FOR BEGINNERS: THE GARY I BY GERALD LEAKE

# Radio Control MODELER

CDC

AUGUST 1965 50¢

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


STARTING IN THIS ISSUE

## THE RCM DIGITRIO

THREE CHANNEL DIGITAL PROPORTIONAL SYSTEM

## YOU CAN BUILD!

ADVANCED MULTI DESIGN – THE PHOENIX BY DON LOWE

# RADIO CONTROL MODELER

Editor
**DON DEWEY**

Production Editor
**CHUCK WAAS**

Contributing Technical Editor
**Ed Thompson**

Art Editors
**Dick Kidd**
**Barry Halsted**

Contributing Editors
**Ken Willard**
**Jerry Kleinburg**
**Gary Preusse**
**Bernie Murphy**

Foreign Editor
**Cliff Rausin**

Club and Contest Editor
**Kathleen Acton**

Special Projects
**Bill O'Brien**

Administration
**Betty Rives**

Reader Service
**Shirley Byers**

Foreign Correspondents
**Geoff Franklin, England**
**Bill Murray, Canada**
**Monte Malherbe, South Africa**
**Per-Axel Eliasson, Sweden**
**Claude Bernard, France**
**John J. Carroll, Ireland**
**Windy Kreulen, Holland**
**Mario Sabbadin, Italy**
**Yuji Oki, Japan**

R/C MODELER CORPORATION, Publisher

Editorial and Advertising Office
P. O. Box 487
Sierra Madre, California 91026
Phone (213) 356-1066

Business and Circulation Office
P. O. Box 1128
Laguna Beach, California 92652
Phone (714) 494-0768

**Subscription service:** All subscription correspondence should be addressed to R/C Modeler Circulation Dept., P. O. Box 1128, Laguna Beach, California. Please allow at least six weeks for change of address. Include your old address, as well as new—enclosing an address label from a recent issue whenever possible.

**Editorial contributions:** must be accompanied by return postage and will be handled with all reasonable care. Publisher assumes no responsibility for return or safety of art work, photographs, or manuscripts. Address editorial contributions to The Editor, R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California.

**Subscription rate:** One year, $5.50, 2 years $10.00. Canada, one year $6.00. All other countries, one year $6.50. Payment from all countries must be in U. S. funds.





**Official Publication of**
**The National Association of Radio Control Clubs**
**International Model Power Boat Association**
**National Miniature Pylon Racing Association**


# EDITOR'S MEMO

## by DON DEWEY

With proportional control the topic of shop and field talk in virtually every corner of the country, and with every mail call bringing more and more requests from RCM readers for "do-it-yourself" construction articles, we have spent several months examining the feasibility and complexities of presenting a multi channel, feedback proportional system that could be constructed by our readers.

This proved to be the most difficult task we have undertaken since the conception of RCM. The first task was to determine what you and I – the RC'er – really needed and wanted. To begin with, we want the maximum amount of controllability from our aircraft – precise and definite **proportional** control. And – we must obtain this method of control with a minimum total expenditure and a maximum amount of reliability.

Let's take a look at what is available as compared to what we want to achieve. We have reed systems – this is not proportional control, but the factor of reliability is generally unquestioned. The price tag of a complete ten channel reed rig, complete with servos and nicads is approximately $350. A six channel goes for about $225.

Now, let's look at what we have with proportional control. The commercially available quad systems – the proportional counterpart of the ten channel reed set-up is usually priced from $450 up. The three channel systems average about $300. Single channel "dither" type systems are available for approximately $200. If you want to "do-it-yourself," you can put together a kicking duck, galloping ghost, or other type of single channel proportional system for somewhat less of an initial expenditure. But – despite the fact that many RC'ers have achieved individual successes with these types of systems, they do not provide completely independent simultaneous proportional control, and for the most part, are marginal in both operation and reliability.

Thus, in analyzing all of these various factors, we arrived at the following requirements. First, a feedback proportional control system that would provide independent simultaneous control of the flight surfaces. To keep the cost to a minimum, we would start with proportional rudder, elevator, and motor, allowing the individual flyer to add coupled ailerons if he so desired. As a further factor of economy, the system must be expandable – that is to say, it should be so designed as to be easily expanded to a "three plus one" or quad system in order to prevent it from becoming obsolete when the builder-flier's proficiency progresses to a point where the added controllability is required.

From a construction standpoint, the system would have to be designed so as to allow the **average** RC'er to construct it with ordinary shop tools. Mechanically, it could not require a lot of machining or lathe work. Electronically, it must be so designed as to be built by the same **average** RC'er – not just the technician with elaborate test instruments and a wealth of technical knowledge. When completed, it should even be able to be aligned without the necessity for an oscilloscope, if one is not available. All components must be readily available from local sources or from one of the several national mail order houses. The overall physical requirements of the system demanded a small, lightweight transmitter, small compact receiver, and commercially available servos with maximum power that could be converted for use with this system.

The next problem was how to obtain this method of control – analog or digital. Both types of system met the physical requirements, but the problem of final adjustment and alignment by the average RC'er, along with the "add-on" requirement, ruled out the analog method.

To sum it up, then, we needed a three channel, "expandable," digital proportional system that could be constructed by the average RC'er with a limited technical background, from readily available parts, at a cost of around $200 complete with servos, that was small in size and weight, and that would provide maximum reliability and performance in a wide variety of aircraft.

These were the requirements – and this month, we commence part one of a five part article on the construction of the RCM Digitrio Proportional System – a well engineered and thoroughly tested system that meets all of the above requirements. There is nothing completely revolutionary about the Digitrio,

*(Continued on Page 7)*


RADIO CONTROL MODELER MAGAZINE

AUGUST 1965 VOLUME 2, NUMBER 9

## THE COVER

Clare Waas adds the feminine touch to Bob Downey's Downey Special, winner of the Midget Races at recent L.A. National Air Races. Frank Johnson's scale R/C version of the Downey Special in foreground. Ektachrome by Chuck Waas.

## FEATURES



## DEPARTMENTS



## NEXT MONTH:

RCM DIGITRIO: *Part II – Constructing the Transmitter. By Ed Thompson.*

KAHUNA: *Plans for John Toomer's Graceful Soarer*

GOOD NEIGHBOR: *Ken Willard's Single Channel Sportster*

Plus Many Other Features

# 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!

**18.95**

**KIT FS17**

**Denight Special**

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

By Sterling MODELS
BELFIELD AVE. & WISTER ST.
PHILADELPHIA 44, PA.

although several interesting and unique design concepts are used. We have not only evaluated, tested, and flown the original prototype, but both Chuck and myself have each built a complete system from the exact instructions that will be presented in the coming issues – purchasing all components from local retail and wholesale sources in order to check their availability.

We are proud to present the Digitrio – a proportional system **you** can build. But, a word of caution – this is not a commercially manufactured unit–when it is completed, you built it, and its performance depends upon how thorough you were during construction. Unlike a commercial unit, there is no service policy – **you** are the manufacturer. The portions of the article on the theory of operation may not be as interesting to you as the actual construction, but it is essential that you understand the system and how it functions. Read **every** part carefully, follow the instructions to the letter, do a good job of building, use workmanlike techniques, and you will reap many, many hours of flying pleasure from your RCM Digitrio system while advancing your own knowledge of this new era of proportional control.

●

The First Annual Radio Control Scale Model Airplane Championships, sponsored jointly by the Southern California Council of R/C Clubs, Movieland of the Air Museum, and R/C Modeler Magazine, was a resounding success! Programmed specifically for scale enthusiasts, this first annual meet was an experimental program that paid off in a big way – drawing more scale entrants than any major contest, including last year's Nationals!

Although it is not the function of this column to report on a particular contest-type activity, the "experimental" facets of this meet are worthy of note. The latter, primarily, took the form of certain programmed deviations from the usual regional or national contest. First of all, this was a **scale** meet designed exclusively for scale enthusiasts. As such, no other categories were scheduled with the exception of an NMPRA sanctioned Goodyear pylon event.

On Saturday, the first day of the weekend meet, ground judging was combined with a public display of the models at the world famous Movieland of the Air Museum at Orange County Airport in Santa Ana. This provided an excellent background for the models, and provided the non-modeling spectator with a double-barreled package. On Sunday, flight judging was performed at the U. S. Marine Corps Helicopter Outlying Field, Mile Square, in nearby Fountain Valley.

But, in addition to the two days devoted exclusively to radio control scale, and combined with ideal public interest features, it is interesting to reflect upon several items that made this meet such an outstanding success. These came in the way of experimental deviations from general AMA R/C Scale Regulations and are listed below:

1.1 thru 1.10 Will not be enforced as these championships are an effort to conduct a contest under conditions most beneficial to the R/C scale enthusiast.

1.11 1.17 1.18 1.19 Models will be entered by and awards made to the builder of model(s). The builder may elect to use a proxy pilot if he so desires. A bonus of 10 points will be added to the flight score if the builder flys his own model. Team entries, per se, will not be allowed.

1.20 No limit on number of models that a builder may enter. No limit on number of awards that an entrant may win.

4. Paragraphs in Section 4 will be waived as necessary to allow maximum participation within limitations of safety at the discretion of contest officials.

24.1a Flyer must hold valid FCC license. AMA license is desirable.

24.16.4 Will be waived if required.

24.16.6 Will be waived to allow participation if model is considered safe and airworthy by contest officials.

24.2 Categories for this contest will be:
Single Engine RC Scale
Multi Engine RC Scale
Grand Champion RC Scale.
Categories are defined elsewhere in these rules.

24.3 See 1.20.

24.4 Qualification flight will be eliminated.

24.7 Change to read ". . . until maneuver 24.9.4 has been completed . . . etc."

24.9.6 Eliminate figure eight. Flight operations will be demonstrated at this point.

24.9 Points for maneuvers will have the same values as in the RC pattern event (0 to 5). Points will be awarded relative to realism of maneuver as compared to the characteristics of the full scale prototype.

24.13 Official score shall consist of the SUM of the flight points and the points from scale judging and scale operations.

– GENERAL –

Proof of scale is the responsibility of the builder. Builder must provide acceptable drawings.

CATEGORIES:

Single Engine RC Scale is defined as a model powered by

*(Continued on Page 71)*

by KEN WILLARD

# Sunday Flier

*If you've followed this column to date you have a well-trimmed rudder-only model ready for flight. Let's get it upstairs and see what happens . . .*

THE last two columns were devoted to some basic requirements for trimming out a sport type R/C model. Now let's see what happens when a well-trimmed model, using rudder-only control, gets into the air.

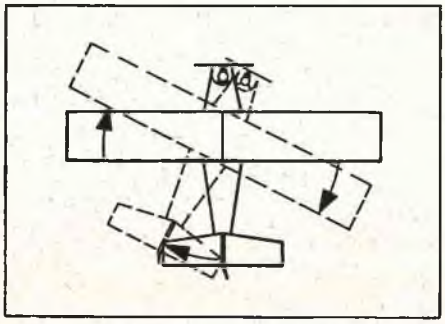
One of the most common mistakes in R/C flying is the failure to recognize that, although the pilot operates only the rudder, the airplane responds on all three axes. Let me describe a typical first flight with an inexperienced pilot.

The airplane is perfectly trimmed, the radio is working perfectly, and it's a beautiful day — just a light breeze blowing.

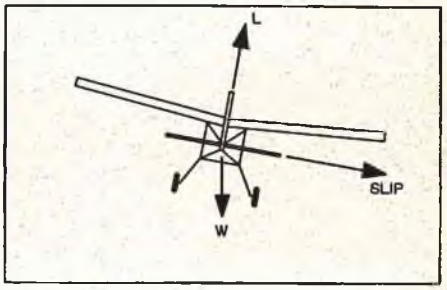
The modeler starts the engine, peaks it, checks radio operation, then hand launches. The model starts off in a nice straight climb — maybe just a shade of a left turn. If the modeler lets it alone, it would complete a beautiful free flight. But of course, with several minutes of fuel, it would soon be out of sight.

So the modeler presses the transmitter button for right rudder (let's assume escapement or servo operation, rather than pulse proportional). What happens? A simple right turn? Not at all — and this is what befuddles the beginner.

First the tail skids to the left, pushed there by the air flow on the right side of the rudder. This increases the relative speed and angle of attack of the left wing and decreases the relative speed and angle of attack of the right wing. So the airplane "banks" to the right because the lift on the left wing is greater than that on the right wing. But now the rudder is not only pushing the tail to the left, it also is pushing the tail **up** since the airplane is in a bank.



Consequently the nose goes down. And the speed builds up! The beginner, confused by this action, lets up on the control button. Since the model is well trimmed, as we mentioned, it starts to recover from the turn and shallow dive into which it has been forced by the rudder. The weight of the model is acting straight down, but the lift is canted, due to the banking turn, so the model starts the recovery by slipping into the turn. As it slips, two counteracting forces are applied.




The right wing hits the air at a higher angle of attack than the left wing, and this tends to bring the model back to level flight. The air flow, due to the slip, hits the right side of the fin — and this tends to keep the model in the turn. So, if the fin is too small, the model rocks back quickly, and if the fin is too large, the model not only stays in the turn, it will get progressively worse unless you correct with opposite rudder.

But let's again assume that the model is not only properly trimmed, but also well designed so the fin area balances the rocking tendency due to dihedral, and a smooth recovery to a wing level attitude occurs. However, since the nose dropped in the turn, the speed built up well beyond normal flying speed. So, even though recovery is smooth, the excess speed causes the model to nose up sharply in recovering. Then, as the speed drops, the nose is up too high and a stall results as the air flow separates from the wing.

No wonder the beginner is confused. By simply applying rudder, and then releasing it, his model has skidded, banked, turned, dived, slipped, leveled

*(Continued on Page 12)*

## Sunday Flier

*(Continued from Page 10)*

out, zoomed, and stalled!

If the airplane didn't dive into the ground following the stall, it will build up speed in the dive and tend to go up into another stall. If the modeler lets it alone, and it has sufficient altitude, the model, being properly trimmed, will proceed with a series of successively milder stalls until it resumes the steady gentle climb. Most often, though, the sight of another stall coming up prompts the modeler to attempt another turn – probably in the other direction, since the first one nearly resulted in disaster!

The second turn follows the same sequence as the first, but, remembering the stall on recovery, the modeler tries a turn in the opposite direction before the stall can occur, and this time, since the model has excess speed, the rudder is very effective. The resulting skid, bank, turn, and dive happens too fast. End of flight.

Sound familiar? Sure it does! We see it happen almost any Sunday.

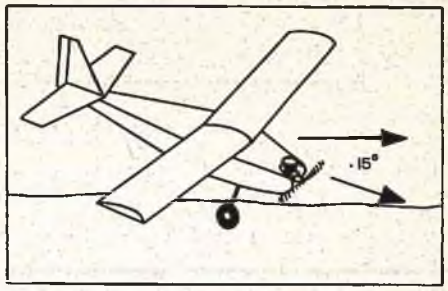
How can it be avoided? There are two ways. One is more reliable than the other, but not always available. I refer, of course, to the method of having an experienced flyer fly your model from launch to a safe altitude, then coach you in flying it until you know what to expect.

The other method is to make your first flight virtually as a free flight, except for quick, short pushes on the button so the model just starts a turn rather than really getting into one. Thus, with several short turn starts, the model can be "eased" around the turn and kept in close until enough altitude is gained to perhaps hold a turn longer and observe the action.

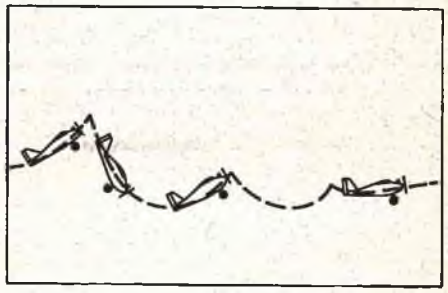
Obviously, if a well trimmed model does all of the foregoing when control is applied, imagine what could happen with a poorly trimmed model! Yet, this is the beauty of R/C. Even though a model may be badly out of trim, a skilled pilot can counteract many of the forces and get the airplane back on the ground in one piece.

But let's get back to flying the well trimmed model. At first, the gentle "blipping" turns (short presses on the transmitter) will give you an idea of the response of the model to your command, and you can steer it around for a couple of practice flights.

On the next flight, get some altitude, then try holding the turn a little longer. Watch the nose come down; don't hold rudder until the model is in a spiral dive! Let up after the nose is pointing 15 to 20 degrees down from horizontal.




Watch it level out and zoom on recovery, then watch the diminishing series of stalls until normal gentle climb occurs.



Now, after seeing this sequence of events a couple of times, put the model in a turn until the nose goes down about the same – 15-20 degrees, then let up. This time, as the model levels out and then starts to zoom, wait until the nose is pointing up about 15-20 degrees and press the button for a turn. Hold until the model develops a bank and the nose **starts** to come down, then let up. The zoom will continue, but now you've put a bank on it, and the model will be in a climbing turn, and with a little practice you can time this so the recovery from the climbing turn occurs without a stall. When you can do this, you're ready to start learning aerobatics.

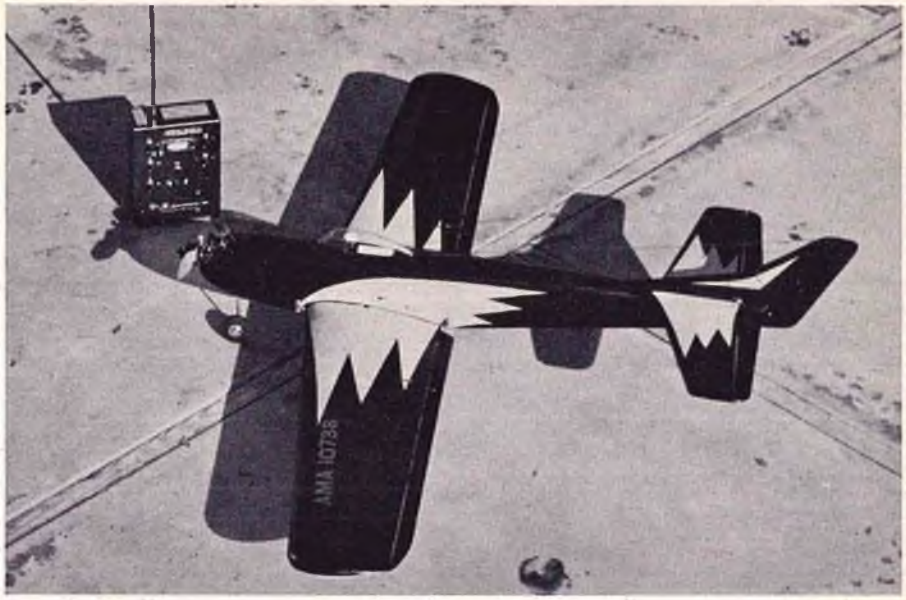
Before we go into aerobatics, though, let's take a quick look into simple pulse rudder flying – that is, proportional actuator control. This type of flying is probably the simplest to accomplish, although the equipment is a little more complex.

The main advantage of pulse proportional rudder is that you can get just as much – or as little – control as you want. Actually, when you're flying escapement, and you make a turn by a series of short presses, you're really "pulsing" the rudder manually at a very slow pulse rate. The pulser does it faster – and better.

But modelers using proportional rudder still get into the same fix as escapement or servo users when they overcontrol – as almost all beginners do. So it's still worthwhile for them to know what to expect.

Let's leave the techniques of "rudder-only" aerobatics for a future discussion. Just remember this, though – "Rudder-only" is a mechanical term; aerodynamically speaking, it is impossible to control the single vertical axis (yaw)

*(Continued on Page 73)*



First a .19, then a .35 — finally, an oak tree.

# THE POINT EIGHT TAURUS

**by KEN WOOLSEY**

FOR those R/C modelers who enjoy a departure from standard kit construction, here is a "goody" that will give you much satisfaction – both from the standpoint of a real challenge to your construction techniques, and for your enjoyment of a fine flyer when it is rolled out on the apron for its first take-off.

I have taken Ed Kazmirski's Taurus plans, and after constructing and flying a couple of the excellent Top Flite kit models, have multiplied all dimensions by point eight, or eight-tenths. It takes a lot of balsa cutting and bending, but the end result is a little beauty weighing in at four pounds, with a fifty-six inch span.

A K&B "19" was used originally, and proved to provide all the power needed. Flew just as well with a Veco "19," and now it is flying with a K&B "35" which makes it a real performer.

One-sixteenth balsa was used wherever three-thirty-seconds was called out on the plans. I bent my own leading edges, which is quite easy to do. Just soak one-sixteenth balsa sheet in hot water for a few minutes and bend it around to approximate shape, holding with masking tape. Let it dry out, and when you fit and glue it onto the ribs, it falls right into the contour you want.

In constructing the wing, use the number 8 rib of the plans as your number 1, and interpolate down to your number 12 from there, using what you can of the original Taurus ribs until you have used their number 12. You are on your own from there on.

Five Annco servos fit into the ship just right to give ten channel action. My Anncos perform beautifully.

I used a removable block above the four ounce tank for easy access to the tank and battery area. The tank is a Williams clunk type, and a five ounce nicad pack under the tank gives all the electrical power you need, and the weight and balance comes out just right.

Originally my ship had straight trailing edges, with taper on the leading edge only, as Kazmirski's later Taurus is constructed. I moved the wing forward three quarters of an inch to keep the center of pressure where it should be. This necessitated cutting the bulkhead in the fuselage to allow the wing leading edge to tuck under. No problem; really.

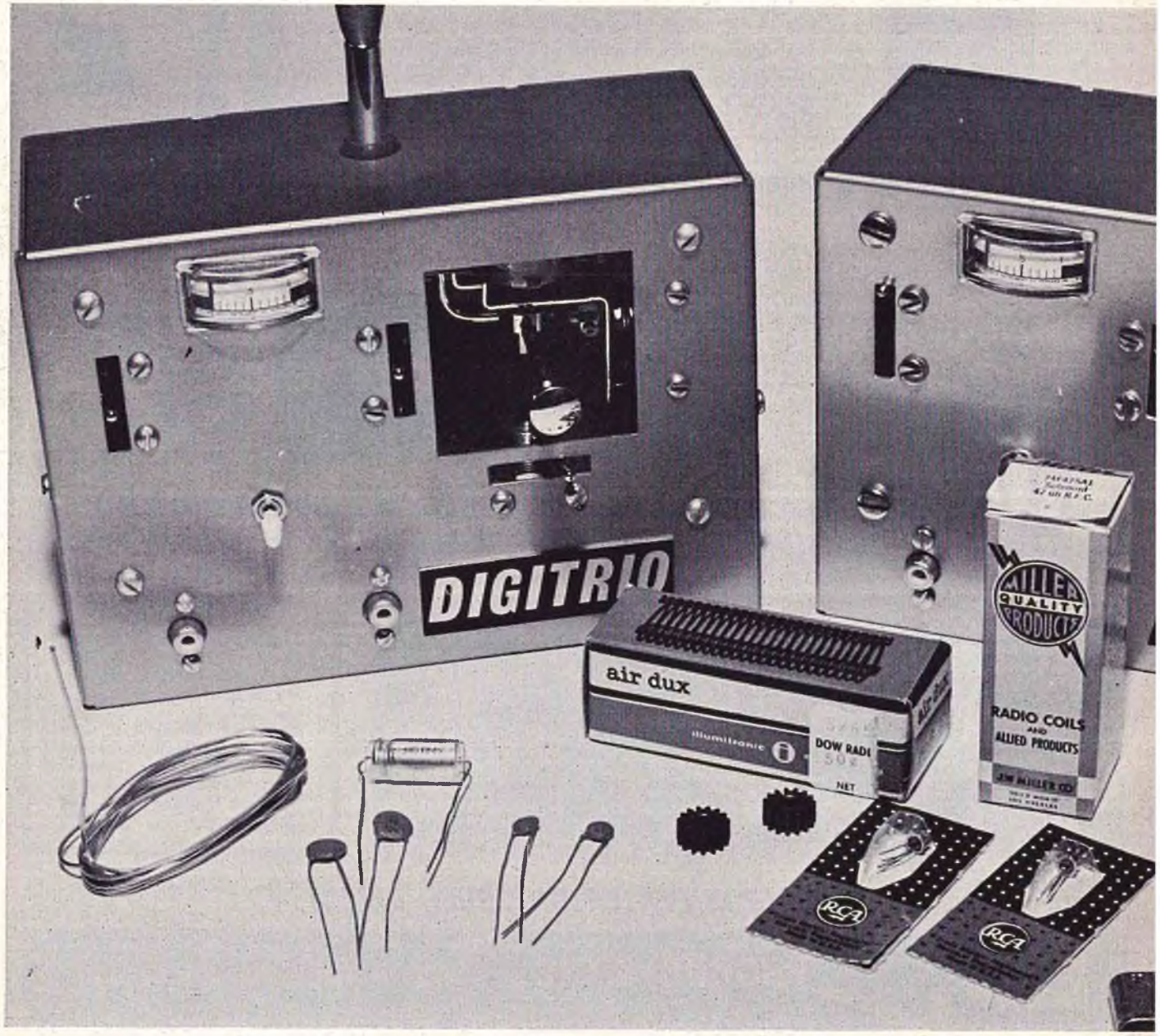
Recently, after flying the ship through an oak tree and shredding the wing, a new wing was constructed with a fifty-eight inch span, and a greater mean chord, by increasing the chord one inch at the tips. I first tapered the trailing edge three quarters of an inch forward to move the center of pressure forward in order to accommodate a heavier engine.

As of this writing, the ship flies like a guided missile with a K&B "35" turning a 10-6 prop. I suppose that I'll find another oak tree before long, but in the meantime, what fun!

# THE RCM

## By Ed Thompson

RCM STAFF PHOTOGRAPH



First in a series of five articles on a Three Channel Digital Proportional System you can build.

# DIGITRIO


*Editor's Preface: Radio Control Modeler Magazine is proud to present this first in a series of articles by RCM's new Contributing Technical Editor, Ed Thompson, on the construction of the RCM Digitrio Proportional System. We feel privileged to present this series to you, with the knowledge that it represents one of the finest individual design and engineering accomplishments in the field of radio control — providing RCM readers with the most thorough and complete construction article ever published by the model press. No attempt has been made to condense, or otherwise shorten, this series, for its author will take you from the basic theory, in this issue, straight through to the final installation of this digital proportional system. If you can use a soldering iron and ordinary model shop tools, you can build the Digitrio. No elaborate tools or electronic test equipment is necessary due to the author's method of presentation. Although access to an oscilloscope would be convenient, even it is not mandatory for alignment. The parts list has been checked, re-checked, and revised to make sure that there is almost universal availability of every component used — and even if you have to buy every item across the new parts counter, the price will be under $200, including the three servos! The system is also being kitted by a major R/C manufacturer for those who prefer a complete package. The editors of RCM have built two of these systems from this article, procuring all parts on an individual basis, and forming all work with common shop hand tools — exactly as was intended by the author, and no difficulties of any kind were encountered. Flight tests of the Digitrio were excellent, and if you follow the instructions to the letter, you will have a proportional system that will provide you with maximum reliability and performance for many years to come. If, for any reason, you should encounter any difficulty that cannot be corrected locally, simply drop a note to The Editor, R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California.*

*You asked for it — we think you'll like the RCM Digitrio. — Don Dewey*

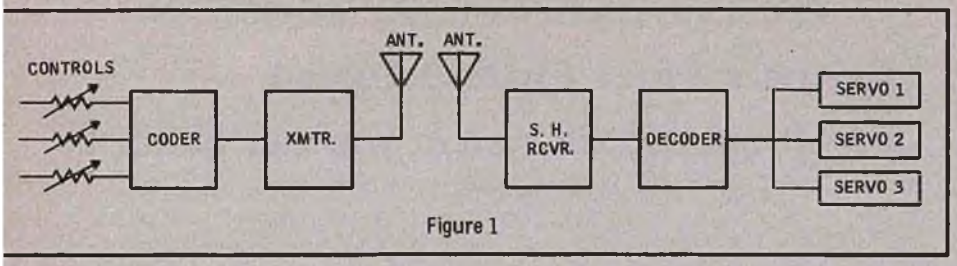


Figure 1

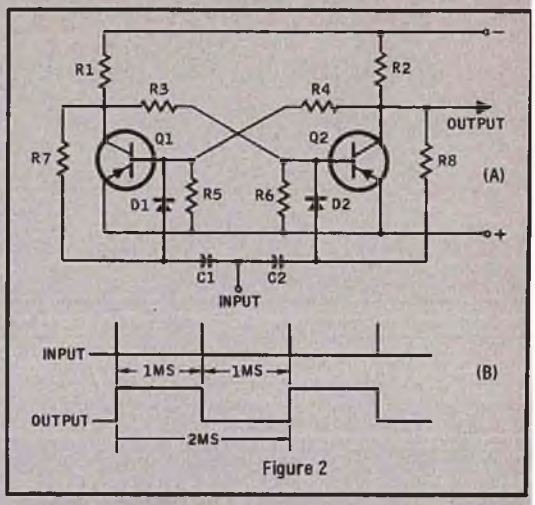


Figure 2

*How to obtain Digital Proportional Control using basic computer circuits along with a brief description of the basic circuits that will be used in the RCM Digitrio is the subject of Part I and will enable you to better understand how your system will work.*

## Preface

THERE is little doubt in anyone's mind that the proportional age has descended upon us. I suspect most of us are a little confused by all the ballyhoo we read and hear about the different systems, no longer having a familiar yardstick to use when evaluating these various systems. In the past, we picked equipment on the basis of dependability, mainly because the equipment was almost identical in makeup – even to the point of looking alike except for the color of the cases! Proportional systems, on the other hand, may look alike, but the internal makeup is limited only by the manufacturers' imagination and ingenuity. Some of it is vastly complex, and if programmed properly, could solve mathematical problems and perform minor computing tasks!

The system presented here will not offer serious competition to Univac nor will it revolutionalize the proportional industry. It will, however, provide a proven three channel, so-called "digital" system. I say "so-called" digital system, because it is not truly digital, nor are the other systems currently on the market. Doug Spreng covered this in a previous article so I won't expound on it.

It appears that a lot of the equipment on the market gets homesick and has a nervous breakdown occasionally. The result is quite dramatic at times – especially when the aircraft tries to do a loop, barrel roll, Immelmann and half ganor at the same time. The usual result is that the hi-strung system is sent home to Papa for corrective action. We then twiddle our thumbs waiting for its return and mutter purple phrases about the manufacturer. We used to be able to spot impending trouble when a reed needed cleaning or tones needed adjustments etc. Now we are faced with sudden malfunctions which leave us baffled, disgruntled, frustrated and unsure (oh yes, reeds will be around for a long time yet). This is mainly due to the lack of knowledge about this new breed of cat.

The manufacturers are apparently not too concerned about this and are doing a good job of keeping their brain children a secret. I don't think this system will unlock any magic door of knowledge on the subject but it will give you an insight to some of the basics used. I sincerely hope that it will stir the imagination of some to experiment and improve the present state of the art.

## How To Obtain Digital Proportional Using Basic Computer Circuits

The heart of the system presented here and in subsequent articles will consist of simple computer circuits. These are common circuits that are neither mysterious nor hard to comprehend. Figure 1 shows how we will accomplish this by means of a simple block diagram.

By adjustment of the controls we program the system. The coder senses the position of the controls and modulates the transmitter with this information. The receiver processes the information and passes it on to the decoder which, in turn, separates it into individual channels. This information is compared in the individual servos with information supplied by the servo itself relating to its present position. If the information received differs with that of the servo it senses in what direction to move in order to correct itself. When the servo moves far enough to agree with the incoming information it stops at its new position. The servo now has a new reference position and keeps comparing for further instructions. Old Hat, so far, and not too sensational.

The main departure from norm is that we are going to do it with computer circuits and pulses measured in milliseconds or MS (1/1000 of a second) and micro-seconds (1000 micro-seconds equal 1 milli-second). We are also going to eliminate tones and use the carrier to convey this intelligence (shades of the RK-61 era!). We will pulse the carrier at precise variable rates and intervals. The receiving end will shape these pulses, sort them out, and precisely analyze each one for any change in program at the transmitter. Let's go on to the circuits we will use to accomplish this feat.

## Brief Description Of Basic Circuits That Will Be Used

For the following discussions the term ground will be synonymous with emitter potential.

Figure 2A shows a bi-stable or flip-flop circuit. Although it is used only one time in this system it is used extensively in, and is the heart of, some of the decoders on the market. Inspection of the circuit will reveal a sort of suicide circuit. R1 and R2 are the collector loads for their respective transistors. R3 and R6 provide forward bias for Q2. R4 and R5 provide forward bias for Q1. Disregarding the other components for the time being let's look at the operation.

The conduction of either side depends on the other side being cut off, and vice versa. Due to this relationship, one side will be cut off and the other side will be conducting. To make it work let's assume that Q1 has a little higher gain than Q2. When we first apply power it conducts a little heavier. Its collector voltage going to ground reduces the forward bias on Q2 thereby helping its collector voltage go more

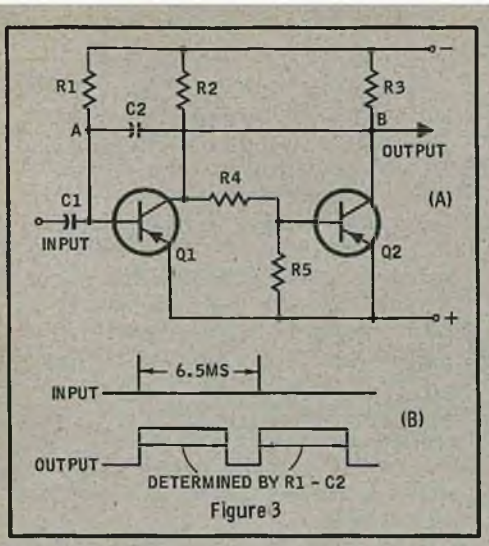


Figure 3

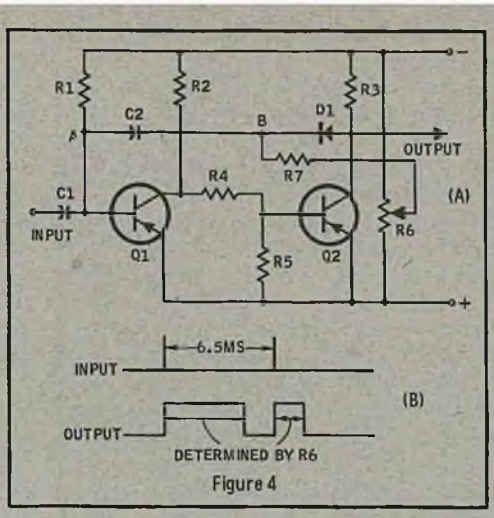


Figure 4

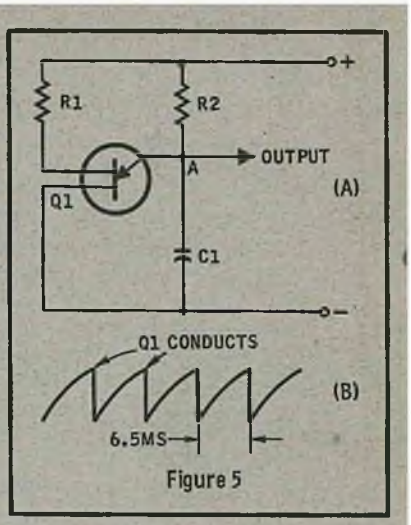


Figure 5

negative. Q2's collector voltage going negative provides more forward bias for Q1 assisting it even further in its race to conduction. This of course assists Q2 to cut off even more. This mutual assistance bond between the two always ends up with one holding the other into conduction.

This then, means that one collector will be negative and one at ground with no in-between conditions allowed. Actually, this takes place instantly, and the state of the two transistors is determined by which one gets a head start. We provide this head start with C1, C2, R7, R8, D1, and D2. If we apply a short positive pulse at the input terminal it will be transferred to Q1's base via C1 and D1.

Simultaneously it will appear at Q2's base via C2 and D2. We left Q2 cut off so the positive pulse will have no effect on it. However, since Q1 was conducting, the positive pulse will cut it off for the duration of the pulse. This causes Q1's collector to go negative briefly and provides forward bias for Q2 which takes advantage of the situation and, armed with a head start, reverses the condition of the circuit. Every time a positive pulse appears at the input the circuit will alternate its state. R7 and R8 are used to assist the action by biasing the diode capacitor junctions. If Q1 is cut off, R7 will apply the negative collector voltage to the D1-C1 junction minimizing the effect of the positive trigger pulse to Q1, conversely R8 will apply Q2's collector ground potential to the D2-C2 junction enhancing, or at least not detracting from the effect of the positive pulse to Q2. This, in effect is trigger gating and allows large trigger-pulse amplitude variations while retaining high trigger sensitivity. There are other ways to trigger the circuit but this is the way we will use it in the system. Actually all I have said so far is that each positive pulse applied to the circuit will change its state. This means that two pulses are required for a complete cycle. Now let's put it to work.

If we send short pulses spaced at 1MS intervals (that's 1/1000 of a second), we will change its state at that same rate. A bit faster than the kicking duck, eh? The output will be square pulses with 1MS widths or 2MS for a complete cycle (See Figure 2B).

We now have to go through another explanation, this time a monostable multivibrator or simply a one shot. (Figure 3A shows this circuit.) R2 and R3 are the collector loads for their respective transistors. R1 provides forward bias for Q1, R4 and R5 provide forward bias for Q2. Q1 is biased more heavily than Q2 and will be conducting in its steady state. Conduction of Q2 depends on the collector voltage of Q1 being negative (which it is not since it is now conducting) so Q2 will be cut off. This places a charge across C2 that is positive at Point A (because the forward biased base emitter junction of Q1 is a very low resistance to ground) and negative by the amount of supply voltage at Point B. If a short positive pulse is applied to the input it will briefly cut off Q1 causing its collector to go negative. This forward biases Q2 which instantly conducts. Q2's collector goes to ground and instantly causes a polarity reversal across C2. Point A now goes positive equal to the negative supply voltage with respect to Point B. This cuts off Q1 which now holds Q2 in conduction. C2 starts discharging through R1 and will keep Q1 cut off until it discharges its positive charge and Point A goes negative enough to cause Q1 to conduct again. This of course causes Q2 to cut off and the circuit is back in its stable state. (See Figure 3B.) At this time we can apply another positive pulse and start all over again. We can also apply a negative pulse to the base of Q2 and obtain the same results by forcing Q2 into conduction. We will in fact do this in the system. As you can see the time it takes to complete a cycle depends on how long it takes C2, discharging through R1, to return Point A to a slightly negative voltage to forward bias Q1. There are two easy ways to control this. We can either vary C2's capacity (larger capacity/longer cycle) or R2's resistance (larger resistance/longer cycle). How do you think we will do it? You guessed it, a third way. (See Figure 4A.) As you can see we have added three components. Now we can vary the voltage at Point B. When Q2 conducts now, Point A will go positive equal to the amount of negative voltage preset at Point B by the setting of R6. This means that for a given time constant of R1-C2 the cycle now depends on the voltage at Point B. The more voltage applied the longer it takes C2 to discharge and vice versa. Diode D1 isolates C2 from Q2. In the circuit's steady state Q2's collector is negative and D1 is reverse biased. When Q2 conducts, it grounds the preset voltage at Point B through D1 which is now forward biased. R7 is a current limiting resistor so we do not damage D1 or load Q2. By adjusting R6 we can vary the cycle time of the circuit. So now we have a **variable** one shot. (See Figure 4B for wave forms.)

One more time, fellas! An easy one this time and then we will put the circuits together. Figure 5A shows a unijunction transistor in a relaxation oscillator configuration. Simply and briefly R2 charges C1 until the voltage at Point A is positive enough to cause Q1

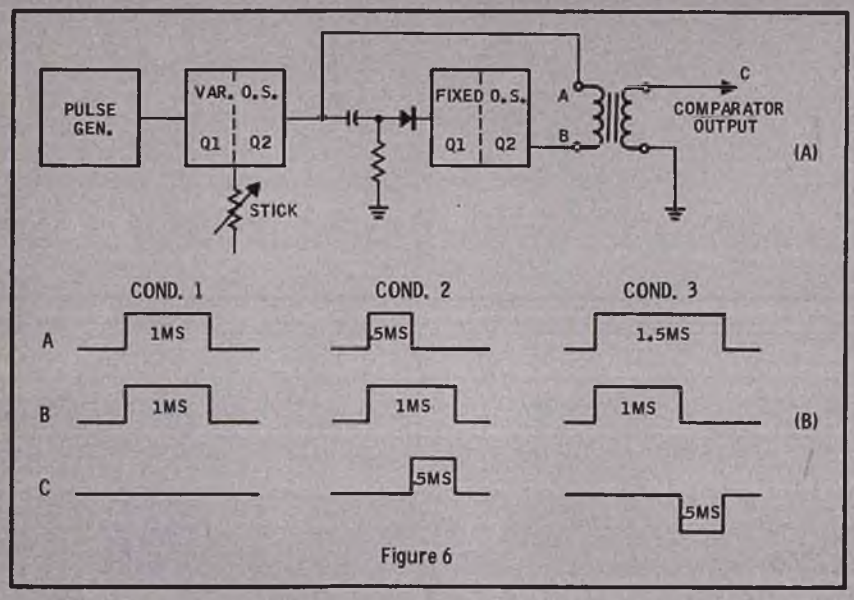



Figure 6

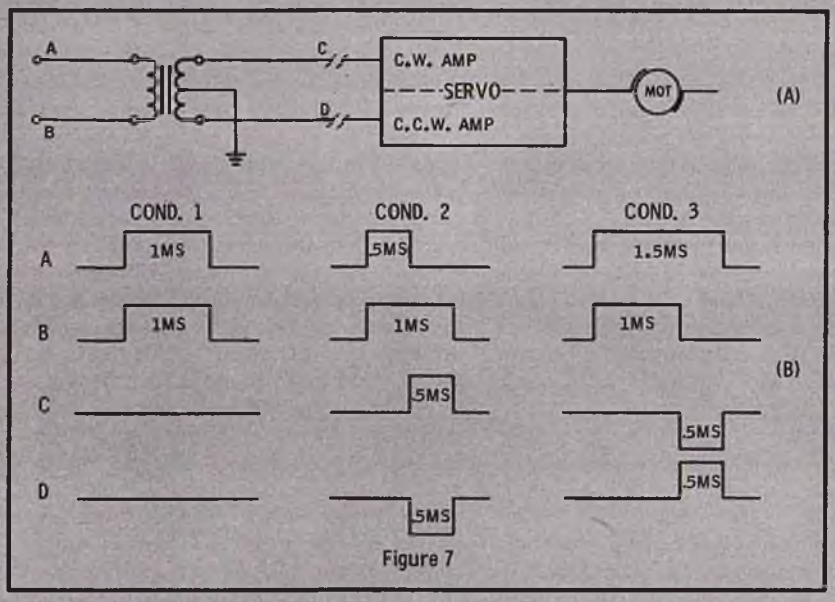



Figure 7

to conduct. When it does the forward biased junction effectively shorts C1's charge quickly cutting off Q1. It then starts over. R1 is similar to a collector load resistor and provides current limiting and temperature compensation. (Figure 5B shows the output wave form.) We will use the downward transitions as a trigger. If we replace R2 with a pot we can vary the repetition rate of the circuit. This circuit appears inverted in the transmitter schematic but inspection will show it is the same as described.

### Connecting Basic Circuits To Give Desired Results

Let's assemble a simple circuit now, and see how we detect a change in pulse width. Figure 6A shows a variable one shot coupled to a fixed one shot of 1MS duration. Assume that the variable resistor of the variable one shot is connected to a control stick. We can now vary the pulse width of the variable one shot from .5MS to 1.5MS by movement of the stick to its extremes with 1MS being neutral. Let's run through the operation with the control stick in the neutral position. The pulse generator triggers the variable one shot every 6.5MS and is used to initiate and repeat the action at this rate. Although we will use the downward transitions of the pulse generator coupled to Q2, it is shown here coupled to Q1 to simplify the drawing. The leading edge of the pulse created by the variable one shot will instantly trigger the fixed one shot. The output of the variable one shot is also applied to Terminal A of the transformer. The pulse of the fixed one shot is applied to Point B of the transformer.

Looking at the waveforms (Figure 6B) for Condition 1 we can see that Point A and B of the transformer will have a positive pulse of 1MS duration applied simultaneously. This will not cause an output because the pulses are identical and cancel each other's effect. It's evident at this point that the transformer is used to compare the pulses and it will be referred to as a "comparator." Condition 2 shows the variable one shot with a .5MS pulse duration. Since the fixed one shot always produces a 1MS pulse, Point B will remain positive .5MS after Point A returns to negative. For the first .5MS the pulses cancel each other. When Point A goes negative we have a resultant .5MS pulse due to the remaining pulse length of the fixed one shot holding Point B positive. There is a 180 degree shift of polarity across the transformer so the output of the comparator is a positive .5MS pulse. Condition 3 shows the variable one shot with a 1.5MS pulse width. This will hold Point A positive for .5MS after the 1MS fixed one shot returns to negative. The 180 degree shift of polarity across the transformer will now cause the comparator output to be a .5MS negative pulse.

Let's go to Figure 7A, now, and see how to run a servo with this type of circuit. As you can see the comparator now has a center tapped secondary. An inspection of the waveforms (Figure 7B) will show that we can now get a positive output from either Point C or Point D depending on which way we move the stick. We also get negative outputs but the servo will only respond to positive pulses and will ignore these negative pulses.

Condition 1 shows neutral position and no output at either Point C or D. Condition 2 shows positive output at Point C and negative at Point D (which is ignored by the servo). The servo amplifies this positive pulse at Point C and runs in a clockwise direction. Condition 3 shows a negative pulse at Point C and a positive pulse at Point D. The servo will now run in a counterclockwise direction. This action is repeated every 6.5MS by the pulse generator so we keep pulsing the servo at this rate and can change its direction by movement of the stick.

We're almost home now, and if you're still with me the rest is a snap! If you're not, I suggest you reread those portions you're hazy about or get the local Einstein to help you. A little effort will be rewarded and once you get the hang of it you'll be saying things like, "how simple can you get" and "I knew it all the time."

Well, so far we have a quasi "bang bang" system. Now let's make it proportional. Figure 8 shows that we have replaced the fixed one shot with a variable one shot which we'll call the reference generator, and mechanically coupled the variable resistor to the

*(Continued on Page 49)*

# KAHUNA


By JOHN TOOMER

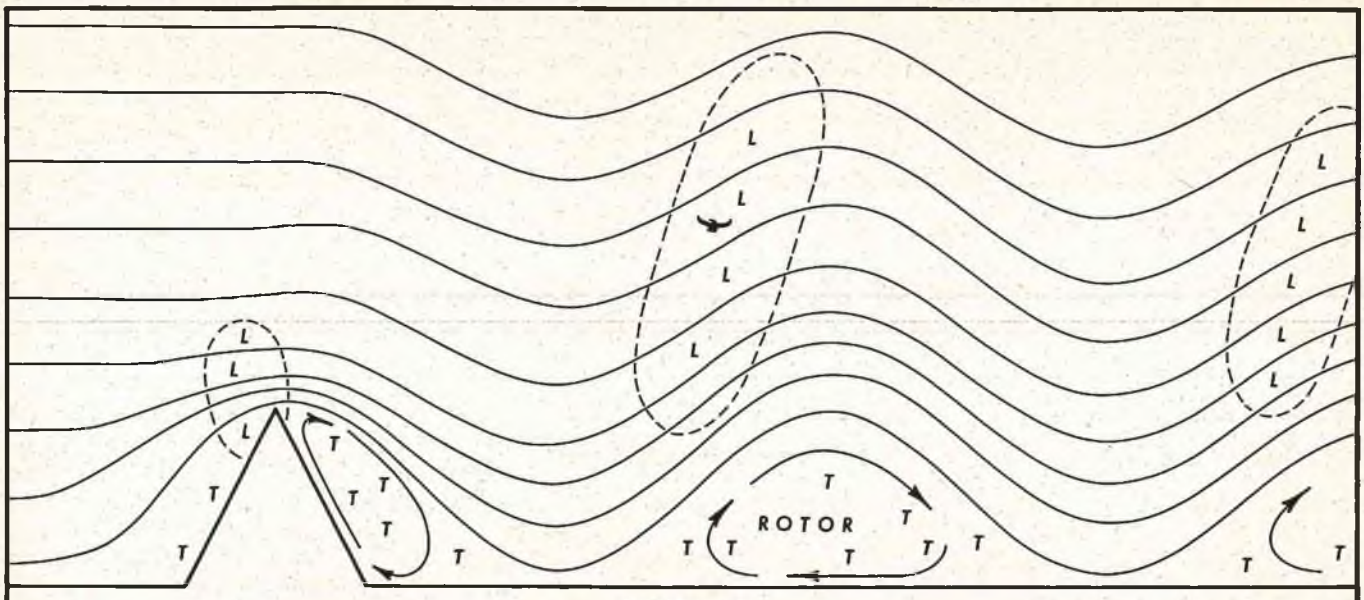



DIAGRAM 1

*TIRED of the hassle you have to go through to do a little flying? Long waits for a few minutes of flight? Interference? High fuel bills? Crowds of wing stompers and fabric pokers? Like a change? No time limits in the air, fly when you like. Fly where you like. No noise to bother people. No fuel bills. No gooey mess to clean off your plane. No oil in servos. No vibration to cause trouble. No crowds to get in your way. Unbolt your motor and try soaring flight. Use your old equipment if you wish. Relays work fine in gliders. Use your old superregen set if you wish. Sit down to fly. Better yet, lay down like I do. Relax Mac, this flying game is fun if you do it right. . . .*

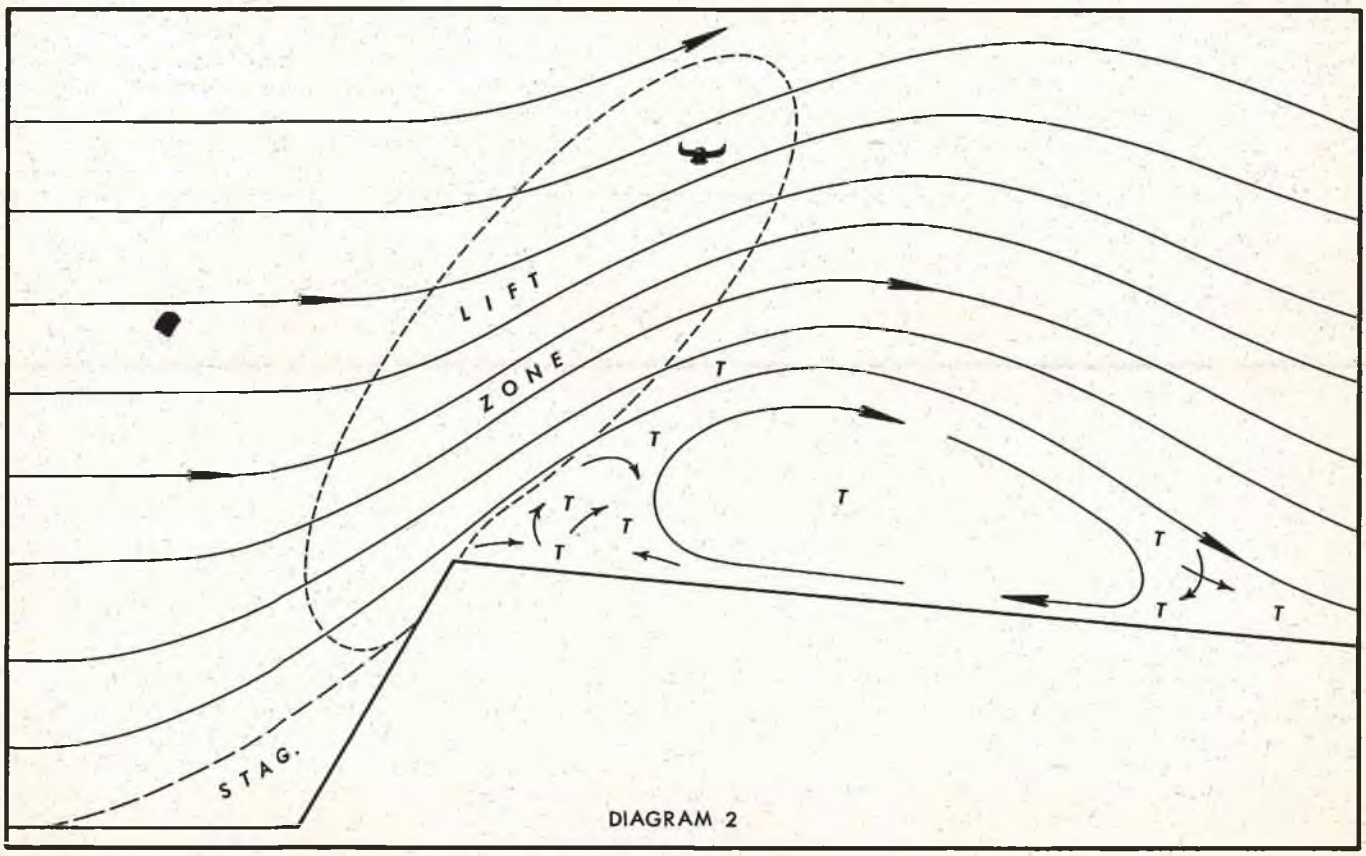



DIAGRAM 2

SOUNDS like sailplanes are the answer to just about everything doesn't it? Well, not quite but they **CAN** provide all I've said. With an engine you are limited to areas where you are allowed to make noise. Without an engine you can fly anywhere you can get your bird airborne.

This two-part article will show you how to build a general purpose sailplane for medium wind conditions. This version of the Big K has been picked because it has no vices or hidden defects to cause you trouble. If you build it according to the plans it will fly on the very first attempt. Several versions of the Kahuna have been flying since 1957. Most of them have been rudder-elevator machines but some have been converted to full multi.

Before we get into the construction of the Kahuna some general notes on gliding will help you gain a feeling for the sport. There are two basic types of soaring flight. The most commonly used is slope soaring or wave riding. This consists of utilizing the up draft of air flowing over a natural obstacle such as a cliff, ridge, hill, or mountain. This ground wave can be of sufficient size for model sailplane use over relatively minor surface features provided they are long enough to block an end run by the wind. Associated with wind barriers such as large cliffs, or mountain ranges are a series of standing waves (see diagram #1) beginning at the obstacle with what we might term the ground wave and extending backwards or downwind of the obstacle in a series of Lee or Sky waves which reach into the stratosphere on occasion. Briefly, these waves are caused by the air bouncing up and down after being forced to pass over the obstacle. The sky waves need not concern us for they are well above our flying range.

Getting back to our mountain we find light, turbulent air near the foot and up the windward slope until we almost reach the top. As we approach the critical edge (which may not be the top of the hill) the wind becomes steady and strong. On the ground it will feel as if the wind is following the contour of the ground as it sweeps over the ridge, but this isn't true. Only a few feet above your head and slightly to windward is a powerful river of air rushing upward. The wind you feel on the ground is simply a turbulent boundary layer.

To the lee of mountains is a zone of violently turbulent air descending the slopes. There is a general rotary motion to this mass of air but it is composed of numerous smaller rotors and whirlwinds oriented in every conceivable direction. If you want a real thrill try flying in lee air conditions. Expect to loose your plane, though!

Diagram #2 depicts a typical hill or cliff and some wind features you may find. First let me say that this drawing cannot attempt to show all the possible variations of conditions you might meet. Even several drawings would not be sufficient. We see an area with little or no wind at the foot of the hill. Above the ridge is an area roughly elliptical in shape and leaning leeward (Loo'ard to you swabbies!) which will support a sailplane. The lift area can be large or small. It can be tall or short. It is ALWAYS a few feet up and a few feet to windward of the ridge but it may not be anywhere else over the area or it may be everywhere. It depends on how hard the surface winds are blowing and how hard and which way winds far above are blowing. You might even notice a cyclic rise and fall in lifting force on rather calm days. This is caused by the passage of thermal areas a mile or so above you.

The strongest lift will run right through the center of the lift zone and tend to be in the bottom quarter. The smoothest ride is to be had at the front of the zone and the roughest along the back. Ravines or "holes" in the hills or cliff edge will cause a dent in the lift zone, and poor lift together with high horizontal components, which will tend to blow you away. Turbulence can be encountered in such areas.

The area along the top of the hill or cliff and to leeward for a short distance is composed of rather indifferent air — light, various winds together with occasional strong currents. What you run into here is determined in large measure by the shape of your obstruction and wind speed.

The second type of soaring is hard to do in model form because of the altitude required and specialized type of sailplane needed. Thermal soaring consists of flying in rising bubbles of hot air. Thermals start out near the ground as a general rising of a blanket of heated air. Fifty or sixty feet off the ground it has begun to divide up into small bubbles of hot air. These keep rising and begin to rejoin into larger bubbles maybe one or two hundred feet across. At half a mile altitude, where the real thermals begin, the lift zone may be as much as a thousand feet across and going up like an express train. Obviously you can't fly half a mile above you where the real lift begins so you are restricted to the smaller thermal activity lower down and may spend much time simply looking for a thermal. As far as I know there are only a half dozen people who even attempt this type of flying.

For these two types of soaring there are three types of glider. First, there is the average general purpose sailplane. It can fly in light wind conditions over a hill or ridge and in heavy thermal conditions. It is an in between machine — too light for a real blow over a ridge and much too heavy for decent thermal soaring. All of the kits on the market today are of this type. Kahuna is no exception but is at the heavy end of the scale. The Big K can take a fair blow, especially the seven foot version with fiberglassed fuselage. You can purchase kits all the way from 24" span on up to ten foot lumber yards. The smaller glider is ideal for rudder only and will perform wonders on a slope. The larger rudder only machines are better flown in the light average conditions you will usually encounter. If you build a real Cape Horner you will be limited in the number of days you can utilize unless you have a hill with a built in hurricane!

The more serious sloper builds at least one glider that exactly fits wind conditions on his favorite flying ground. The specialized sloper is a short wing high weight machine with full multi control. It takes a fair breeze to keep one up. Extreme types are called "Penetrators" because of their ability to be trimmed down to speeds which allow them to make headway against winds which would blow a lighter or slower machine away. Take a Falcon, Orion, Taurus or other powered stunt plane, remove the motor and wheels, add a pound or so of weight and you would have a pretty fair penetrator. In fact come to think of it that is a good way to make one although I don't know that anyone ever has. I'd like to suggest trying out soaring with your present plane by flying from a hill, throttling down and then trying to keep your iron mine in the air. The first few times you will probably pick days without enough lift. It takes a little time to become accustomed to flying in high winds.

Any sailplane with more than rudder and elevator control can perform most of the AMA stunt pattern and good pentrators can do it almost as well as a powered plane. Next time you're having trouble making a good pattern remember there are people who don't even use motors that can do better than you! (I'd better state here that I'm not one of 'em!)

The last and least common are the thermal soarers — huge machines with and acre or two of wing area, spans of ten and twelve feet and weights of four and five pounds. They are capable of flying only in light to medium weather. The thermal sailer cannot be stunted very safely due to its design and structure so you are confined to plain soaring which can be quite a game in itself.

Under normal trim conditions the average sailplane flies slowly enough and reacts slowly enough that almost any control system is adequate. Even compounded escapements for multi control work out very well. We'll go

*(Continued on Page 48)*

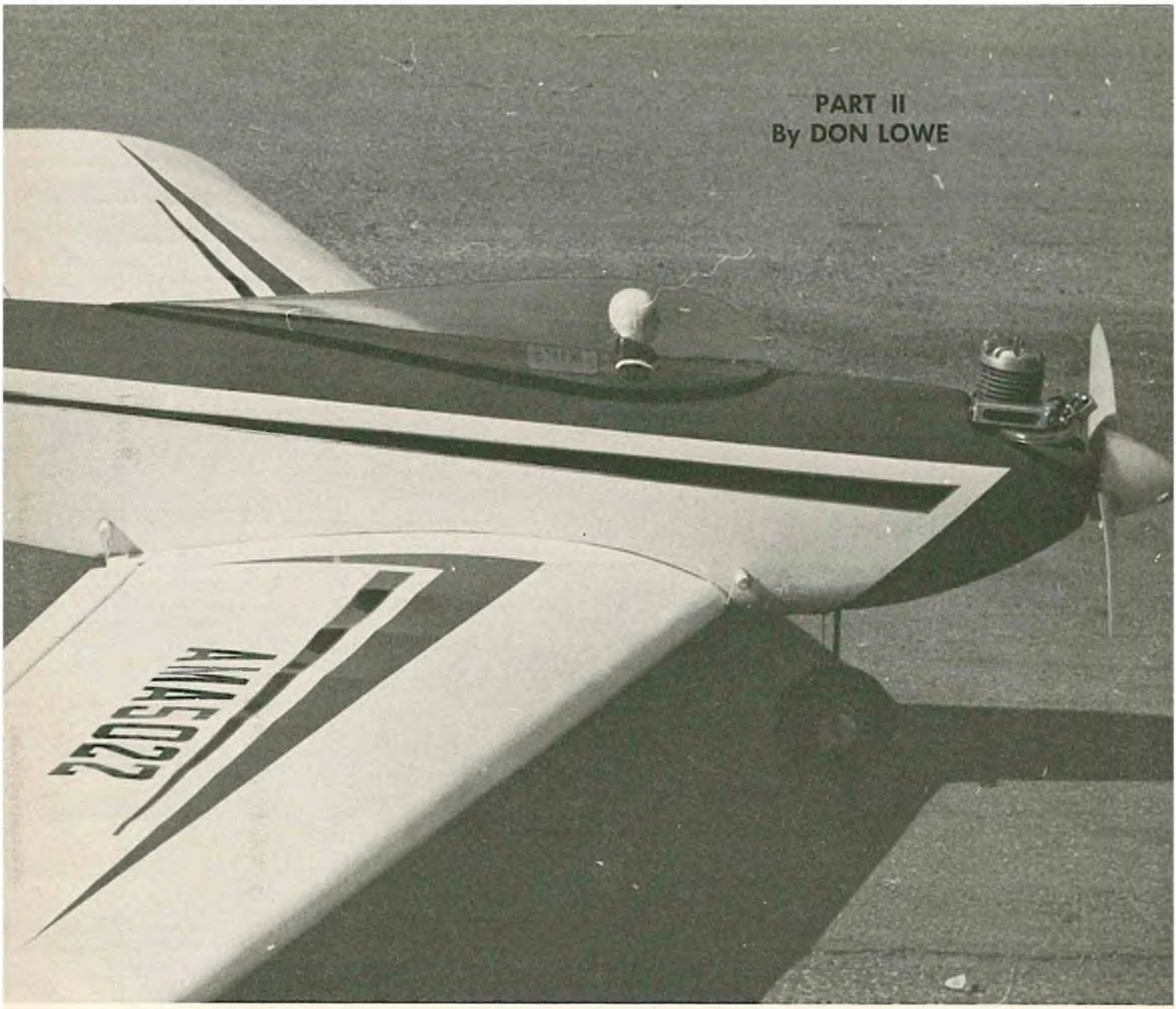
# THE PHOENIX

FELLOW club member Ray Nugen and I have been experimenting with swept designs for over two years. In all, we have constructed 8 ships with wing sweep ranging from 5 degrees to 23 degrees per panel. We have flown the designs with both reed and proportional equipment. The designs (Ray's and mine) have been basically similar in proportions but different in size. My ships (named Phoenix) have had wing areas from 700-720 square inches. Ray's ships (named Expinkamental) are larger, having about 790 square inches. Both airfoils are originals and quite similar except that I have been using about 17% thickness and Ray about 13%. The airfoil used on the Phoenix wing is progressive to a thicker (percentage) section at the tip in order to delay tip stall and "soften" the stall characteristic of the wing. One ship used in the program, other than the original designs, was a modified Taurus in which the wing was swept about 5 degrees per panel. No appreciable change in flight characteristics could be noted with this design. However, spins were difficult with this airplane and it showed absolutely no inclination to snap roll.

We found very early that care must be used in locating equipment in the airplanes since the center of lift is quite far aft on the fuselage. Conventional placement would create a nose heavy condition. Batteries, for example, should be mounted aft of the servo installation, and servos should be placed as far aft in the wing bay as possible. Care must be exercised with regard to weight in the nose since these airplanes tend to be nose heavy. You will notice in the Phoenix design that the nose moment appears to be quite short. This has been purposely done in order to alleviate nose heaviness. The effective nose moment is not short, however, since this is measured from the prop to the center of lift.

We have found these airplanes a pleasure to fly. Not only groovy, stable in rough air, and spinning and snapping demons, but quite pretty to watch. Inverted flying is a pure pleasure and is every bit as easy as upright. Care must be exercised to keep the aircraft above stall speed (except when commanded) since the stall is abrupt. I definitely would not recommend these designs to the multi beginner. I don't mean to imply that the airplanes are vicious, since they most definitely are not. They will tolerate a reasonable amount of horsing around on the approach at slow speed, but they are a little less tolerant to sloppy flying under these conditions. One must only remember the most important axiom of full scale flying — maintenance of airspeed is the prime requisite for safe flying.

The trim is "peaked" when the C.G. is as far aft as tolerable for safe flying since they will snap and spin most easily under these conditions. This is a good trim premise for any design, for that




matter, since required elevator control deflections are decreased, and consequently, control drag is also decreased. When properly trimmed the design should never fail to snap or spin.

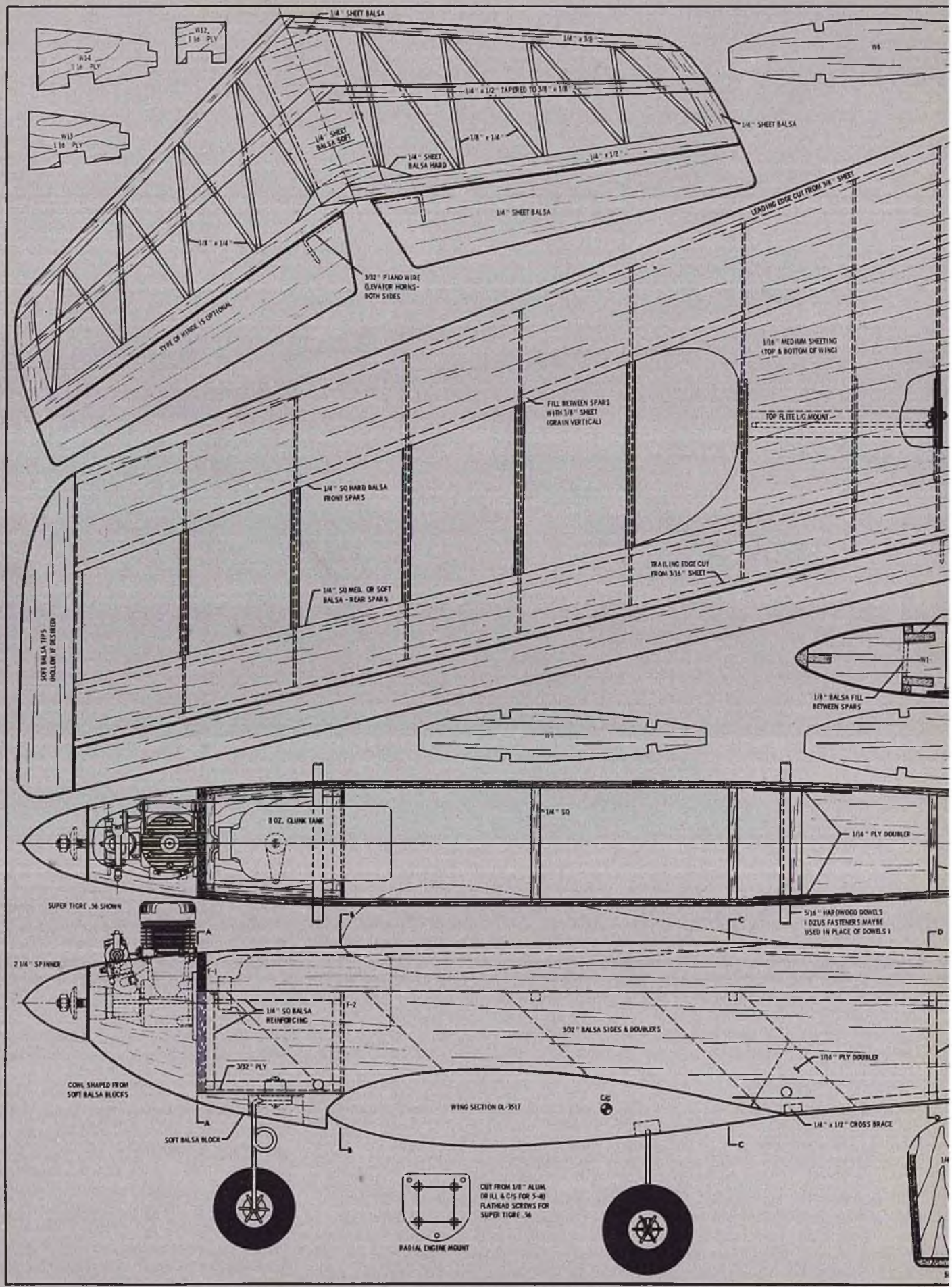
The design shown is the Phoenix I. This ship has the maximum sweep used in the series and in my opinion is the better of my designs since it is a bit groovier, very stable and has nice soft control response. Since the design is intended only for the proficient flyer (and builder) complete construction details are not given since I feel this would be an insult to your intelligence and ability, and should be left to your own personal preference. A number of the Phoenix I's have been built and I'm sure no two were constructed alike (except mine). Bob Noll of Endicott, N. Y., has even built foam wings for the Phoenix I and I understand he is building a second one with retracting gear, so it's builder's choice. I would recommend keeping the ship light since weight isn't as important to good windy weather flying as in some designs. Wing loading should be kept down since you will recall that the maximum lift of a swept wing is less than for an equivalent area straight wing.

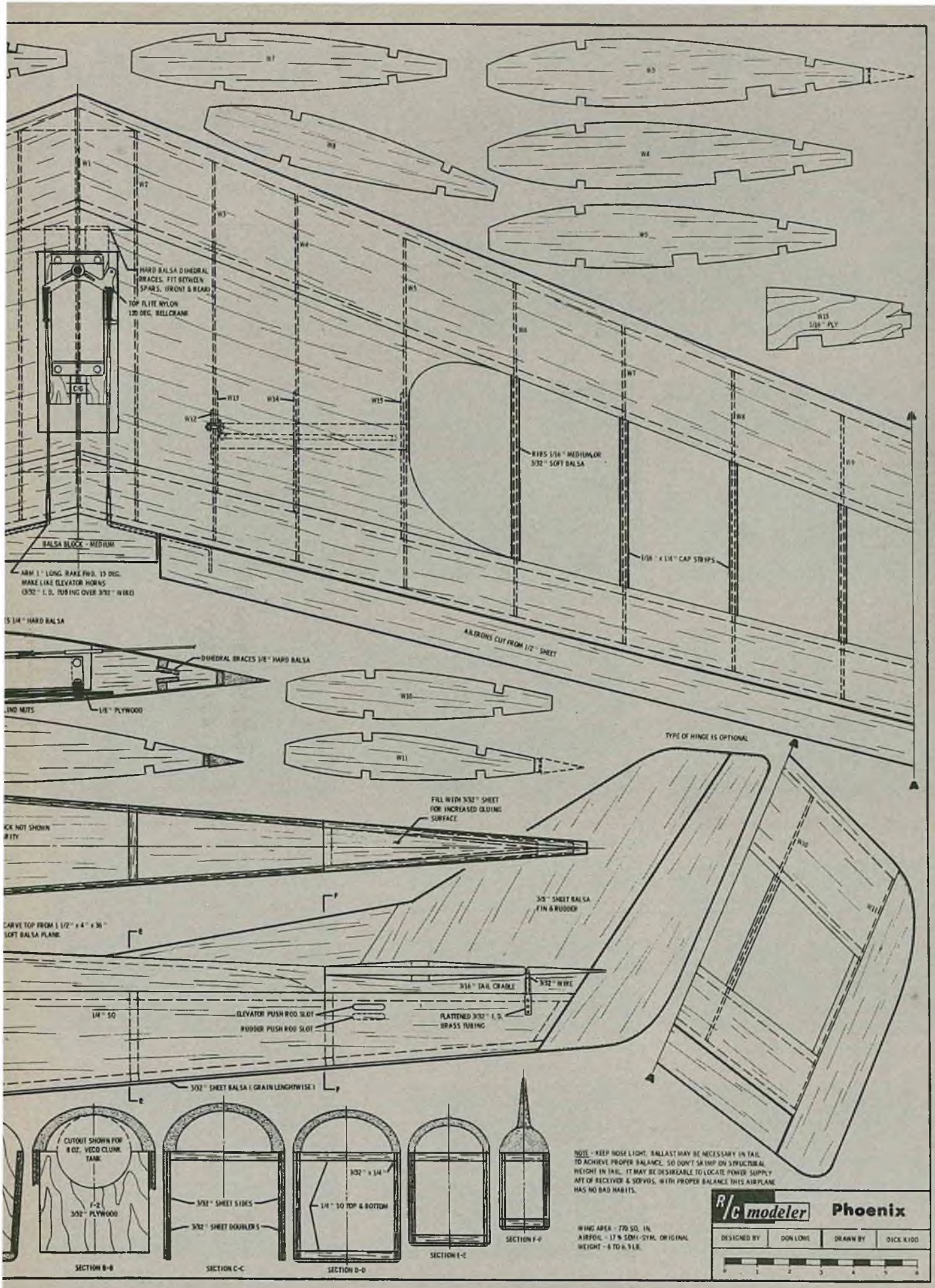
Using the C.G. location shown on the plans will make the airplane very docile. You may even have trouble making it spin. When you feel proficient move the C.G. aft ½"-¾" and note the improvement in spinning and snap rolls. Since no two airplanes ever fly alike I feel it is best to start with a safe C.G. location and work from there. My first Phoenix had the C.G. about 1½" aft of the indicated location on first flights, and it was a little touchy. Moving it forward made it docile as a lamb.

You may wonder about the wing section shown. It is a product of my contention that airfoil shape is not particularly critical in model design. After thumbing through a lot of NACA (NASA) data on airfoil sections I was impressed by the "sameness" of the lift slope curve (change in lift with change in angle of attack). The "laminar flow" sections do seem to have a drag "bucket" at small angles of attack which seemed desirable in order to keep the induced drag down during maneuvers. It also appeared that the pitch change required for inverted maneuvering was about the same for most sections, so I sketched a slightly semi-symmetrical 17% thick section somewhat resembling the "laminar flow" types. I couldn't give you wind tunnel data on this section but I know that it works quite well and appears to prove my hypothesis.

Picture "A" shows the 4 remaining ships used in the program. Reading from bottom to top are the Phoenix I with 23 degrees per panel, Phoenix II with 15 degrees per panel, Ray Nugen's Expinkamental with 23 degrees per panel and modified "Taurus" with 5 de-

*(Continued on Page 49)*


1/4" SHEET BALSA
W12, 1/16" PLY
W14 1/16" PLY
W13 1/16" PLY
1/4" x 3/8"
1/4" x 1/2" TAPERED TO 3/8" x 1/8"
1/4" SHEET BALSA SOFT
1/4" SHEET BALSA HARD
1/8" x 1/4"
1/4" x 1/2"
1/4" SHEET BALSA
LEADING EDGE CUT FROM 3/8" SHEET
3/32" PIANO WIRE ELEVATOR HORNS - BOTH SIDES
TYPE OF HINGE IS OPTIONAL
1/16" MEDIUM SHEETING (TOP & BOTTOM OF WING)
FILL BETWEEN SPARS WITH 1/8" SHEET (GRAIN VERTICAL)
TOP FLITE L/G MOUNT
1/4" SQ HARD BALSA FRONT SPARS
TRAILING EDGE CUT FROM 3/16" SHEET
1/4" SQ MED. OR SOFT BALSA - REAR SPARS
SOFT BALSA TIPS (HOLLOW IF DESIRED)
W1
1/8" BALSA FILL BETWEEN SPARS
8 OZ. CLUNK TANK
1/4" SQ
1/16" PLY DOUBLER
SUPER TIGRE .56 SHOWN
5/16" HARDWOOD DOWELS (DZUS FASTENERS MAYBE USED IN PLACE OF DOWELS)
2 1/4" SPINNER
F-1
F-2
1/4" SQ BALSA REINFORCING
3/32" BALSA SIDES & DOUBLERS
1/16" PLY DOUBLER
3/32" PLY
COWL SHAPED FROM SOFT BALSA BLOCKS
WING SECTION DL-3517
C/G
1/4" x 1/2" CROSS BRACE
SOFT BALSA BLOCK
CUT FROM 1/8" ALUM, DRILL & C/S FOR 5-40 FLATHEAD SCREWS FOR SUPER TIGRE .56
RADIAL ENGINE MOUNT


W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
W14
W15
W13 1/16" PLY
HARD BALSA DIHEDRAL BRACES. FIT BETWEEN SPARS. (FRONT & REAR)
TOP FLITE NYLON 120 DEG. BELLCRANK
CG
BALSA BLOCK - MEDIUM
ARM 1" LONG. RAKE FWD. 15 DEG. MAKE LIKE ELEVATOR HORNS (3/32" I. D. TUBING OVER 3/32" WIRE)
R185 1/16" MEDIUM OR 3/32" SOFT BALSA
1/16" x 1/4" CAP STRIPS
AILERONS CUT FROM 1/2" SHEET
1/4" HARD BALSA
DIHEDRAL BRACES 1/8" HARD BALSA
1/8" PLYWOOD
TYPE OF HINGE IS OPTIONAL
FILL WITH 3/32" SHEET FOR INCREASED GLUING SURFACE
3/8" SHEET BALSA FIN & RUDDER
CARVE TOP FROM 1 1/2" x 4" x 36" SOFT BALSA PLANK
3/16" TAIL CRADLE
3/32" WIRE
1/4" SQ
ELEVATOR PUSH ROD SLOT
RUDDER PUSH ROD SLOT
FLATTENED 3/32" I. D. BRASS TUBING
3/32" SHEET BALSA ( GRAIN LENGTHWISE )
CUTOUT SHOWN FOR 8 OZ. VECO CLUNK TANK
F-2
3/32" PLYWOOD
3/32" SHEET SIDES
3/32" SHEET DOUBLERS
3/32" x 1/4"
1/4" SQ TOP & BOTTOM
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
NOTE - KEEP NOSE LIGHT. BALLAST MAY BE NECESSARY IN TAIL TO ACHIEVE PROPER BALANCE. SO DON'T SKIMP ON STRUCTURAL WEIGHT IN TAIL. IT MAY BE DESIREABLE TO LOCATE POWER SUPPLY AFT OF RECEIVER & SERVOS. WITH PROPER BALANCE THIS AIRPLANE HAS NO BAD HABITS.
WING AREA - 770 SQ. IN.
AIRFOIL - 17 % SEMI-SYM. ORIGINAL
WEIGHT - 6 TO 6 1/2 LB.
R/C modeler
Phoenix
DESIGNED BY
DON LOWE
DRAWN BY
DICK KIDD
0 1 2 3 4 5 6

# 1ST ANNUAL R/C

*Sponsored jointly by the Southern California Council of R/C Clubs, Movieland of the Air Museum, and R/C Modeler Magazine, the two-*

A portion of the flight line at 1st Annual All-Scale Meet.

Mike Tanny's 1st Place Stearman PT-13.

A portion of the display at Movieland of the Air Museum.

Al Thompson's 2nd Place Fairchild in foreground.

Joe Bridi and Zel Ritchie with Spitfire.

Ray Downs, Bud Crane and Cliff Weirick prepare for a heat.

Cliff Weirick & Howard Bonner with 2nd Place Li'l Toni.

Joe Martin's Denight Special — took 7th.

SCRC present tea service to wife of El Toro Base Commandant.

To the victors belong the spoils.

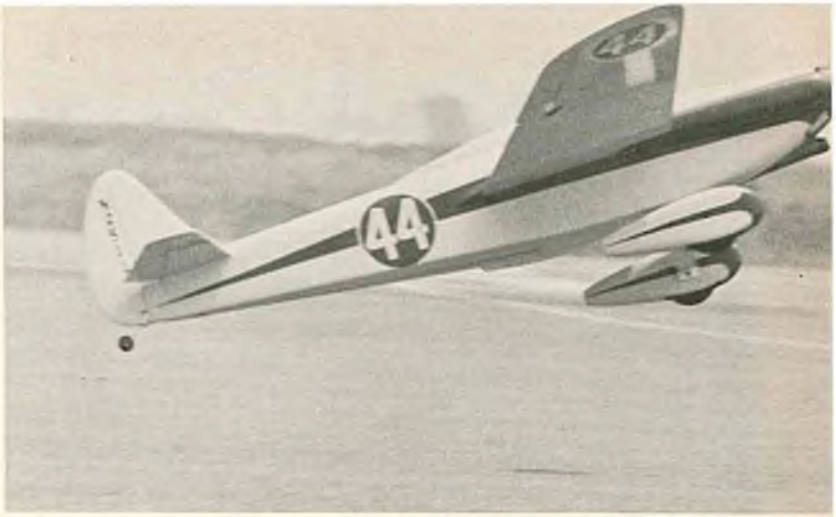
Judges examine Don Blessing's Nemesis.

Mike Tanny prepares the Stearman for qualifying flight.


Close-up of T. G. Cunningham's Little Toot.

# SCALE CONTEST

*day event made its mark as one of the largest R/C scale meets ever held as well as hosting a new N.M.P.R.A. national record.*




Ray Down's Shoestring — A new national record.

Scale judges examine presentation on Corben Super Ace.

Pilot Hank Giunta holds as Al Thompson leans out Fairchild.

One of the best flying entries—Joe Bridi's Spitfire.

Woody Woodward's 3rd place Corben Super Ace.

Frank Johnson's Bob Downey Special at Air Museum.

Dick Riggs and 5th Place Aeolus.

Bud Crane's Loving Special.


Lou Proctor's famous Antic has been kitted by Lou.

Dick Riggs prepared for a heat against Granger Williams.

Bob Doell's JD-1, crashed on takeoff.

Austin Snider's Tri-Motor. 1st, multi engine.

Granger Williams and well-known Nieuport.

*A SEVEN year old boy proudly stands on the runway with his eyes turned to the sky. A 12 channel transmitter is held in his small hands as a thumb patiently pushes the rudder toggle switch twice to the left and then once to the right. Overhead GARY I turns, levels its wings and glides in for a perfect landing. A big smile breaks out on the boy's face, and he feels the same thrill of a successful flight well made that his Dad has felt. True, the airplane the boy was flying doesn't use umpteen channels, have flaps, speed brakes, ailerons, elevator and steerable nose wheel, and all that formidable looking associated gear, but he gets just as big a kick out of flying his single channel airplane as does "dear old Dad" out of flying his umpteen channel airplane.*

# THE GARY I

TEXT BY: GERALD LEAKE
PHOTOGRAPHY BY: GEORGE HICKSON

GARY I was a Christmas present for my boy. It was designed with four things in mind. First of all, I was almost broke (aren't we all at Christmas time?) and my boy wanted an R/C airplane he could fly without having to worry about extensive repairs in case of pilot error. It had to control well (hence, the short tail moment and rugged fuselage). It had to be cheap (under $2.00 for the airplane, a little scrounging may turn up second hand single channel tone receiver and an escapement for about $15.00). It had to fly with an engine or without an engine, in case he got tired of flipping props or couldn't afford to buy an engine and fuel. So, keeping all these things in mind, GARY I began to take shape.

An old .049 engine was placed on a removable mount, on top of the wing over the C.G., so that with the engine and mount removed, the plane could be flown as a towline or slope soaring glider. With the engine and mount rubber banded on, the plane gets upstairs in a hurry. For gentle flying an .049 is a little too much power, and I recommend an .020 instead.

In line with keeping the cost and building time down, an old free flight wing was repaired and used. The wing was an A-1 Nordic glider wing donated by David Frerk, an avid free flight man who generously gives me his obsolete airplanes in return for some equally obsolete money. However, most of the time he conveniently forgets about collecting the money. So fellas, here is a chance to patch up those old free flight wings and put them to good use. If you don't have a free flight wing, find a friend who has. There are a lot of them around. Free flight guys aren't half bad at all, you know. As for the fuselage, pylon and tail, they were very carefully and scientifically designed. Well, almost. I sketched the fuselage side and tail freehand on a 3/32" x 3" sheet of balsa with a ballpoint pen and then cut them out with an X-acto knife. The side was then placed over another 3/32" x 3" piece of balsa and the second side cut out by tracing around the first side with the knife. The pylon was sketched out on a 1/8" scrap of 5 ply plywood. Incidentally, you'll save your plans if you trace the parts onto some tracing vellum and then tack the vellum to the balsa. Cut through the vellum and balsa together. You'll get a more accurate part that way and don't forget to use a steel straight edge when cutting on a straight line.

The entire fuselage and tail were built in one evening. Plenty of room is available, enough for even the superhet single channel systems. The construction is so simple, I don't think it is necessary to go into details. I believe the plans are self explanatory. The top curve of the fuselage may be modified to accept the airfoil of any Nordic A-1 wing (or wing of similar area) you may want to use. For those of you without any A-1 wings in your stable, the plan for a flat bottom wing of the same area is illustrated. The engine pylon is held on with rubber bands, hence the rails along the side of the pylon mount to keep the bands from slipping off. Notice the mounting of the tow hook on the bottom of the airplane; this may be moved forward or aft to provide the best towing point. The position that is shown on the plans provided the best towing point on the original airplane.

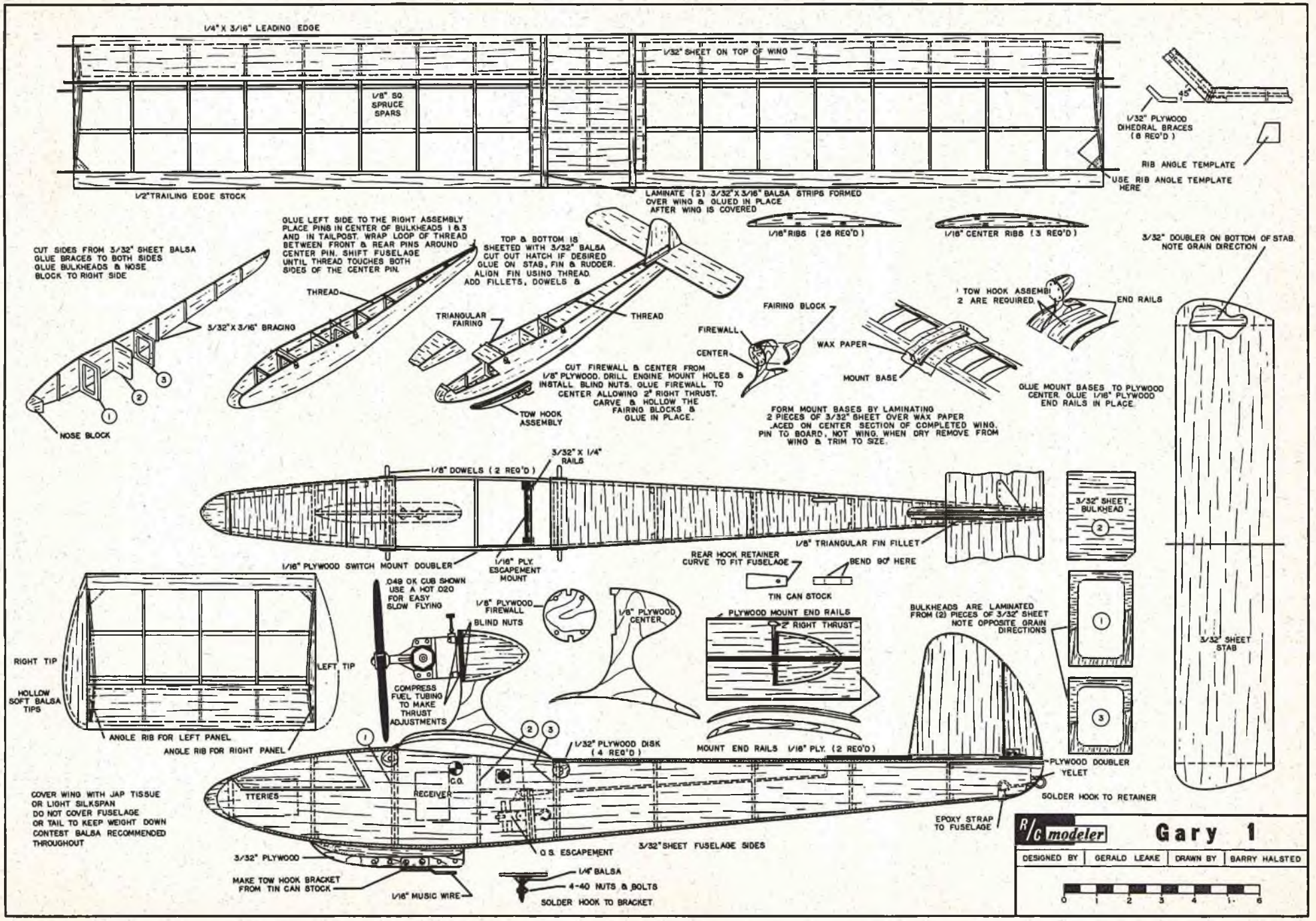
A 3 volt single channel receiver and an O.S. push-pull type escapement with one loop of 1/4 inch rubber were originally used in GARY I. Since additional weight will have to be added to the nose of GARY I to bring the C.G. within limits, double up on the battery pack. I soldered 4 pencells in series-parallel to provide extra weight up front and have the added bonus of extra long battery life. The same set of batteries have been used for over 3 months now. When soldering to Eveready pencells, be sure to remove the stamped sheet metal disc on the negative end and solder directly to the lead case. If GARY I is your first R/C airplane, don't forget to find an experienced R/C man to check out your radio gear, show you how to tune it, range check it and teach you how to fly it safely. His help will enable you to get hundreds of successful flights. There is no substitute for experience, no matter how many how-to-do-it articles you have read. Any R/C type will be tickled pink to help you get GARY I into the air.

Most of the flights of GARY I have been as a glider. No trim adjustments were found necessary to fly the airplane in either configuration. Again David Frerk came to the forefront when he loaned me his tow line and reel and taught me how to tow up a 15 ounce airplane. Please build it lighter; I am sure you can. He would launch the plane for me and I would run like I had my tail feathers on fire. Believe me when I say, don't attempt to fly this thing as a glider on a calm day, you just can't run fast enough. Unlike most single channel airplanes, this one loves a little wind, and so will you when it takes the plane up like a kite. In a wind GARY I gets on top of the line in a real hurry. Everyone who has seen it has been surprised at how fast it goes up. It sure saves on shoe leather and a pounding heart for us old, out-of-condition, stand-in-one-place R/C'ers. The thin airfoil gives good penetration and adequate rudder throw ensures excellent turning qualities to keep the plane close, even in a stiff wind, so tow it up with as long a line as you can handle. Dave Frerk's tow line is 160 feet so that was as high as I towed it for the first couple of dozen flights: however, the plane is capable of handling much more line, possibly as much as 500 feet. Three hundred feet of line is about the most I have flown it so far. Just play the line out and tow the plane like you would a kite. It will get way up there, then when you're in position, let the line go slack and the flag on the end of the line will drag the loop off the hook. Be sure to use a nice large loop and a light tow line.

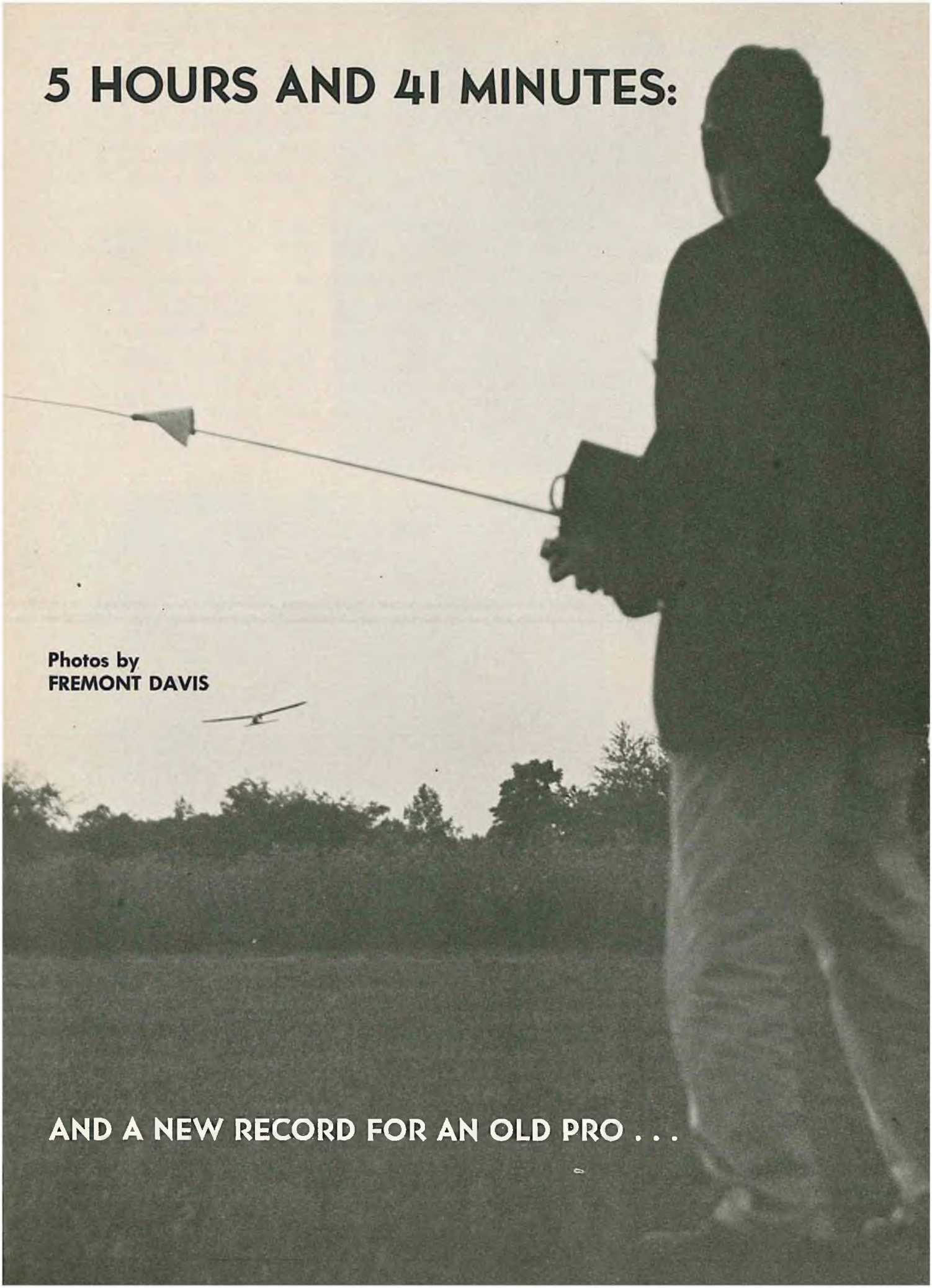
When GARY I soars around with your son (or you) guiding it round and round till it settles gently, we hope, to the ground, you'll understand why I think there is nothing like it in the world. I know it is certainly a relaxing change of pace for the multi man. Try GARY I; I'm sure you'll get as much enjoyment out of flying on a togetherness basis as we do.

By the way, those of you sharpies who noticed I mentioned my boy Gary pushed the toggle switch to the left twice, and once to the right, will point out that "to a single channel receiver, it doesn't make any difference which way the switch is pushed." Very true, but to a seven year old boy it makes more sense that he pushes the toggle to the left to make the plane go left and he pushes it to the right to make the plane go right. Simple but very effective. He very seldom misses a control and never (almost never) gets confused. Of course you don't have to use a 12 channel transmitter; a single channel transmitter would do the job equally well I'm sure! I do recommend a toggle switch instead of a pushbutton. We think it is easier and more positive to keep track of what you're doing.

See you at the flying field, and may all your prangs be little ones.

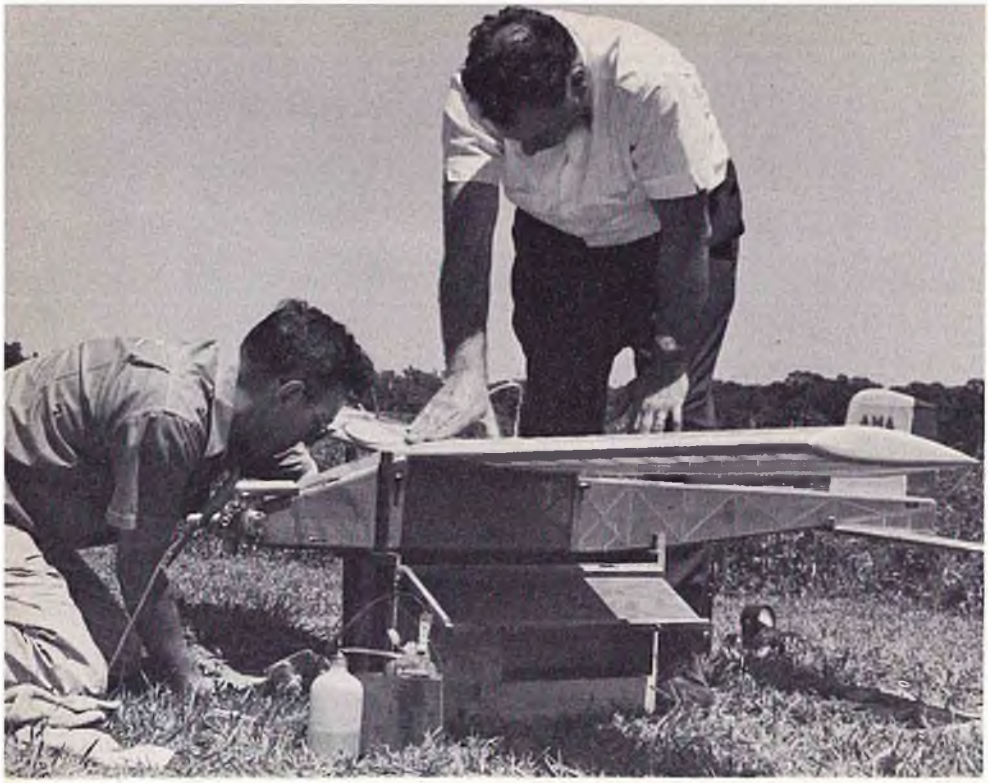

1/4" X 3/16" LEADING EDGE
1/8" SQ. SPRUCE SPARS
1/32" SHEET ON TOP OF WING
1/2" TRAILING EDGE STOCK
LAMINATE (2) 3/32" X 3/16" BALSA STRIPS FORMED OVER WING & GLUED IN PLACE AFTER WING IS COVERED
45°
1/32" PLYWOOD DIHEDRAL BRACES (8 REQ'D)
RIB ANGLE TEMPLATE
USE RIB ANGLE TEMPLATE HERE
1/16" RIBS (26 REQ'D)
1/16" CENTER RIBS (3 REQ'D)
CUT SIDES FROM 3/32" SHEET BALSA GLUE BRACES TO BOTH SIDES GLUE BULKHEADS & NOSE BLOCK TO RIGHT SIDE
3/32" X 3/16" BRACING
NOSE BLOCK
GLUE LEFT SIDE TO THE RIGHT ASSEMBLY PLACE PINS IN CENTER OF BULKHEADS 1 & 3 AND IN TAILPOST. WRAP LOOP OF THREAD BETWEEN FRONT & REAR PINS AROUND CENTER PIN. SHIFT FUSELAGE UNTIL THREAD TOUCHES BOTH SIDES OF THE CENTER PIN.
THREAD
TOP & BOTTOM IS SHEETED WITH 3/32" BALSA CUT OUT HATCH IF DESIRED GLUE ON STAB, FIN & RUDDER. ALIGN FIN USING THREAD. ADD FILLETS, DOWELS &
TRIANGULAR FAIRING
THREAD
TOW HOOK ASSEMBLY
CUT FIREWALL & CENTER FROM 1/8" PLYWOOD. DRILL ENGINE MOUNT HOLES & INSTALL BLIND NUTS. GLUE FIREWALL TO CENTER ALLOWING 2° RIGHT THRUST. CARVE & HOLLOW THE FAIRING BLOCKS & GLUE IN PLACE.
FAIRING BLOCK
FIREWALL
CENTER
TOW HOOK ASSEMBLY (2 ARE REQUIRED)
END RAILS
WAX PAPER
MOUNT BASE
FORM MOUNT BASES BY LAMINATING 2 PIECES OF 3/32" SHEET OVER WAX PAPER LACED ON CENTER SECTION OF COMPLETED WING. PIN TO BOARD, NOT WING. WHEN DRY REMOVE FROM WING & TRIM TO SIZE.
GLUE MOUNT BASES TO PLYWOOD CENTER. GLUE 1/16" PLYWOOD END RAILS IN PLACE.
3/32" DOUBLER ON BOTTOM OF STAB. NOTE GRAIN DIRECTION
3/32" X 1/4" RAILS
1/8" DOWELS (2 REQ'D)
1/16" PLYWOOD SWITCH MOUNT DOUBLER
1/16" PLY. ESCAPEMENT MOUNT
1/8" TRIANGULAR FIN FILLET
3/32" SHEET BULKHEAD
REAR HOOK RETAINER CURVE TO FIT FUSELAGE
BEND 90° HERE
TIN CAN STOCK
.049 OK CUB SHOWN USE A HOT .020 FOR EASY SLOW FLYING
1/8" PLYWOOD FIREWALL
BLIND NUTS
1/8" PLYWOOD CENTER
PLYWOOD MOUNT END RAILS
2° RIGHT THRUST
BULKHEADS ARE LAMINATED FROM (2) PIECES OF 3/32" SHEET NOTE OPPOSITE GRAIN DIRECTIONS
RIGHT TIP
LEFT TIP
HOLLOW SOFT BALSA TIPS
ANGLE RIB FOR LEFT PANEL
ANGLE RIB FOR RIGHT PANEL
COMPRESS FUEL TUBING TO MAKE THRUST ADJUSTMENTS
1/32" PLYWOOD DISK (4 REQ'D)
MOUNT END RAILS 1/16" PLY. (2 REQ'D)
3/32" SHEET STAB
PLYWOOD DOUBLER
YELET
SOLDER HOOK TO RETAINER
EPOXY STRAP TO FUSELAGE
COVER WING WITH JAP TISSUE OR LIGHT SILKSPAN DO NOT COVER FUSELAGE OR TAIL TO KEEP WEIGHT DOWN CONTEST BALSA RECOMMENDED THROUGHOUT
TTERIES
RECEIVER
C.G.
O.S. ESCAPEMENT
3/32" SHEET FUSELAGE SIDES
3/32" PLYWOOD
MAKE TOW HOOK BRACKET FROM TIN CAN STOCK
1/16" MUSIC WIRE
1/4" BALSA
4-40 NUTS & BOLTS
SOLDER HOOK TO BRACKET
R/C modeler
Gary 1
DESIGNED BY | GERALD LEAKE | DRAWN BY | BARRY HALSTED
0 1 2 3 4 5 6

# 5 HOURS AND 41 MINUTES:



Photos by
FREMONT DAVIS

## AND A NEW RECORD FOR AN OLD PRO . . .



**Maynard Hill** added another radio control mark to his world record accomplishments on June 4 by a 174 mile closed course flight which lasted 5 hours and 41 minutes, exceeding the old record of 135 miles held by N. Malinkov of Russia. At left, Maynard prepares the record breaking plane with an assist by John Worth. With a Merco .49 for power, the model weighed 11 pounds, ready for flight. 3:00 P.M.

**Below:** The launch of the record F.A.I. closed course distance flight by John Worth. Hill checks the plane as it is started on its record breaking flight. The model is essentially the same Sampey equipped design used on previous records. The ship featured wet wing construction, with the fuel carried in an epoxy-coated tank in the inboard rib sections. A muffler on the Merco .49, plus the addition of unleaded gas to the fuel added to the fuel economy.

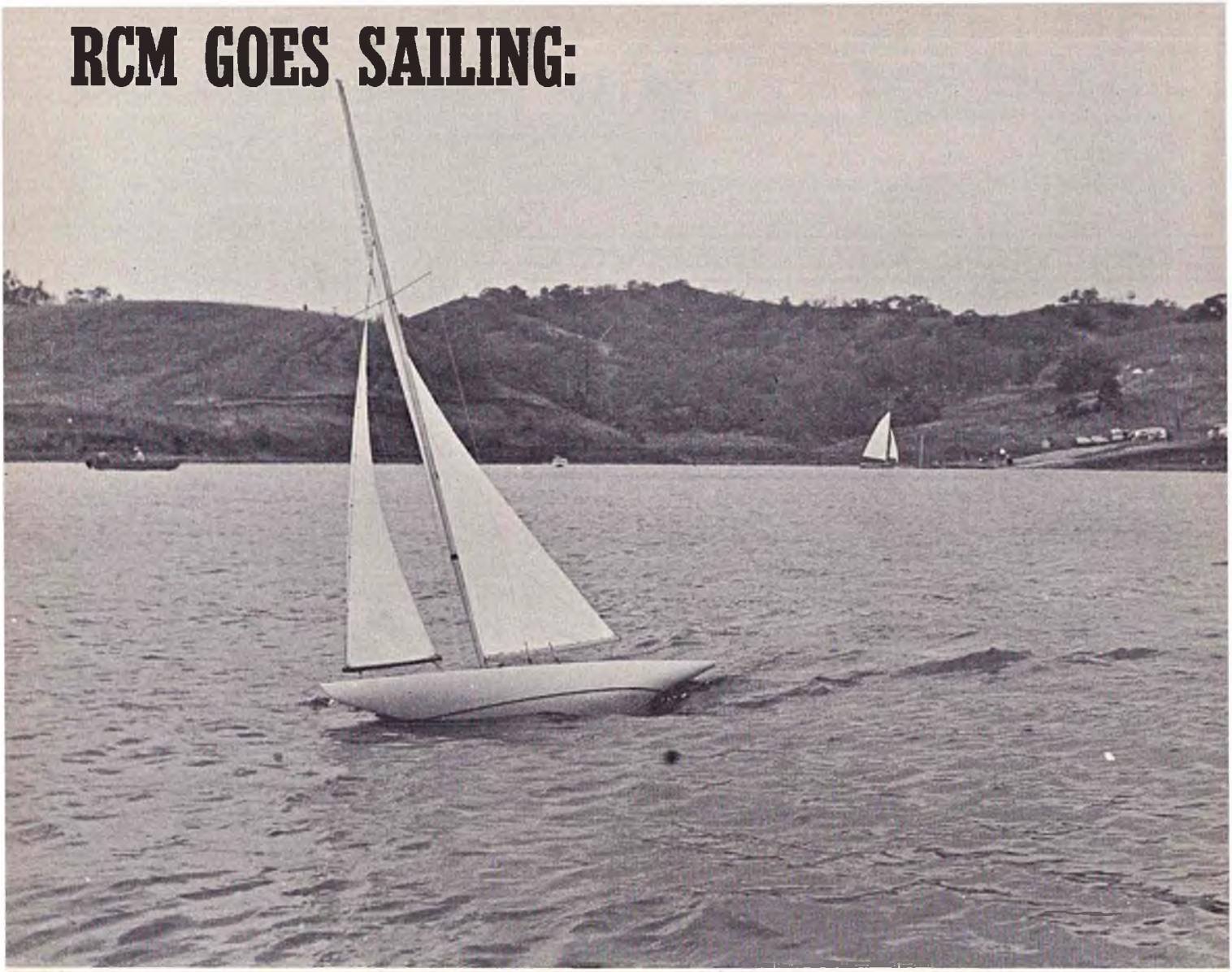
**Flying** for six hours from the top of a weed filled hill at one end of the course required Maynard's constant attention for almost six hours. During the early stages of the flight the heavily laden aircraft was difficult to keep aloft due to engine overheating and down drafts. Toward the end, lap speed increased with the decreased fuel weight.

**Right:** Maynard Hill brings his record breaking plane back to the flight line in the shadows of evening after the 174 mile closed course distance flight. Hill's flight was intentionally concluded at dusk when it became impossible for him to control the aircraft or see the flagman at the far pylon on the 1 km. course laid out near Washington, D. C. He still had 2 pounds of the original 5 lbs. of fuel left and estimated he could have flown almost twice as far. **Inset:** Congratulations by Dr. Walt Good on another new record for Maynard Hill. About 20 spectators and officials witnessed the flight, including AMA Executive Director John Worth; CIAM prexy, Walt Good; and AMA's George Wells.

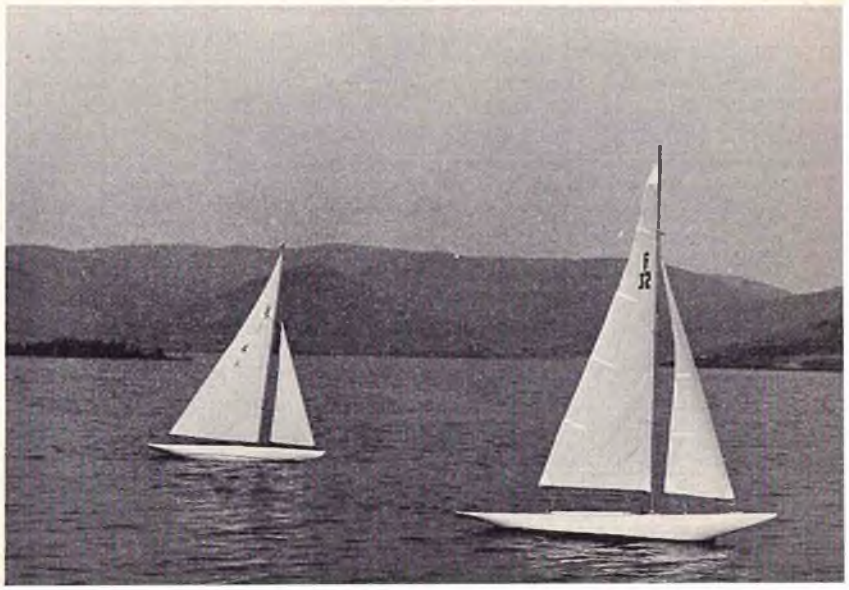

AMA
14

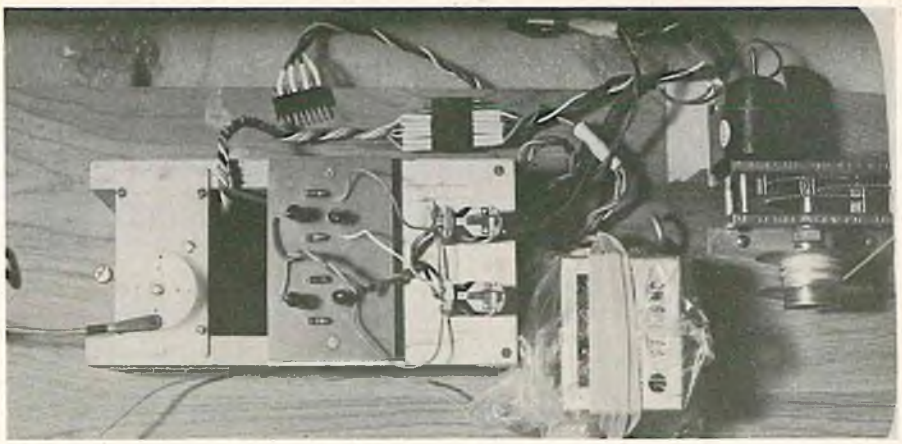

AMA 14

# RCM GOES SAILING:

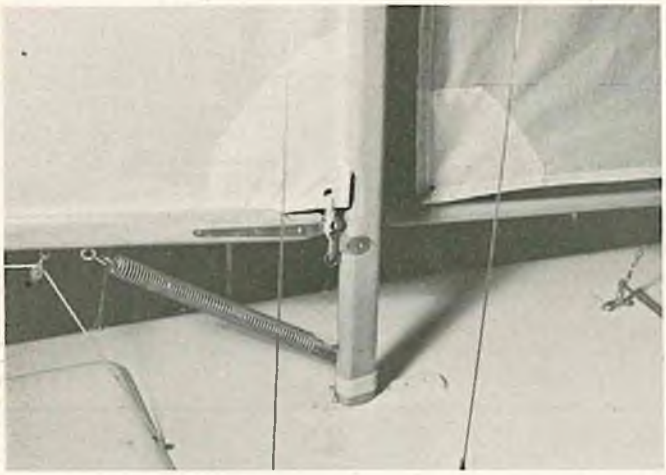


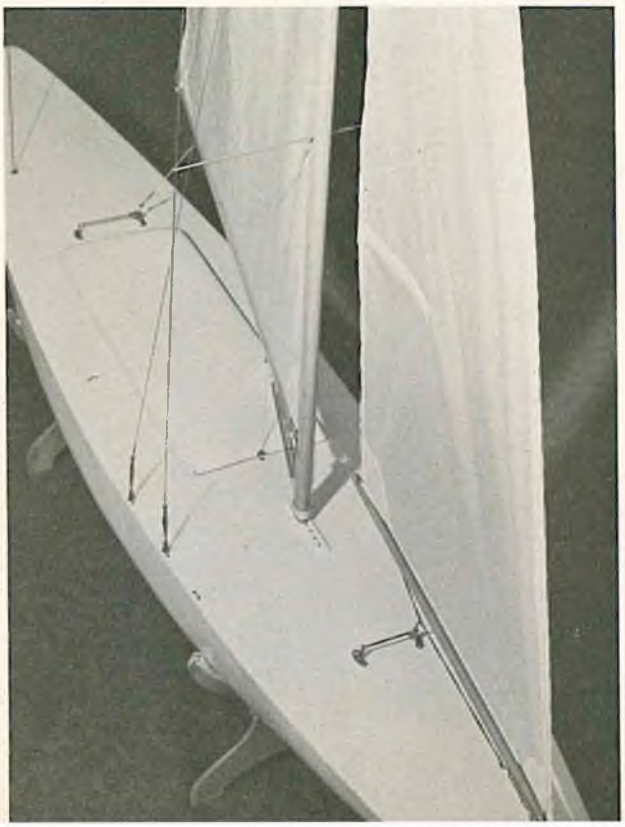
Above: Matt Jacobson's 1⅜" class R "Regatta" One Design makes a graceful turn in the evening dusk. The fiberglass Regatta One is manufactured by R/C Model Sail Yachts, a division of Tech-Aero Products Co., Box 3134, Burbank, California. Left: RCM Editor Don Dewey makes a pass by the camera with Chuck Waas's 1⅜" 6 meter yacht. This boat is produced by Reynolds Manufacturing Company, 3010 Chris Lane, Orlando, Florida. Below: The two international racing class sailboats head for home after an evening's race.

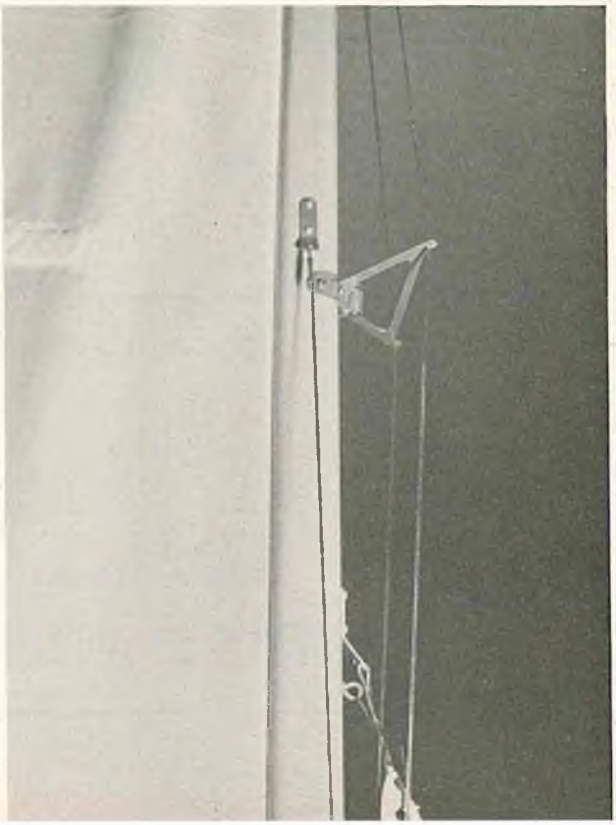


Left: Photo of Chuck's son illustrates size of Reynold's boat. Above: Control of the mainsail is achieved by a Wilson gear train operating off a transistorized amplifier from a Controlaire 6. Royal multi servo on rudder. 5 "D" size alkaline energizers operated over 20 hours with no appreciable battery drop. The latter gives power supply and adds to needed ballast. All up weight is 24 pounds. Lower left: Spring added to boom aids return of mainsail. Left, below: View showing general deck platform. Jib boom and gooseneck in foreground. Note watertight hatch cover. Right, below: View illustrating rigging of the jib stay, jenny stay, etc. An exciting and challenging aspect of R/C!







# NATIONAL ASSOCIATION OF RADIO CONTROL CLUBS

P. O. BOX 487 • SIERRA MADRE • CALIFORNIA

## RAY DOWNS SETS NEW NATIONAL RECORD

NMPRA Sanction #2, held in conjunction with the 1st Annual R/C Scale Contest, sponsored jointly by the Southern California Council of R/C Clubs, Movieland of the Air Museum, and R/C Modeler Magazine, saw eight entrants for the fast qualification speed. These qualifiers were allowed up to three attempts. Don Blessing, flying a new ship with flaps to improve landing characteristics, put in one qualifying flight, improving his Turlock speed by 23 seconds. Ray Downs, who qualified at NMPRA Sanction #1 at 3:47, put his good looking Shoestring through a series of races with times of 3:22, 3:02, and a final 2:50 for the low time of the meet and a new national record.

Dick Riggs, with his Aeolus, posted two official times out of three attempts and improved his Turlock time by 23 seconds. Ted Comerinsky joined the group without enough time on his engine or enough fuel in his tank! His Lil Knarf was fast enough when the engine was running properly, but he just couldn't seem to get in his ten laps!

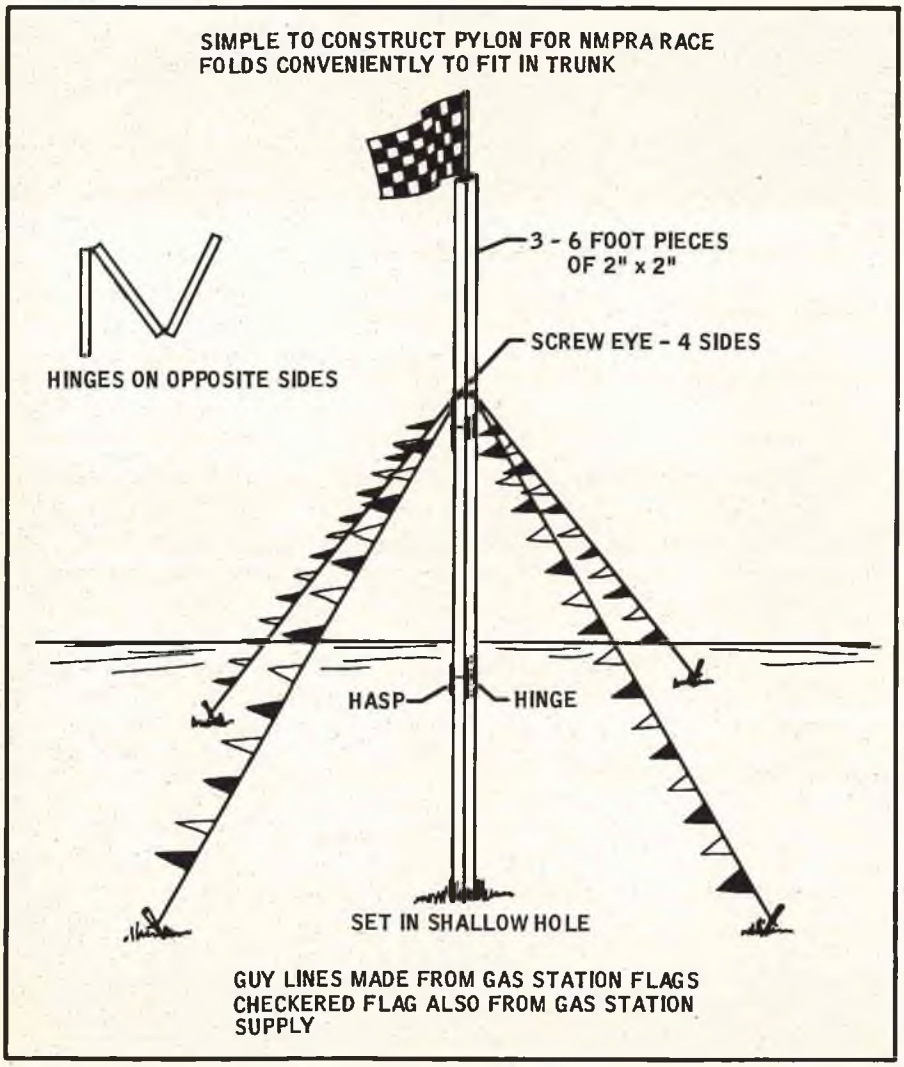
Bob Heise and his Swea Pea kept the pylon judges on their toes as he turned in a qualifying time of 3:17, switching from his old Greenhead Torp to a Series of 64 for an 18 second pickup from Turlock.

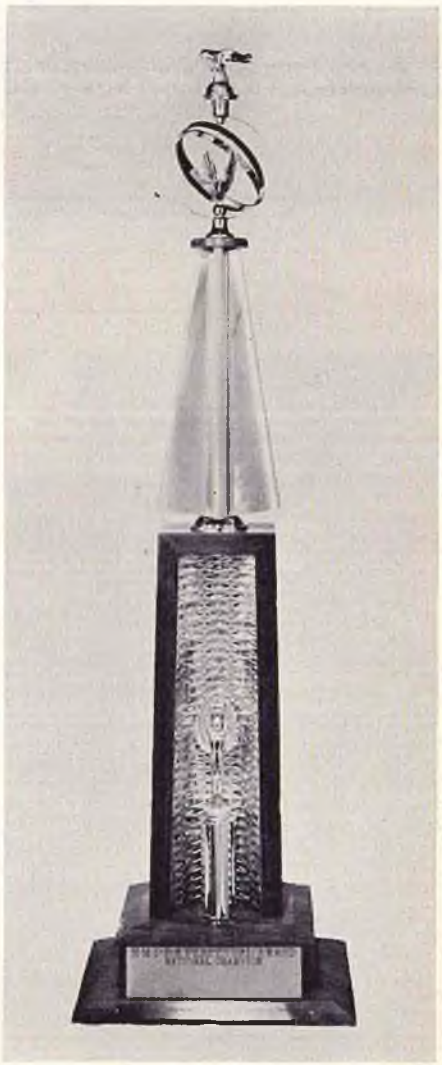
Granger Williams is going to have to be called "Mr. Consistent." He didn't show much improvement over Turlock, but all of his qualifying flights have been right up there. If he gets enough time from his business to fly the pylons more frequently, he could make the party a little rough.

Former Goodyear champion Joe Martin had one of those weekends modelers have nightmares about . . . his radio developed a mind of its own, his engine would say "nuts" on the downwind leg, and the Denight Special didn't seem to want to make an orthodox takeoff.

Bud Crane qualified his new Loving special at 3:45. For the finals, three planes at a time fought their way around the pylons, trading positions as the spectators cheered. Both spectator and contestant interest was at fever

*(Continued on Page 51)*



Below, left: Portable pylon construction hints from Bernie Murphy, N.M.P.R.A. Eastern Director. Below: First perpetual trophy to be awarded to N.M.P.R.A. winner at 1965 Nationals.


Cliff Weirick, Phil Kraft, and Jerry Nelson at Fresno R/C Meet. Phil Kraft and Kwik-Fli, first in Class III Expert, pose with RCM Editor's trophy. Weirick and Candy, 2nd, Jerry Nelson and Roman, 3rd. All planes RCM designs.

# NATIONAL ASSOCIATION OF R/C CLUBS

**CONTEST DATA • CLUB NEWS • HINTS & KINKS**

## By KATHLEEN ACTON

The **Amarillo Radio Kontrol Society, Inc. (ARKS)** recently held an election of officers. Results: Truman Judd, President; Dick Dickson, Vice President; Bill Irwin, Secretary (3302 Lewis Lane, Amarillo, Texas); Hugh Smith, Treasurer. Activities for the summer include a family picnic and their annual contest for September 25 and 26.

•

You Galloping Ghost enthusiasts will enjoy hearing about Gordon Pearson of Farmington, Michigan who has had ten years of successful flights – right off the board! The picture shows his Jetco Imperial R/C 100 with 15 flights to its credit. It loops well and will do a fair roll, but its short comings in aerobatics are made up in a very fine glide. Gordon uses Orbit 10 equipment for rudder, elevator, trim, aileron, and spoilers, with Annco servos.

•

The **Jeffco Aeromodelers** of Denver, Colorado boast 26 active R/C members and one member who flies free flight helicopters. Picture taken at flying area includes (left to right) – Keith Kidder, Byron Hight, Walter Resteiner, Fred DeFoor (Vice-President), Dr. Lee Taylor (flies free flight helicopters), Michael Raisch, Jim Stephenson, Larry Rallens, William Eich, Dr. Dean Sadler (Club President), Dennis Longnecker, Don Port. Missing from photo is Paul Gehrke, Secretary-Treasurer, 2418 Otis St., Edgewater, Colorado 80214.

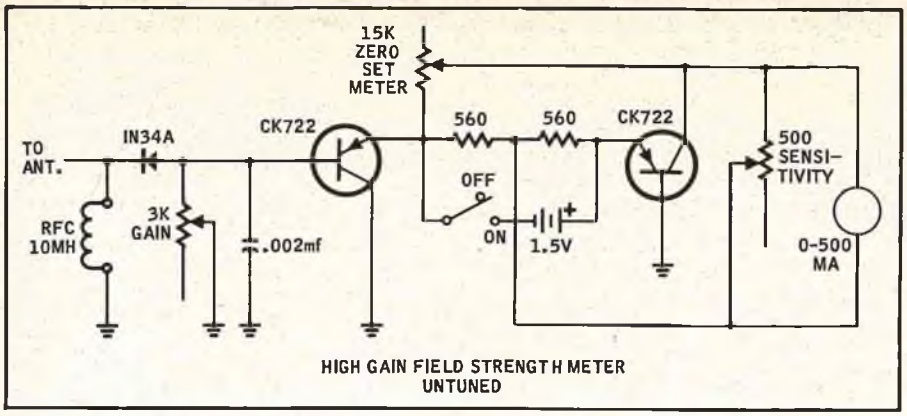
•

Announcing the formation of an AMA chartered R/C club composed of active modelers and fliers in the Shreveport,

*(Continued on Next Page)*

Bob Bentley, Jimmy Grier, and Dave Burt on the ready line with Curt Dimberg and 102" span multi. Photo taken at the R/C Club of Chicago's 3rd Annual Multi Contest. TV covered the event as Maxey Hester took 1st Place.

A portion of the members of Jeffco Aeronodelers, Denver, Colorado. 26 active R/C members and one who flies free flight helicopters. Dr. Dean Sadler, club prexy, third from right.




HIGH GAIN FIELD STRENGTH METER
UNTUNED

From Max Blose, K5ZPY, Hamilton, Texas, the schematic for an untuned field strength meter with exceptional sensitivity — it even picks up a local 250 watt broadcast station at 8/10ths of a mile! Works on 6 meters, too.

Gordon Pearson and his Jetco Imperial R/C 100.

Louisiana area, SMSgt. John J. Moyle, Publicity Chairman, writes us that the club was organized last January and has grown steadily to the present membership of 22. Club officers are: John Hitt, President; Dave Williams, Vice President; Mrs. Martha Beason, Secretary and Editor of club Newsletter **SHARKS SPARKS**; Mr. T. R. Monk, Treasurer. Captain (USAF) Larry Beason serves as senior advisor. Club meetings are held the first Saturday evening of each month. The group's temporary flying site is an industrial park near Shreveport downtown airport. Along with numerous other clubs around the country, they are looking for a more permanent flying site. Inquiries or requests for copies of club newsletter should be addressed to **Shreveport Area Radio Kontrol Society**, Mrs. Martha Beason, Secretary, 222 Bossier Rd., Barksdale AFB, Louisiana 71110.

●

Are you looking for a real reward? The **Valley Forge Signal Seekers** suggest offering your club for demonstrations at charitable events — and they speak from experience! The VFSS put on an R/C flying demonstration at the Flying Fair to aid the Chestnut Hill Hospital Building Fund. Six ships were involved, Bob Kopski on 6 meters, Joe Kursh, Doe DeFranco, Al Grove, Dan McClain and Bill Wetty on the CB channels. Len Brune was kept busy trying to describe the maneuvers, the pilots and their planes. When the last ship touched down and taxied back to its pilot, resounding applause, congratulations and back-slapping to the chants of "Good Show," "Well Done," "Excellent" were heard from the pleased crowd. Not only have the Valley Forge Signal Seekers aided a worthy cause, but also have spread much good will for the R/C hobby. May we add our congratulations to those of the crowd. Correspondence can be directed to Dan McClain, 524 E. Leverington Ave., Philadelphia, Pa.

●

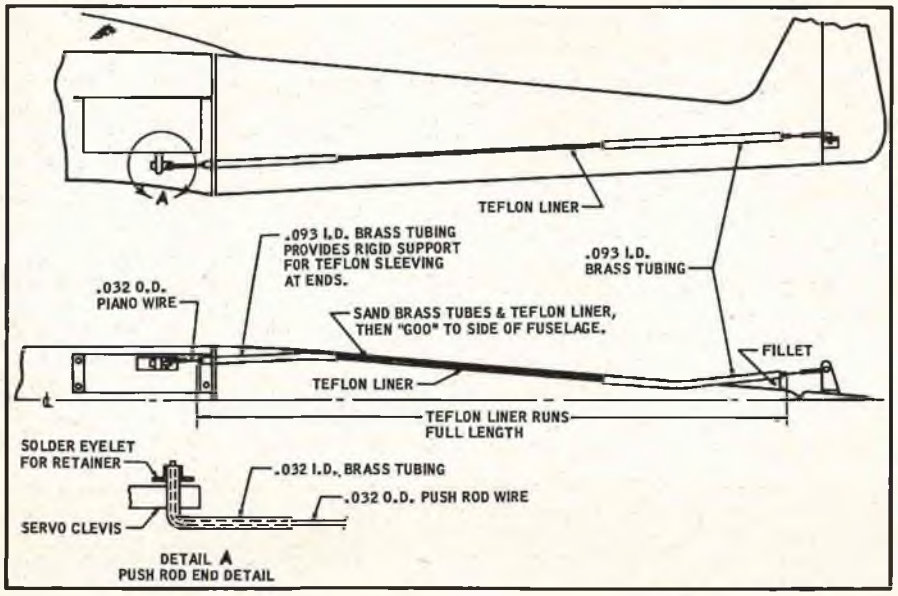
Congrat's and best wishes to another new R/C club, **The Cordova Model Masters**. Current membership is 22, including four father-son teams. Meetings are at the Rancho Cordova Community Center, and their present flying site is the Sacramento Speedway Park. Results of their .020 Pylon Contest according to the June Newsletter: Senior; First — Hersh Roby; Second — Dick Harrell; Third — Steve Gibbs. Junior; First — Lee Roby (this win entitles him to permanent possession of Junior Trophy). Valuable raffle prizes for club meetings, rummage sales to aid treasury, sounds like a real going club — keep up the good work, fellas!

●

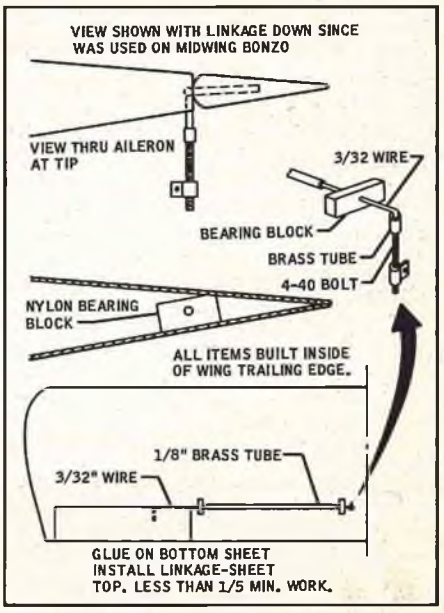
George Kostura, Editor for the **Valley Flyers Radio Control Club** Newsletter, says "it just shakes my teeth" when I buy a magazine and find a new item, plan it into a model, only to find that it won't be available for three or four months. It seems that the magazines and manufacturers should get a better system for introducing new prod-

*(Continued on Page 50)*

From Bill Campbell, McDonnell R/C Club, an excellent method of pushrod installation. Reduces binding along with noise.

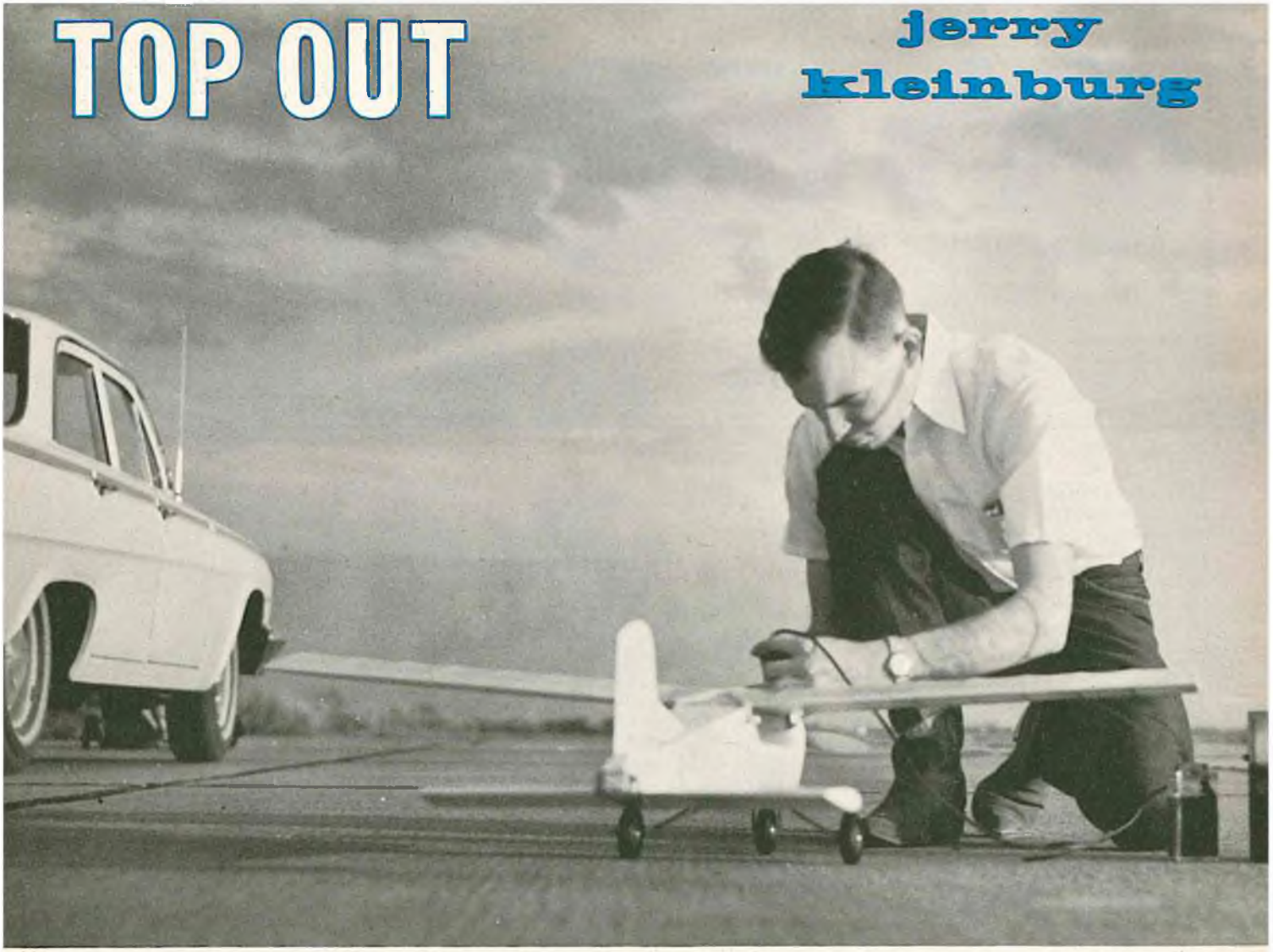



Chuck Cunningham's clever aileron torque tube installation, excellent for the new Goodyear Racers.



# TOP OUT

jerry kleinburg



Typifying many modelers who build and fly for relaxation and sport, Jerry Jackson, research physicist of Southwest Research Institute, readies his 42" Separator in the cool of a Texas evening. (Cowpoke boots 'n all.) Power is a Veco 19, lifts 2 transmites, Citizenship 6-channel radio. Note the wind streamer on the antenna — not bad for February when this pic was taken.

The Grand Bash, otherwise known as the Nationals, will be in full swing as these words are read. For RCers the ultimate question of what goes on will, as usual, focus on equipment, planes, and hardware. After a scrutiny of these, the "who-did-what-in-what" will gain the attention of modeling buffs. Following this natural interest line, a few before-the-fact prognostications will be attempted here to provide a "scorecard for the game" for onlookers.

In Class I, it's not expected that radio equipment will be significantly different from that used in Rudder for the past two years. A few may show up with proportional gear but this equipment will be seen mainly in other classes, at least this year. (Although no one has told me, I expect Tom Williams to attempt to repeat last year's Nats sweep using 'propo' since Tom is usually found in the forefront in R/O developments.) In any case, the mainstay in radio will remain the ten channel superhet reed rig which has provided Class I fliers with outstanding service and dependability and makes Class I results the product of skill and practice.

Mickey Moused servos—that is, modified stock units — should be around in significant numbers at Willow Grove. It's anticipated that some interesting but legal things will be done to actuators to bring some of those six unused channels into play to realize greater rudder position selectivity. Microswitches and add-on printed circuitry will result in rudders that move part way, to normal full, and also to overtravel. All this to accomplish various operating modes required for top point earning maneuvers and control. Bonner Transmites are expected to lead the pack in the servo field although gains by Annco will be noted.

Battery power, of course, will be almost 100% nickel-cadmium cells. A few 9 volt receiver systems will carry separate lead-zinc units but most ships will have circuitry where servos and receivers share the same rechargeable pack of nickel-cad batteries. Although transmitters used by Class I contesters are designed mainly for dry cell power, the majority are expected to have been changed to operate from sets of nickel-cad cells ranging from 900 ma to 1200 ma capacity. To those who wonder at this almost universal use of nickel-cadmium power units, the proven convenience and dependability along with lower costs — in spite of the high initial investment — is pointed out.

Due to a rules loophole some Class I planes will have limited castering nose wheels and spring-loaded brakes. Although these features will not be powered by actuators as present rules prohibit, the 'wiggly' type nose wheels have been developed along with brakes that come into play as pressure increases on the nose wheel. These developments indicate the desire for safer ground control which may see Contest Board action soon on proposals to allow powered

*(Continued on Page 46)*

steering and braking in Class I as it is now for II and III.

Fewer four foot size radio planes will appear this time around, being replaced by five foot plus varieties. Primary reason for this trend is to gain advantage of the larger engines since idling and low engine speed operation are essential for good pattern work. Power from the 'big brutes' is also attractive while Class I-ites try to realize loops from flat cruise without sacrificing penetration. Wing loadings will be tailored to prevent scalloping flight characteristics, while equipment space problems will be practically nil with these larger radio-craft. Fuel manufacturers will find satisfaction in the 8 to 12 ounce tanks which replace the 4's and 6's used in previous years. Veco 45's, Super Tiger 51, 56, and 60's, and McCoy 35/40 should mainly adorn Class I fuselage fronts this year.

Fliers will continue to show improvement in their air work with some performance bettering what was acceptable for multi not long ago. Although Class I scores are expected to be higher, the flying will not receive full appreciation from judges and spectators since it will continue to be mixed together with

*(Continued on Page 64)*

Fly with a young guy — Major Clarence Hart, son Mike, who typify many father-son R/C teams. This adds another dimension to R/Cing — helping the younger set to worthwhile habits, pastime. Expansion of this theme is discussed this month.

Bob Fish, Sierra Vista, Arizona, pauses with his Tri-Squire during the 15th Southwest Regionals. Max 19 using K&B 100 powers this kit design — hauls two Transmites, Kraft superhet radio gear.

Another of TOP OUT's class I cavaliers, Jack Gardner, of Jackson, Miss., shows his K&B 35 powered modified Champion. Uses transmites, superhet, usual 4 channel contest arrangement. Placed 4th at Dallas Nats.

George Gorden and Sigma 7, an original. A TOP OUT Cavalier, George is well known on the contest trails, garners many trophies each year. Sigma 7 is pulled by a ST 46, uses 10 channel radio gear in typical contest arrangement.

# SAVE TIME AND MONEY ON YOUR NEXT R/C SHIP

By CHUCK CUNNINGHAM

WITH all of the reading material available on the wonders of R/C it is surprising that we can find any time to build, fly, shoot the bull, or lay around resting between stints at reading the model mags! All of the wonderful texts on "How to Finish . . ." or "How to Design . . ." or "How to Build the Electromarvel-whiz" or "There I was at two hundred feet, flat on my back when I waggled the stick on my new Digi-Loco Propo unit and immediately went into an inverted Immelspin . . ." have added much to the knowledge of all of us, to say nothing of pure and simple joy. The one major thesis that I haven't seen as yet would, perhaps, be the most welcome — "How to Make Enough Money to Afford It."

At any rate, if you are the one modeler in a thousand that gets his kicks from spending long evenings in the work shop turning out a super duper scale craft with full wire rigging, machine guns that fire, and pilot relief bottles that work, then read no further — go back, get to work and turn out the kind of model that I wish I could do!

Today's multi ship lasts a lot longer than its earlier brother, but interference, radio malfunction and . . . **PILOT ERROR** still do creep in now and then, and wham, there went another bunch of cash and a lot of time. The problem of how to build quickly and cheaply has long bothered us and a few thoughts on both subjects bear investigation.

If you added up all of the hours it took you to construct your last ship, no doubt the amount would stagger even your wife (who knows you spend too much time at it, to say nothing of the expense involved!). So, let's see where we can save as much time and money as possible.

On the assumption that our project is going to be of balsa construction and that it is going to be one of the basic type designs such as the Kwik Fli, Candy, or Stormer, the one largest time-consumer is in the drying time of the glue that we use. Some glues or adhesives set very rapidly on the surface, yet do not dry under their surface skin for several hours. The quick drying model cements generally do not develop sufficient strength for use in R/C work. For our adhesives try the epoxy glue such as Hobby Poxy which dries in an hour; white glue for lower stress areas; and contact cements for all sheet and doubler work. If you haven't tried contacts, you're in for a big surprise, especially when you glue in doublers on the side skins and find that there is no warping or bowing and that they are dry upon contact.

Since we have picked our group of mastics the next time saver is to make sure that we have purchased all of the wood necessary to construct the ship, and that during the middle of construction our supply doesn't run out. Most of us have had the experience of building a box type body and suddenly, somewhere along the line, we have found out that it is all out of alignment. On this ship we will build our box a bit differently. On the top view of the plans construct a crutch of 1/4" x 1/2" balsa, pinning it all in place and installing cross braces where needed. If you didn't use epoxy glue on this assembly get out your wife's hair dryer and blow on the joints, or better still, have **her** do this while you go on to the next step. Cut the fuselage sides to shape and lay them flat on the work bench (or do you build on the kitchen table?). Make sure that you lay the sides down so that there is one right and one left. Cut out the doublers — and this time use 1/16" plywood rather than balsa — not too much more weight, a heck of a lot stronger, and providing a better surface to which we'll mount our servos.

Now, take your ball point pen and mark a line along the sides to indicate the space for the crutch to fit. These sides will fit outside of the crutch. Cut out the ply doubler. Do not use plywood at the wing saddle since 3/16" or 1/4" balsa is much easier to shape if you have to sand a bit in order to make up for some error in alignment. Smear on the contact cement and set aside to dry (about ten minutes). Glue in reinforcement at the rear of the body with white glue while the contacts are setting up. Next, match up the doublers to the sides and firmly press into position. Do it right the first time — there is no second chance! While the sides were setting up, cut out the ply firewalls, motor mounts, bulkheads, etc., and glue in place on the crutch with epoxy glue.

Paint contact cement on the outside of the crutch, and the sides, and while this is setting, move to another part of the work bench and construct the framework for the elevator. Use either white glue or epoxy. Since the sides have been

*(Continued on Page 68)*

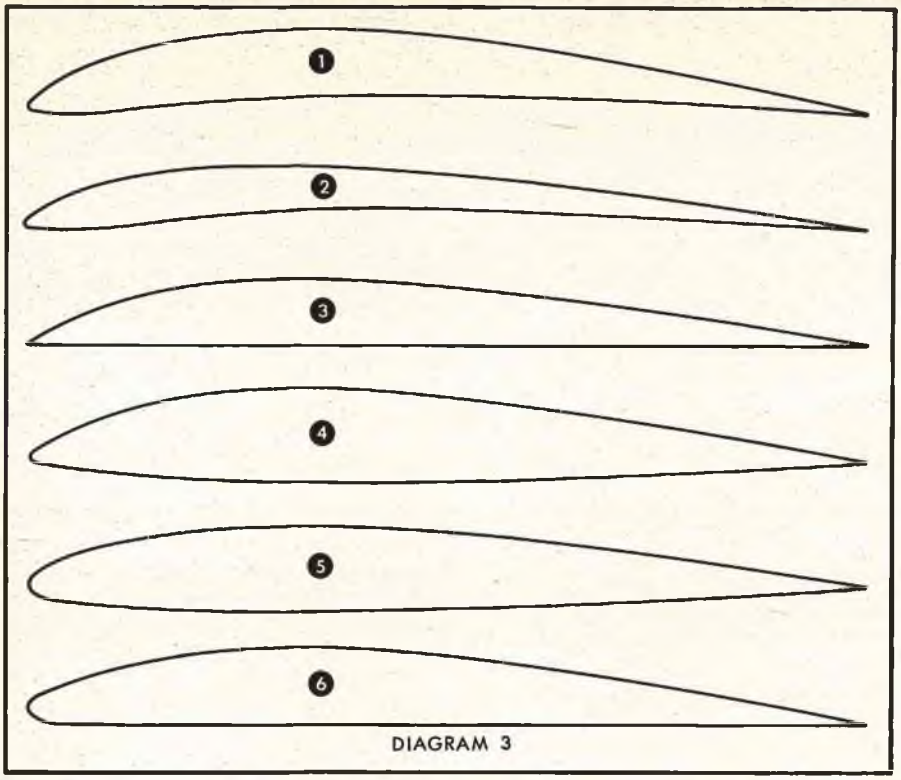


DIAGRAM 3

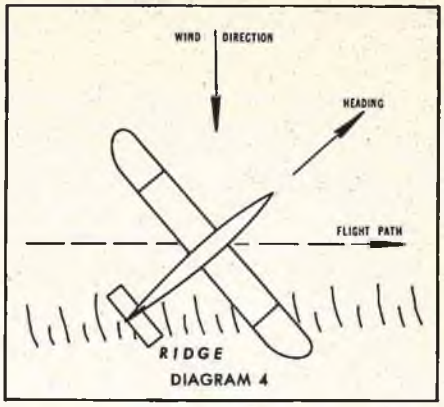


DIAGRAM 4

## Kahuna

*(Continued from Page 25)*

through a few dozen ways of controlling things so you can see what a wide variety of methods you may employ. With no vibration to worry about you can use equipment and wiring techniques that would spell disaster in a powered model. Wires can be connected by using contact pins from old radio connectors. As previously mentioned relays are ideal for sailplanes and there are a lot of old relay sets around. If you get out into the country to fly you can use super-regenerative equipment.

The simplest form of control is rudder only using a plain two or four pawl sequence escapement. The four pawl variety allows you to leave the plane in a turn without sending a signal. Self neutralizing escapements relieve you of the problem of remembering which position you will go to next. Single channel servos relieve you of the tedium of winding rubber motors. They are also handy if you have a large rudder only plane. Air loads build up rapidly on a control surface to overcome escapement power and there is nothing more heartrending than to see your pet buzzard wheel it in with a hung control. An answer to this problem is air balanced surfaces but none of us use them for some odd reason.

Elevator control added to rudder opens up an entire new dimension in flying. I think this is more true of a sailplane than of a powered model. Elevator control is the throttle of a sailplane. With the ability to trim the elevator setting comes the ability to adjust to varying weather conditions, change speed, and of course stunt in a workmanlike manner. You can gain quite a bit of this ability by using escapement control of elevator via compounding or by using the famous Galloping Ghost. The latter is a trifle more evident in a sailplane than it is on powered models – reminding one of a threshing machine drunk with power and bent on world conquest!

Four Channels allow full control of both rudder and elevator by use of servos. There are two interesting modifications which are used on four channel planes. Both are more applicable to the sport flyer or thermal machine than they are to stunt or penetrator. The elevator servo is the recipient of one of these gimmicks and the rudder servo the other. By masking off a section of the return circuitry on the P.C. board which most servos now sport we can convert the elevator unit into a semi trim device. Small sections of the automatic return circuit are covered with a good quality electrical tape or Scotch Magic tape. A quick blip up sends the elevator servo up but when it tries to return to neutral the slider rides up on the tape and the servo stops a small fraction away from true neutral. The same effect is made to occur on the down side by another small sliver of tape. The elevator can be positioned in this dead area by quick blips in the required direction for the masking does not impair your direct control over the unit. The limit of up trim position is picked so the plane is flying at a nice slow float. The down position is picked for maximum speed without having the plane pour "Over the edge" into a dive In between these two extremes you can trim your sailplane to fly as you wish. Some people use fully trimmable elevator but this can be quite hairy to sort out in a pinch.

The rudder modification is similar but done about half way out on each of the rudder return lands. The result is that the rudder will stop at an intermediate position when returning from full throw. This allows the plane to be left in a permanent turn for circling. To recover neutral you simply blip opposite rudder to move it over the tape and it will then neutralize in the normal manner.

If you have six or more channels at your command you can next add Ailerons, Trim elevator, and with ten or more channels, Air Brakes which gives you full house on sailplane. Trim elevator and Ailerons allow you to stunt and do the full AMA pattern taking into consideration the lack of a motor for some of the weirder maneuvers. They are also of great aid in soaring as such and are used almost as much as rudder for keeping a heading once their use is understood. (I'm speaking about Ailerons in that last sentence.)

Our last item of control is Air Brakes. Aircraft that fly in updrafts at times develop the nasty habit of not wanting to go home when you do. A dethermalizer corrects this tendency in most cases. Air brakes can be termed a dethermalizing device. Ridge runners of the penetrator class never need worry about such things, but as wing area goes up and wing loading goes down it becomes more and more of a problem. There are several aids used to bring a wayward buzzard down but none are foolproof. What you usually think of as dethermalizers are not usable because they destroy control in most cases. Pop-up tails, parachutes, etc., are not used on radio controlled aircraft.

Trailing edge flaps are used and opened out to somewhere between 60 and 80 degrees. Flaps of this type almost have to be used with trim elevator for they cause a considerable nose-up tendency as they are deployed and con-

*(Continued on Page 50)*

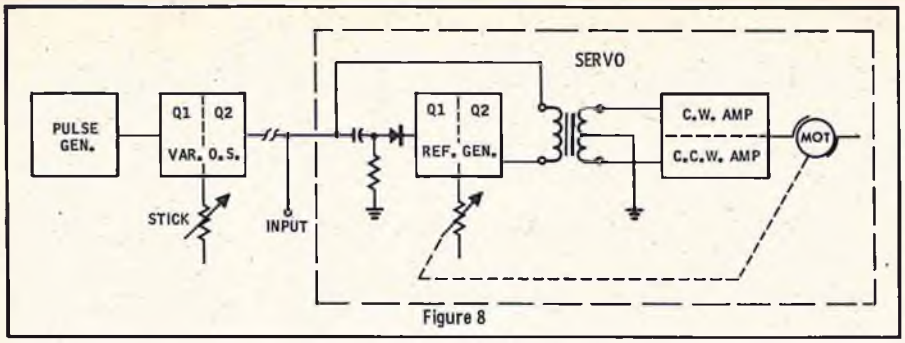


Figure 8

## RCM Digitrio

*(Continued from Page 22)*

motor. All of this, including the comparator, is now contained in the servo case. When the motor runs it also turns the variable resistor. We now control the pulse duration of the reference generator and lengthen or shorten the pulse depending on which direction the motor turns. If the incoming pulse duration is longer than the reference generator, assume that the comparator will cause the servo to run in a counter clockwise direction. If the variable resistor turns in a direction so as to lengthen the reference generator pulse it will eventually match the incoming pulse length and the comparator output will go to zero stopping the motor. As long as we hold the control stick in this position the servo will remain where it is. Any slight movement of the stick however will cause comparator output and the servo will correct itself. It works the same way only opposite if the incoming pulse duration is shorter than the reference generator pulse. Here is the main departure from analog servo operation. Since any slight movement of the stick will cause comparator output of the same voltage (only the pulse duration varies) we get full power for the smallest incremental movements of the servo.

Figure 9A shows how we do this via radio control. The coder pulses are variable and for Condition 1 (Figure 9B) modulates the transmitter with a pair of pulses spaced 1MS apart. Point B shows the carrier being "spiked" off by these pulses. The receiver receives and processes these pulses and a replica of Point A appears at Point C. The flip flop we discussed earlier converts these pulses to a pulse with a 1MS duration. We can apply this pulse to the input of Figure 8 and by varying the spacing of the pulses transmitted, by stick movement, we can vary the position of the servo. Figure 9B waveforms show how the decoder follows stick movement.

There you have a basic single channel digital proportional system. This has been a simple explanation without frills and the confusion factor has been held to a minimum. As we progress we will replace the transformer comparator with transistors, add two more channels and provide a means for the extremely short comparator pulses to run the servos smoothly.

(END PART I)

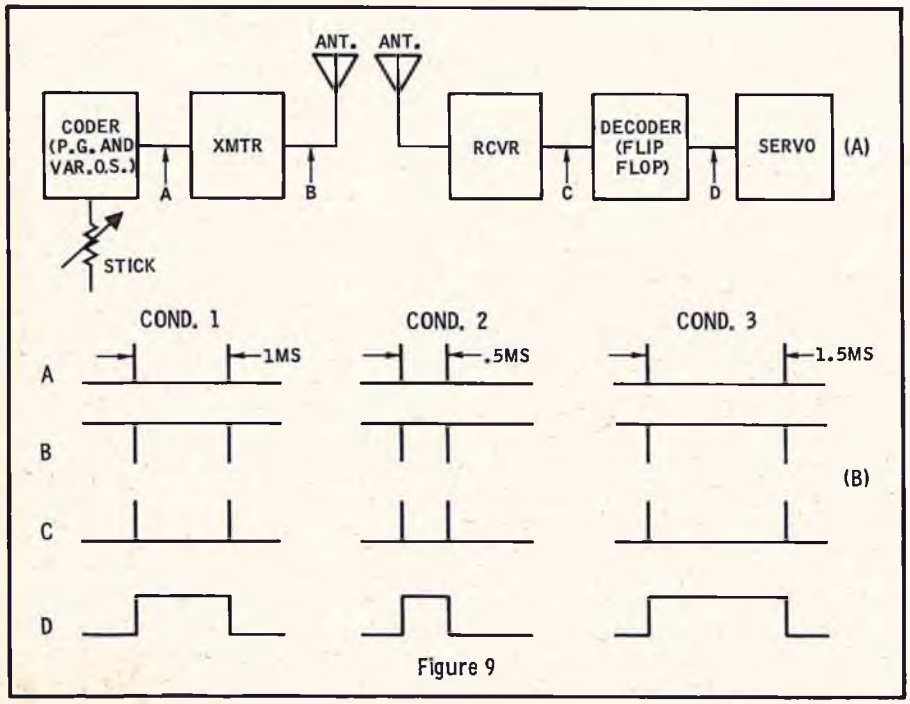


Figure 9

## The Phoenix

*(Continued from Page 27)*

grees sweep per wing panel. These models all fly at about the same speed and are all on the light wing loading side.

The modified Taurus has been flown with both Controlaire reeds and F&M proportional. It does not like to spin and will not snap roll. It is bouncy in rough air but is pure pleasure to fly with the F&M proportional system.

The Phoenix I shown is the second Phoenix I that I built since the original was wiped out at the "63 NATS due to battery failure. It (and the first) is powered by a ST 46, weighs about 6¾-6½# and has 720 square inches and 23 degrees sweep per panel. It has been flown only on reeds and has the softest control touch of any R/C airplane that I have ever flown (and that covers a lot of territory since 1952). It does remarkably well on the small engine and has no trouble with vertical 8's. More power would help when flying off grass. It does quite well in rough air and flies as easily inverted as upright.

Phoenix II has a ST 56 for power, weighs 6½#, has 700 square inches of wing area and has been flown only with proportional control. It has 15 degrees sweep per panel and is very similar to the Phoenix I except for wing and tail sweep. This ship also flies well but I don't believe that it is as stable in rough air as Phoenix I. It also "grooves" very well inverted.

Ray Nugen's Expinkamental weighs about 6¾#, has a ST 56 for power, has 790 square inches wing area and has 23 degrees sweep per panel. You will also note the "dive brakes" on the fuselage which are coupled to the throttle to assist in steepening the descent angle. This is the fourth Expinkamental and is a fine flying aircraft. Rolls very nicely and has never failed to spin or snap roll. It, too, has been flown only on proportional. Previous models were flown with reeds.

Well, there it is. I like bent wings. I hope you do too. If you have questions feel free to write, c/o Radio Control Modeler Magazine.

## Kahuna

*(Continued from Page 48)*

trol becomes rather sensitive after the plane is re-trimmed. The flaps in effect change the decalage angle and cause an apparent tail heavy effect. Slotting the flaps (making a space between the flap and the under surface of the wing when the flap is open) helps out with the trim problem and also increases the braking effect. Split flaps which open both up and down should be even more effective but I have never seen such a scheme used. True air brakes look like flaps but are farther forward on the wing. A typical hinge point being 50% of chord for an under wing installation and 40% below and 60% above for dual flaps opening on both surfaces. Twenty-five to thirty percent of span is usually adequate brake size and all brakes are slotted for maximum effect.

Spoilers (I'll bet you were wondering when I'd get to them) are infrequently used in models for two reasons. Firstly they are deadly things to control and secondly they don't really do what we want. (I'll get back to the second reason a little later.) Spoilers are fences which open on the top surface of a wing to throw the airflow off and destroy lift. Spoilers can be situated anywhere from about 20% of chord to 75% of chord depending on the degree of action wished. Spoilers are usually from 10% to 20% of span and stand up from the surface about 5% to 10% of chord. A very small spoiler will go an awful long way! The effect of spoiler action will be a decided nose-down tendency so if you decide to try, be ready!

While diddling around with spoilers we discovered that even closed spoilers have an adverse effect on the performance of a wing. On model aircraft the airflow is so slow and the camber of the wing so little that almost no energy transfer is involved, and as a result, once the airstream becomes detached, it can't regain the wing surface. The airflow energy is so low that almost any irregularity will cause separation. The end of the wing leading edge planking being a very good example. Kahuna has such an irregularity but you will never know the difference for it is only of importance on high performance contest sailplanes or thermal soarers.

Air brakes are not dethermalizers as such. They are speed control devices and are used in conjunction with other controls to bring the buzzard back to the ranch. There are three basic methods of achieving a squat on the old homestead. Method number one is: Fly out of the lift and wait. That sounds pretty easy and nine times out of ten is all that is required. Which way is out though. Well, if you have explored the lift you are in (which all good pilots do) then you have a pretty fair idea of which way is the closest exit. A couple of additional rules will help you. If you are low to the ground (you are low if you can distinguish control surface parting lines and other details), turn down wind. If you are high, turn up wind. The danger of turning down wind when up high is that by the time you get out of the lift you may have been swept so far down wind that the plane will become lost on landing.

Method number two is: Spiral down. This must be done with care. Sailplanes have a greater tendency to spin or spiral because of their design and trim and some designs will not recover if the airspeed gets too high. Beware of machines with vast rudders. All that acreage wasn't put there for nothing. Keep your glider in a wide spiral and don't drive it too hard. Try to maintain as much of a bank as you can for a wing on its end can't do much lifting. If you have ailerons you will find this no problem. Your planes will come down unless you are in real trouble.

Method number three is for real trouble: DIVE! Sounds even simpler than method one doesn't it? Just push the stick forward and come down in a nice smooth dive. Why waste time with all those kooky other ways? Well matey, sailplanes have one nasty little feature I haven't mentioned. They can just about break the sound barrier in a dive and they DO break the wing barrier. I don't know what the terminal velocity is with the wings on. I suspect it is close to 100 M.P.H. I DO know what it is with the wings OFF. MUCH too fast for survival of any radio gear. You don't even need to bury the remains. That is completely automatic! The wings begin to show signs of distress at about forty miles an hour and rarely last beyond sixty. I'm speaking here of sailplanes as opposed to ridge runners or other no-float varieties. Sailplane wings are long and with very little thickness. It doesn't take much to start them flapping. First comes a faint shuddering which can sometimes be heard on the ground. Silkspan covered wings can buzz at certain speed. Then as speed goes up an obvious fluttering can be observed. This may be in several modes at once. By this time the noise is rather pronounced. Shortly thereafter one or both wings will resign. The answer to the airspeed problem is some sort of air brake to make a dive more controllable and regulate the maximum speed at which the glider can fly. Flaps or air brakes do this job. Spoilers do not (and here is reason number two why spoilers are used infrequently) have any braking effect. Used in conjunction with flaps, spoilers are ideal, for they counteract the trim disturbance caused by flaps.

*(To be Continued)*

## N.A.R.C.C.

*(Continued from Page 44)*

ucts. George thinks there would be more satisfied customers if the distributors had the products at the time they are advertised. . . . What's your views on the subject??? The Valley Flyers put out the welcome mat for a new husband-wife team in Ken and Loretta Hall. They are single channel enthusiasts and Loretta builds and flies her own planes. Correspondence should be directed to Secretary/Treasurer Neil Gottenbos, 16025 Rayen Street, Sepulveda, California.

●

Bob Williams, June Editor for KC/RC Contacts, extends congratulations to **Kansas City/Radio Control Club** Vice-President Courtney Smith on earning his private pilot's license. (Captain) Smith advises that the proper landing procedure in a cross-wind is to lower the wing toward the wind and to hold the proper heading with opposite rudder. Editor Williams thinks this should be interesting with a rudder only airplane!

Jim Martin of the **Middle Tennessee Radio Control Society** Bulletin gives an unbiased report on some new gadgetry; Superior Smoke Bombs. These last three minutes will provide that spectacular touch you have been trying to come up with. If your outside loops are erratic, simply ignite smoke bomb and tell the judge that the maneuver was just blotted out by the smoke but was, in reality, perfect. Crash of the Month – Cast: Bob Reuther with a Jenny, and Jim Martin with a Digester. The Jenny had taken off and was about 100 feet in the air and the Digester was trying to enter the traffic pattern on the downwind leg. . . . Suddenly The Great Crash ensued! The two aircraft rammed together and tumbled toward the ground, both engines still running. The clear-headed pilots(?) both gave high motor and the airplanes flew apart under perfect control even though the Digester had a two square foot hole in the wing. Happy ending? No such luck. . . . The Jenny landed unhurt, but Martin was laughing so hard that he flew the Digester into a tree totaling the whole mess. . . . The interesting part is that they were the only two people flying . . . maybe Martin can blame it on those smoke bombs he was talking about!

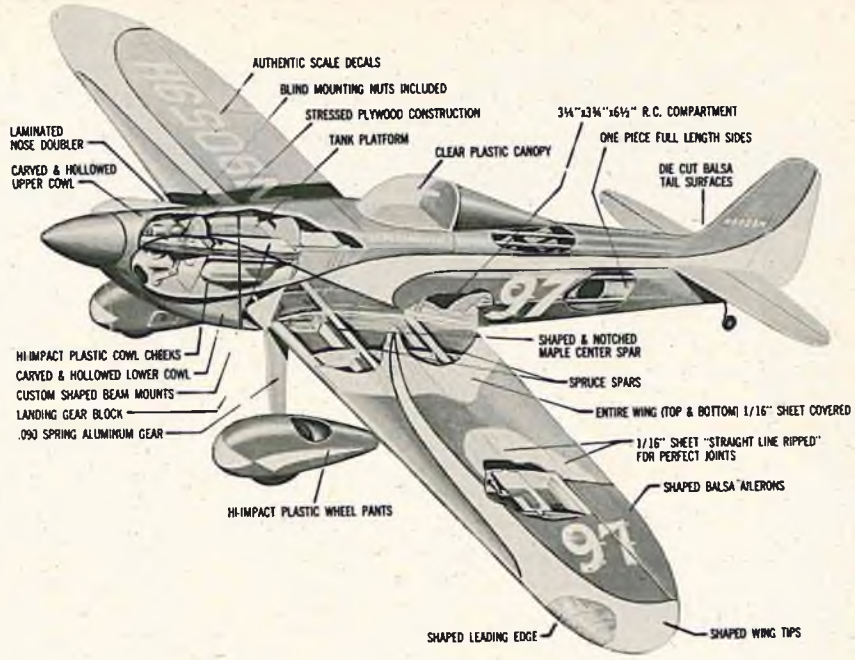
●

Birds Eye Views, Newsletter of the **B.I.R.D. Club of Long Beach**, California, announces new board members: President – Dal Moran; 1st Vice-Pres. – Lou Governale; 2nd Vice-Pres. – C.

*(Continued on Page 54)*

# The Roostertail

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




The regatta on April 24 & 25 at Lake Woollomes, Calif., sponsored by the Blue Dolphins was quite a meet! No less than seven (7) world records were set. The first records to come from the Midwest in the '65 season were set May 23 at Lombard, Ill. Get out your record sheets, and make the following corrections:

**Oval — ¼ mile:**

R. J. Foley, A-3 (.09), 1:07.78, 13.28 MPH, 4-25-65.

C. Borchert, B-3 (.15), 0:54.97, 16.37 MPH, 4-25-65.

E. Mundt, F-2 (?), 0:40.4, 22.3 MPH, 5-23-65.

G. Preusse, E-2 (?), 0:40.13, 22.4 MPH, 5-23-65.

**Straight 1/16 mile:**

R. J. Foley, A-3 (.09), 0:12.14, 18.53 MPH, 4-24-65.

J. Henry, B-2 (.19), 0:09.57, 23.51 MPH, 4-25-65.

G. Spickler, B-3 (.15), 0:09.66, 23.29 MPH, 4-25-65.

J. Barazoto, E-3 (.61), 0:07.19, 31.29 MPH, 4-25-65.

California's Jim Whitlatch and modified White Heat V.

*(Continued on Page 60)*

peak, proving once again the almost universal appeal of this type of aero modeling. NMPRA #2 is now history, a new champion is on the spot for upcoming challengers, and our thanks go to Ed Shipe, Bill Wisniewski and son Mike, Arnold Nelson, Roger Theobald, and Jim Nightengale for their outstanding assistance in making this event the outstanding success that it was.

Official flight recording for the event is listed below.

●

Bob Russell, President of Robert R. Russell & Associates, Des Moines, Iowa, announced that the Des Moines Modelaires Club and Russell Trophies will present a 48" silver, gold, and walnut trophy to Jerry Nelson for his cause in promoting the N.M.P.R.A. This is a perpetual trophy to be awarded to the National Champion at the 1965 Nationals. Jack Patton, Nat's CD, has authorized flying time from 5 P.M. to dark Thursday, Friday, and Saturday for Goodyear event fly-offs at the forthcoming Nationals.

●

One of the forthcoming Goodyear events you won't want to miss will be held as part of an AMA sanctioned meet September 19th in Lakewood, New York. According to Howard Dart, CD, over $200 in prizes have already been allocated. In addition, an Orbit 3 plus 1 proportional system will be among the merchandise awards. Howard states that they have also signed a contract with the Pepsi Cola company which will enable them to have over $500 in advertising in order to assure a good spectator turnout. Interested contestants should contact Howard Dart, Yorktown Industries, Inc., Lakewood, New York.

●

According to a recent AMA information release, the Academy announces that AMA insurance coverage for licensed model flyers will be extended for NMPRA Goodyear event flying "providing that established AMA safety measures are taken."

The latter, seemingly, specifies that this can be accomplished only by flying the Goodyear event over the racing course layout already approved by the insurance company and the RC Contest Board — in other words, the AMA Open Pylon course. The NMPRA can readily understand the AMA's position in this matter, but suggest that the approved NMPRA course be submitted for approval, since the NMPRA rules must be adhered to in meets. We are flying a Goodyear event — not open pylon, and to fly a course intended for another type of event would destroy part of the purpose of this event. The NMPRA will *not* sanction any event flown on a course other than the NMPRA approved Goodyear course, and that includes the Open Pylon course, unless it is the majority wish of the general membership and the unanimous vote of the NMPRA Board of Regional Directors.

●

The first commercially produced kit for a Goodyear event racer has been released by Sterling Models. This is Joe Martin's "Denight Special," winner of the first NMPRA sanctioned Goodyear event at Turlock, California, and as featured in R/C Modeler Magazine. The new kit, priced at $18.95, includes many deluxe items, including pre-formed high impact plastic parts, such as wheel pants. The Denight Special is available at your local dealer.

●

## N.A.R.C.C.

*(Continued from Page 50)*

B. Smith; 3rd Vice-Pres. — John McGill; Secretary — Laor King; Treasurer — Bill Snedeker; Contest Director — Harry Gould; Field Director & Ass't C.D. — Pete Peterson; Sargeant at Arms — Chet Ogborn; Public Relations—Andy Foster. Good luck during the coming year! Other news item from Long Beach; that Viper of Eldon Linds seems to have an affinity for the weeds — Bill Snedeker finally had to say adieu to his much abused Sr. Falcon. The last crash was just too much. — Pete Peterson's beautiful Phantom flies as good as it looks. — Since Joe Bridi's P-51 flies so well, people are asking why he doesn't enter Class III as well as Scale. — That new Skylane of Doug Hertzog's is proving to be a rugged little beast, he had 34 flights in one weekend.

●

**Indian City Radio Control Inc.** played host to Jack Lemon Jr., of the Min-X Corp. for some enlightening demonstrations of that company's products. Not too long after that, they hosted Mr. Bev Smith, sponsored by Joe's Hobby Shop, for a demonstration of the Hobby-Poxy method of finishing. I.C.R.C. Inc. has discovered a source of free publicity. Fred Socia, parade chairman for the Fourth of July parade held at Wyandotte, Mich., asked the children of club members for ideas on what they would like in a club sponsored float. Where else could you display your planes before thousands of people — F R E E ! Indian City Radio Control Inc., P. O. Box 145, Wyandotte, Michigan.

●

"As is usually the case, good weather happens between Mondays and Fridays. That being the case, many club members have been flying in the evening from 5:00 or 6:00 P.M. until dark. Believe me, a lot of flying can be done in two or two and a half hours." This astute judgment, shared by many, is expressed by editor Carlos Cartagena of the Clanking Armor, voice of the **Lincoln Sky Knights Radio Control Division Inc.**, Lincoln, Nebraska. Active members practicing this rule were Don Svoboda, Lonie Charlson, Bill Johnston, Royce Hope, Skip Hirchman, Bob Bates, and Don Neill. (Address: 1909 N. 58th St., Lincoln, Nebraska.)

●

President Ralph Pennetti announces that plans are being made for the renovation of the field, with consideration for moving the buildings, relocation of the fences and parking area, and for the extension of the landing strip. This will add to flying fun and also to the safety factor (a big issue with many clubs). The Beep Sheet, official newsletter for the **Greater Pittsburgh Aero Radio Control Society**, practices a good idea, saluting a Member of the Month. Featuring pictures and a brief personal story of an enthusiastic newcomer. (Address: 841 Maplewood Dr., Pittsburgh, Pa. 15234.)

●

An Information Release from the Academy of Model Aeronautics has proclaimed that the United States has applied for recognition of a brand new international record for model aircraft — distance in a closed course with a radio controlled glider. Frank Colver, 30, Costa Mesa, California, flew his 8 foot span Jetco Imperial model a total distance of 43.5 miles while circling two pylons 100 meters apart on the cliffs of Corona del Mar on May 8. Howard E. Johnson, Academy of Model Aeronautics President, says the flight was tedious and grueling, although quite thrilling in several ways. About twice every hour, intense thermal activity off the cliffs caused the plane to rise uncontrollably to extreme heights. If it is approved, the United States will have captured the First record since this category was established by the Committee for International Aero Modeling of the FAI last year. Other FAI records for radio controlled gliders are held by Russia and New Zealand. The Californians report that they are aiming for the glider speed record, and others in the near future.


# KITS and PIECES

Generally speaking, in any type of review, the summary of findings is left for the last paragraphs, however, our enthusiasm over the VK Cherokee just can't be withheld until then. The Cherokee is, in all respects, one of the finest kits that we have had the pleasure of building.

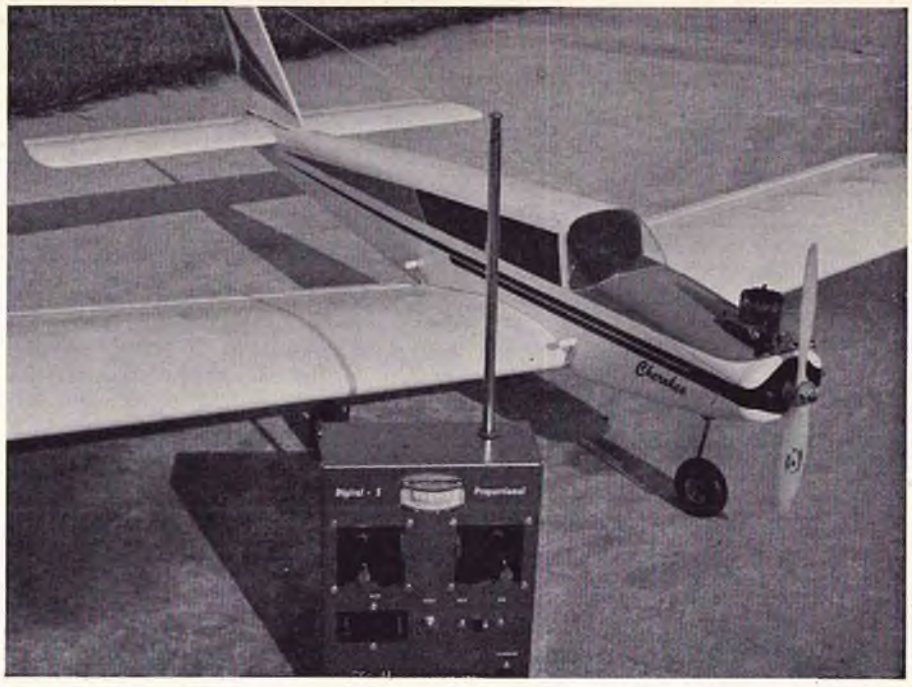
The VK Cherokee is a full house multi design, suitable for either reeds or proportional equipment. We would classify the Cherokee as an "almost semi scale," since it does strongly resemble the full size ship. A fully symmetrical eighteen percent wing section has been used, with an area of 754 square inches. Strip ailerons have been utilized, a deviation from scale.

When last month's column was written, we had completed the wing and fuselage, but will recap for those who missed it. The wood included is of excellent quality with very cleanly cut parts. The sheeting material has been exceptionally carefully planned, to the extent that there is virtually no scrap upon completion. Use of care in selecting a given sheet for a specific purpose is a must! The sheeting, as supplied in our kit, had been cut to exactly the right width required. This caused some problem due to the slight warpage of the sheets, making a straight butt joint somewhat difficult. Later kits have these sheets slightly oversize to allow trimming the edges true.

The wing was completely assembled on an Ajusto-Jig, our first use of this type of jig. All wing parts fit perfectly, with even the webbing precut to width. Use of the Ajusto-Jig allowed all dihedral braces to be installed while building (these also fit unusually well), along with the webbing and most of the sheeting, both top and bottom. The resulting structure was completely solid and warp free when removed from the jig, with no work left to be done that might introduce a twist.

The fuselage assembly progressed as indicated on the plans, with the exception of the nose gear mounting blocks and installation of the blind nuts for the engine plate. The nose gear blocks were purposely omitted until after the sides had been assembled to the formers. Then the engine mounting plate was installed to assure correct alignment. Then the gear blocks were glued in place. The nose section was coated with

*(Continued on Page 56)*



VK Cherokee and F&M proportional ready for test flight.

epoxy resin before installing the chin block. Be certain to install and securely tighen the cast aluminum nose gear mount before gluing the chin block in place! Unless you are an expert flier, we would advise inserting a piece of 1/16 inch plywood into the chin block in the area where the nose wheel would strike on a hard landing, preventing denting the nose.

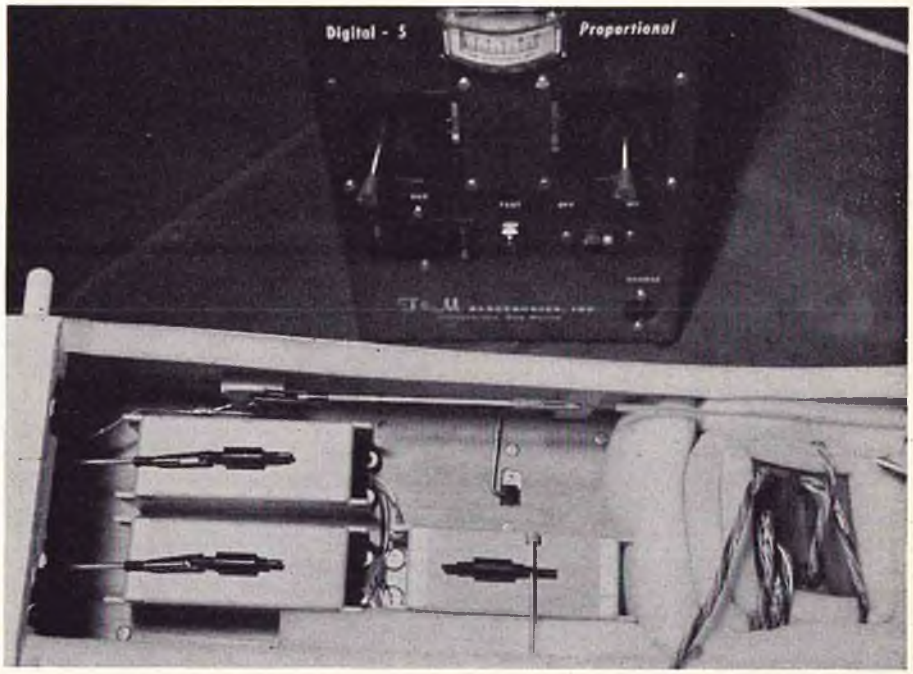
The stabilizer is built up and completely sheet covered. Ours was built on a Magna Jig, although any flat surface would do. When covering the bottom of the stab, the leading and trailing edges were blocked flat and weighted to prevent twisting while installing the sheeting.

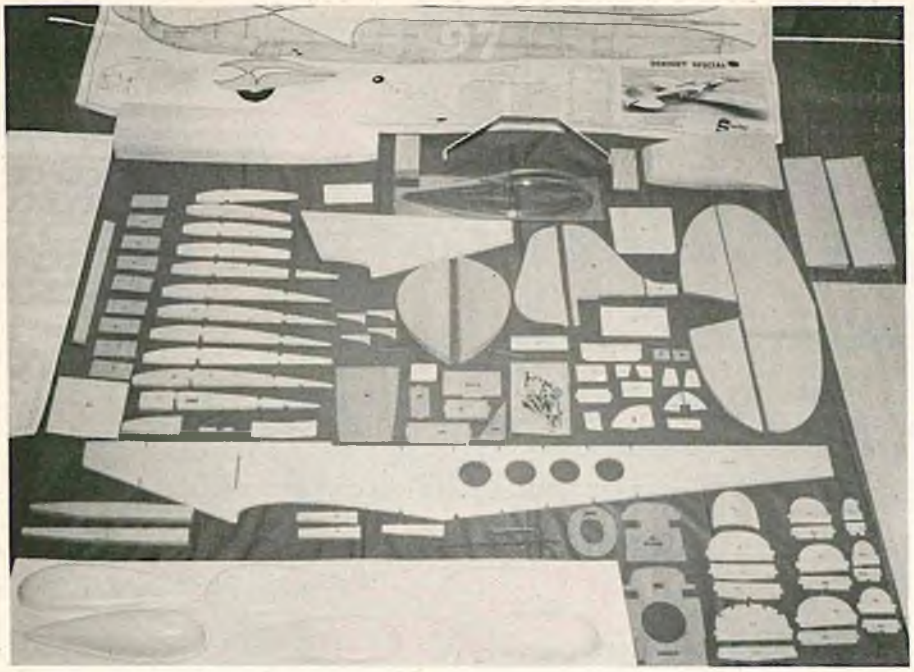
If the fuselage has been assembled carefully, the wing and stabilizer saddles will fit and align perfectly, with no trimming required. This is important, since it allows no chance of changing the decalage accidentally.

The entire structure was covered with Royal Products Silron, applied damp (not wet). The damp Silron does not have quite as much drawing tendency on the sheeted areas as it would applied wet. Also, the danger of warps or raised grain is greatly reduced. The fin, which is ¼ inch sheet showed some tendency to twist while covering and doping, but was corrected by twisting in the opposite direction slightly and holding.

Since the fin is unusually large, it

F&M proportional installation in Cherokee. Plenty of room.





Sterling's latest — Joe Martin's Denight Special. 230 parts including many formed and shaped wood and plastic pieces.

must be accurately located on the fuselage. This is easily done by placing a pin in the center of the tailpost, and another carefully centered in the cabin area. A thread run between these pins will locate the centerline of the fin, and the slot is cut from this line. DuBro leather fillets (the type pattern makers use) were used on the fin and also on the stabilizer. These form perfect fillets, quickly and easily, and in addition add greatly to the strength of the joint. We recommend these for almost all fillet work.

The entire ship was doped using the new Kampel Butyrate dope. This is a new dope product designed for model finishing. Our results were excellent, with very good coverage. The clear dope is unusually easy to work with. These dopes are of a heavy consistency and require thinning at least 25 percent. A brushing retarder is also available and is a big help in reducing brush drag and also blushing.

A Veco .45 was installed for power, along with a 12 ounce Williams tank. The Veco .45 was purchased from Custom Products as "ready to run." Somewhat surprising, but that is exactly what it did. We have labored through the break-in period on several of these engines and were a little doubtful, but the engine started easily and peaked out right away.

An F&M proportional system was installed in the Cherokee with ease. An idler bar was installed in the ship at the trailing edge of the wing to allow for easier equipment installation. This also reduces the weight of the pushrods on the servo and allows for travel adjustments.

Our model balanced within 1/16 inch of the location shown on the plans, so no further adjustments were made. Control surface travel was adjusted to provide about 5/16 inch on both up and down elevator, and the ailerons were set for 7/32 up and 3/16 down. The rudder was allowed to swing about an inch on either side. We were ready for the test hop.

At the field, the Cherokee immediately drew a crowd (as every new ship does). The interest was more than casual, for here was not only a new untried ship, but also a ship that looked like an airplane, not the stereo-typed multi stunt ship.

The engine responded instantly, one last check of the controls — the time was here. The throttle was retarded and the Cherokee was on its own. A slight advance of the throttle and it began taxiing down the field, a turn at the end of the runway and full throttle — a slight pressure on up elevator and our Cherokee lifted gracefully into the air and bore straight down the field, no tendency to turn. Several minutes were spent checking trim and getting the feel of our new bird. Elevator response was smooth as was aileron. The roll rate was a trifle slower than we were used to, and full up elevator would not produce a spin, so both travels were increased before the next flight. (We strongly recommend making the first flights at the reduced travel.) The first flight was terminated with a beautiful three point landing. The Cherokee handles quite easily on landing, having a moderate landing speed, enough for smooth response, but not hot. Subsequent flights showed the Cherokee to be capable of

*(Continued on Page 73)*

## The Roostertail

*(Continued from Page 51)*

W. McCallister, K-3 (18.51bs), 0:09.41, 23.91 MPH, 4-25-65.

The DeVry Tech. Club is only the second club to request a sanction for an all Multiple Boat Regtta, but this is the beginning of a trend. Multi-Boat was run at the Annual Regatta of the IMPBA for the first time this year. From the sanction request we have received, speed is the big thing, with precision taking a back seat. It was just a few years ago that precision was the order of the day, and speed was run if anyone was interested. The advent of radio equipment that is reliable is probably the most significant single factor in the advancement of R/C power boat racing. It was a rather frustrating thing to have a fast boat run out of control and head for the rocks on the shore. Reliable super-het equipment available today allows a modeler to put his heart in racing, and concentrate on performance and speed and not have to spend all of his time hunting bugs in the radio.

Another significant contribution to the sport of model racing is the availability of fine, proven models, either in plan, kit, or prefab glass form. Every man is not a designer of racing hulls, even though he enjoys racing. The commercial equipment available today permits a man with a minimum of experience and 'zero-ability' of design to buy the material and equipment he needs to build a boat which is suitable for competition. No manufacturer can guarantee instant success, but they have come a long way in increasing the odds in the favor of the modeler.

●

As long as you have your pencils out to change your record sheet, you might do well to make a correction in the HANDBOOK OF MODEL POWER BOATING.

**OFFICIAL NOTICE** – Rule R-3, Section 2, Maximum Displacement should read: The Maximum displacement of any one (1) cylinder of an engine shall be 1.8308 cu. in. (30 cc).

●

Tether man may remember R. E. L. (Bob) Johnson of Toronto, Canada, as the host of the Toronto Society of Model Engineers. Bob, who was active for some 15 years, in the days before R/C, died last April. Though not a charter member of the IMPBA, he made many contributions to the art of tether racing.

●

On several occasions, tether men have written to the General Office and com-

*(Continued on Page 62)*

## The Roostertail

*(Continued from Page 60)*

plained that there is no news about tether racing in the ROOSTERTAIL. To date, every bit of tether information (except the '64 Annual Regatta results) has been printed. Exactly zero! We report facts, we don't invent race results.

•

In the last several months, the ROOSTERTAIL has presented a proposed addition to the Rules of Competition which will provide a basis for Multiple boat competition. The one item which is the cause of some comment is the direction of the turn. Is the course to be run "to the right" which means that the boats make right hand turns, or if you prefer, run clock-wise, or should the boats run "to the left" or counter-clockwise? In the present proposal, the direction is given as right hand turn, or clock-wise traffic. The point here is then to decide whether the proposal should remain as is, or if it should be changed. Now is the time to voice an opinion. Which way do you think the traffic should run in a multiple boat race?

One of the arguments for left hand racing (counter-clockwise) is that "the big ones" run counter-clockwise. True, the Unlimited class hydros run counter-clockwise. However, I would like to point out that this is just common sense for the men who race the "big ones." They are running with props which turn in the opposite direction of the props we use on model power boats! In other words, they are taking advantage of the torque of the engine to keep the hull flat in the turns. To run a right turn, or clockwise course would be suicide for the Unlimiteds! To say that the counter-clock racing is more realistic is to change another man's asset into a liability for yourself.

When a new hull is launched, there are usually a number of "bugs" which must be trimmed out in order to get contest performance. It is during these several trimming runs that the turn is trimmed. Why not trim it to the standard of the majority of those competing? It is foolish to flip a coin at the time of a meet to determine traffic patterns. This puts the loser of the toss at a distinct disadvantage. In effect he has lost the race by the flip of a coin, no matter what kind of boat he has or how his equipment functions. We must have a standard. Indicate your preference thusly: Print the words "RIGHT TURN" or "LEFT TURN" and your name and IMPBA number on a post card, and mail it to "Traffic" c/o IMPBA General Office, 2405 S. 19th Ave., Broadview, Ill. 60155.

*(Continued from Page 46)*

Class II and III flying. This mixing of 'apples and oranges' prevents a real Class I vs Class I competition, which creates a confusion factor for the Navy judges as well as the public. In view of the technical and administrative advances started in Dallas last year perhaps a separate Class I flight line will be seen in Chicago in 1966 — it won't be in Philadelphia. At least it's something to work toward. . . .

While we're at it, let's take a look into the crystal ball and see how many of the Class I winners may be seen two months ahead. Usually there's little percentage in sticking the editorial neck out in these matters but in the spirit of John Worth's slogan of "It's Only A Hobby," let's guess a little. In spite of many unknowns it seems sufficient grist is predictable enough to kick a few factors around and see if they add up.

Eastern fliers, due to their numbers, have the edge, with west-coasters, who will have the least Class I representation, playing the dark horse role. Mid-country RCers will make their weight felt with strong centers of Missouri, Oklahoma, Michigan, and Texas having experienced contenders with the staying power to win. Leading fliers such as Santmeyer (Mich.), Smith (Mo.), Rhodes (Tex.), Gorden (Ohio), and Tom Williams (Okla.) are expected to offer stiff competition to stalwarts like Angus (Ariz.), Gardner (Miss.), Ritter (Mich.), and Morgan (N. H.). If fliers such as Bernie Williams (Mich.), Bob Wischer (Wis.), Don Sump (Wyo.), or Rogers Barton (Tex.) compete more surprises could be expected. Who will win?

Giving due consideration to **all** factors, I see the edge tipped toward Suncook, New Hampshire and Harrison Morgan with his fine "Hi-Fin." Mel Santmeyer will have a wrestling match with 3 or 4 others but should scrape out in 2nd place by a point or two with his "Caravelle." Bob Angus, Jack Gardner, and Courtney Smith will scramble for the next three places while Tom Williams, who will find proportional takes more practice, will have to look to Chicago and 1966 for the honors his skill merits.

While the Open fliers are battling, don't lose sight of the Jr.-Sr. boys. They will be in there to show each other and the adults that Class I belongs to them too! Bill Wischer (Wis.) and John Schroeder (N. Y.), previous winners, and Gary Leonard (Mo.), the 1964

winner, may find much competition from Gary Davis (Md.), Mike Ritter (Mich.), Steve Strong (Tex.), Steve Carter (Calif.), and Bobby Woods (Okla.), among others. Gary Leonard looks good to me to repeat the No. 1 take although John Schroeder will be guarding his 1963 win in his own territory and won't give up easily.

Well, these are my guesses and of course you're entitled to your own – the game is open to all! Put them on paper and we'll compare notes in Philly and see how things turn out. It could be more fun than harassing contest directors! Regardless of who wins, together with the national TV coverage scheduled for our annual modeling radio, the total story from Philadelphia should be one of increased maturing and stature for all aspects of aero-modeling. The emphasis, however, will growingly center on R/C.

**TO BE SERVED – SERVE**

In a column such as TOP OUT and in a magazine such as RCM it may seem unusual to read about Rat Race, Stunt, Jet Speed, and Free Flight since they are not usual fare within these pages. It's fair to state the reason for the limitation has to do with business practice rather than unconcern for the interdependence of all phases of the hobby. Coverage in depth, as we try here, necessitates a policy of limitation – normally. However, a moment is being taken here to comment on a small news item involving the other facets of modeling in conjunction with R/C.

On May 16th a group of Texas modelers including Ben Harr, veteran R/C-er, George Aldrich, famed control-line stunt flier and designer, Dick Ritch and Bill Strawn, Rat-race impressarios, Gene Comontofski and Bob Westall, free-flight artists, and Jim Summersett, control-line jet whiz, put together a flying demonstration at the Job Corps Center near San Marcos, Texas. The Job Corps Center there is the first of several to be opened in various U. S. areas to provide education and vocation training to thousands of young guys 16 to 21 years who, for one reason or another, need a boost in the right direction and have sense enough to know it and do something about it! Sargent Shriver heads the national effort which is part of President Johnson's Anti-Poverty Program.

Although the flying show was marred by a Texas-type cloud burst, enough was seen by the Job Corps officials, including Dr. O. J. Baker, chief administrator of the Center, and local civic leaders to convince them that a spare time hobby shop for the students was a right move. Encouraged by arrangements for instructional and motivational help volunteered by members of the Alamo Aero-Modeling Council the Gary

*(Continued on Page 67)*

## Top-Out

*(Continued from Page 65)*

Center is pressing plans and action to establish the hobby work shop which will emphasize model aircraft building and flying for its 3000 students. Officials noted that this was their first real contact with model planes and it was obvious that they had readily dropped their 'toy' concepts as they gained first hand knowledge of the avocation potential of the underlying skills involved in modeling together with its character building environment. Plans for the near future include a model flying show and exhibit during an 'open house' tentatively set for next October.

Many of you who read this recognize, of course, the potential of 'new blood' for modeling and a real worthwhile service that may be rendered many young men looking for guidance and whom will be significantly influenced by the examples we set, be we R/Cers, control liners, or free flighters. With more of the centers opening an expanding opportunity is being created for responsible modelers and modeling organizations to prove through such public service that modeling has civic use and value. In this way the talent possessed by so many modelists may be sought after and be brought to bear to help others toward useful lives; a usefulness which is the substance our country is built upon and continues to need to thrive.

The opportunity for service is not limited to Job Corps Centers alone, nor is the idea of service itself a new one since many examples of past and present community endeavors exist. The Job Corps opportunity is, instead, another of a continuing series of these service opportunities. It is, nevertheless, one that offers modelers and the modeling fraternity a chance to aid in a program of national scope and to gain for ourselves a new stature and recognition.

**MISCELLANY**

- Congrats to Frank Colver of Costa Mesa, Calif., on his 43½ mile R/C gliding record. John's 8 foot Jetco Imperial was airborne for 2 hours 45 minutes, sometimes in booming thermals which made the chore a mite interesting. . . .
- According to Maurice Teter, AMA District VIII V.P., the annual Dallas Southwestern Regionals will not come off this year. This will give the TORKS of Oklahoma City and their Labor Day R/C meet a break. In any case, the Southwesterns, a regular fixture for many years, will be missed. . . .
- Thanks for your reactions, kind words, about the rules recommendation — keep them coming. . . .
- Before signing off this month, one more item is presented. Your ideas, opinions, etc., on including Class I in the FAI World Championships are sought. FAI sporting regulations provide for a single control class but up to now it has been side-tracked in the main event. In the past where one flight line was standard it was understandable. But now that separate facilities are a proven reality and in view of the performance capabilities of Class I, it is time to work toward building international activity and for inclusion of rudder planes in the FAI scene. Maynard Hill will represent us in Europe next November and will undertake to present such a proposal. All that's needed now is sufficient reaction to support the move — so, how 'bout it, guys, let's hear from you on this. . . .

*(Continued from Page 47)*

setting during this building, the contact should be ready, so very carefully fit the sides to the crutch, and also glue the sides to the formers.

With the fuselage in this position you can locate all of the servos, drill holes in the side for attachment; install your favorite nose gear hook up; build pushrods, and fit them into place, and in general, accomplish all of the hard detail work much easier since you can get to everything. Install the bottom sheeting with white glue, remove from the board, install the top sheet and you are ready to sand. The nose block can be glued in place with white glue and then sanded in just a few minutes.

The elevator framework should be dry by this time so leave it on the board, apply contact cement to the ribs and to the sheeting, and allow to dry. While this process is taking place build the rudder and allow to dry. Put one sheet skin on the elevator and immediately remove from the building board and sheet the other side. No drying time needed, and no warps!

The wing usually represents the most time in construction and the best way to save it here is to go the foam route and build a foam wing using epoxy cement and the new contact adhesives for foam. If you have become skillful at foam cutting, a wing can be turned out in two hours or less. If you are building the wing from balsa it is a good idea to build it before commencing the fuselage so that the additional time can be used for drying. The hardest job in balsa wing building is to cut out ribs. If you have a band saw or a saber saw trace the rib on a balsa block cut out on the saw and then slice like bacon. If no saw is available cut rectangles the size of the ribs, pin between two master ribs and sand to shape, either by hand or with a power sander.

Apply the sheet covering to the ribs with contact cement and sheet cover the entire wing. Don't bother with cap strips, etc., simply sheet the entire surface.

The entire aircraft is now completed ready for sanding and finishing. Since this is a speed building text the following finishing method won't win any prizes for beauty, but the job will get done, and you can throw in your own steps to beautify the finished product.

All of the ship is sheet covered so we are not going to use silk, silkspan or jap tissue. In leaving off the silk we have made a major contribution to saving weight, time, and money. Use thinned (with water) white glue as a filler on the entire body, wipe it into the grain using a ¼" x 1" x 2" piece of balsa as a trowel. Wipe it well into the wood and set the whole mess aside to dry – usually about an hour or less unless you live in a swamp.

When dry, lightly sand the wood and

a smooth surface will result with very little grain showing. For the painted finish use color dope, Hobby Poxy, or automobile lacquer. The epoxy paints are best and some do dry more rapidly than others. Experiment with several kinds, most give a high gloss with very little effort. If you have worked steadily along and have ignored the wife and kids, you can complete this system in one weekend, allowing the following week for paint drying time.

Now for a look at the money saving problem. Since most of us will run the risk of offending the various manufacturers of model supplies to say nothing of the FHD (Friendly Hobby Dealer) to save a buck, here are a few buying tips. Seek out a lumber dealer in your area that makes a specialty of plywoods, rare woods, and siding. Chances are that he will sell quarts of contact cement for a buck and a half and pints of white glue for a dollar or less. He probably also stocks balsa wood in blocks, as our favorite material is used commercially for building molds and in reinforcement for fiberglass boats. Some of these dealers also stock mahogany veneer in 1/28 thickness and this can be used for skins on foam or planking on wings. It is a bit thick for the foam skin but some 1/64" material can be found.

If you have made up your mind to try foam wings the raw material can be found from companies that make expanded polystyrene bead boards for insulation and flotation. Like the man says, use the yellow pages. The cost of the blanks for a foam wing should run about one and one half to two dollars per wing.

Hardware and fittings are a major consumer of our hobby dollar and some savings can be effected here. Haunt your local hardware store for the unusual – it is surprising what they have that can be converted for model use. While on the subject of hardware the best material to be found so far for all types of fittings is nylon. The best and most economical source – broken nylon propellers! If you don't break them (?) surely someone at your field does, so help keep the flying area clean. A nylon prop hub can supply at least four fittings for strip ailerons or two fittings for steerable nose gear. The blades can be used to make keepers for pushrods, bearings, and many other items. One of the best uses we have found is to make lock nuts for 2/56 and 4/40 bolts–they won't vibrate off of the bolt!

By a careful study of your building habits and methods and expenses most models can be built at a savings with much less expenditure of time. When you have made this great saving of time and money, wrap up the spare cash, put it in an envelope and mail it to me in care of R/C Modeler. You keep the time – just send the money!

## Showcase '65

*(Continued from Page 8)*

receiver and transmitter, and battery charger. Price of the 4-channel system is $495 while the six channel version is $550. For further information, **Circle #7 on the Reader Service Card.**

**R/C Boat Control.** Now you can obtain three forward speeds plus stop and reverse on your electric powered boat using only two channels. This new electric speed control from Al Seidenberg comes complete with printed circuit board, wired and ready to be installed on your Bonner trim servo. Unit features four relays with heavy duty contacts which will handle up to three large motors up to 12 volts or two motors up to 18 volts. Completely mounted, wired, and ready for installation. Price is $29.95. Al Seidenberg, 729 Evelyn Avenue, North Bellmore, N. Y. **Circle #8 on the Reader Service Card.**

**Foam-Lyte Wings.** Foamcrafts Manufacturing, 1707 Fallbrook Ave., San Jose, Calif., announces their line of expanded bead type foam wings for most popular R/C designs. Each wing core weighs approximately four ounces and features one piece solid maple hardwood landing gear spar assembly, preformed inset aileron pushrod cutouts, preformed landing gear spar assembly slots, choice of 45 degree or square wing tips, preformed leading edges in choice of 1/16" or 3/32" contest type balsa, preformed dihedral. Price of kits are $12.95. Wing halves or any individual parts of wing kits may be ordered separately. For further information, **Circle #9 on the Reader Service Card.**

*(Continued from Page 63)*

Pylon. J. Ibbotson CD, 3502 Fenton Rd., Flint, Mich.

28-29 — St. Louis, Missouri. 8th Annual McDonnell R/C Meet Contest. Site: Kratz Field, St. Louis Cnty. Class I, II, III, Scale, Pylon. B. Campbell CD, 4363 Selwyn Lane, Bridgeton, Mo.

29 — Washington, D. C. National Capital Model Airplane Championships. Site: Andrews AFB, Md. Class I, II, III, Pylon. J. Solko CD, 6307 Martins Terrace, Lanham, Md.

29 — Chardon, Ohio. Cleveland Radio Controlaires 3rd Annual Contest. Site: Club Field, Chardon. Class I, II, III. R. Rautenstrauch CD, 1315 Avondale, So. Euclid, Ohio.

September 4, 5, 6 — Fresno, California. West Coast Championships. Site: Madeira Airport.

25-26 — Endicott, New York. Aeroguidance Society's 10th Annual R/C Contest. Site: Pending. Class I, II, III, Scale and Pylon. Bob Noll CD, 96 Pine Knoll Rd., Endicott, New York.

## Editor's Memo

*(Continued from Page 7)*

one engine. This includes models of multi engine full scale aircraft whereby the model is powered by only one engine.

Multi Engine RC Scale is defined as a model of a multi engine full scale aircraft whereby the model is powered by more than one engine.

Grand Champion RC Scale will be the model with the highest total points from scale judging plus scale operations. Flight points will not be included in this score. The model must be airborne, demonstrate that the model is under control by radio, and land with not more than minor damage (broken propeller, noseover, scratched wing tips, etc.). Judges' decision as to major/minor damage will be final.

The result? One of the largest and most successful R/C scale meets ever conducted, drawing entrants from most of the western states and as far East as Ohio. Conducted under a new concept in scale rules, it provides quite a bit of food for thought. . . .

•

Want to try something different in R/C? Take a good look at the photo series in this issue on radio controlled six-meter sailboat racing. As dyed-in-the-wool airplane enthusiasts for some twenty years, the prospect of a sailboat left us rather cold. Now all we can say is just give it a try! We did, as you will see from the article, and it proved to be one of the most challenging, demanding, and exciting experiences since we have been in this hobby. The beauty of these big six meter models is something to behold. The maneuvering, trimming, and course requirements are very similar to those of the full-size six meter racing fraternity. We will always fly R/C model aircraft, but the experiences involved in what started out to be a simple line-of-duty "plug" for the R/C sailboaters introduced us to a phase of our hobby that is one of the most interesting we have ever encountered. Virtually all of the local members of our staff, in addition to many local flyers, have tried their hand at sailing our Reynolds six-meter and have come up with the same feelings.

We urge you to give it a try – it's something every member of the family will enjoy.

•

Nationals time is here again, and we're looking forward to the biggest

*(Continued on Page 72)*

## Editor's Memo

*(Continued from Page 71)*

meet of the year. Since it's fun to guess at who is going to win the big event, we're going to go out on the limb and predict that the first two places in Class III will be taken by Phil Kraft and Cliff Weirick. We'll predict an upset, and give a slight edge to Phil with his Kwik-Fli (RCM plan) design and new proportional system. Cliff will be right in there, and if he's up to par, it'll be a real run for the money as his Candy (RCM plan) goes through the paces. Third slot is anybody's money and the list of contenders would fill an entire paragraph. We won't venture a guess on Class II, and will bow to our correspondent Jerry Kleinburg and his predictions for Class I.

The World Championships in Sweden? Cliff Weirick first with Fritz Bosch a close second.

Kathleen Acton, who has been our editorial secretary since the beginning of this magazine, is now the editor of the NARCC and club news section. Club secretaries are requested to send photos and bulletins to Kathleen at R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California. Contest listings should be sent well in advance of the scheduled dates to insure publication.

•

Now that RCM is running full color advertisements, I've been trying to convince John Maloney at World Engines to run a full-color, fold-out photograph in his usual centerspread ad position similar to that of another well known model magazine . . . like it could say, "Go Proportional," then list the specifications (38-25-35), with a simple "World Engines" at the bottom of the page.

It might not sell a lot of gear, John, but think of what it would do for the morale of the troops. . . .

•

Miscellany: Don't feel too bad about pushing the stick the wrong way, Clyde — this morning's paper carried the account of the first U. S.-Vietnamese combined long-range air strike intended to obliterate a Viet Cong jungle stronghold. Cast: 26 bombers, 270 tons of explosives. Cost: 24 million dollars. Result: Several large muddy craters and an unharmed pile of bagged rice. Casualties: Two U. S. B-52's from an accidental collision before arriving over the target, one plane with a malfunction of its drop mechanism, and one abort shortly after takeoff!

I, for one, am not going to feel too badly about the next "pilot error" I make. . . .

•

Sayonara.

## Sunday Flier

*(Continued from Page 12)*

without inducing forces which create movement on the horizontal (pitch) and directional (roll) axes. If you keep that in mind, it will help a lot as you practice your flying technique.

Speaking of flying techniques, there are some which are very valuable for flying in small areas. Tell you what I'm gonna do. Next month I'll publish the plans for my new neighborhood flyer, called the "Good Neighbor." It's especially designed for flying in small fields, even your front yard if you have understanding neighbors. It maneuvers quickly, and even if you goof, the sponge rubber nose keeps it from hurting anything it might hit.

You can build it in a few evenings, and in the issue following the plans I'll give you some hints on "flipper" turns and precision approaches. Meanwhile, keep practicing.

## Kits and Pieces

*(Continued from Page 57)*

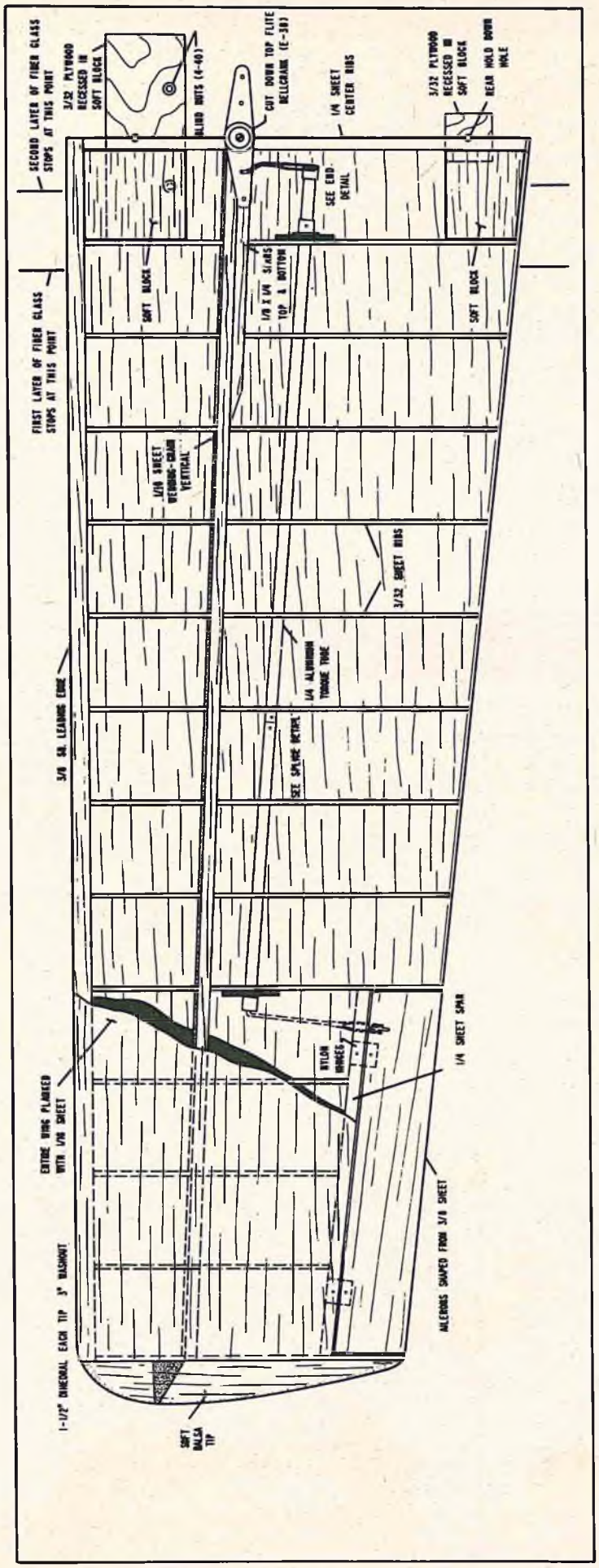
all maneuvers in a smooth and impressive manner. This is not a beginner's ship! Some multi time should be accumulated before attempting the Cherokee. It does not, however, require an expert. Anyone capable of flying a Challenger, Sr. Falcon or other ships of this type should enjoy the Cherokee.

Our total weight was 6 pounds, 9 ounces (1 ounce over specified). The Veco .45 provided adequate power without creating a BOMB (no connection with Builder of Model argument). The F&M Digital 5 proportional system worked well during all phases of testing the Cherokee (we even learned to fly it left handed!). Response was smooth and positive, and at no time did a "fail safe" occur. The F&M system will be reviewed by RCM next month.

●

We just obtained one of the new Sterling Denight Special kits for N.M.P.R.A. Pylon. Preliminary examination looks good. We hope to be well along on construction and report more fully by the next issue. The kit includes "lotsa goodies," and we have been told that the plastic wheel pants and cheek cowlings and also the landing gear will be available separately for those who are building from RCM's plans or plan an original. The plastic pants set is $2.00 and the landing gear is $1.50, direct from Sterling. Add 60c for handling.

Till next month — See **YOU** at the field!




**Correction:** The plans for Dick Rigg's N.M.P.R.A. Goodyear Racer, the Aeolus, were incorrect insofar as the wing planform was concerned. The error was in omitting 4" of span from the wing center section, thus reducing the total area to less than N.M.P.R.A. minimum requirements. The Aeolus wing is shown above corrected and all full size Hobby House Plans will include this corrected plan.