drawings.







The converted GD-47 on left, and GD-19 showing the differences in the location of the encoder board and throttle pot. The socket on the side of each transmitter is merely a low voltage charging socket and not necessary for the 3 axis stick modification.



WIRING DIAGRAM FOR  
3 AXIS STICK

#### PARTS LIST FOR HEATHKIT 3-AXIS STICK CONVERSION

GD-47	
1 ea 10-230 5K control	\$ .55
1 ea 204-787 Control Mt. Bkt.	.10
1 ea 252-7 control nut	.05
1 ea 254-4 control lockwasher	.05
1 ea 90-366 Cabinet back	.70
1 ea 204-922 Meter Mt. Bkt.	.10
1 ea 462-299 Thumb knob	.60
1 ea 266-145 switch stop	.15
1 ea Kraft 901-016	
3 axis stick	39.95

Color coded wire . . . . .

GD-19	
1 ea 5k Control (10-230)	.55
1 ea 204-787 Control Mt. Bkt.	.10
1 ea 252-7 control nut	.05
1 ea 254-4 control lockwasher	.05
1 ea 90-427 Cabinet back	.90
1 ea 462-299 Thumb knob	.60
1 ea Kraft 901-016	
3 axis stick	39.95

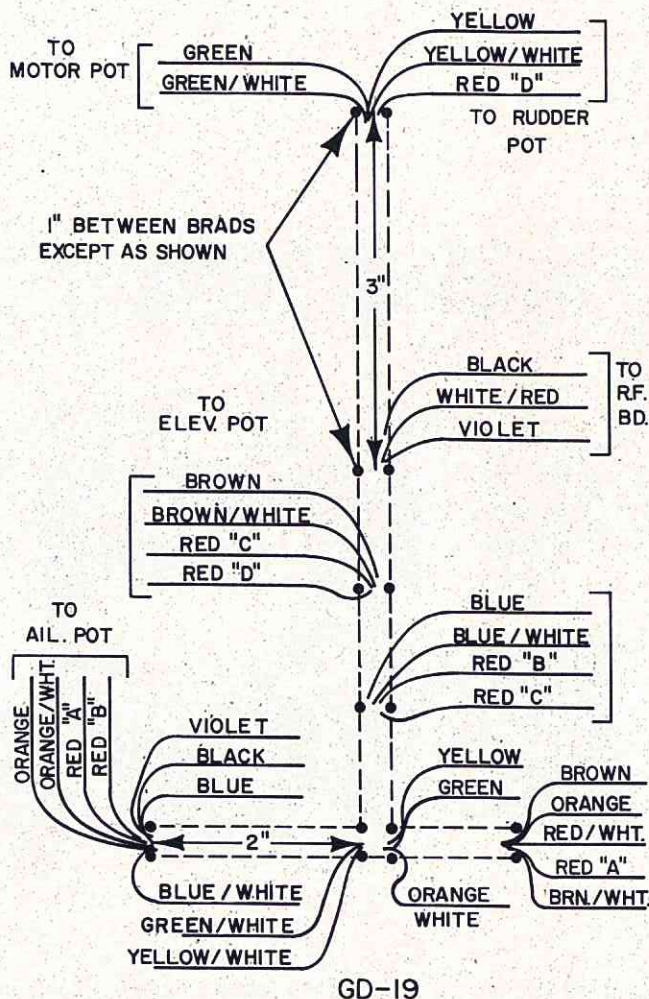
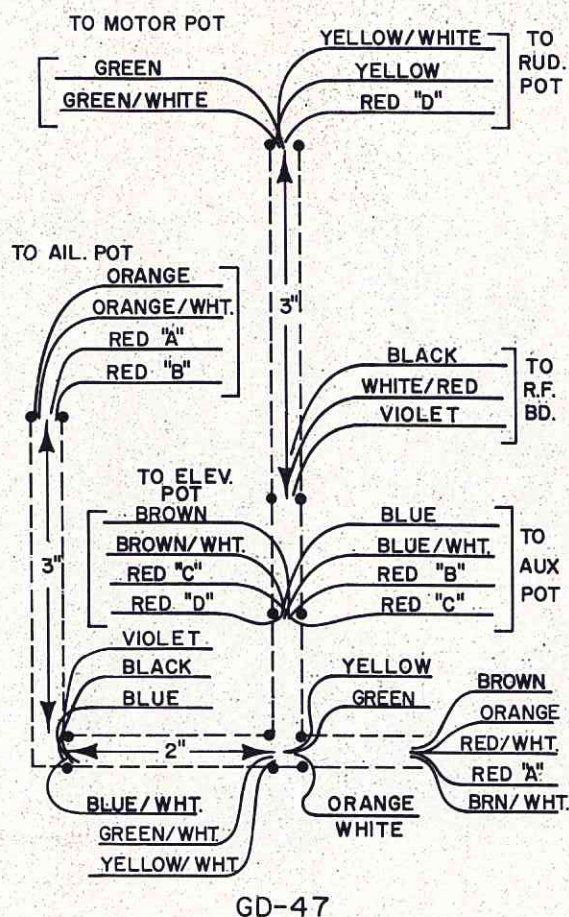
Color coded wire . . . . .

All Heath parts can be ordered from:  
Heath Company  
Benton Harbor  
Michigan 49022

The 3 axis stick can be ordered from:  
Kraft Systems Inc.  
450 West California Ave.  
Vista, Calif. 92083

Special care must be taken in connecting the wires from the rudder pot to those coming from the cable... be sure all joints are not cold-soldered and then insulate well.





All wires are threaded from point to point with the exception of the red wires. These may double back in some cases so that the B+ is carried to all positions. Each red wire is labeled with a letter, merely thread point to point, as before, leaving about 3" on all wires free at each break-out. When all wires are threaded bind with waxed cord and know every 1" or so.

on this conversion is the Kraft 3 axis stick, which is available direct from Kraft Systems, Inc., at a cost of \$39.95 complete with all pots and mounting hardware . . .

In wiring the new stick, it differs from the basic Heath instructions only in that, with this single-stick arrangement, the rudder pot is placed on top of the stick and the throttle pot is placed anywhere it is convenient to operate with your left hand (right hand if you are a south-paw). With these two pots being separate, the trim functions must be, and are, performed with auxiliary pots wired in series with the main control pots. The hook-up is shown in the accompanying drawing.

With the GD-47, the bottom plate is flopped end-for-end and all the parts remounted, putting the charging socket on the left side (looking from the rear) providing clearance on the right side for mounting the encoder

board vertically. (This is not necessary on the GD-19.)

Due to the relocation of some of the parts, your original wire harness cable will no longer be able to reach all the components. While it is possible to solder extensions to each wire, this is not advisable. The best approach is to make a new wire harness cable from the proper color coded wires, which is not at all difficult to accomplish. By following the pattern for a jig in the accompanying drawing, and driving brads in a board leaving about  $\frac{3}{8}$ " of the brad above the board, you can then thread the various wires thru and bind them together with waxed cord knotted about every inch or so. A look at the original will illustrate how it is done.

There is really only one word of caution necessary and that is; if you ever think that you will want Heath to work on your transmitter, then forget

the whole thing because Heath warns that they will not accept for repair, or work on any unit, that has been modified. However this shouldn't bother most people since almost any independent repairman in the business would work on it providing your work was neat and professional.

If you've been wanting to update to the single stick configuration, then this is about the most economical way to do it. The Heath transmitter, properly built, is acknowledged to be among the very best and, if you've wanted a new "mini" system, take a good look at the new GD-19 receiver, and also the mini servo kits such as the Royal and World Engines people offer. You needn't sell, give away, or relegate the old Bonner sticked GD-47 to limbo, just update it and you'll have a real conversation piece at the flying field with your "1970 Heathkit Single Stick".





Line-up of winners at RCM's First Annual Fun-Fly Championships hosted by Ft. Worth Thunderbirds.

R/C MODELER MAGAZINE'S 1ST ANNUAL

# FUN-FLY CHAMPIONSHIPS

**Scores smashing success as the Ft. Worth Thunderbirds host unique national contest for sport fliers only.**

**BY JERRY KLEINBURG**

Fun-fly contests have been around for a long while. But the fandango hosted in Texas by the Ft. Worth Thunderbirds and sponsored by R/C Modeler Magazine — the 1st National Fun Fly Championships — had a fresh appeal to it we haven't experienced lately.

Perhaps it was the spectacular straight-up climbs of the birds as they went for spin altitude. Or, maybe the gyrating flat descents that gave ample time to really see the anatomy of a spin. Or, perhaps the close attention everyone — including other contestants — gave to each flight that made the difference. Then again it could

have been those 17 rounds of flying that did it . . .

Whatever the causes, the first National Fun Fly was a memorable success, one that the contestants and visitors will be talking about for a long time to come. Chuck Cunningham, Helmer Johnson, Bob Lutker, Johnnie Casburn, Jim Simpson and the rest of the Ft. Worth Thunderbirds had the meet running like a tuned Offenhauser masterpiece, the weather cooperated magnificently, and the setting at tree-lined Benbrook Lake gave the outing a picnic atmosphere. Frosting on the cake was the pile of original trophies picked up by the winners and

merchandise shared by just about everyone. Needless to say, everyone is looking forward to the next one . . .

Here's a rundown on the winners and their scores . . .

Ed Alexander	289 ( 98 spins)
Gary Clay	256 ( 96 spins)
Jerry Harbert	239 ( 90 spins)
Bob Langley	235 (100 spins)
Bill Sharp	231
Harold O'Daniel	229
R.L. Howard	199
Helmer Johnson	176
Floyd Idom	175
Jim Simpson	175

<b>Juniors</b>	
Kim Johnson	197
Eddie Campbell	152
John Davis	125
Wayne Leverett	124





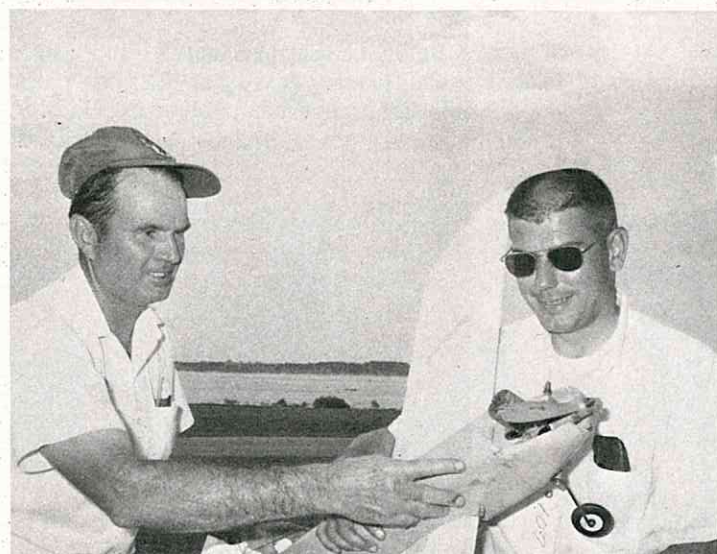
Left: Ed Alexander, 1970 Fun Fli Champ with O'Daniel Special. 600 sq. in., 4½ lbs. Fox 59, Monokote. 98 turns. Below: Spin technique. Harold O'Daniel shows crossed controls which flattened spins, increased score. Harold 6th at Nat'l Fun Fly. New spin knowledge gained . . .



Fun-Fli hi-jinks. Bruce Brown and Alex Perez take exception to "Sam Slovanovitch" (alias Chuck Cunningham) stapling ident tag to their Dart Cart III.



Kim Johnson flew RCM Instructor to Jr. win. Dad Helmer was speechless, almost! Enya 60, Logictrol. 197 points . . .



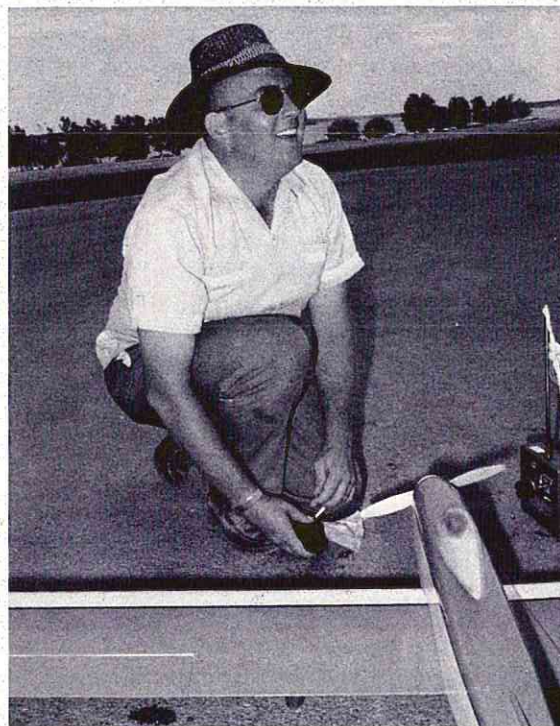
Above: Jerry Harbert (r) gets Ed Alexander assist after 3rd crash. Jerry persisted, 3rd with 239 points. W. Virginia RC'er member of Valley IFO's. Mile's Master ship 5 lbs. Citizenship radio. Right: Typical Fun Fli climb 600' in 30 seconds. Bandito was Dart Cart with boxed fuselage.



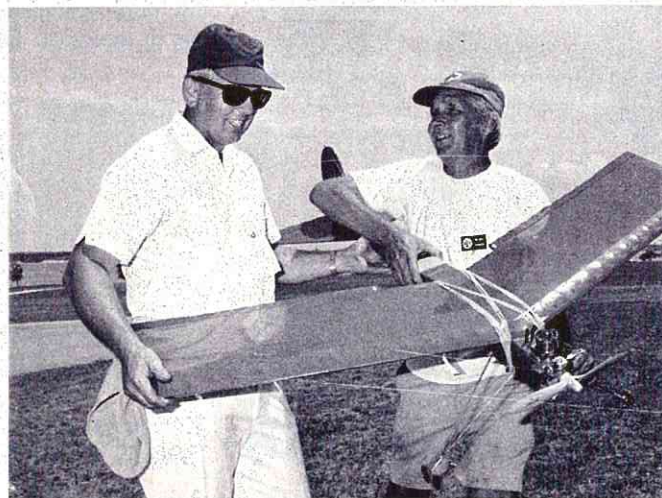




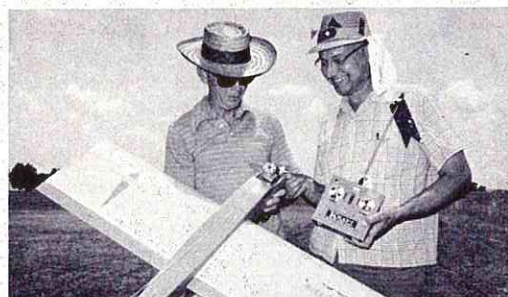
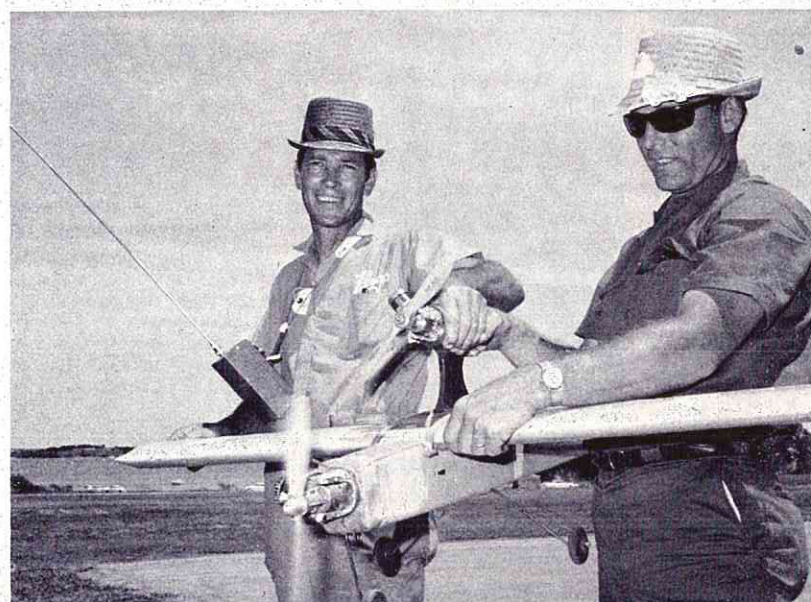
**Above: Gary Clay and 2nd place Sweeper. 4½ lbs. Fox 59, Logictrol. MonoKote. Bob Lutker assisted. 96 turns. 256 points. Tough competitor. Right: RCM's Sunny Jim Simpson flew Kwik-Fli II to tie for 9th place at 1st Nat'l Fun Fli. Veco 45, Logictrol, 4½ lb. ship covered with MonoKote.**



**Bob Langley heads for spot. Precision landing feature of Fun Fli. Perfect weather helped. Scene, Benbrook Lake, south of Ft. Worth, Texas.**



**Bobby Langley and typical Fun Fli ship. Light, low wing loading, capable of flat spins, quick rolls. Bob, spin champ, 100 turns officially. Helmer Johnson helped.**



**Left: Floyd Idom brought strapped-on twin from Hobbs, N.M. Fox 59 and Fox 40 on 4½ lb. bird. Logictrol. Stan Britt assisted. Floyd tied for 9th place. Above: Duke Fox checks Bandito by Bill Sharp. Box fuselage helped hold ST 60 in place, reduce vibration. Perry carb, Kraft radio. 3½ lbs.**

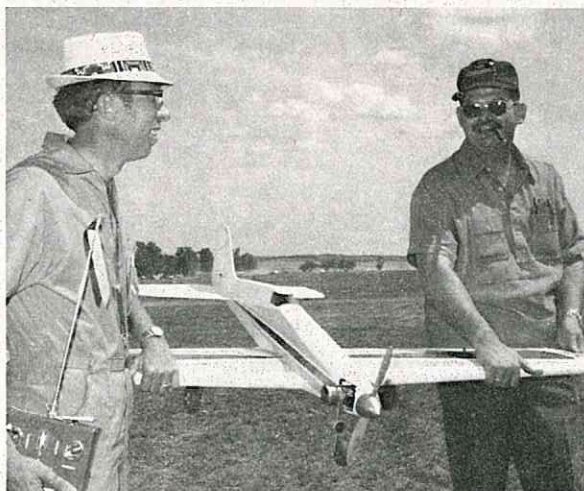




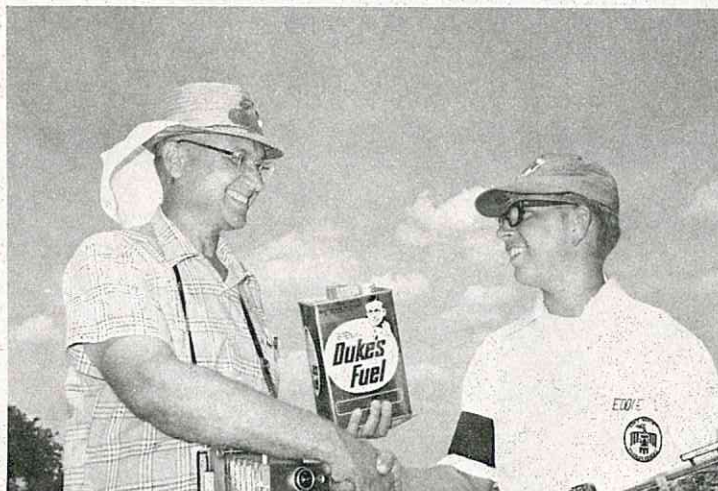
Left: Gene Thurber has his Dart Cart high. Ship favorite at Fun Fli. 3½ lbs., Veco 61, Perry carb. Charley Powell, Jerry Mrazek, and Harold Lowe supplied musical interlude for Saturday dinner.



Saturday night dinner drew large turnout at Nat'l Fun Fli meet. Comedy and music featured.



Max Blose and Tarman (RCM, Sept. '69) were aided by Chuck Reisinger. Broken arrow RC'er had Enya 60, Micro-Avionics in 7 lb. bird.



Fox, all the way. Eddie Cambell won gallon of Fox fuel for his Ugly Stik powered by Fox 59, Fox plug. Fuel given by Thunderbirds to lucky fliers.



Left: Johnnie Casburn and "Fun Fli Special." An ARF kit by Casburn Model Engine. 600 sq. in. Veco 61 and Kraft. Foam wing and polished vinyl covering. Nice. Above: Jane Johnson bestows crash armband. On the left arm meant multiple crashes. Flat spins brought on dorks, light damage. Bill Hickman qualified.





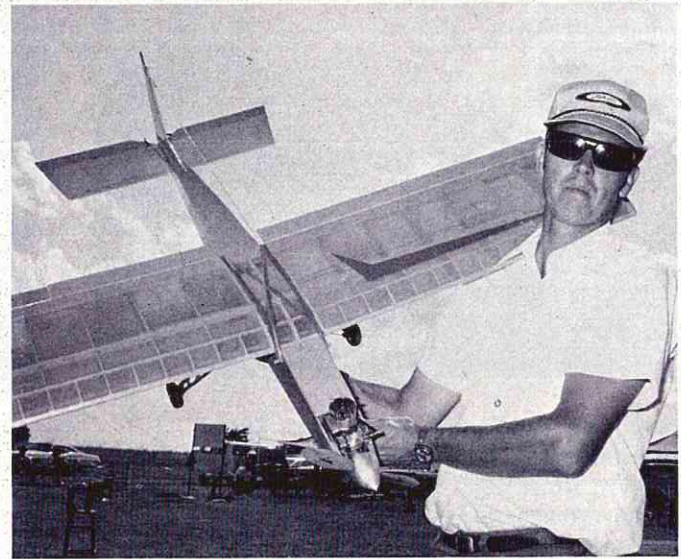
**Jerry Mrazek and Scamper original. Won Logictrol propo set raffle at Nat'l Fun Fli. Talents include mean banjo plunkin' . .**



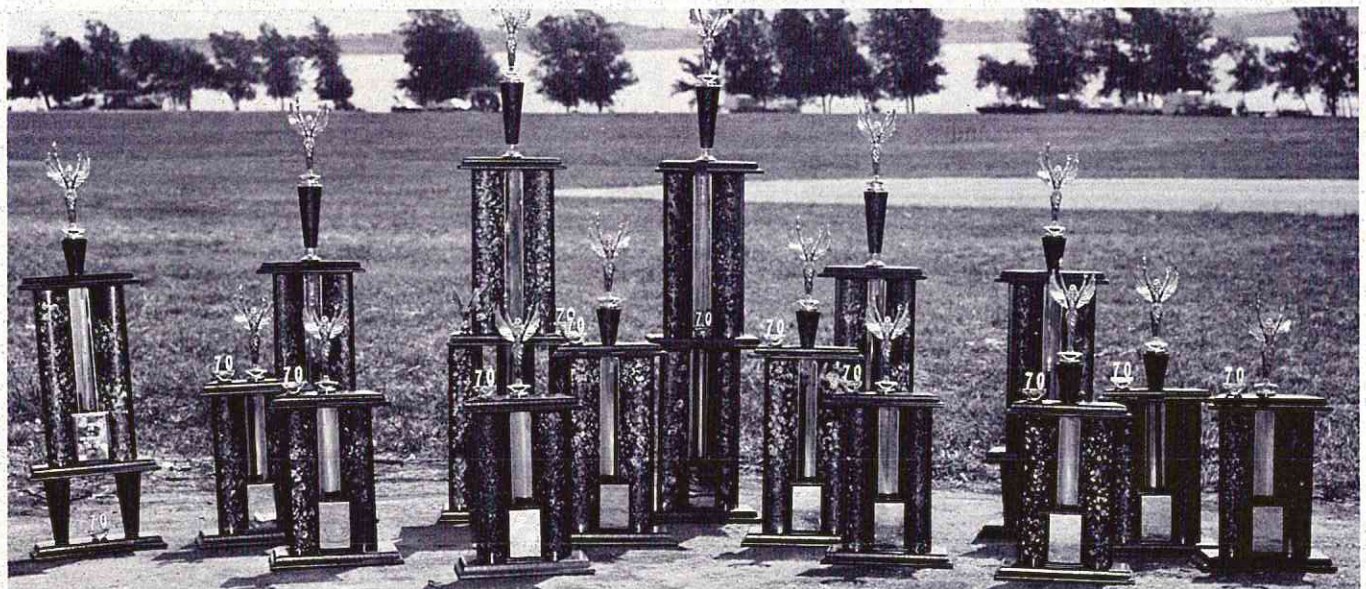
**Clay Price (r) found Trainer Master right for Fun Fly. Flew 17 rounds. Ship 5½ lbs. Veco 61 Perry. Clay Comm. of Gen'l Dynamics Rec. Assn. Johnnie Casburn helped.**



**Close. John Davis bounces Dart Cart III off of spot during round at 1st Nat'l Fun Fli. Lots of flying for 4 lb. bird. Enya 60-Perry. Kraft.**



**Gary Clay and spare bird. Ugly Stik wing with flaps. 40% CG location. One flap used to create flat spin. Did 96 turns. 4½ lbs. MonoKote. Logictrol.**



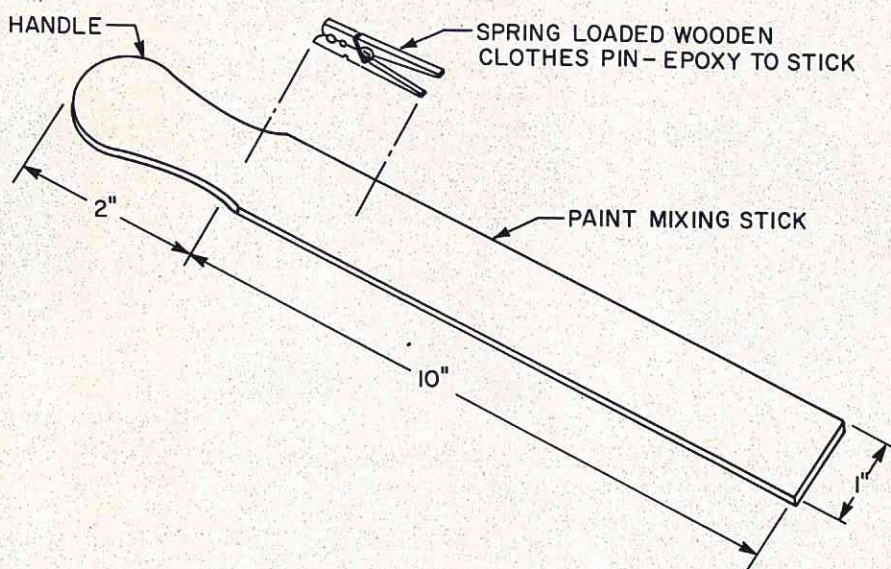
**Trophies lined up at 1st National Fun Fli. Photo by George Rodgers.**



# FOR WHAT IT'S WORTH

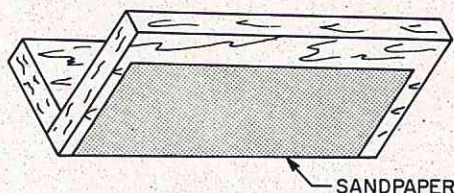
George Pack, of Clarence Center, New York, has a remedy for the problem of paint lifting as you peel your masking tape from you newly sprayed model. Instead of paint masking tape, George suggests using commercial drafting tape since it is not as sticky thus reducing the chance of a paint lift. Clear dope sprayed over the tape before the color application to prevent bleeding is not necessary if you roll the edge of the drafting tape with the side of the handle of your X-Acto knife. The pressure from the handle causes the tape to stick very tightly reducing the chance for bleeding.

Dixon Kodama, of the Kapiolani RC Club of Hawaii, suggests the following method for field frequency control. The matter of using colored spring-loaded clothespins was discussed, but this method left something to be desired in the matter of visibility at a distance. Also, the matter of such a small item being "forgotten" on somebody's transmitter antenna and taken home was also a consideration. The problem was solved with the use of paint mixing sticks obtained without cost at the local commercial paint store. These sticks are made out of what appears to be pine and have a smooth slick surface ready for painting to the desired frequency colors or ready for instant MonoKote. Those made for the club were painted with colored dope and visibility has exceeded all their expectations. It was found best to cut the sticks into 12" lengths and a spring-loaded wooden clothespin epoxied 2" from the handle end for proper balance. The clothespin is used for clipping on to the radio antenna and also on to the pin board when not in use. For the master pin board, a four pronged wooden shaft spear (commonly used for night torching in Hawaii) was drilled out at the top to accept a 3/8" dowel. At the field the spear was stuck into the ground, the dowel through, and presto — instant pin board. The paint sticks, with this modification, are light and do not disturb the balance of the transmitter when pinned to the thick section of the antenna. The added visibility at the field saves much time



trying to track down the "other fellow" with your frequency color.

One of the handiest tools you can have in your workshop is a "sanding square." This is simply a sanding block as shown in the sketch. The garnet paper is glued directly on the face of the block. Several are useful but the handiest one is one with 80 grit garnet paper on it. The best use for this tool is for squaring the ends of stock in order to be truly square. It is difficult to cut a piece of balsa over 1/4" thick on the square in all directions, so usually a couple of strokes with the "squaring block" will make the end true. John Hancock of Rhodesia, Africa, who suggested this idea, usually puts the piece of balsa to be sanded on a cutting block thus getting it up off the table. One can vary the height of the block on which the balsa is placed as the paper begins to wear.



Bill Aldridge, of Nae Nae, New Zealand, uses fiberglass resin to laminate 1/16" sheet balsa together to form the tail section of his pylon racer. The balsa is cross-grained, and gives an extremely strong and warp-free surface with the added

bonus that the resin gets right into the pores of the wood and a sharp trailing edge can be produced with no lifting of the wood fiber. Incidentally, Bill has rolled his pylon job end over end during a couple of rough landings with absolutely no damage to the tail surfaces, proving the strength of this construction method. This usage of fiberglass resin is also excellent for block laminating since there is no joint line. Finally, the resin sets off and hardens right through the laminate at the same time so one does not have the problem of soggy, soft glue in the center of a joined block which sometimes takes days to harden.

## HAVE A BETTER WAY?

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MODELER MAGAZINE, P.O. BOX 487,  
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*"Es bildet ein Talent sich in der Stille..." / (Genius develops in quiet places...)*

GOETHE

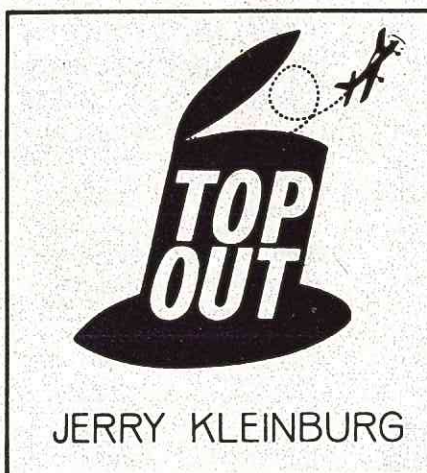
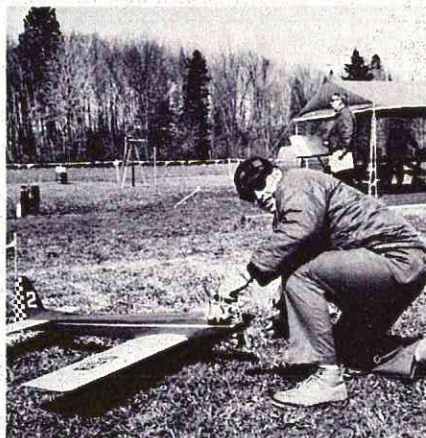
## THE FOREIGN DESK

RC action is in full swing just about everywhere at this time of the year. In these pages we've focussed on the U.S. scene, but to check elsewhere let's take a fast globe-girdling trip through the foreign mail basket...

### CANADA

**Sault Ste. Marie. UGLY** is the word for one of the earliest contests each year seen in the Provinces. It doesn't necessarily refer to the weather, but rather to the Upper Great Lakes Yearly, as Nino Campana is careful to explain frequently. Weather, however, does often play a big part and it takes a hardy and dedicated group to stage AND participate in the annual affair. This year was no exception but the May contest came off anyhow with as large a turnout as usual. After making it through the "brittle" weather, rain and high winds, Gary Putman of Lake Orion emerged as Grand Champion of the 2-day affair. Gary placed 1st in Class B Pattern, Pylon, and Limbo in taking the top spot. Other winners were Jean Nadeau in Class A, George Estes in Class C, Leonard Roe in Class D flying his original L'oiseau, and Bud Nosen took Scale with an impressive AM-1 Martin Mauler that dropped bombs and fired rockets in flight which went off on impact with the ground. Rather impressive. ("They" tell us Bud's U.S. Nat's contending scale ship is a P-47 to absolute scale with operating wing and cowl flaps, electrically operated canopy, in-flight

**UGLY Meet Grand Champ...** Gary Putman 1st in B, Pylon and Limbo in Sault Ste. Marie annual. Taper wing Kwik-Fli versatile...



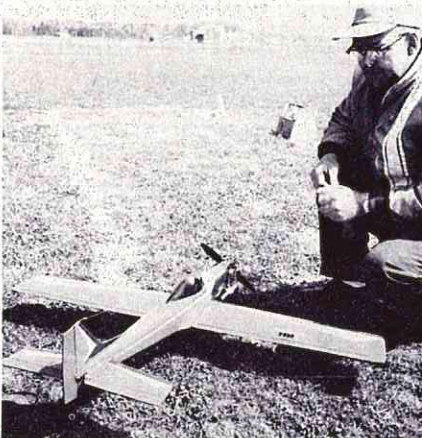
**RCM Trainer (July '68) by Jack Moisley** is year-round flier. **OS Max 35** with a Kavan carb does fine in sturdy basic ship.

ordinance delivery, working lights, scale control hinging and rivets, and a built-in starter! Competition beware...)

While on the subject of Scale planes, here's a thought or two on the subject by Herr Nino taken from his ever-popular N/L GLITCH, entitled "Scale, Beyond Chauvinism". (He means without prejudice...)

"Because of the very effective propaganda generated by military circles,

**1st in D-Expert at Soo meet** was Len Roe and original L'oiseau. **Enya 60** and **KO muffler**. Popular in mid-west.



scale modelers have tended to favour three nations for attention — namely Britain, USA, and Germany. At that, the planes with the greatest exposure get the greatest interest, such as the Spitfire, Hurricane, Me-109, P-51 and P-47, plus trainers.

"Other countries also developed fascinating aircraft, some with unusual features. Fokker didn't quit after the D-VIII in WW I; he decamped back to Holland and began building more fighting machines. He got up at least to the D-XXVII, and also built F-VIII's with one and three engines. Poland and Czechoslovakia, Sweden and Finland came up with some interesting machines. France and Italy were contenders for aeronautical honours. The Russians and Japanese produced some notable birds too. And let's not forget Canada's contributions...

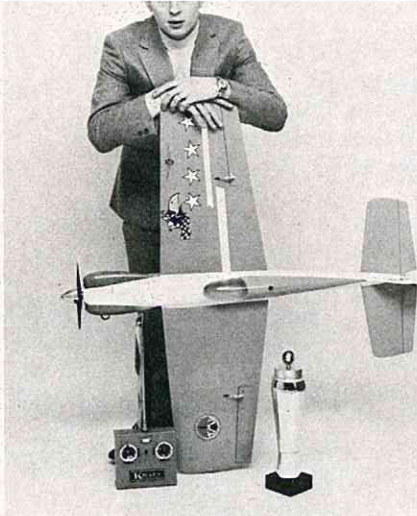
"Regrettably, we N. Americans have neglected foreign machines in favour of those we have come to know best in terms of contact and exposure. This came to my attention quite forcibly when I received the Italian equivalent of Profile Publications, called 'Aeroplani d'Italia'. It's published by Giorgio Melocchi of Italy, and possibly in an effort to redress the imbalance, concentrates on Italian planes. Don't go 'way, yet. Although the text is in Italian and the measurements are metric, the books are excellent for a scale modeller's purposes. The books are profusely illustrated and feature at least two sets of 3 views, one being a large fold-out occupying 8 sheets when unfolded. This large plan is rife with detail.

"There are all manner of aircraft described. Let's mention a few: My own favourite — the Breda-Pensuti Triplane, very simple and at 1/6th scale

**Sterling Smith** and another L'oiseau were 2nd in Class B at Sault meet. **F/g fuselage** by Len Roe. **Foam wing, Enya 60** and **KO muffler**.







Left: 1st Pylon Champion in Belgium is Jean Mathysens. Ship, a Class I Midget Mustang powered by an OS Max 40. Kraft radio. Above: G. Cappuyns topped FAI pattern class in Belgium RC Nationals. Original airplane, Capro digital radio. ST 60 with KO muffler. Above, right: Belgian Class 3 champion — Yves Van Gompel. 14 year old RC'er flew a "Vautour" using an Enya 60 and Kraft. F/g fuse, foam wing.



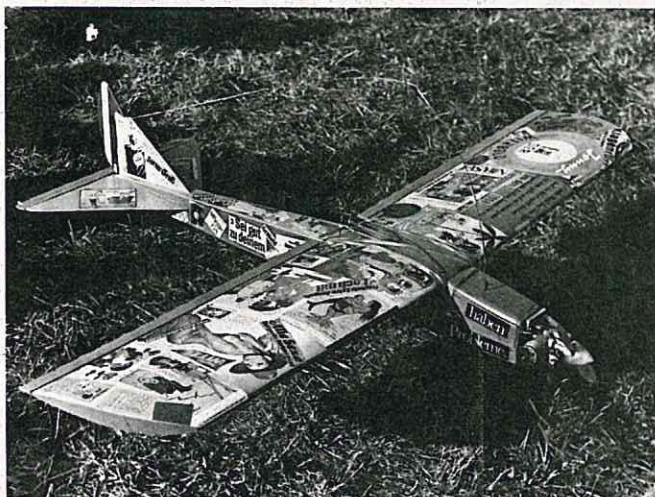
Hungarian FAI RC Champ. Gabor Masznik flies modified Kwik-Fli with Moki 60 engine. Simprop radio . . .



Veteran RC'er, Rene Longdot readies Graupner Kwik-Fli for Belgium Nats flight. 1959 Rudder Champ placed 2nd in Class 2. Enya 60, Kraft radio.



Ed Wallner and 'outfit'. Transmitter featured coffee grinder, 'whip' antenna to thrash the model. Won original event at 7th Graupner Internats.



Left: Close-up of Hanno Prettnner's comedy routine ship. Marcel Van Gompel pic shows 'beauty's' decoration. Enya 35. Above: Junker's by Schweitzer (l) and Junk (r) of Germany was sensation of 7th Graupner Internats at Gorzia, Italy. 2 Wankels, Max 60 power. 20 pounds. Flies very well.

From Lesce-Bled Yugoslavia, Ing. Menciger brought well detailed original. Greatly admired, 100" span was silver Monokoted. Max 80 power. Loving care apparent . . .

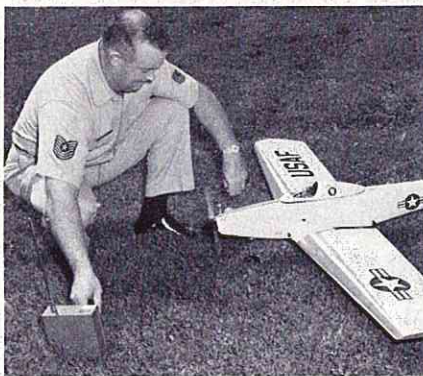






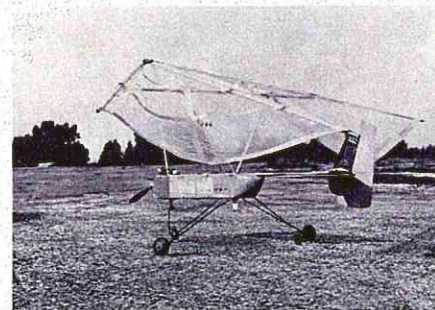
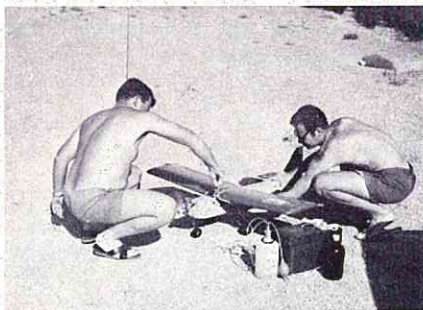
At-rest view of Lorber Flexwing. Israeli ship weighs 6½ kg., has gone as high as 7.3 kg. Aluminum and plywood fuselage. Boom aluminum. Polyethene wing filament over 12 mm aluminum tubing frame. Spans 1.67 meters.

RCM Instructor is proving to be durable ship. Peretz Fishbein of Tel Aviv winds his. Enya 45, Micro-Avionics.

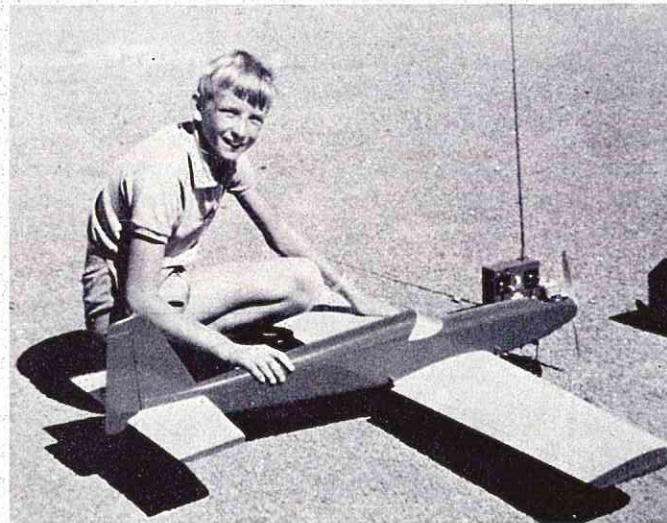


Far left: Hanno Prettner was FAI stunt winner at 7th Graupner Internats. Possible Austrian FAI team member for 1971 World meet. ST 60, Silence-Aire.

Right: M/Sgt. Eddie Hewett and Fliteglas Pagan Mk. III. Veco 61, 6 lbs., Logictrol. Adana, Turkey RC wilderness.



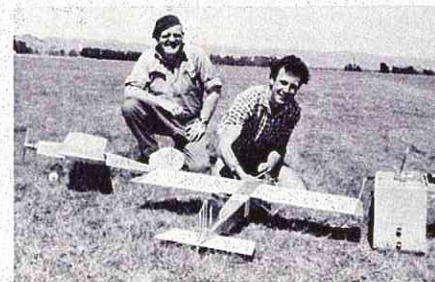
Above: Israeli portrait. Naphatali Horowitz and RC friends. Kwik-Fli uses Veco 61 and Royal radio. Right: "Swift-Fli by A.J. Schoeman. Spans 65", Merco 61, Logictrol on 1st original design.



Snakes and Separators. Bundu flying has its hazards but RCing goes on for Jack Brown-Eve in Kokstad, Africa.

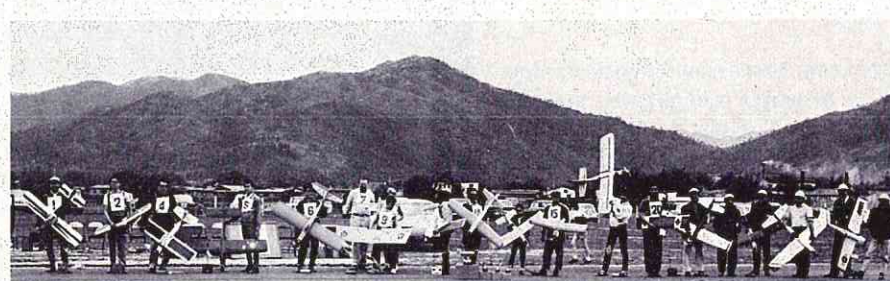


Bob Young's record ship. With Tony Montanari, Bob set Aussie speed record of 119.45 at Nats speed trials.



Bill Aldridge and Neville Dawson have a go with a pair of Stiks. Fun ships all the way in New Zealand . . .

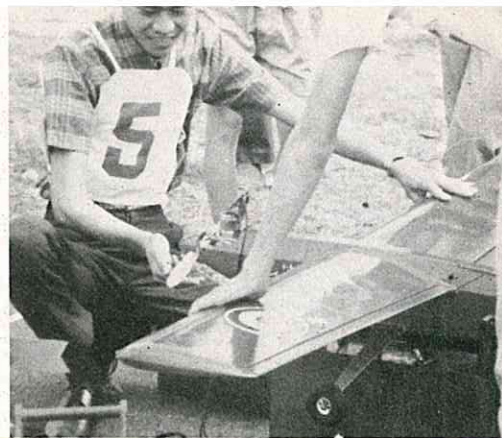
Hong Kong RC action. 20 contestants flew in 1st "Friendly RC Contest", a memorial meet to KY Cheang, club Chairman for many years.



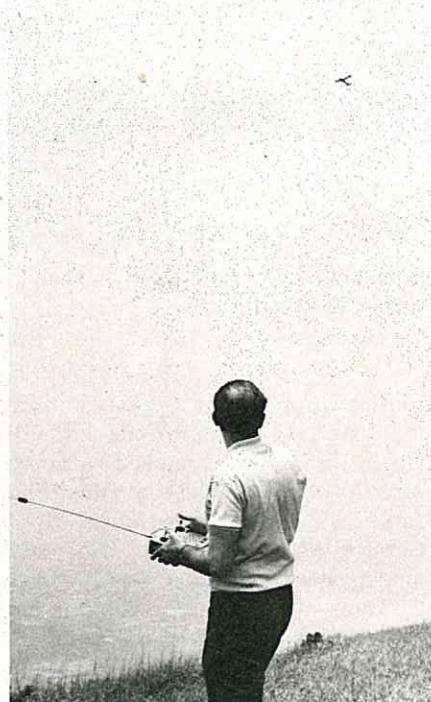




Above: The winner, Tsang Hin Seng won K.Y. Cheang Memorial Trophy at 1st "Friendly RC Contest" staged by Hongkong Model Engine Club. Right: OS Max 40 get tuned by Siu Chuen at Hongkong meet.



Chan Ho Ming gets ready. Ship, Royal Grace, Enya 60, Orbit radio. Scene, 1st Friendly RC Contest by Hongkong Model Engine Club.



Far left: Larry Hoffman guides his Veron Impala glider to 70 minute flight at Hakone Nat'l Park near Tokyo. Above, left: Currie Lee of the Aloha RC Club gives buddy box checkout to Ted Green, Recreation Dept. Director Above: Gene Cantrall, Lou Cisco, and Bill Fushberger ready for demo flight Right: Jim Miura pic catches father-son team of Brian and Leonard Onaga reading RC fleet for action. Site is Diamond Head Crater.

the model would span about 32.6". How about a Ryan ST with an upright engine (like a Fokker D-VIII)? There's an Italian scale job called the Breda 39 which would match that description. Do you like the Lockheed Hudson? The Italian counterpart is the Breda 38. How about a racer with an elliptical wing on a stub pylon (years before Carl Goldberg) with wide struts that (a) served as a lifting surface, and (b) rotated to become airbrakes? That's the PM-1 "Vittoria". A scale bird that would drive British scale judges hairy is the Breda 44. If you're acquainted with the DeHavilland "Dragon Rapide", you'll know why. The DeH was designed about 1930 as a bimotor biplane passenger craft. Two years later Breda adapted the configuration with Alfa engines of 130 hp.

They proved inadequate, so the Italians ended up using 160 hp DeH Gypsy 6's, just like the Dragon Rapide. Where the British plane had tapering wings, the Italian version had constant chord wings with rounded tips.

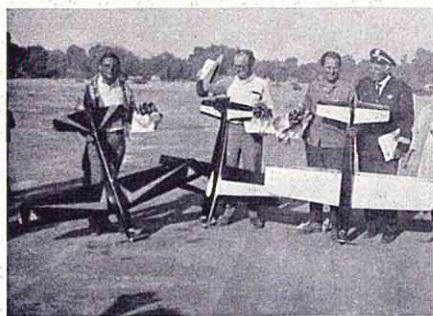
"So, if you care to try a new approach, write Giorgio at via Carnovali, 68, 20158 Milano, Italy. Send 600 lire (\$1.00) per copy wanted. I'd recommend the Breda-Pensuti airplane, the Breda 39 and 44, and the Vittoria PM-1, or PM-2. You can write in English, and tell 'em Nino sent ya. That'll confuse 'em!"

Timmins, Ont. Jack Moisley found the RCM Trainer could be adapted for snow operation and has been rapidly consuming Imperial-size gallons of fuel ever since. "It's a real going trainer

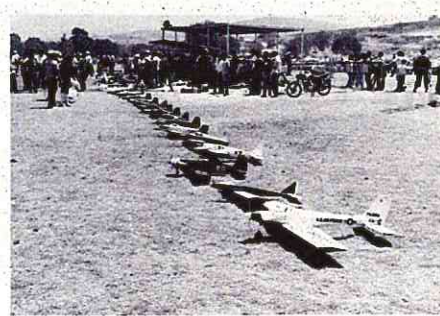
that rolls and flies inverted like a breeze. I've lost count of the flights", Jack enthuses. The ship uses an Max 35 reworked to take a Kavan carburetor effectively. Citizenship radio is used for control.

Quebec. Ray Gareau and his flying buddies have a Jan. 1st tradition going. Regardless of temperature, they try to fly. So far, Ray and Dick Baylis, along with Gerry Pronvost lately, have only missed a couple times in the last 8 years. Once was due to the high wind. As for the cold, it gives them the chance to develop and test the best ways to overcome major operating obstacles. In engine operation, Ray favors routing the fuel line near the exhaust to heat the fuel and reduce the thickening of the castor oil which Ray prefers over the thinner Ucon oils.

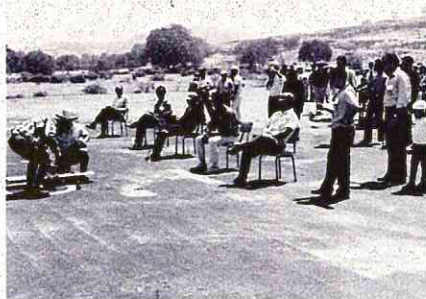




Above: Pattern winners in Mexico City annual. (r to l) Salo Feiner, Jerry Krause, and Ben Castaneda Right: George Killeen and unlimited pylon bird, 1st in Ciclon race in Mexico City.



Pylon race scene in annual Mexico City contest. A hot race, many casualties to the models. Won by George Killeen, Emilio Lozano, 2nd.



Judges row at Mexico City. Judges were contestants. System has proven practical. Ben Castaneda prepares to fly.



Max Bentacourt and "Fumigador". Steady and reliable. Maneuverable at 7200' Mexico City altitude. Plans available.



Bruce Lund and his Fumigador. Two wins in 1970 so far.

Radio gear also gets a dependability workout in such climes. Ray is presently using the Alouette, a Canadian designed and built set by Dino Jouanou of Ottawa. The receiver has been checked to  $-40^{\circ}$  and, until Ray found the transmitter was OK down to a  $-10^{\circ}$  F., he kept a hot water bottle strapped to the box during operating periods. About 50 of the sets are in use and feature EK servo hardware and a linear feedback capacitor that Dino has patented.

## BELGIUM

Hamoir. A Phil Kraft visit after the 1969 World Championship Meet helped stimulate an already growing RC activity for the Hamoir Aeromodeling Club. Phil was invited to inaugurate the club's new field and runway. Belgium RC'ing also saw the crowning of its first Pylon Champion at the last Belgium Nationals. The top honors went to Jean Mathysens flying a Midget Mustang with an OS Max 40 and Kraft radio. Following close behind was G. Cappuyns who also was named the top stunt flier after winning the FAI event in Pattern. Yves Werion was second in the FAI class event. In class 2 it was A. Piroton followed by Rene Longdot, one of Belgium's

veteran RC'ers. Rene was the Belgium Rudder champ some 10 years ago... Yves Van Gompel won the Class 3 event (similar to the old AMA class II) with J. Rimmer placing 2nd. Fliers from many countries participated including Gabor Masznik, the Hungarian FAI Champ. Marcel Van Gompel invited fliers everywhere to come and fly at the new Hamoir flying field...

## ITALY

Gorizia. Paolo Zappolato sends word there were fliers from 5 countries at the 7th Graupner Internats held 23-24 May. Site was the scenic Adriatic Sea resort town of Gorizia where the 1973 World Championships may be held should the Italians host the epic meet. In this 1970 contest 2 events were flown; FAI pattern and an "Original Design" competition where just about anything went as long as it was different. Rockets, bombs, and parachutes were popular in this one. Hanno Prettnr of Klagenfurt, Austria was winner of the Aerobatic event followed by Josef Wester of Germany (3rd in 1969 World Meet in Bremen). Hanno also took part in winning the Original Design event. He teamed with Ed Wallner to stage a hilarious clown

routine using an outrageously decorated 'publicity' plane. While Ed provided the clowning comedy, Hanno secretly flew the wildly gyrating ship. Junk and Schweitzer came from Germany with their two impressive models; the tri-motor Junkers that has 2 Wankels and an OS Max 60 for power, and Junk's well-known Delta. Menciger, an engineer from Lesce-Bled, Yugoslavia showed his talents with a 9' original that attracted admiration for the craftsmanship and detail. A "creator" of models, was the opinion...

## TURKEY

Adana. It appears Turkey is an RC desolation. None in sight, says M/Sgt. Eddie Hewett of Lake City, Florida, who is there on an AF overseas tour. This isn't stopping the resourceful RC'er who has designed at least two ships while serving in Turkey. Ed says he's looking forward to his next duty station in Thailand. "They'll be doing more there, I hope," he writes. First though, he hopes to catch up with the others in the Jacksonville area on his way to SEA.

## ISRAEL

Tel Aviv. Although RC'ing is on a limited scale so far, there is consid-

(continued on page 60)



# SUNDAY FLIER

KEN WILLARD



The "Maxi Sailer" - - - 98" span thermal soarer designed by Ken Willard.  
All-up weight, two pounds.

There is no such thing as an ugly sailplane.

OK. "Beauty is in the eye of the beholder." And I will admit, some sailplanes aren't as graceful as others. But the very nature of sailplanes requires that they be beautiful — at least when airborne. Just as a Chinese junk, when under full sail, has a beauty of its own, even the most ungainly of sailplanes is beautiful as it swoops through the air.

The rapid growth of popularity for the sport of R/C soaring is ample testimony to the challenge and pleasure which it provides, and the countless number of designs which are either available commercially or in plan form reflects this popularity.

Along with this rising popularity comes a whole new set of problems. For contests, what should be the rules? What should be the classes? What events should be flown? And

these problems are not going to be easy to solve — at least to the satisfaction of everybody. And what about R/C soaring at the Nats? As this is being written, an unofficial R/C soaring event has been scheduled — straight duration plus bonus points for spot landing accuracy. It will be interesting to see how this event turns out, both from the standpoint of participation and spectator interest. And since there is no provision for judging the spot landing, are we likely to have the same thing happen as happened in power planes some years ago, when the contestants in some instances dumped their models roughly into the ground so they would be inside the high point circle?

By the time this column appears in print, the Nats will be over — and the arguing just begun. My guess is that trying to include R/C soaring with all the power events at the Nats will be

considerably more difficult than the inclusion of R/C pylon racing was — and if I recall correctly, that took about two years. Soaring events take longer, tie up the frequencies longer and, therefore, will not be as easy to include, unless the obvious solution is utilized. And what is that? There are really two. Either have the soaring championships at the same time, but at a different site, or extend the time schedule of the Nats so soaring can have at least one whole day. Neither of those solutions will be easy to accommodate. How about an alternate, like a separate Nats for soaring? Again, I can hear the groans at AMA headquarters. The planners have really got their hands full.

Would you like another wild idea? How about having the R/C National Soaring Championships included as an event at the Soaring Society of America's full scale championships? You could get into the same type of events they have — goal and return, declared start point for duration, precision and perfection landing, closed course racing, etc. And you wouldn't be hogging their frequencies!

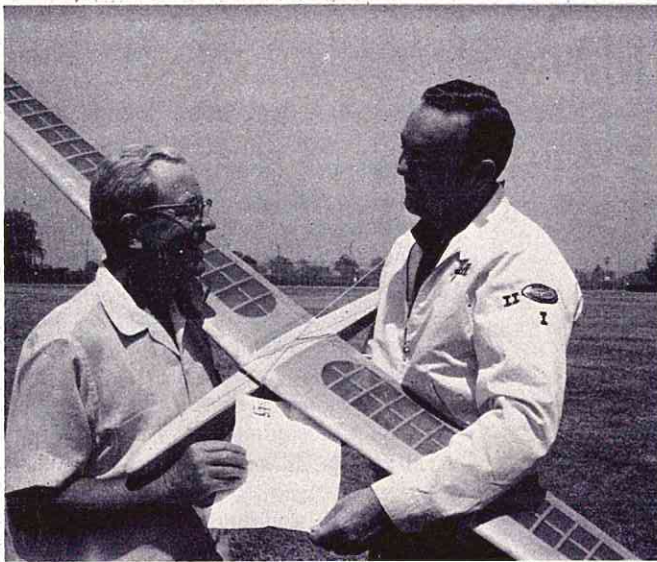
Anyway, as you can see, R/C soaring is having growing pains.

So far as I can ascertain the most active international organization in R/C soaring is the League of Silent Flight. I do not say this because I happen to be a member; I say it because no evidence has been presented to me that any other national organization is really doing anything. The LSF requires members to also be members of the national FAI representative organization (which, in the U.S., is the AMA) and therefore is not attempting to usurp the rights of the established international bodies in R/C modeling. On the contrary, the LSF is augmenting those bodies in the same way that the NMPRA is doing in power pylon racing.

Nor do I mean to imply that the AMA is doing nothing about R/C soaring. The fact that they have included it as an unofficial event this year is evidence of their recognition of the growing interest in the sport. But they are already spread so thin that they need help. And, in my opinion, the LSF is the best qualified group available to provide that help. I hope they take advantage of it.

By now, most of you are familiar with the LSF's "soaring accomplishments program," in which you can progress by stages, or levels, until you have achieved the pinnacle, or





Ken Willard is congratulated by Marshall Watson, LSF Secretary, for achieving Level 2 of Soaring Accomplishment Program.



Chris Jones' 'Skyhook' mounted on fiberglass 'Del Gavilan' fuselage.

Level Five. And believe me, that will take some doing — eight hours on the slope, two hours thermal, 10 kilometers goal and return, plus one win and two places out of six contests with more than 15 contestants in each. I predict that it will be at least two years before anybody makes it. So far, only one member of LSF has achieved Level Three, and that is Rick Walters, of the South Bay Soaring Society in Sunnyvale, California. This required that he fly the slope for two hours, thermal for 30 minutes, make a 1 kilometer goal and return flight, and win a place in one of six contests where five or more were entered. Even Level Three isn't easy.

I know from experience. About a week ago I completed the requirements for Level Two, and began undertaking the events for Level Three. Probably the most difficult is the 1 kilometer goal and return flight. However, as luck would have it, the first day I went out after completing Level Two (which you must do before you can try any of the Level Three events for record purposes) the thermals were blossoming, and after several six minute flights I launched into a real "boomer." My new thermal design, the MaxiSailer (a thin, stretched out version of the Mini-Sailer) went skyrocketing up almost out of sight. At first I thought I'd try for the half hour thermalling event, but after about fifteen minutes the thermal gave out while I was pretty far downwind, so I came back upwind looking for another. I was about to give up, when I saw a wing bounce as

the model soared upwind at about seventy five feet of altitude. I turned the MaxiSailer into the updraft and boom! Up and away, again almost out of sight. Somebody called out "Hey, why'ncha go for goal and return?" We have a course set up for the event which goes from the high school field to an eating establishment several city blocks away — and there's no place to land if you don't make it. Pretty sporty course.

Well, I decided to chance it. The sailplane was so high that it took three of us to keep it in sight, so I should be able to get over and back. Cal Street had his Volkswagen with the sun roof open ready, and Bob Andris and Rick Walter led me over to it. I couldn't take my eyes off the model or I'd lose it. To get into the car, I handed the transmitter to Rick, who flew the model until I was in and standing up with my head and shoulders sticking out of the sunroof. Then, after I relocated the model, Rick handed me the transmitter and we were off. Wow! what a ride! The wind blew my hat off, and there went the sunshade — but we could not stop to get it of course. We went over a bump, snapping my head, and I lost sight of the model. "Hold it down!" I yelled. When I located the model, it was in a vertical dive. Carefully I pulled it out, and it shot out ahead of us. "Go, go, go!" I hollered, and Cal stepped on the gas.

"Are we there yet?"

"No, Got a couple more blocks to go."

The model was now low enough to

follow easily, but there was still some distance to go, and the return still had to be made.

"OK. You've made it. Turn around and let's get back fast!"

The return flight was going downwind. I'm not sure, but I think Cal might have nudged the speed limit a bit to keep up with the model, which was making a ground speed of about thirty miles per hour. Also, it only had about two hundred feet of altitude.

I don't know what the people along the way thought, as they saw a Volkswagen come roaring (do Volkswagens roar? Sounded that way to me) down the street with some guy's head and shoulders sticking out the top, with a box and rod in his hands and peering intently up at the sky. But I didn't care, either.

About one block short of the landing field the model had sunk to about seventy five feet of altitude, and we were about two hundred feet behind it. Cal sped up until we were about one hundred feet behind it, but the model was perilously close to the ground by now, and still had to make the turn from the road into the field — and there were telephone poles and wires in the way. There was no alternative. I turned the model, pulled up elevator, cleared the wires by about three feet, and just as the model was about to disappear behind the school building we cleared it, and I was able to glide the model across the school yard and land it near the winch. Goal and return completed!

That was the most thrilling flight I  
(continued on page 54)



# GEMS



GENERALIZATIONS EFFECTING MODELS

BY Jim Simpson and Jim Bonar

Now that you are the Resident Expert in your neck of the woods are you quite ready for the responsibility? OK? Don't think there's any responsibility, huh?

Well look around you, Expert. Notice how many guys are flying the same brand of radio as you. Did they all buy because yours works so well? Or for that matter, how about airplanes and accessories they're currently using?

Are you being asked more questions lately? And even by new guys and strangers at that? What are you telling them and what are you doing?

The first great requirement of a good Expert is that he be modest and friendly. Unfortunately, most New Experts aren't. They are too busy looking for their own names or pictures in the magazines or, what's worse, they're suffering the worst case of "I's" ever known to man!

This illness is characterized by the following symptoms: Subject Expert begins all sentences with "I" this or "I" that. He talks loudly, and gets louder as the object of his verbage moves away. If not cured soon he will degenerate to name dropping, especially by association, which generally results in acute embarrassment when he tells the stranger how he knows old "Uncle Phil" real well and it turns out the stranger is "Uncle Phil". So, your responsibility as new expert is to be modest and humble!

How about what you're doing? Will all your actions on the flying field bear close scrutiny? Let's see.

By far the most useless, and therefore unwise, maneuvers we've ever

seen the New Experts do, the on-the-deck-inverted-pass takes the cake. Although no official statistics are available we're sure it must be right at the top of "moves" the new guy tries which costs him a radio, plane, engine and all. We're talking about the "inches of altitude pass" not the 2-or-more-yard variety!

Another just as bad, but much more dangerous, is "buzzing the crowd" even if the crowd is only your own dependents! This sort of thing is strictly a "no-no". Not only is it hazardous to your own health and well being (they put you away for less) but it also can kill people!

Another flying safety problem is about to rear its ugly head and that's buzzing real airplanes! This must be stopped before it gets started because you very well know that a midair with a real airplane would result in cessation of our activity forever.

Therefore your next responsibility as a New Expert is flying safety. You just **must fly safely!**

If you heed all the above advice it won't be long till the new guys come to you for help and advice. Both of which you will be willing to dispense without limit, strictly by virtue of your present position.

But what will you do if he asks you to test hop his "new one" for him?

Let's suppose you accept and just crank it up and head for the wild blue yonder! Fine, until you start the turn, which is when you discover there's nothing — just nothing — followed by the familiar sickening **thud!** You look at the anguish in his face and now I guarantee you will **FEEL** the respon-

sibility of being Resident Expert!

Here follows a broad general set of guidelines for you to start with — they are by no means complete but do result from many years of observation and can possibly be of some use to you.

First and foremost make an agreement or come to an understanding about who bears the financial responsibility prior to the first flight. This can be a real bugaboo. All you need say is, "what happens if anything goes wrong and it crashes?" If he says, "You pay for it" you say "forget it!" and follow your own advice. After all, if the flyer has to pay for the damage let the flyer have the fun of damaging it. Seriously, I'm sure you see the point so we won't belabor it further.

Next is the airworthiness inspection. So far "Big Brother FAA" doesn't require certificates on the models but they must, nevertheless, be inspected.

Take a good long look from about five feet away to insure all the basic components are there! We once read of a guy who took off in a Piper Tripacer which had the rudder removed 2 days prior to the flight, so make sure it doesn't happen to you.

Next, approach the plane from the rear and check everything for security and insure that there are no warps. Give each moveable surface a "tug" to see if the hinges are secure, (you should try to fly a plane with the elevator flapping on the end of the pushrod sometime!) and if the controls are connected to the servos.

Now make sure that all removeable items are secure, that is, enough rubber bands on the wings and tail etc., or enough fasteners in the right place, and so on! While you're at it pick the subject up, turn it over, and inspect the bottom side. While so doing you might also check the wheels to be sure they are all free (especially on a conventional gear).

Next is the Center of Gravity. Remember a general rule of thumb is 1/3 back with fuel tank full (which is how it is for flight). There isn't a day goes by in the world where at least one good model snaprolls and crashes because it was tail heavy! So, if it's tail heavy, don't fly it! (Or, too nose heavy for that matter.)

Now turn on the radio and check that all surfaces move from limit to limit freely, without strain on the servos, and that they move in the correct direction because every be-

(continued on page 57)



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(continued from page 52)

have made since I flew Big Breathless from Long Beach to Catalina Island thirteen years ago! I can imagine what it will be like to try and make 10 kilometers. There is some question in my mind whether it can be done unless you have a model with a wingspan of around fifteen feet.

There's a lot of satisfaction in achieving the LSF soaring accomplishment levels. I recommend it to you.

One of the interesting sidelights of soaring is the high attraction it has for teenagers. They seem to come by it naturally — just like they do in sailing as compared to powerboating. Several of the contests out this way have been won by comparative youngsters like Mark Adams and Rick Walters, and others have placed well up in the standings. It's really a pleasure to watch them fly, too. Also, I've heard from their fathers how, in some cases, they went out and earned the money to buy their equipment.

One of the more unusual young fellows took the advice of J. Paul Getty (probably didn't know he was, though) to "find a need, then fill it." Chris Jones, eighteen years old, and just graduated from high school, noted that modelers would move the tow hook forward or back as conditions demanded, and this took some time. So he came up with a little device he calls a "Skyhook" which attaches to the bottom of the sailplane's fuselage and gives three towhook locations. It's a simple thing, but does take quite a bit of time to make, and for a buck ninety I, along with a lot of other soaring enthusiasts, would rather let him make it than take the time. In fact, enough guys have bought them from him that he earned the money to buy himself a proportional rig, and he's busily engaged in building his own sailplane to use it in. Also, he's just



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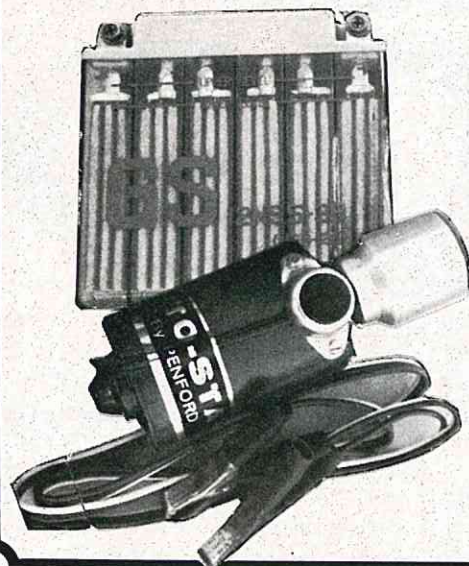
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entering college, so if you want to do yourself a favor and help a guy get to college at the same time, get a "Skyhook" from him. Chris lives at 1154 Snowberry Court, Sunnyvale, California 94087. In a recent column I presented the results of a beginner survey, which was primarily directed at power plane flyers. I did get some letters indicating their preference for gliders, but as I said, it's a somewhat different field, even though closely related. I am always surprised to see an experienced power plane flyer get himself all tangled up when he tries a sailplane — particularly a high performance sailplane — the first time. When you don't have all that brute power to pull yourself out of trouble, it takes a bit of learning to figure out the best recovery from, say, an undamped phugoid oscillation.

So what is the best type of model to use when a beginner wants to learn soaring? Ask five guys, you'll get five different answers. Same with ten, probably. Anyway, for what it's worth, here's what I think.

The ideal beginner's sailplane probably should not be a sailplane in the fullest sense. Rather, it should be rugged, small, easily built and easily repaired glider that can stay aloft on a slopewind of eight to ten miles an hour, and can be easily towed by a winch high enough to glide around for a minute in dead air, and maybe pick up a little altitude, or at least maintain altitude, if it flies into a thermal. As in the case of the beginner's powerplane, it should be completely stable and able to recover from any flight attitude all by itself, provided sufficient altitude remains. Obviously, if it can do all

these things, it won't fall into the high performance class.

Depending on the degree of proficiency, in building, of the beginner, there are several kits which fulfill the above specification. Such gliders as Midwest's "L'il T," Astro Flight's Malibu (which also has good potential as a slope racer once you learn to fly it). The "Quarterback," "Halfback,"

models of the Silent Flight Center, and the glider version of Dumas' "Evolution" are good examples of gliders that will do the job if the builder can build them without warps.

The MiniSailer, published in RCM some months ago, is a good beginners' glider for less experienced builders. No kit is available, but the plans can be had from RCM Plans Service. It uses

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the Midwest foam wing, thus eliminating the problem of making sure your wing construction is true in alignment. It also is very easy to repair. In fact, you can build a whole new fuselage, should you really clobber it, faster than you can repair some of the larger models. And, it is small enough that hand gliding to check the balance and glide path can be done without worrying about the amount of room available. Sure, you won't win many contests with it (unless they are spot landing contests) but you'll learn the basic principles of gliding flight, and on the slope, after you learn how to handle it, it stunts like mad.

Of course, for the beginner who is fortunate enough to have an instructor available, and particularly one with a "buddy box" transmitter, it doesn't matter too much which glider or sailplane you choose. The instructor can trim it out for you, give you dual instruction, and when you're ready to solo, turn you loose. But, unless I miss my guess, the number of soaring enthusiasts who have that luxury available to them as beginners is definitely in the minority. So, for the majority of beginners, my advice is "pick a small and simple design, teach yourself to fly (along with learning the patience to repair the results of your mistakes) and while you are learning with the simple job, spend a part of your time watching others, pick the high performance model that strikes your fancy, and be building it in anticipation of the time when you will consider yourself proficient enough to fly it.

And what high performance model should a beginner select for that great moment when he thinks he's ready? Well, fellas, that's the real toughie - and I think I'll chicken out for the time being. The kits that are available all have several things in their



favor, and then, when you see them in flight and in competition, each one has usually had small modification made to it by the builder which he believes makes it just a little bit better. Soaring is a highly individualistic art and science. If I were to tell you that the Fliteglas "Schweitzer" was the best, I'd get a lot of nasty letters from proponents of the Graupner "Cirrus" and other high performance designs. The fact is, they're all pretty much "even steven" and the skill of the pilot becomes the determining factor.

So, for all you soaring enthusiasts, I say "Good lift to you!" And to all you power enthusiasts, I'll try to have some items of interest next month.

Y'know, it's kinda tough at times to keep all you Sunday flyers happy.

But it sure is fun to keep trying. So keep on writing. OK? ●

## GEMS

(continued from page 53)

ginner hooks up at least one servo backward. For that matter a lot of experts do, too!

Start the engine and check the throttle response. Remember, it's much better to have the engine die in idle than to have it run too fast when on a test hop.

When the engine is adjusted correctly taxi the airplane around to get the feel of it and to check the radio range.

When you're satisfied that all is in good order make the takeoff and adjust the trim as soon as possible for straight and level flight. Then land the model after you've checked the landing characteristics with a high approach. (Altitude is insurance!)

After you land, mechanically adjust the surfaces so the trim levers can be returned to neutral. Then, if you had a good first flight, make another short hop to check the adjustments. Then land it and check the whole plane over for loose bolts, nuts, servos, etc., before further flights.

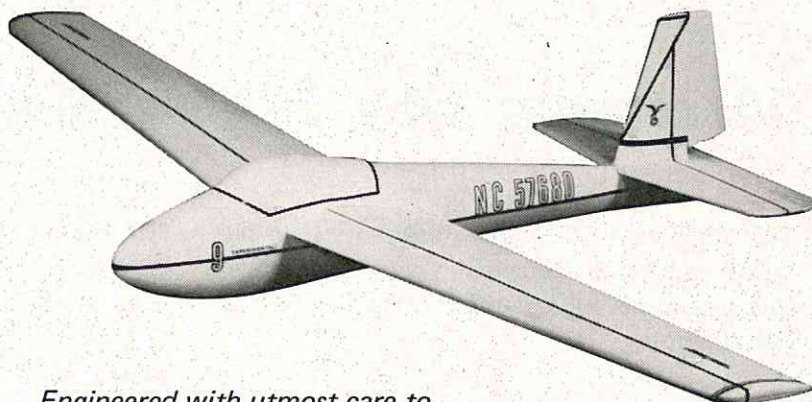
If you are lucky in these regards then the beginner will look to you as his personal mentor and you can begin to build the experience to qualify you as Resident Expert.

It won't be long after that until you're designing your own planes which will be published in RCM and, if you're modest and humble enough, then one day old Don Dewey will call you up and want you to write a column in his magazine, so good luck to 'ya! ●

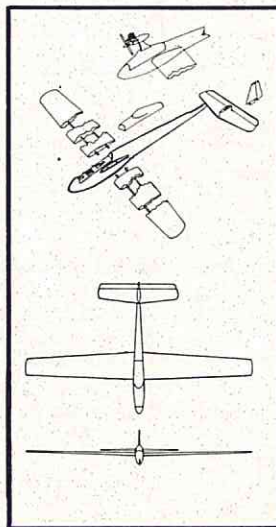
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erable variety in the models being flown. Naphtali Horowitz sends along word that shows it takes a good measure of enterprise and ingenuity to overcome the obstacles. Nevertheless active fliers are now using propo radio gear and flying ships that range from standard contest types to experimental creations. Helpful distributors such as Paul Runge of Ace RC give valuable assistance in shipping the small quantities of the wide range of supplies and hardware RC flying now takes. A lot of "make do" is still required. A real pioneering period. A serious developmental effort by Azriel Lorber with flexwing aircraft has been underway for some time now. Two models have successfully been flown and a good deal of experience gained in the venture. Polyethelene film has been found best for the wing material being better than mylar which proved too stiff. Speeds between 40 and 50 kmh have been reached with models weighing about 6½ kg with a wing area

of a little over a meter square. No ailerons are needed with coordinated turns being achieved by rudder control alone. A Webra 61 supplies power. Weather in Israel allows year-round flying with summers getting rather warm, Naphtali assures. "Help from the U.S. is sure appreciated," he adds.

#### AFRICA

Oudtshoorn. A letter from "AJ" (AJ is A.J. Schoeman - RCM, Jan. '69) brings us up to date on his further development in RC. AJ, you recall, began RC on his own and without help ran into all the difficulties associated with leaping into such a hazardous (mainly to the ego and wallet) course of action. AJ's unusual persistence made the difference however, and it's possible to report a respectable amount of flying expertise has come to AJ since those early days of trial and error. The original Falcon led on to a Skylane 62, then an Aristocat, followed by Kwik-Fli's II and III.

Thermal soaring with an H.S. Clou came next for AJ which was followed by an "exciting" Delta as a sort of balancing adjustment from the relaxed glider flying. All this was followed by a successful try at a design of his own, the Swift Fli. Here's what AJ had to say:

*"The model came out exactly as dreamed, was christened the Swift Fli - 'Swift' for the sweep of the wings which resemble a black Swift bird in flight, and 'Fli' to give credit to designers of the Kwik-Fli, the Sun Fli and maybe a half dozen others who provided tips and dimensions. As the saying goes, it flew off the board, with no trims from neutral being necessary on the first flight. Hands off cruise, grooves well, and does the complete pattern smooth and clean. If you were to ask what contributed most to the success of my first design, I would say it's because I never burn my crashes! I always repair and fly them again and so get to know the in's and out's of*

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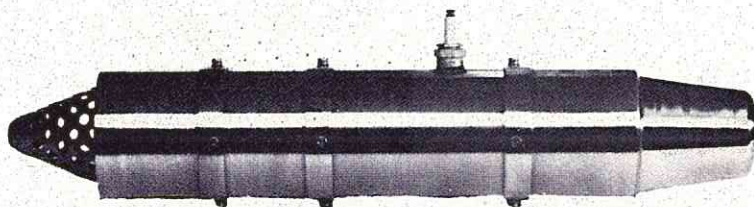
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*each model before advancing to the next...*

Kokstad. From another RC outpost, Jack Brown-Eve gives us the picture of Bundu (remote area) flying. Jack is flying several aircraft including a .10 powered 38" Separator (RCM, May '68). All have to be rugged and simple due to the rough areas Jack laughingly calls flying sites. Jack's RC history goes back to hand made "hard tube receivers and 2½ lbs. of batteries". "I remember," Jack recounts, "the 'bad' days when diesel engines without throttle would run like fury when the radio wouldn't

work, or sputter along with the model just about stalled 5 feet up when the radio did work and you didn't dare give it a signal or she'd crash. (So you left it alone and it flew through a barbed wire fence...)" Jack still finds himself doing basic manufacturing tasks such as winding coils and output transformers by hand after a particularly hard crash. But this isn't an obstacle and Jack flies a wide range of RC. "We are also keen on slope soaring", he continues. "I've built several gliders but ran up against terrain difficulties. We found a perfect site but the ground was completely

rock covered. The farmer said we were welcome to fly and clear the area if we would sign a release from death or injury from snakebite! Seems as though it was a breeding grounds for Cobra and Puff Adder and without trying he caught a couple hundred a year for sale to the snake park in Durban. We are not using that site..."

### AUSTRALIA

Sydney. A new Australian speed record for RC aircraft was set at the last Aussie Nationals by Bob Young and Tony Montanari. Official two-way average was 119.45 mph with the highest recorded ground speed reaching 133 mph. Engine used was a standard OS Max GP 60 RR with a bored out intake. 40% nitro fuel was used on the record runs and a Heathkit Thumbtack registered 13,000 rpm output on the Max 60 engine. Airplane used was a Young original "windy weather" pattern ship with a NACA 0012 wing section. Other vital statistics are: Span—54" / Area—540 sq. ins. / Wgt.—5 lbs. 7 oz. / Prop—10 x 10 Peperell.

The radio was Bob's own Silvertone Digital which is popular in Australia. Bob also designed the electronic timing devices used to authenticate the time trials. He was assisted in this particular task by Al Fisher and Art Wild and by Miller Tripods Co. who loaned Bob this expensive equipment. There were problems a-plenty in designing the mechanics of the timing system and when an early test timed a Pylon racer at 400 mph, Bob knew something was wrong! Coordinating the watches at the ends of the speed trap and triggering them at the 90° position was finally solved by some neat electronics and mechanics to switch the micro-switches at the precise angles. Maximum error was reduced to less than 1/10th second with 4 sighting operators involved. Prop performance was of interest. At 90 mph, 11 x 8 props did well. At 98 mph, the 10 x 10 was found too coarse. But, at 120 mph, the 10 x 10 Peperell toothpick worked best although there were indications that it was a bit too fine at times. Brian Green provided some competition at the Nats record trials and posted a creditable 115 mph run. Ken Jack of Sydney also was there but fuel feed problems kept him grounded. Bob's record also had the assist of others. Steve Vickers, Norm Smith, Laurie Cantwell, and John Summerville.





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Clayton. Got any early RCM's that are extras? Dick Dakers can use some '63 to '65 issues to build an English language library of modeling magazines. It's a good cause, so if you can help drop Dick a line at 101 Moriah St., Clayton, Victoria, Australia.

### NEW ZEALAND

Nae Nae. Fun flying is still the order of the RC day for Bill Aldridge and his flying partner, Neville Dawson of Masterton. Here's Bill's comment on his latest interest: "Now about my latest abort—sorry—creation. As you know, it started life as a Stafford Midget Mustang but after building the fuselage I went berserk and decided it would make a beautiful biplane! So out came the sheet of lunch wrap to draw on, and away at a fast gallop. Vital statistics emerged as: Upper span, 44" x 8" chord. Lower wing, 40" x 7" chord. Power — OS Max 40. Area — 632 sq. in. Weight — 6 lbs. (sheesh!) Ailerons — top & bottom.

"I must admit I was a bit dicky the first time I took it out as it seemed to weigh a ton and I had doubts about the thing ever getting unstuck off the deck. However it shook me as it leaped off the ground and took off like a scared rabbit. Fast in the air, but stable and extremely easy to land, it can be dragged in slowly with a bit of power on in a nose high attitude without flopping off. Incidentally, the undercart is a chunk of shovel steel 1/16th thick that works bang-on too." Bill and Neville put in a lot of air time flying Liddle Stiks. Bill's comment: "It looks horrible, I must admit. At first I wasn't sure whether to hang it with the other models or hide it in a closet. But it's a beautiful flier..."

### HONG KONG

RC has swelled the ranks of the Hongkong Model Engineering club in the last year indicating the effect of growing interest and dependable equipment. That's the word from W.C.

Kwok who is the Secretary for the 25 year old club. The club gained 50 members in a year. This year, to memorialize their former Chairman of many years, the club — headed now by Mr. L.K. Tsue — decided to stage its first RC contest. To assure the contest stayed in the right spirit, the senior members of the club gave a significant name to the annual affair: the Friendly RC Contest. Simple, direct. Since their flying site is only available on Saturdays (it's under military control and used by other recreational groups on other days) the contest was staged on succeeding weekends. It didn't diminish the enthusiasm. Contest officials were Lai Kwok Poon, Ng Bing Lin, Capt. T.Y. Lo, K.H. Tang, and Lai Chung Kong. An abbreviated FAI pattern was used to allow for the level of general competence and to 'feel' their way through this first meet. A wise idea. 20 fliers competed with Tsang Hin Seng jumping into the lead on the first weekend in bright but windy



Most famous German sailing — and oldtimer — model airplanes, such as

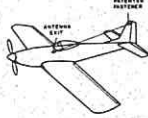
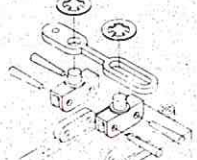
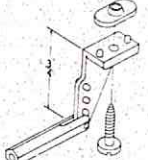



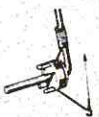
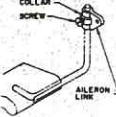
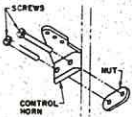
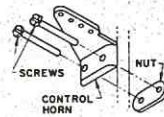
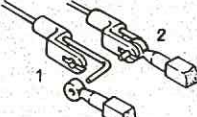


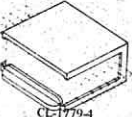
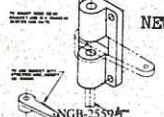


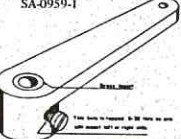
**Uranus / Darmstadt D-36 'Circe' / Kaiseradler / Messerschmitt Me 109 / Rumpler C-IV / Fokker Dr-1 (triplane) / World-Champs model 'Marabu WM-69'** (by Bruno Giezendanner) are issued by 'Flug & modell-technik,' the well-known German magazine for aero modelling.

Sample issues with full-size plan and plans list may be ordered against \$1. — prepayment from

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weather. He managed to stave off the challenges of Chan Shu Huen and Sammy Lee and brought his Debonair Panther into a deserved 1st place. Prizes were awarded at a dinner party by the Chairman, L.K. Tsui.

### JAPAN

Tokyo. Larry Hoffman had a ball flying in his first glider meet and claims he's been bitten deeply by the silent bug. Occasion was the first fly day staged by the All-Japan RC Glider Assn. which is patterned after the League of Silent Flyers. Scene was the Hakone National Park at an altitude of 2100 feet. With Mt. Fuji as a background, the view over the valley inspired the flying of all participants. Purpose of the event was to start qualifying fliers as Sr. glider pilots. A sustained slope soaring flight of 15 minutes was required. Larry logged 40 minutes and one of 70 minutes! Next phase is flat land thermal flying and finally, spot landings in a 6 meter circle (about 20 feet). Larry writes he has to leave all this RC bliss and his new address will be in Taipei, Taiwan in the near future. Last word from Taiwan was that RC action was sparse. We'll bet it'll pick up now that Larry is on his way.



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### HAWAII (A convenient stopover from the orient)

Honolulu. RC growth in Hawaii was  
seen in the opening of a new flying site  
in Kailua. On hand for the dedication  
activities was Parks and Recreation  
Director, Ted Green. Gene Cantrall  
and Bill Fushberger represented the  
Hawaii RC Club, Currie Lee, Lou  
Cisco, and George Dirkson came for  
the Aloha RC'ers, while Jim Miura was  
on hand for the Kapiolani RC Club.  
The new site is ideally located away  
from residential areas. Flight demon-  
strations gave Ted Green and his staff  
a close-up look at the RC action.

### MEXICO

Mexico City. Sun Fli IV's were  
popular ships at the Mexico City  
annual Easter Week contest with the  
four top pattern places going to flyers  
using them. Salo Feiner won the top  
spot this year in FAI pattern using one  
of Joe Bridi's designs. Salo had an HP  
60F in his and guided it all with an  
Orbit radio. In second place was Jerry  
Krause of EK using a Veco 60 in his  
Sun Fli. Third place went to Ben  
Castaneda and a Webra powered Sun  
Fli. Bob Guzman left the microphone  
long enough to garner enough points  
for 4th place with a Super Tiger mill in



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a Sun Fli. (At least the engines were different.) To add to the fun and excitement, the 3rd stanza of the Cyclone Thompson unlimited pylon race was flown. George Kileen took the race with a ship resembling Bob Smith's Mach I. George's plane sported a diamond shaped wing section and once it got going it easily outdistanced the field which had been considerably thinned by crashes and over-heated engines, casualties of the high altitude (7200') and eager fliers. Salo Feiner's pattern win was the first time the classic meet has been won by a hometown flier. Salo was a member of the 1969 Mexican FAI team that placed 13th at the Breman World Championships.

**Ciudad Satellite.** The popularity of Max Betancourt's "Fumigador" is being sustained as the rugged ship continues to show its flying capabilities. Not only did the ship do well in pattern contests but it also showed its heels to most of the field of the RC XC race from Queretaro to Leon last December. Continuing development also is the full size crop duster being built near Mexico City which has been patterned after Max's design. We'll have more on this as the news develops . . . ●

*(continued from page 8)*

was the next one up, and this airplane is really a thing of beauty. The basic kit is well done but the finished product is really one of the most beautiful of all models. The wind velocity wasn't quite enough for this ship, as it is a bit heavier than the Snake, but later on it was launched from the hill with superb results. Bill Davidson then dragged out his much rebuilt Kurwi glider. This aircraft sports a V tail, which seems to help in tight turns, but for the life of me, I can't figure out why this much extra work is needed to make a glider fly. Bill's ship was much heavier than it had been designed to fly, due to several repairs to the fiberglass fuselage, so it needed a stiff breeze to keep it flying. Later in the day when the winds came in it soared with the best of them. The last glider to try was one of Jerry Nelson's KA-6 12 lb. fiberglass gliders. With this beauty you really do need a lot of wind, but once in the air it is a dream to fly.

Now, to some of the brief lessons learned while trying my hand at slope soaring for a few hours. First, to go up, you must hold DOWN elevator. Yep, up is down. Think about it and you will see why. You must penetrate

into the wind at all times, the stiffer the breeze, the more need to keep the nose down and dive into the wind. The natural lift of the rising air currents will keep you climbing. If you fly like most power pilots do, then you will feed in up-elevator when you want to climb and just as quickly, you have lost all of your lift! You can stall out a glider, especially on one of the higher wing loaded types quicker than you can blink an eye, and if you are below the brow of the hill, or in a location where the lift is marginal, then you may just have to hike down the hill or cliff to pick up your model. As you toss it into the wind hold a slight bit of down pressure on the stick and the glider will ride the slope wave right on up into the blue sky. (Well, in Texas the sky would have been blue, in California, slightly grey). I knew about this "down-is-up" business before going out on the slope, so I disappointed the two Bills by not dumping the Snake into the ground right on take off. The next lesson is never to turn into the hill when making a 360 or 180 degree turn. Always turn out away from the cliff to keep the glider in the rising air current. With a quick reacting glider you can make S-turns back and forth right in front of you

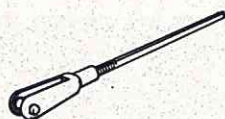




THIS MONTH  
IN THE SPOTLIGHT

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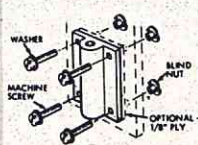


Send 10¢ for 4-pg. Illustrated Catalog, with recommendations on "Getting Started in R/C."

P.S. For best service, see your dealer for kits you want. If not available, write direct; add 35¢ per kit in U.S., 75¢ outside U.S. Minimum order \$1.

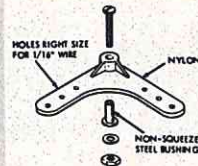
## FITTINGS and ACCESSORIES

### NOSE GEAR BEARING



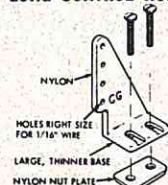
One-piece Nosegear Bearing mounts easily to firewall without alignment problems. If extra steering angle is desired, use 1/8" ply stand-off. Includes blind nuts, screws, etc. ....60¢

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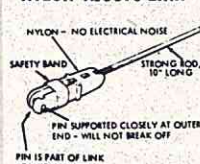
Control Horn has right size holes for 1/16" wire, and nut plate for simplest mounting to control surface. Horn is long for maximum range of throw; can be cut down. 50¢ for 2

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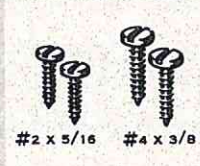
Extremely tough. When applied with heavy coats of cement, it approaches fiberglass. Excellent hinge material. 3/4" wide x 5 ft. ....25¢

### NYLON AJUSTO-LINK



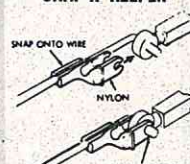
Ajusto-Link is used for adjusting linkage to control surfaces, throttle, steerable nose gear, etc. Nylon-tough and no electrical noise. Takes heavy load. ....29¢

### SHEET METAL SCREWS



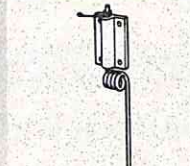
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and gain altitude all of the time. The third lesson is landing. The normal method for landing a pattern ship is to fly a landing pattern down wind, make a turn back into the wind, chop throttle, and land. Tain't so with the silent types. If you make a landing pass down wind, you will no doubt go behind the face of the cliff, and once there, lose the rising air current and down you come on the back side of the hill. Most landings are made either down wind, or by making a turn overhead, and then by keeping the glider headed into the wind direction, just behind the face of the up air current, allow it to settle down for a landing.

This then brings me to lesson number four—to build that glider strong. The most popular covering seems to be MonoKote and Solarfilm. These tough mylar films keep the wings and stab from getting stabbed a million times by tough weeds, or rocks, especially so on downwind landings. The sight of these brightly flashing wings is something to see! A real hazard in slope soaring is mid-air collisions. The lift is in the same place, and if you want to get up, all of the gliders tend to seek the same spot in the air. If there are several gliders of the same type flying

in the same air space, it's kinda tough to figure out which one is yours. This is especially true of the kit types as they seem to favor look-alike color schemes. So, lesson number five on slope soaring is to stripe your wings to tell you quite quickly and easily which one is yours. The two Bills were telling me of three brothers each flying the same type glider with the same colors, at the same time. They all crashed together because each thought he was flying his own aircraft, when actually, he was flying his brothers'.

Control systems on the soaring type of R/C aircraft can be the very simple rudder and elevator set up, or more advanced controls with ailerons. The mechanics of hooking up ailerons to a set of wings that come apart at the middle for easy transportation is quite a project. For general flying, rudder and elevator controls are really quite enough. But, for pylon racing, aerobatics, etc., the use of ailerons is a large asset. Actually, in thermal flying, you need to make your turns flat and quick to pick up a thermal. The rudder turn is a yawing turn, and tends to keep the wings more flat than does an aileron turn, but by using both rudder and aileron, just as do the full size glider pilots, the turn can be made

very flat with no loss of altitude. Coupling the rudder and aileron control to one stick, either by mechanical coupling between surfaces, or electrically between servos, may offer the very best of all control systems for glider flying. I have long advocated that this control method is one of the better ways of general sport flying, especially for the less experienced pilot, and this holds true in glider flying as well.

Speaking of thermal soaring, a great many of the same type of machines can be used for thermal flying as are used in slope soaring, with the exception that the wing loading must be kept low in the thermal aircraft and the C.G. is usually located further aft. One good method of doing this is to build two different wings. One wing of a smaller area to be used in slope soaring, the other, larger wing to be used for thermal sniffing. Use the wing loading chart that we presented in the July issue to give you something to shoot at if you decide to go this route. Another good idea that is used in the large gliders is ballast. With the man carrying machines, it isn't practical to use two different wings for two different types of flying. The idea is change the wing loading. Rather than



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(continued from page 67)

change wings they change the weight of the aircraft by the use of ballast. In the large gliders this is accomplished by using built-in water tanks. If the days flying is to be in high winds then more water is used to give a higher wing loading, and much better penetration. If thermal soaring is the order of the day, and in light air conditions, then the tanks are left dry. If the air conditions may change, then often the pilots will start out with full tanks of water and let out a little as the air changes. This is one idea that has been completely overlooked in our model flying, either power or glider. We tend to fly the same aircraft at the same weight on a windy day as on a calm day. In a high, turbulent wind the aircraft with the higher wing loading will fly better, and tend to pass thru the turbulence while the lightly loaded aircraft will be bounced around like a log in a flood. With the advent of all of this tiny radio equipment, it is just possible that a ballast tank could be added to either a glider, or a power aircraft to change this wing loading for the type of weather.

Thermal flying is an art just as is

slope soaring. As many of you old free flighters know, the elusive thermal is a rising current of hot air, and many, many times it is tough to find. With your controlled glider it isn't as hard to find as it was in the days of free flight. The glider will actually sniff out the thermals itself. If you are flying over country that will give you thermal lift, then let your glider do the looking. Get enough altitude, then fly the glider across the fields, keeping a very light touch on the controls. If you fly like you are flying your Kwik Fli around the sky, you will pass right through, or by, a thermal without even knowing it is there. Let the glider do its own flying. Watch it closely. If it suddenly bumps and turns to the right, very quickly make a flat turn to the left into the thermal, or, if it makes a turn to the left of its own, turn it back to the right into the thermal. The reason is this: The rising column of hot air that constitutes a thermal will suddenly lift the wing tip of the glider venturing into its path. This lifted wing tip will then cause the glider to turn AWAY from the thermal, and you have missed a free ride. When you see a wing tip bump upward and the glider start to take a turn then you have a pretty good idea that you have

been assaulted by a thermal, quickly turn back into the air current. Some thermals can be so powerful that once a glider gets caught, it cannot escape. You need large control surface areas to break the hold of a really good thermal. Sometimes the use of spoilers is needed to get your bird back down again. If you live in the part of the country frequented by the soaring birds, (Buzzards, down here in Texas), you can follow their flight paths to lead you into thermals. These birds seek out the thermals just as do the glider pilots.

The use of trimmable trailing edges has not yet become popular with glider fliers, in this country, but the idea is similar to the ballast idea. With the trimmable trailing edge you can change the lift of your airfoil. Depress the trailing edge for more lift in light air conditions, raise the trailing edge to a neutral position for more penetration in high winds.

I would like to wind up this month's column with a letter received from Bob Aberle. "I just finished reading your current contribution to RCM concerning R/C glider design. Suffice to say the contents, as expected, are very accurate. I sincerely that this article is incorporated into one of the



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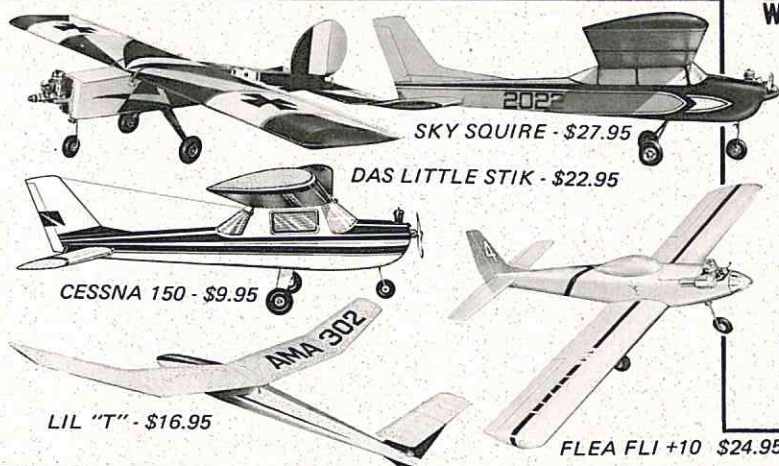
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new RCM anthology books, for future design reference.

"Although I'm not a glider specialist I did have occasion last summer to design a glider quickly for a new type of local club contest. This contest, by the way, was the subject of an article I authored for Flying Models Magazine... Both the glider and the contest were a great success by Long Island standards.

"This past spring I decided to retire the constant chord wing and substitute a tapered version, maintaining the same 700 sq. in. area but with an increased aspect ratio of 10:1. If you look at the attached two page specification sheet, concerning my design, you will find almost every flight surface proportion, aspect ratio, moment arm, literally everything, coincides with your design guidelines. Apparently I accidentally hit upon the perfect "average" glider design. This probably explains why the glider flies so well.

"I might add that the motor up front not only helps from a balance standpoint, but also provides better control under power, without the normal ballooning tendency that I have observed with the motor mounted on top of a pylon. The

power plant in my glider is a muffled Enya .19 muffler. This is more than the .099 that you stated, however I found it perfectly controllable and not overpowered. Of course the intent of our "Fun Contest" is to have the least engine run to longest glide. The contestant with the best ratio of glide to engine run being the winner. Under these rules a relatively fast climb under power is essential.

"I've included some photographs of my current glider which coincides with the specification sheet. I'm afraid the design is too average and simple for publication, but I thought you would be interested in seeing your glider design criteria fully corroborated. Congratulations again on a fine article. I'm looking forward to part II next month."

The purpose of repeating Bob's letter here is so that you can see the results of an average glider designed around an average set of specifications, and to encourage those of you who haven't given this phase of the sport a try, the desire to get with it. Only one thing bothers me, Bob, your contest... it kinda sounded like a free flight contest with radio, fast climb and all. I know that on Long Island, as here in Texas, the slopes just

aren't available, but I'm a bit worried that the fast climb idea may get out of hand and wind up with over powered bombs much like the current free flight aircraft. How about an engine to wing area rule that will keep everything in place?

Time to close up the typewriter and go flying. Every phase of the sport is growing rapidly these days. Hope that there is enough time to try all aspects of it.

### SCALE IN HAND

(continued from page 14)

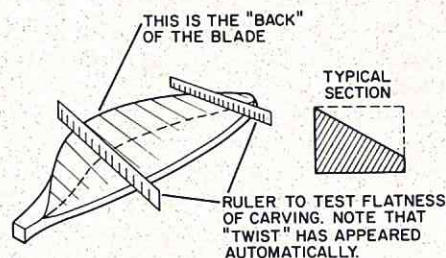


FIGURE 5.

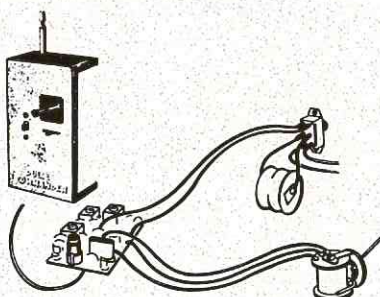
6) Turn blade right side up and carve front face to section shown in Fig. 6.



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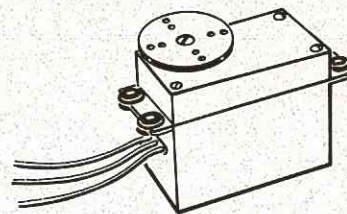
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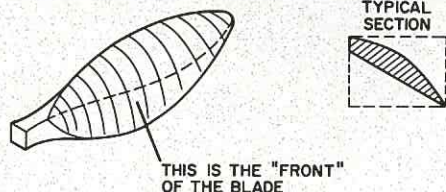
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THIS IS THE "FRONT" OF THE BLADE

FIGURE 6.

7) Now, simply round off the L.E. to get the correct section and BINGO!, one blade! Sand it all nice and smooth. Repeat the entire process for the other blades. Draw up a suitable hub and glue in the individual blades. Take care with alignment. The blades can also be pegged if desired for additional strength — see Fig. 7.

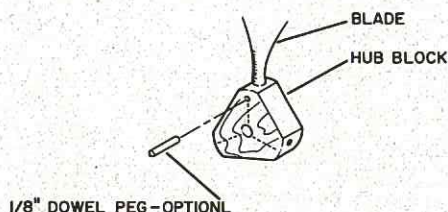


FIGURE 7.

See — it wasn't difficult, was it?

While reviewing aviation artist J.B.

Deneen's series of WWI paintings a few months ago, we closed with the thought that a WW II series would be welcomed.

Ah! the power of Scale in Hand! But, all kidding aside, the Echelon Publishing Co. has now come up with five superb WW II bomber paintings at the same size (16 x 20) and price (\$2.00 each, set \$7.95) as the earlier birds. For all WW II fans, these carefully-authenticated scenes will be required wall decoration. Only one small point puzzles this reviewer: how come the R.A.F. fin flash on the otherwise U.S.A.A.F. marked B-24 is backwards? We've seen many instances of aircraft carrying two nation's insignia, especially Britain and America together, so we have become used to this rather interesting marking quirk. But, we'd sure love to see the evidence that the R.A.F. fin flash on this particular B-24 had its blue stripe leading!

If your model shop cannot supply, write direct to: 301 First Federal Building, Minneapolis, Minnesota 55402.

According to another columnist, the subject of "weathering" has become a "raging controversy". Could be that, journalistically, "raging contro-

versies" are good for trade — so are worth giving a bit of "help"! Seriously though, here's a letter on the subject. Dear Don,

I am only 14 and new to modeling but I have one argument to present to you.

I am referring back to "Viewpoint" Nov. In that article Don Dewey explains how the British incorporate worn appearance into their models, and explained how the American models are glossy and looking in top condition.

I have not read anywhere in the rule book where it states that the model must be a representation of a well used plane.

I feel judges are unfair to present higher points to this variation of models. They are blind to the fact that many people enjoy scale planes in new condition. I feel that either type require much work and the type with the new, glossy appearance, and the modelers who created them should not be discriminated against!

Thank You,  
Randy Giedrycz

Many thanks for your letter to Don which he passed on to me for reply. Hope you don't mind the switch?

There are two quite separate ans-



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wers to your question, which is a perfectly valid one. All that the rule book says is that the finish should be realistic. It doesn't say it should be weathered or that it should be clean and bright.

So; answer number 1 is this:

"It depends on the subject involved. One would not expect to see a weathered, battle-damaged and generally beatup Goodyear Racer! Neither is it likely for a WW II veteran fighter or bomber to be all bright and new-looking. If one were to make, say, a Battle of Britain "Spitfire" and paint it glossy, with squadron insignias and kill markings, then it must be expected that the model will be down-pointed. This seems fair enough to me — how about you?"

So that's answer number 1 and states the position very fairly, I think. It seems that what you (like many other modelers) are doing is making the assumption that a model got good points because it was weathered. You

should ask yourself "Was this model of excellent quality, superior to the others, and was it going to get top points anyhow?"

Let's say that one model had all its correct detail; panel lines, cockpit, pilot, rivets, scale wheels and weathering. It comes up against a bunch of models with glossy dope finish all level, no panels, rivets, no cockpit detail, no pilot, commercial wheels, etc., etc. Does the first model get top points because it was weathered?

Answer number 2 is a "ratty" one and it's not this column's answer — neither are we defending it. But it is one that could easily be given in answer to such criticism:

"The only complaints against weathering are made by those who can't do it! No squawks are heard from those expert at it. A man who gets beaten seems to need some justification for his failure and will blame whatever reason presents itself. If the top model was weathered, he'll

say — Gee! I got beat because my model wasn't weathered."

★ ★ ★ ★

## NEW RETRACT-GEAR UNIT

We seldom give a rave review to a new product in this column (only one in the 18 months that Scale in Hand has been around — to the book "Japanese Army Air Force Camouflage WWII", a masterpiece that fully deserved it). Frankly; too many raves would soon destroy a reader's trust and anyway, even if an item is the best of its kind, that doesn't necessarily mean it is good.

When we received a pair of the CAS retracting-gear units, our familiarity with this thorny subject naturally made the appraisal a very critical one. In spite of this, or because of it, we are very impressed. As readers of our earlier column on retract-gear design will remember, it is not easy to make a unit combining every desirable feature for Scale RC models, but Chuck Kanavle of Sealelectronics Co., designer

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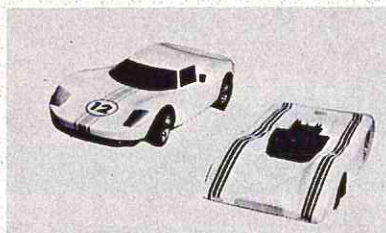
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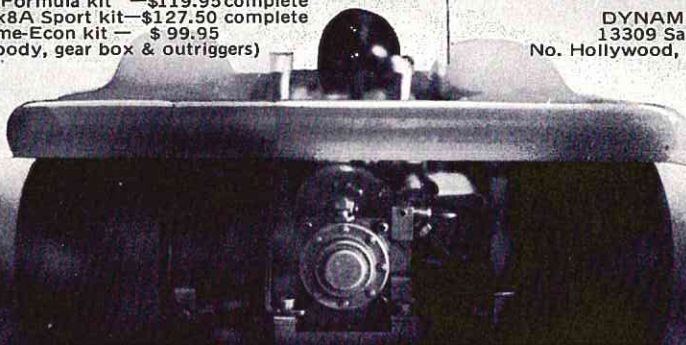
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of the CAS unit, has cleverly licked the problems of varying balance requirements with an adjustable spring-arm. The spring is correctly placed for true balance and could be replaced with a stronger one if the situation demanded.

For scale model use, we'd still rather use the Wing Mfg. motor/gear train as the prime mover instead of the servo recommended (for pattern models) but the unit is strong, priced well, and we especially liked the plywood mounting plates and full-size drawing of the unit; thoughtful finishing touches to a really excellent product.

★ ★ ★ ★

Southern scale fans attention: The first "All Scale All South" Meet (AA) will be held September 26 and 27 at the Old Huntsville Airport, Huntsville, Alabama. For details, write A.E. Wilson, 117 Governors Drive, S.E., Huntsville, Alabama 35801.

★ ★ ★ ★

To finish up this month, a really excellent photo of a first-class scale RC model and meet winner, Percival Proctor, by Roy Yates. Yes, Roy (not Dick!)



### WIDGET

(continued from page 23)



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second coat of white glue and smeared it in with the palm of my hand to make sure all areas of foam were covered. The beveled tips of the wing were also covered in this manner. When the wing was dry, it was sanded smooth with emery paper. The wing was then sprayed with white dope, the first coat being applied very lightly. About three coats of white dope, thinned to about 50-50 with thinner, were sprayed on. Three coats of clear then gave it a high gloss. This method of covering a foam wing of this size gives a very smooth and attractive finish.



After the fuselage had been sanded, filled, and sanded once again, it was covered with Silray, followed by three coats of clear dope, four coats of white, three coats of trim color, and two coats of clear, overall.

After the plane was painted, the canopy, which was cut from a 15" Sig canopy was added to the hatch.

#### SPECIFICATIONS

Wingspan ..... 44"  
Wing area ..... 264 sq. in.  
Overall length ..... 32 1/4"  
Flying weight ..... 34 oz. with Galloping Ghost.  
Engine ..... OS Max-10 RC.  
Equipment used ..... Rand GG pack.  
Controlaire GG transmitter  
Controlaire SH-112 receiver.  
Controls ..... Rudder, elevator, and motor.

#### COMING NEXT MONTH!

The 1970 Nationals presented in the most extensive photographic coverage ever seen in a model aviation publication.

#### ENGINE CLINIC

(continued from page 12)

rotating the back plate 90° clockwise when viewed from the rear. In the case of most rear rotor engines this will move the carburetor from the top corner to the bottom corner which might present tank location problems. Super Tigres have two drive slots in the rear rotor that can engage the crankshaft drive pin. By rotating the back cover 90° counter clockwise when viewed from the rear and using the drive slot that is not used for normal rotation, the engine will be reversed, and the carburetor will be moved from the right hand side to the left but still be at the top.

\*\*\*\*\*

Dear Clarence:

One of my Enya .09 engines was recently transferred to another plane, but, before installation I cleaned it with thinner and gave it a few drops of oil.

At this time I noticed a "knocking" sound when the engine was turned over and upon inspection found the hole in the con-rod, at the wrist-pin end, to be oval and extremely over-sized.

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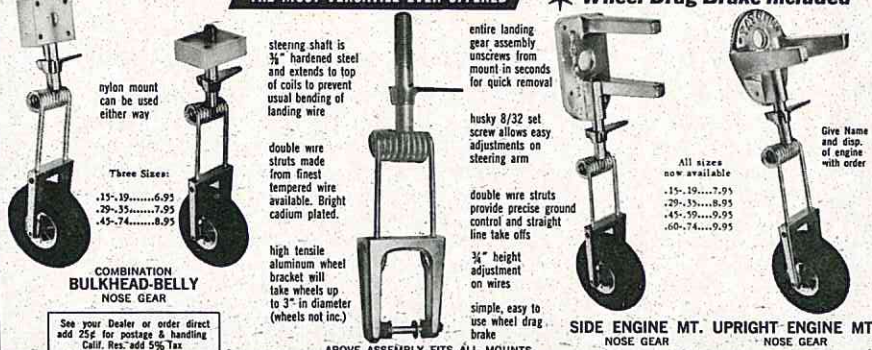
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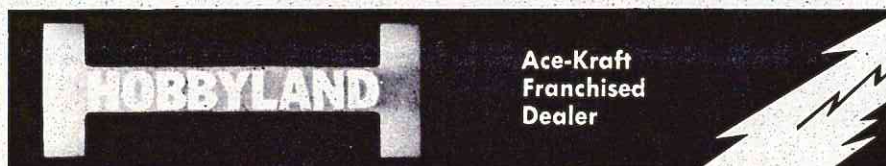
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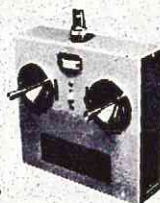
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## KAOS

**Joe Bridi's Sensational 59" Span Competition Multi as Featured in the  
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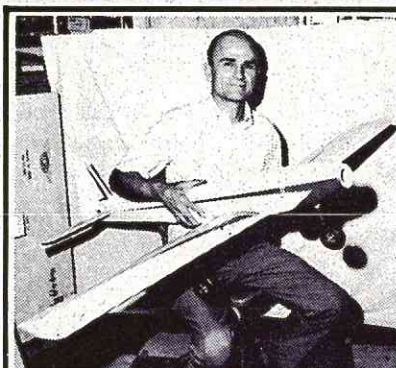
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Prior to removing the engine it had been turning 12,500 as measured with a Heathkit Thumb Tach. Performance was excellent and was the main reason for wanting to use it in the new plane, a small pylon racer. Also, this "knocking" sound was never noticed prior to the cleaning with thinner.

The question I have is two-fold: one, will continued use with the present con-rod be advisable, and, two, if replacement is suggested should the piston/sleeve/wrist-pin also be changed?

Best regards,  
Larry Hoffman  
Tokyo, Japan

Washing the engine out with thinner removed the heavy castor oil. This in turn allowed you to now hear the excessive rod clearance. The engine will most likely sound better if you lubricate it with castor oil. If the rod is loose enough to knock, it would be best to replace it. Generally if the upper end of the rod is badly worn, the wrist pin holes in the piston will be worn also, so be sure and check these. If okay, then only the rod will need replacing. If worn, then the piston and sleeve will need replacing also.

That does it for another month, gang. Keep those letters coming in. If you want a personal reply, be sure and enclose a stamped self-addressed envelope.

**WRITE TO**

**CLARENCE LEE**

**ENGINE CLINIC**

**R/C MODELER MAGAZINE**

**P.O. BOX 487**

**SIERRA MADRE, CALIF. 91024**

**THE MODEL WIFE**

*(continued from page 6)*

when the house was full of modelers laughing and talking, kidding each other good naturedly and in general, having a ball.

I have defended model building and flying for years as a healthy indoor and outdoor hobby. One that really holds a man's interest, is fun, gets him out in the fresh air, takes his mind completely off his work and is a true recreation.

We even had to defend ourselves with one real estate man; it took a few days to convince him that we would not even consider a house without space for a shop.

Relatives, friends and neighbors have learned over the years that we like modeling and all the accompanying things that go along with it. I



have not ever heard the wife of an avid golfer be put through the questions that I have answered in defense of modeling. Many people have taken up the hobby after observing our enthusiasm for it and are now enjoying it as much as we do. But why is it that we must constantly defend ourselves from people who evidently think we are bordering on lunacy? One lady I met recently thinks models are expensive toys and the men who build and fly them, to her, are messy, immature, overgrown children.

I am at present defending them again, but I have enough arguments to bring most people around to an understanding of the way I feel. Which is this: Modelers are interesting people and gain much satisfaction from good work on a model. They enjoy themselves with a vigor seldom seen in other hobbies. They never get too old to fly radio control and get a kick out of fine maneuvering or making a good landing. If bad weather sets in, they can go right on with their building, repairing and planning of other models. It is active to some extent; have you ever hiked to retrieve a downed plane or loaded a car with all the things one must carry to the flying field?

It can be done at home (a decided advantage to wives) and, as I like to point out to some women, it keeps husbands from unhealthy pursuits, such as chasing other women! (Ed's note: Really?)

Besides all of this, we have learned quite a bit of history from looking up a certain kind of plane and reading up on it to build a flying scale model. It is no more expensive than golfing, skin diving, fishing or any number of other hobbies. Cost is so often put forth as an "I've got you there" sort of argument. Do these same people analyze the cost of fishing, for instance? Some men buy boats, motors, lake front vacation homes, expensive rods and reels, all sorts of costly flies, rubber hip boots and even cars which they call their "fishing heap". Of course any hobby can be expensive, according to how much enthusiasm the person has for it. Fishing could consist of a hook, line and sinker, but how many fish that way? Few, after the age of three.

Let's face it girls. We need to be about the job of telling people about the advantages of modeling. Spread it so well that we will never be looked at with pity again.

We don't need it.

## CANADIANS

Is the high cost of modeling keeping you grounded? Send 25 cents for my catalogue and be pleasantly surprised.

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KO Mufflers now in stock for the following, Veco .61, Enya .60 II, Merco .61 111, Enya .29 .45, Fox .74, Webra .61. This is one of the finest mufflers made and was highly recommended by Clarence Lee. My Canadian price same as USA **12.95** each—Just arrived, Webra .61 Blackhead **72.95** Internats winner.

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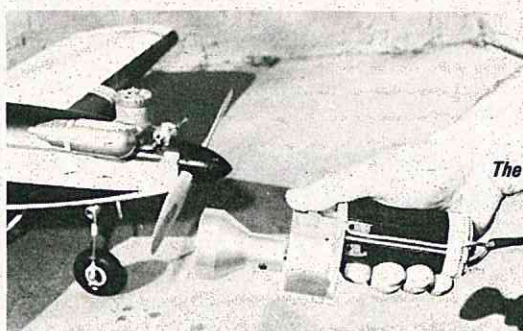
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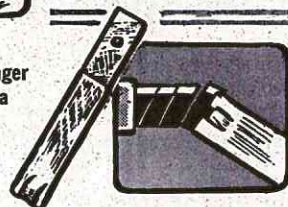
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## VIEWPOINT

(continued from page 5)

would add some loot to the club treasury without any expense.

There should be no real problem developing the training program. Basically, the five hours "dry" would consist of the stick movements necessary for takeoff, landing, loops, and rolls. Touching on the movements necessary to recover from unusual attitudes. The two hours "actual" could consist of the four "dry-flying" maneuvers with safety and interference control. The last thirty minutes of the two hours could be supervised solo with the instructor advising if the student got in a bind. These seven hours on these four maneuvers would give any beginner a good basic knowledge of his plane and equipment as well as the maneuvers. When the training program was perfected, a club could require that every new member had to participate and pass the program before he would be accepted as a member with all privileges. The ten dollars would be considered an entrance, training, and first month dues fee and could be refunded if the student could show cause as to why he couldn't complete the program. The only exceptions would be new members who could demonstrate that they were qualified pilots, and current flying members of the club.

Training members in this fashion would assure a higher level of proficiency among all club members and upgrade the overall quality of the club safety and interference record. It could give all of us another wedge to use to kill the "toy airplane" image. I hope I have aroused your interest in psycho-cybernetics. I know it works, but it sounds, and is, so simple that you may be skeptical until you try it. I urge that you do. Give it a fair trial. I think you'll discover a method of practice that is cheap, safe, and thorough.

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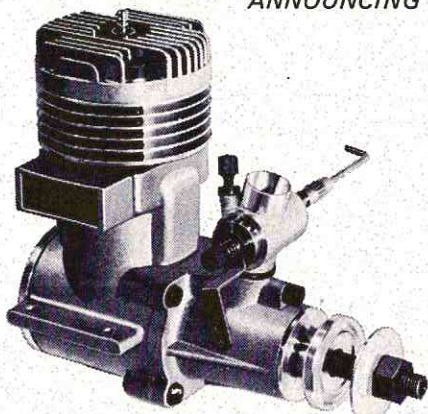




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- B. Elevator Use for Pitch Control
- C. Rudder Use for Yaw Control
- D. Combining Controls to Make Turns and Maintain Straight and Level Flight

#### IV. Snap Rolls

- A. Rudder Effect
- B. Elevator Effect
- C. Combining Controls for Snap-Rolls

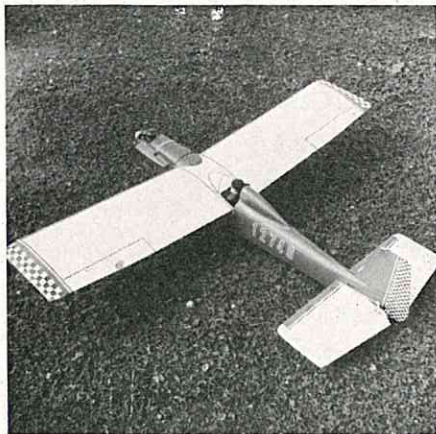
#### V. Aileron Rolls

- A. Aileron Effect
- B. Elevator Effect
- C. Combining Controls for Aileron Rolls

#### VI. Landing

- A. Altitude
- B. Throttle.
- C. Elevator Use.





## PLY PAIR

(continued from page 23)

where cleanness and function find their moment of truth. So while a plane of this size might today be typically powered with engines in the .29 to .40 range, I chose a Webra .20. Whether the resulting performance proved out the design or the engine is not completely clear, for this is undoubtedly the finest engine of its size I have ever owned. Power galore, beautiful throttling action and ball bearings where they count, it is truly a quality designed and manufactured engine well worth a couple of extra bucks. In any event, the combination was a natural and almost any maneuver is possible from level flight, with the exception of Vertical Eights, etc. The small nose cross section clears a 9-4 or 9-6 prop so that the whole disc puts out, and the minimum drag concept follows through by not creating large forces to be overcome.

Slow speed flying characteristics are excellent with no bad habits, rolls are rapid and, all in all, it is a very satisfactory combination. A fast building semi-symmetrical wing section was used as most sport flyers do not seem to do a great deal of inverted flying. However, if you want the whole show, go full symmetrical. As a matter of fact, some of you will probably go the large engine route and blow the whole premise anyway, but that is the great attraction of the sport, for you can tailor it to your own desires. Incidentally, many flights were made using three servos and coupled rudder-aileron controls. With the exception of some wing dipping on takeoff, flight performance was almost indis-

tinguishable from full house.

As to survivability, a broken wire (I think) resulted in a vertical spiral dive from an altitude in excess of 100 feet. The long walk to pick up the pieces was filled with mental pictures — all bad, so upon reaching the remains I was somewhat stunned to find it sitting upright and intact, with only some spreading of the fuselage at the main landing gear due to a bad glue joint. 'Nuff said!

Since this piece has begun to ramble around like my first takeoffs, let's touch on another related matter. There are quite a few designs offered today as the answer to everyone's every wish i.e., the all purpose-rudder only, galloping ghost, proportional beginners' ship capable of doing the complete FAI and AMA patterns simultaneously. Perhaps a few can really accomplish most of these things, but a basic aerodynamic fact of life cannot be avoided. No one design can do all of these things well. This is true because each mode of control has specific problems best solved in specific ways. The Plymate is a case in point. As originally designed for the Rand system, ailerons were not included and ten degrees of dihedral were used to help the roll rate since the yawing action of the rudder would have to do all the work. To let you in on a secret, it didn't work! To be blunt — the plane was sluggish in turns and absolutely refused to roll. Want to know why? Well the answer is in one word, WINGTIPS.

The relationship may not be apparent to some but the following observations are based on flight testing involving a variety of R/C designs. First, that the tip of the wing has a positive dihedral effect in terms of the roll axis is generally well known as evidenced by the wide use of "slashed" — from the bottom up — tips by almost all rudder only designs. The rule-of-thumb law indicates that a 45 degree angle will add from one degree to two degrees of effective dihedral. What is generally not so well understood is that a flat, or even streamlined, tip can actually subtract from dihedral. Also, in the case of a tip with a squared planform (seen from above) and to a greater degree with tip plates or Hoerner type tips, roll is actually resisted! These tips, by modifying the tip vortex pattern, create a more stable condition which can be undesirable when only the yawing action of the rudder is used to create a rolling condition. Therefore if no ailerons are

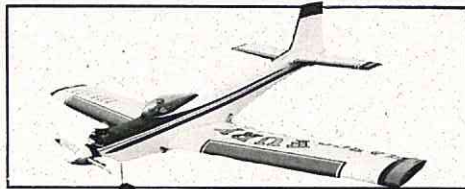
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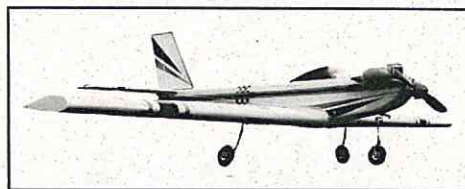
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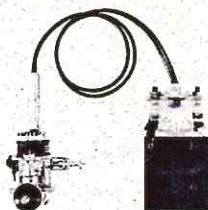
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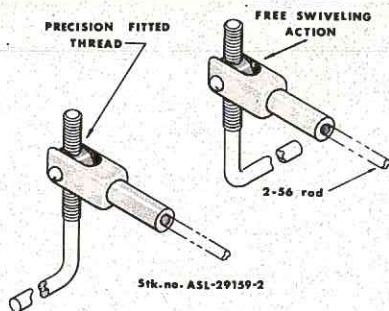
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used, be sure to use the slashed tip version.

With the growing use of ailerons of various types the problem is much less critical, in fact, often ignored. But the fact remains that poor tip design reduced effective span and creates considerable drag. For this reason it would not appear to be advisable to carry ailerons all the way to the tip where they can only add their turbulence to that already present. With the current practice of adding power and more power to overcome design faults being the rage, perhaps all of this becomes academic. But for those who are interested in efficiency as a design goal, these principles cannot be ignored. In any event, try either of these planes as designed, and judge for yourself.

As these are not beginners' models, the construction notes will be just that, a few comments to clear up procedures. The real hope is that many of you will see the method as one readily adaptable to a variety of designs of your choice. Try it! This may be the start of something BIG!

### CONSTRUCTION NOTES

#### WINGS

Both wings are typical D-Tube and cap strip construction requiring no special comment. The semi-symmetrical section has been used on a number of designs with excellent results. The bottom of the ribs are straight from the spar back to permit building flat on the board with no jig needed. Balsa sheeting is held with masking tape rather than pins while drying. Give extra care to the shaping of the leading edge as variations here can only cause trouble. And, of course, there must be no warps. Wings on both planes were covered with MonoKote. Use aileron hinges of your choice. I used Rand. Be sure the ailerons are stiff enough to resist twisting. Stabilizer construction should be clear from the plans, nothing different here.

#### FUSELAGE

The canopy or windshield can be cut down from 8" or 9" commercially available types. The Plymate, using the front section, the Skyraker, the rear part. Take your time shaping and sanding the blocks at the nose, like you really care. Finish can be the traditional filler and dope, polyurethane enamels, or Hobby Pox. It's your choice. But beware of most of the commercial spray enamels as many are not fuel proof. Good luck to all you noble experimenters!

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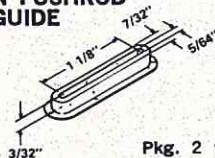
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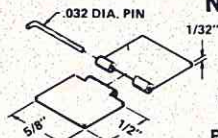
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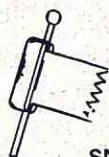
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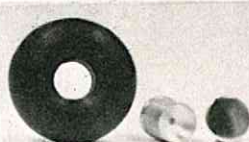
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**INVICTUS**

(continued from page 18)

trailing edge sheeting can now be cut away as indicated to make room for the goodies.

The wing is now ready for the linkage. Add all the nylon tubing indicated and cut it flush with the bottom sheeting. Keep it smooth and free from any binding. The rubber cable tubing should be placed between the aileron and elevator servos and as close to the top as possible. A small 1/16 wire pin will be added later to mate with the rudder servo bellcrank in the fuselage. This may appear like a hell of a lot of bellcranks and tubing to go through in order to activate twin rudders, but a little diligence at this point and it will work smoothly with a minimum of slop. Complete the top center section sheeting; sand and cover the wing with silk or Super MonoKote and set it aside.

Next build the booms and the stab. They are simple and easy to construct utilizing the "sandwich" type construction. At this point you must decide whether to inlay the tubing in the booms or use the quick and dirty method of running them along the outside of the inner boom sheeting after construction is completed. I have used both methods. Both work well, but inlaying the tubing is a little neater. Again, make sure to cut the tubing flush with the balsa sheeting. Keep construction of the fin part of the booms and the stab light. This will obviate the need for lead nose ballast later. The booms, although rather frail looking, are surprisingly strong and will withstand the normal rigors of flying and bad landings.

After completion of the booms and stab, sand and cover them now with silk, silkspan, or Super MonoKote. Place the wing airfoil template over the booms and cut them out. Make sure you are accurate. This will insure an exact zero-zero wing-stab incidence. Cut a 1/2 inch wide strip of covering material away from the wing at the proper boom location point, slip the booms over the wingtips, and slide them into precise alignment. Here is where good trammeling pays off to insure proper alignment. Use strings,

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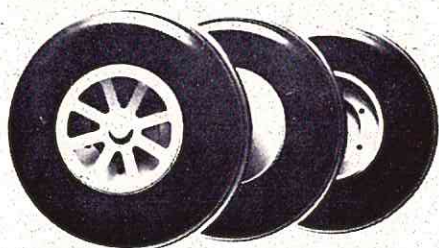
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tape measures, carpenter's levels, and whatever else you can think of. Spot glue the booms in place. Next carefully glue the stab on top of the fin, again making sure of exact alignment. Using a good grade of epoxy or epoxy putty, fillet in the booms and stab. You have now formed a strong lightweight box structure.

Add the center section trailing edge stock. Cover this and you are finished. Up to now we have had no use for the fuselage, whatsoever, as the wing-boom-stabilizer group is a separate entity.

The fuselage construction is, again, quite simple. Cut out the fuselage sides, 1/16 inch plywood doublers and bulkheads, and assemble. Add the bottom nose sheeting. Don't worry too much about weight here as you will need it to counterbalance the tail. Now carefully mate the fuselage to the wing. Add the wing lock dowels and the Tatone or Camlock bolt assembly and fasten it on securely over waxed paper or Saran Wrap. Make the wing fillets from epoxy or epoxy putty.

It is now time to locate the rudder bellcrank assembly before the top fuselage sheet is added. This should work out so the fuselage can easily be removed and replaced. A 1/16 inch music wire pin soldered to the rudder cable works nicely as a key and should fit easily into the rudder bellcrank. Add the top fuselage sheeting. It may be necessary to wet this and block it up over night to achieve the necessary bend. Tack on the nose block and razor plane and sand to a smooth, rounded contour.

### COVERING AND FINAL FINISHING

Any good finish will do. The prototype had a standard butyrate finish. The second one was covered with Super MonoKote, which, in my opinion, is the best way to achieve a quick and very acceptable finish. A word of warning to lovers of butyrate dope and silk: be very careful with the booms or you will end up with a lot of warps. This problem does not occur using Super MonoKote or Hobbypoxy enamel. Finishing Touch Decals add a lot to this design, so if you are inclined, please use them.

Flying this design is no different than a standard pattern ship so I won't insult your intelligence by telling you to make sure the switch is on. A little engine side thrust may be necessary depending on your engine-prop combination. So fire it up and let her go. Good Luck with your INVICTUS. I hope to see you in the winner's circle.

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