JOE FOSTER'S HI-PERFORMANCE 'PATRIOT'

CDC

Radio Control MODELER

JULY 1965 50¢

AMERICA'S LEADING PUBLICATION FOR THE WORLD'S FASTEST GROWING HOBBY

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THE PHOENIX: PART 1 DON LOWE

RCM's 1st ANNUAL DESIGN CONTEST

RADIO CONTROL MODELER

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EDITOR'S MEMO

by DON DEWEY

ALL TOO OFTEN, in the hurried, frantic pace of modern living, a man's work may go unnoticed – that is, unless he doesn't do any! In our hobby of radio control, one particular man's work has extended far beyond the normal realm of merely providing sustenance for himself and his family. This month, RCM is proud to salute the twelfth anniversary of Ace Radio Control, and the fine gentleman behind that organization, Mr. Paul Runge.

Twelve years ago, Ace Radio Control was a far cry from what it is today. During that span of years, Paul Runge developed one of the largest distribution and mail order houses in the world that caters almost exclusively to the needs of the radio control enthusiast. For the RC'er who enjoys "doing it himself," Ace R/C is the home of an amazingly wide and diversified variety of radio control kits, components, and hard to get items. For the experimenter, it is also a source of information – a vertitable fountain of knowledge on experimental techniques.

As a matter of fact, the latter category was expanded eight years ago by the publishing of the first magazine in this country devoted exclusively to radio control – Grid Leaks Data Service. Starting in a modest way as a mimeographed publication devoted to the home-builder and experimenter, this publication has grown to a position of international importance in our phase of modeling.

I am quite sure that the entire R/C fraternity joins the staff of RCM in wishing Paul Runge and Ace Radio Control a most joyous twelfth anniversary – this, combined with the thanks of of all of us for a most important and significant contribution to the enjoyment of each and every RC'er.

●

This month, RCM has lost two of its most valued contributors – Gil Duarte, staff photographer, and Don Mathes, Technical Editor. Gil, who has been with RCM since the very first issue, resigned his position as in-plant photographer with the Consolidated Electrodynamics Corporation, a subsidiary of Bell & Howell, and has moved to Grass Valley, California. All of us will miss Gil's outstanding photographic presentations and wish him the best of luck in his new endeavor.

Don Mathes, RCM's Tech Editor for the past few months, found it necessary to resign due to the pressure of his newly formed RC manufacturing facility, Micro-Avionics. Although Don's technical know-how and various technical contributions were of great value to all RCM readers, he felt that it would not be completely fair for a manufacturer to be the Technical Editor of a major publication in the same field, once his doors were open for business. Good luck, Don, and thanks for the help along the way.

●

This month several letters have been received, here at RCM, from modelers who have misinterpreted a recent ruling and/or statement by the Federal Communications Commission. This statement, in effect, says that the Citizens Band may no longer be used for "hobby purposes," but will be used only by those having a definite need for the Citizens Service. In checking with the Los Angeles field office of the F.C.C. for a clarification, we were reassured that this affected only the "hamming" by voice stations – thereby using the Service for "hobby" purposes. This does not, however, affect the License-Free portion of the Citizens Band – that portion of the Service where very little restriction is placed upon CQ'ing, hamming, length of time on the air, etc. Here, on a frequency spread of 26.97 to 27.26 megacycles, the operator can "chew the rag to his hearts content as long as his power *input* does not exceed 100 mw and his antenna does not exceed a single element longer than 5 feet.

But here's the rub. This would seem to restrict this type of operation to low powered walkie talkies which operate on our frequencies to a point where they could only interfere with radio control aircraft if they were within a few hundred yards proximity to us. Let's look again. The electronics magazines are already publishing "how-to" articles for devices to find ways around this ruling. For example, a recent publication illustrated the construction of a new final for a five watt base station which, in effect, converts the operator's present final to a driver stage for this add-on unit. The indoor power unit utilizes a dummy load in which the output of the base rig is dissipated. A detector unit in the new rig converts part of the base rig's RF into audio, which signal is fed up a cable to modulate a 100 mw transmitter *mounted five feet below the top of the operator's present base station antenna!* And, although the transmission utilizes the whip antenna on the "airborne" transmitter, its effective height has been

(Continued on Page 7)

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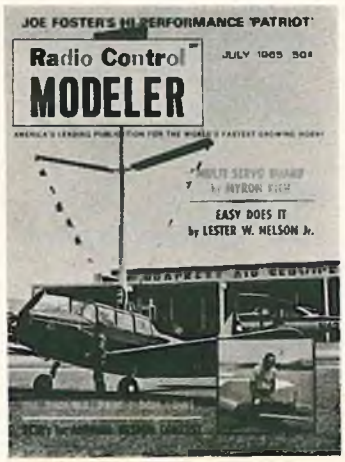
FEATURES

DEPARTMENTS



COVER

Al Thompson's scale design photographed at Brackett Field, Pomona, Calif.

Ektachrome by Chuck Waas

NEW! Joe Martin's Sensational 50" Scale R/C Beauty

DENIGHT SPECIAL!

the hottest thing to ever hit R/C

. . . Miniature Goodyear Pylon Racing!

Pylon racing has caught fire . . . from coast to coast! Patterned after the fabulous Goodyear races of the 40's and 50's the miniature R/C versions are bursting with excitement. Racing associations are springing up overnight . . . clubs and contests are mushrooming—because *nothing* can equal the thrilling, pulse-pounding sight of three or four of these speed demons flashing around the Pylons wing-tip to wing-tip in actual racing competition!

And here's the greatest of them all! Joe Martin's magnificent DENIGHT SPECIAL is sweeping contest after contest! Now this great plane is *yours* in kit form—produced by Sterling in its finest tradition of uncompromising quality.

CHECK THESE GREAT FEATURES!

Full Length, Die-Cut, One-Piece Balsa Sides and Doublers; Full Width, Die-Cut Tail Surfaces; Shaped and Hollowed Upper & Lower Balsa Cowls; Individually Custom-Shaped Maple Motor Mount Beams & Center Spar; Full Length Spruce Wing Spars, etc. Kit also includes: Crystal Clear Bubble Canopy, Special Hardware; Plastic Cowl Cheeks & Wheel Pants; Stamped Spring Aluminum Landing Gear, Authentic Decal Insignia; Full-size plans with easy-to-read step-by-step illustrations and instructions —plus much, much, more!

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KIT FS17

Denight Special

For .19 to .60 engines.
Pylon racing maximum: .40

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substantially increased. And, thus, a Part 15 operator can call CQ to his heart's content, talk without using call letters, and not have to observe silent

"It all started when I couldn't dig up enough money for a new proportional R/C outfit."

periods between transmissions. With this device (and, we're sure, others that will follow it), these "would-be" hams are going to transmit much farther than would ordinarily be expected of a low power walkie talkie—and, subsequently, cause more damage on our own frequencies. We strongly recommend the use of a superhet monitor, such as appeared in the last issue of RCM. You may well need it in the months to come, and until our new frequencies are approved by Frank Charlie Charlie. An interesting sidelight to this is that when we completed our prototype of the superhet monitor, I flipped on a frequency at random and there was a lovable character who identified his location as 400 miles distant, broadcasting full bore over one of our frequencies with a Class D rig, and who boasted of having a thirty watt linear amplifier in service. . . .

Although the Citizens Service provides necessary communications for industry, emergency service, and the like, it is becoming increasingly difficult for them to maintain normal operations. And, from our viewpoint, we can begin to see why the Amateur Radio operators were somewhat reluctant to give away the eleven meter band to a very loud minority of individuals who are too lazy to become Amateur radio operators themselves and would hamper the necessary operations of those who had a valid reason for using Citizens Service Voice communications. May their numbers decrease rapidly. . . .

Speaking of amateur radio, we at RCM, are privileged to have as friends, many "hams" throughout the country—most of whom have been bugging yours truly to set up a station here at RCM. (Might set a new record—Worked All RC'ers In Shortest Time.) Our buddy, Ed Thompson, in Glendale, Arizona, has given up on old Dewey as a budding Novice and has resorted to phone relays via a local Amateur. Seriously, Jack Mathias (W9FMW) of Evansville, Indiana, has a good idea. Being an RC'er of some fifteen years standing, he suggests that all RC'ers who are hams contact RCM so that skeds could be set up. Jack, by the way, runs 1200 watts PEP SSB and listens mostly between 3965 and 3985 KC. How about it, RC hams? Let us know the pertinent data and we'll help with the schedules. SWL's drop a line, too. As for old hopeless Dewey, I'm willing, already! You guys each send one part for the station along with detailed instructions and I'll put together the latest super regen receiver and quarter-watt, one-tube Tx. Push me too far and I might even dust off the old books and do something desperate—like study for a license.

•

It takes a lot of people to write a magazine each month. The quality of a magazine depends upon the caliber of material that appears within its covers. The editor's job is relatively simple—he selects material, edits, and re-writes. If an issue is good, the credit belongs to the contributing modelers who made it good. If it's not-so-good, the fault lies with the editor who is responsible for selecting the material. At least, that's my opinion. So, what I need from you is more good material. So, you've never written an article before—now's the chance. What's your other excuse? Oh, yeah. You can't spell and your typewriter can't spell. Big Deal. Print it so we can read it and don't worry about the spelling. Charlie can't spell and he's still an editor. Besides, if all articles were perfect and didn't need rewriting, I'd be out of a job. If you have a favorite building or finishing technique, or want to expound on the fundamentals of electronics for RC'ers, or have a design that occasionally gets airborne—write it down. Send pictures. Sketch it out. We'd like to see it. And chances are, so would the rest of the readers.

And what about you? You don't have an article to write? So send a letter and tell us what you'd like to see in RCM, an RC sailboat? Glider? Proportional System for do-it-yourselfers? We can't read your mind, so take five and fill up the next few mail sacks that come our way. All suggestions and criticisms are welcomed, always.

Like the RC'er who wrote—"Dewey, you're the only guy I know who has absolutely nothing to say—and says it beautifully."

•

You sure know how to hurt a guy, fella. . . .

Sunday Flier

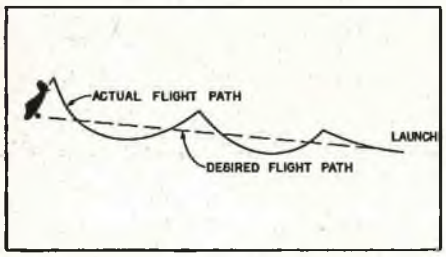
by KEN WILLARD

Conclusion of a two-part "how-to" series on trimming the R/C model . . .

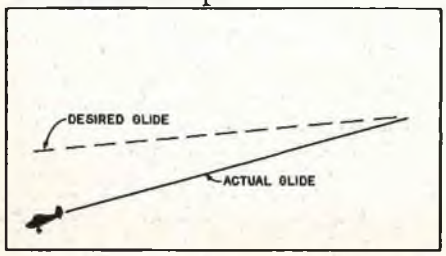
Last month, you checked the balance, the alignment, and the warps, made the corrections, and now it's time for "test and trim." Let's assume the design you've built is one that was thoroughly flight tested before the plans were published. The first flight for you, then, will be "routine" for the model, even though exciting for you.

If you have selected a small model, glide tests from hand launch are useful. However, for larger models, the value of hand gliding is questionable. You're better off to be reasonably sure you've checked the balance and alignment, then go ahead and fly with power. Let's limit this discussion to the latter case.

The basic purpose of the first test flight is to check the general power-on flight trim with the power-off glide characteristics, with the achievement of a good straight glide (or possibly a wide left-circling glide for escapement or single channel servo-controlled models), following a good straight climbing power flight. Now you can't just make a single correction to get a good glide without considering the possible effect on the powered flight. For example, supposing your model, under power, flew in big dips and swoops –



– and you were lucky enough to have it go high enough so the engine quit, and it achieved a glide, but the glide was fast and steep:

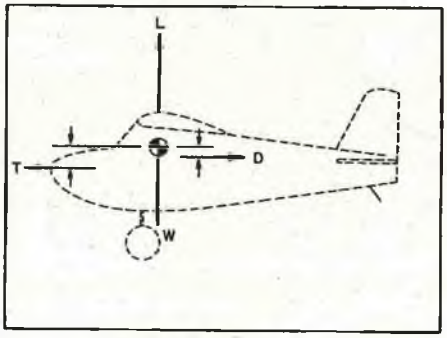


This is one of the most common "first flight" patterns. Nearly all designs which show the engine thrust line parallel to the "line of flight" will exhibit this tendency. Two corrections are required here, and they oppose each other. For example, you could correct the power swoop by:

(1) Moving the C.G. forward by adding weight in the nose.
(2) Shimming up the trailing edge of the wing so it flies at a slightly lower angle of attack and thus moving the Center of Pressure back.
(3) Lowering the trailing edge of the stabilizer (or elevators, if you have them).
(4) Adding downthrust on the engine.

But, except for number (4), which wouldn't effect the glide, the above corrections would make the glide even worse. You need to do the exact opposite!

So, how do you "get there from here?" You compromise. Take a look at one possible simplified force diagram of the conditions:



Don't get worried, now. I'm not going into a big discussion of theory – just enough to make the point. From there on, we'll just consider corrective measures.

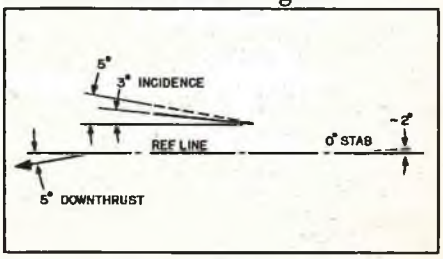
Note that I've shown T=thrust as slightly larger than D=drag. Thus, the plane will accelerate in level flight. This will make L=lift exceed W=weight, and the plane will climb. For simplicity, I've assumed the total lift to act at the C.G., but note that both the thrust line and total drag line are below the C.G. Since the thrust is both greater than the drag and further below the C.G., it produces a clockwise movement around the C.G. which, in turn, makes the plane nose-up until it loses speed, stalls, then repeats.

Then, when the engine quits, since the drag is below the C.G., it creates a counter-clockwise movement that tends to make the plane go into a dive. As the speed picks up, though, the profile drag of the wing increases and the center of drag moves closer to the C.G. until balance is achieved. This may occur in a steep glide, or, as I have actually witnessed, in a near vertical dive!

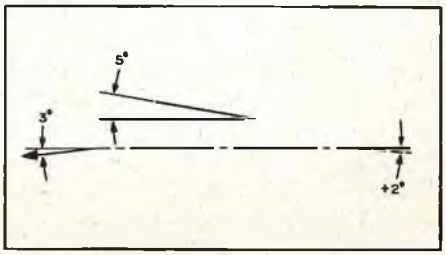
That's just one example – there are an infinite number of variations. In fact, I've really oversimplified just to give you the general idea. Serious aerodynamicists would probably point out the omissions, but this column is for the purpose of stating some "rules of thumb" – not delving into the equations of the six degrees of freedom.

So you've got a power swoop and a diving glide. Let's correct it. First, adding downthrust to the engine will help reduce the swoop – but do nothing for the glide. Unless, of course, you put in enough downthrust so the plane bores ahead at high speed under power, without enough climb. Then you can shim up the leading edge of the wing – that will flatten the glide and bring back some of the climb.

Another way would be to change the stab setting by lowering the leading edge, or if you have a fixed stab and movable elevators, put a little up-trim on the elevators. This may appear to give the same result, but it's not quite the same. Look at the diagram:

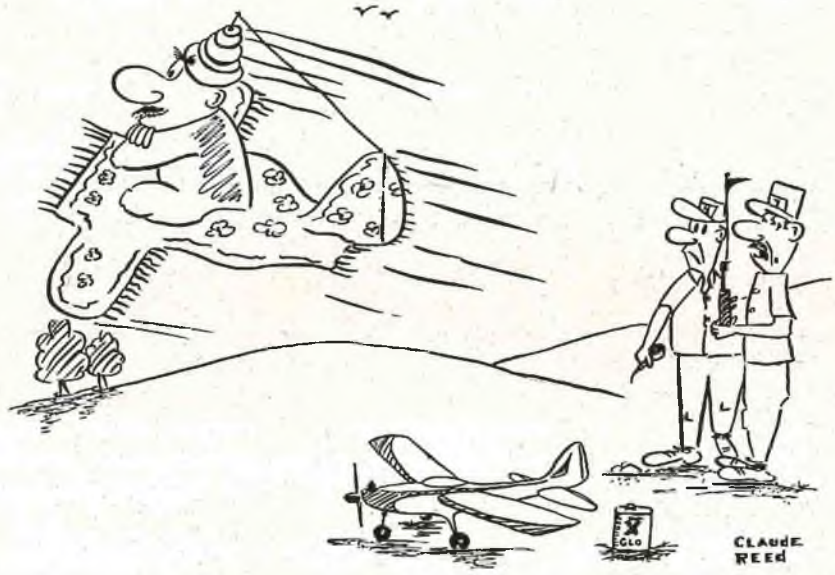


If you shim the wing 2 degrees, the effective downthrust relative to the wing is increased. If you change the stab, the downthrust relative to the wind isn't changed, but the negative setting of the stab tends to make the airplane fly in a slightly nose-up condition. Let's draw the diagram again, with the reference line parallel to the negative stab setting, but rotating the whole diagram so the reference line is horizontal.



Now you've got the wing at 5 degrees as though you'd shimmed it up and left the stab at 0 degrees – but your downthrust, with regard to the reference line, has been reduced to 3 degrees. So, you see, the two adjustments are not the same when you consider the change in flight attitude.

The final answer will vary with each model, but some combination of the four adjustments available must result in a combination of good power flight and glide pattern – or you'd better redesign your model. That's another subject. In achieving longitudinal trim, then, first obtain a satisfactory glide, then vary the thrust line to obtain good power flight. If you find that varying the thrust line won't do it, then you'll have to go the route of changing the C.G., re-establishing a good glide, and again working with the thrust line for power flight.



"That sure shoots down all of Willard's theories . . . !"

There's no simple answer – but by using the "cut and dry" method, you can achieve good longitudinal trim for power and gliding flight.

Here's a suggestion. If you've got a model that flew okay, and you never changed the settings once you achieved satisfactory flight, and now you're building a new one, try some of the variations I've described on the old model. See for yourself the difference between, let's say, shimming up the wing 2 degrees in incidence and compensating by moving the C.G. forward to retain a good glide, and then putting the wing back where it was originally but adding 2 degrees negative incidence on the stab. Although the glide will not change too much, note the difference in powered flight. You might even find several new trim settings that make your old model fly even better! And it will help you immensely in obtaining the best performance out of the new ship.

Along with the longitudinal trim setting variations, it is necessary to keep tab on your directional trim. This, also, was covered in the February '64 issue of RCM, but here's a quick recap:

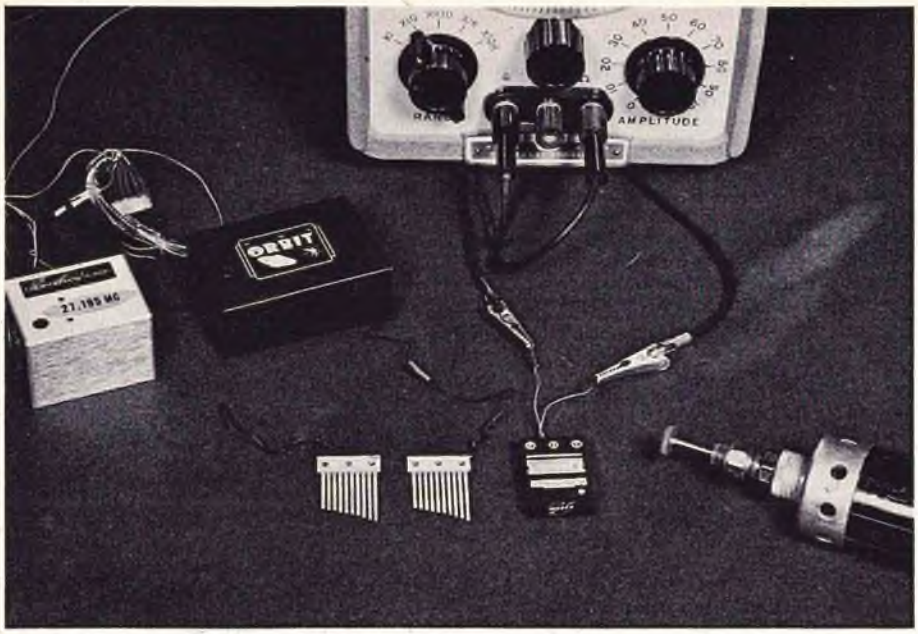
(1) **Model turns left both under power and in the glide.**
   a. If gentle, no problems – good for sport flying. If the turn tightens into a dive, adjust the rudder to the right.

(2) **Model turns right under power and in glide.**
   a. Adjust rudder to the left until the flight path is straight. Or, slight left turn. The left turn is better for escapement or single channel servo operation since one press on the transmitter button will correct the turn.

(3) **Model turns left under power, right in the glide.**
   a. Add right thrust – about a degree at a time, until the model has right turn under power and gliding, then straighten up by adjusting the rudder slightly to the left.

(4) **Model turns right under power, left in the glide.**
   a. Reverse the procedure listed under (3) above.

We have already reviewed up and down thrust changes in connection with the wing and stab settings. Now it's up to you. Try to make the "number of trials exceed the number of errors by one," and next month we'll discuss timing techniques in flying single channel servo operated models.

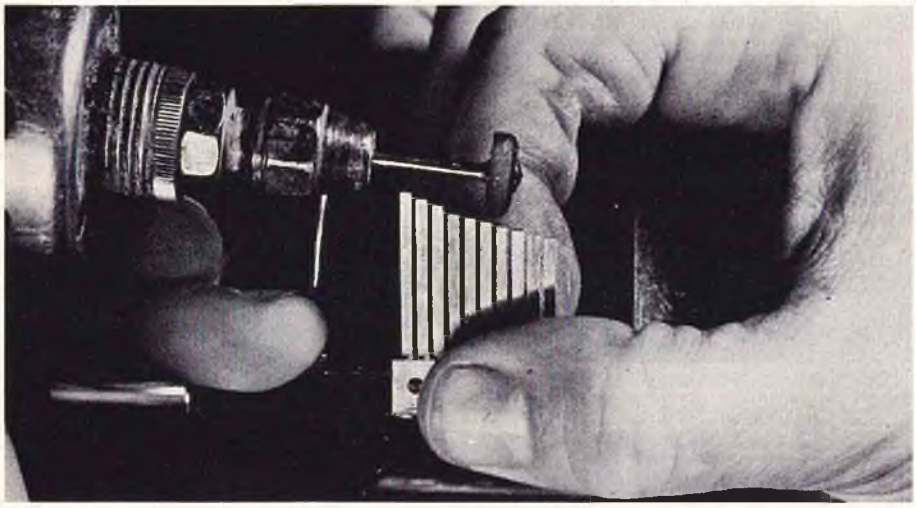


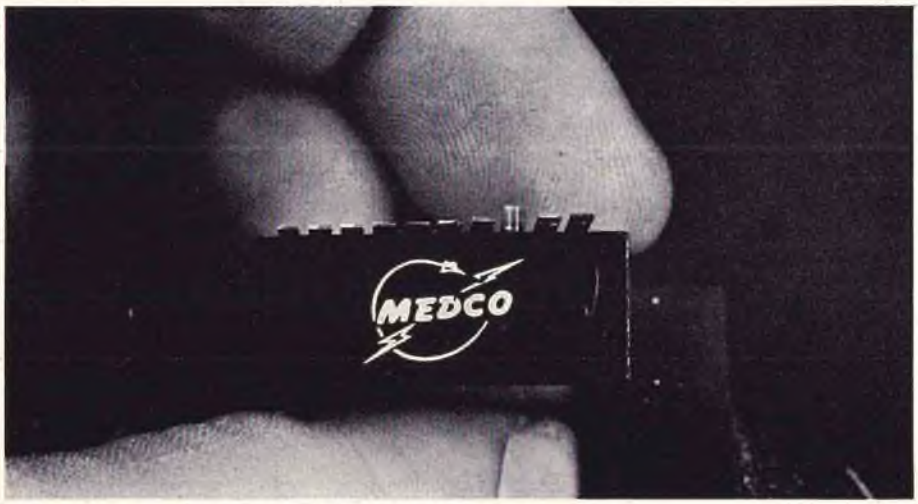
ELECTRONICS

Have a second receiver but only one transmitter? Here's how to match both reed banks. . . . Takes a good night's sleep and a steady hand.

MARRIED REED BANKS

by BRYCE PETERSEN, WA8KER





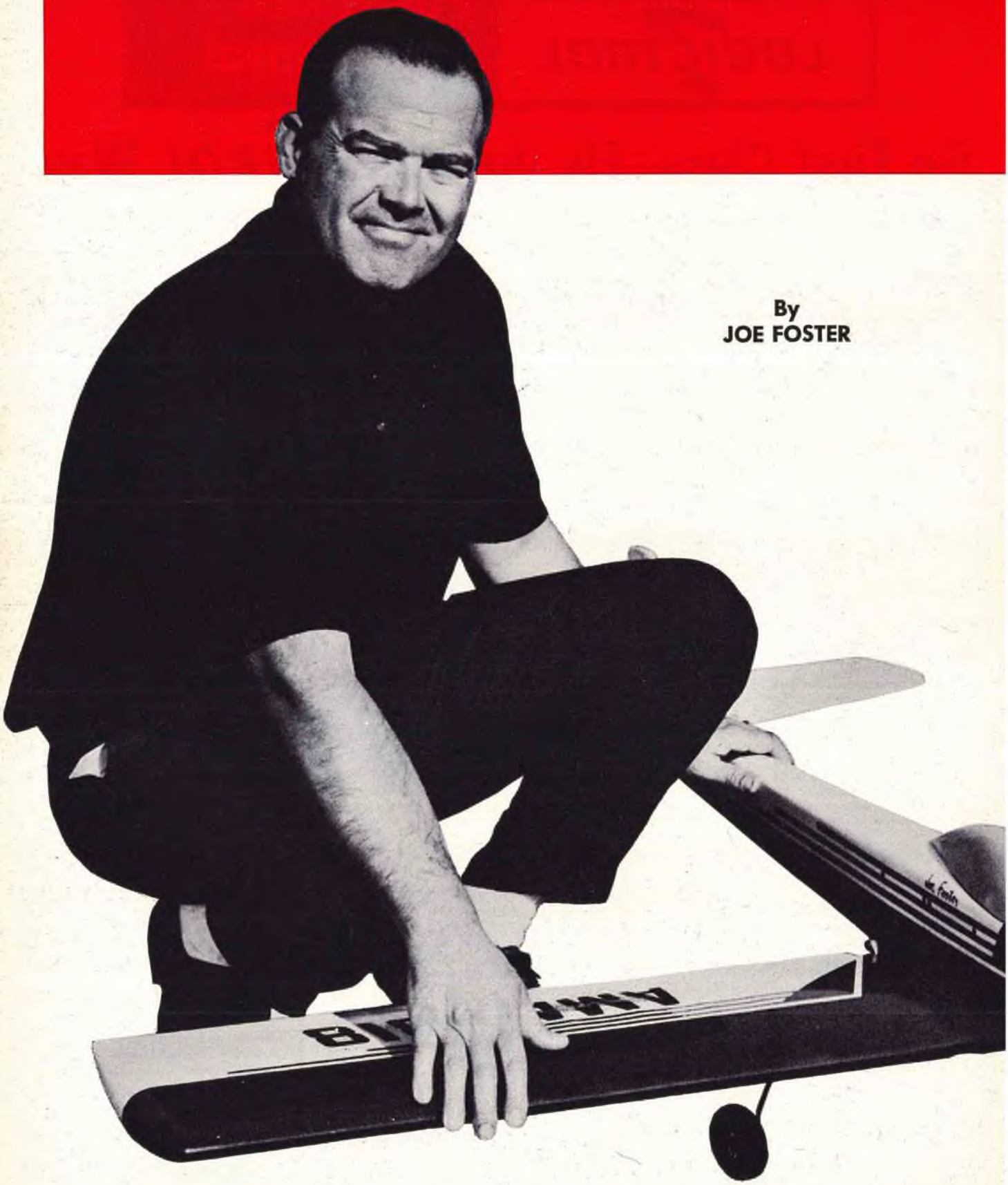
Sunday afternoon with perfect flying weather, and because of a hard landing, you are grounded for the day. It would be wonderful to go to your car and pull out a six channel ship and continue flying, but who can afford the second rig. Not me, but maybe I could manage a second receiver and three old used servos.

The problem is to match the reed banks to the one and only transmitter. Both reed banks must be the same make (in my case, Medco). It is only necessary to remove one reed bank completely from the receiver. Only three wires are removed – the two small gray ones and the black. Be sure to code these wires for proper rewiring. Only the reeds are removed from the other receiver. I obtained a Hewlett-Packard Model 200 CD audio signal generator from a local laboratory along with a small high-speed drill. After a good night's sleep and a good breakfast (not too much coffee!) the project was started.

First, I let the signal generator warm up for one hour for stability. Then, I checked my reed frequencies, and much to my surprise, they were almost the same (those Medco boys are on the ball). The trick is to find the reed on each bank that is slightly lower in frequency and grind its tip to match the higher reed. Using your fingers, hold the reeds against the case and tune for maximum deflection. By lowering the signal intensity, this setting becomes critical. No "almost" settings are permitted here. A steady rod was placed out from the dial to gunsight the dial. A small rubber abrasive wheel was used (absolutely no files here) to grind the reeds. A **light** touch is all that is needed.

A two minute break was taken after each reed (nerves). About two hours later they all matched perfectly. Close attention should be paid to harmonic possibilities, although I experienced no problems along this line. One final cleaning and the two banks were one. A Lissajous pattern on a scope may help those who have access to the proper equipment.

By
JOE FOSTER



THE PATRIOT

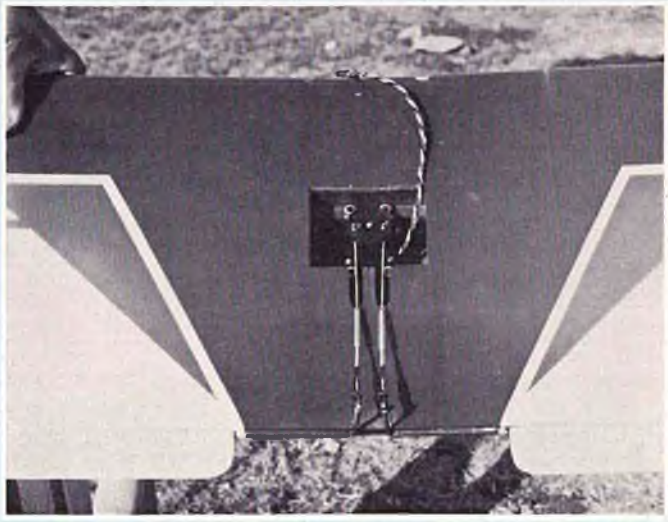
THE Patriot design is an endeavor on our part to put together a ship that combines pleasing appearance with practical design features, such as a constant chord wing and other easy-to-build features.

Contrary to a recent popular trend to design shorter tail and longer nose moment arms for proportional control, we are experiencing great success with our longer tail moments and higher aspect ratio wings. This type of design seems to absorb a little more power, but in turn, offers the extra smoothness about the pitch moment that we feel is an asset, and with the engines available today, a little more power is not hard to come by. To date, no one has been able to convince us that the small degree of added efficiency and faster roll rate of a tapered wing is worth the added building effort. Strip ailerons are also incorporated to lessen building time. A word here about our experience with the latter. Our first three attempts with 'strips' were very disappointing. We had a lot of trouble obtaining a smooth, positive response. We tried them larger, smaller, and tapered with equally poor results, finally learning that "flexing" was the problem. So, at this point, let me offer a word of caution. Construct your ailerons from very firm "C" grain wood and keep the slop out of the linkages for best results. In addition, we've learned that a little more than the conventional 60%-40% up-to-down differential of aileron movement is required to obtain a truly axial roll. The Patriot requires 9/32" up and 5/32" down movement.

The airfoil used in the wing is a result of three previous experiments tried on this design. It has a very smooth stall combined with good penetration which, in our opinion, is very desirable for proportional control flying. Our experience with some thicker sections on this ship evidenced smoothness in calm air, but left something to be desired in the wind. Thinner sections will cause the ship to sail at landing speeds. This is a design you will have no trouble landing in the circle. It has a good positive sink rate and yet will flare beautifully for smooth touch-down. And if necessary, you can drag one until the tail touches without dropping a wing. More dihedral was tried and found unnecessary. In fact, the latter lessened inverted flight performance along with smoothness of rolls. The amount called out offers a small degree of positive stability in a banked turn. This, we feel, is highly desirable. It is very difficult to make smooth turns with a ship that wants to increase its bank as it turns. The Patriot requires a small positive pressure to hold it into the banked position.

So far we have discussed our experience with the design equipped with proportional control. Actually, the ship started life as a reed job and was flown very successfully before we equipped it with the new Orbit proportional. The original, before modification, incorporated 3 degree of right thrust, a 20% thick airfoil with the high point at 35%, a more rounded leading edge and a smaller elevator. The installation of reed type servos, receiver and battery pack is not illustrated on the plan, so a short, written description may be in order. With rubber cement, glue a ½" thick piece of foam rubber to the back of the receiver and then to a piece of 1/16" plywood cut to fit upright against bulkhead 'C'-'C'. Depending on the make of receiver used, you will have to hollow the canopy for clearance. The plywood supporting the receiver may be held in position by rails for easy removal. Bonner servos can be mounted by bolting them to the fuselage sides. The battery pack should be mounted

Joe Foster's Class III design has been proving itself in competition from Coast to Coast. Sixth at last year's Nationals, The Patriot can be your entree to the Winner's Circle . . .



Upper left: View of engine installation. Note Johnson throttle installed on S.T. 60. Above: View of center section of wing showing installation of Orbit Proportional servo and linkage to ailerons. Left: Author and original prototype. Below: Full view of red, white, and blue Patriot.

in the canopy.

This ship may not be the answer to all your prayers, but if you like a machine that covers a lot of sky very smoothly and will do all the maneuvers, run, don't walk, to your favorite hobby shop, buy some sticks and glue and let's get started. Wait! One more piece of advice. When you select your balsa, leave that wood marked R/C for the guys who like 8 lb. airplanes; we'll use 8 to 12 pound 'C' grain for everything that is not called out 'hard' on the plans, and 4 to 6 pound contest balsa for stab and fin. We want the ship to weigh 6 to 6½ lbs. without fuel. We'll not bore you with too much detail of construction, because she's not hard to build.

Wing

The wing can be constructed on any of the commercial jigs with no trouble. We built ours in separate halves on a good flat board, blocking up the leading and trailing edges. Exercise caution when blocking in dihedral. Any airplane is only as good as the wing is true. Use good, hard, straight grained balsa for leading and trailing edges and spars. The rest of the construction is straight forward.

Stabilizer

The stab design shows a lack of imagination; however, it is easy to build and except for our insisting you use light wood, will offer no challenge.

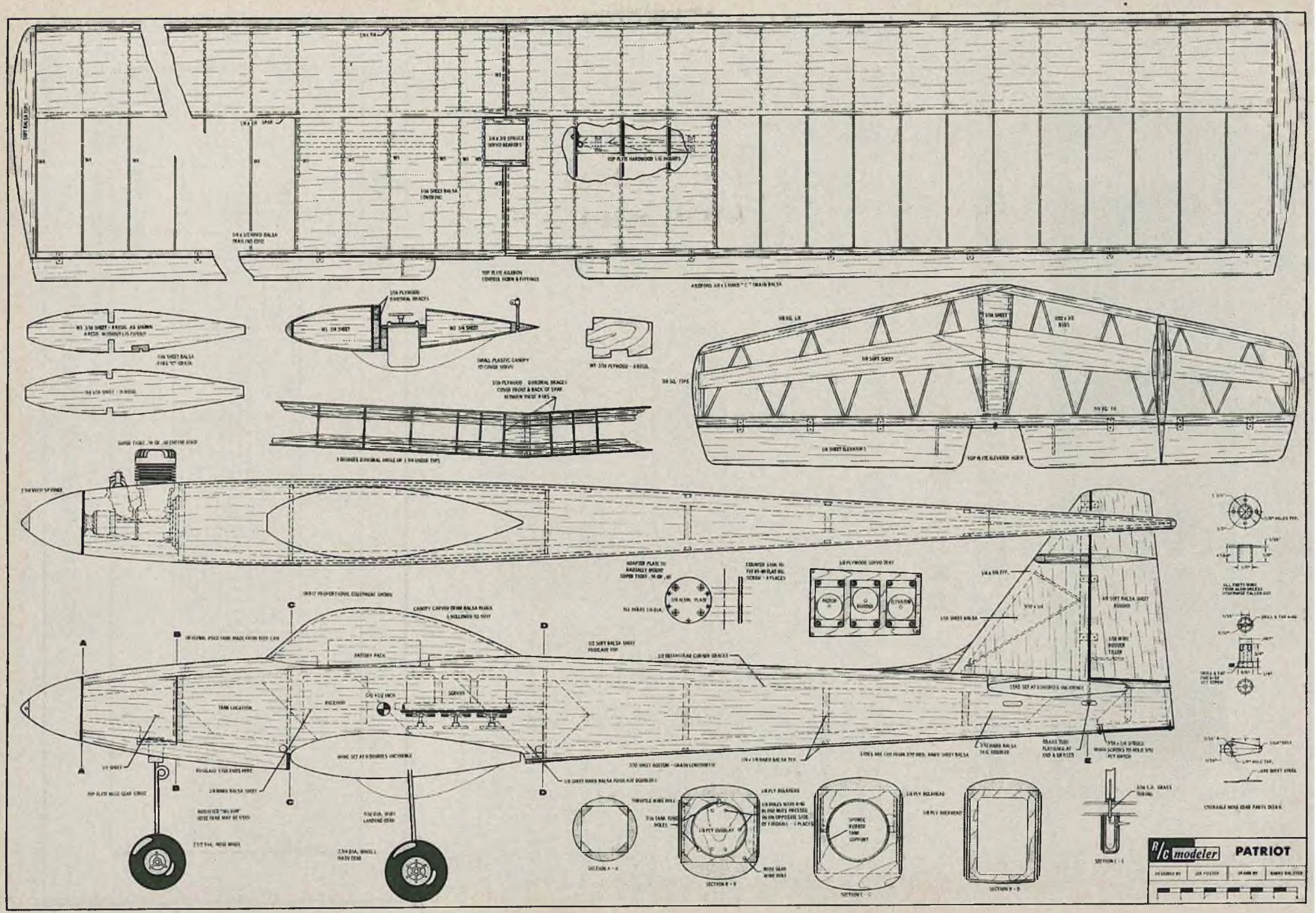
Fuselage

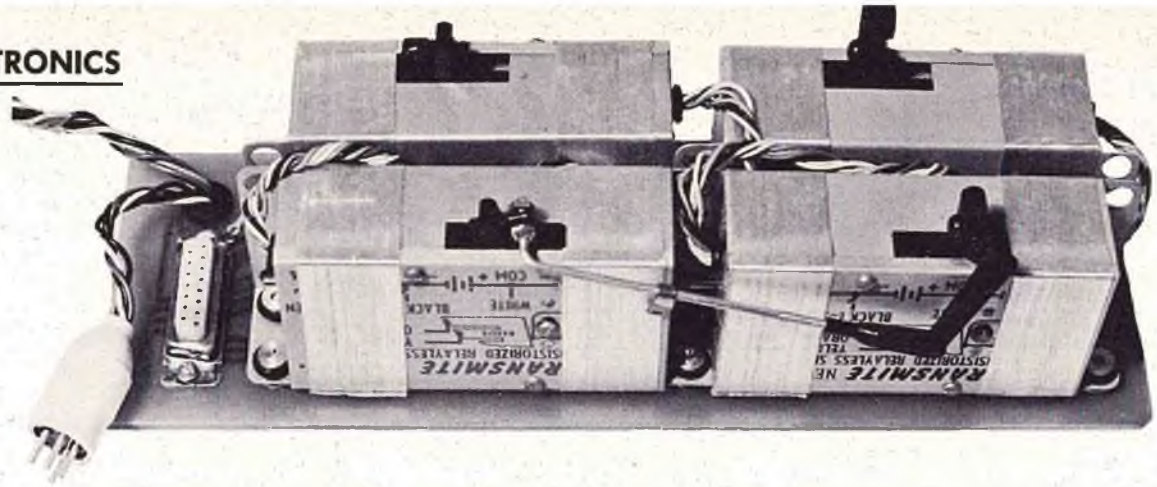
The fuselage, as you will notice, does not offer you much extra room. In fact, we're so stingy with room, we put the battery pack in the canopy. Actually, the idea here is to bring the center of gravity up a little and get it as close to the thrust line as possible, along with making the cross section utilitarian. Start by cutting out fuselage sides as indicated by arrows on the plan. Use 3/32" sheet. Glue ⅛" forward, and 3/32" aft, hard sheet doublers, ½" triangular corner braces and side stiffeners in place as shown. The firewall section B-B and bulkheads, section C-C and D-D are glued in position to join the two sides. The soft ½" sheet balsa fuselage top is the only potential problem as it is hard to bend to fuselage curvature. We get around this by wetting the wood and warping it to fit. When dry, carve in the taper and glue in position. If this sounds like too much work, laminate two ¼" sheets together, gluing on one at a time. Cowling the engine is a carve-to-fit proposition and does not propose much of a problem inasmuch as the fuselage top and bottom form the backbone of the engine room. The steerable nose gear requires some machining. If you cannot make one, a 'Nelson' nose gear modified to fit, will work quite well. The wing saddle lends itself naturally to the use of 'Dzus' fastener wing hold downs, if the gum bands are too old fashioned for your taste. I'm going to try it on my next one. Radial mounting of the engine requires the adaptor plate shown on the plan. 5'40 flat head screws hold it to the engine.

Covering and Finishing

The fuselage is covered in the conventional way with silk, filled with three coats of dope and four sprayed coats of

(Continued on Page 68)


R/C modeler
PATRIOT



MULTI CIRCUIT BOARD

by Myron J. Rich, 1/Lt. U.S.A.F.

The following multi servo board uses an epoxy-glass printed circuit board with the receiver and servo plugs soldered directly to the board. Either Bonner Transmites or Annco's may be used. This eliminates wire congestion in multi installations, as do the commercially available boards, but makes the servos and receiver easier to remove or replace. Its construction is relatively simple, and no difficulties should be encountered. It may be of interest to those RC'ers contemplating building this board that I constructed the Transmite Servo Console which appeared in the February 1965 issue of RCM. This is used as a pre-flight console in conjunction with this board by running jumper cables from the console to each servo on the board. This would be impossible with boards that did not incorporate plugs on each servo.

Construction

Step 1 — The Cannon plug used for the receiver must be modified. (If you are unable to obtain a Cannon plug, or if you prefer, the receiver wires can be taken through the board via a second grommet and soldered directly to the copper lands. Be sure to leave adequate wiring length between the receiver and servo board. Strain relief should also be provided on the receiver wire cable.) Drill out the mounting holes in the metal case to one size larger (approximately). This will separate the plug into its component parts. Discard all but the 15 pins, the bottom section of the case, and the top section of the nylon insulator. (See Fig. B.)

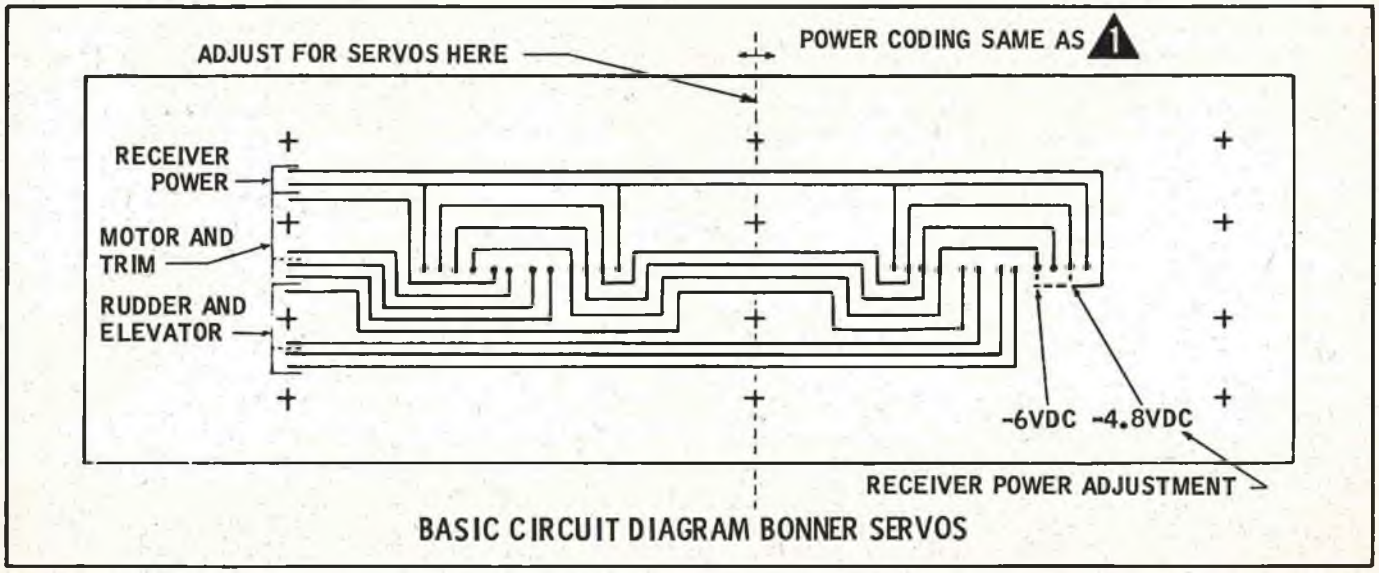
Step 2 — Servo boards have been constructed from both 1/16" and 3/32" EPOXY glass board, however for normal use, the 1/16" material has sufficient strength and the weight is considerably less than the 3/32" board. After selecting the desired thickness, mark and cut the board to the dimensions indicated.

Step 3 — Mark and drill the board for the plugs, servos and the grommet. A punch should be used to insure that all holes are drilled accurately. After all holes are drilled, trial fit the plugs. Minor drilling inaccuracies can be corrected with a small round file.

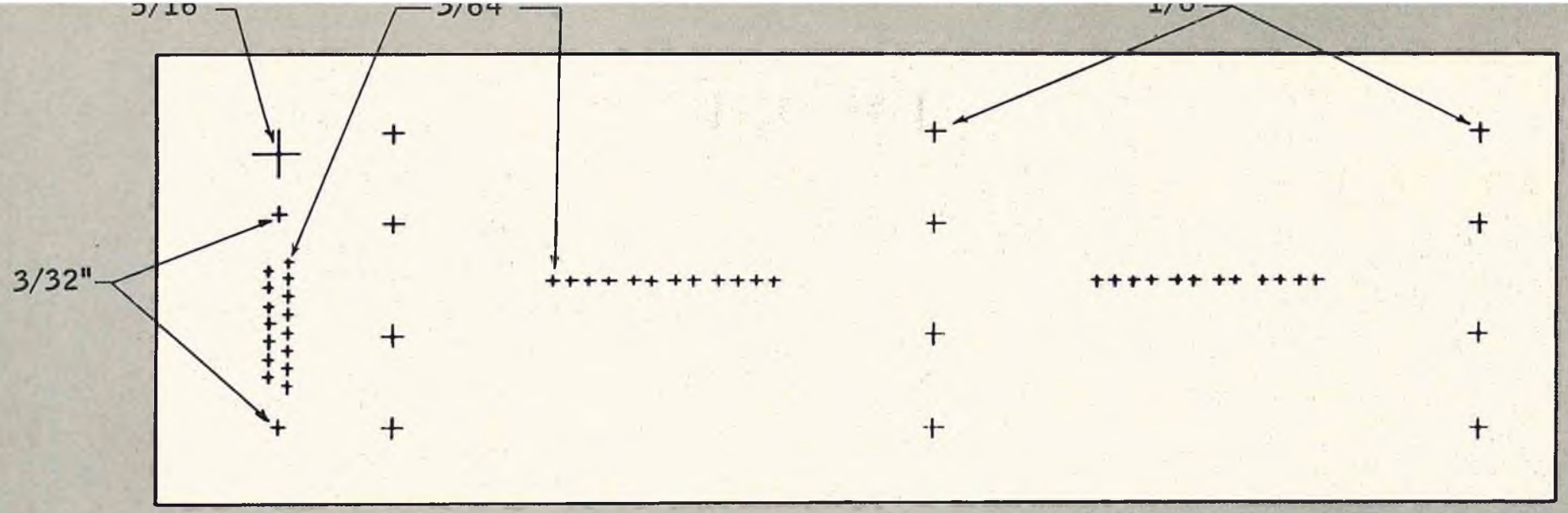
Step 4 — Clean the board with fine steel wool. Trace the circuit onto the board. This can be done directly on the board or first drawn on paper and then traced onto the board using carbon paper. I recommend the carbon paper method.

Step 5 — Apply tape "resist," which is similar to that used to decorate models, to the board. The 1/16" wide variety is recommended. Extreme care must be taken to insure that the tape is pressed tightly to the board, particularly at all joints. As an alternate, the circuit can be printed on the board with ink resist or even model airplane dope.

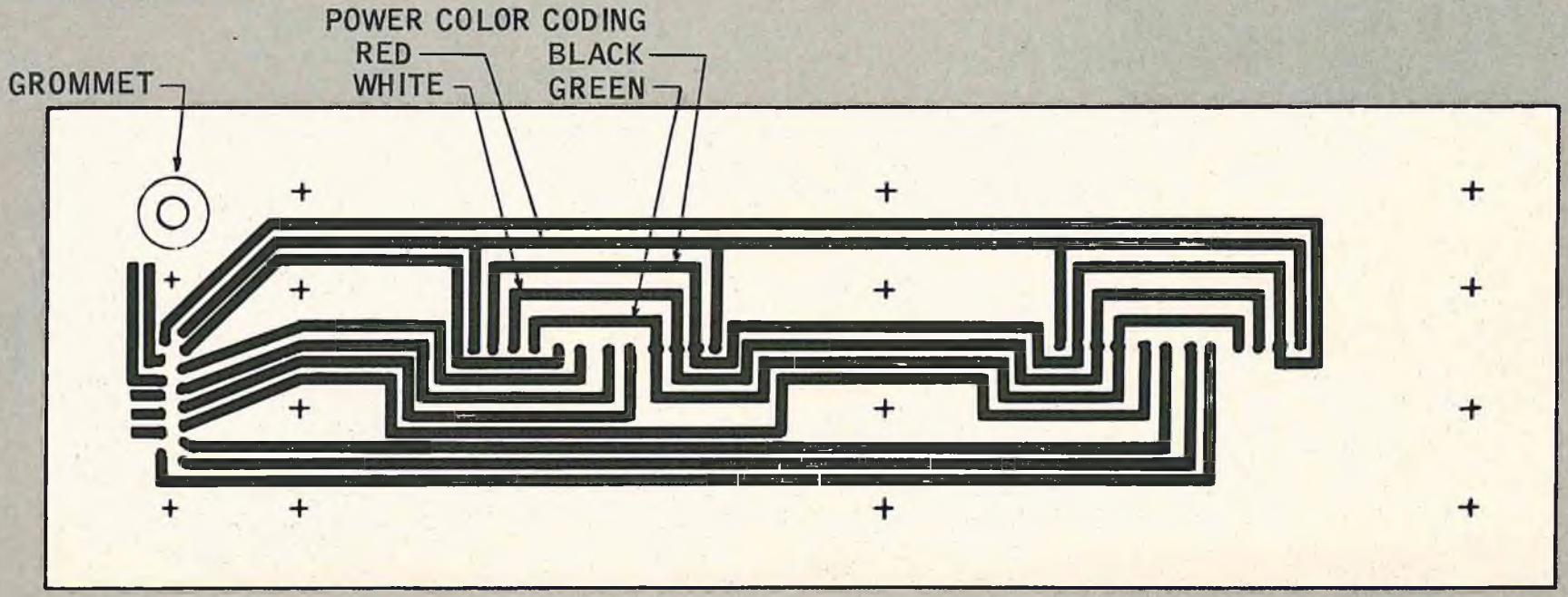
Step 6 — Place the board in a glass or hard rubber tray or equivalent and



BASIC CIRCUIT DIAGRAM BONNER SERVOS



DRILLING DIAGRAM BONNER SERVOS



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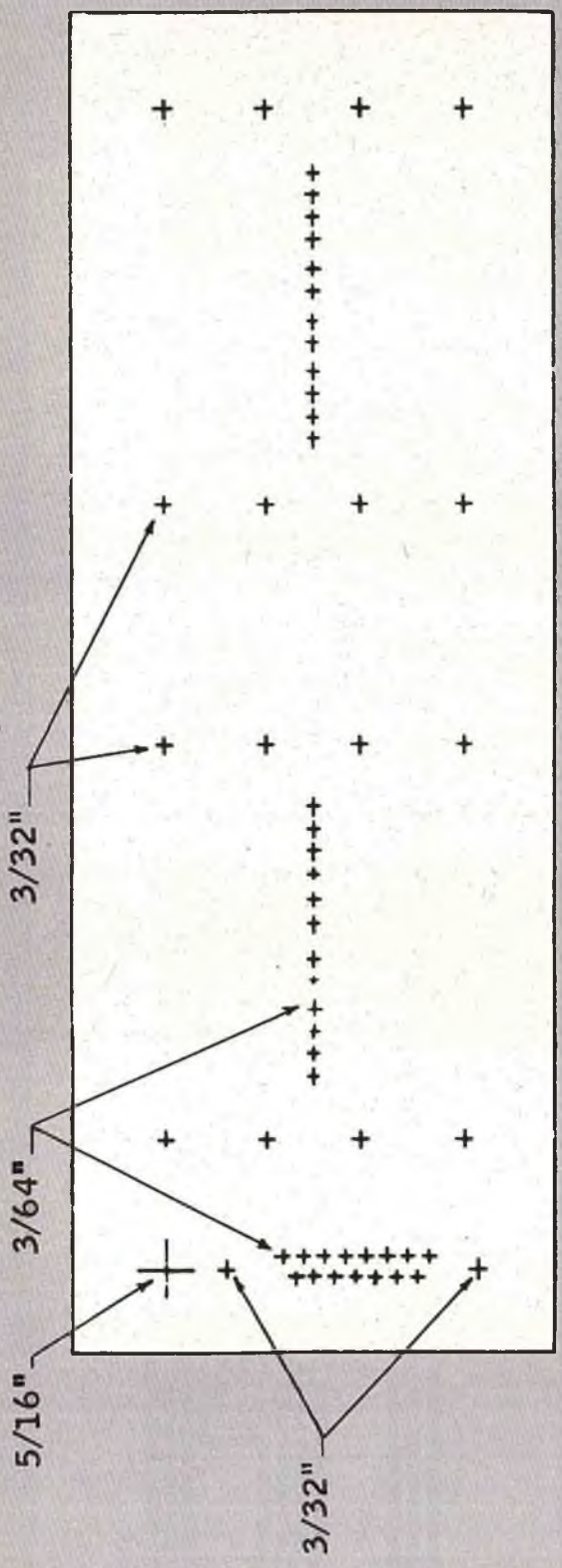
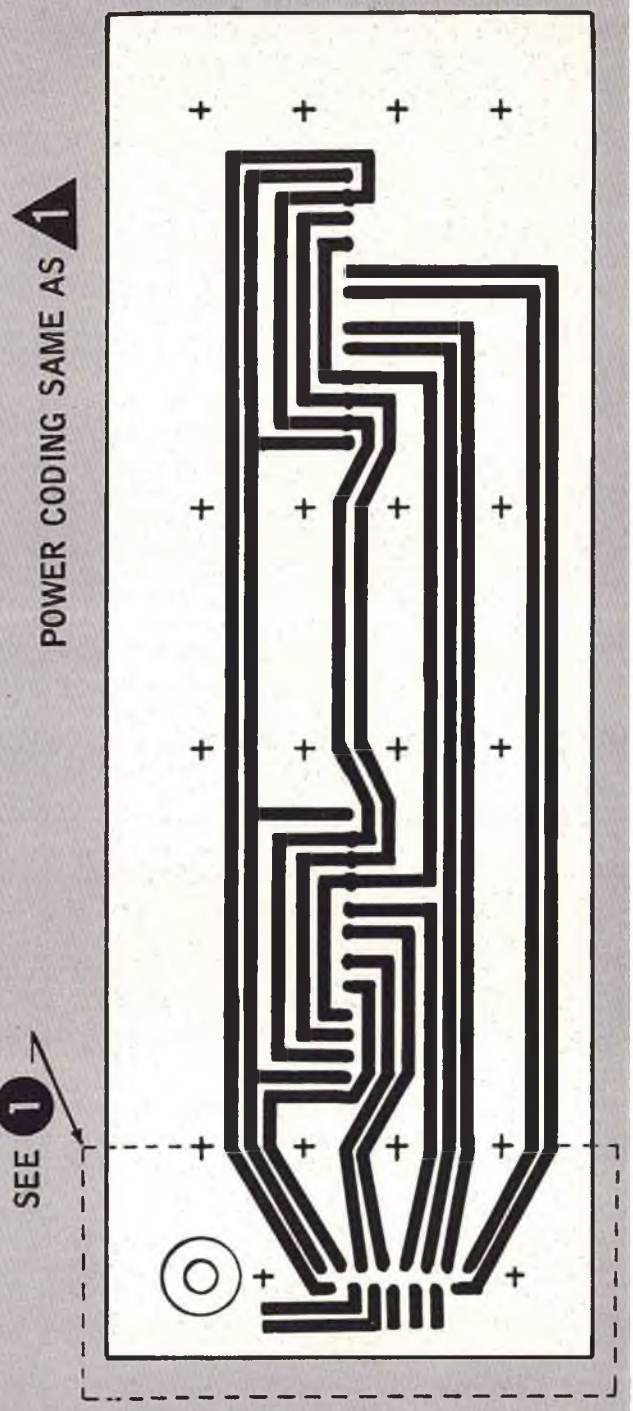
CIRCUIT DIAGRAM BONNER SERVOS

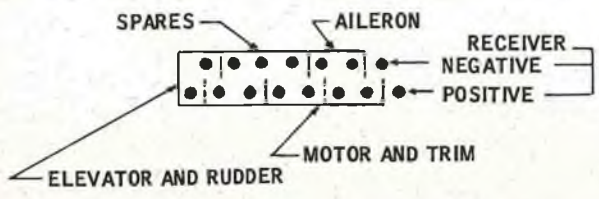
FULL SIZE DRILLING AND CIRCUIT BOARD LAYOUT



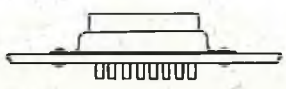
DRILLING DIAGRAM ANNCO SERVOS



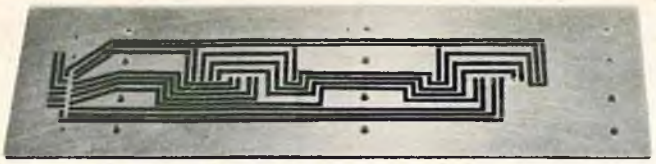
1 RECEIVER PLUG WIRING DIAGRAM AS SEEN FROM BOTTOM OF BOARD



MODIFIED CANNON PLUG FOR RECEIVER IS SOLDERED DIRECTLY TO BOARD



NOTE: FEMALE PART OF EACH PLUG IS SOLDERED TO BOARD TO ELIMINATE THE POSSIBILITY OF SHORT CIRCUITS



Glass-epoxy board with 1/16" wide resist tape (or decorative trim tape) in place. Board is ready for etching.

Top of printed circuit board with four Orbit plugs soldered in place and power, aileron cables soldered and laced to board.

pour in the etchant until it covers the board. It will take about 15-20 minutes to etch. During this period rock the tray until all the exposed copper has been etched away. The etchant may be reused, however the etching time will lengthen with each reuse. After the board has been etched, rinse with water, remove tape or ink resist, rinse with water again, dry and clean with fine steel wool or fine sandpaper. A word of CAUTION: "The etchant is a reasonably mild reagent. It is dark brown in color and will normally leave stains on clothing if splattered. It will be otherwise normally harmless to persons not sensitive to photographic solutions. Persons having sensitive skin or open cuts on the skin should use rubber gloves in handling the etchant." DO NOT POUR USED ETCHANT DOWN HOUSE PLUMBING.

Step 7 — A soldering iron larger than 35 watts should not be used to wire the board since too much heat could cause the copper lands to separate from the board. Install the four servo plugs and the modified cannon plug. If copper lands are on both sides of the plugs, solder both sides so the electrical circuit is not left open. Also make sure the plugs are pressed down against the board when soldering so they can't vibrate and break the copper lands. Do a good soldering job — this is very important.

Step 8 — Install grommet.

Step 9 — The aileron and power plugs are soldered to 6" lengths of hook-up wire. They are then fed thru the gromment and soldered to the copper lands on the bottom of the board. Again be very careful when soldering to the board.

Step 10 — Solder the plugs to the servos and mount the servos on the board.

Step 11 — Solder male cannon plug to receiver.

Step 12 — Mount servo board in plane of your choice.

Bill of Materials

1 — 9" x 3" x 1/16" or 3/32" copper laminate epoxy-glass board;

5 — Orbit 6 pin connectors;

1 — Power plug (I recommend the Medco 6 pin connector);

1 — 15 pin cannon plug;

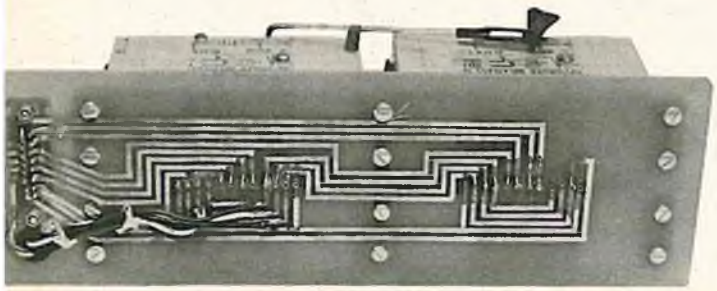
1 — 3/16" I.D. grommet;

Misc. 1/16" resist tape — 1 small bottle etchant — hook-up wire — solder.

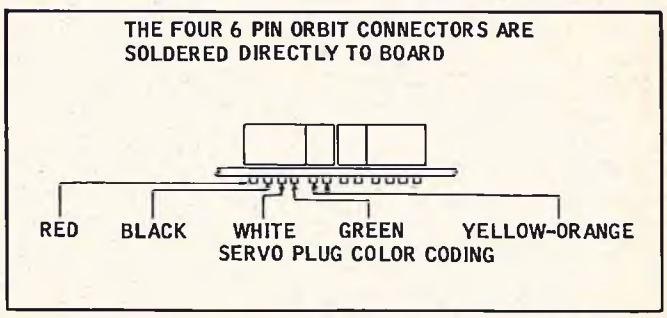
Epoxy-glass board and etching materials are available from Techniques Inc., 40 Jay Street, Englewood, N. J.

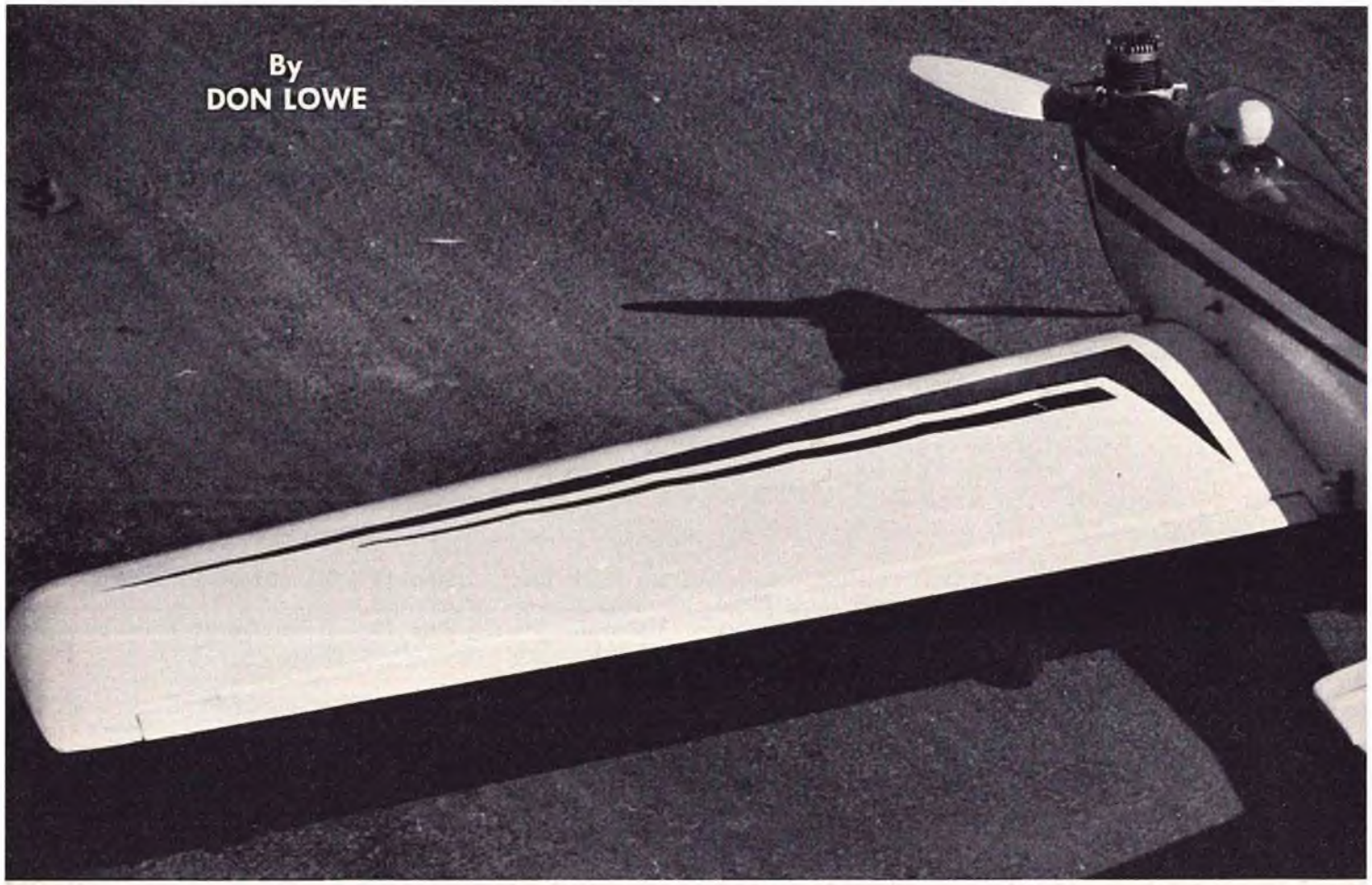
The Cannon 15 pin connector is available through all Cannon Distributors or direct from Cannon Electric, 3208 Humboldt Street, Los Angeles, California. Specify one DA-15P and one DA-15S. Price is $2.78.

Underside of multi circuit board showing power and aileron cables plus connection of Orbit plugs to copper lands.



Identification of leads from the four Orbit connectors for motor, trim, rudder and elevator servos.





By
DON LOWE

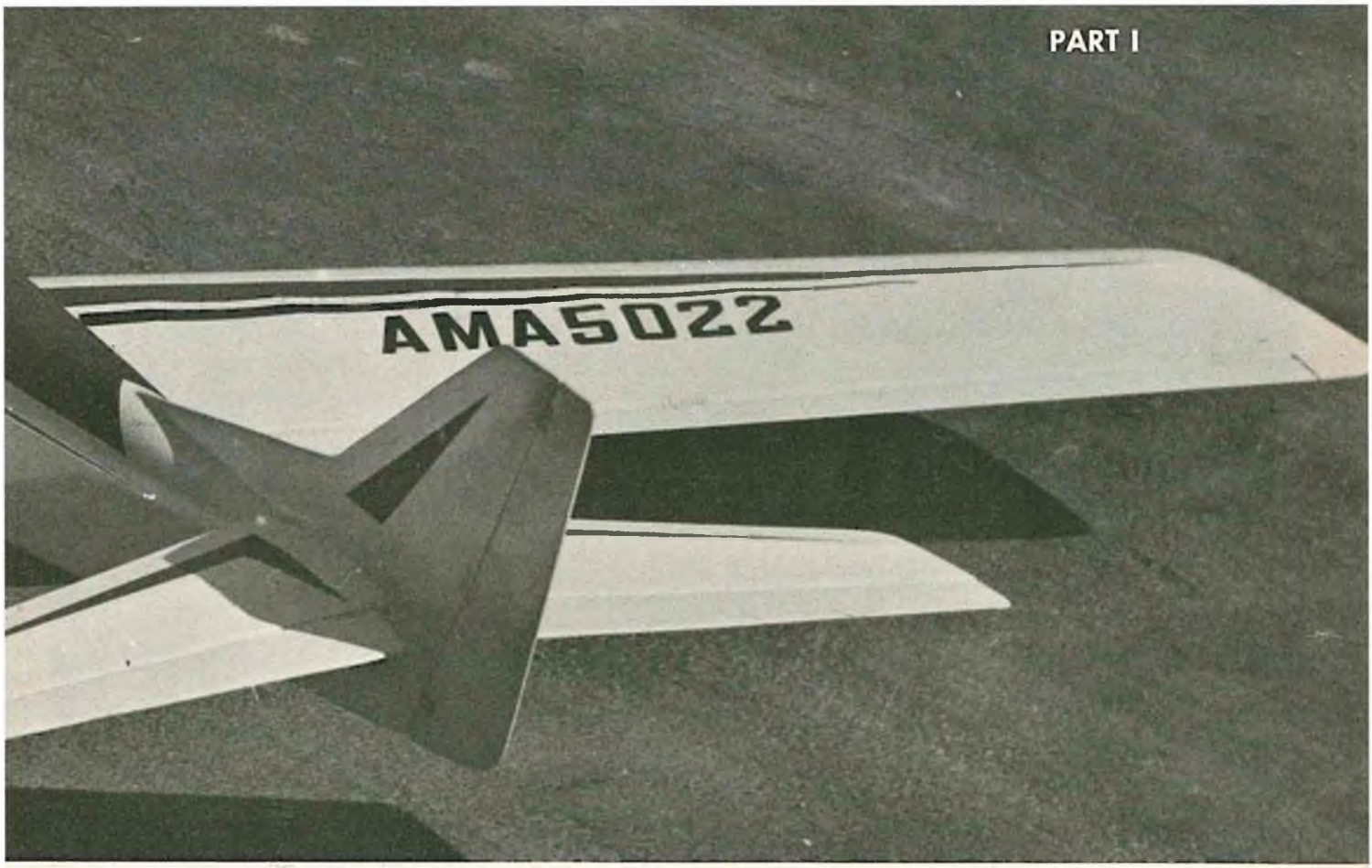
ADVANCED MULTI DESIGN . . .

Some time ago fellow WORKS (Western Ohio Radio Kontrol Society) club member Ray Nugen and I decided we were a bit weary of the rut that R/C multi model design appeared (to us) to be in, and decided to explore the virtures of swept wing design. Obviously this was not virgin territory since a number of swept wing designs had been built and flown by various individuals with various degrees of success. Almost universally, however, the opinion appeared to be that such designs were a bit nasty in stall characteristics and required considerable proficiency in piloting skill in order for the airplane to survive for a reasonable length of time.

Since I have long been enamored with the beauty of swept wing full scale aircraft, and being possessed with the desire for something different, we plunged in. After dusting off the aero texts and doing a little bit of horse sense reasoning we were encouraged to continue the venture.

Swept wing design for model aircraft would appear at first thought to be entirely unnecessary. Wing sweep is employed in full scale aircraft design to delay compressibility (shock) effects and thus achieve a lower drag design for high speed flight. This of course is not required in model aircraft design since we are flying at no such speeds. It is also a means used to achieve a very stable design for rough air conditions which of course *is* of interest to modelers.

There are other desirable flight characteristics afforded by wing sweep in which we should be interested. First of all, wing sweep provides a dihedral effect which, essentially, functions equally both in the upright and inverted positions. The dihedral effect obtained is a function of sweep angle, angle of attack of the wing and wing lift coefficient (unit wing lift defined for specific flight conditions). Dihedral effect is defined as the rolling moment created due to sideslip (yaw). In a sideslip or yaw, the leading wing will create greater lift than the trailing wing since it will be flying at a higher effective angle of attack (due to the dihedral), thereby creating a rolling moment. The rolling moment created will increase for increasing dihedral angle. This is why we see rudder only ships with much more dihedral than multi designs, since the rolling moment necessary to establish a turn must be commanded by yawing the airplane with the rudder. This dihedral effect will be somewhat invariant with change in wing angle of attack for straight wings but will change rapidly with angle of attack for swept wings. It is interesting to note that airplanes with swept back wings will have an increasing dihedral effect with increasing lift coefficient (angle of attack), while airplanes with swept forward wings will have a decreasing dihedral effect with increasing lift coefficient. The variation of dihedral effect with wing sweep is a complex relation and one that is almost impossible to estimate quantitatively by any analytical approach. We have therefore resorted to the experimental approach in our model designs. In essence, the higher the angle of attack and wing sweep the larger the dihedral effect. What we are obtaining is increased lateral stability in flying maneuvers which require increased angle of attack such as inside and outside loops. This is very desirable, of course, since the airplane will "groove" or track better, and will groove equally well in both inside and outside maneuvers. This improved di-



PART I

. . . AND THE PHOENIX 1

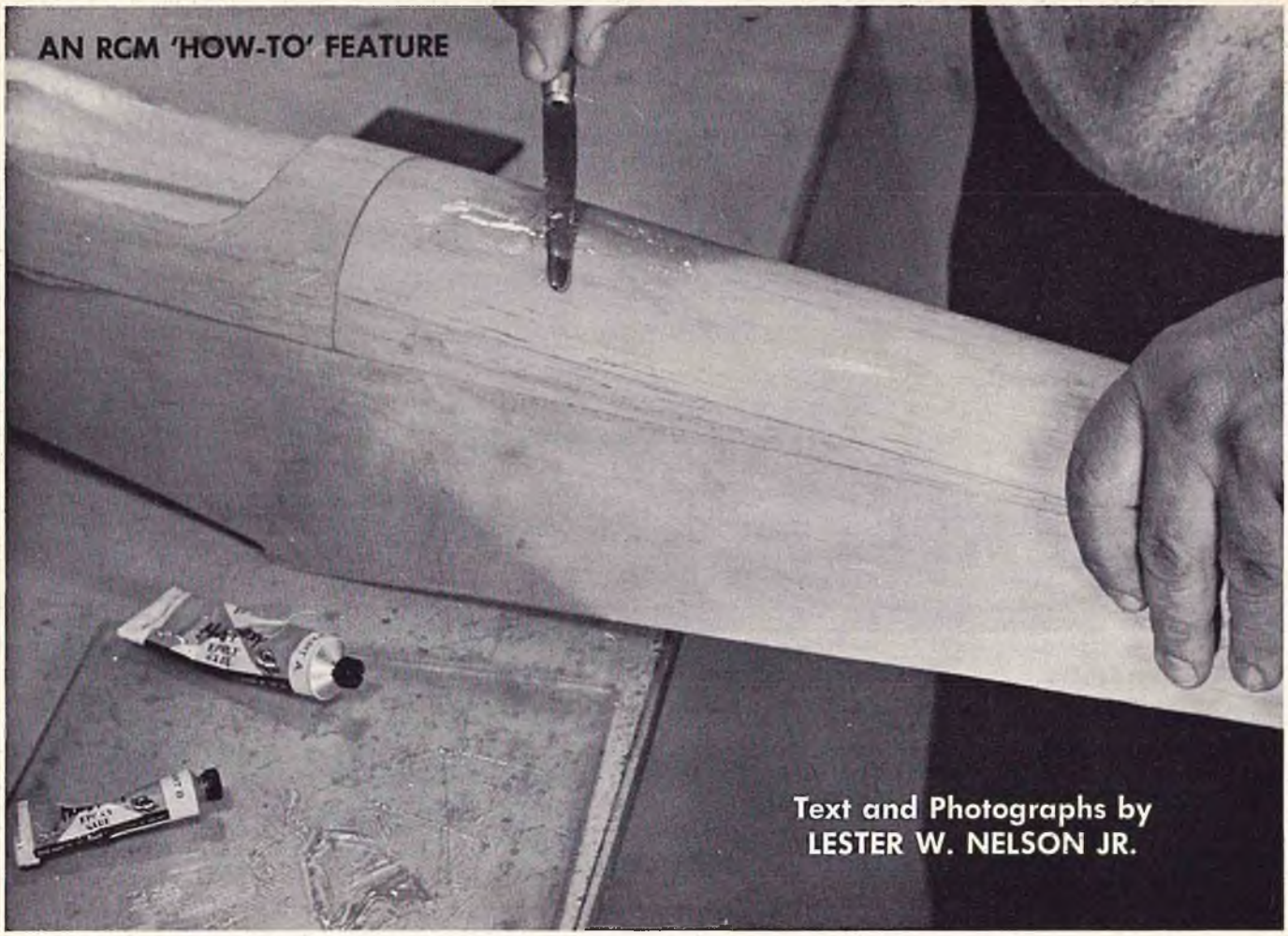
hedral effect is also obtained at no sacrifice in roll characteristics since these maneuvers are flown at low angles of attack. We have found that inverted maneuvering is "duck soup" due to the increased lateral stability while inverted.

An additional effect of wing sweep is a change in stall characteristics of the airplane. Most of you undoubtedly have heard that swept wing airplanes have a vicious stall and will snap roll at the drop of a hat. To an extent this is true, and it is precisely this characteristic that we have been trying to exploit. A large number of current model airplane designs are extremely stable in order to assure smooth pattern maneuvers. This stability requires a sacrifice in spin characteristics unless excessive control movement is used to accommodate the airplane design deficiency. These airplanes also will not snap roll easily (some not all). A snap roll is essentially a horizontal spin. Unlike a conventional spin, it is usually entered at velocities above normal stall speeds. An intentional snap roll is commanded by application of full up elevator and rudder which causes the airplane to enter a high speed stall accompanied by simultaneous rotation. The prime objective of the simple single snap roll is to exit the snap at the same altitude entered and in a horizontal level attitude. The difficulty of the maneuver is due to the stalled condition of the airplane and the rapid rate of rotation. There are many variations of the controlled snap roll such as a half snap, double snap, snap on top of a loop, snap from and to knife edge flight, etc.

There is also a maneuver known as the uncontrolled snap roll which has been the undoing of many a modeler. This occurs in some aircraft due to a number of things such as high wing loading, aft C.G. location, excessive control movement, excessive control rate, and, yes, sloppy flying. It might be worth explaining the uncontrolled snap at this point. I have flown a number of models, my own included, which exhibited this tendency. It has *always* been traced to one or more of the reasons previously cited. The snapping tendency has always been cured by either moving the C.G. forward or by decreasing the control movement and rate. You will say that the control surface rate of a reed system equipped aircraft is fixed since it is fixed by servo speed, and I would have to agree with you. However, the airplane *pitch* rate is the important control consideration here and this can be controlled by varying the effective elevator deflection angle by "beeping." A number of models have been saved by being very cautious in controlling the pitch rate and thus preventing high speed stall. You might ask, why the airplane snaps when it stalls under such conditions. This is due to the fact, that, unless the model is absolutely symmetrical (equal wing lift at all angles of attack and airplane attitudes) a rolling moment will be introduced at the stall point since one wing will stall before the other. It usually isn't a violent rotation and can be handled if you are on your toes. Control rate is no problem in proportional flying of course, since the flyer can easily provide any rate desired by simply varying the control input rate at the transmitter. This is obviously limited by the servo speed limitation and ideally the servo speed should match the transmitter input capability, but, then this is another subject.

It is my feeling that some of the most beautiful (and difficult) maneuvers per-

(Continued on Page 70)



STEP 1. Hobbypoxy glue being applied to sanded balsa fuselage.

EASY-DOES-IT!

WHEN the Pettit Paint Co. introduced Hobbypoxy glue it appeared that it had possibilities in other model building applications in addition to its excellent qualities as a construction adhesive. The ideas shown here are the result of looking for ways to cut down on building time without losing strength or quality. During the course of trying these methods it was found that the finished model or component actually turned out lighter, stronger, offered a better base for the finishing paint, as well as being much quicker.

There have been many methods advanced for filling and finishing sheet covered fuselages, wings and tails. Each of them have their pros and cons, but this method will give you the best finish you've ever had in about two evenings' work! There are only a few easy steps between a sanded balsa starting point and your final paint job. Compare this with the method you are now using! You can forget the individual steps you previously used for crack filling, doping, fabric covering, more doping, plus the wasted time while you waited for the dope to dry, and the silk or nylon to shrink and warp your masterpiece out of shape!

Ready to give it a try? Start with a well-sanded balsa fuselage or wing. Your work will be made a lot easier if you do a good job of sanding. Mix a small amount of Hobbypoxy glue as directed. Apply it to the fuselage with an artist's, or Hobbypoxy "Easy-Does-It" spatula, and spread it around a section of the piece you are working on. Start at one end and spread out to eliminate any heavy gobs of glue. Then using a small piece of ⅛" thick rubber as a squeegee, work the glue well into the wood. You can do the spreading with your spatula alone, but a better, smoother job results from using the rubber squeegee. Try to spread it out as thin as if you were trying to scrape the glue off the model. The thin layer you leave will be enough to do the job, and any extra will simply add weight and nothing more. Keep mixing more glue in small quantities, working your way from one end of the fuselage to the other. When you have the whole thing covered, set it aside and let the glue set up. Without any heat it will be done in about an hour. With heat lamps the time can be reduced, but don't get it too hot or the glue will tend to blister. Next you're going to ask where to put the thing while the glue sets. Easy – place a few pieces of Saran Wrap on your workbench where the fuselage will contact it as the glue will not stick to the Saran Wrap. This will save you the embarrassment of taking your workbench to the flying field because you can't get it off your fuselage!

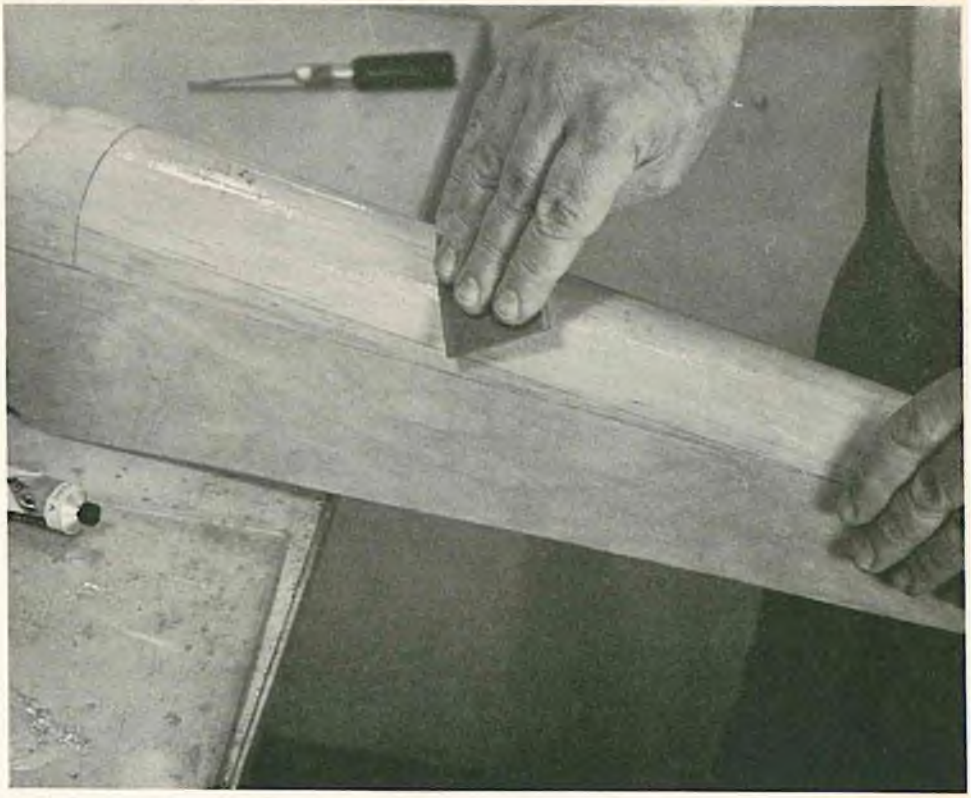
The next step, after your glue has completely hardened, requires an Enders razor blade. This is available at most drug stores, but if you can't get one, a regular single edge blade will be satisfactory if you file the sharp cor-

ners off first in order to avoid gouging the wood. Hold the razor at right angles to the work and start scraping the glue, retaining the 90 degree angle of the blade, but allowing it to flex in your fingers. You'll find this is a lot easier than it sounds and goes quite rapidly. It produces a smooth matte surface with only a few passes of the blade. Go over the entire surface until you have it as smooth as you can get it. You'll find small low spots will show up as glossy depressions. Refill these with a fresh application of glue along with any spots where you scraped into bare wood. Let this set up, and rescrape as before until the whole surface is matte. Dampen a cloth and wipe down the fuselage. It should appear glossy and smooth. This time, nicks and scratches will appear a dull matte. Refill as before. When dry, use the rounded corner tip of the blade and scrape until smooth. Follow up with a light sanding with 400 wet sandpaper applied wet. Wipe dry and go over everything with a tack rag to pick up any dust remaining. You're ready for your final color coats. Either Hobbypoxy or dope can be used.

You'll find the finished surface is as strong, or slightly stronger than a silked job, more resistant to dents and knocks, weighs less, is easier to patch and repair, looks like a machine molded product, and took far less time! It is not costly either, when you consider that all you needed was a set or three of glue; no silk, dope or filler coat.

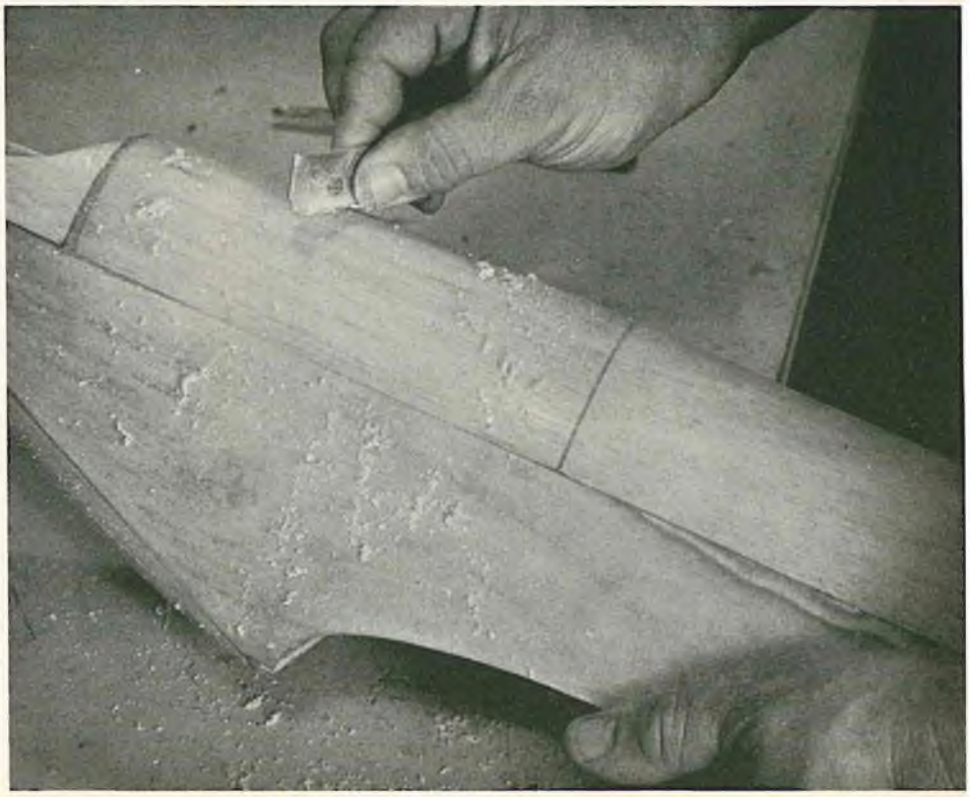
The other idea for this product uses the same basic application techniques to produce molded parts; wheel pants, fairings, wing tips, cowlings, even complete fuselages if you want. The photos show this procedure pretty well, so I'll give some added comments which will make it easier to follow through. If you are about to pass this by because of bad experiences with previous attempts at fiberglass molding attempts, don't do it. You can do this without even getting your hands dirty! Gone are the days of sitting there with a dripping mess, praying it will jell soon, before you throw the whole thing away. This one works, and it works quickly!

You can make a male mold out of almost any workable material. The same styrofoam used for wings makes an excellent material. It can be cut easily with an X-acto #26 blade and sanded with ordinary sandpaper. Of course, balsa or hardwood can be used, but take longer. Make your mold about 1/16" smaller all around if you are a scale nut and want to hold dimensions closely. If you choose to try the styrofoam, it helps to preserve the finished mold if you'll coat it with a light layer of Hobbypoxy glue. This keeps your fingernails from denting the surface. The easiest way to make two-piece molds is to use

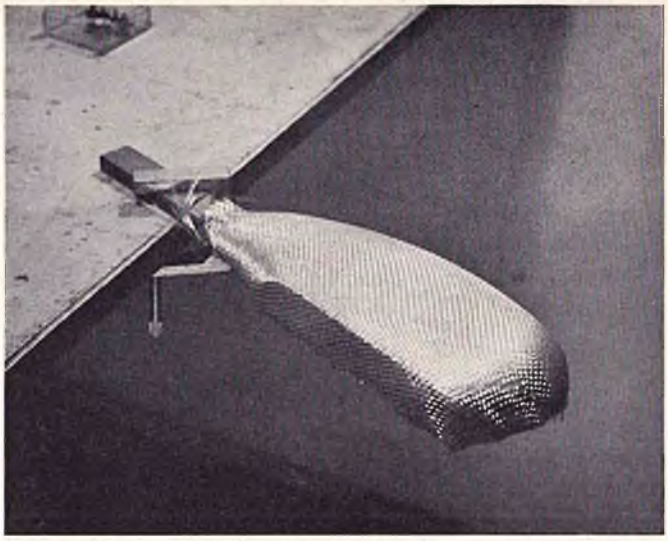


STEP 2. A rubber squeegee is used to spread the glue and force it into the pores of the wood.

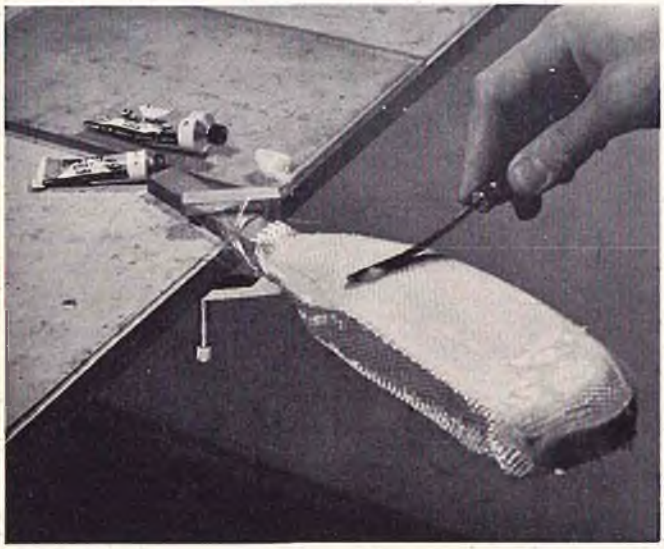
STEP 3. An Enders Speed Blade is used to scrape the hardened glue to a smooth, even surface.



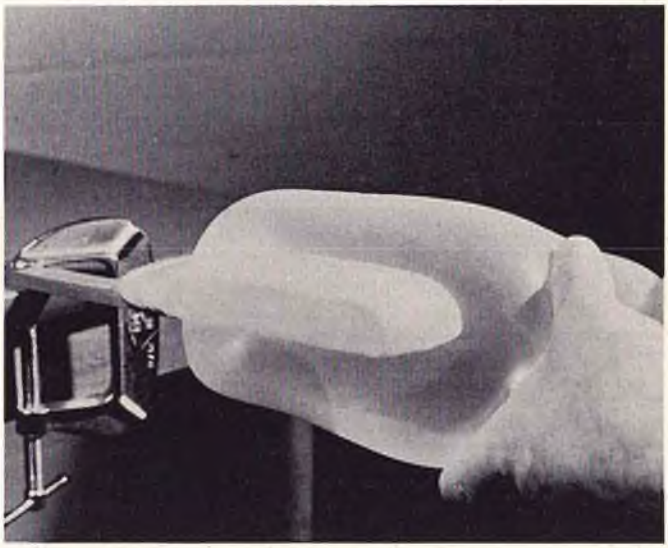
STEP 1. Original male wheel pant form mounted on supporting stick and covered with Saran Wrap. Wrinkles will not show in finished molded part.



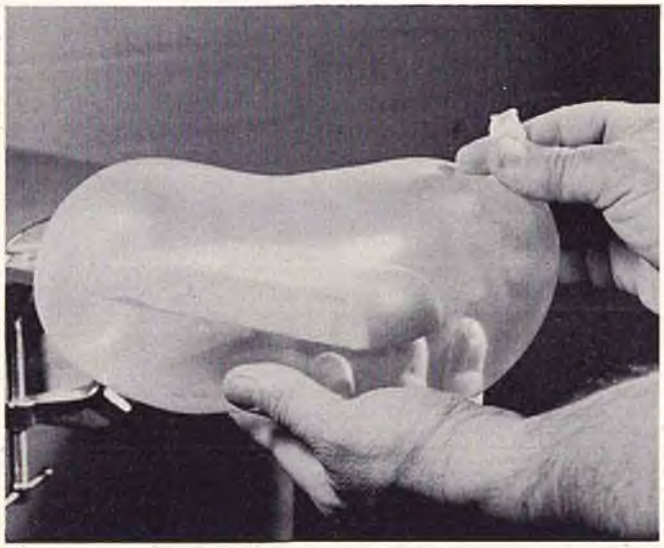
STEP 2. Fibreglass or Dynel cloth put on form dry. Cloth is held in place with masking tape on underside.



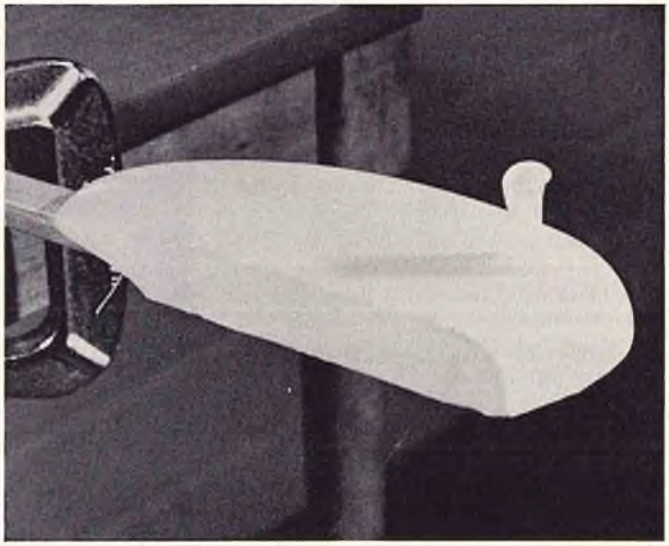
STEP 3. Hobbypoxy glue is applied to cloth and worked completely into the weave, filling the cloth.



STEP 4. An inflated balloon is pushed against the end of the form while the glue is still wet.



STEP 5. Here, the balloon is going over the form while the air is slowly let out.



STEP 6. The balloon is then hooked over the end of form and balance of air let out. The balloon will press out wrinkles and smooth glue to uniform thickness.

double faced scotch tape to hold the two halves together for shaping, then pull them apart. This works equally well for balsa or foam.

After you have your mold made, attach it to a supporting stick long enough to leave six to eight inches protruding. You must also use a ⅛" piece of wood between your mold and the supporting stick as a spacer to keep all edges of the mold clear of the support. Clamp the support stick to the edge of your workbench with a C-clamp and you're ready to go.

Cover the mold with a layer of Saran Wrap, or if it is small enough, use a Baggie or Glad-Wrap sandwich bag. Hold the Saran Wrap in place with masking tape on the under side of the form. Don't worry about wrinkles. You can't get rid of them, and they have absolutely no effect on the finished product. Then take a piece of fiberglass about one inch larger all around than your form and lay it on the form. Use masking tape or thumb tacks to hold this in place. Again don't worry about wrinkles, but do try to get as many out as possible. The best weight of cloth to use is 10 ounce material. This is pretty heavy looking, but is quite light in actual weight, and a good layer of cloth is needed to supply enough body. Try to get a closely woven cloth because it is stronger and takes far less glue.

Now mix a small portion of Hobbypoxy glue and apply it to the fiberglass with your mixing spatula. Work the glue into the cloth by going over it several times in opposite directions. Try to leave a slight layer of glue on top of the cloth so that the material is completely covered and not exposed anywhere. Mix new glue as needed until you have the entire form covered. Work quickly as you only have about 15-20 minutes before the glue starts to set up and subsequently becomes very tacky.

The next step is the key to the whole process and is as easy as blowing up a good-sized toy balloon. And that's exactly what you do. The inflated balloon should be at least **twice** the size in all dimensions as your molded part. Hold the inflated balloon so you can control the escape of air with one hand while using the other hand to guide the balloon over the form. **You must do this while the glue is still wet.** Push the balloon against the end of the mold, guiding it onto the mold with one hand, and letting air out slowly with the other. The balloon will go over the mold easily by turning back in on itself. When you get the balloon covering the entire form, retain some air in the ballon until you can get a firm grasp on it and hook it over the end of your form. Then, let out all the remaining air. You now have a tight fitting "glove" consisting of two

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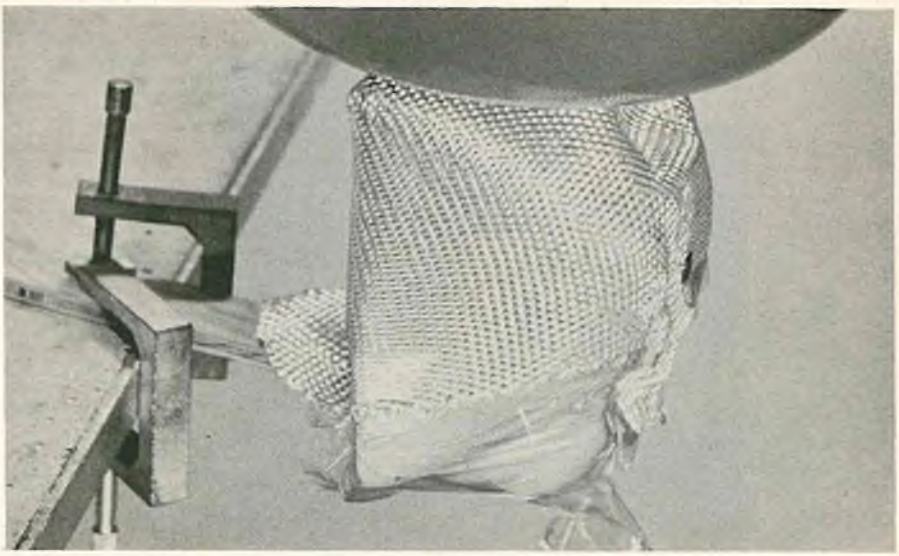
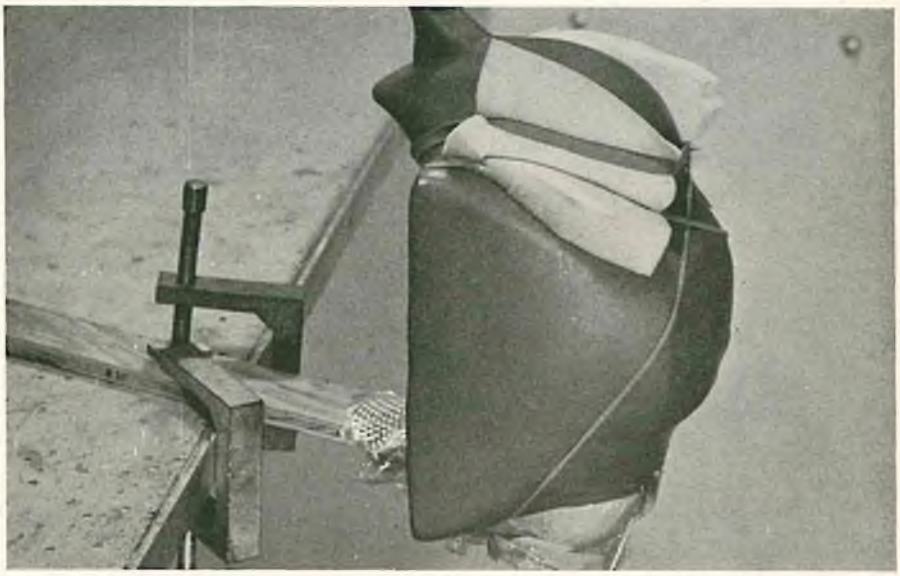
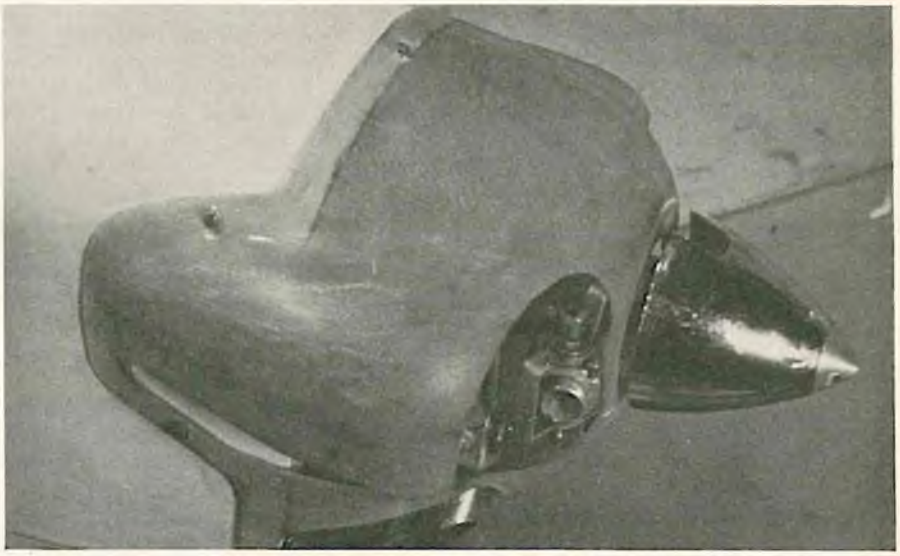


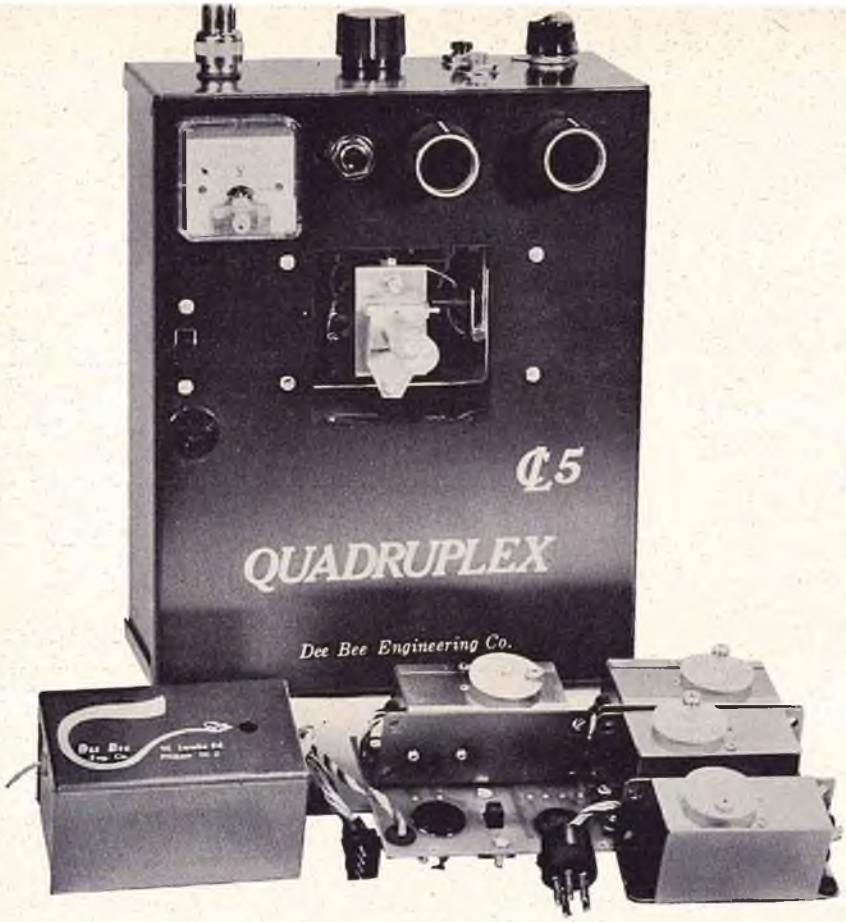
Goodyear racer cowl, illustrating how complex forms are molded one half at a time. Double faced transparent tape wrapped around form below glue-covered area holds balloon in place.



Balloon over form with sponge used to apply pressure on concave sections while glue cures.



Finished cowl in place on model. Cutouts to suit engine used are made after finishing.



RCM PRODUCT REPORT:

DEE BEE QUADRUPLEX CL5

Last October RCM reviewed the Quadruplex 21, now DeeBee is in production of a new generation of Quadruplex, the all new CL5. We had anticipated that the new CL5 might be a rework or modification of the earlier Model 21 system which had proven consistent in both performance and reliability. Obviously this would be the easiest route for any manufacturer to take. It is possible to add feedback servos to the 21, in fact a feedback adaption to the 21 is available. The new CL5 system, as received, is a completely new system, resembling its predecessors in outward appearance, although considerably smaller and more refined. Inside there is no resemblance to the earlier systems except for the high quality workmanship.

General Description

The DeeBee Quadruplex CL5 is a quadruple simultaneous fully proportional feedback radio control system. The total airborne weight is approximately 25 ounces including the superhet receiver, servos and nickel cadmium power supply. As with the 21, the CL5 is completely prewired. Three independent servos are mounted on an epoxy glass mounting board which also contains the aileron servo plug, battery connector, on-off switch, and a jack for auxiliary function. This auxiliary control is even more ideally suited for electric brakes with no other servo required. The receiver is connected to the servo board by means of a connector allowing for easier installation. The board mounting of servos makes installation extremely easy, the board simply being screwed directly to the servo rails. The receiver is foam packed ahead of the servo board. The pre-wiring and cabling provides installation flexibility and eliminates installation error. All plugs are polarized and each is of a different type, making errors in connection virtually impossible.

The Quadruplex CL5 provides independent proportional control of rudder, aileron, elevator and throttle plus an auxiliary control for brakes, flaps, etc., and a pre-program control for extra up-elevator for use in spins. The receiver and transmitter are housed in an attractive maroon anodized case.

Transmitter

Four simultaneously transmitted tones are employed in the CL5. There is no pulse or commutation of the tone, eliminating the need for filter or memory networks in the receiver. The transmitter consists of three general sections – RF, modulator and the four tone generators. Since there is no need to pulse or commutate the tones, the number of components used in the transmitter has been greatly reduced. In fact, only eight transistors are used in the transmitter. The transmitter power supply consists of ten 1.2A. nickel cadmium cells, giving a total on-time of ten hours from full charge.

The quadruplex CL5 transmitter is a completely transistorized, single stick model with the throttle on the top rear corner of the case. All controls are trimmable, with rudder and aileron on the front of the transmitter and elevator on the top where it may be controlled with the left hand during flight. A dual purpose meter is located on the front of the transmitter for a constant check of RF output and a push button test of battery condition. The charge jack is located on the front of the transmitter. The overall transmitter size is 8⅝" x 7" x 3¼". The familiar long screw-on antenna used on previous DeeBee systems has again been used on the CL5 transmitter. In our opinion, this antenna is a little awkward, due to its extreme collapsed length, however, this could easily be replaced. The convenient handle which has always been a part of Quadruplex transmitters has somehow been omitted on the CL5.

Receiver

The superheterodyne receiver utilized in the airborne system is a two deck completely transistorized unit with no relays. The upper printed circuit board is the superhet front end. The lower deck contains four Schwab detectors, designed by Carl Schwab of Huntington Station, New York. It is these four Schwab detectors that separate the four simultaneous tones as received from the transmitter and direct them to the proper servos. Monitoring of the tones from the transmitter and an oscilloscope trace of the transmitter output leaves us somewhat amazed at how these Schwab detectors operate. Each Schwab detector creates a tone in the receiver thereby creating four tones in the receiver, one for each function. These tones, as generated, are servo neutral. The neutral tones from the transmitter are matched to these receiver tones. The receiver locks on to the transmitter tone, and any slight variation from the transmitter will cause the receiver to follow. The receiver and transmitter act very much like magnets in that the receiver almost attracts the transmitter tones. With any

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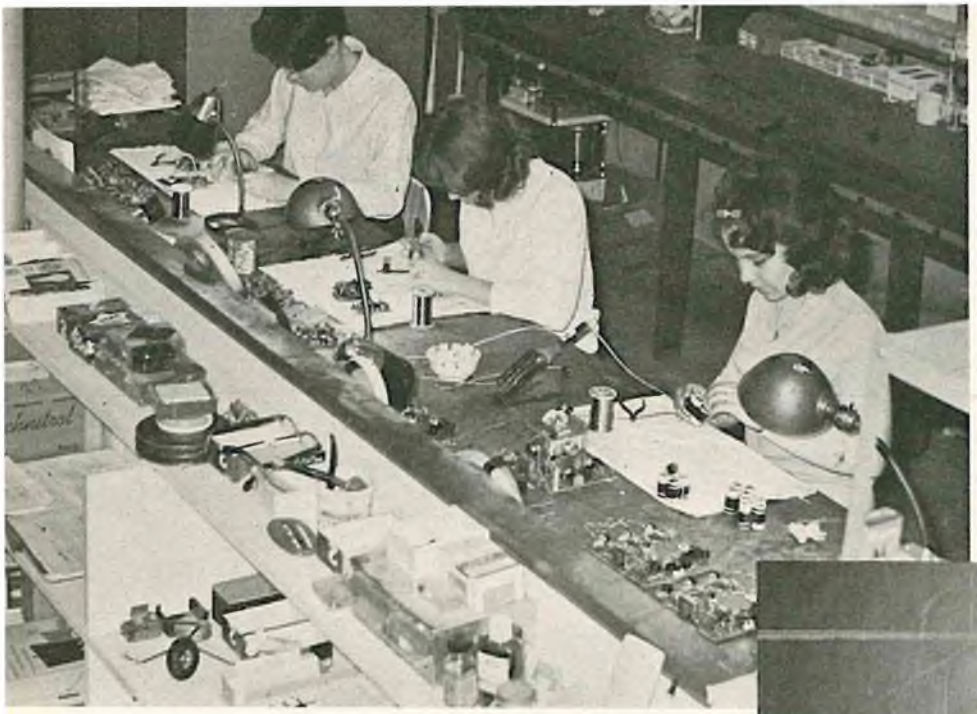
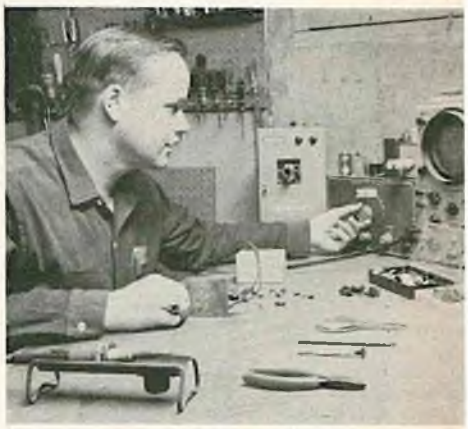




Above: Several young ladies hard at work at the Dee Bee assembly line.

Above right: Dee Bee's design engineer, Carl Schwab. Carl is also the designer of the Schwab Audio Detector used in the new Quadruplex CL5.

Right: The ever-popular Dee Bee 21 Systems awaiting tune-up prior to shipment.

Below: Don Brown supervises a Dee Bee technician.

Below right: Don Brown at his bench.

Dr. Walt Good during technical discussion of vibration effects on radio controlled models.

1965 D.C.R.C. SYMPOSIUM

By BERNIE MURPHY
RCM CONTRIBUTING EDITOR

And the technical discussions went on even outdoors . . . Carl Schwab, Don Brown, Harold McEntee, Jack Lemon and friends.

Among the manufacturers displaying new R/C items was Sterling Models and their newest kit offering, Joe Martin's Denight Special. Sterling's Mambo Special at left.

THIS year, as in the past, the DCRC Club presented its annual R/C Symposium. A symposium is, by definition, "a drinking together" **or** "a collection of comments and opinions – several brief essays or articles on the same subject," in this case, radio control. The formal, arranged program centered on the latter definition, although some members enjoyed the eighth annual affair to its fullest meaning. There was even a rumor about a tug boat in the Sheraton swimming pool!

The DCRC Symposium for 1965 was held on May 15 and 16 at the John Hopkins Applied Physics Laboratory, located just outside of Washington, D.C. The affair began early Saturday morning with displays of equipment, kits, accessories, and new ideas. Talks and discussions were presented throughout the day, with only a short break for lunch. In the evening, there was an enjoyable banquet, followed by an equally enjoyable program of entertainment.

Numerous manufacturers showed their very latest, most up-to-date gear, as well as many new items not yet available on the consumer market. The latter category, of course, was the one in which most attending members were most interested! There were displays by AAMCO (Andrews Aircraft), Accutronics, Action Industries, Citizen-Ship, Controlaire, Dee Bee Engineering, Logictrol, Min-X, Pettit Paint, Sterling, and Top Flite. Each manufacturer presented something new and interesting for the RC'er to consider. With interest in proportional systems at its highest peak, it was interesting to note that the display creating the most conversation was not a piece of equipment, but rather, an airplane! Lou Andrews showed the first prototype model for a new biplane, and just about every one at the Symposium wanted one! Lou wouldn't even venture a guess as to when it would be kitted, but after its spectacular

(Continued on Page 42)

Fremont Davis, Grand Remote Wizard, presents Paul Runge with the highly coveted (?) Order of Propwash . . .

. . . While outside, John Spaulding hides from the sun he longed for all winter.

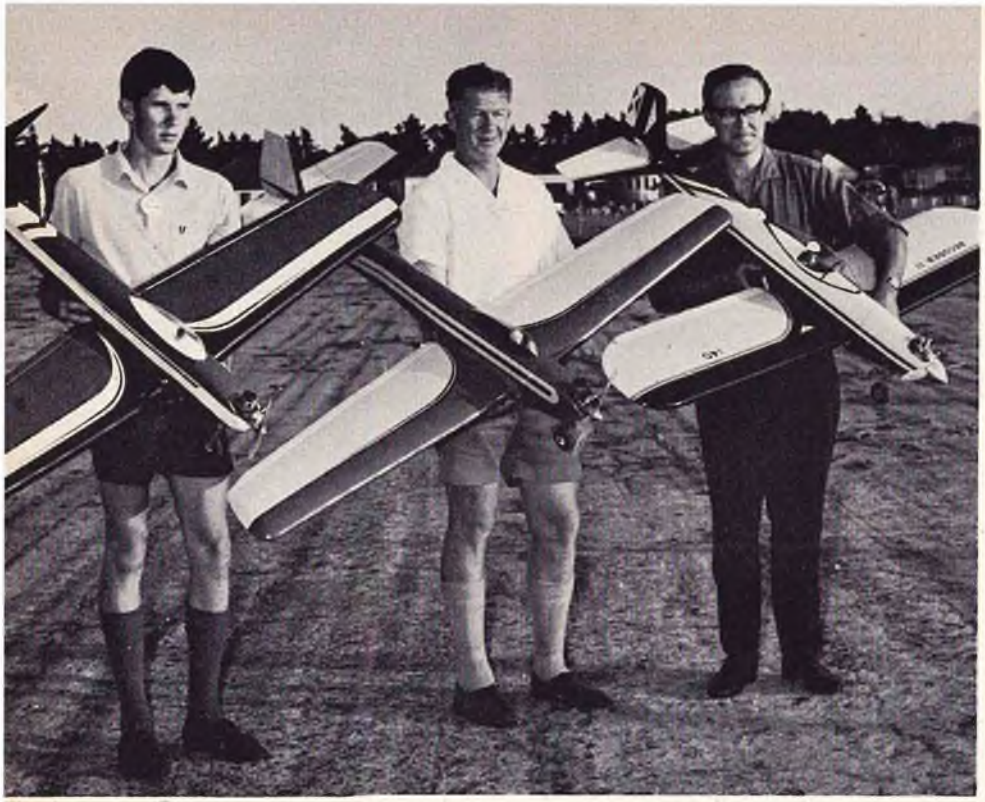
Bill "Pushbutton" Northrop explains the fine art of R/C sailboating to Lou Andrews.

Jack Lemon of Min-X and Fred Wallman of Annco discuss some of the complexities of proportional control . . .

. . . While Tony Bonetti proves them with an audio-visual demonstration.

George Wells' vacuum formed 'Icarus.'

Above left: The hit of the show — Lou Andrews' new biplane, soon to be kitted. Flies as good as it looks! Above right: Citizenship proportional display in foreground. At right: Bob Elliott of E. K. explains Logictrol proportional system.



To the victors, a berth on the Internat's team. L. to R: Wessels, Culverwell, Sweatman.

1965 SOUTH AFRICAN NATIONALS

By Chips Wannenburg & Monte Malherbe

THE four day 1965 South African National Radio Controlled Model Airplane Championships, held during Easter weekend at Youngsfield Aerodrome, Wynberg, Cape Town, was resolved with the final selection of Cliff Culverwell, John Wessels, and Chris Sweatman as the 1965 Internats team to fly under the national colors of South Africa.

Although this year's Nationals were plagued by intermittent foul weather, this did not appear to be a deterrent to the contestants arriving at the Aerodrome, located one thousand miles from Johannesburg. Despite the prevailing high winds, contestants arriving early for the annual event utilized every moment of time practicing the F.A.I. pattern. Both Cliff Culverwell and John Wessels were to fly under a handicap, having destroyed their first string models during the first day's practice. Culverwell's "Candy" was demolished during a rough practice landing in adverse weather conditions, while Wessels totaled his front-line Taurus due to radio failure.

Saturday, April 17th was the first day of official competition, with the opening ceremonies performed by His Worship the Mayor of Cape Town at 10:30 A.M. Skies were overcast and the wind blustery and fierce. Rain fell periodically through the opening ceremonies, as it was to do through the rest of the day. The first flyer to perform the pattern was a very nervous Chris Sweatman from Port Elizabeth who registered a creditable 1028 points with an original design that resembled a cleaned-up Astro-Hog. This was topped by Jim Connagher of Port Elizabeth with a modified Taurus and Constellation 7 proportional system, racking up 1209 points. Johannesburg's John Wessels then moved into second position, which he held through the second round, and until the last flight when he was quietly edged out by Cliff Culverwell, who, with his Taurus and Constellation 7 combo, had drawn last flight position.

Sunday's competition was marked by a complete contrast to the preceding day's weather. The morning started bright and clear with near perfect flying conditions, as Chris Sweatman came up with an impressive 1374 points to take the lead. Interest quickened among the many spectators as G. W. Hamilton, Johannesburg, then edged him out with a Taurus and O.S. 12, only to be set back by Cliff Culverwell who followed him with 1506 points for the highest

(Continued on Page 47)

Above: His Worship the Lord Mayor of Cape Town following opening ceremonies. L. to R: F. W. Raubenheimer, Mayor, Chips Wannenburg and wife, Monte Malherbe. Left: Flight line-up in ready boxes.

Jerry Krause

JERRY KRAUSE is an RC'er we will be seeing and hearing of in the future. The former Tulsa man has moved to Huntington Beach, California, and is the "K" in EK Products Inc. of Midway City, California. EK Products manufactures the new Logictrol 7 full-house proportional now being marketed nationally.

Affable and friendly, 31 year old Jerry caught the RC bug in 1958 while in the U. S. Army. He crowned three years of single channel flying with a switch to 10 channel reeds in November 1961. In early spring 1962 he entered his first contest and placed 2nd in Class III and 2nd in Pylon.

Jerry entered the Southwestern Championships at Dallas in September 1962 and placed 1st in Class III. Since that time he has competed in a dozen contests plus the 1964 Nationals, netting four 1st places, six 2nds, and four 3rds. His most significant recent win was in the 1964 Mid-America contest, where he placed 1st in Class III using the Logictrol 7 equipment, which he now manufactures in association with designer Robert "Bob" Elliott.

Late in 1963 Jerry decided that he would go proportional for 1964. He found that proportional systems were scarce, and ones that worked consistently were even harder to find. Hearing rumors of new systems to be introduced at the Toledo RC Conference, Jerry made the scene, only to be discouraged by the showing of the new types.

A graduate aeronautical engineer (Northrop Institute 1954, University of Colorado 1960) Jerry was with Douglas in Tulsa in April 1964 and was temporarily transferred to the firm's new Huntington Beach facility. Through a mutual friend, Jerry met electronic engineer and designer Bob Elliott, originator of the relayless servo circuit concept, and 1958 New England RC champion.

At that time, Bob was flying his new proportional system. Jerry asked Bob to give him a demonstration of the new unit. "I was sure that Bob really had something. I was itching to get my hands on it, and really kept after him for a complete demonstration," Jerry said. Bob was going to present a paper on Logictrol at the DC/RC symposium in May and promised to give Jerry the unit to "wring out" on his return.

Bob was as good as his word, and Jerry got the opportunity to fly the system the weekend after Bob's return from Washington. He was exultant after the first flight. "I knew that this was the system I wanted and had been looking for," he recalled. "It had centering accuracy far better than my old reed system."

With barely two weeks before the Nationals, Jerry began serious flying in Tulsa with his own Logictrol set. Every morning for two weeks he endlessly practiced the maneuvers, burning over five gallons of fuel during this period. The system operated flawlessly throughout the two weeks.

At the Nationals Krause went through the frequency check without a hitch. He flew through the rest of the week with no problems, and although he did not place, his scores were in the 70's, which encouraged him greatly. Even more encouraging was the trouble-free functioning of the new system throughout the meet, while many other proportional systems were unable to fly. Satisfied by the system's performance in the Nationals, Jerry settled down to prepare for his next goal – the Mid-America Contest at Kansas City. He placed 1st.

The following week Douglas Aircraft Co. again transferred him temporarily to California. He got together with Bob Elliott again, and they decided to market the system nationally under the trade name of Logictrol. They formed EK Products Inc., with headquarters in Midway City, California. Several systems had been flown consistently since March without any problems showing up. "After such successful and extensive testing under a wide variety of conditions, Logictrol was ready for RC'ers and we began marketing plans immediately," Krause said.

In the near future an RCM product report is scheduled for the Logictrol 7. Meanwhile, watch for Jerry Krause in contests – *He's* likely to be your stiffest competition.

RCM INTERVIEW:

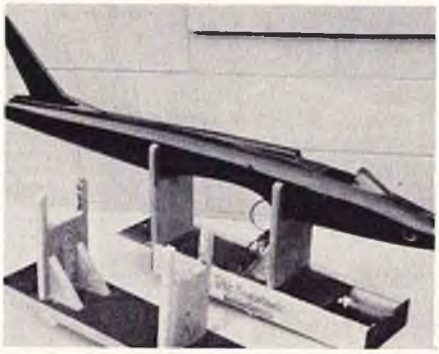
MEINKE

MODEL ENGINEERING

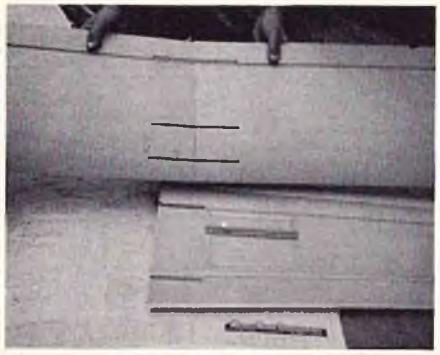
ORLANDO, FLORIDA

Garth Meinke of Meinke Model Engineering.

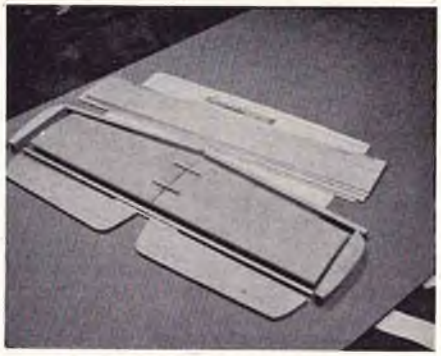
Meinke's foam wing kit plus cutter and power pack.



The Meinke pit assistant field box. Glaskraft Viper.



Foam wings held together showing three slot alignment. Lower wing shows L.G. installed.



Foam Stab kit available for most popular designs.

Meinke technician assembles the Hotline power pack for do-it-yourself foam wings.

Packaging the power packs and Hotline cutters.

Two years ago, G. W. Meinke established a part-time company involved in the manufacturing of precision built, conventional aircraft wings. A short while later, they pioneered the commercial sales of foam wing kits and instruments for cutting styrofoam. Today, Meinke Model Engineering of Orlando, Florida, produces fourteen different types of foam wing kits, distributed by dealers in thirty-seven states.

The rapidly expanding line of Meinke wings, known as the Gator line, are solid cores of white beaded polystyrene. These are offered as complete wing kits with all the parts pre-cut, or as a semi-kit, consisting of either the white or blue cores, landing gear blocks, center spar joiners, and complete illustrated instructions.

Also available as a complementary line of nine stabilizer kits which match most of the wings currently available.

At the present time, Meinke is in the process of packaging a rubber based contact type cement. This product will allow a wing to be fully sheeted in one evening, when used in conjunction with Hobby Poxy glue on the critical joints. Upon application of the new cement, only a fifteen minute drying time is required, and with substantially less weight than when conventional white glues are used.

In addition to their present list of products, Meinke Engineering is preparing to release a series of foam Goodyear Racer wings for the new N.M.P.R.A. events. Another project, still in the engineering stage, is a complete Goodyear racer of their own design, and featuring a completely prefabbed fuselage.

The RCM photos accompanying this Interview will best tell the Meinke story — a company that evolved from an original theory that the RC modeler wants more time in the air with less time at the work bench, while still retaining the necessary ingredients of the personal and individual touches of craftsmanship and finish.

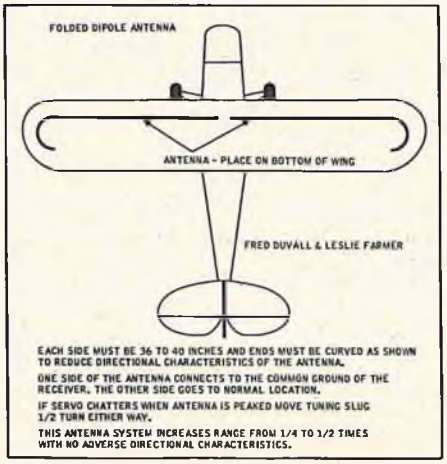
TOP OUT

jerry kleinburg

Part of the Class I line-up at the 15th Annual Southwestern Regionals held under ideal conditions at Buckeye, Arizona. Winner, Bob Angus, second from left, beams out over his .45 powered yellow and black original. Bob, a consistent contender, was 5th at 1964 Nat's, 6th at 1963.

THOUGHTS AT RANDOM

• **Juniors** – The growing realization, at least editorially, that RCing is an 'adult' hobby calls for resolute action to create room for the Junior and Senior age groups in sport and competition flying in order to prevent a 'justified rationalizing' away of the problem. The excuse that it's adult, therefore a not-much-can-really-be-done attitude must be guarded against. Class I, with the new breed of servos and interference-resistant superregens, offers a good solution to the economics. In fact, opportunity is constantly improving to reduce equipment costs as production increases. Rules, if we wish, may also be readily tailored for the competitive young set. Not much really stands in the way except perhaps the lack of sustained desire on the part of possible candidates. The building, care, and upkeep of an airplane is another part of the problem deserving earnest solution. An idea that keeps cropping up is that old-fashioned concept of an apprentice-craftsman approach. Perhaps by updating the language and by following that time tested method, then potentially good prospects could go about 'earning' their way by being useful and needed while learning the several underpinning RC skills. Simply by 'teaming' with an adult flier (not necessarily a son and dad combination) would make possible the establishment of a mutually useful combination that would test the resoluteness of *both* partners. . . .



While on the subject of young fliers, Jim Robertson of the Austin Texas Capital Aeroneers tells of his club encouraging Junior contest participation by having an extra trophy in combined events for the highest placing youngster. If by chance the Junior bests the adults he walks off with two trophies – a real feather in his bonnet!

• **McCoy 40** – Early success of the McCoy 35 for RC led to experimental development of a 40 during the last months of 1964. With the class I trend for a 'little more power,' coupled together with the effective throttling characteristics of the Red Head 35, interest perked at the prospect of a 40. After several months of quiet the more curious are starting to wonder if the 40 is going to make it for 1965. . . .

• **Plastic Props**—The popular brands of domestic nylon props have an interesting price structure. Eleven inch size costs a buck – the twelve, a buck and a half. With the market on the twelves increasing perhaps a price break is in the offing which will level the 50% hump. Perhaps Tony Grish would care to comment. . . .

• **AMA Prexy** – Welcome to Howard

(Continued on Page 62)

They came, they saw, they flew.

DCRC Symposium

(Continued from Page 34)

reception, it is a certainty that it will be in the immediate future.

The technical papers presented at John Hopkins covered a wide range of topics, from "Pulsed Reed Proportional Control" by Dick Jansson, to "Meteorology and R/C" by Willard Shinners. Another approach to proportional keying of reed systems was presented by Fred Marks. Dick Allen pointed out some interesting aspects of contacts and connections, giving some insight as to how and why our relays and switches occasionally fail. (At 1000 feet!) A discussion of the many varied approaches to proportional control was presented by Jack Lemon, and the inner workings of the Annco servo was revealed by Fred Wallman. An elaborate multi proportional was described in a paper by Walter Freter of Germany, and presented by William Hirschberger. Dr. Walter A. Good shook the audience with his discussion of vibration levels in R/C models — as high, in some cases as 60 g's! Rusty Nelson described molding techniques using styrofoam forms and epoxy. Dr. Good, again, also reported on the status of the AMA/F.C.C. Committee, while Maynard Hill pressed for more activity in FAI records. I managed to squeak through an impromptu discussion of NMPRA Pylon, after which Bill (M.A.N.) Northrop took everyone for a sail on the nearby pond with his R/C sailboat.

The banquet provided a chance for a congenial get-together where conversation centered on the topics of the day — as well as yesterday's and tomorrow's! The evening's entertainment program included a hilarious R/C dogfight film with scale WW I ships, plus a showing of the 1938 Nat's film. All present were accepted into the DCRC fraternity — the Remote Knights of the Air, by self appointed Grand Remote Wizard, Fremont Davis. The Order of Prop Wash was conferred on Paul Runge of Ace R/C and Grid Leaks Data Service for his assistance in furthering R/C and for his invaluable help with the F.C.C. Committee.

Top Flite's Schoolgirl kit on display at DCRC confab.

Willard Shinners, who discussed weather predicting on Saturday, arranged for a beautiful day on Sunday — clear, hot, and calm. And hot again! Everyone turned out for a day of flying fun and demonstrations. A stroll along the ready lines revealed just about every size, type, and class of ship and equipment, both old and new. In the pit area, discussions of various equipment continued, while on the flight line, as many as seven fliers skillfully pitted their gear against all comers.

A spectacular demonstration flight was made by Ernie Huber, builder of the Andrews prototype bipe, after which Lou was swamped with "When — When — When?" No one even bothered to ask that all important "How much?"

This year's Symposium saw more flying with more proportional, in less space, with even less frequent cries of "I ain't got it!" — R/C is looking up (in the sky), not down (in the ground)! Whether we realize it or not, R/C manufacturers are giving us more reliable and all around better equipment than ever before. It is now up to **us** to improve **our** installation techniques for maximum reliability.

The weekend concluded with thunder and lightning at dusk on Sunday — the Weather Gods could hold out no longer. Too late to dampen our spirits though, for everyone was packed and ready for the journey home.

To our hosts, the DCRC, and the Symposium co-chairmen, John Strong and John Spaulding, our thanks for a pleasant and most informative stay.

We'll see **you** there next year.

Easy-does-it — the Hobbypoxy display.

IT WAS SERIOUS THEN.....

LT. COL. EUGENE HUGHES, USAF

TODAY, it is our privilege to reprint a choice bit of journalism from the aviation archives of 1911, when the official flight instructions were issued on delivery of the latest model Glen Curtis "Pusher." This material, submitted by Lt. Col. Eugene Hughes, U.S.A.F., is reprinted from a current Air Force publication.

RULES GOVERNING THE USE OF AERONAUTICAL APPARATUS

1. The Aeronaut should seat himself in the apparatus, and secure himself firmly to the chair by means of the strap provided. On the attendant crying "contact" the Aeronaut should close the switch which supplies electrical current to the motor, thus enabling the attendant to set the same in motion.
2. Opening the control valve of the motor, the Aeronaut should at the same time firmly grasp the vertical stick or control pole which is to be found directly before the chair. The power from the motor will cause the device to roll gently forward, and the Aeronaut should govern its direction of motion by use of the rudder bars.
3. When the mechanism is facing into the wind, the Aeronaut should open the control valve of the motor to its fullest extent, at the same time pulling the control pole gently toward his (the Aeronaut's) middle anatomy.
4. When sufficient speed has been attained, the device will leave the ground and assume the position of aeronautical ascent.
5. Should the Aeronaut decide to return to terra firma, he should close the control valve of the motor. This will cause the apparatus to assume what is known as the "gliding position" except in the case of those flying machines which are inherently unstable. These latter will assume the position known as "involuntary spin" and will return to earth without further action on the part of the Aeronaut.
6. On approaching closely to the chosen field of terrain, the Aeronaut should move the control pole gently toward himself, thus causing the mechanism to alight more or less gently on terra firma.

South African Nationals

(Continued from Page 36)

score of the Nationals. Wessels then upset the applecart by registering second highest score with 1469 points, securing a third round second place, only 73 points behind Culverwell with a total of 2686.

The fourth and last round had everyone on their toes, as it was obvious that the final results hinged on this flight. Sweatman held onto a total of 2739 points until Culverwell flew himself steadily into first place with 2902. Johnny Wessels, a remarkable flyer, fought all the way to second place with a final total of 2834, ending up with the final standings of Culverwell, Wessels, and Sweatman.

Following the traditional dinner-dance on Sunday evening, it was planned to attend the Single Channel and Scale portions of the Nationals, along with a demonstration of formation flying on Monday. These portions of the 1965 Nationals, however, had to be scrubbed due to 50 m.p.h. winds which even grounded the full size aircraft at the Aerodrome.

This, then, was the 1965 South African Nationals – and the selection of the Internationals team which will compete under Springbok colors at Sweden this year. Team manager will be Monte Malherbe who has retired from active competition.

OFFICIAL RESULTS: 1965 SOUTH AFRICAN NATIONALS

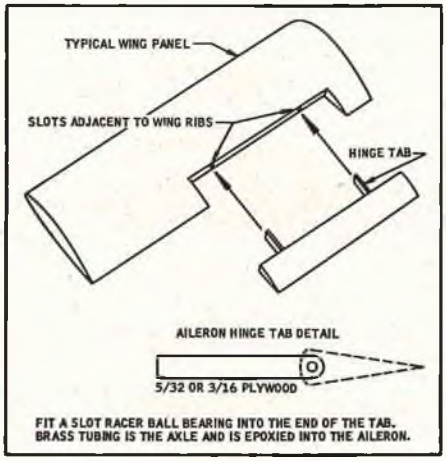
Contestant Town	Plane	Radio	Engine Prop	Final Score
C. A. Culverwell Johannesburg	Taurus	Constellation 7	Veco 45 11/6	2902
J. H. Wessels Johannesburg	Taurus	Min-X 10	Veco 45 11/6	2834
C. E. Sweatman Port Elizabeth	Decoder II	Orbit 12	Merco 61 12/8	2739
J. Marais Pretoria	Taurus	Orbit 10	Veco 45 11/6	2683
D. Pedersen Cape Town	Perigee	Orbit 10	Veco 45 11/6	2674
H. Pedersen Cape Town	Startern	Orbit 10	Merco 35 10/6	2603
F. W. Raubeheimer Cape Town	Pinball	Bonner Digimite	S.T. 56 12/6	2592
J. B. Connagher Port Elizabeth	Original	Constellation 7	Veco 45 11/6	2571
G. W. Hamilton Johannesburg	Taurus	O.S. 12	Veco 45 11/6	2516
D. du Plessis Port Elizabeth	Taurus	Kraft 10	Veco 45 11/6	1924
K. Jacobsen Pretoria	Beachcomber	Constellation 7	S.T. 60 12/6	1693
R. Pedersen Cape Town	Orion	Orbit 10	Veco 35 10/6	1254

N.A.R.C.C.

HINTS and KINKS

Frank Baker developed this system of aileron installation which will enable the modeler to achieve a better finish. The tabs, as illustrated, are not glued until after painting.

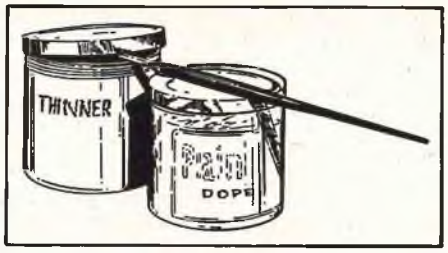
— Norm Rick in the MARCS *'Sparks'*



FIT A SLOT RACER BALL BEARING INTO THE END OF THE TAB. BRASS TUBING IS THE AXLE AND IS EPOXIED INTO THE AILERON.

When you need to apply several coats of dope and don't want to clean your brush after each coat, try this method from Jerry Burpee. The fumes from the open jar will keep the brush from drying. Dope or thinner in the jar will be fine — no home brew!

— Jerry Burpee in the Sentral Illinois *'Sirs'*



After six weeks of repairing and finishing operations the Square Hawk IV is airborne once again. The finish was a bit unusual, but it does look quite good if I do say so myself. Used Hobbypoxy — BRUSHED! It can be done, relatively simply. Here's my technique.

Two coats butyrate clear over balsa, with light sanding between coats. Layer of Silkspan, two coats clear, sanding between coats, followed by another layer of Silkspan, 90 degrees to the original layer. Two more coats clear with usual sanding. Incidentally, I wait 24 hours between coats of dope. Now the filling operation.

Thin Hobbypoxy Stuff with acetone (yes, it is compatible) and brush on. Let dry a day then sand to a grain-free surface with Sears extra fine no-load silicon carbide paper. Now wait 72 hours before using Hobbypoxy color.

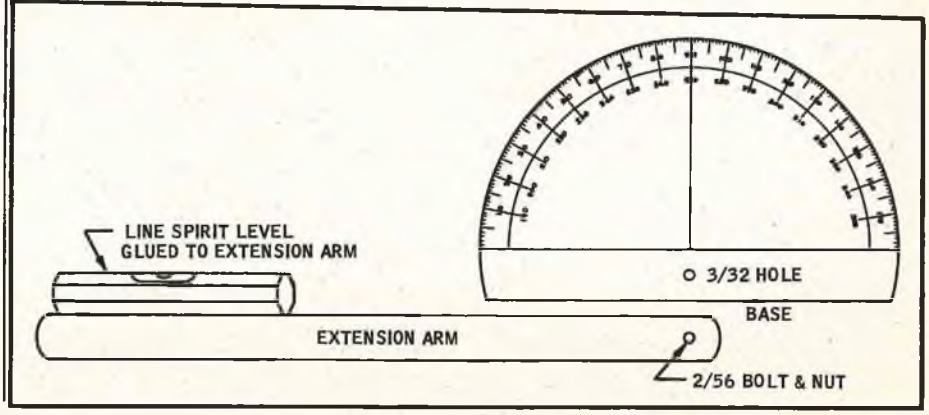
Mix color as directed, use tack cloth on surface, then brush on coat to one side of surface. I did the underside of the wing one day, topside the next, and so on. One brushed coat of the light colors isn't sufficient to give a deep full coverage so plan on three coats of white or yellow. Don't worry about the dust you pick up on the surface. After allowing 48 hours drying time at room temperature give the surface a light extra fine sanding before applying succeeding coat. After the final coat drys for 48 hours use automobile rubbing compound to take down the sheen and eliminate dust particles.

For trim, use low stick masks and apply color as before (my green trim stripes were only one coat applications). After the trim is dry give it the rubbing compound treatment also. Use Shell Furniture Polish to impart a satin depth to the surface. And that's it. May sound like a lot of work, but it really isn't, especially considering use of a brush. Spraying would be much better of course, since only one spray coat of even the lightest color will give adequate coverage. Hobbypoxy can be brushed — successfully — and relatively simply. Why don't you give it a try once yourself.

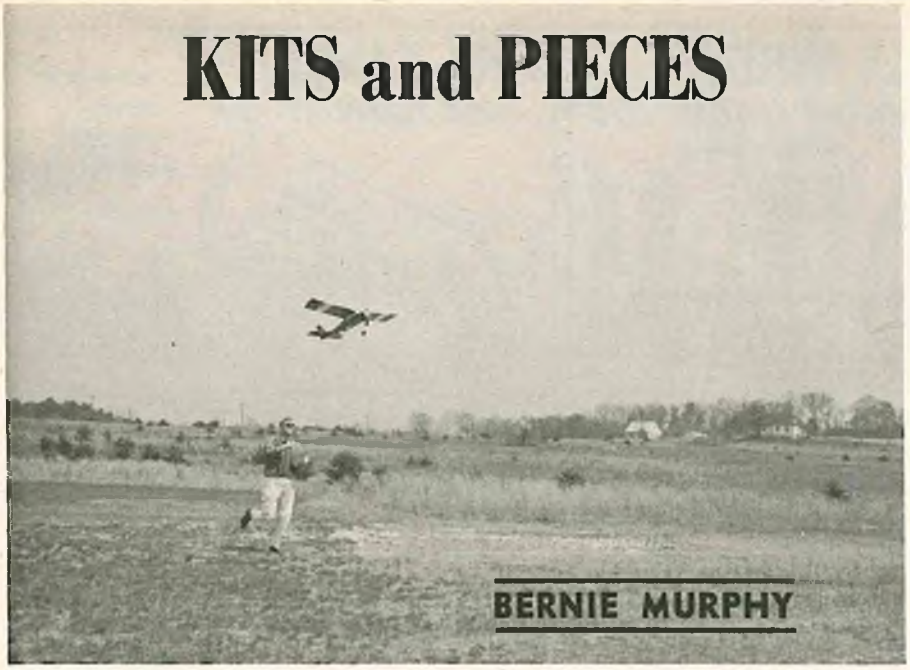
— Lou Guerrieri in The Pioneer R/C Club *'Modulator'*

The Abney Level is a device which can be used to determine, or set, the incidence of a wing. Basically, it is nothing more than a spirit level mounted on an adjustable calibrated protractor, and can be built for less than $1.50. Use an inexpensive 6" type protractor with an extension arm attached and glue to it a line type spirit level. Its uses are not limited to checking the incidence of a wing but can also be used to check the down and side thrust of an engine. In the latter case, set the model level, then set the base of the protractor on the motor bearers and raise the arm until the

(Continued on Page 55)



KITS and PIECES



Bob Wilkinson and Aamco H-Ray. Small size of Min-X transmitter makes unassisted hand launch practical.

This month, we are going full house multi, with the VK Cherokee. Before we do, however, let's go back to last month's column on the H-Ray and S-Ray. Time was short, and only a limited amount of flying was completed. After a dozen or so flights, the entire system was turned over to Bob Wilkinson for his opinions. Bob is an experienced Rudder Only flyer. The following is an excerpt from his letter.

"I feel it imperative that I write you a few words of praise insofar as perfection in rudder only flying is concerned. As you know, I have been flying multi for the past year, however, I have expressed the fact that rudder only was still a great source of enjoyment to me. The H-Ray and equipment which you made available to me has greatly increased this enjoyment and satisfaction. I have never flown a more perfectly matched system. By system, I refer to the entire package, H-Ray, Min-X Pulsmite 1200's transmitter and matching receiver, Accutrol Minipulse servo, and the Enya .15 T.V. Engine. In my opinion, and based on today's standards, this system is the ultimate, in single channel, rudder only flying, both for the beginner and the experienced contest flier.

"To date, I have over fifty flights on the H-Ray, in both calm and windy weather. Under windy conditions, I have found that a 1/16" hardwood shim under the stab leading edge would enable the H-Ray to penetrate better. With the engine at full throttle, the ship will R.O.G. and make a steady climb without stalling (from grass). The Minipulse servo affords seven throttle positions on the Enya 15, and I found that the first position below high to be just right for all flying maneuvers. At half throttle, the H-Ray is about as docile as a glider. At full low throttle, the Enya 15 is truly amazing. This engine will idle like no other .15 that I have seen.

The system combination is capable of *all* R.O. maneuvers including touch and go, rolls, spins, etc., yet at reduced power is suitable for the novice . . ."

(Continued on Page 50)

The H-Ray in flight.

Moment of decision . . .

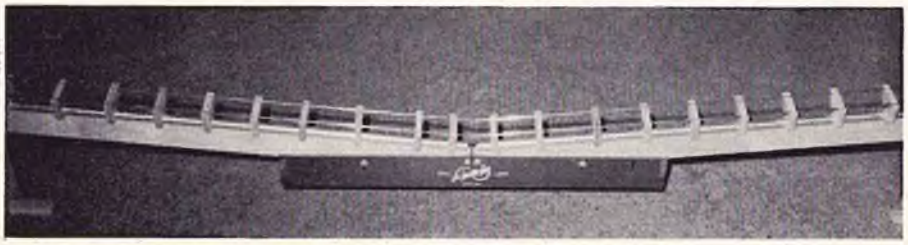
Kits and Pieces

(Continued from Page 49)

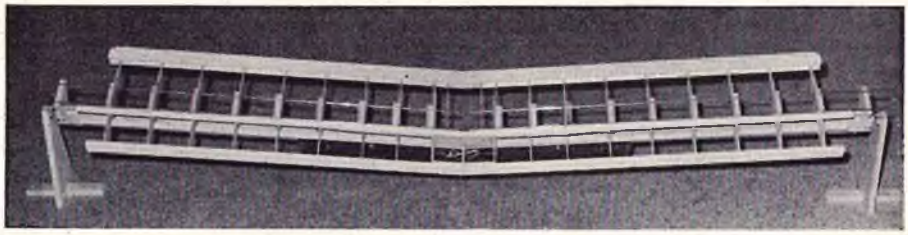
So much for the H-Ray. The S-Ray is flying with rudder, elevator and throttle using the new Babcock 27 system and an Enya 09. This combination is also an excellent one. Although escapement flying has dropped off with the advent of other methods of control, there is still a place for them. The "27" system is ultra simple to install. A little care on control surface freedom and escapement rubber makes the "27" exceptionally reliable. Three single strands of ¼" rubber proved best in this installation. Equipment, airplane, and engine for under $100.00! If you enjoy flying, we recommend either of these systems without qualifications.

Now for the multi flyers – the VK Cherokee. This is our first encounter with a VK kit, so naturally every part underwent a closer-than-usual examination. The hardware package yielded our first big surprise. All hardware is not only included, but is of top notch quality, blind nuts (DuBro type), nylon rudder and elevator horns, aileron cranks, tubing fittings, bolts, and VK's own cast nose wheel mount.

The die-cut parts were removed without any cutting whatsoever (this may vary with tool wear and wood grain). The many sawed pieces are well cut and fit as they should. The wood is of unusually excellent quality and appears to have been graded for specific purposes. All sheet stock is cut to the proper width for use! Extreme care is required during construction, as each piece in the kit has a specific place to be used. A ruler or finely calibrated eyeballs are a must! All parts are clearly defined in a parts list.



A-justo-jig setup for Cherokee wing.



Cherokee wing framework.

Completed Cherokee wing ready for removal from jig. Only center planking and tips yet to be sheeted.

We started the construction with the wing for a change of pace. One panel was first laid out on the Magna-Jig and constructed per the plans, using no glue. All parts fit perfectly. This panel was then disassembled, and the jig feet removed from the wing ribs. All ribs were carefully sanded (stacked) and drilled for the alignment rods of the Ajust-O-Jig. The entire wing was then assembled in one complete operation on the Ajust-O-Jig. Amazing! The entire wing was completed, except bottom cap strips and center planking in one evening on the jig. The top of the wing was even sanded and doped before remov-

ing! A careful check showed the entire wing to be true within 0.1%!

Fuselage construction is typical of most multi designs. One point to watch is in the installation of the nose wheel blocks. As noted on the plans, the engine blind nuts must be installed before these blocks are glued in place. We believe that these blocks should be omitted until after the fuselage has been assembled, making it easier to locate the engine mount screws properly. Also, the push rods should be installed before the bottom of the fuselage is planked.

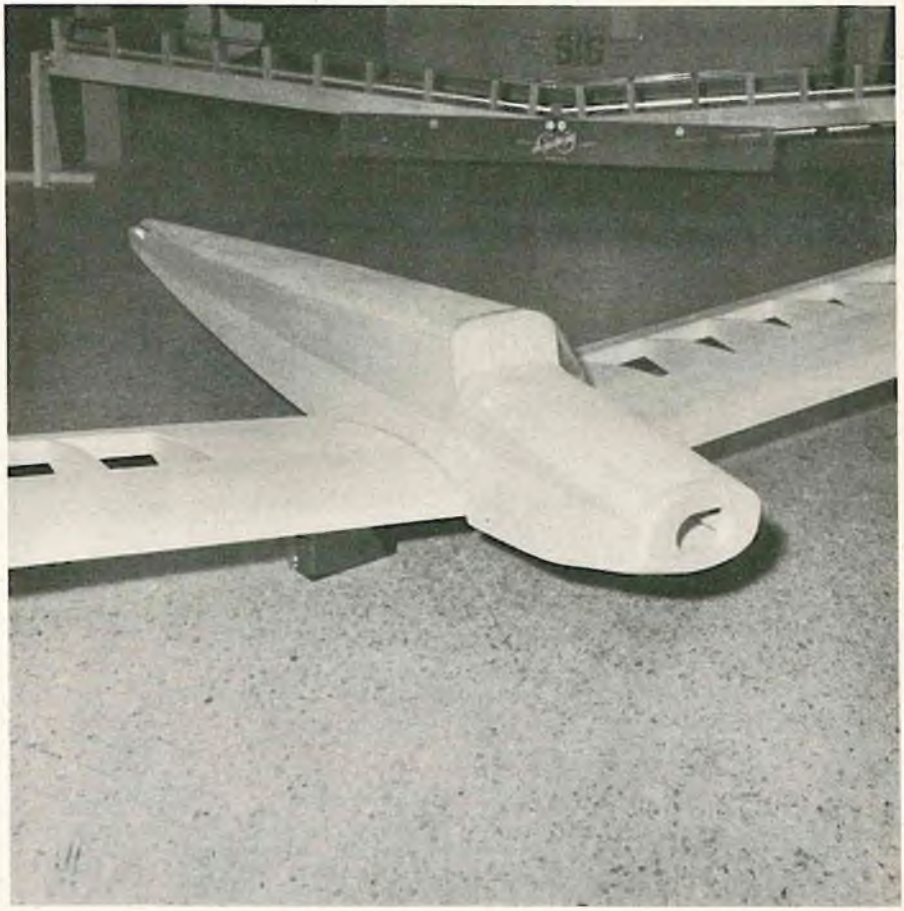
We have not completed the stab as yet, but a pre-assembly fit shows all parts to fit well and as shown.

The Cherokee is a full house contest multi ship for either proportional or reeds. We have seen the Cherokee fly, and it is a delight to watch — it looks like an airplane! Ours will be flying before the next column rolls around.

New items this month include Sterling's Denight Special for N.M.P.R.A. Pylon, and Kampel Model Finishes. Sterling, who has led the R/C field in Scale kits, has purchased Joe Martin's Denight Special design. The kit has been designed for simplicity and ruggedness, and features shaped and hollowed upper and lower balsa cowls, shaped maple motor mounts and center spar, spruce wing spars, spring aluminum gear, hi-impact plastic cowl cheeks and wheel pants, hardware and decals. The complete sheet covered wing has special "straight line ripped" sheets to insure perfect butt joints.

The Kampel finishes are not "miracle finishes." Kampel is producing a butyrate dope of excellent quality, packaged in quantities suited for the average R/C'er. Kampel dopes are available in the standard colors, plus a couple unusual ones, like Metallic Cocoa, in pints, quarts and gallons. These dopes are of much heavier consistency than usual, and will require at least 25% thinner. (This stretches your dope dollar.) Brushing retarder is also available and is highly recommended for all uses, as it reduces blushing and increases gloss. These finishes appear to contain more plasticizer than most others, reducing warping and crazing tendencies. An excellent, all around, easy-to-handle finish.

Till next month,
See you at Willow Grove.



Basic V.K. Cherokee framework. An excellent ship from a company with an enviable record for quality and attention to details.

Easy-Does-It!

(Continued from Page 31)

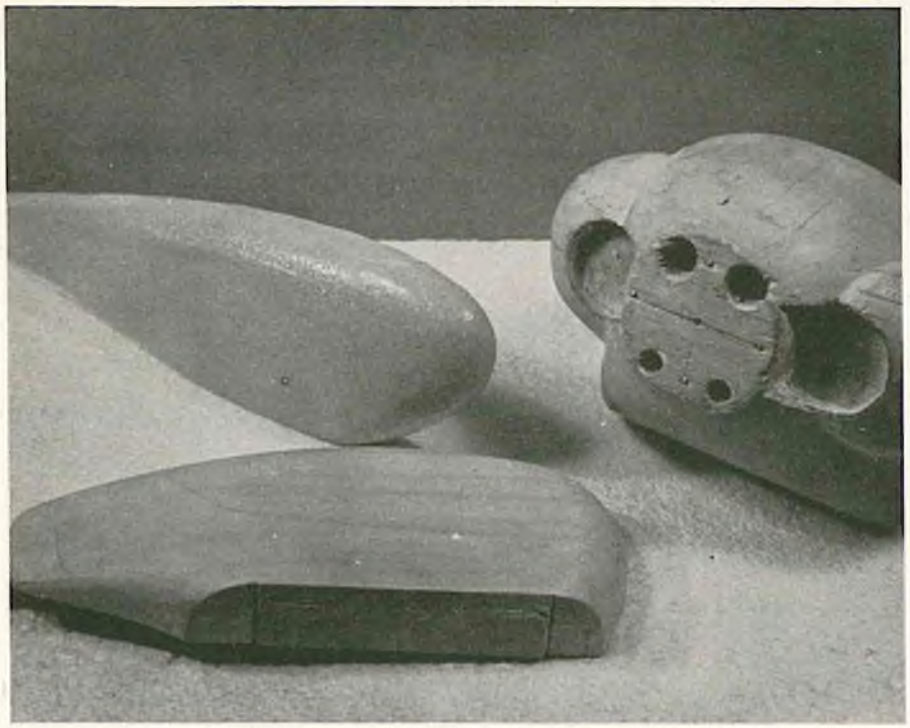
layers of balloon rubber. This presses the glue into the cloth and produces an even, smooth surface. Leave the balloon-covered form alone for at least one hour in order to allow the glue to set up and harden. The glue will not stick to the balloon once it has hardened, but it sticks like mad while it is still tacky.

After you are sure you've allowed enough time for the glue to set up, the balloon can be removed. The best way to accomplish this is to blow it up. Do it slowly and chances are it will come off slowly. If not, it will pop in your face and you don't get to use that balloon again! Unclamp the form from your workbench and trim the excess cloth from the mold with a sharp blade. Your finished form can now be pulled off the form, and the Saran Warp peeled off the inside.

If you were thinking ahead, and had a two piece mold, you made one while the other was curing, and you now have the two halves to work with. Be sure all excess is trimmed off of both halves. You can do final trimming with a blade or a small pair of tinsnips. Hold a piece of medium sandpaper on the bench and run the half forms over it several times so as to true up the edges.

Now you use masking, or cellophane tape, to hold the two halves together. Get them lined up correctly, using as much tape as necessary on the outside only. When you have them aligned, mix a small batch of glue and run a bead on the **inside** of the joint. Let this set up, then remove the tape. You'll have to fill the joint on the outside now, but this double gluing is easiest and strongest. After the second application of glue in the joint sets, you can clean up the joint area by scraping with the razor blade. Examine carefully for any bad spots where you did not get a good application of glue. These are usually seen as pin holes, or low spots, and should be filled with a light coating of glue. You can now scrape the entire form with the razor blade to produce an even matte finish, then sand with 400 paper applied wet.

Additional reinforcement, if necessary, can be applied by using strips of cloth applied to the inside of wheel pants or cowls at stress points. Small pieces of plywood can be affixed in the same way to accept mounting, or blind nuts, for attachement.

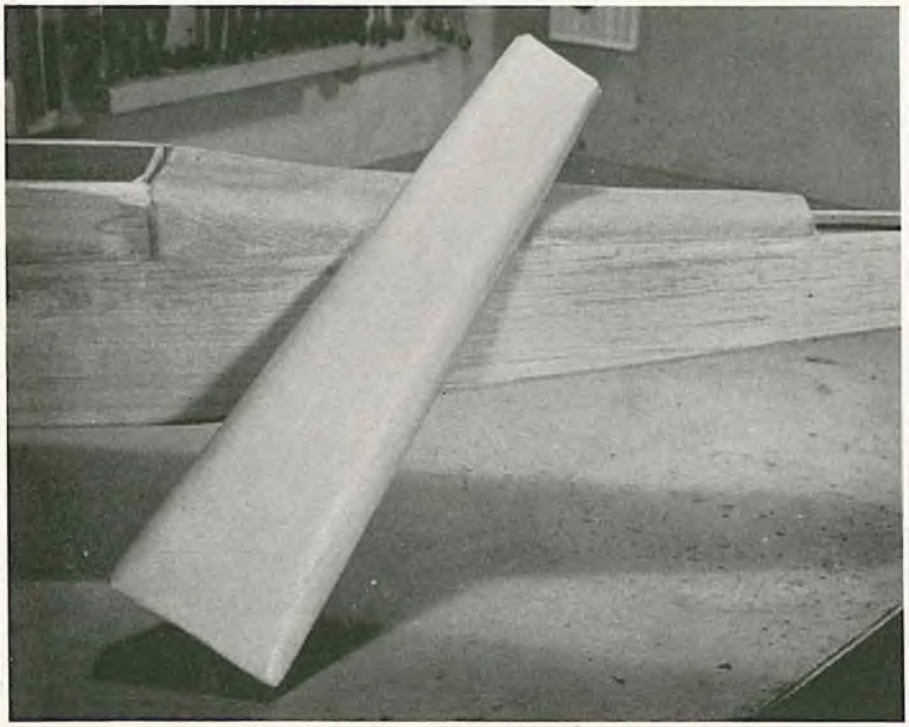


Any type of material may be used for original form. Glue-coated styrofoam in back, hardwood in foreground, balsa cowl at right.

The completed part can be painted with any finish you like, but Hobbypoxy colors are highly recommended. When you see the final job, you'll be putting molded parts on all your planes. It's that easy! A pair of wheel pants can be built from scratch in only a few hours' time. And the cost is not high – a single set of Hobbypoxy glue is enough to do two wheel pants.

If you're a Goodyear Racer fan, this molding technique will bail you out on cheek cowls, wheel pants and fairings. As most of these planes have sheet covered wings and fuselages you can use Hobbypoxy glue to do the whole job. It will look almost too good to fly, but when you do get it airborne and flying you'll find this finishing method stands up longer and takes more abuse than any other you've ever tried. It will look like you spent months getting that beautiful finish, but we know you didn't. Try it!

Formed fibreglass turtledeck used in place of silk covered stringers. Form made of styrofoam covered with masking tape for protection against nicks.



His Imperial Highness the Shah of Iran with the Empress and the little Princess during an RC demonstration in Teheran. 4000 kits, accessories, and radio units purchased by the Iranian government in order to promote R/C flying among Iranian youth. Model in picture is a Veron Concord distributed in the U. S. by Westee Hobby Imports.

(Continued from Page 48)

air bulb reaches the level mark. This will show you the down thrust. As for the side thrust, lay the model on its side, level it as per the center line, and repeat the preceding — the protractor set on the side of the motor bearers. For the wing or stab, use a template that conforms with the airfoil section, indicating the center line of the airfoil.

Be sure that your protractor is 6" or larger and is marked in half degrees. Most stationery stores carry the type with an extension arm, such as the Staedtler #5861.

— Ray Gareau in the MARS *'Pulse'*

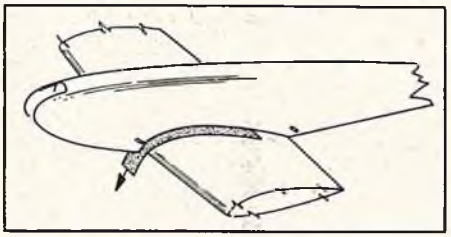
Sanding sealer? Try mixing corn starch with your clear dope for an excellent sealer. It may be mixed to any consistency you wish.

— Earl Farasy in the Sky Knights *'Roundtable'*

A quick and easy method for achieving that perfect fit between wing and fuselage is as follows:

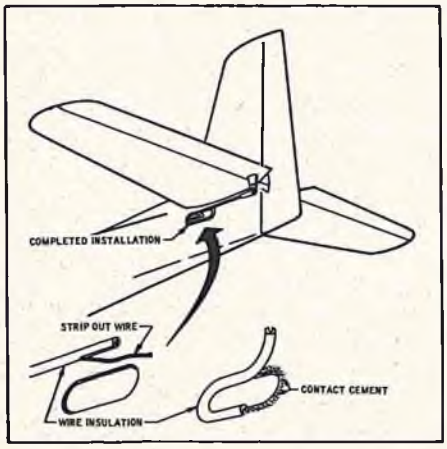
First, cut the fuselage to rough contour using a cardboard template (make from contour of wing main rib), then set the fuselage on the finished wing with a strip of sandpaper sandwiched between them. Apply a small amount of pressure and draw the sandpaper out towards the nose. After a few pulls with the sandpaper, the exact wing contour will be transferred to the fuselage. This method also works quite well on stabilizers.

—W. A. Sandham, Central Ohio R/C Society



One way to finish off pushrod openings is to cover the rough edges of the pushrod cut out with insulation from electrical wire. In addition to enhancing the model's appearance, this "combing" will tend to strengthen the area, and prevent splitting of the wood surfaces. The size of the insulation used would depend on the size of the model and the thickness of wood used in the structure. For the average 6 to 10 channel multi, standard 100 volt line wiring is about right. Use contact cement for installation. By the way, instead of rubber insulation, black neoprene tubing or electrical spaghetti can be used.

— Dave Kovensky in the McDonnell *'Carrier Wave'*



The Roostertail

The Official Publication of the International Model Power Boat Association
General Office: 2405 19th Avenue Broadview, Ill. 60155

If you haven't made plans to attend the 16th Annual IMPBA Regatta yet, you have only a few days to do so! This year, the BIG ONE will be held July 4 & 5, at Cape Coral, Florida. To add to the festivities, the Miss Florida World beauty contest will be held in Cape Coral on the same weekend, and as it stands, Miss Florida World will present the trophies to the regatta winners. This regatta promises to be the biggest and best yet!

●

All members of record April 15th, 1965, should have received a copy of THE HANDBOOK OF MODEL POWER BOATING and the 1965 DIRECTORY and one of our new Decals. For those of you model boat enthusiasts who have not yet joined our ranks, watch for our decal to start appearing on models all over the world. This design is the winner of the contest we announced last October.

Our thanks to Bill LeFeber, of Indianapolis, Indiana, for this design. Our thanks too to the many contestants who submitted the host of entries which made the selection of the winner such a pleasant task.

Aside from the usual places for the display of the new decals (boats, transmitters, car windows, etc.), you might want to add the decals to trophies which have a regular surface. Cups and plaques take on a new meaning when they display the emblem of the sanctioning body. Plain water tumblers or highball glasses become attractive conversation pieces when adorned with a full color decal which discreetly tells one and all that you are a model power boat enthusiast. Decals are available to all members at 10¢ each. Just send your remittance to DECALS c/o IMPBA General Office, 2405 S. 19th Ave., Broadview, Illinois 60155.

You Can't Win 'Em All Dep't. — After all the work that went into organizing and printing the 1965 Directory, the sheets were gathered and stapled wrong! The sheets are all in the right place, but each one is flip-side up. The pages are all numbered, so it is no trick to rearrange them to make all the States and Countries fall into alphabetical order. To change the Directory, 1. Remove the staples carefully. 2. Page through the book, flipping each page over completely before you "turn the page." 3. Check the page numbering, if it is consecutive, restaple the pages and cover together. 4. Now use the Directory as a mailing list for your next regatta, for places to visit and people to meet on your next trip.

●

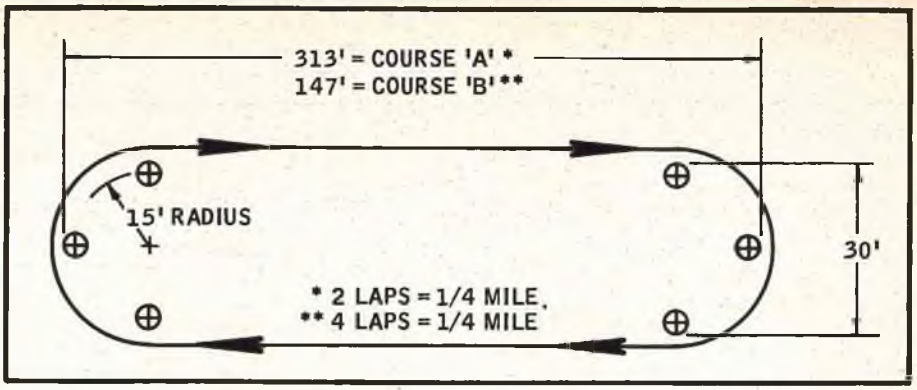
Official Notice — There was an error in the HANDBOOK OF MODEL POWER BOATING. The dimensions of the INTER-NATIONAL OVAL are incorrect. Course "A" as dimensioned to the outside of the marker should read 313'. Course "B" should read 147'. Also the diameter of turn at each end of the course is 30', or below shows the correct dimensions.

A correction sheet will be sent to all members about the end of the season, to try to catch all of the errors which may show up. In the meantime, the ROOSTERTAIL will print all changes as they occur, in order to keep you, the member, fully informed. We are truly sorry for the inconvenience caused by the errors in the HANDBOOK, or the 1965 DIRECTORY, and ask your indulgence.

●

NEW RECORDS — The Argonauts regatta at San Diego on February 29th produced the first new World Records of the season. Since the new rule passed requiring the timing of the Straight 1/16

(Continued on Page 60)



Roostertail

(Continued from Page 56)

mile to be an average of both passes all of the old records are void. Any time set at any sanctioned meet will be recognized as a record, provided of course no one beats you to the draw and established a two-way record in the meantime.

¼ Mile Oval:

D-3 (.35 Unlimited) K. Offerman 48.38 sec. or 18.6 MPH

B-3 (.15 Unlimited) R. J. Foley 58.68 sec. or 15.35 MPH

Straight 1/16 Mile:

B-2 (.19 Hydro) James C. Henry 0:12.65 sec. or 17.79 MPH

B-3 (.15 Unlimited) R. J. Foley 0:11.6 sec. or 19.4 MPH

D-3 (.35 Unlimited) Karl Offerman 0:10.27 sec. or 21.9 MPH

E-2 (.60 Hydro) Del Park 0:06.39 sec. or 35.21 MPH

E-3 (.60 Unlimited) Keith Gaeth 0:11.39 sec. or 19.75 MPH

F-2 (1.3, Hydro) J. Witlatch 0:9.14 sec. or 24.6 MPH

Del Park's average speed for two passes equalled the old record and his first pass over the course was a sizzling 0:5.97 sec. or 37.6 MPH. You can see from this that a two way average can make quite a difference in the official speed. It is only fair, since a good tailwind can affect the speed, and we want to give credit for a fast boat, not a slow one running in a stiff breeze.

●

Use the following form to submit your nomination for Directors of the IMPBA. Be sure to give the complete address of your nominee, so we may contact him. If you think you would do a good job as Director, or Vice-President of the Tether Division, put down your own name. Nominations close August 15, 1965.

NOMINATION FOR OFFICE OF THE IMPBA
For Director in charge of Records and Awards:

Name _____

Address _____

City _____ State _____

For Vice-President in charge of the Tether Divison:

Name _____

Address _____

City _____ State _____

_____

Your Name IMPBA No.

Application for membership to the I.M.P.B.A. for 1965

I.M.P.B.A.
2405 S. 19th Avenue
Broadview, Illinois 60155

Annual dues 50 cent plus $5.50 for a year subscription to R/C Modeler Magazine. (See subscription rates for outside USA). Family Plan: 50 cents per person plus $5.50 for a single one year subsription (one address only).

Name_____

Address_____

County_____ State_____ Country_____

IMPBA LIFE #_____ Interest: R/C_____ Tether_____ Club_____

I have a current subscription to R/C Modeler: Yes___ No___ Fee Enclosed___

Top Out

(Continued from Page 41)

Johnson, the new AMA president, who got the nod over Gorden Gabbert by just a handful of votes. Considering that Howard is a non-RCer and since RCers constitute the main adult group in the AMA brings interesting speculation as to what happened. In any case, both Howard and Gorden are experienced modeling executives so the general AMA membership had much to gain either way. . . .

• **Toy Airplanes** – This term raises the hackles on many RCers and seems to persist despite 'educational' efforts, explanations, etcetera. Many fliers are now learning to live with the misnomer; some are even seeing it as a plus in selling RC since the alternative to toy airplanes – at least in the minds of those uninitiated to RC – are the real aircraft. The in-between nicety of our radioplanes–a nicety the RC fraternity readily grasps – defies a simple explanation since the denominator of understanding requires common experience. Maybe the increase in relaxed attitude on the part of RCers reflects a maturing to the problem, is resulting in a poise which will help bring about a 'soft sell' solution. . . .

THE CONTEST SCENE

Fred Duvall – ex jet jockey and leading RC promoter of Alexandria, La. – relays information about the April contest which was favored by weather a lot more hospitable than at last year's effort when a 'monsoon' drowned the club's early season try. This year 30 contestants – 7 in class I – gathered for two days of flying and southern hospitality which saw some interesting flying techniques and test of a new technical development. It appears that the Pt. Arthur group had things much their way by taking most 1st places – George Brammer in class I, Norm Rhodes in class II, and Cal Scully in class III novice. Capt. Larry Beason of Barksdale AFB led expert in class III where a pronounced trend for slow sweeping flight patterns was noted as proportional control begins to draw more fully on its potential. 'Folded Dipole' antennas – as Fred, along with 'Glade' Farmer call their brainstorm – were tried to prove the reception gain and range improvement of this configuration. Ground checks of 4000 feet (!) have been obtained using the dipole system which Fred says is cut to a non-resonant length – each side 36 inches or more – to avoid adverse directional characteristics. Results were reported as good, resulting in fewer 'fail safe' cycles and overcoming signal absorption caused by the metal reinforcing of regular aircraft runways. Further description is seen in the accompanying sketch Fred provides. Dr. Bob Lien won the consolation mystery prize for clobbering his swept wing original – good naturedly unwrapped a Pactra U-Reely Control handle to the delight of the crowd. . . .

IN THE MAIL

Two letters, one from Chuck Morgan of Flagstaff, Arizona, Aeromodelers, the other from Don Downing of Wichita Falls, Texas, reflect a similar theme which deserves mention here. Chuck's letter, in part, says;

"I've been flying for sport for a few years (modeling for over 20) but this class I flying has bitten me now! I have the reed equipment to fly class III but I feel there is more to offer a novice contest flier like me in class I than in any other. With class I fliers I seem to be in a group of fellows like myself – and P.S., I like it!"

Don's letter mentions a scale Me 110 and then goes on; "For awhile I flew a class I job, a much modified Guillow Beam, which I used to break in the McCoy 35's and check out servos for the Me 110. These class III guys around here in Arlington where I'm going to school couldn't believe their eyes when I shot consistent touch 'n-go's. I called the ship the Tranquilizer, which it was with the throttle cut back – but not with it wide open! Everybody and his dog wanted to fly it and even people who didn't know one lever from another were flying the plane. Most surprising, the hot multi fliers just had to see what it felt like to fly a rudder only again, especially with the new servo set-up. Finally crashed the ship because while doing rolls the fin and rudder let go and that's all she wrote . . ."

A notice from Noel Hess (1779 Kensington Av., Salt Lake City) of the Utah State Aeromodelers brings news of their September 4th & 5th AAA contest. All pattern classes and scale will be offered at the Saltair Model Airport where, we hear class I activity is high.

Tom Sutor (of King Orange fame) chairman of the Youth Aerospace Foundation announces RC contests for all age groups and AMA events scheduled for April 24 & 25 at Sebring, Fla., May 1 & 2 at Moultrie, Ga., May 15 & 16 at Montgomery, Ala., June 12 & 13 at Spartenburg, S. C., June 26 & 27 at Nashville, Tenn., and July 4 & 5 at Jackson, Miss. Tom's notice also states that meetings will be held at each of the contests to establish groups for continuation of the events. With a program of this scope the Youth Aerospace Foundation, a non-profit organization, deserves encouragement and support in this promotional effort. Write Tom at Bldg. 903, Sebring Air Terminal, Fla., for additional information – he will be happy to oblige.

TECH TALK

• Part of the winnings from the King Orange contest was an Enya 45 which is being run in for use this season. Initial examination shows it to be a creditable piece of work with promising features. Pete Chinn's March MAN review gives it highest power marks for a 45, a factor showing on our stock copy from the first time it was turned on. Starting, hot or cold, was super simple at any throttle setting and idle was satisfactory from

the start. Adjusting the twin needle valves for high and low settings works out just as the ample instructions describe and it's possible to run blubbering rich to peaked on the high side yet have the idle stay constant without added adjustment. Settings are not critical although at present, with 1½ hours of running time, there are speeds at which vibration is still a bit more than desired. This is expected to clear and we'll report more after it's given some air time.

• The new Mambo kit airplane features a lifting tail section that contest fliers are finding unsuited for engines larger than those recommended. Due to increased speed take-offs require about a ¼ inch of shimming down of the leading edge of the horizontal stabilizer to nullify the extra tail lift and to allow the ship to rotate enough for a smooth lift-off. Building the horizontal stabilizer with a symmetrical section (about 8 or 9%) will do the trick more efficiently when powered with a .29 or .35 is planned.

• The good looks of Harrison Morgan's new Hi Fin (March 1965 MAN) is attracting attention of class I-ites. The nose gear, often a trouble point in rudder planes, looks especially good and it's hoped Harrison won't mind if I use it for my own new ship. As for Hi Fin — with its simple yet adequate construction, well designed wing and section, and different looks for a class I airplane — it should become popular in contest circuits this year and help sustain Harrison's leadership in Class I and as a TOP OUT Cavalier.

CONTEST TECHNIQUES

In response to queries requesting assistance on contest flying of class I planes, starting this month Pattern maneuvers will be detailed as space permits. Since engine is, more than ever, the elevator for our ships, new techniques considering this factor, have to be mastered if contest-level performance is to be gained. For those answering the challenge of the Standard Pattern, certain basics must be faced if proficiency is to result. The 'word', of course, is PRACTICE. With the number of variables involved no single set of words will dress every situation. What will be said here can only aim the steps; arriving is up to the individual and practice is the fare. So, since your ship is trimmed, and you can safely negotiate going up and coming down, let's start. (At the outset, however, I'm going to renege a little by skipping initial taxi maneuvers since they are 'non-flying,' and besides, there are just too many darn conditions to cover here. Suffice it to say however, be sure your undercarriage tracks true, is rigid enough so that it doesn't flex or fold on taxi turns, and that drag brakes — if any — work right!)

• **TAKE-OFF** — This is where class I aircraft can really shine. Graceful **scale-like** take-offs are possible because lift-off results from a smooth aerodynamic build-up which elevator assisted efforts on II & III ships find very difficult to duplicate. Speed for take-off may also be realistic resulting in a pleasing effect. With these thoughts in mind, make sure the aircraft is facing **directly** into the wind (watch your antenna streamer — there is one, isn't there?) and that the engine idles slow enough so there's no creep. At this point run the rudder back and forth for a final check, take a hitch on your nerves, and get ready.

Now, ease on the throttle and open it **all** the way and allow the toggle to neutralize. At this time (about 1 to 2 seconds after starting up with the throttle) be especially watchful for turn caused by torque or gyroscopic effect. If wheel tracking is true, engine off-set correct, and take-off is straight into the wind, rudder control should be able to correct for these initial reaction forces which, if they occur, will rotate the plane to the left. Be ready for a right correction at about the time the engine comes on full. (After a while you'll automatically give a small tap at about the 2 second mark.) Just be careful to guard against an over control because correction for **that** would be a left, and in all normally trimmed aircraft, left turns tend to be faster and therefore a little tougher insofar as pilot reaction is concerned. Remember, what you are after here is a straight line take-off with corrections, if any, so small as to create no noticeable rotation of the tail. It must be realised, though, that it is at this point, when ground speed is slowest, that directional control is most difficult to maintain but where high points for this maneuver are initially established in the minds of the judges.

The aircraft is picking up steam and now's the time for your thumb to be positioned on the motor toggle preparatory for a power decrease. Assuming your plane can leave the ground under average conditions within 75 feet, at about 50 feet feed in a power decrease to about ½ throttle, aiming at a timing that will allow take-off to occur through the inertia created by the acceleration during the first 50 to 60 feet. Sometimes two power reductions are desired, one to take the top off the engine sound at about 35 feet and the other to under half-power at 60 feet. Strive for the single reduction method for its simplicity as should be the goal for all maneuvers. A good lift-off will give the impression that the plane seems to 'pause' at the moment it takes to the air although a profile or side view shows no plateau or leveling once the wheels leave the ground. What does occur is that the climb path is changed by the power reductions from an ever-increasing or geometric pattern to a straight line linear configuration. It is the attitude of the plane itself, as it freezes into a fixed nose up condition, to give the gentle sloping flight upward (about 10°), that creates the 'pause' impression. If power reductions are executed correctly, the flight profile should continue up in a constant straight line with the power set just before take-off. At least

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Top Out

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that's what you work for. Wind or atmospheric conditions may make it necessary to increase power at about 3 or 4 feet of height so as to continue the straight slope upward. Don't allow the ship to turn as yet, it should proceed straight out. Also, don't allow a dip from the take-off slope by being late with a touch of power should the wind kill off the take-off acceleration.

If, at this point your take-off run was straight and you got the 'pause' and the slope upward was flat, you can expect appreciation for the effort and most points. But don't count them yet because most judges don't turn off their calculators at this time and so there's a little more work to do to build your take-off 'reputation.'

So far, we've got the plane at 4 feet, climbing steady and going straight out. Allow the climb to reach 10 feet while preparing for the next positioning maneuver. What's wanted is a climbing turn to get the plane to about 60 to 75 feet high while flying it in minimum time to a spot about 50 feet directly downwind of your ground position and heading straight into the wind. As the plane reaches 10 feet, simultaneously (you do have 'simul,' don't you?) give it a small increase in power and smartly roll (what's smartly? — answer, anything less than a snap roll) into a 60° bank in the direction away from pits and spectators. The power increase is dependent upon the wind; the more wind, the more power. Just be sure you don't get the nose too high as you roll back to a wing level climb since about now you'll be going downwind and a stall at this point makes for a ragged flight (airplane too, if you misjudge and dork it). The downwind path should be about 75 feet to one side, and as the plane passes, start another turn to bring it to that keyhole point 50 feet downwind at 60 to 75 feet high and heading straight upwind. One more power reduction is needed as the plane makes the last 90° of turn into the wind so that altitude is stabilized at a constant height for the Straight Flight Out maneuver. Be sure to turn yourself as the plane is flown through this positioning maneuver and move closer to the judges so they'll hear your confident call outs. As the plane approaches the 'over the transmitter' point, altitude and azimuth (direction) should be well established for best positioning of Straight Flight Out.

At this point also, we've run out of space. So, with a hope that the ship has enough fuel and that there's someone to bring the next issue of RCM, we will carry on at that time with more of the Standard Pattern for class I.

Quadruplex CL5

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incoming signal from the transmitter, the signal output to the servo is constant with no degrading of control with extreme distance. With any loss of transmitter the receiver will return to its own neutral.

Power Supply

The power supply consists of four 1.2A. nickel cadmium cells with a total idle time of 10 hours, and at least 6 hours safe flying time.

Servos

The servos employed in the CL5 system are manufactured by Accutronics Engineering for DeeBee. These are the same servos reviewed in the January RCM with minor changes in the amplifier circuitry. These servos are relatively compact, each measuring only 1 1/16" x 1¼" x 2⅜" including mounting flanges. The output of the servo is of the wheel type which is quite easy to adapt for different mounting positions or direction of throw. The servos are housed in a rugged metal case and are designed for ease of servicing. The rudder, elevator and throttle servos are mounted on an epoxy glass board measuring 2¾" x 6", and mounting on the same center lines as the 21 board. This board also contains all needed connectors. It is our feeling that this arrangement is quite flexible. In rare cases where extreme compactness or other configuration is needed, the servos could be removed from the board and wired together using a printed circuit board or similar junction.

Price and Availability

The DeeBee Quadruplex CL5 system retails for $579.00 including charger and is available through R/C dealers and distributors.

RCM Findings

Bench tests showed the CL5 to be exceptionally interference free. Transmitters, both proportional and reed, on identical frequencies had no effect on

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Quadruplex CL5

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the CL5. Full control was maintained under all conditions. This is due primarily to the receiver design and its ability to separate independent tones and recognize only those four with which it is concerned, rejecting all others. Servo resolution is extremely good with no deadband. Servo response is immediate and positive, with plenty of power. Response time is extremely fast. Range checks were consistently over 1500 feet with the transmitter antenna collapsed, giving an antenna extended flying range well beyond visibility.

The system employs temperature tracking. This means that the receiver and transmitter will track each other with any change in temperature, so long as both are at reasonably equal temperatures, thereby eliminating any neutral shift with temperature variation. This is accomplished by using identical LC components in both the receiver and the transmitter. The receiver and transmitter are completely stable over the entire flying temperature range. Tests show that a difference of temperature between receiver and transmitter in excess of 30 degrees F will cause a very slight control shift.

Flight tests of the CL5 showed the system to be quite responsive with very positive neutrals. At no time was loss of control or a fail safe condition noticed. During one flight the transmitter antenna was collapsed and the ship flown beyond a normal flying area. Again no loss of control or reduction in control was noticed! Following bench test operations, other transmitters were turned on during flying on the same frequency, at no time was interference in evidence. During flight the transmitter was purposely turned off. The ship responded instantaneously by proceeding to neutral control and low throttle.

Something new on the CL5 is the addition of a new machined control stick. This stick, replacing the older knob, makes single stick control much more positive, as it allows the flyer to rest his hand on the transmitter case holding the stick as he would a pencil, giving very precise fingertip control.

The design of the transmitter allows the elevator trim and motor control knobs to be interchanged making the transmitter comfortable even for a left handed flyer.

At all times the CL5 performed as well or better than the manufacturer had indicated. It is our general feeling that the new CL5 system may well prove even more reliable than its '21' predecessor, inasmuch as there are no relays, no tubes, and generally fewer components than these earlier models.

The Patriot

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'Hobbypoxy' "Stuff" thinned to proper consistency and sanded each coat. Wing and stab are covered with 'Silkspan' . . . Yes, we said 'Silkspan' paper. Three coats of thinned nitrate dope and three coats of thinned 'Stuff', sprayed and sanded. Why do we use 'Silkspan' instead of silk? Our experience with silk sealed with butyrate dope is that unless the surface being covered is too heavy, it will warp and never stop warping. A true wing today is not a true wing three months hence; besides, it is half as much work, saves weight, and is almost as strong. Final color coats are of 'Hobbypoxy' to suit your own taste.

Flying

This ship, although fast, is not hard to handle, as it is stable at all speeds and has that groovy feel. You will find that it likes the larger more graceful maneuvers. Its high, power-to-weight ratio pulls it through the largest loops, vertical eights, etc., at a constant speed. The extra zip will get you through the pattern with time to spare. You'll find you have the extra time needed to fly farther out and make the larger turns sometimes needed to get the 'presentation' that is the difference between a 4 and a 5 point maneuver.

Spend a little extra time setting the ship up, and you'll take some of the work out of that first flight. Let's start with the C.G. She's not at all critical to C.G. shift, but we have found that for best all around performance, you should balance it within the limits called out on the plan. We did not show any push rods on the plan, as we feel you all have your own pet method. Whatever you use, make them stiff. You've all heard the woes of flexing push rods. Ours are made of ¼" square spruce. Take the extra care necessary to eliminate binds in the linkage, and at the same time do not drill sloppy or incorrectly sized holes. The latter will provide you with loose neutrals which, in turn, makes your ship difficult in level flight. While you are at it, check and tighten, if necessary, the neutralizing adjustment on your reed type servos if you use them.

The aileron throw for reed or proportional, as mentioned earlier, should be adjusted for 9/32" up and 5/32" down movement. This should give you a medium roll rate with no yaw.

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The Patriot

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The elevator throw for proportional should be adjusted with just enough up movement for a positive spin. Start with ½" up, and make final adjustments based on flight tests. For reed installations, we prefer less movement, approximately 5/16" up; however, this amount will require that you install a kick up device or an over-ride servo for extra up elevator, with low engine to get a spin. R.G.A. sells a very good over-ride system for 'Bonner' servos. We do not use a 'differential' elevator horn, and therefore down movement should come out the same as up, giving you the same sized loops, inside as well as the outside variety. Individual ships, however, vary in C.G. location, weight distribution, etc., and you may have to make an adjustment in up-down differential, to achieve the same sized inside and outside loops.

Double check your ship for proper wing and stab alignment, making sure that they are a 0 degree incidence. Check also for warps, steaming out any that might exist.

Try one of these birds. Build 'er true, and you'll have yourself a good contest machine or Sunday flier, as suits your preference.

Advanced Multi Design

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formed by full scale stunt aircraft are the snap roll maneuvers. One has only to witness a performance by Bevoe Howard and his Jungmeister to reach this conclusion. It is my contention that these types of maneuvers should be added to the AMA pattern since it places a larger demand on airplane design and on piloting skill. This appears desirable since we are constantly seeking growth plus a greater challenge in our sport.

A swept wing design stalls abruptly for a simple reason: the tips stall first, permitting a rapid movement of the center of lift forward on the wing. This of course creates an additional pitch up moment and thus a divergent situation. This characteristic can be modified by a change in wing sweep and by devices which delay tip stall such as sections that stall at a higher angle of attack or by tip "wash out." Wing "fences" will also tend to delay tip stall. For a given wing area, wing sweep also places the center of lift closer to the fuselage. In rough air, this gives us increased sta-

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Advanced Multi Design

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bility since the roll moment induced by gusts is decreased. As you change the angle of attack of a wing the lift changes, of course. Typically, the increase in lift for a straight wing for a given angle of attack change will be appreciably larger than for a swept wing. This simply means that when disturbed in pitch by gusts, the lift will change less for a swept wing resulting in a smaller flight disturbance and thus a smoother flight. This characteristic also contributes to smoother or "softer" pitch maneuvers when commanded.

One additional benefit is increased rudder control. Most conventional designs, which utilize minimum dihedral, control very poorly with the rudder. About all that occurs with application of rudder is a yawing moment (or side slip) with little induced rolling moment. I've seen several multi's bite the dust with loss of aileron control since the rudder would not command the necessary rolling moment to bring a wing up. Swept wing designs have very good rudder control and this characteristic saved a ship for me this year when an aileron servo went out. Rudder control is effective since, as the airplane is yawed by the rudder, the advancing wing generates substantially more lift than the retreating wing. This is due to the fact that wing lift is also a function of wing sweep. For a given angle of attack the lift will increase as the sweep is reduced. Effectively this is occurring in a yaw or sideslip since the advancing wing is flying at a reduced sweep angle in relation to the relative wind. The net result is a good rolling moment in the desired direction.

There is another feature of swept wings which is a product of their equal lateral stability when either upright or inverted. This phenomena is roll rate. A conventional wing with dihedral has a higher roll rate when inverted than when upright simply because it has less lateral stability when inverted. This means that the roll rate of the airplane will change when performing axial rolls. It is particularly noticeable when flying very slow rolls with proportional equipment and aileron deflection must be reduced while inverted to maintain the same roll rate. This does not happen with swept wing designs. It is a very apparent phenomena which I have noticed in flying the modified Taurus (with 5 degree sweep) and the "Phoenix" or "Expinkamental." Slow, constant rate, axial rolls are *much* easier to perform with the more highly swept wing airplanes.

(To be Continued)

BURLINGAME, CAL. — The following excerpt is reprinted from the Burlingame Advance-Star:

"A small plane went down in the Foster City area yesterday.

There was only one problem as a United States Coast Guard rescue helicopter whirled up and down the bayshore . . . or as San Mateo County Sheriff's deputies hurled their cars along rutted dike-top roads at water's edge . . . or as anxious California Highway Patrol officers scanned the foggy bay waters from San Mateo-Hayward Bridge approaches.

No one knew just exactly how small the small plane was.

Very small. About four feet from wing tip to wing tip.

"A what?" one CHP officer, barked incredulously at his dispatcher. "That's what I thought you said. A model airplane."

Sheriff's deputies explained, as all the emergency equipment left the area, that motorists on the bridge had seen the realistic maneuvers of gas-powered models in the Foster City area, and had mistaken one of them, at least, for something bigger."

The "downed" flier? Duane A. Machtig, an RCM subscriber and member of the Peninsula Channel Commanders, and his two sons who were flying the O.S. .15 powered Tri-Squire.