MARCH 1969 75¢

R/C MODELER MAGAZINE

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL SPORTS ENTHUSIAST

A few words about me.

I am Electronic Engineer and this is my day job.

From tender age two things attracted my interest and I managed to have them in my life.

The first was electricity and the second the bluesky.

I´ve found the model airplanes hobby in October 1973.

I love the wooden structures from scratch airplanes and boats also.

I started collecting plans, articles, books and anything else that could help the hobby of many years ago and have created a very large personal collection of them.

Since 2004 I became involved with the digitization and restoration of them and started to share the plans from public domain with my fellow modelers.

Now after all this experience I have decided to digitize, to clean and to re publish in digital edition and free of all issues RC Modeler magazine from 1963 to 2005 and others books and magazines.

Certainly this will be a very long, difficult and tedious task but I believe with the help of all of you I will finish it in a short time.

I apologize in advance because my English is poor.
It is not my mother language because I am Greek.
I wish all of you who choose to collect and read this my work good enjoyment and enjoy your buildings.

My name is Elijah Efthimiopoulos. (H.E)
My nickname Hlsat.

My country is Greece, and the my city is Xanthi.

Λίγα λόγια για μένα.

Είμαι Μηχανικός Ηλεκτρονικός και αυτό είναι το αληθινό μου επάγγελμα εργασίας.
Από μικρός δυο πράγματα μου κέντρισαν το ενδιαφέρον και ασχολήθηκα με αυτά.
Πρώτον ο ηλεκτρισμός και δεύτερον το απέραντο γαλάζιο του ουρανού και ο αέρας αυτού.
Το χόμπι του αερομοντελισμού το πρωτογνώρισα τον Οκτώβριο του 1973.
Μου αρέσουν οι ξύλινες κατασκευές αεροπλάνων και σκαφών από το μηδέν.
Ξεκίνησα να συλλέγω σχέδια, άρθρα, βιβλία και ότι άλλο μπορούσε να με βοηθήσει στο χόμπι από τα πολύ παλιά χρόνια.
Έχω δημιουργήσει μια πολύ μεγάλη προσωπική συλλογή από αυτά.
Από το 2004 άρχισα να ασχολούμαι με την ψηφιοποίησης τους, τον καθαρισμό τους αλλά και να τα μοιράζομαι μαζί σας αφού τα δημοσιοποιώ στο διαδίκτυο (όσα από αυτά επιτρέπεται λόγο των πνευματικών δικαιωμάτων τους).
Σήμερα μετά από όλη αυτήν την εμπειρία που έχω αποκτήσει, αποφάσισα να ψηφιοποιήσω, να καθαρίσω και να ξαναδημοσιεύσω σε ψηφιακή έκδοση και ελεύθερα όλα τα τεύχη του περιοδικού RC Modeler από το 1963 μέχρι το 2005 και κάποια άλλα βιβλία και περιοδικά.
Σίγουρα είναι μια πολύ μεγάλη, δύσκολη και επίπονη εργασία αλλά πιστεύω με την βοήθεια όλων σας να την τελειώσω σε ένα καλό αλλά μεγάλο χρονικό διάστημα.
Ζητώ συγγνώμη εκ των προτέρων γιατί τα Αγγλικά μου είναι φτωχά.
Δεν είναι η μητρική μου γλώσσα γιατί είμαι Έλληνας.
Εύχομαι σε όλους εσάς που θα επιλέξετε να τα συλλέξετε και να τα διαβάσετε αυτήν την εργασία μου καλή απόλαυση και καλές κατασκευές.
Το όνομα μου είναι Ηλίας Ευθυμιόπουλος.(Η.Ε)
Το ψευδώνυμο μου Hlsat.
Η χώρα μου η Ελλάδα και η πολη μου η Ξάνθη.

RCM Magazine Editing and Resampling.

Work Done:

1)Advertisements removed.

2) Plans building plane removed and hyperlinked.

3)Articles building plane removed and hyperlinked.

4)Pages reordered.

5)Topics list added.

Now you can read these great issues and find the plans and building articles on multiple sites on the internet.

All Plans can be found here:

Hlsat Blog RCModeler Free Plans and Articles.

http://www.rcgroups.com/forums/showthread.php?t=2354459

AeroFred Gallery Free Plans.

http://aerofred.com/index.php

Hip Pocket Aeronautics Gallery Free Plans.

http://www.hippocketaeronautics.com/hpa_plans/index.php

James Hatton Blog Free Plans and Articles.

http://pulling-gz.blogspot.gr/?view=flipcard

Vintage & Old-Timer RCM Free Plans.

http://www.rcgroups.com/forums/showthread.php?t=2233857

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Editing by Hlsat.

Thanks Elijah from Greece.

R/C MODELER MAGAZINE

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THIS MONTH

DEPARTMENTS

RCM cover artist Bill Polvogt illustrates another 'typical' R/C situation! If the punishment were to fit the crime. . . . .

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VIEWPOINT

BY DON DEWEY

In response to our 'Open Forum' invitation to respond to a recent editorial by AMA presidential candidate, Maurice Woods, we are pleased to present the following guest editorial from Cliff Piper, A.M.A. Vice President of District No. 1:

To AMA members, concerning Elections, and mixed emotions:

At this writing, near Christmastime, it will be difficult to remain compassionate, and some of this message may come out sounding somewhat vindictive. If so, hopefully, please believe that the purpose is only to clear the air, even if slightly.

In rebuttal to words and phrases such as, "Deplorable and decaying conditions of the hierarchy of AMA." etc., it is indeed difficult to remain considerate of the opinions of others. This is especially true when one is part of an organization (AS ARE MOST OF THOSE DOING THE SCREAMING) that is being criticized, scrutinized, and aroused.

If the methods and procedures of present rules and by-laws are not satisfactory they should be, (and probably will be) changed. I cannot feel that any of us on the Executive Council, or Nominating Committee are on trial for doing our job to the best of our collective voluntary ability.

Mr. Maurice Woods has recently asked questions that deserve an answer. "Why was the meeting not held as scheduled?" This answer is in the quoted minutes. There was a conflict in activities at the scheduled time. "Why was the rescheduled time in direct conflict with flying being conducted at the contest?" Regardless of the scheduled time, there would have been some conflict, I am sure. The busy Nats doesn't leave a great deal of unscheduled time, between different society, Navy, category, and other committee meetings – all important. In answer to the statement, "it is interesting to note that only four members were present at 3:00 PM," and so on, – let me say that I for one was quite busy in tabulation, where we put in up to an 18 hour day at the Nats. Eva Biddle, for another, was working her heart out in a hanger on the other side of the station on the Delta Dart program. I know, for I went over to get her from this wonderful, clamoring shot-in-the-arm for our Junior effort.

As far as domination of the AMA, or lack of it, by R/C advocates, and the alleged lack of RC representation on the Council, you had better take another look, chum. The percentage of RC oriented members of AMA, first off, is probably closer to 70 percent, than your 50. Of the Council members, 8 of US are deeply involved in RC flying and interest, aside from a basic dedication to the modeling hobby. This factor, however, is of questionable significance, I feel. R/C is the pinnacle, and logical point to which a lot of modelers seem to aspire. It is the most complex of AMA events, and is definitely more glamorous, image building, and desirable in general. I think that most youngsters getting involved in model aviation probably hope to someday be an RC flyer, flying that B-52 with the operating turrets and relief tubes. He may even wish to become a Council Member - - -.

Now let's cover the political comparison aspect of this rhubarb. If statistics mean anything, let's consider that we had three candidates on the AMA ballot for President, and developed one significant write-in. Our membership of 25,000, then gave us quite an edge percentage-wise over our recent National elections where we also had three candidates. If our AMA nominating committee is not capable of boiling down to three candidates, from those under consideration for the ballot, within the present rules; then for a United States Presidential election, we should have 5000 candidates on the ballot. Boy, how would that be for fragmentation?

As for mutual back-scratching on nominations to the ballot, as earlier mentioned, let's all get together and change these rules, if this is the problem. I still have to live with the rules, and will help get them changed to suit the overall views of District 1 membership.

If my personal feeling, and subsequent voting has been misled by the fact that I know, respect, and admire the three people who were on the ballot, then please color me pink, and help find someone else to run for District 1 VP next year. I'll vote for him, too.

He will need a broad pair of shoulders, hip boots, one deaf ear, an R/C airplane, thick skin, time to read 4 modelling publications, about 500 hours of unscheduled time, and infinite wisdom and patience. At this point, you probably hope he doesn't write letters of this type or length. Now let's wrap up the whole message as I would like to present it.

It is high time that this whole tennis match was wrapped up, and we put all our efforts to the Junior program, and other more pressing business of the AMA and our hobby. There will always be an AMA. There will always be dissenters. There will always be willing and capable members and office holders. There will always be someone who feels that he didn't get a fair shake. We are all able to express our opinions. Be proud that this is our heritage. If you can't buy this, find another tennis court, or change the name of the game.

To our new President, John Patton, I pledge firm support for the coming year. To Maurice Woods, let me say that I am truly sorry that this whole fiasco has reached the present magnitude. There have been many unfortunate and innocent contributing factors. Strong feelings, strong words, mixed emotions, and strained relations have been the only results thus far. Modelling has even suffered. I wanted to build a wing tonight. Maurice, I hope that some day we may have the opportunity to work together in some capacity within our hobby. If the time should come, may we all look back upon all our words as constructive backbone for an even stronger organization. Toward this end, I firmly pledge my future cooperation and effort.

Cliff Piper
AMA V. P. Dist. 1

BIRD CLUB INC. of Signal Hill, California, the largest Charter Club in AMA with over 250 members will hold their 5th Annual Open Contest on March 15 and 16, 1969. Due to a mandatory muffler requirement on BIRD Field, the AA contest will be held at Sepulveda Basin. Events will be Stunt only, Class A, B, C/N and C/E. CD's are John Greenshields and Harry Gould. Don't miss this one!

Since our Chief Sunday Flier, Ken "Skinny-socks" Willard, has this ego-thing about the letters he receives from RC'ers wives, I'd like to present the following, received by yours truly, from Mrs. Janet Feather of Fairfield, Connecticut:

To the Editor:

I was just skimming through the October R/C Modeler, and lo and behold, came across a letter written by Mrs. Grace Morgan. All I can say, Grace, is "you're a better man than I am Gunga Din."

Naturally, there ARE these moments of humor with my R.C. husband. But someone please tell me this: How do you get all this "GOOK" (Glue, paint, balsa) out of this "lovable," obsessed man's clothes?

My husband is a Mechanical Engineer, and at his place of employment, instead of eating lunch, he is currently working on a "Big John." He has it set up on a large spare table in his office. I have to admit, it's a beauty! He's a perfectionist when it comes to things of this nature.

Has anyone yet created a way to keep the wax paper, Saran Wrap, and Reynold's Wrap in the kitchen? What about your scissors that keep disappearing and turning up covered with dried glue? (He has these items of his own, but is forever misplacing them).

I have to admit, however, that there are times he can be romantic-- when he hears of a new and better system he would like to possess.

How about the days he stays out much later than expected and then comments innocently that the roast is too well done, again.

Did you ever get a kiss from a man whose hands were moving imaginary servos behind your back?

We'll be married thirteen (happy, aside from the airplanes) years in March, and have two boys, ten and eleven (they fly U-control). Maybe thirteen is my lucky number and my husband will discover that, "man cannot live on 'planes' alone."

I can dream, can't I?

Sincerely,
Mrs. Janet E. Feather

P.S. I bet my husband that you would probably not print this letter since it is not favorable to R.C. flying. He says you will because you're unbiased. What loyalty!

So there, Ken Willard! At least I don't send out autographed 8"x10" color photos of myself in bathing trunks SUPPOSEDLY chasing my amphibian at the local lake. Chuck Cunningham doesn't, either. Of course, he's not as handsome as we are . . .

See 'ya.

"Open that blasted door and let me in, Walt!" came the muffled voice of Wagger from outside the shack.

As Walt hastily moved to comply, he soon found why the voice of the usually placid Bassett was more garbled than usual. His jaws were clamped tightly around the fuselage of a very black and slimy 'Liddle Stik'; indeed, shortly after gaining entrance Wagger lost his hold and the aircraft spurted across the floor like a popped cork.

"Hah, propo-hound! That jury-rigged muffler didn't work out, so you came back early, right?" chortled Walt.

"Wrong as usual," snorted Wagger. "I said that the big O.S. 35 muffler would really quiet our .19 down so we could fly off the baseball field, and I was right. Also, it DIDN'T fall off. However, I ran out of clean rags and grease remover so I figured I'd come home before everything on the aircraft drowned in a sea of goop."

Walt scratched his head. "Well, old hound, we've been putting up with that slop for years since we ALWAYS fly with mufflers."

"But Walt, now that mufflers are getting very popular and people are all finding out that the castor oil gets cooked into that black slop and then spreads down the side of the aircraft in copious quantities, why hasn't some manufacturer taken the next logical step?"

Walt continued his blank stare, so the dog continued:

"I mean a gas-tight muffler assembly COMPLETE WITH A 6" FLEXIBLE SEALED EXHAUST PIPE so the slop can be ducted clear of the aircraft! I've tried coil springs wrapped with aluminum foil, but they're rather short lived and tend to make the muffler leak at all the pores. However, a manufacturer could find the solution, I'm sure!"

"I wonder," said Walt. "Let's watch for developments. By the way, do you know of any modelers who have found solutions to the problem?"

"One guy says he has," replied Wagger. "What IS a hand-launched glider?"

ENGINE CLINIC

BY CLARENCE LEE
RCM Contributing Editor

With the flying season in the Mid-West and East slowed down or at a standstill right now due to Winter, I thought it would be a good time to talk about care and maintenance of your engine.

How many of you hung the ship up for the winter without putting any 3-in-1 oil in the engine? Quite a few I would be willing to bet. This should actually be done after every flying session. Unfortunately the glow fuels we use have a tendency to corrode the aluminum parts of your engine. You should get into the habit of stopping the engine at the flying field by pulling the fuel line and letting it run out dry. This leaves only oil and no raw fuel. If you stop the engine by throwing a rag into the prop, you will be leaving it full of raw fuel. Never kill the engine by putting your finger over the carburetor and choking it to a stop – you are in for REAL trouble then. In about a week, the inside of your engine will look like the battery terminals on your car. If you allow the engine to stand unused for several months the castor oil will turn gummy. After three or four months it will begin to resemble chewing gum. The first time you run the engine the ballbearings will slide and skid rather than roll, and develop flat spots. This, and radial mounting, are the two main causes of damage to the front ballbearing. Excluding contact with old mother earth, naturally! The rear bearing is less likely to be damaged as raw fuel reaches it right away and loosens it up. Anytime you are planning on letting an engine stand idle for a while, load it up with 3-in-1 or similar machine oil, and place it in a plastic bag.

How many of you realize the old mill is getting a little tired but have decided to wait until spring to send it in to the manufacturer for a check-over? Now is the time to do it, Dad! I hate to see April and May come around each year because I get snowed under with engine repair and overhaul jobs. Most are sent airmail special delivery with a note saying the first contest of the season is coming up the next weekend and the engine is needed back right away. The manufacturers will appreciate it, and you will get your engine back a lot sooner, if you send it in during the slow season.

How about those mills that were used all last year and most likely have at least fifteen or more gallons of fuel through them. They are still running good, but the last time out you noticed it didn't quite peak out as it did previously. It is probably just plain carbon and varnish build-up. Now is the time to go through it and clean it up. Don't wait until the middle of a contest flight next spring, and when it starts sagging, wish then that you had done it.

A lot of fella's are hesitant about taking their engines apart. Some of the manufacturers even frown on this. Those that do evidently know very little about R/C flying. Sooner or later the inevitable is going to happen – the fickle finger of fate is going to pick on you and bury your pride and joy in the ground. If it was a total, you just box up the radio and engine and send them off to the manufacturers – and pray they will have mercy when it comes to the bill. If you were lucky, the plane

was just bent a little, the engine was just a little dirty, and no radio damage. A few nights work and you are back in the air. However the engine just doesn't seem to work the way it did before the crash. So, off to the manufacturer. The "good guys" enclose a letter saying the engine was in a crash and give the manufacturer a clue as to what to look for. But some of you bucket heads try to keep it a big secret! (Most likely in hopes of a smaller bill.) Nothing aggravates me more than to get an engine back with a bent crankshaft, a bent case, and a note saying "It hasn't been running quite right lately. Is there a chance some of the parts could have been defective?" The parts are defective all right – after being bounced off of the asphalt! Actually, the defective parts are between the ears of the sender. So level with the manufacturer when you send the engine in for repair. He doesn't like to play guessing games. You will probably be surprised to find that he does have some mercy. However, on the other hand, don't send the engine back encased in mud – with the broken prop, motor mounts, and pieces of the fuselage still attached, hoping to impress him with the horrible fate that has become you. It takes time to remove and clean up the mess, and it is time that YOU are going to pay for.

Many of the engines I get back for repairs after crack-ups are completely ruined – but not by the crash itself. The crash was very mild – it hit in very soft dirt. So you wash the engine off with fuel and keep on flying. The dirt you DIDN'T get out of the inside does all the damage. After any crack-up where dirt is evident on the outside of the engine, you should pull the head, the back cover, and the carburetor, and check for dirt. Please notice that I included the CARBURETOR. Many, many, times I get engines back that fliers have cleaned up before sending in. The insides are nice and clean. Then I pull the carburetor. There's the dirt, just WAITING to be run through the engine! If you don't find any dirt when you remove the head, back cover, and carburetor, then it is okay to reassemble the engine and use it. However if there is any dirt inside at all, it is advisable to strip the engine all the way down and clean it completely. You are most likely missing a few specks behind the rear ball bearing, in the bypass, etc.

Let's face it – you can't send the engine back to the manufacturer every time you get it dirty. So let's take one down, and as I mentioned last month – do it without using vise-grips and a crowbar.

This may sound as though I am being a little facetious. I only wish you could see a few of the engines that come back for repair. It is almost unbelievable what some of you ham-handed hackers can do to an engine. The biggest problem seems to be in getting the sleeve out. We'll assume you can get the head and back cover (front housing on the Webra & Enya) off without too much trouble. Now scratch a mark on the side of the sleeve flange and the top of the case. This will assure your getting the sleeve back in its original position. Try to push the sleeve out from the bottom WITH YOUR FINGERS!!! No screw drivers!!! If you are lucky it will slide right out. Chances are 10-to-1 that it is going to be stuck. Don't panic – and keep your hand away from those pliers. Simply take an ordinary glow plug washer and place it on the top of the piston. Slip the edge into the exhaust port. Be sure you use a copper glow plug washer, not an ordinary steel one. Put a prop nut on the crank and with your prop wrench turn the engine over. The sleeve should lift right out. If it doesn't want to come, don't force it. Some of the manufacturers heat the cases when installing the sleeves so you will also have to heat the case to remove the sleeve. If you don't already own a propane torch it would be a very worthwhile investment to make right now. They cost less than $5.00, which is less that the price of a gallon of fuel and are indispensable around the workshop. Hold the bottom of the case with your hand. Don't bother with gloves, as you don't want to overheat it. Evenly heat the fins for a minute or so and then try turning the crank again. The sleeve will come right out this time. Engines that use a one piece case such as the Super Tigre and Veco will have to have the wrist pin fished out of the hole that is provided on the back of the case. No sweat – just bend a hook on the end of a pin and use it to pull the wrist pin out. The piston and rod will fall out now. The Webra and Enya have a removable front housing and the piston, rod, and wrist pin can be slipped out as a unit.

The crankshaft shouldn't be too much of a problem. Some will push right out, but others take a little persuasion. With a one piece case, stand the crank upright on a piece of wood and smack the back of the case with the palm of your hand. Nine out of ten will come right out. The tenth one is usually a Super Tigre! The split collet that holds the prop drive washer often jams on the shaft. A little heat from the propane torch on the drive washer will loosen it. However, if you should have an engine that you can not get the shaft out of by hitting with your hand, DON'T use a hammer. If you hit too hard, you can dent the ball races and put flat spots on the balls that will ruin the bearings. It is best to just forget about it and flush the dirt out the best you can. It is important that the shaft be removed if at all possible. Any dirt that has gone down the carburetor will be lodged between the shaft and its housing and can cause considerable damage if not completely removed.

Now we come to the rear ballbearing. A lot of tempers have been lost trying to get this d— thing out. No edges to grab. Nothing to push against. You can't even find a place to stick a screw driver!

Actually it is really very easy. With a one piece case – hold the case by the fins and heat the outside of the bearing area with the torch. Smack the back of the case sharply on a piece of wood and the bearing will pop right out. An exceptionally tight fit bearing may require heating the case a second time, but I have never found a bearing I could not get out this way. Engines with

(continued from page 9)

removable front housings should have the crankshaft removed and the housing replaced on the case. Then follow the same procedure. Some engines have half of the bearing pressed into the front housing, and the rear half slips into the case for alignment. The bearing is already half out, so just heat the housing and smack the edge on a piece of wood. The bearing will pop right out. The front bearing is a cinch. Just warm the housing and push it out with a wooden dowel.

Now we've got the little monster all apart. Throw the bearings in a can of acetone or lacquer thinner and let them soak. This will get rid of the varnish and residue that has accumulated. Clean the piston, sleeve, and head with one of your wife's SOS pads. This is the best and only way to get rid of all the varnish and carbon. Any residue on the outside of the case and head can be removed with Sunbeam Metal Kleen as mentioned in last month's column. Scrub the parts with a toothbrush and plain old hand soap. I use Lux if you want a brand name. Any corrosion in the case should be removed with the SOS pad. Be sure and clean the exhaust baffle and inside of the exhaust stack. Don't remove the rings from the piston unless you intend to replace them. You will spring them out of shape and they will not reseat. If you do intend to replace the rings, be sure and rough the sleeve up with No. 360 (wet or dry) paper. Most of your engines have either hardened or chromed sleeves, so the emery won't hurt them. The Enya has a soft sleeve, so take it easy. You just want to remove the high shine. Roughing up the sleeve helps to seat the rings quicker.

Okay, now for reassembly. Thoroughly flush the bearings in the solvent, dry, and lubricate with light oil. Slip the rear bearing on the crankshaft. Heat the outside of the case around the bearing area and drop the shaft and bearing into place. Slip the front bearing onto the shaft and push it as far into the housing as you can with your fingers. It is very important that you do it this way. Don't try to put the bearings back without using the crankshaft as a guide. You'll get them cocked in the hole and made a lot of extra work for yourself. Now put the drive washer, prop, prop washer and nut on, and tighten them down. This will pull the bearings right into place. A light tap on the end of the crank with the prop wrench will free up the pre-load you put on them drawing them into place. The counter-balance should now rock to the bottom. If you feel any drag or binding, the shaft or housing are probably bent and should be replaced. Any drag here will rob the engine of a great deal of power. Even a slight drag can take 1,000 rpm off of the top end. I would like to make it clear that a LITTLE play in the bearings is desirable. If you can feel a little fore and aft movement when you grab the prop, THIS IS GOOD. This will allow for any misalignment, heat expansion, etc. Some fliers have the mistaken idea that if they feel any play the bearings are bad. This is one of the secrets of getting a racing engine to turn on – an ABSOLUTELY dead free lower end. It doesn't matter how tight the bearing fits the case, or how tight it is on the shaft, AS LONG AS YOU CAN FEEL FREE PLAY AFTER ASSEMBLY.

Reassemble the engine in the same order that you took it apart. If you had to heat the case to remove the sleeve, then heat it again to put it back. Be sure you put the sleeve back in right. The exhaust ports are the high ones on the sleeve. Line up the scratch marks you made prior to disassembly. Use new gaskets when installing the head and back cover. Be sure and cross-tighten the head. Front – rear – left front – right rear – left rear – right front. And be sure and tighten down equally. If the front and rear screws are not on the center line, just turn the case 60 degrees.

Now that the engine is back together, lets check the relationship between the carburetor and the exhaust baffle. This is very important for a reliable idle and is quite often goofed up. In fact, a lot of engines HAVE COME FROM THE MANUFACTURERS INCORRECTLY ADJUSTED. You do not want the carburetor to be too far open with the baffle still closed. The engine will not idle unless, of course, the baffle is extremely loose.

At idle, plain suction is drawing the fuel. This is the same thing that happens when you put your finger over the venturi and choke the engine to start. At full throttle it is the velocity of the air going past the spray bar that pulls the fuel. At partial throttle you begin to lose the strong suction and the air velocity is not strong enough yet to draw the fuel. This results in a lean spot between a quarter and a third throttle. Most of you have probably experienced your engine jumping into a two cycle idle during taxi when the tank was almost empty. It would idle, but when you gave it a little throttle it buzzed and jumped to a higher rpm (two cycle idle). This was caused by the lean spot. All carburetors have it to some degree, and some are worse than others. As you advance the throttle, if the baffle is still closed, back pressure builds up within the engine and keeps it from bypassing internally. So if the lean spot and the high back pressure occur together the engine will die. For this reason you want the baffle to be open slightly as you pass through the lean spot in the carburetor. The setting will vary slightly with individual engines but I can give you a good place to start by using the setting intended for the Veco .61. This will pertain to almost all your engines from .45 up.

First we want to make sure the baffle is fit correctly. On engines with the rotor type baffle such as Veco, Enya, Fox, etc., there is nothing you can do about the fit other than to make sure it is clean. Varnish build up can make a big difference. Engines that use the wiper type such as Webra and Merco, often have the baffle either too tight or too loose. If the baffle has a hole in it you then want it to be a fairly snug fit. Just loose enough so that it will move without binding. If it does not have a hole you want the clearance to be .005". Check this with a feeler gauge. You can buy a feeler gauge or a piece of .005" shim stock at any auto supply store. While you are at it, go to the local hardware and buy a No. 55 carbon drill. The material has nothing to do with anything, carbon drills are just cheaper than high speed drills.

Now slip the shank of the No. 55 drill into the venturi and close the barrel down on it. Adjust the idle speed screw to hold this opening. With some of the older engines such as the Veco .45, K&B .45, and any others that have a notch in the upper edge of the barrel, it will be necessary to remove the carburetor from the engine and stick the drill in from the bottom. Set the opening and re-install on the engine. With this opening, you want your rotor type baffles straight up and down, and the wiper types to have just closed. The Webra in particular will benefit greatly by tightening the baffle and adjusting as mentioned. The engine has a great top end and idle, however, there is sometimes a problem getting it from idle to the top end. Intermediate is bad. This will cure the trouble.

For those that are using a Kavan carburetor on your engine – use a piece of 1/32" (.031) piano wire. The bottom of the barrel on the Kavan has been notched so that it almost closes at idle

and pulls the air through the airbleed hole. It therefore runs further closed at idle than your other carburetors. This is the reason a lot of fellas have had problems after installing a Kavan carburetor on their engines. They did NOT have the exhaust baffle correctly set in relation to the carburetor opening. This brings up the point, that Mr. Kavan tells you in the instructions that accompany the carburetor, to remove the exhaust baffle. I have received quite a few letters and inquiries about this. As most of you have found out that have tried to use the carburetor without the baffle, it will not idle near as well as it does with the baffle. Why Mr. Kavan recommends this is a puzzle to me. I do know that he uses a muffler, and in this case you can remove the baffle. However, if you don't use a muffler, you definitely need the baffle.

I have been receiving quite a few letters lately asking questions regarding the Kavan carburetor. Will it really improve engine performance – is it worth the $10.00, etc. Some of the fellas also seem to be having some problems adjusting it properly.

First I would like to say that in my opinion the Kavan carburetor is the best carburetor available for model engines AT THE PRESENT TIME. I do know of a carburetor that is under development that may obsolete all of the ones that are presently in use if it works out. It has two adjustments, high speed and idle. Once set you do not have to touch them again. There is no needle valve to adjust each flight. The designer, John Perry, has been flying one for several months and now has a couple more of the prototypes in operation. Bob Palmer is also presently flying tests on one. John has promised me one, so I'll keep you informed as to how they work out.

The Kavan carburetor helps some engines more than others. It does increase the fuel economy slightly and generally improves the idle. However, if you are not having any idle problems, then it is not going to be of much of an advantage to you. The biggest advantage of the Kavan carburetor is the ability to regulate the fuel draw at idle to compensate for tank position. In other words, if your tank is too low or too high the carburetor can be regulated to compensate for this. It also does a very good job of metering the fuel at all rpm settings and eliminates a lot of the loading you experience with other carburetors at intermediate throttle settings. I have not experienced any noticeable rpm increase at the top end. The Kavan carburetor intended for the .60's has a .312" venturi. If your present engine has a smaller venturi, then you will notice an increase. The Kavan seems to benefit the Super Tigre more than any other. Some of the fellas feel that it helped their Veco .61 and others don't. I do make it available on the Custom Veco .61's that I sell and about 50% of the buyers request it. General opinion seems to be that it doesn't do a thing for the Enya. In fact several fellas thought it made their engine worse. However I am sure this was an adjustment problem.

The fact that the Kavan has both a fuel mixture and air bleed adjustment confuses quite a few of the guys. Although they both do the same thing, they do it in different ways. By rotating the needle valve assembly (the whole unit, not just the needle valve) you can richen or lean the idle mixture. Turning the unit clockwise leans the mixture, and counter-clockwise richens it the same as with the main needle valve. This is how you adjust for tank position and the big advantage of the Kavan. This adjustment lets you lean or richen the mixture without affecting the fuel draw. The air bleed will also richen or lean the mixture, but it does so by reducing the fuel draw. With the air bleed screw all the way closed the fuel draw is strongest. As you open the screw you lean the mixture by decreasing the fuel draw. So, naturally, the major adjusting should be done with the needle valve assembly and the air bleed used to compensate for minor changes in weather, humidity, etc. If it is necessary to turn the air bleed screw more than one turn in either direction, you should be adjusting the needle valve assembly. When correctly adjusted the engine should idle with the air bleed screw between a quarter and half open. If it is necessary to have the screw all the way open, the idle mixture is set too rich and the needle valve assembly rotated very slightly clockwise. Now take it easy, this adjustment is very sensitive and it doesn't take much. If it is necessary to have the air bleed closed the carburetor mixture is set too lean and the assembly rotated slightly counter-clockwise. Once you have made this adjustment you will not have to do it again unless you change your fuel tank position or use the engine in another airplane.

Well, gang, that's about it for this time. I mentioned last month that I would discuss fuels this issue, but the maintenance bit ran longer than I figured, so we'll have to put it off for a future issue.

Send in your questions. If you have any criticism of the column – good or bad – or anything you would like to have discussed, let us know.

FOOLISH FOLLIES

BY J. ALEXANDER

By the time this appears in print the latest production of our very own theatre guild will probably have run its course and the antagonists withdrawn into sullen silence. Though these periodic displays may furnish us with some amusement along with a certain insight into AMA politics, a growing number of R/Cers are questioning the value of such antics, and the academy itself, to model aviation. More explicitly to R/C aviation.

The evolution of R/C from simple regen equipment to modern proportional units now widespread has seen a level of progress and growth undreamed of a few short years ago. And with technological advances has come a change in the R/C fraternity.

Because of the high reliability index of planes and equipment, R/C flight has been elevated to a position between model airplanes and full-scale flight. This unique circumstance has attracted an altogether different type of person – the aviation buff who may not be a modeler (or builder if you like), who's primary interest is flying. He's been attracted to R/C by its similarity to full-scale flying and the camaraderie he finds with others of like interests.

What building he does is likely of the foam and glass or pre-fab kit variety, or perhaps he takes the ARF route. Building or non-building may be due to likes, dislikes, inability, time pressures, etc., and for the purpose of this article is immaterial. Suffice to say this individual is here, his number is swelling daily and he is rapidly becoming the economic backbone of radio control.

Another fact, and one persistently ignored by the academy and some self-styled literary "experts," is that THE AVERAGE R/Cer IS AN ADULT. This fact has brought wails of anguish and predictions of doom from certain editorial babble-machines in which much lamenting is done because of less wood-splitting and glue-smearing. Ideals or economics?

But the FACT remains. The average R/Cer IS an adult, and by its very nature of complexity and cost, R/C IS AN ADULT FUNCTION. Therefore, any organization PURPORTING to represent the R/Cer is expected to perform in an efficient, adult manner. In this respect, it has become increasingly apparent the academy cannot fulfill its role as a national representative body for R/C. And herein lies the growing disenchantment. This is evident by continuing lack of real support of the academy by the bulk of the R/C fraternity. This non-support is easily understood when the present status of R/C is considered.

Our public image is that of ten-year-olds with stick-and tissue model airplanes. Little has been done, on a national level, to change it.

Last year saw an international R/C competition. The United States team won. Where was it published other than in model mags?

Demonstration flights were performed at a number of full-scale air shows before greatly impressed crowds. Many of these spectators said they had no idea such a thing as R/C aviation existed.

R/C is used by industry and government in various fields. Unless you read model mags you're unaware of this application.

Then there's the loss of flying sites, about which little has been done. Equipment costs remain high because we've done little collectively to encourage their reduction. And engine noise – we're still plagued by it because we have no means of encouraging manufacturers to devote real research and attention to the problem. Speaking of engines, while astonishing progress has been made in every other phase of R/C – we're still chopping holes in fuselages for ungainly cylinders to flop in the breeze.

The list goes on and on, but one thing is clear. In standing idly by without effective repre-

sentation, publicity, or programs, the situation will remain unchanged. We will continue to be "that nut down the street" who "plays with toy airplanes." And we'll continue to deserve the representation we've had – NONE!

That last statement will probably revive the old "frequency-watchdog-and-getter" song. We'll digress enough to say that this particular subject could evolve into a whole article, but the AMA is not the beneficent diety dispensing radio frequencies, nor does it wield the power and influence suggested by some writers.

At any rate, we need not, indeed, SHOULD not, allow R/C to limp along without direction and subject to the whims or nostalgic yearnings of a minority who's actions do not further and in some cases are detrimental to, R/C aviation (or boats, or cars, or . . .).

We, the R/Cers, must take care of R/C. No one else is able or willing to do it for us. We have the personal interest and investment. We have most to lose or gain. Not manufacturers, dealers, or other branches of model aviation. Of course, one publisher may lose a few subscriptions!

We are told we MUST support AMA. We MUST subsidize and support junior programs. We're RESPONSIBLE for the health and welfare of manufacturers and dealers. In short, it seems we must support everything and everybody – even at the expense of our own interests. Now philanthropy is a wonderful thing – IF you can afford it. We keep hearing of the well-heeled R/Cer. This writer is not personally acquainted with a rich R/Cer. Are you?

Be that as it may, we HAVE supported. The academy took in around $200,000.00 in dues from some 25,000 people. The proportion of R/Cers in the membership seems to be some sort of deep dark secret but estimates range from 40 to 90 percent, depending on who you talk to. So if we take a median of 50% – that's a hundred grand! In this writer's book that's one hell of a lot of support! ESPECIALLY for the value received.

What have we as INDIVIDUALS gained by this support? Well, we've received a field insurance policy, a magazine subscription, and been "allowed" to compete with academy "sanction." In 1969 we can have all these benefits plus a few decals. But it'll cost ten bucks instead of six. Did YOU vote for a dues increase?

But perhaps the greatest privilege for us in 1968 was the AMA sponsored nationals which reportedly cost $25,000.00 at which 125 of our number flew. It may be uncouth to point out that twenty-five thousand dollars is a lot of money and club contests are held across the country at fractions of that cost with nearly that many entrants. And, the dastardly thought comes to our boorish mind that, an R/C contest backed with that kind of money would be ONE BONNY BRAWL! But we digress again.

There is only one way we can promote the potential of R/C, to give it the image and stature it deserves, and by so doing increase our personal enjoyment of it ten-fold. That way is to ORGANIZE.

We MUST have a representative body who's sole interest and actions are for R/C EXCLUSIVELY. And it must represent ALL R/Cers in ALL phases of the sport. NOT small segments.

It has been said we are organized – through AMA – but we will not support it. This is ridiculous! If we don't support it we are not organized. Those of us who have supported – financially at least – have received Godawful little for it! The vast majority of our fellows do not support it in any manner because it has nothing concrete to offer them, as individuals, to earn their support.

But an all-R/C association, managed by adults for adults and offering progressive, tangible benefits to its membership would draw tremendous support from the R/C fraternity.

A national radio control association administered by, and drawing upon, the professional talents of R/Cers could take advantage of news media to present our case to the public. This alone would bring thousands of newcomers to our ranks. With their coming, a volume market would develop, inevitably leading to high-quality and competitive pricing. With a larger market, more research and constantly improving techniques would elevate R/C to a state now only dreamed of.

A national association would provide a voice heard by the now unheeding bureaucracy and help move municipal machinery in flying site development. With radio control assuming national stature, sites would be offered, not begged for. Nothing stirs politicians like voices – and votes!

In view of the advantages inherent in a national R/C association one may ask why such an organization has not been proposed before. Actually it has and a certain amount of work done to bring it about. An association nearly became reality in 1966 when the academy was torn with dissension. Investigations into insurance, organizational structure, and financial aspects was undertaken. When a proiminent R/Cer was elected to the presidency in 1967, action was suspended in hopes he would be able to bring about policy and publicity changes favorable to R/C. In fairness to Cliff, it must be said he made no fantastic promises or hinted at an all-R/C academy, and such was not expected. But nothing changed, except perhaps the sideshows, and we've continued to foot the bill.

Subsequent "grass roots" leanings toward a national organization

(continued from page **12***)*

were effectively shouted down by a small but highly articulate group who's interests are best served by maintaining the status quo. Their arguments appealed to emotionalism and a "let's give 'em a change" theme. Those foolhardy enough to disagree were labeled malcontents bent on destroying the academy and model aviation. Well, two more years have passed with no changes except a better political comedy than before and a dues increase.

It has been said a national R/C association would have no international or competitive meaning. This is assinine! An organization of, and supported by, the bulk of R/Cers would be very quickly recognized by every other organization simply because it would be supported by U.S. radio flyers. This is only common sense!

And this brings up another reason for lack of full academy support by the R/C fraternity. The guiding lights know, and admit, that competition flyers are a minority in R/C. Yet their actions, efforts and finances are stubbornly expended in behalf of this minority. This is done, it is explained, because competition is the life-blood of R/C (and other branches of model aviation), and is the only way to insure growth.

Nonsense!

The theory may be fine – but in reality exactly the opposite is true. If just one-tenth of the energy, time, and money were spent in just one area – publicity – that is presently wasted in bungling contest boards, rule changes, and expensive rule book publication, more good would be done in one month than is now done in ten years! This perverse insistence on the "competition is all" thing has done more to alienate the vast numbers of R/Cers and retard growth of the sport than any of the numerous other idiocies!

Just to set the record straight, the writer is the first to say competition is important, in many ways. But in the overall scheme of things the contest flyers are a minority. The strength of R/C lies in the Sunday types, and this is the reservoir we must use to lift R/C to prominence. Strong insurance, national publicity, and an organization he'll be proud to join is all that's required to gain his support.

Once we have a strong national body, more newcomers, the volume market with lower prices the "fun flyer" will become the contest man. When he can compete without risking a month's wages and time he will compete – not before. But you have the organization first. Not the other way around.

Another argument that's been advanced against a national R/C association has been finances. It's been said such an organization would not have funds to operate. True – at its inception.

But consider this. An association providing effective representation and tangible membership benefits, upon proving itself, would likely have, conservatively speaking, at least 25,000 members. If we use the AMA's ten dollar figure that's $250,000.00. Friend, that's a lot of funds! And if we carry it further and figure that half of the estimated 100,000 R/Cers would join – the take amounts to half a million dollars. Think about it!

There have been other objections offered to formation of an R/C association, and all are equally meaningless. The fact remains that it's about time for R/Cers to face facts – to take care of R/C. But how do we start?

First we must determine how many of us would want and support a national radio control organization dedicated solely to R/C and its problems. And right here we become aware of the ridiculous state of affairs.

We're a vast army, with an astronomical investment, AND WE HAVE NO PLACE WHERE OUR OPINIONS AND DESIRES WILL BE HEARD, COMPILED, AND ACTED UPON. Small wonder we're considered a collection of lunatics both in and out of R/C!

So what do we do now?

Well, there's only one thing we CAN do. We can write. We can talk. We can get the subject out into the open, we can stop our furtive whispering and back-door allusions and do something about it. We can let those of our number with the talent and ability to organize and run our association know we'll back them.

And we have such people. Whether we take advantage of their abilities to further our sport and our individual enjoyment of it depends on us. But we've got to encourage them and let them know we're interested.

There are any number of ways we can do this. Just this once, take five minutes and write a short note for inclusion in your club paper. Heaven knows club editors are constantly asking for some kind of information from us. And write letters to the national mags. They may not be published, but so what! If you can afford $10.00 for the academy you can surely afford a six cent stamp! You go to meetings, don't you? Yak it up! So what if some buddies don't agree with you! You've got thick skin or you wouldn't be in R/C in the first place. Fact is, you may be surprised at the number of people agreeing with you.

Another golden opportunity to exercise your oratory is during "hangar flying" sessions. Instead of bitching about the field you lost – tell how a national association could help find fields.

Another thing you might try – maybe more effective than anything else is this: Next time the bird bloops, forget the usual "interference!" Yell "R/C National!"

But, in a serious vein, if you believe, as many of us do, that comedies and farces belong on the stage – not in our national body, put your mouth where your thoughts are!

But do something!

If we don't – nobody else will do it for us!

Editors Note: R/C Modeler Magazine is now nearing completion of two years of research on the feasibility of a national R/C association, based on the AOPA and NPA type of structure, complete with insurance coverage, car rental discounts, etc. Your letters of comment concerning such a national organization are not only invited, but needed. Address to: U.S. R/C Association, c/o R/C Modeler Magazine, P.O. Box 487, Sierra Madre, Calif. 91024.

Take one Top Flite 'Flite Streak' U-Control Kit, modify slightly, and you've gone . . .

from ukie to wireless

The Wireless was "born" at a bull-session during which the conversation covered the gamut of model building, design and flying. For some strange reason the discussion wandered off into U-control stunt (an unlikely subject for R.C. modelers) and the progression of U-control stunt design. I recalled that I had seen, on one occasion, a profile stunt model make a very credible free flight, circling its handle to an altitude of about 200 feet. Although the flight was extraordinary, the landing was spectacular since the control wires landed across a 12,000 volt power line and blacked out a large section of the city!

This was the catalyst for what was to follow. My co-conspirator (co-nut would be more appropo) and I decided that application of RC to a ukie model would decidedly improve its control during free flight and be a tremendous safety feature for landings. The fact that such a combination might NOT work never entered our minds.

I had an old Top Flite "Flite Streak" kit at home with the wing partially completed and this served as the basis for the design. First off, it was readily apparent that the profile fuselage was just too slim to house even the smallest propo equipment and the tail surfaces a bit too small to go with the wing. So these parts we've chucked and a new design developed around the wing. Something of an effort was made to retain the appearance of the "Flite Streak" with allowances for a certain amount of flight reliability. The resulting package was similar to a ukie stunt job with fairly pleasing lines.

The first flight of the original was almost anti-climactic. It rose into the air smoothly and exhibited fairly good stability, though quite sensitive in the roll mode. The really surprising part was the landing, which was not a "drop-out-of-the-sky" type as expected, but rather smooth with an almost floating glide. That thick symmetrical section developed a tremendous amount of lift at a slight angle of attack.

The number one prototype logged 25 flights before succumbing to interference (verified!!). The number two aircraft is the one presented here, and is a cleaned up version of number one. You'll note the plane shown does not have a rudder, although one IS shown on the plans. It can be built either way, and the extra servo has room in the fuselage since the plane shown uses one servo just for the steerable nose gear. The Wireless requires a good running .15 or even a .19. This plane has to be "on the step" or she can be a real handful to fly! Both the original and number two weighed less than three pounds and every effort should be made to hold it to this weight, or less.

The Wireless, although not a true R/C ukie, has proven, to me at least, that some of the present day U-control creations are quite adaptable to radio control. I recently saw a ship with a "Nobler" wing turn in a fantastic performance. While not for the novice, planes like the Wireless can be real "fun" types for the more experienced fliers. Who knows, maybe we can do for U-control what Marconi did for the telegraph — make it "Wireless."

CONSTRUCTION

Fuselage:

Cut two 3/32" sheet sides and 1/8" doublers from medium hard sheet. Do not make the cut outs for the wing on these pieces, but mark their outline accurately on the sides. Cut the triplers, including wing cutouts, from 1/32" plywood. Glue the doublers and tripler to the sides and weight or clamp to insure a good bond.

While the sides are drying, cut out the rear turtle deck sheeting, firewall, formers and other fuselage parts. When the sides are dry glue on the 1/2" and 3/8" triangular stock, the vertical uprights and tail reinforcement. Pin the rear turtle deck sheeting on the plan top view and glue F-3 and F-5 to it, being sure they are perpendicular.

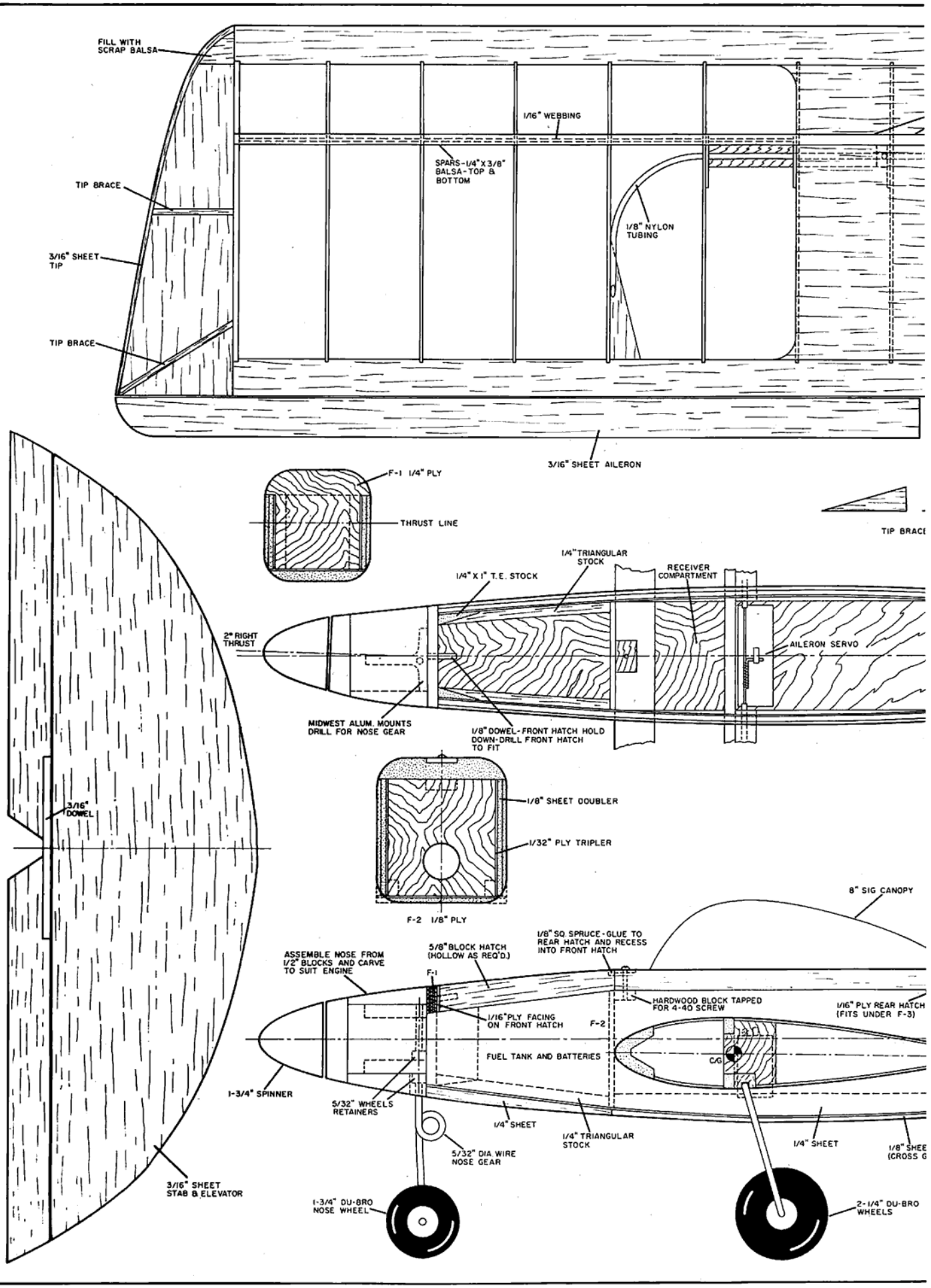
Taper the triangular stock to match the top view and glue the 1/8" square tail post to one side. Pin and glue the sides, inverted to the turtle deck sheet, and formers F-3 and F-5. Add the cross pieces at F-4 and allow the complete assembly to dry thoroughly before proceeding.

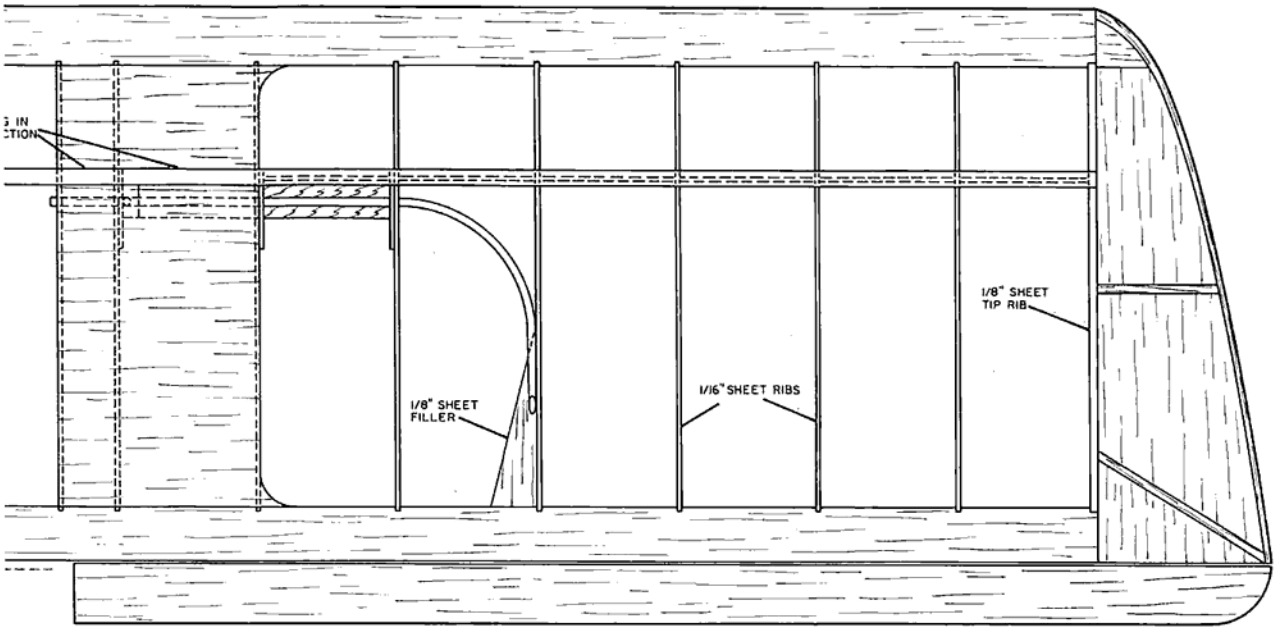
After the above assembly is dry, block up F-2 to its proper position on the plans and pull the sides into it using EPOXY to secure it to the sides. Before F-2 sets epoxy the firewall to the sides being sure it is properly positioned and perpendicular to the work table. Epoxy the trailing edge stock behind the firewall. Glue or epoxy the 1/4" sheet rails to the center of the fuselage and allow the fuselage assembly ample time to cure. I cannot over-emphasize the use of epoxy at all stress points since the gluing areas, in most cases, are small and maximum joint efficiency is essential.

Remove the fuselage from the plans and sand the bottom square. Epoxy the 3/16" sheet fillers at the tail and glue on the bottom sheeting from F-3 back.

by paul strengell & bill o'brien

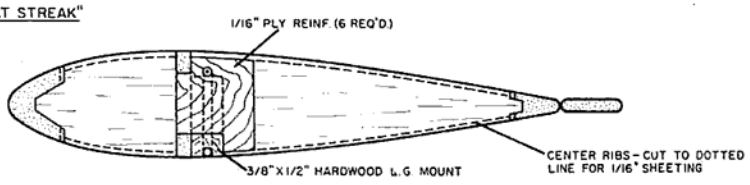
EKTACHROME BY DON DEWEY


FILL WITH SCRAP BALSA
1/16" WEBBING
SPARS-1/4"X3/8" BALSA-TOP & BOTTOM
TIP BRACE
1/8" NYLON TUBING
3/16" SHEET TIP
TIP BRACE
3/16" SHEET AILERON
F-1 1/4" PLY
THRUST LINE
TIP BRACE
1/4" TRIANGULAR STOCK
1/4" X 1" T.E. STOCK
RECEIVER COMPARTMENT
2° RIGHT THRUST
AILERON SERVO
MIDWEST ALUM. MOUNTS DRILL FOR NOSE GEAR
1/8" DOWEL-FRONT HATCH HOLD DOWN-DRILL FRONT HATCH TO FIT
3/16" DOWEL
1/8" SHEET DOUBLER
1/32" PLY TRIPLER
F-2 1/8" PLY
8" SIG CANOPY
1/8" SQ SPRUCE-GLUE TO REAR HATCH AND RECESS INTO FRONT HATCH
ASSEMBLE NOSE FROM 1/2" BLOCKS AND CARVE TO SUIT ENGINE
5/8" BLOCK HATCH (HOLLOW AS REQ'D.)
F-1
HARDWOOD BLOCK TAPPED FOR 4-40 SCREW
1/16" PLY REAR HATCH (FITS UNDER F-3)
1/16" PLY FACING ON FRONT HATCH
F-2
FUEL TANK AND BATTERIES
C/G
1-3/4" SPINNER
5/32" WHEELS RETAINERS
1/4" SHEET
1/4" TRIANGULAR STOCK
1/4" SHEET
1/8" SHEE (CROSS G
5/32" DIA WIRE NOSE GEAR
3/16" SHEET STAB & ELEVATOR
1-3/4" DU-BRO NOSE WHEEL
2-1/4" DU-BRO WHEELS

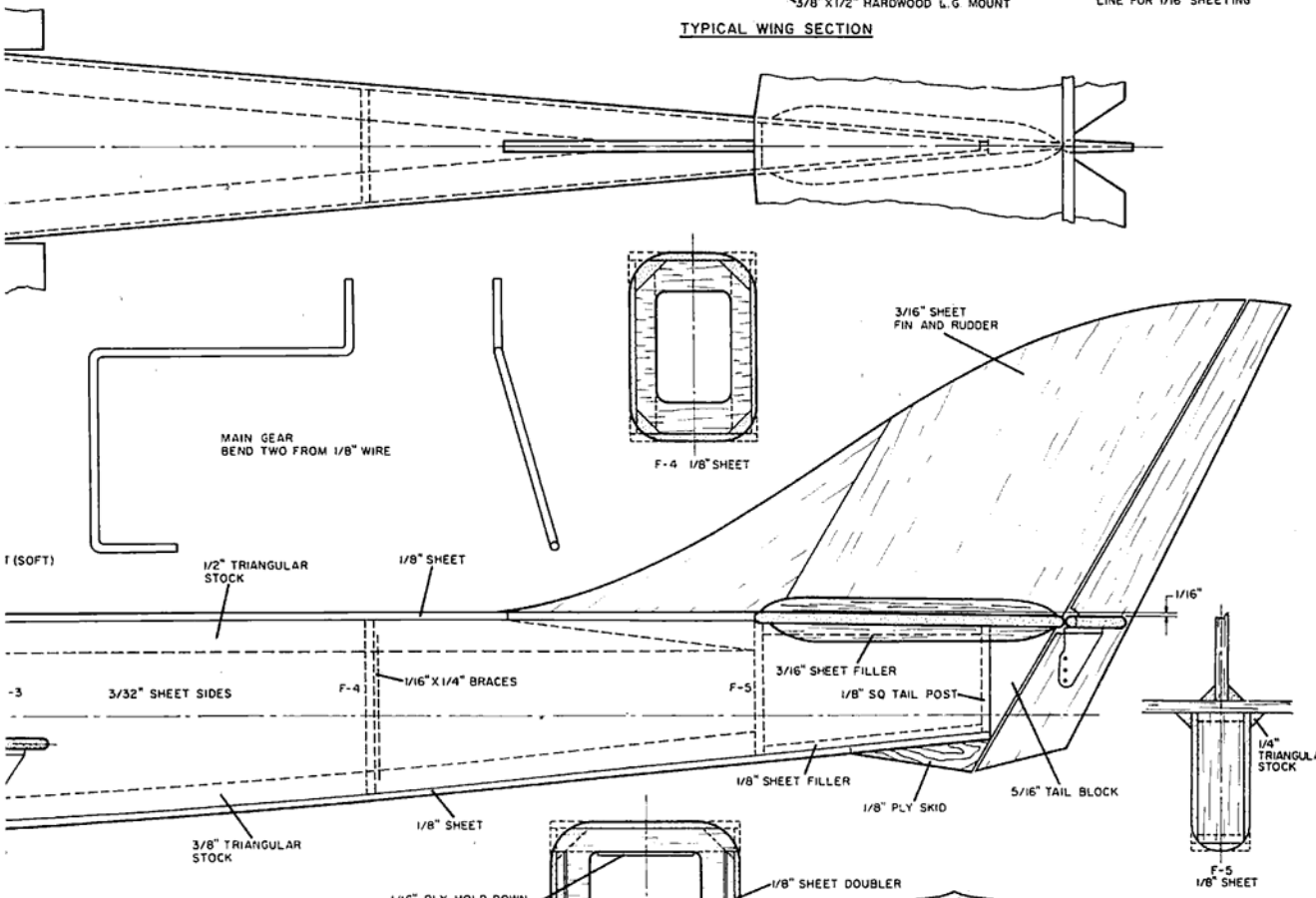


R 8-7/8" CHORD

WING FROM TOP FLITE "FLITE STREAK", "COMBAT STREAK" OR "COMBAT CAT" KITS.



TYPICAL WING SECTION



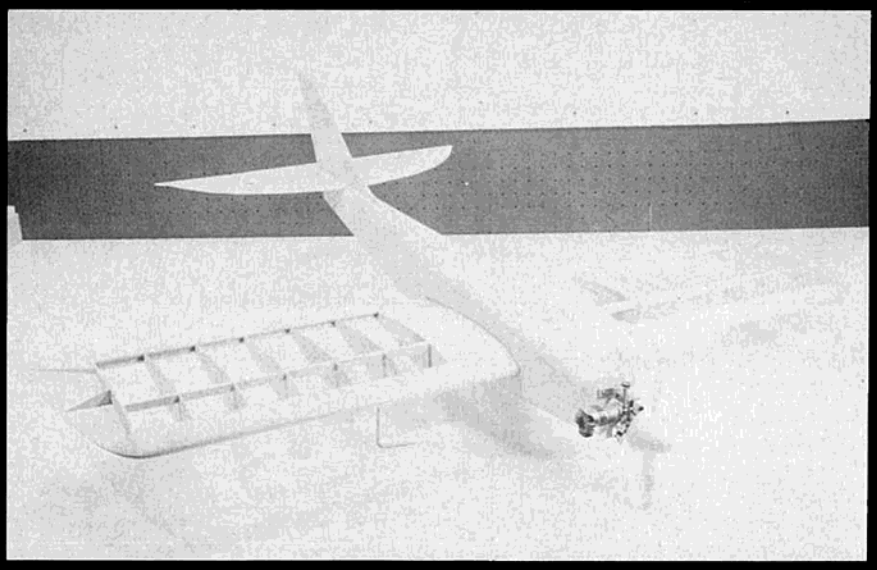
the wireless

DESIGNED BY	P.B. STRENGELL BILL O'BRIEN	DRAWN BY INKED BY	P.B. STRENGELL GERARDO FLORES

0 1 2 3 4 5 6

379

FULL SIZE PLANS AVAILABLE – SEE PAGE 70



. . . you can slow the wireless up and stretch the glide with no tendency to fall off.

oxy the 1/32" plywood bottom from F-3 forward and allow to cure. Cut the top hatch blocks to outline and spot glue to the fuselage. Glue the 1/8" sheet to the bottom from F-3 forward. Now add the 5/16" tail block. The fuselage is ready for carving and sanding to shape. Be careful not to sand out the markings for the wing cut-outs.

After shaping is complete, remove the hatch blocks. Drill and tap the Midwest motor mounts for the engine and drill the 5/32" holes for the nose gear. Bolt the engine mounts to the firewall. Build up the nose around the engine mounts with 1/2" sheet, spot gluing it to the firewall. Temporarily reinstall the front hatch and shape the nose to conform to it. Please note: The nose may have to be modified to suit your particular engine so make your plans accordingly, it's a pretty tight fit! Remove the nose and drill the holes for fuel tubing to match the tank you use. The original used a Sullivan RST-4, 4 ounce tank. Install the engine temporarily and hollow the nose gear. This completes the fuselage up to final assembly.

Wing:

The basic wing can be obtained from any Top Flite "Flite Streak," "Combat Streak," or "Combat Cat" kit. The "Combat Cat" kit is especially attractive if more than one airplane is planned because it contains two complete wings.

Cut two new ribs from 1/8" sheet for the tips and notch the leading and trailing edge for the two new center ribs. Drill or slot the ribs for aileron linkage and make 'cut outs' for landing gear blocks. Cut landing gear reinforcements from 1/16" plywood.

The plans show tubing and cable aileron linkage, however, I leave it up to you as to what best suits your fancy or equipment. Wing construction is straight forward so I won't insult your intelligence by telling how to do it, suffice the admonition to watch out for warps. The tips supplied with the kit are a little flimsy and should be replaced with new ones of 3/16" sheet. Make, but do not install, the ailerons at this time. Also note the wing, as built, has too much chord and has to be trimmed to match the chord shown on the plans.

Tail and Fin:

Try to find some medium hard

straight grained sheet for these surfaces. Cut to shape and sand to the desired section, but do not sand any more than necessary in order to preserve their rigidity. Attach the elevator and rudder (if you use one) using your favorite hinge.

Assembly:

Cut out the fuselage to accept the wing, making the openings slightly larger than the wing. This will give good penetration of epoxy into the joint and allow the wing to be positioned properly. Slide the wing through the fuselage and hold in alignment with small wedges of balsa. Horizontal alignment can be checked by laying a straight edge across the top of the fuselage and adjusting the wing to parallel it. Check the angle of incidence carefully. When all is in order work epoxy into the space between the fuselage and wing and epoxy the leading edge to F-2 and the trailing edge to F-3.

Epoxy the tail, fin, and tailskid in place, including the 1/4" triangular stock reinforcement. Check alignment carefully.

Glue the nose in place and sand the entire plane to blend in the surfaces and prepare for finish. Cover and finish to suit. Pick your color scheme for good visibility. This plane moves fairly fast and, being small, can get out of sight in a hurry.

The equipment installation is a custom job and will require some planning. The available room is limited, however, any of the small Kraft, Orbit or Bonner systems will fit.

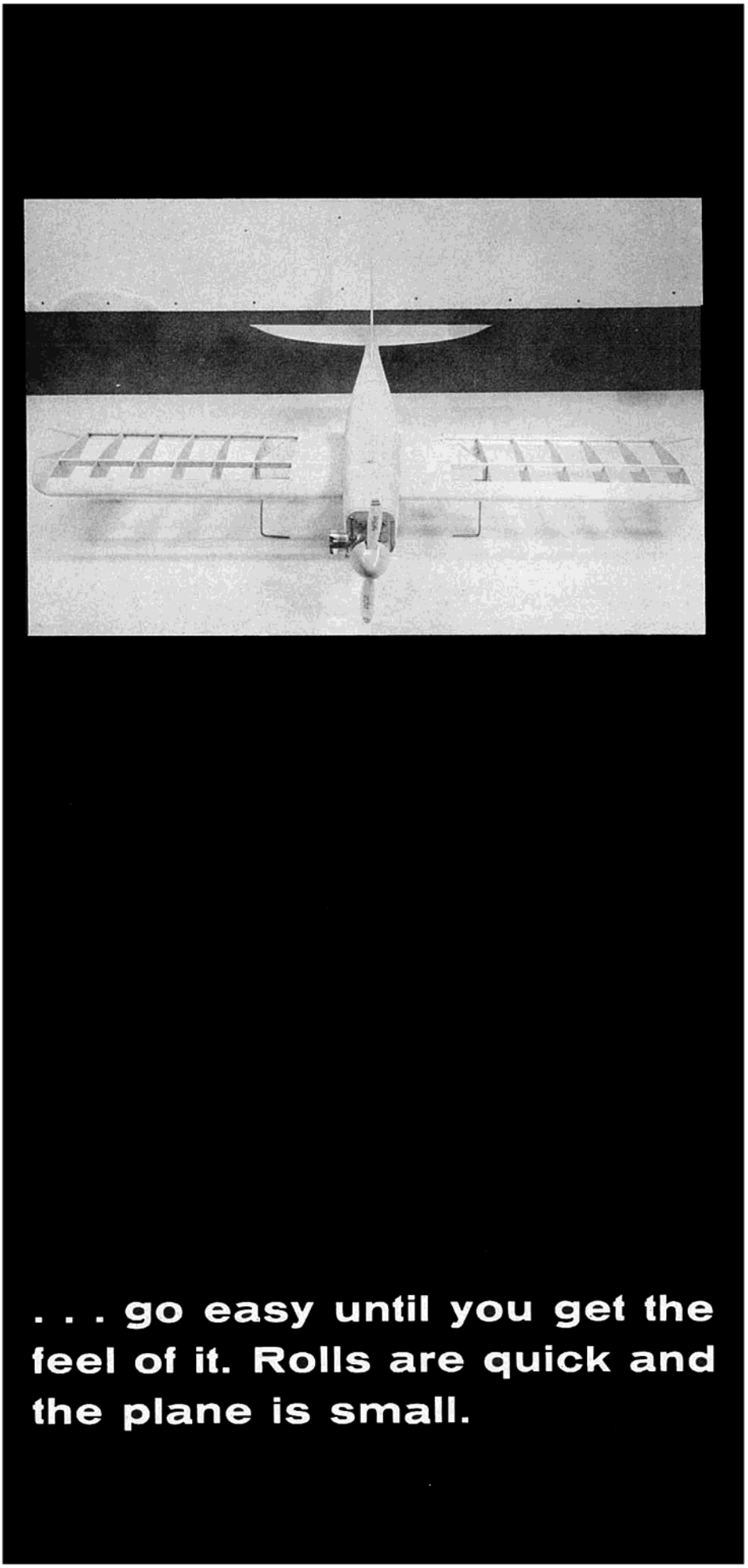
Flying:

The center of gravity should fall just behind the spar.

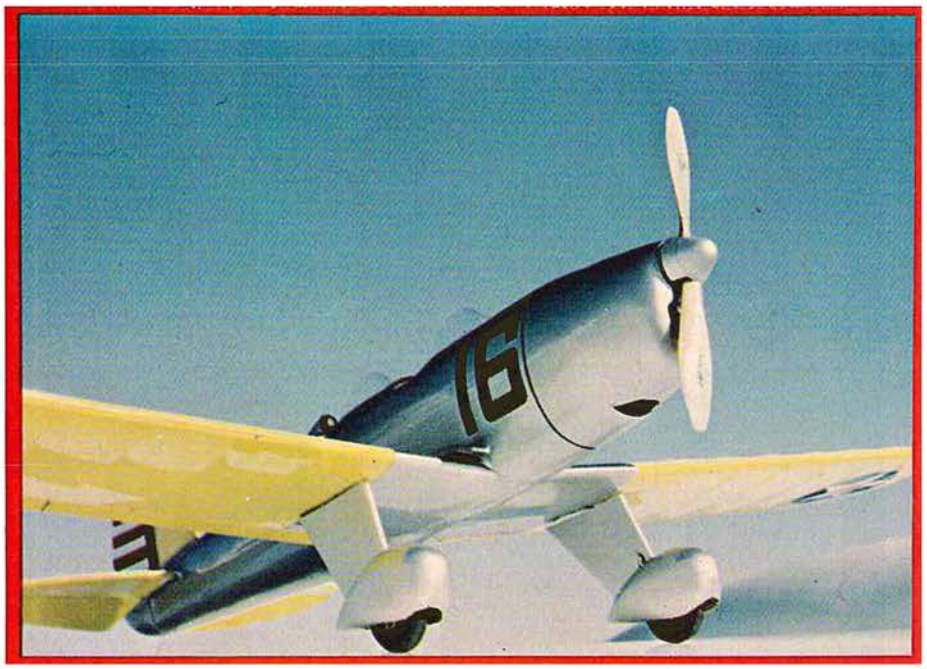
Check the aircraft carefully for warps or misalignment. With everything lined up the Wireless prototypes came off the ground in about 50 feet with a slight touch of up. The C.G. can vary about 1/2 inch, but go slowly when moving it BEHIND the location shown.

Rolls are quick and the plane is small, so go easy until you get the feel of it. The landings are surprising – you can slow the Wireless up and stretch the glide with no tendency to fall off on a wing tip.

What started as a casual experiment has resulted in two fun aircraft. Good luck.



. . . go easy until you get the feel of it. Rolls are quick and the plane is small.



Story by
DICK FISCHER

RYAN ST

Perhaps the most exciting trend in Radio Control today is the scale or scale-like flying model. By Scale Flying Model I mean a realistic, good looking ship that the novice R/C'er can build and fly.

Most modelers have been avid aviation enthusiasts since youth. What could be more fulfilling, then, to see airborne that dream ship of years gone by? For me that dream ship is the Ryan ST.

When the Ryan ST first flew in 1934, it shared a sky filled for the most part by wood and cloth biplanes. Its appearance marked the end of the biplane era and signaled the beginning of the sleek, streamlined monoplanes. Wealthy sportsman pilots were quick to appreciate the racy good looks and flashing performance of the ST, and most of the 181 airplanes built found homes among private owners. A few Ryan ST's were purchased by the U.S. Army and dubbed YPT-16. These aircraft had the distinction of being the first low-wing monoplane trainers used by the Air Corps.

Our scale Ryan ST seems to reflect many of the qualities of its full-sized counterpart. Not only does it have a great deal of eye appeal on a low flyby, but also turns in a good scale-like aerobatic performance. The one thing that has been bred out of our model is the tricky ground looping tendency of the full scale version.

If you have looked over the plans and photos and waded through the nostalgia portion of the text, you must be ready to cut wood. Some of the construction may look a bit light to those of you who are used to hanging a .60 on your creations. Fear not, however, all structure is plenty adequate for a .19 sized ship. Just be sure to use good glue and follow the wood densities suggested. That round fuselage looks pretty tough, let's start with it.

Begin by cutting two Basic Fuselage Sides from 3/16" soft sheet. Glue 3/16" x 3/4" Basic Longerons to sides, being sure to have one left and one right side. Add the 3/16" soft sheet Forward Doublers, the 3/16" x 3/5" Forward Longerons, and the 3/16" square Corner Block. Next, glue on the 1/16" ply motor mount Webs and the 3/8" square hardwood Motor Mounts.

Set the two side assemblies aside to dry and cut out all of the Formers. Also cut out the 1/16" ply Servo Floor. The 1/16" ply may sound a bit thin, but is plenty good if you attach your servos with the foam tape made by Rocket City. If you prefer to use screws, add an additional 1/16" plywood lamination only in the area of the servos.

When the two sides are dry lay the right side over the plans and glue in F2, F5, and F6. Then set the left side down on top of the formers, being sure that all is square. Allow to dry thoroughly. Glue in the Servo Floor, and then the three F4's. Also glue in two F3's. Allow to dry thoroughly, once again checking

Photos by
JIM PHELPS

THE RYAN ST SIGNALED THE BEGINNING OF THE SLEEK, STREAMLINED MONOPLANE ERA. FIRST FLOWN IN 1934, 181 PRODUCTION MODELS WERE BUILT, OF WHICH THE YPT-16 WAS THE FIRST LOW-WING MONOPLANE TRAINER TO BE USED BY THE ARMY A.C.

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the fuselage to be sure that it is square. A little care here avoids the embarrassment of having some kid ask, "Hey Mister, is that a banana on your wing or is it the fuselage?"

Next slide F1 on over the 3/8" square motor mounts and epoxy in place. Also epoxy the 3/32" motor mount plate. Proceed by adding F7, F8 and F9.

Curved sheeting is best pre-formed by steaming or soaking and then wrapping around an old paper towel tube to dry. (Come on Clyde, take the paper towels off the tube first.) A wrapping of waxed paper between tube and balsa helps preserve the cardboard tube.

While your curved sheets are drying, assemble the horizontal and vertical stabilizers. The leading edge of the stab is two 3/32" x 1/4" strips laminated together.

The first piece of curved sheet to be applied covers the cockpit area from F2 to F6. While this is drying, attach the horizontal stabilizer and F10 to the fuselage. Next add the top skin from F6 to F10.

At this point you can add your fuel tank. I glued a Sullivan RST-4 tank between F1 and F2 using Dow Corning silicone rubber bathtub caulk. Position your tank as far to one side of the fuselage as possible so that the brass tubes sticking through F1 miss the engine. The tank should be on the same side as the fuel tube on your engine (with the engine inverted). Close out the tank area by adding the upper and lower blocks between F1 and F2. Be sure to hollow the blocks to about 3/16" thickness.

At this point you should set all your equipment in place for a trial fit. Route the throttle, elevator and rudder pushrods, cutting through bulkheads as required.

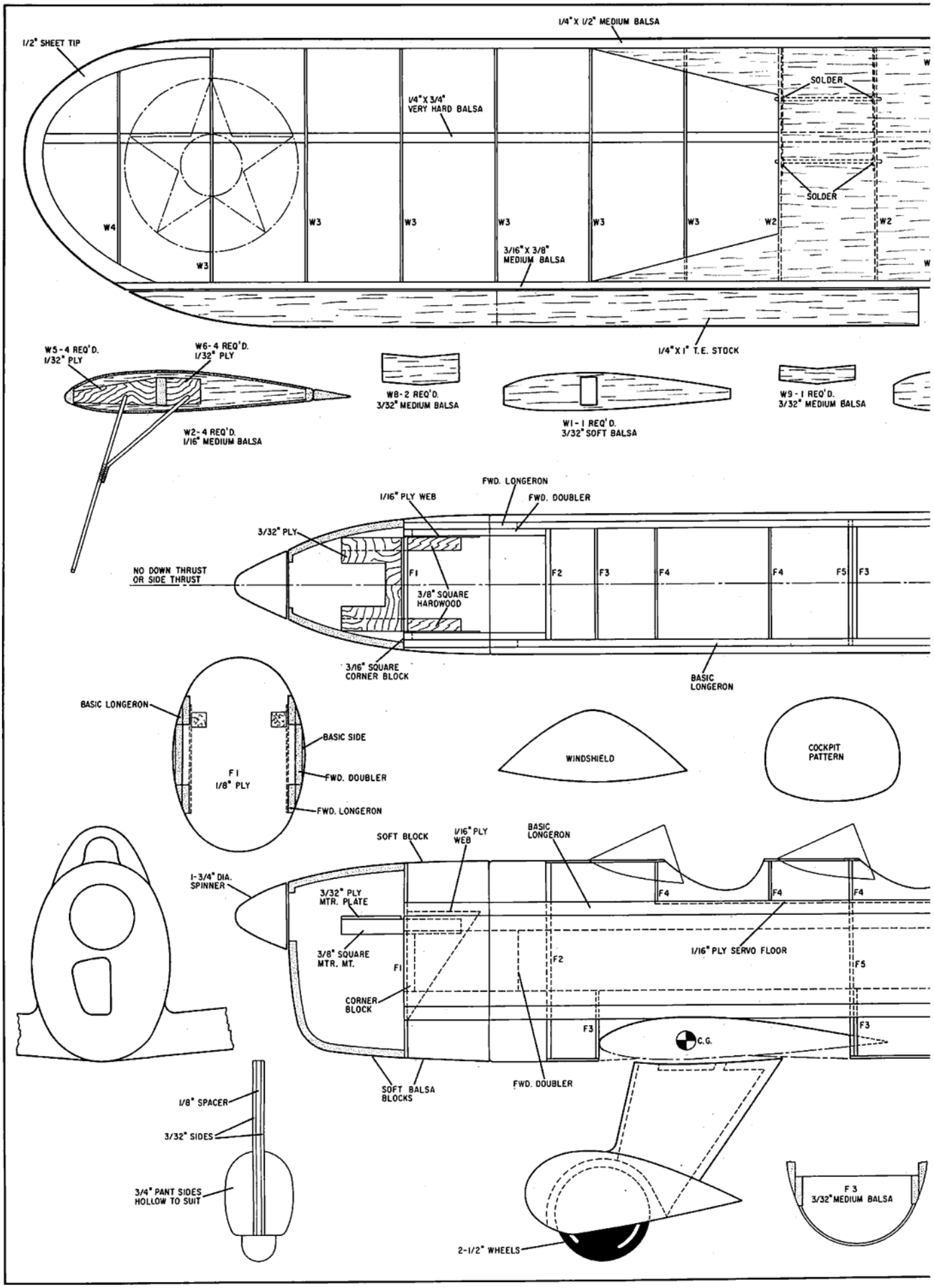
Add the 1/4" x 1/4" block to the face of F9. This block holds the bottom rudder hinge. Use a sturdy hinge, such as the DuBro, since it is the principal support for tailwheel loads.

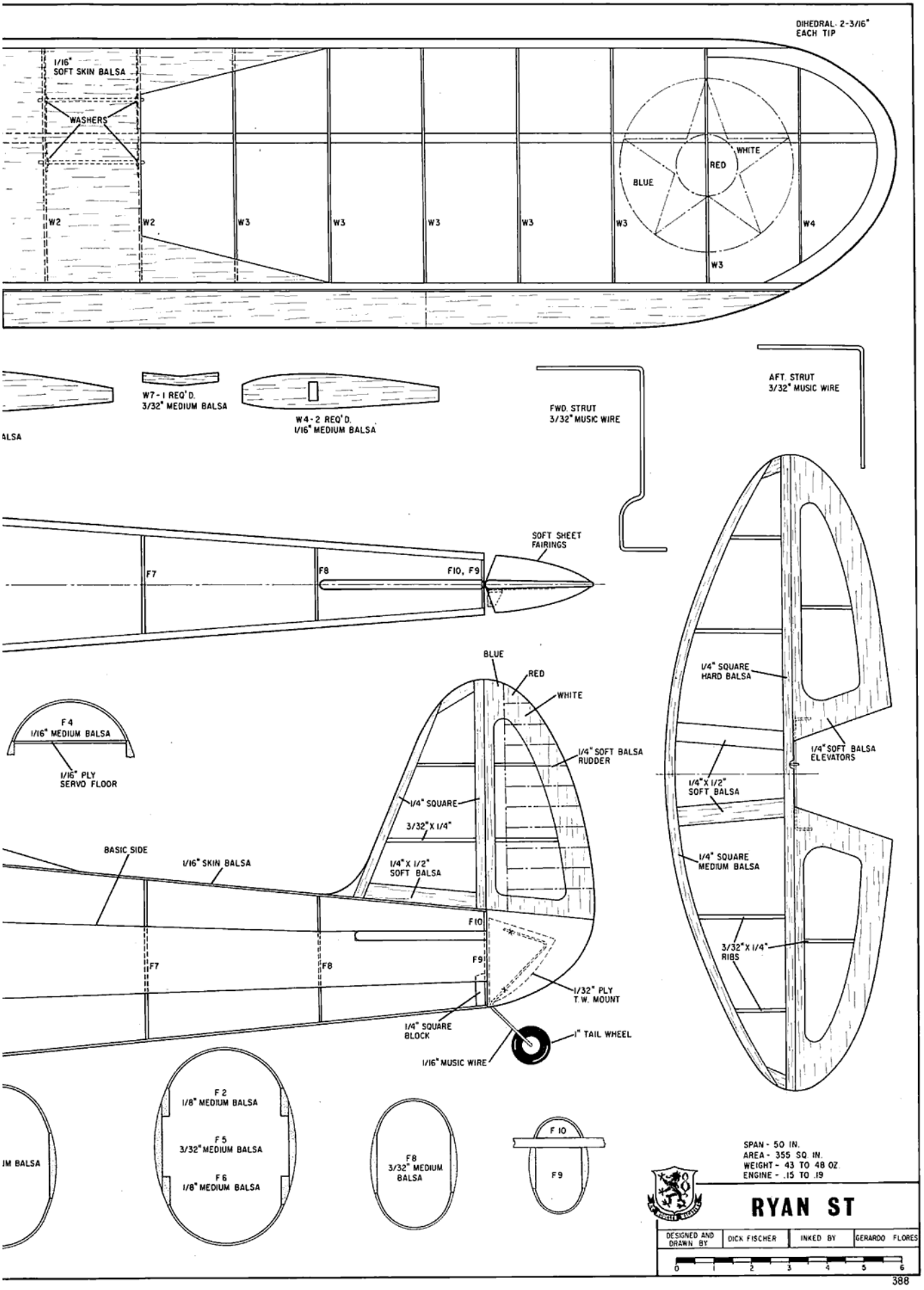
Cover the bottom of the fuselage with two pieces of curved sheet just as you did the top. When the bottom sheeting is dry the fuselage may be sanded to shape.

The nose cowling for my ship was carved from a balsa block and held on with screws through the sides into the 3/8" square motor mounts. A cowl made of fiberglas would do very nicely. Whichever you use be sure to cut an opening in the bottom of the cowl to allow cooling air to exit.

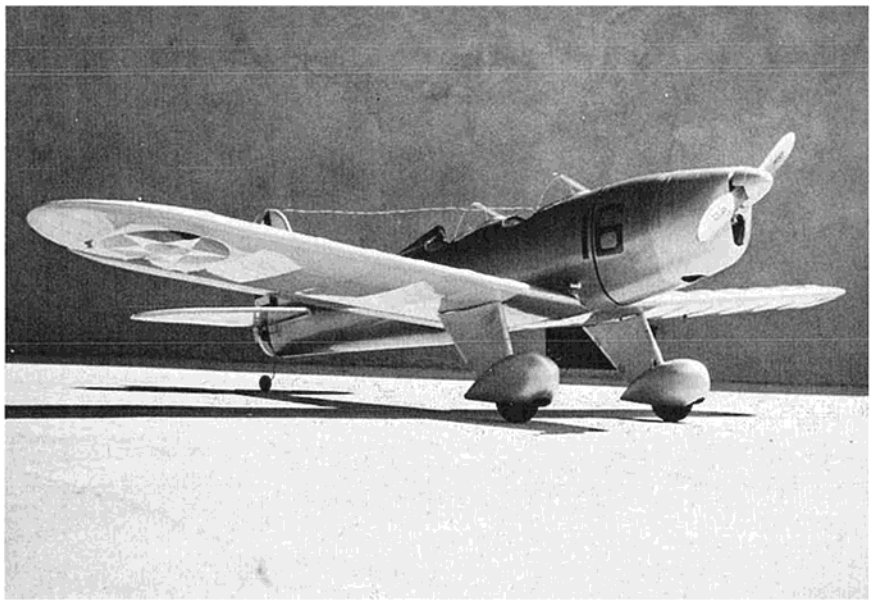
The rudder is unique in that it holds the tailwheel. This has proven to be a simple and amply sturdy arrangement. The tailwheel wire is bent to shape and sewn to a piece of 1/32" plywood. This assembly is then glued to the rudder.

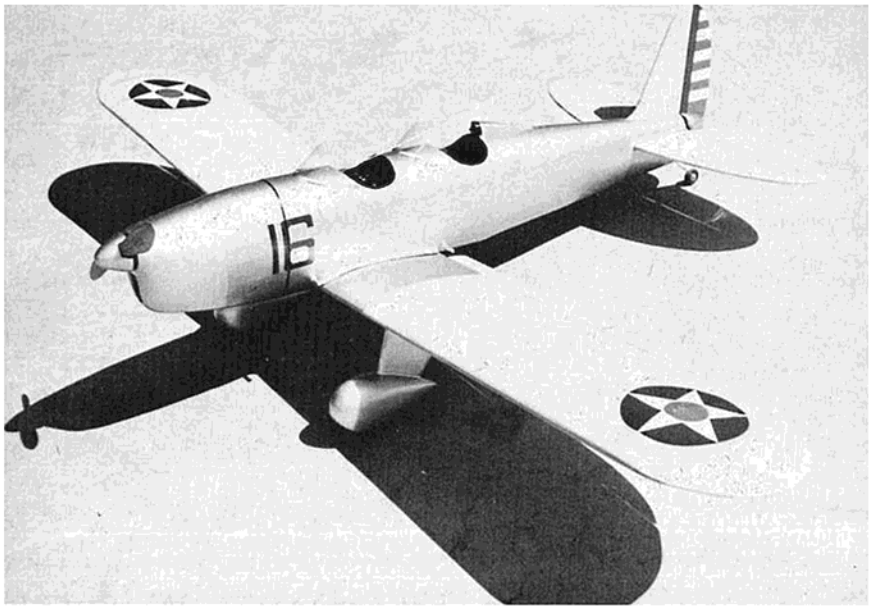
The wing is of very simple construction. The only unconventional setup here is the main landing gear attachment. Before assembling the wing, W5 and W6 Doublers are glued to the W2

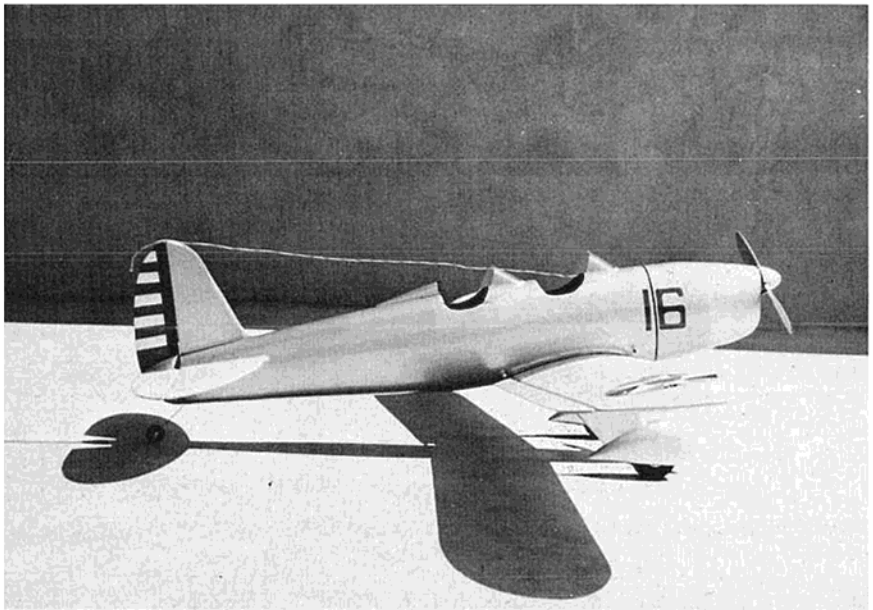

1/4" X 1/2" MEDIUM BALSA
1/2" SHEET TIP
SOLDER
1/4" X 3/4" VERY HARD BALSA
SOLDER
W4
W3
W3
W3
W3
W3
W2
W2
W3
3/16" X 3/8" MEDIUM BALSA
1/4" X 1" T.E. STOCK
W5 - 4 REQ'D. 1/32" PLY
W6 - 4 REQ'D. 1/32" PLY
W8 - 2 REQ'D. 3/32" MEDIUM BALSA
W9 - 1 REQ'D. 3/32" MEDIUM BALSA
W2 - 4 REQ'D. 1/16" MEDIUM BALSA
W1 - 1 REQ'D. 3/32" SOFT BALSA
FWD. LONGERON
1/16" PLY WEB
FWD. DOUBLER
3/32" PLY
NO DOWN THRUST OR SIDE THRUST
F1
F2
F3
F4
F4
F5
F3
3/8" SQUARE HARDWOOD
3/16" SQUARE CORNER BLOCK
BASIC LONGERON
BASIC LONGERON
BASIC SIDE
F1 1/8" PLY
FWD. DOUBLER
FWD. LONGERON
WINDSHIELD
COCKPIT PATTERN
SOFT BLOCK
1/16" PLY WEB
BASIC LONGERON
1-3/4" DIA. SPINNER
3/32" PLY MTR. PLATE
3/8" SQUARE MTR. MT.
F1
F2
F4
F4
F4
1/16" PLY SERVO FLOOR
F5
CORNER BLOCK
F3
F3
C.G.
SOFT BALSA BLOCKS
FWD. DOUBLER
1/8" SPACER
3/32" SIDES
3/4" PANT SIDES HOLLOW TO SUIT
2-1/2" WHEELS
F3 3/32" MEDIUM BALSA



FULL SIZE PLANS AVAILABLE – SEE PAGE 70







ribs and 3/32" holes drilled as shown. The wing is built in one piece with top planking added in place. After unpinning the wing, slip the fore and aft landing gear wires into their appropriate holes and solder washers in place. This prevents the gear from moving spanwise. Bind the fore and aft gear struts together with fine wire and solder. Now you can plank the wing bottom. The strip ailerons aren't scale, but the inboard end can be made to look like flaps by painting on a "separation line" as shown in the photos.

The aileron servo is mounted on top of the wing. This may seem a bit strange at first but works very well. I merely glued (bathtub seal) a 3/32" plywood plate to the top of the wing and mounted my servo to the plate. This preserves a great deal of the strength usually lost in making a servo cutout.

The fuselage-to-wing juncture is now completed by carving the fuselage bottom to fit the wing. Epoxolite wing fillets serve double duty. They add to overall appearance and beef up the wing saddle.

The wheel pants are made in halves. The periphery of one half has attached to it a 1/8" sheet spacer. This allows sufficient gap between the 3/32" sides for the passage of the 3/32" wire landing gear. The two halves sandwich the landing gear and are held together by a few spots of Ambroid glue so that they may be readily broken apart.

Finishing the Ryan is pretty straightforward. The most important thing to remember is that this model must be kept light. One extra ounce is like three ounces on a full sized multi. I chose Super MonoKote for my model and had pleasing results. The color scheme used was typical for the pre-WWII era trainers. The fuselage is all silver, as is the wing out to the landing gear. From the landing gear outboard the wing is yellow. The tail surfaces are all yellow with the exception of the rudder, which has the red, white and blue striping used on most Air Corps aircraft of that era. The wheel pants are all silver.

If you have managed to come in under the three pound target weight your Ryan should pose no flying problems. Should you build a lead sled (we call them Desert Penetrators), I suggest substituting a hotter .19 or a .23. Preface your first flight with some test gliding into alfalfa or tall grass if possible. Hand gliding is practically a lost art among R/C'ers today, but its rewards are as great as ever. Your ship can be trimmed to have a nice, straight, flat glide in just a few minutes. This practice

seems to take the edge off that first flight for me.

Once out to the flying field make a thorough check of radio and engine operation. Taxi around a bit to get the feel of tailwheel steering. Many people avoid tailwheel models because they have seen others have trouble, so here are some pointers based upon my experience both as pilot of the model and of full sized Ryans.

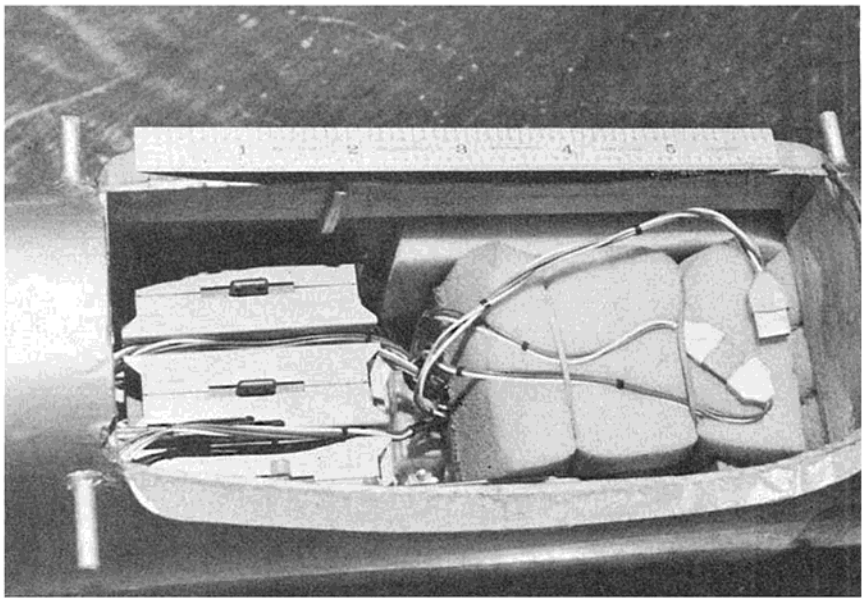
a. Taxi very slowly.
b. Watch your model closely, and apply corrective rudder as soon as it begins to deviate from the desired course.
c. Apply short, pulse-like rudder corrections.
d. When taxiing upwing, hold full up elevator to keep pressure on the tailwheel.
e. When taxiing downwind, hold full down elevator to keep pressure on the tailwheel.
f. Try to take-off into the wind whenever possible.
g. Open the throttle slowly and make immediate corrections to all heading deviations on take-off.

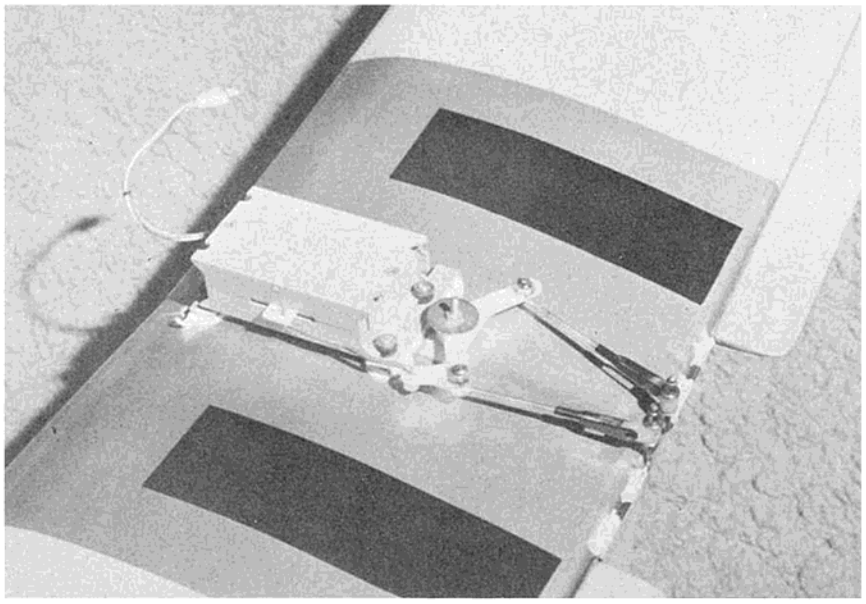
These suggestions are not meant to imply that the model is a ground looper. On the contrary, it makes almost effortless take-offs and landings and taxis surprisingly well in the wind. If you follow the guidelines, though, you will do a more professional job than most people can manage with the aid of a trike gear.

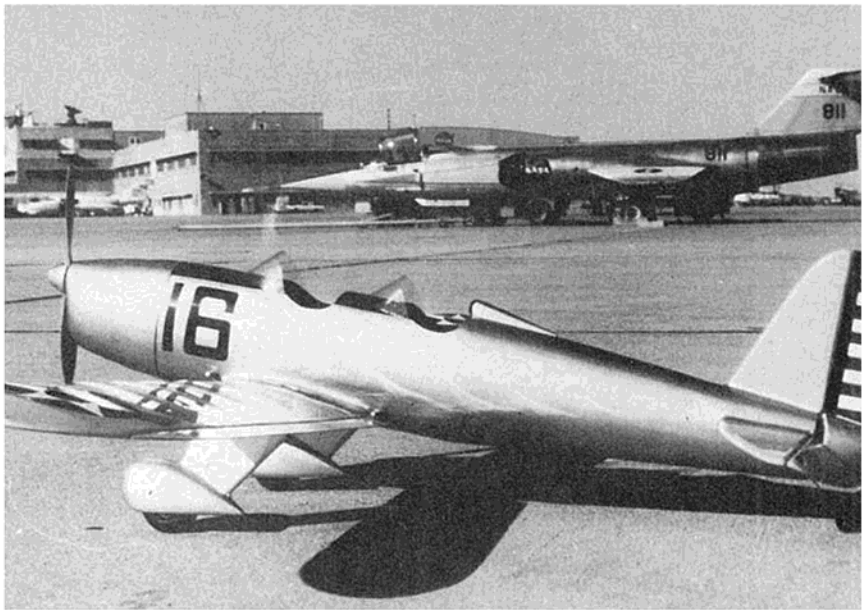
Now that we've got you out on the runway, what next? Almost as soon as you ease the throttle open the tail will be up. The nose may wander a bit to the left, so be set to tap right rudder. A bit of back stick will get the ship airborne at about the same speed as a Senior Falcon. Flying is no more difficult than a Falcon, although the Ryan rolls much faster. Rudder control is not as positive as, say a Falcon, but an experienced galloping ghost pilot could do well with a .15 powered 2½ pound model. If in doubt, add another half inch of dihedral under each tip.

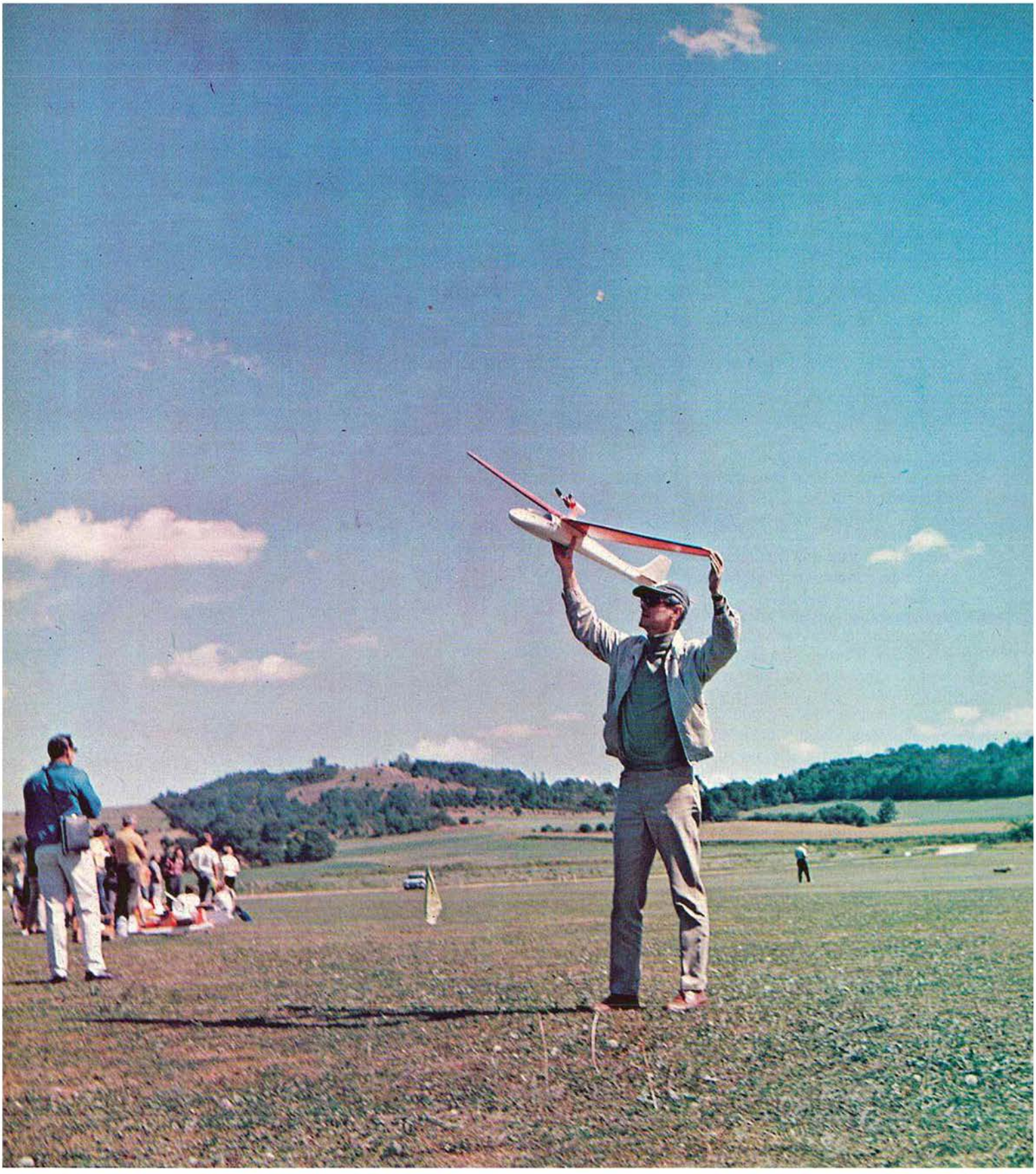
Good landings are the result of a well executed approach. Probably the easiest approach is the 360 degree overhead. Enter the pattern by flying upwind at half power directly over the runway. Altitude should be about one hundred feet. As the ship passes midfield (where the pilot should stand), throttle back to just above idle and begin a wide 180 degree descending turn to the left (or right, as conditions dictate). Ease in some back stick to slow down in the

(continued on page 39)









Windsong

By OWEN KAMPEN

A cool summer evening. The winds of the day are now a soft breeze and low on the horizon the sun seems to rest. The others have departed and, suddenly, the field is strangely silent. Alone – watching the cluster of rose-grey clouds gathering around the sinking red globe, I am reluctant to leave for this is the moment for one final joining of pilot, plane, and sky. This is NOT the time for the roar of a hot .60 shattering the silence, or 70 mile an hour missiles splitting the air. It seems wrong to disturb the serenity of the evening.

The Windsong rests on the grass, clean red and white against the close cropped green, waiting. In a moment the tiny .049 comes to life, systems are checked and the slim bird is lightly launched. Climbing out a little faster than might be expected we smoothly circle upward toward the sunset till only a moving dark dot is visible against the colored light of the sky. At several hundred feet the engine quits, the transition almost imperceptible except for a slight slowing down and a leveling of the flight attitude. Quietly flying elongated figure eights across the wind line above a nearby hill, I find there is little lift but here and there are the areas of zero sink. We hold our own for some minutes until the gathering darkness quiets the breeze and the slow descending circles terminate in a soft-slide across the grass, Windsong coming to rest a few feet from where I stand. The switch is turned off, plane wiped clean, gear loaded and i's time to leave. . . to return to reality.

How does one explain the mood, the time, the place, the peace? To me, this is what it's all about, but only another sailplane addict can ever understand or even believe in its importance. The Windsong does not stunt, roll, do vertical eights or hot touch and goes. It is not at home in a powered pylon race, it just flies. It flies up rather quickly and comes down quite slowly and it does this with great grace. That's all. It is beautiful to the eye, in the air or on the ground.

It has a detachable motor pod so that it can be soared in thermals or along slopes but in these flat lands I fly the "impure" powered version. The Windsong is the end result of several years of design experiments with a wide variety of sizes and shapes and constructions of powered gliders. It's quite traditional in many respects but unique in a construction technique which contributes to the simple clean lines of the fuselage form. It came about by accident.

I have long envied the clean and smooth oval cross-sections possible with fiberglass fuselages, but considerations of time combined with an inherent laziness has prevented me from going that aromatic route. Lots of formers and gangs of little stringers belong to my lost youth and so for years modified rectangles have become the rationalized expedient.

It was while working on the original SKAMPY that thoughts of the strength of curved bent forms occurred which resolved themselves one quiet evening when, with nothing better to do, I began to bend balsa. Two disadvantages soon became clear – the tendency to split along the grain plus the necessity of gluing up wide sheets. Looking around for something else to bend I found a rather large sheet of Midwest's 1/32" birch plywood left over from an abandoned project and an idea was born. Not very clear but a glimmer. A one piece formed fuselage! Abandoning the traditional engineering approach of "draw it up and build it," I reverted to my artist's instinct to let the material lead the way. I became a follower. Rough cutting and wet bending resulted in an inverted teardrop section and formers were then cut to fit existing openings. The whole procedure was backwards but it worked. Within a few days the process was refined and a larger version soon became the beginnings of Windsong.

Since then, several more fuselages have been built with minor modifications which have been included in the plans. While an extra pair of hands are helpful, construction can be handled alone with the one-piece shell-forming and gluing being accomplished in as little as 1½ hours. The end result is smooth and round, exceptionally strong and almost as light as sheeted balsa. The birch plywood does NOT require additional covering and takes half the usual amount of dope to achieve a fine finish. Reasons enough to give it a try.

The resulting reduction in drag coupled with a rather thin airfoil section creates a sailplane with excellent penetration capabilities plus a wide range of slow to fast flying speeds. All original flight testing was done with pulsed rudder using an Adams dual actuator which is a most reliable and economical performer. Other R/C packages are being worked on at the time of writing including a hi-rate pulsed Bellamatic servo, and the use of the Hallco "103" on rudder with the motor control arm linked up for positionable elevator trim.

With the large number of reed sets now gathering dust and often available at a fraction of their original cost, consideration should definitely be given to a Reed-Rudder or Rudder-Elevator combo. Controlaire's single channel Analog system provides an almost dither-free, low drain arrangement, reported to be excellent for large gliders. Two flapping surfaces create considerable drag which would tend to discourage the use of the Galloping Ghost combinations, but the Rand LR-1 or Dual Pack are proven performers which overcome this objection.

The ultimate, of course, would be any of the new miniature proportional systems, such as Orbit's 8 oz. system, Kraft's 11 oz. rig, etc. The choices are many and dictated only by your pocketbook and personal taste. Let's get on with the construction notes which are the result of a lot of trials and errors. Give them a careful reading.

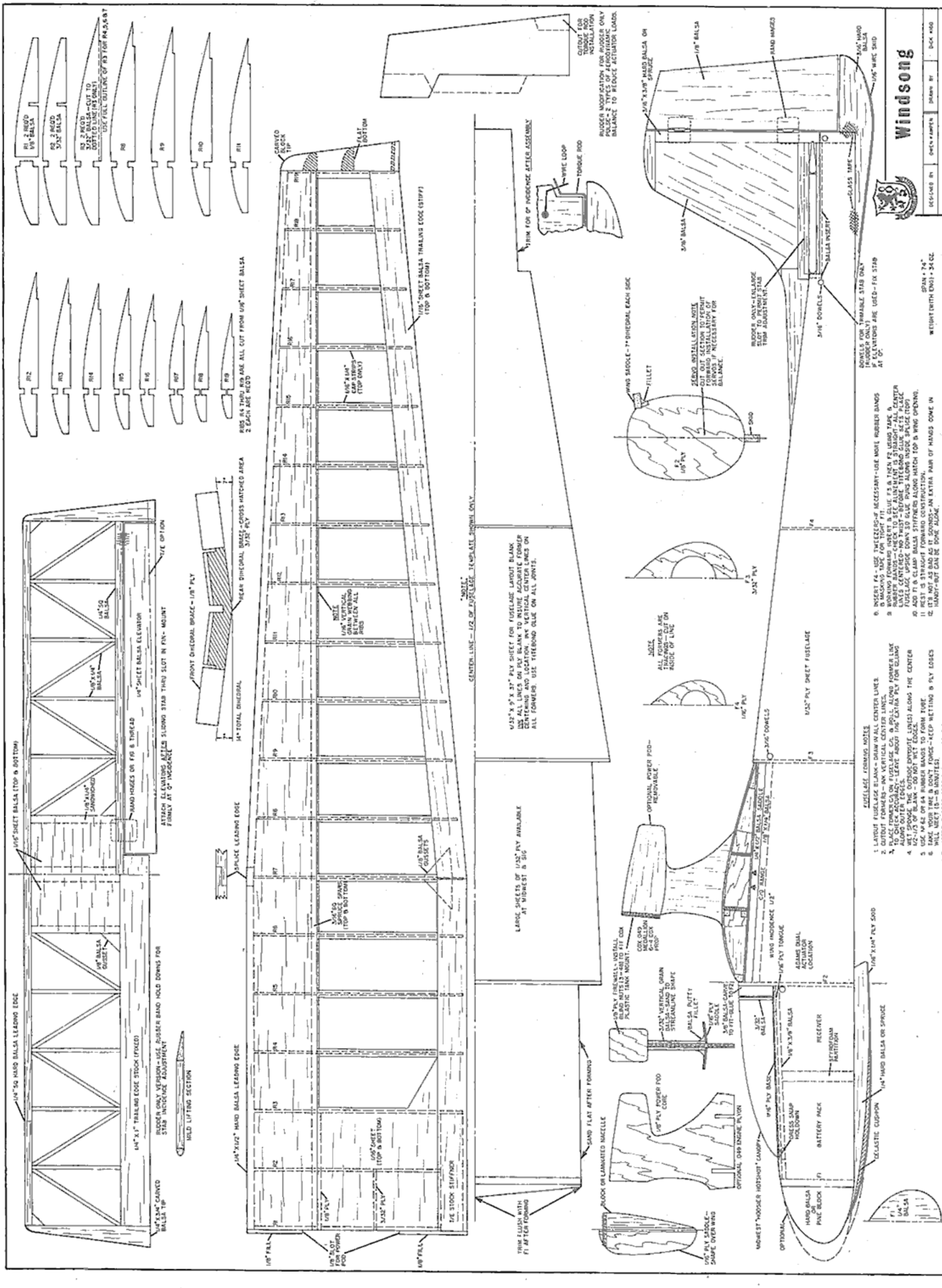
Fuselage

Construction is NOT straightforward until after you've built one. Since few of you have large sheets of 1/32" plywood lying around, start by ordering a 12" x 48" sheet from Midwest Products or Sig. The cost is approximately $2.40 and you'll have some left over for all kinds of doublers and other uses. With balsa prices what they are – it's a good deal! While you're waiting for the ply to arrive, start on the wing and stab. They are "straightforward" (whatever that means). Or – if you lucked out and your corner Hobbie Shoppe had some stacked in the corner, let's start right now!

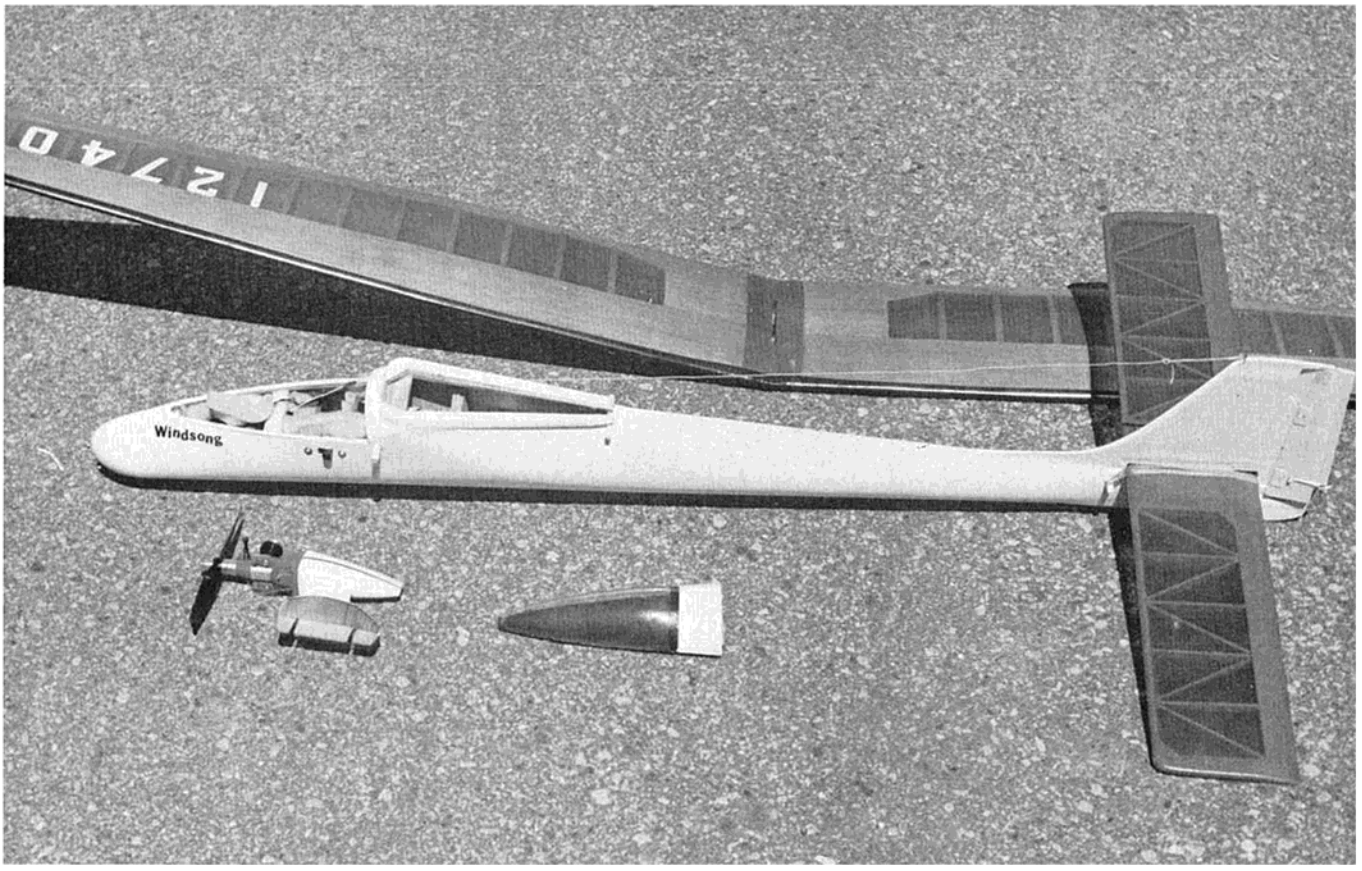
1. Use a ballpoint pen, layout and locate the fuse center line on the ply sheet. Transfer all measurements from the pattern with care and use lines to locate all former positions. Cut out the fuse blank.
2. Draw a VERTICAL center line on ALL formers and carefully cut to shape.
3. TEST the accuracy of fit by placing the former center lines on the fuse center line and rotating out to each edge. There should be about 1/16" margin on each side of the fuse blank to provide adequate gluing

surface.

4. You'll now need a sponge, a roll of masking tape, a bunch of No. 62 or No. 64 rubber bands, TITEBOND GLUE and a small pot or pan of water. (Note: ammonia hastens the bending process but the aroma is too much for me.)
5. Let's go. With the sponge – wet along the center 1/3 of the blank LENGTHWISE on the outside (side opposite the center lines). Several light wettings are better than one big one. Do not get water on the outer edges of the blank or the masking tape will not hold.
6. Slip a few No. 62 or No. 64 rubber bands over the blank and it will start to form a tube. Keep wetting but TAKE YOUR TIME. DO NOT FORCE!! In a short while (5-10 min.) the edges will meet making a natural tear-drop shape.
7. Several approaches have been tried but I prefer to work from the tail forward. Insert the rudder post and clamp tight. Some splitting will occur at the bottom but don't panic as this will later be cut open to accept the tailskid.
8. Run glue along the edges of the fuse top spine and around F4.
9. Carefully checking the alignment of



FULL SIZE PLANS AVAILABLE – SEE PAGE 70



center lines, insert former F4 (tweezers make it easier), and close tight with masking tape and more rubber bands.

10. F3 and F2 follow. These are easy as there is more hand room. Just make sure the center line of each former is EXACTLY on the fuse center line. At this point, check to make sure no twists have developed. You might have to remove and straighten the tail post.
11. Now turn the fuse shell upside down so that the glue will settle along the inside of the spine. Check again for twisting then LET DRY.
12. Add F1 and clamp balsa stiffeners along the hatch and wing openings.
13. From here on it's like any other fuse construction. Rough carbe the nose block and glue in place and install the wing saddles as per drawings.
14. The rudder is added and faired in with balsa putty. The tail skid of hard balsa inserts about 1/4" into the fuse bottom. Epoxy the nose skid in place.
15. Light weight fiber glass cloth can be used to reinforce the nose and tail skid areas.
16. Check the angles of incidence of both wing and stab. Trim the fuse sides if necessary until alignment is correct.
17. Complete the hatch as per drawings. The Hotshot canopy is available from Midwest Products, Hobart, Indiana.
18. A smooth glassy finish on the ply can be achieved quickly with four coats of clear dope – sanded between coats. Two color and one clear finish. Wet paper sanding and waxing complete the job.

R/C Installation

No details are presented here because of the wide variety of equipment combinations. But whatever is installed – KEEP IT FORWARD! Otherwise you'll wind up adding lead for balance! The all up weight with .049 motor, Adams actuator and 4-600 mah. nickel cadmium battery packs was 34 oz. About optimum for average flying.

Wing and Stab

About the only comment here is to build it on a flat board. NO WARPS PERMITTED. If you have never tried a built up wing before – don't start now! It's not difficult but accuracy is vital. If you want the option of the engine, be sure and add the 1/8" ply spacers in the center section to take the pylon mount. The original was built with Midwest Micro cut balsa and covered with red silk and clear doped. With so many covering materials now available, the choice can become a bit confusing so stick with something you are familiar with.

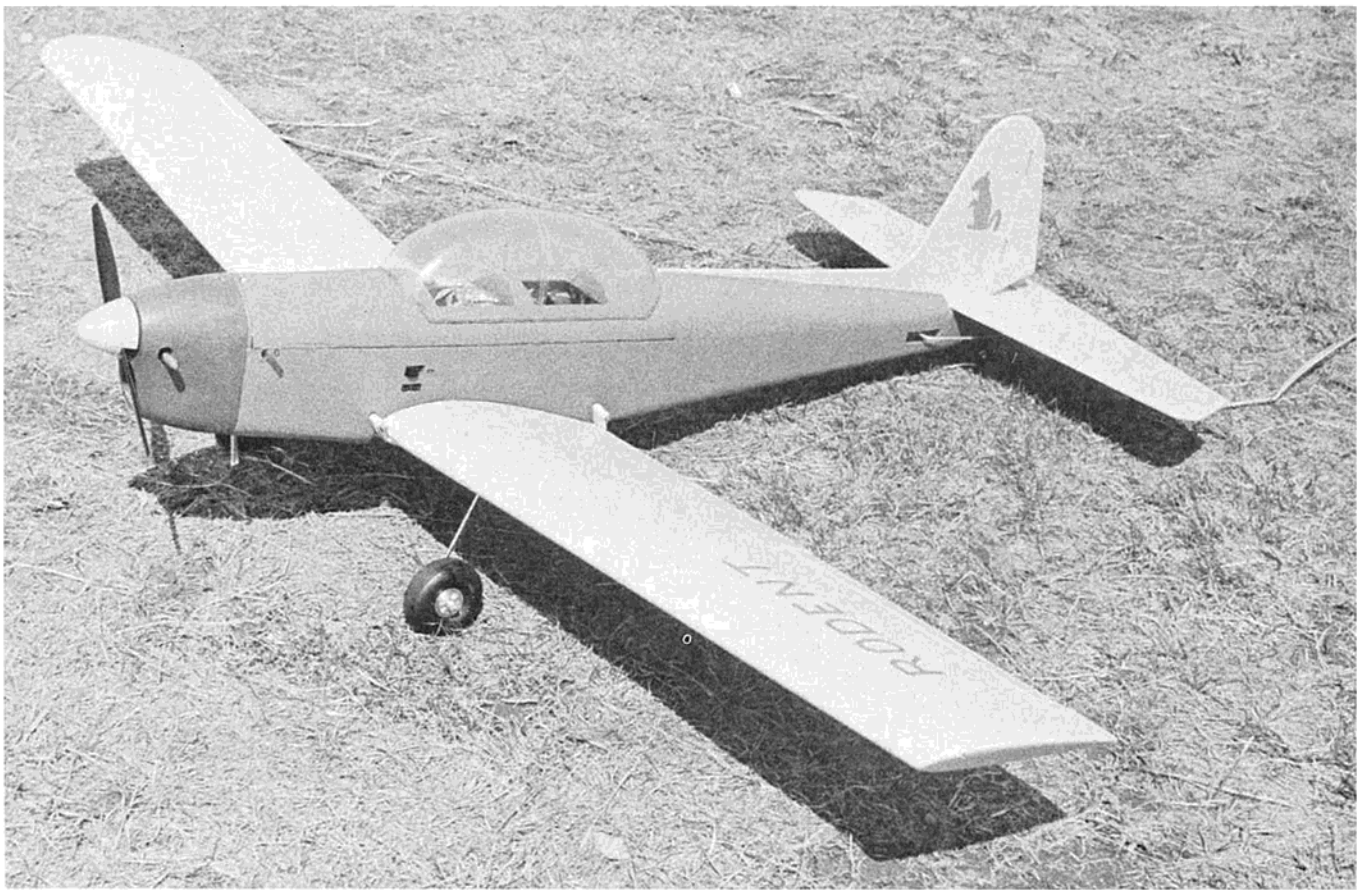
NOTE: Spruce wing spars are recommended as loads on a thin, high aspect ratio wing such as this, can build up rather quickly. Be sure the wing balances. With the long moments involved here, unequal balance will result in a built in turn.

Flying Notes

As previously mentioned, several hours of flight time have been logged using pulse rudder-only. The response is very positive when using full off or on signals while on the stick it is best to LEAD the plane – both INTO and OUT of turns. Response is very smooth but slow and so it is necessary to anticipate all turns and let it come around. The rudder area shown is OK for powered flight and thermal soaring.

Slope soaring is another matter and I am told by experts that at least 50% more rudder and elevator area would be desireable. I can only suggest that any modification be determined by the type of flying you intend to do and the equipment you will use. The Windsong responds readily to elevator trim and can be flown quite fast for wind penetration or trimmed out close to a stall for thermal sniffing – not unlike a free flight or tow-line glider. On an engine run of 3-4 minutes, an estimated altitude of 3-400 feet can be reached giving an average gliding flight of 6 minutes in

(continued on page 39)



THE RODENT

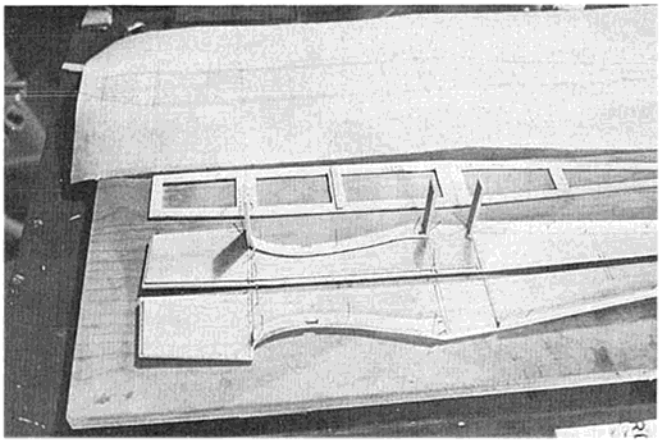
BY ABBOTT W. LAHTI

A 40" SPAN, .049-.10 POWERED LOW-WING AIRCRAFT DESIGNED FOR THE LAHTI PULSE PROPORTIONAL SYSTEM. BEARING A STRONG RESEMBLANCE TO THE DEHAVILLAND CHIPMUNK, THE MODEL IS QUITE CAPABLE OF ADVANCED PERFORMANCE.

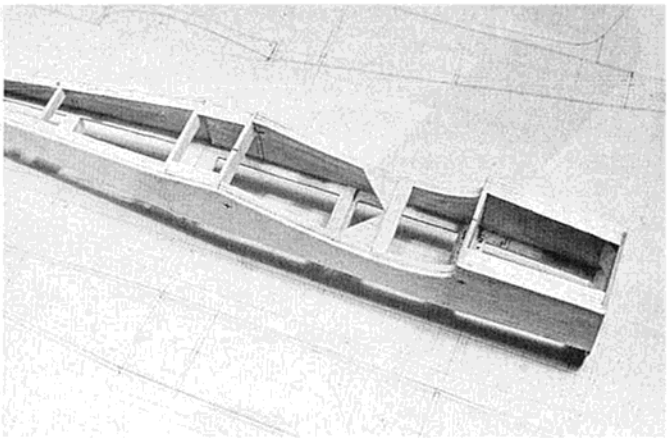
My favorite light aircraft has for a long time been the British and Canadian DeHavilland "Chipmunk" primary trainer, so I decided that sometime I would build an R/C model of one. The available "Chipmunk" kits were for larger models, but having a personal preference for smaller aircraft, I decided to make one from scratch. It used simple construction techniques based on Owen Kampen's crutch idea and either the Midwest or Testor replacement foam wings. Furthermore, it was a good test bed for my decoder, which was described in last month's issue of R/C Modeler. The result is not a scale "Chipmunk" but does bear a strong family resemblance, hence the name of the "Rodent."

The prototypes were originally flown with a throttle equipped Cox 0.049 Medallion with a QZ muffled cylinder assembly (most flying sites in the Boston area require mufflers). This motor combination provides considerable power in a very light package. If you are an experienced flyer or very sporting, the design provides room for a 0.09 or 0.1 engine. It is too bad that Cox does not make a QZ assembly for their 0.09 and 0.15 engines. They would fit in these smaller cowled models very nicely. An OS Max .10 provided the additional margin of power for truly outstanding performance.

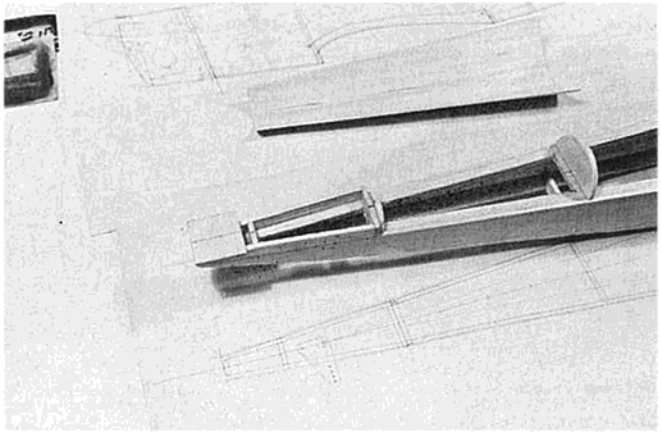
Coupled aileron and rudder, plus elevator, are used for control. The ailerons are responsible for its smooth performance and it is recommended that they be used. A lightweight, high-pulse rate, pulse proportional system should be used. My system as well as the Airtrol RE-1 are both very suitable. The dual Rand system with the small battery would be all right, but the large battery takes up too much room and is too heavy. Conventional Galloping Ghost has not been used but it should not



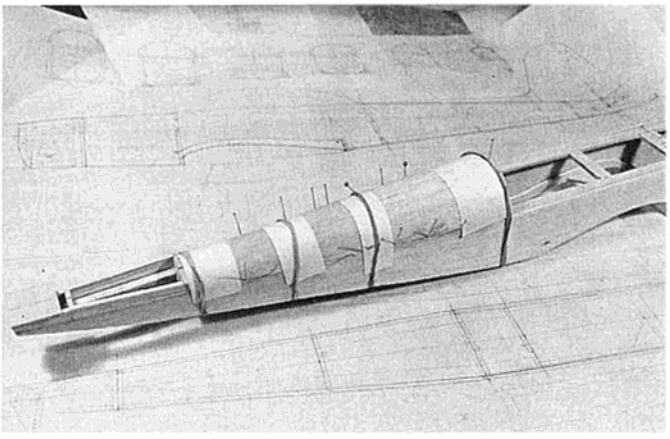
Pre-bent sides and doublers, wing saddle, & formers F2-F4.



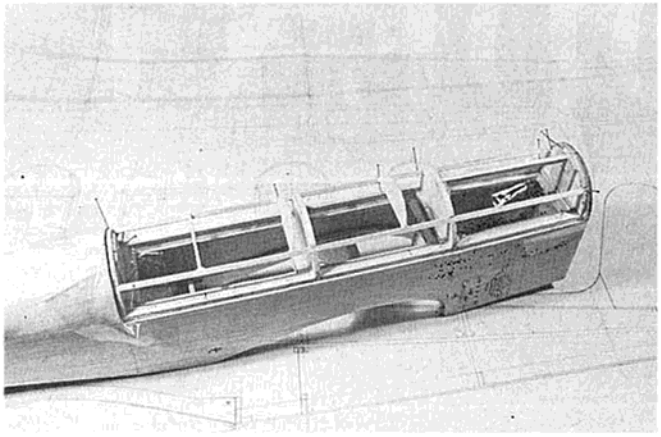
Assembled fuselage, bottom view.



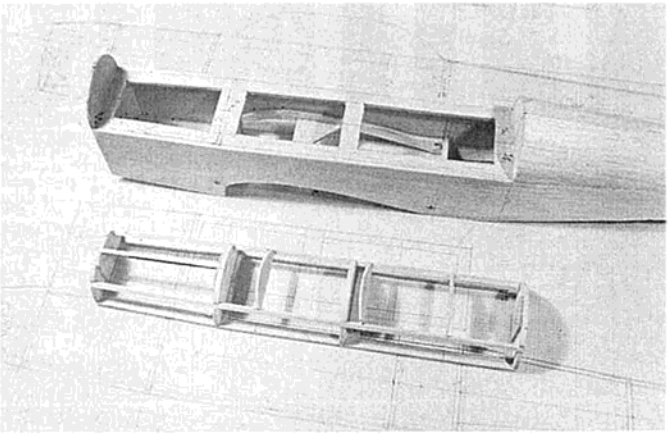
Stab saddle with F-10. Note pre-bent rear cover.



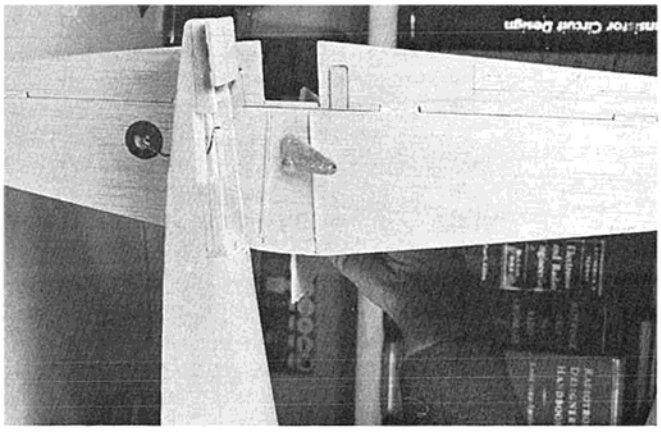
Rear cover being glued in place.



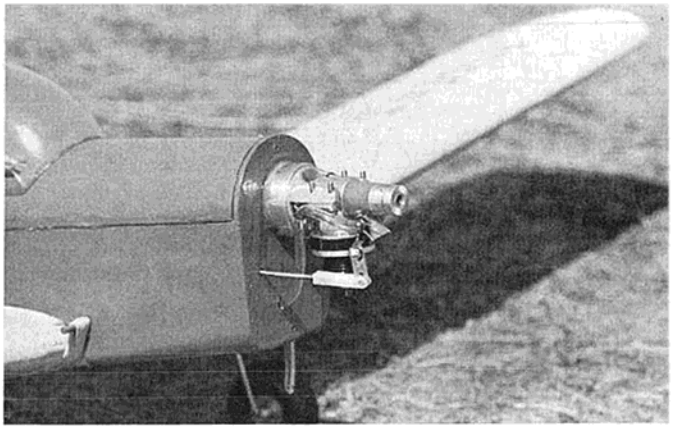
Hatch being built on top of fuselage.



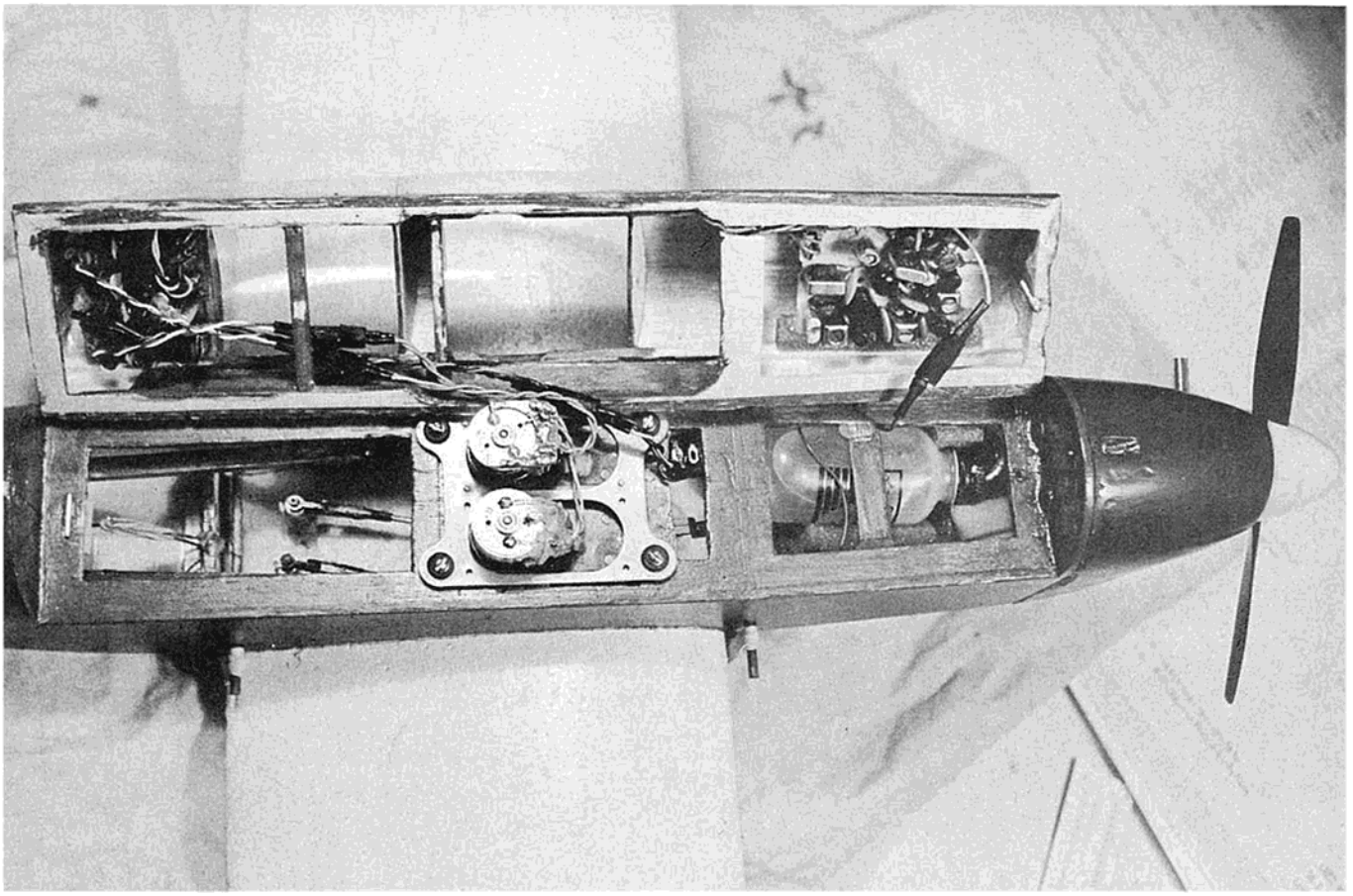
Completed hatch frame with fuselage.



Tail assembly - note tail wheel linkage.



View of .049 engine and throttle.



The Lahti system installed in the 'Rodent.' Note the aileron linkage and the internal rubber band antenna tensioner. The antenna runs along the outside bottom. The converted SH-100 receiver does not use its case since it is not needed and only adds weight. The receiver is cemented to foam with G. E. Clear Seal. Note the crutch construction technique used for both the fuselage and hatch.

present any problems if the control surface throws are not excessive.

A foam horizontal stabilizer is not used since part of the Chipmunk character is obtained by the shape of the stabilizer which cannot be approximated by the foam unit. Also, a 1/8" sheet stabilizer permits more room to unobtrusively connect the steerable tailwheel to the rudder.

Before beginning construction, collect all the materials, adhesives (Titebond, and either Sig or Hobbypoxy formula 2 epoxy, and a tube of clear acetate cement), several new No. 11 Exacto blades and some single edge razor blades. Cut out all the parts except for F-10 and label them. Use a metal straight edge for all straight line cuts. Mark the former positions on the sides and crutches. Mark the fuselage position and the fin position on the horizontal stabilizer.

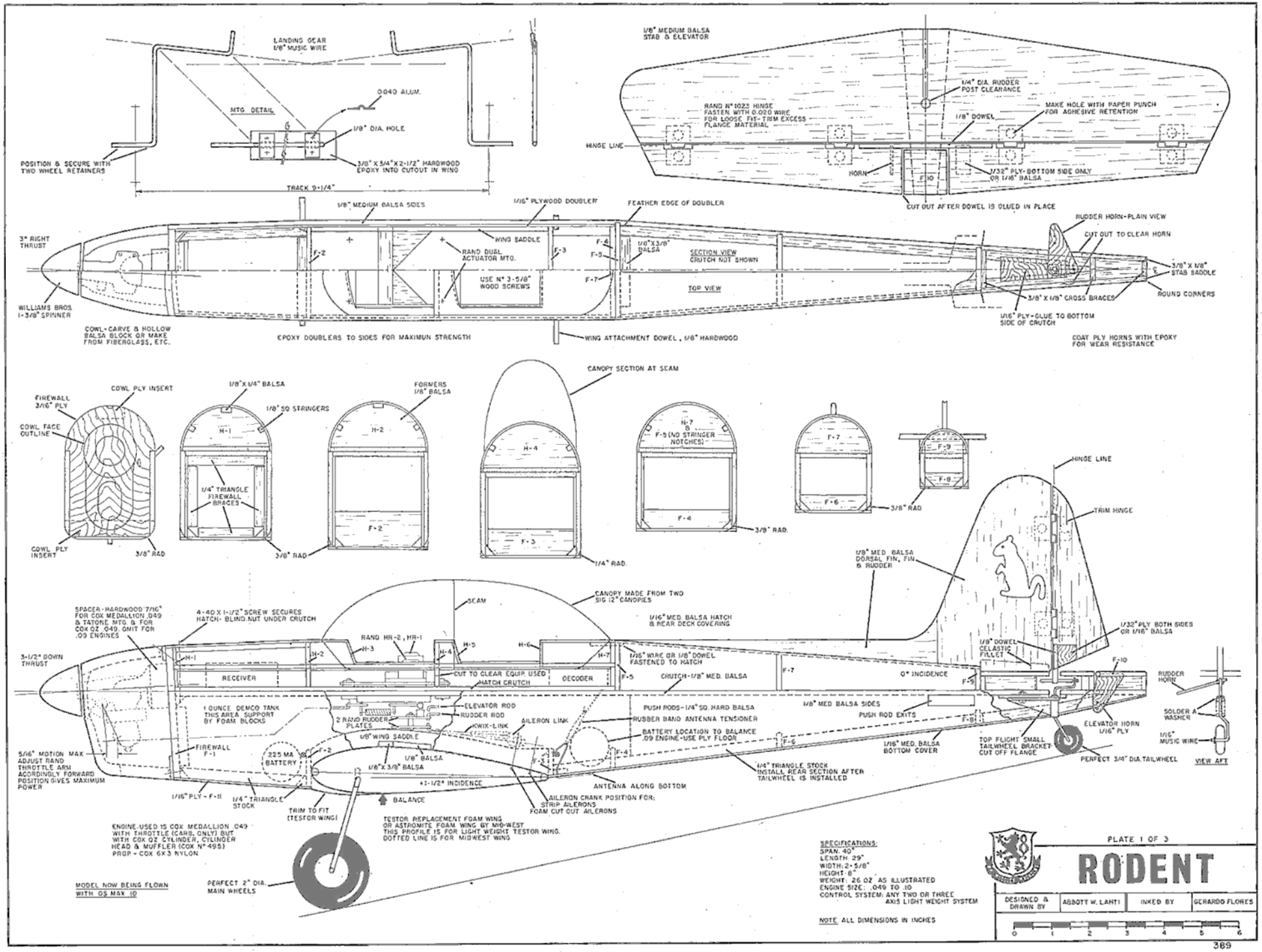
Fuselage

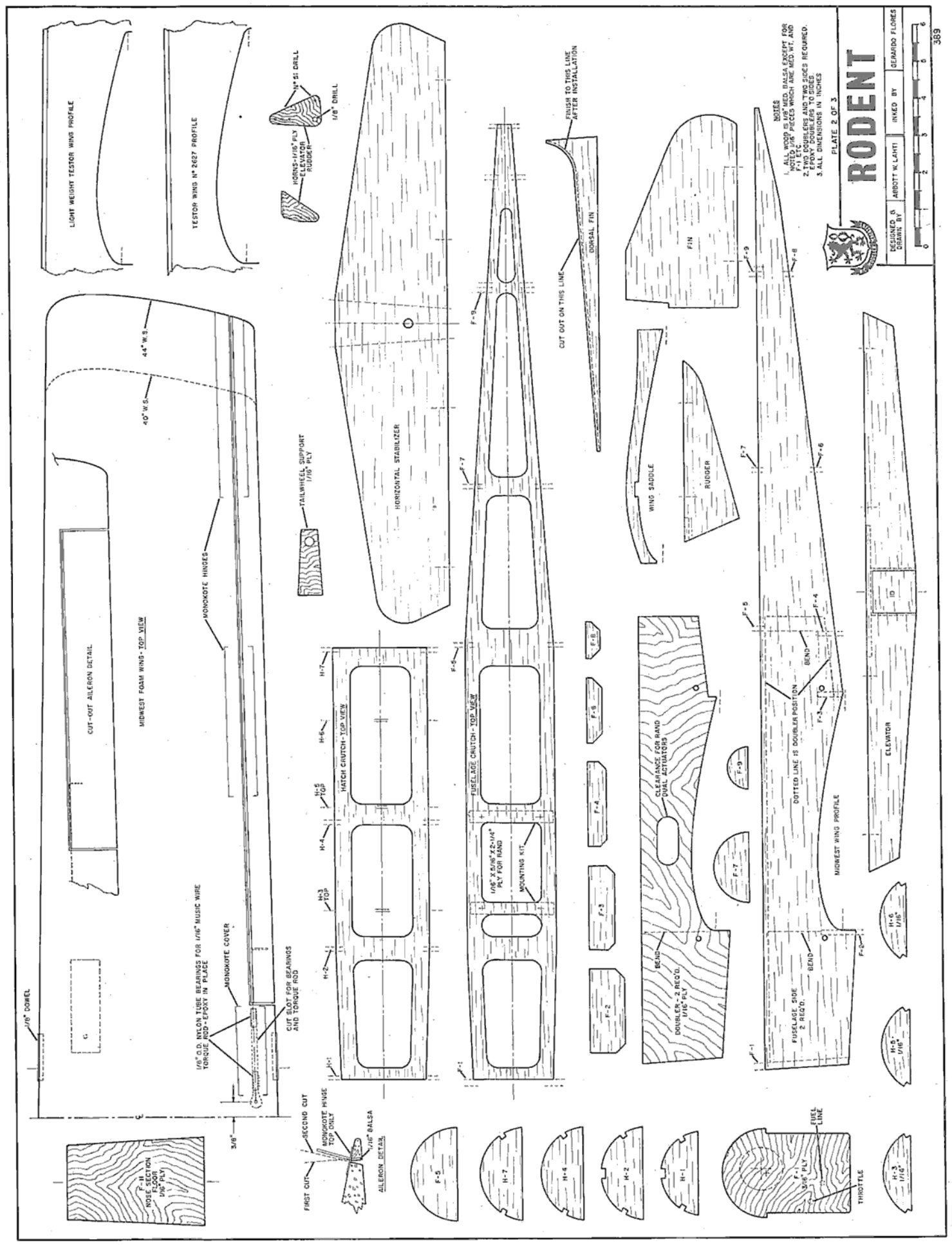
Pre-bend the sides to conform to the crutch by cutting a narrow vee almost through the wood on the inside and bending inwards. Pre-bend the front of the doublers by cutting part way through on the outside. Don't worry about lack of strength; the cuts will be filled with epoxy. Lay the sides out on the bench, inside up. Coat the doubler with epoxy and position onto the sides, making sure that there is a 1/8 inch clearance for the firewall and crutch. Pin in position. Shim the nose ends with 1/8" scrap and the tail ends with any convenient prop. Scrape away the epoxy where it has oozed out into the crutch and firewall area. Check the alignment against the crutch. Glue the 1/16" x 5/16" x 2¼" ply Rand mounting strips and the tailwheel support on what will be the underside of the crutch. Glue and pin F-2, F-3, and F-4 onto one of the sides. Insure that they are perpendicular with a square. Epoxy the wing saddles in position.

When the adhesives have hardened, pin the crutch bottom side up on the bench over some Saran Wrap. Allow the nose section to overhang the edge by an inch or so. Flow Titebond along both edges of the crutch and on the other ends of F-2, F-3 and F-4, and pin the sides in position. Epoxy the firewall, F-1, in position. Now add F-6 and F-8. When this has set up, fit and glue the four 1/4" triangular firewall braces. Now fit and glue the 1/4" triangular braces cut from scrap. Allow the glue to harden and remove the fuselage from the bench and trim off all the glue flash. Cut the flanges off a small Top Flite tailwheel bracket and bolt it in position with 2-56 machine screws and lock washers. Cut away the crutch under the nuts to permit them to seat securely on the plywood. Now cut, fit and glue the rest of the 1/4" triangular longerons in two sections on each side aft of F-8. Glue and pin F-9 in position; then cut, fit and glue the 1/8" x 3/8" stabilizer saddle and add the cross braces. Glue F-5 and F-7 onto the crutch. Allow to dry thoroughly.

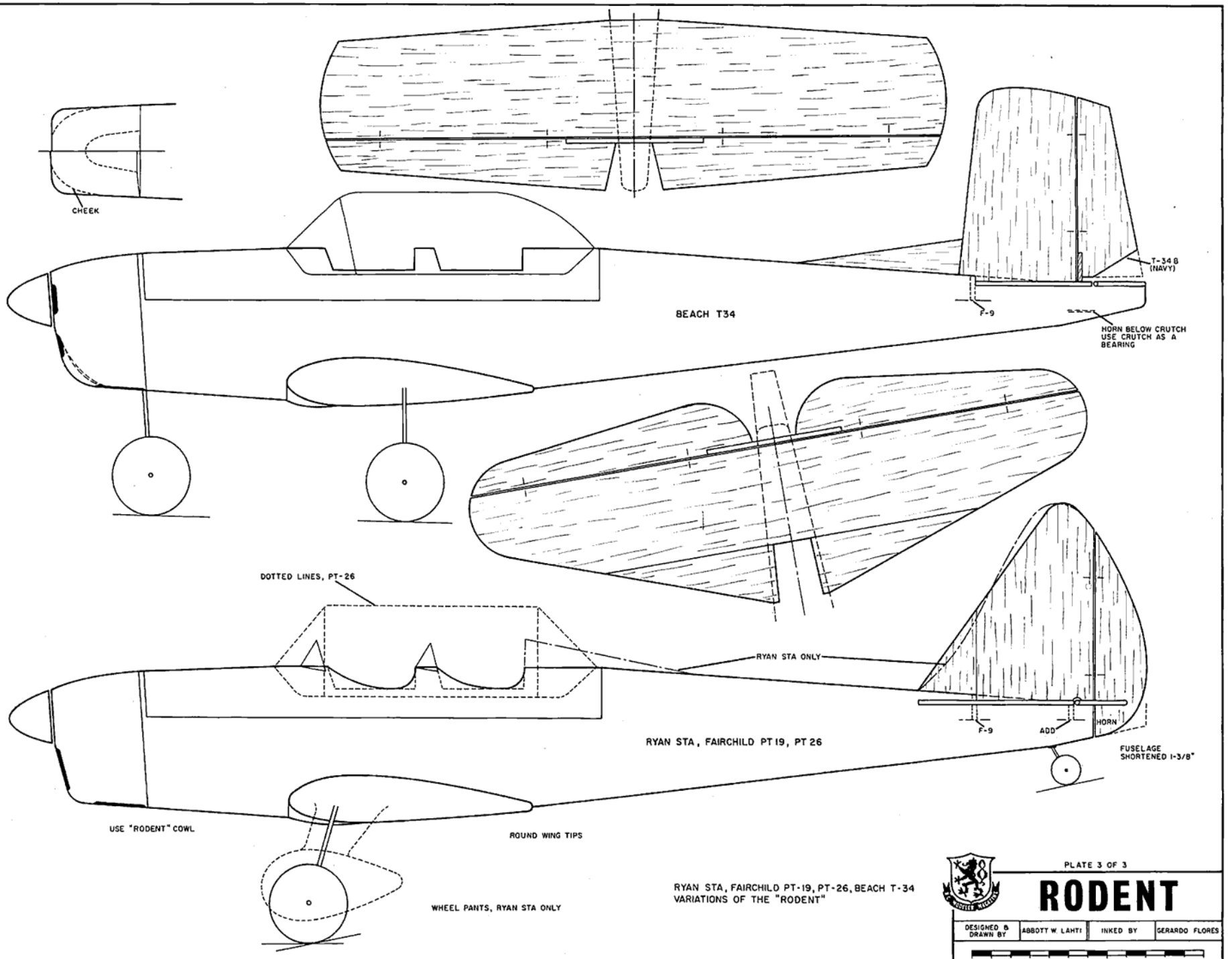
The hatch is begun by lining the hatch area, F-1 and F-5, on the fuselage with Saran Wrap and pinning the hatch crutch to the fuselage crutch. Insure that 1/16" clearance exists along the hatch crutch sides which will be eventually occupied by the 1/16" sheet hatc h cover. Glue H-1 in position, laying it against F-1. Do likewise with H-7, fitting it snug against F-5. Glue H-2 and H-4 on the crutch. Add the 1/8" square side stringers and the 1/8" x 1/4" top nose stringer which is cut out from scrap. Now glue H-3 and H-5 onto the stringers, slanting them forward.

Make a 6" x 36" sheet of 1/16" balsa


LANDING GEAR 1/8" MUSIC WIRE
MTG. DETAIL
.040 ALUM.
1/8" DIA. HOLE
3/8" X 3/4" X 2-1/2" HARDWOOD EPOXY INTO CUTOUT IN WING
POSITION & SECURE WITH TWO WHEEL RETAINERS
TRACK 9-1/4"
1/8" MEDIUM BALSA STAB & ELEVATOR
1/4" DIA. RUDDER POST CLEARANCE
RAND N° 1023 HINGE FASTEN WITH 0.020 WIRE FOR LOOSE FIT- TRIM EXCESS FLANGE MATERIAL
MAKE HOLE WITH PAPER PUNCH FOR ADHESIVE RETENTION
1/8" DOWEL
HINGE LINE
HORN
F-10
1/32" PLY- BOTTOM SIDE ONLY OR 1/16" BALSA
CUT OUT AFTER DOWEL IS GLUED IN PLACE
1/8" MEDIUM BALSA SIDES
1/16" PLYWOOD DOUBLER
FEATHER EDGE OF DOUBLER
3° RIGHT THRUST
WING SADDLE
RAND DUAL ACTUATOR MTG.
USE N° 3-5/8" WOOD SCREWS
F-2
F-3
F-4
F-5
F-7
1/16"X3/8" BALSA
SECTION VIEW CRUTCH NOT SHOWN
TOP VIEW
RUDDER HORN-PLAIN VIEW
CUT OUT TO CLEAR HORN
3/8" X 1/8" STAB SADDLE
ROUND CORNERS
3/8" X 1/8" CROSS BRACES
1/16" PLY- GLUE TO BOTTOM SIDE OF CRUTCH
WILLIAMS BROS. 1-3/8" SPINNER
COWL- CARVE & HOLLOW BALSA BLOCK OR MAKE FROM FIBERGLASS, ETC.
EPOXY DOUBLERS TO SIDES FOR MAXIMUN STRENGTH
WING ATTACHMENT DOWEL, 1/8" HARDWOOD
COAT PLY HORNS WITH EPOXY FOR WEAR RESISTANCE
CANOPY SECTION AT SEAM
FIREWALL 3/16" PLY
COWL PLY INSERT
COWL FACE OUTLINE
COWL PLY INSERT
3/8" RAD
1/8"X 1/4" BALSA
1/8" SQ STRINGERS
1/4" TRIANGLE FIREWALL BRACES
3/8" RAD
FORMERS 1/8" BALSA
H-1
H-2
F-2
H-4
F-3
1/4" RAD.
H-7 & F-5 (NO STRINGER NOTCHES)
F-4
3/8" RAD.
F-7
F-6
F-9
F-8
3/8" RAD
HINGE LINE
TRIM HINGE
1/8" MED. BALSA DORSAL FIN, FIN & RUDDER
1/32" PLY BOTH SIDES OR 1/16" BALSA
1/8" DOWEL CELASTIC FILLET
F-10
RUDDER HORN
SOLDER A WASHER
1/16" MUSIC WIRE
VIEW AFT
ELEVATOR HORN 1/16" PLY
PERFECT 3/4" DIA. TAILWHEEL
TOP FLIGHT SMALL TAILWHEEL BRACKET CUT OFF FLANGE
SPACER- HARDWOOD 7/16" FOR COX MEDALLION .049 & TATONE MTG. & FOR COX OZ .049, OMIT FOR .09 ENGINES
4-40 X 1-1/2" SCREW SECURES HATCH- BLIND NUT UNDER CRUTCH
SEAM
CANOPY MADE FROM TWO SIG 12" CANOPIES
1/16" MED. BALSA HATCH & REAR DECK COVERING
RAND HR-2, HR-1
H-1
H-2
H-3
H-4
H-5
H-6
H-7
1/16" WIRE OR 1/8" DOWEL FASTENED TO HATCH
3-1/2" DOWN THRUST
RECEIVER
CUT TO CLEAR EQUIP. USED HATCH CRUTCH
DECODER
F-5
CRUTCH- 1/8" MED. BALSA
F-7
0° INCIDENCE
F-9
1 OUNCE DEMCO TANK THIS AREA SUPPORT BY FOAM BLOCKS
2 RAND RUDDER PLATES
ELEVATOR ROD
RUDDER ROD
AILERON LINK
KWIK-LINK
1/8" WING SADDLE
PUSH RODS- 1/4" SQ. HARD BALSA
RUBBER BAND ANTENNA TENSIONER
BATTERY LOCATION TO BALANCE .09 ENGINE- USE PLY FLOOR
PUSH ROD EXITS
1/8" MED BALSA SIDES
1/16" MED. BALSA BOTTOM COVER
F-6
F-8
FIREWALL F-1
225 MA BATTERY
1/8" BALSA
1/8"X 3/8" BALSA
+1-1/2° INCIDENCE
ANTENNA ALONG BOTTOM
1/4" TRIANGLE STOCK INSTALL REAR SECTION AFTER TAILWHEEL IS INSTALLED
5/16" MOTION MAX ADJUST RAND THROTTLE ARM ACCORDINGLY FORWARD POSITION GIVES MAXIMUM POWER
1/16" PLY- F-11
1/4" TRIANGLE STOCK
TRIM TO FIT (TESTOR WING)
BALANCE
AILERON CRANK POSITION FOR: STRIP AILERONS FOAM CUT OUT AILERONS
TESTOR REPLACEMENT FOAM WING OR ASTROMITE FOAM WING BY MID-WEST THIS PROFILE IS FOR LIGHT WEIGHT TESTOR WING. DOTTED LINE IS FOR MIDWEST WING
ENGINE USED IS COX MEDALLION .049 WITH THROTTLE (CARB. ONLY) BUT WITH COX OZ CYLINDER, CYLINDER HEAD & MUFFLER (COX N° 495) PROP- COX 6X3 NYLON
MODEL NOW BEING FLOWN WITH OS MAX 10
PERFECT 2" DIA. MAIN WHEELS
SPECIFICATIONS:
SPAN: 40"
LENGTH: 29"
WIDTH: 2-5/8"
HEIGHT: 8"
WEIGHT: 26 OZ AS ILLUSTRATED
ENGINE SIZE: .049 TO .10
CONTROL SYSTEM: ANY TWO OR THREE AXIS LIGHT WEIGHT SYSTEM
NOTE ALL DIMENSIONS IN INCHES
PLATE 1 OF 3
RODENT
DESIGNED & DRAWN BY
ABBOTT W. LAHTI
INKED BY
GERARDO FLORES
0 1 2 3 4 5 6



FULL SIZE PLANS AVAILABLE – SEE PAGE 70



RYAN STA, FAIRCHILD PT-19, PT-26, BEACH T-34
VARIATIONS OF THE "RODENT"

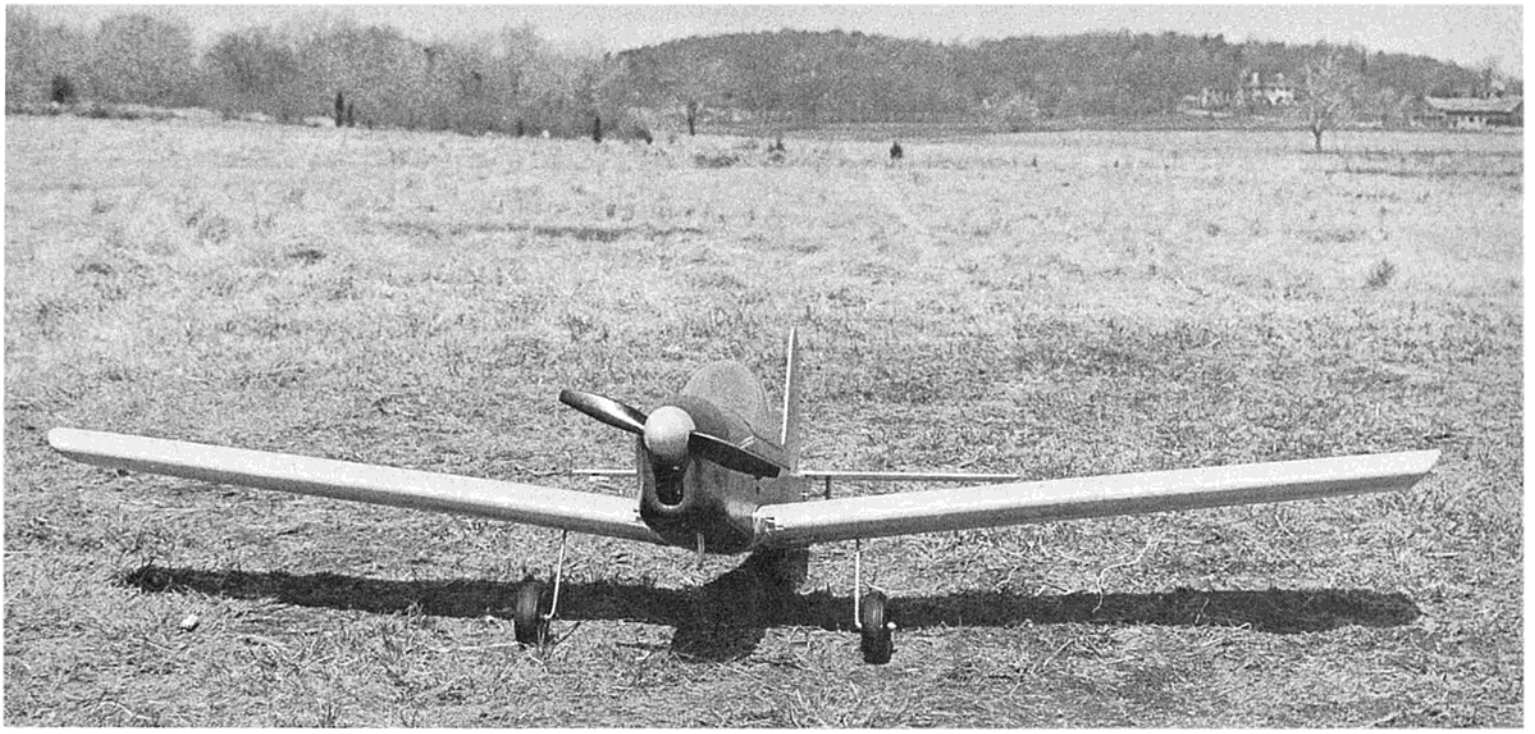
PLATE 3 OF 3

RODENT

DESIGNED & DRAWN BY	ABBOTT W. LAHTI	INKED BY	GERARDO FLORES

0 1 2 3 4 5 6

389



by taping two 3 inch sheets together closely on one side. Open the crease and fill with acetate cement (which is waterproof), then lay flat to dry over pieces of scrap balsa so that air can circulate underneath hastening the drying.

When the hatch formers and the 6 inch sheets have dried, remove the tape and cut the wide sheet into the approximate lengths of the hatch and rear deck. Soak them in water until very pliable, then wrap the rear deck over the fuselage formers and hold in position with rubber bands. Use file card strips under the bands to avoid forming grooves in the wood. Also position the bands over the formers to prevent the deck from becoming swaybacked. Bend the hatch cover over a 2½" diameter bottle or tube. Let these dry completely. They can now be trimmed, glued and pinned in position. A vee in the hatch covering extending from H-1 to H-2 will allow it to conform to the change in curvature.

Mix some more epoxy and smear it thinly around the inside of the fuselage from F-1 to F-4. This fuel proofs that area and adds a little more strength. Then epoxy F-11 onto the fuselage. The aft bottom cover is not installed until later.

Cowl

This can be carved from a balsa block and hollowed out so that the walls are about 1/4 inch thick. It will be coated with epoxy inside and out after it is fitted over the engine and all points of interference with the throttle eliminated. Alternatively, it can be made from fiberglass or the Hobbypoxy easy-does-it method over a slightly undersized solid mold. This technique is recommended because it provides more room inside. The cowl fastens to F-1 with two No. 3 x 1/2" wood screws.

Tail Surfaces

Glue sections of 1/8" dowel into the rudder and elevator. When dry, cut away F-10 and glue it onto the fuselage. Fit your favorite nylon hinges (I prefer the Rand No. 1023 hinge) and assemble the rudder to the fin and the elevator to the stabilzer. Make a hole in the hinge flange with a paper punch for adhesive retention. Insure that there is no binding. Next epoxy the fin to the stabilizer, making certain that they are perpendicular. When it is secure, epoxy the rudder horn to the rudder dowel extending through the stabilizer. Angle it as shown on the plans. At this point the tailwheel is fitted to the fuselage. Its wire bends back and up to intercept the matching hole in the rudder horn. Now glue the stabilizer to the fuselage on its saddle, making sure the tailwheel wire has engaged the rudder horn. Fit either a nylon or plywood horn to the elevator. The plywood horns should be coated with epoxy for wear resistance. Now add the Celastic rudder fillet.

Wing

Midwest or Testor 44 inch foam wings are used. Check the profile against the plans since the two that Testor supplies as replacements for its aircraft and the Midwest wing all have different cambers. The fuselage wing cutout must match it. Strip ailerons are recommended because they are the easiest to build. Draw two lines 9/16" and 5/8" on the wing top forward of the trailing edge. Refer to the plans as to the cutting angle made along those lines. Discard the narrow foam wedge. Glue the foam trailing edge to a strip of 1/16" balsa with Titebond. Make certain that there are no warps and that it is perfectly straight. This is now a very light, torsionally rigid, foam aileron. Bend and fit the 1/16" music wire torque rods. Slide two sections of 1/8" O.D. nylon tube over each wire prior to making the last bend. Epoxy them to the ailerons after cutting away some of the balsa backing. Cut a 1/8" square trench in the wing to accept the torque rods and the nylon bearings. Attach the ailerons to the wing with a 1/32" clearance by a single layer of MonoKote strip. Now epoxy the bearings to the wing, then cover with a MonoKote strip. Slab ailerons are made in the same way if you desire to use this kind.

Epoxy the landing gear blocks into the under side of the wing. Bend 1/8" music wire to form the two landing gears. Fasten them to the blocks with metal strips or Veco wire retainers. Use No. 3 x 1/2" wood screws.

The designed wing span of the Rodent is 40 inches (shortening is done prior to the aileron construction) but if you are not too experienced a flyer, start out with the full 44 inch span.

Equipment Installation

Begin by installing the servos or actuators. If Rand units are used, they can be assembled on Rand's dual actua-

(continued on page 38)

(continued from page 37)

tor mounting plate. Fasten this to the top of the crutch with Rand grommets. Cut away the crutch and H-4 as necessary. My Rodent uses an HR-1 mounted in an HR-2 base and the HR-2 is really an LR-3 with the elevator plate removed. Connect the rest of the electronics temporarily to check the mechanical phasing and to see whether they will "go around" without fouling the doublers. A little cutting may be necessary. The rudder and elevator pushrods are made from 1/4" square hard balsa with Kwik-Links epoxied to the horn ends and 1/16" music wire on the actuator end. I prefer the Rocket City keepers because they slide axially taking up little room to connect or disconnect. Add the 1/16" lower rear sheeting, grain lengthwise, and round off all the bottom corners.

To have coupled rudder and ailerons, a second Rand rudder plate is bolted to the existing one with 3-48 x 1/2" machine screws and spaced 3/16" from it. I used the ferrules in a Rand mounting kit for spacers. A 5/8" length of 3/32" O.D. brass tubing is fitted over each crank end of the aileron torque rods and soldered, over which the Aileron Links are positioned. Temporarily assemble the wing to the fuselage with dowels and rubber bands. Fit a pair of Kwik-Links from the added Rand rudder plate to the Aileron Links. Drill out the rudder plate's holes so that the links are free to move up and down 30 degrees. Open up the Kwik-Link ends so that they do not bind on the Aileron Links. The stunt in connecting these is to previously attach the Kwik-Link to the rudder plate (Rocket City retainers again), reach into the fuselage, grasp the Aileron Link with your thumb and first finger, and snap the Kwik-Link in place with a pair of long nose pliers.

The engine is bolted to a radial mount which is in turn bolted to the firewall. The 0.049's require a 7/16" spacer in back of the radial mount. Right thrust is obtained by drilling out the engine crankcase mounting holes and skewing it on the radial mount. Adjustments are readily made this way. Use a Ny-Link between the throttle and actuator.

Since my motor is equipped with a muffler, the throttle controls the venturi only. The slotted link of the Cox throttle spray bar was removed and a strip of scrap 0.030" brass was bolted and soldered to the throttle arm. It must be bent to clear the muffler. Drill a No. 51 hole in it for the Ny-Link so positioned that the effective arm length is one inch. This allows a three position control with the fourth being an idle cut off. It is connected backwards in that the forward position gives full power.

The receiver, decoder and battery can now be installed as shown on the plans. G.E. clear seal is a convenient adhesive to hold these components in place. Isolate the receiver with foam. The battery is not connected until the plane is finished since its position determines the correct overall balance which is from 1 7/8" to 2 inches back from the wing leading edge at the fuselage. A one ounce Demco plastic three outlet tank is installed next if you are using an .049. Use a 2 ounce Sullivan Pylon tank if you utilize the Max .10. Cradle it on foam blocks and retain it with a section of springy ice cream stick. Do not let it foul the throttle rod. The switch and charging socket can be fitted in any convenient place. I used a five pin socket connected to each battery cell to take advantage of Amp-Gate charging when those diodes become readily available.

Canopy

The canopy is fabricated from two 12 inch Sig canopies cut and fitted back to back. They are joined with a 1/4" wide scrap canopy section using acetate cement. After the fuselage is doped, it is retained with acetate cement.

Finishing

Any lightweight technique can be used on the wood surfaces. The method I used was to dope the entire structure with two coats of 50-50 clear dope and thinner, sand, apply dry colored tissue with 50-50 clear dope, add two thin coats of color dope, and finish off with a coat of 50-50 clear. All dope was brushed on. The next time I plan to use Super MonoKote over the clear doped and sanded wood. The foam wing was sprayed with two light coats of Testor's PLA which was also used on the cowl. The wings and tail were colored yellow and the fuselage Bonanza blue. Solarfilm can be applied directly to the foam wing due to the low heat needed for application.

The last step is the sealing of the wing saddle, hatch, and cowl. With coarse sandpaper roughen the fuselage wing saddle, the bottom of the hatch crutch, and the mounting face of the cowl. Apply a bead of G.E. clear seal to the roughened areas. Cover the mating surface with a smooth layer of Saran Wrap to prevent undesired sticking. Fasten the wing, hatch and cowl to the fuselage with their own mounting fixtures. After the G. E. seal has cured for eight hours, remove the parts, trim the flash and remove the Saran.

Flying

Hopefully the total weight is around 26 to 27 ounces and the aircraft is balanced correctly. Set all the control surface throws for about plus or minus 10 degrees. Later on they can be increased. Mechanically trim all the surfaces to neutral. A range check should be made. Run the engine to see if vibration bothers the electronics. The control surface movements must correspond to the appropriate transmitter stick movements.

A Cox No. 755-6 glow plug clip lead with the clips bent 90 degrees to the handle is used for starting. The bronze clips are brittle and must be bent with care and the bend solder reinforced. To start the engine, invert the plane, prime the venturi with 4 or 5 drops of fuel (Cox racing fuel is fine), pull the prop slowly through several revolutions, right the plane, and flip the prop smartly. It should start readily.

Hand launch the first flights and let it climb to at least 100 feet before maneuvering. The original Rodent flew "right off the drawing board" with only a slight reduction in the wing incidence, which change is incorporated in the plans. Shadow turns will not cause the nose to drop but a steep turn will unless up-elevator is applied. Loops and rolls require a shallow dive to pick up sufficient speed. Stalls are gentle and straight with no tendency to fall off on either wing. The glide is flat and the rate of sink is low. It penetrates the wind very well and can be flown when other planes are grounded. ROG's can be made from pavement or short, smooth grass. Begin the takeoff run with full up elevator. In all, the performance is quite scale-like.

If you are a beginner to R/C, by all means have an experienced flyer help you through your first flights.

Since its "Chipmunk" appearance is largely due to the shape and position of the tail surfaces, dorsal fin, canopy, cowl and landing gear, these can be varied to make approximations of other aircraft. The Ryan STA, Fairchild PT-19 and PT-26, and the Beech T-34 are examples which can be based on the Rodent fuselage and the Midwest wing.

List of Materials

1 Midwest or Testor 44 inch foam wing.
4 1/8 x 3 x 36 med. or med. light balsa sheets.
4 1/16 x 3 x 36 med. or med. light balsa sheets.
2 1/4 x 36 triangular med. balsa.
1 1/4 x 36 square hard balsa.
1 3/8 x 3/4 x 12 hardwood.
1 1/8 x 24 hardwood dowel.
1 1/8 x 6 x 12 plywood sheet.
1 1/16 x 6 x 12 plywood sheet.
1 3 x 4 x 6 med. balsa block for cowl or cowl mold.
1 3/32 x 36 music wire.
1 1/16 x 36 music wire.
4 Kwik-Links
1 Ny-Link.
1 pr. Aileron Links
6 Nylon hinges.
2 Sig 12 inch canopies.
Misc. – Wood screws, machine screws, 3/32 O.D. brass tube, MonoKote strips, Saran Wrap, wheels, adhesives, etc.

RYAN ST

(continued from page 25)

turn. Roll out heading downwind, holding in enough back stick to visibly slow the model. Observe the descent angle on the downwind leg. If the Ryan appears to have a very flat glide, or does not come down at all, throttle back a bit more. Altitude should be fifty to seventy-five feet now. When the ship is approximately two hundred feet downwind, begin another 180 degree descending turn to the left. This turn will line you up on the runway. When it is obvious that the model will make it to the desired touchdown point, throttle back completely. At about five feet flatten the glide with an extra dab of up elevator. If the model is correctly slowed in the pattern, no ballooning will occur. An ideal touch down is made on all three wheels simultaneously. After touchdown, hold in the back stick and maintain a straight roll out with rudder. As your Ryan slows to a walk, turn off the runway and taxi back to the pits.

Hmmmmmm, I wonder how much brakes and flaps would weigh?

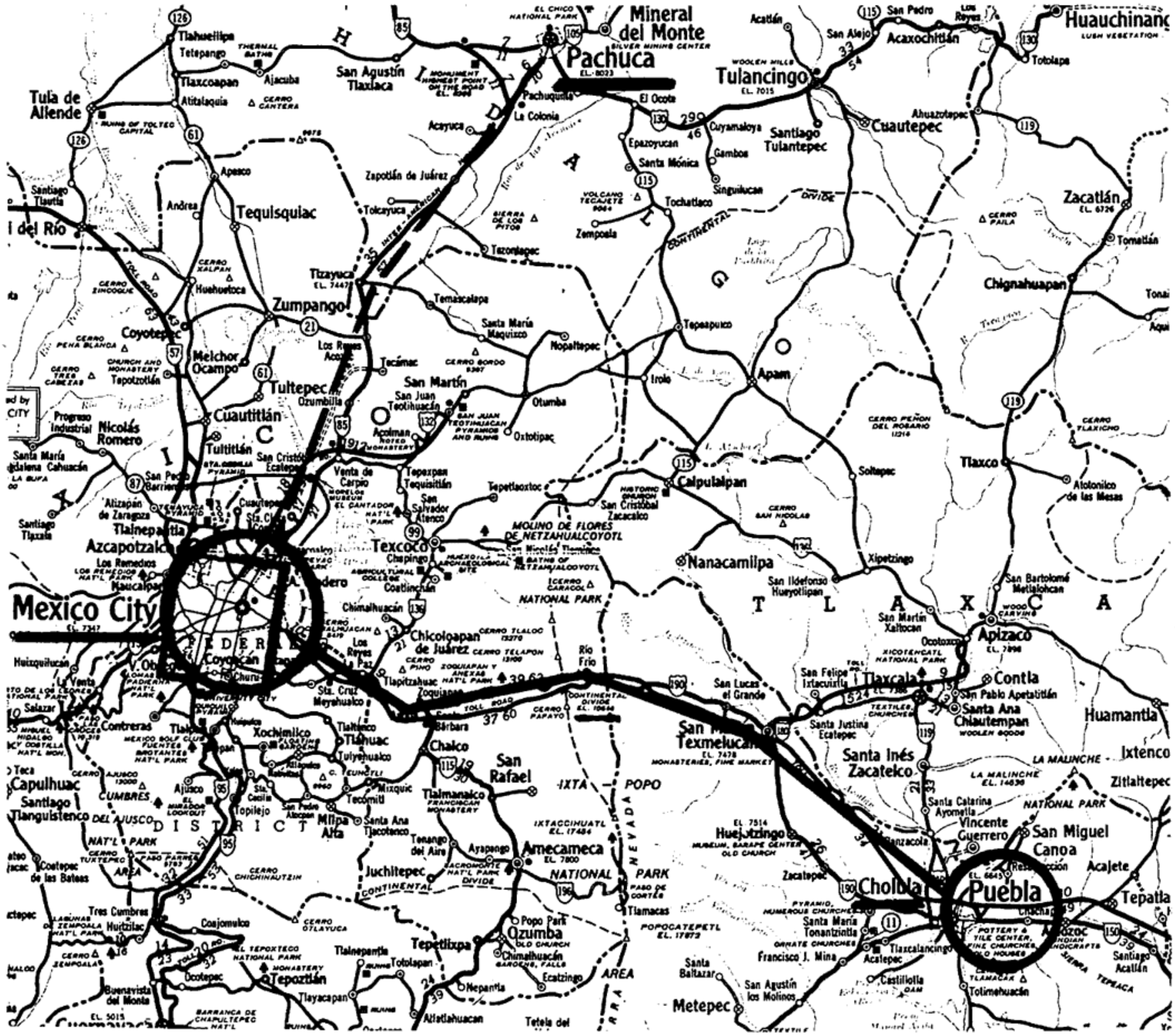
WINDSONG

(continued from page 30)

absolutely still air. Under lift conditions anything is possible so be sure your batteries are always charged up fresh.

It has been a real joy to make, what I hope is, a small contribution to the "state of the art." Here then is another approach in construction which will lend itself to a variety of applications limited only by one's imagination.

Imagine away!



X-C Endurance race courses followed by AMRCers of Mexico City. Dashed line to Pachuca was 'test run' for new RC event. Solid line traces 73 mile route through mountains to Puebla. Continental divide at Rio Frio shows highest point.

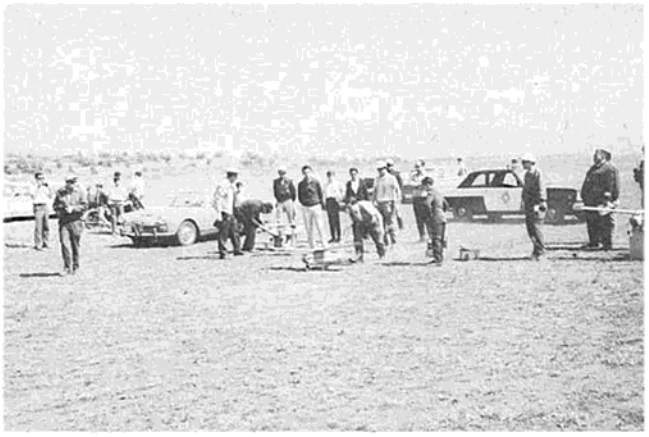
X-C RACING

R/C MODELER MAGAZINE SPONSORS A NEW R/C DIMENSION

By JERRY KLEINBURG

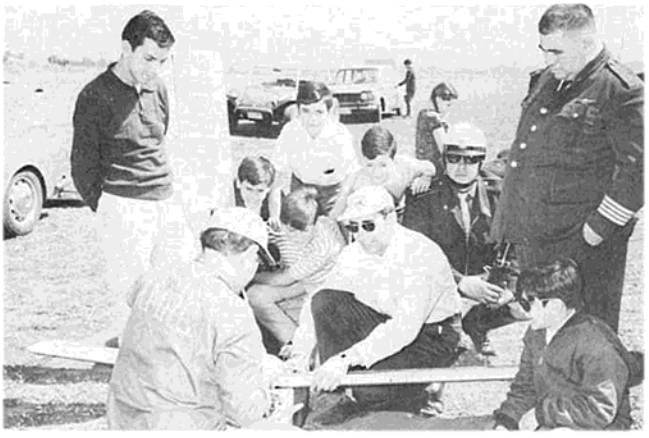
We had heard about X-C, that is, cross-country RC racing, but we had to see it to fully appreciate the challenge, suspense, excitement, and gratification associated with this new wrinkle in the ever-expanding RC panorama. Opportunity for a close-up look came about when the AMRC club of Mexico City staged a race from Mexico City to Puebla over a 75 mile route that started at 7350 feet high, climbed to 10,646 feet as it snaked through mountain passes past snow-capped Mt. Popocatepetl's 17,872 foot peak, and then descended again to 6650 feet at ancient Cholula and its pre-Columbian pyramids. A challenging accomplishment for pilots and planes!

As in many such ventures, the idea for this particular race came out of a half-jest among the MRC fliers who thought it might be a different way to get their planes to Puebla where the 4th round of the Mexican FAI team selection tournament was to be held in early November. But jest became serious effort as special planes were prepared for the new event. Fuel systems were designed and tested, fuel mixtures were discussed and tried, dusty cabin planes were renovated to carry fuel and propo radio gear, while engines were selected and fitted into the endurance systems. A test run - a mere 60 miles - was made to Pachuca to gain experience for the more rugged run to Puebla. Although



Take-off try. Initial effort in Mexican X-C endurance race by Adolpho Valezquez, modified Live Wire stalled. Mountains loom in background, was course for race.

Fuel-up. Supercruiser gets 63 ounce fuel load. Teamed by Gallegos, Prat, and Esteves. Motorcycle escort, Manuel Escobar watches process.



Lash-up. Smog Hog gets wing in final assembly for cross-country race try. Teamed by Feiner, Elizondo, and Westrup. Aviation official, Luis A. Jara notes procedure with police escort Luis Quintero.

Close-up. Live Wire, teamed by Valezquez, Padillo, and Velasco, gets final attention. Motorcycle escort Angel Suarex, and Henry Westrup in white shirt, check details.

Happy group after race, 73 miles from Mexico City to Puebla - non-stop! Paco Gallegos holds Supercruiser, Salo Feiner with Smog Hog. Cabin planes were practical. Aviation officials and highway troopers cooperated, helped in holding race.

Youngsters showed interest. Paco Gallegos gets help in checking fuel used during race. ST 60 burned .76 oz./min. in 1 hr. 19 min. flight.

Fuel system arrangement, simple. Planes carried 63 oz. Feiner checks fuel remaining after 73 mile trek. K&B consumed .4 oz./min. for 1 hr.-34 min. duration.

only one plane of the 4 that tried, made the distance, valuable knowledge of the practical problems involved was gained and shared by the club members out of this initial trial.

In the meantime, in a development unrelated to the Mexican activity, RCers of the Northern Utah RC Club conducted a "fun" event where 7 planes and teams made a try at a 26 mile course from Corinne to the new Golden Spike Monument in northern Utah west of Brigham City. In this attempt, 3 men teams consisting of pilot, co-pilot, and an RC experienced driver were used - a set-up found best also by the Mexican innovators. The 7 NURC pilots were Harold Money, Jerry Holcombe (flying Bud Neiser's plane), Walt Staff, Kirk Lee, Arvid Swift, Chuck Steed, and Von Warner. Harold Money's K&B 35 powered Tri-Squire had the largest engine and lasted for 21 miles before running out of fuel due to unexpected 25 - 30 MPH headwinds. Jerry Holcombe came closest to making the whole trip non-stop, getting to some 300 yards of the destination. Fuel tanks were mainly 16 ounce clunks with direct feeds. Walt Staff's diesel powered Mambo Special also traveled 21 miles in the Utah affair, while Chuck Steed was judged second at 23 miles.

Back in Mexico, final arrangments were completed for the pioneering race. Police escort was arranged, convertible autos were readied, and rules for the contest were agreed upon. The rules were simple and provided a point system to establish the winning plane. One point for each kilometer flown, 20 point penalty for any mid-course re-fuel or repair stop, and a pilot was given 5 points for each other plane getting to the finish line with an elapsed time longer than his.

Three planes made it to the starting line; a K&B 45 powered Live Wire teamed by Rafael Padillo, Enrique Velasco, and Adolpho Velasquez; a K&B 45 powered Smog Hog teamed by Salo Feiner, Alex Elizondo, and Henry Westrup; and a ST 60 powered deBolt Supercruiser Bipe teamed by Paco Gallegos, Felix Prat, and Humberto Esteves. Each plane was fueled with a 2 tank supply interconnected with a simple gravity-vacuum feedline arrangement. Engines started and the drama of lifting the heavily laden planes from the 7350 foot high field began. It was soon evident the Live Wire was out of the action when it stalled heavily on take-off and was damaged enough to preclude further trying this time. The Supercruiser broke a prop as it ran out of runway on its initial try and a scramble was on to retrieve it for another go. Salo Feiner guided the Smog Hog into a shaky lift-off and slowly fought for altitude while his crew yelled encouragement as they grabbed flight boxes and dashed to the waiting convertible. Four minutes later Paco Gallegos got the Supercruiser into the air and the race was on!

It was quite a caravan as each plane sped down the interstate highway followed by a convertible, a motorcycle policeman, and several cars containing assorted wives, children, well-wishers, and spectators. The first miles were level and easy, allowing the pilots to feel out their planes, adjust to wind drift, and to stabilize engine speeds. It also gave the drivers a chance to become accustomed to listening for driving instructions and to learn NOT to watch the airplane. Previous RC experience was obviously helpful in this job by making it possible to be able to anticipate necessary driving speeds as road and flying conditions warranted the need. It's a task not to be taken lightly. Flight problems soon developed as hills and tall trees began to appear on both sides of the road. It soon became a system where the plane was edged to an open side of a turn in the road or to slow the car as the plane climbed for a bit of altitude when steep cuts or tight valleys had to be gingerly negotiated. At times speeds reached 75 mph when downhill descents or wind allowed the plane to scoot ahead. Engine throttle action was kept at a minimum to avoid stoppages and to conserve fuel.

The first crisis came suddenly as the Smog Hog disappeared behind a small hill as the car swept through a curve into a mountain cut. Hearts seemed to stop as the car crawled upward along the solid rock slit while the thought flashed about possible radio signal loss. Eternity lasted 10 seconds, then the rock wall slid past and the ship came into view again flying along as if nothing had happened! This incident was followed shortly by a neck-and-neck race as the faster ST 60 powered Bipe finally overtook the Smog Hog during another passage through a rock-lined cut in the hill. Engines sounded like angry bees as the rocks echoed the sound coming from the two planes suspended some 50 feet above the road. It lasted only a short while, then Beto Esteves edged the red Alpho convertible past Henry Westrup driving the Buick as the Bipe gained distance on the Hog. In a few moments plane, cars, and escort were out of sight around road turns and tree covered mountains. From then on it was a matter of careful flying to assure avoiding hills and trees and to not run out of fuel.

One hour and nineteen minutes after take-off from the flying site of the Metro 14.5 RC Club of Mexico City, Paco Gallegos brought the Supercruiser into a landing at the pre-selected field on the western edge of Puebla. Speedometers showed a bit more than 73 miles had been flown non-stop in the endurance race. Salo Feiner brought the Smog Hog into an uneventful landing after an elapsed time of 1 hr. 34 min. This brought on a round of relieved handshakes and "embrazos" hugs and mutual congratulations between the two teams. Of interest then was fuel consumption comparisons which showed the ST 60 had used 60 ounces of fuel while the K&B had used 38 ounces. This translated into an ounces/minute rate of .76 for the ST versus .40 of the K&B. As a consequence of these fuel usage figures, a fuel limit rule of 1/2 ounce of fuel per course mile to equalize engine advantages is being considered for future X-C endurance races.

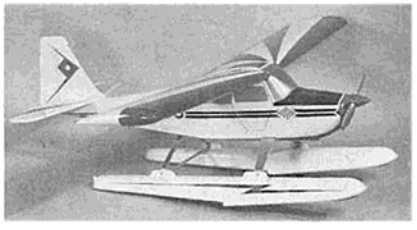
With RCers looking for new means of flying expression it appears a new chapter in the sports history has begun with the advent of X-C. And RCM is happy to have been associated in the Mexican race. While it's certainly a new way to compete, the comparison to flying an open cockpit airplane occurs to us. It also recalls the free-flight days of the late 30's when running boards were perches for timers and spotters as modelers made their way cross-country after soaring contest models.

Yes, X-C is new - but it has a familiar feel to it.

SHOP & FIELD

PRODUCT NEWS

Angel Mini-Flite Co., of Fitchburg, Massachusetts, announces immediate shipment of their 90% scale, ARF, plastic 'Citabria' – the first model in their new fly-for-fun series. Called a "plane for all seasons," the model comes fully equipped with floats, wheel pants, and skis, and is designed for .19 to .29 engines. The floats shown are capable of supporting four pounds and feature a watertight plastic extrusion as well as a molded stern leg to receive a water rudder. The model features a fully assembled body with all scale detail, a one-piece cowl, exclusive "smooth outline" tail assembly with full length piano hinges, factory-covered foam wings with optional molded ailerons, and a complete hardware package including aluminum motor mounts, formed landing gear, nylon bolts, screws, cement, and a giant plan sheet showing detailed drawings of all parts. The other models soon to be released in the fly-for-fun series from Angel include the 'Fly Baby,' well known low-wing homebuilt, and the new acrobatic 'Pro' by Champion Aircraft Co. Each model lists for $39.95 and are available at leading hobby dealers. Descriptive brochures are available by writing to Angel Mini-Flite Co., 340 Broad Street, Fitchburg, Mass. 01420.



CitizenShip Radio Corp., 810 E. 64th St., Indianapolis, Indiana 46220, has produced a new two channel digital proportional system especially designed for model boaters, although it can be used equally as well in model aircraft. Providing rudder and throttle from a completely proportional, simultaneous digital system, the transmitter is furnished with a ratchet for throttle control on the left stick, easily changed to spring centering for those who desire that particular mode. The DPT-2 transmitter also is enhanced by a leather-grained vinyl case and utilizes a Burgess D6 type inexpensive dry battery. The receiver and decoder utilize integrated circuits and weighs three ounces complete with harness and plugs. The two Model DMS servos provided with the system provide a minimum of four pounds of thrust with a .6 total travel time from lock to lock. Integrated circuitry is also utilized in these servos which feature a hot molded carbon feedback pot for maximum service and reliability. Resolution is .5%. Output modes are two push-pull linear and one rotary. Total weight per servo is 2 3/8 ounces. Size is 2¼" long by 1" wide by 1 31/64" high. A prototype of the DP-2 system, used by Ed Hughey Jr. in the 1968 IMPBA Nationals took four first places, five second places, and three third places. Price of the complete system is $199.95.

Killer Wot Boats, P.O. Box 4334, Jacksonville, Florida 32201, is presently marketing a complete control system for model electric boats. This system consists of a Killer Wot Speed Switch and Killer Wot Reversing Switch which, when wired in together, gives the ultimate in control – three speeds in forward and in reverse, with a "posi-off." When the only need would be speed control and an off position, such as in a racing boat, the Speed Switch would be used alone. This would give three separate speeds as desired, by connecting into the desired number of cells or batteries as needed. Where the need is for only one speed forward and one speed in reverse, and off, such as in the prototype boat class, the Reversing Switch could be used alone. The above switches are sold in pre-cut, preformed kits easily and quickly assembled. The switches are designed for high voltage, high amperage draw as needed in fast electric running. Feedback proportional and multichannel RC systems may be used with these switches. The Killer Wot Speed Switch Kit is priced at $4.95 postpaid, and the Killer Wot Reversing Switch kit is priced at $5.95 pp. Available from local dealers, or direct from the manufacturer.

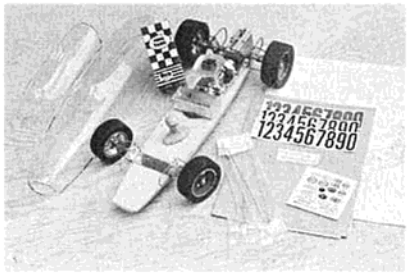
Orbit Electronics Inc., 11601 Annabel Ave., Garden Grove, Calif. 91640, is now manufacturing what is presently the world's smallest proportional servo. The weight of this servo is only slightly more than one ounce with an overall size of 1-7/16" x 11/16" x 1-3/8". Designated the PS-4 servo, this unit utilizes the same type of carbon pot that has proven so successful on previous Orbit servos. The PS-4 has approximately three to three-and-one-half pounds of thrust and it will work with any Orbit IC proportional control system. Price per servo is $40.

Midwest Products Co., 400 South Indiana Street, Hobart, Indiana 46342, in announcing production on "Das Little Stik," featured a few months ago as a construction article in RCM, says "Sure it's ugly, but it's for flying, not for looks!" Designed by Larry Leonard, 'Das Little Stik' is a smaller version of Phil Kraft's "Ugly Stik." The model is constructed entirely on a flat board in order to insure alignment. Das Little Stik is a trainer for the miniature proportional systems or a sport flying model with larger engines for the more experienced fliers. The kit includes all nylon hardware, formed landing gear, aluminum engine mounts, and Midwest Micro Cut Balsa. Wingspan is 46" with an overall area of 414 square inches.

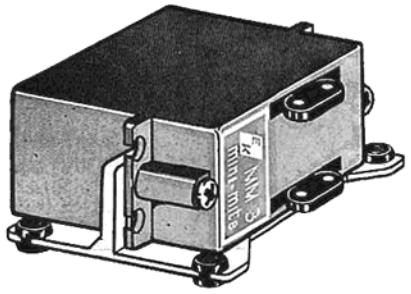
Designed primarily for engines in the .19 to .23 category, many fliers have been flying this aircraft quite successfully with the larger bore .30 to .45 engines. Price of the kit is $22.95.

For an exciting new hobby-racing sport try Ra/Car's thrilling 1/8 scale radio controlled race cars. Weighing about 6 lbs. and clocking an honest 35 mph in high gear, these precision built model cars feature genuine cast magnesium wheels, molded Goodyear tires, two-speed working gearbox-transaxle (which you can shift by remote control), all independent suspension via torsion bars and shock absorbers, universal joints, centrifugal clutch and gas engine. Any three channel digital proportional radio control set may be used to control the cars. Steering is fully proportional,

finger tip control for throttle permits hairline precision of speed control and, you can actually hear the engine rev up as you shift into low gear for better control in the turns. Formula I - Indy and GT body styles are available for the basic chassis. Cars come in kit form or fully assembled. Kits start at about $125, assembled cars (without radio) from $200. Races can be held by remote control on parking lots, tennis courts or schoolyards. Here is a dignified lifetime hobby for the frustrated Fangio types. . . on a low budget! Send 25 cents for illustrated brochure to **Ra/Car Developments, 522 W. Central Park Ave., Anaheim, Calif. 92802,** and thrill to the sight, smell and sound of realistic racing action.



KEK Corporation, 3233 W. Euless Blvd., Hurst, Texas 76053, in addition to the Uni-Mount, has produced a convenient, shock mounted single servo mount for the Logictrol III mini-mite servos. This "AIL-RON MOUNT" can be used for the wing servo installation, mounting servo to fuselage sides, and other special installations. The "AIL-RON MOUNT" retails for $1.25.



Nelson Model Products, 6053 Dougherty Road, Dublin, California has been appointed exclusive import distributor for SIMPROP Radio Control Systems, according to Jerry Nelson, principal of the organization which specializes in radio control products. This marks the first major marketing effort in the United States on the popular German digital proportional system. Both 3 channel and 5 channel SIMPROP units are being prepared for distribution from Nelson Model Products new site in Dublin, which will house parts stocks and service facilities for the R/C system. In addition to SIMPROP activity, Nelson Model Products will import, export and manufacture radio control specialty items for the model trade. The company is in production now on a glider model which is fabricated by an exclusive fiberglass and foam technique. Jerry Nelson, a rated glider and power plane pilot, offers outstanding modeling background. A veteran of national and international R/C competition, he was a member of the U.S. International Team in 1963, and managed our R/C Stunt Team at Corsica, France in 1967.

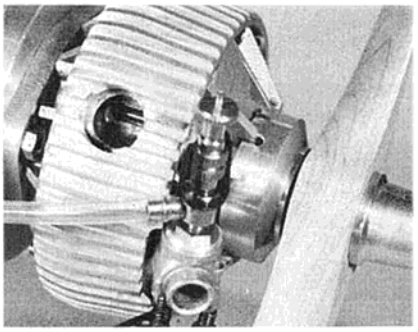
Peter Rittmaster, president of Bertram Yacht Corp., holds a full scaled radio controlled model of his famed ocean racer "Master Moppie." Behind Rittmaster is the original, a 31 foot Bertram deep vee offshore race boat powered by twin 475 h.p. Mercruiser sterndrive engines. Custom made by **One Design Electronic Models, 3100 E. Washington St., Rt. 37, Toms River, New Jersey, 08753,** the five-foot fiberglass model "Mini Moppie" can do 35 miles per hour, about half that of the real thing, with a 3½ horsepower Homelite gasoline engine. A 4 channel Citizenship transmitter and receiver comes with the boat's $700 price. In trials before the Miami-Nassau ocean powerboat race, the little craft zoomed over the seas with amazing agility. Its operator guides the model from shore or a nearby boat via a remote control transmitter. Available in kit form, or ready-to-run, from One Design Electronic Models.

What's in a plan? That's the question Sid Axelrod, vice president of Top Flite Models, has been asking himself after receiving many requests for a full-size plan of Top Flite's new Kwik-Fli III R/C model. Because the Kwik-Fli III is such an advanced model, Top Flite's engineering staff felt that its popularity would be confined to long-experienced model builders who could easily interpret a construction sequence. The reputation and fame of the Kwik-Fli III was far more wide-spread, and Axelrod's office was quickly flooded with letters from apprentice and intermediate modelers who found it quite difficult to work from these sequences. New full size plans of the Kwik-Fli were printed and inserted in all current shipments. Modelers who have already purchased a Kwik-Fli III kit with construction sequences may get a set of the larger plans, free and completely postpaid, by merely clipping the Top Flite logo and "KWIK-FLI" name from the lower right hand corner of the reference sheet, and mailing it, with their name and address to **Top Flite Models, Inc., 2635 South Wabash, Chicago, Illinois 60616.**

On December 2, 1968, Yoshio Tadokoro, Chief Editor of 'Radio Control Technique,' Japan's leading radio control publication, announced the the well-known Japanese engine manufacturer, O.S., had introduced a new type of model engine similar to the German Wankel.

Demonstrated publicly for the first time at the 4th Japan Air Pageant on October 18, 1968, outside the city of Tokyo, this new type of rotary engine was made under the technical cooperation of the Graupner firm in Germany. Quite similar, in fact, to the NSU Wankel system, the O.S. 1 Rotary has a cylinder capacity of 5 c.c. (.30) with an output of 0.65 HP. Top RPM is in the 12-13,000 range with a 9/6 propeller.

No further details on this new glo plug ignition, air cooled rotary engine have yet been made available, although first-hand reports from Tokyo indicate that the performance met, or exceeded, design specifications.



R/C DESIGN MADE EASY

BY CHUCK CUNNINGHAM

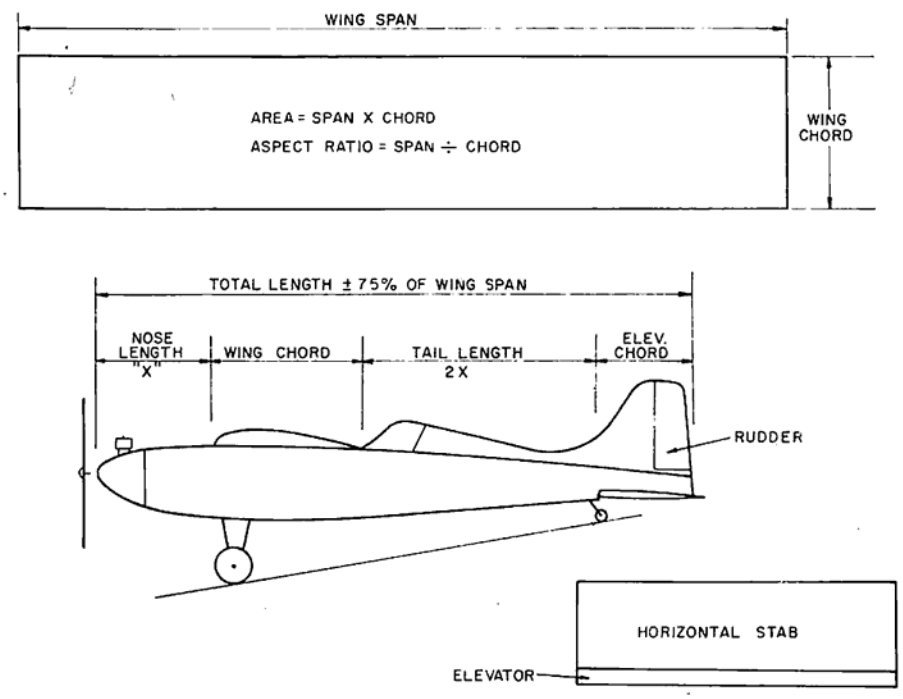


FIGURE N° I BASIC GALLOPING GHOST AIRCRAFT

PART III IN A SERIES ON DESIGNING YOUR OWN R/C MODEL. THIS MONTH, RCM EXAMINES TWO BASIC R/C DESIGNS.

As promised earlier, this month we are going to try and eliminate the chance factor in the design of two very popular types of aircraft, the galloping ghost ship, and the biplane. Both of these are enjoying widespread use around the country and both can give the fledgling designer a lot of trouble if just a few minor points are overlooked. First, let's examine the design of the typical galloping ghost aircraft.

For best results with GG, it's a good idea to stick to a moderate size model. Engine power from .19 down to .09 is just about the best. .049 ships can be flown well on galloping ghost, but the weight of the batteries as well as the lack of throttle equipped engines are a bit of a detriment to this engine size. If, on the other hand, you want to use pulse rudder and elevator for a vest pocket .049 ship, you can gain much valuable flying experience, and they are certainly economical to build. For good all around pulse proportional flying, the popular .10 is hard to beat. The design of the aircraft, itself, is similar to the designs that we have been exploring in past issues. But, we have to remember two things: First, the flapping of the surfaces causes quite a bit of drag back at the tail end of the aircraft, which necessitates a bit more power; and second, the elevator action is not as good as a full house proportional rig, and therefore the aircraft should be designed to have some strong "self-flying" characteristics.

Let's decide upon the size of the aircraft. Wing area is a good place to begin. For an .049 model, about two hundred to two hundred forty square inches, for a .10, from two hundred and fifty to four hundred square inches; and for a .15, from three hundred fifty to four fifty; and for a .19, from four fifty to six hundred. As you can see, an aircraft designed to the lower wing area in each case will result in a hotter ship, while the upper limits will give you a more docile aircraft.

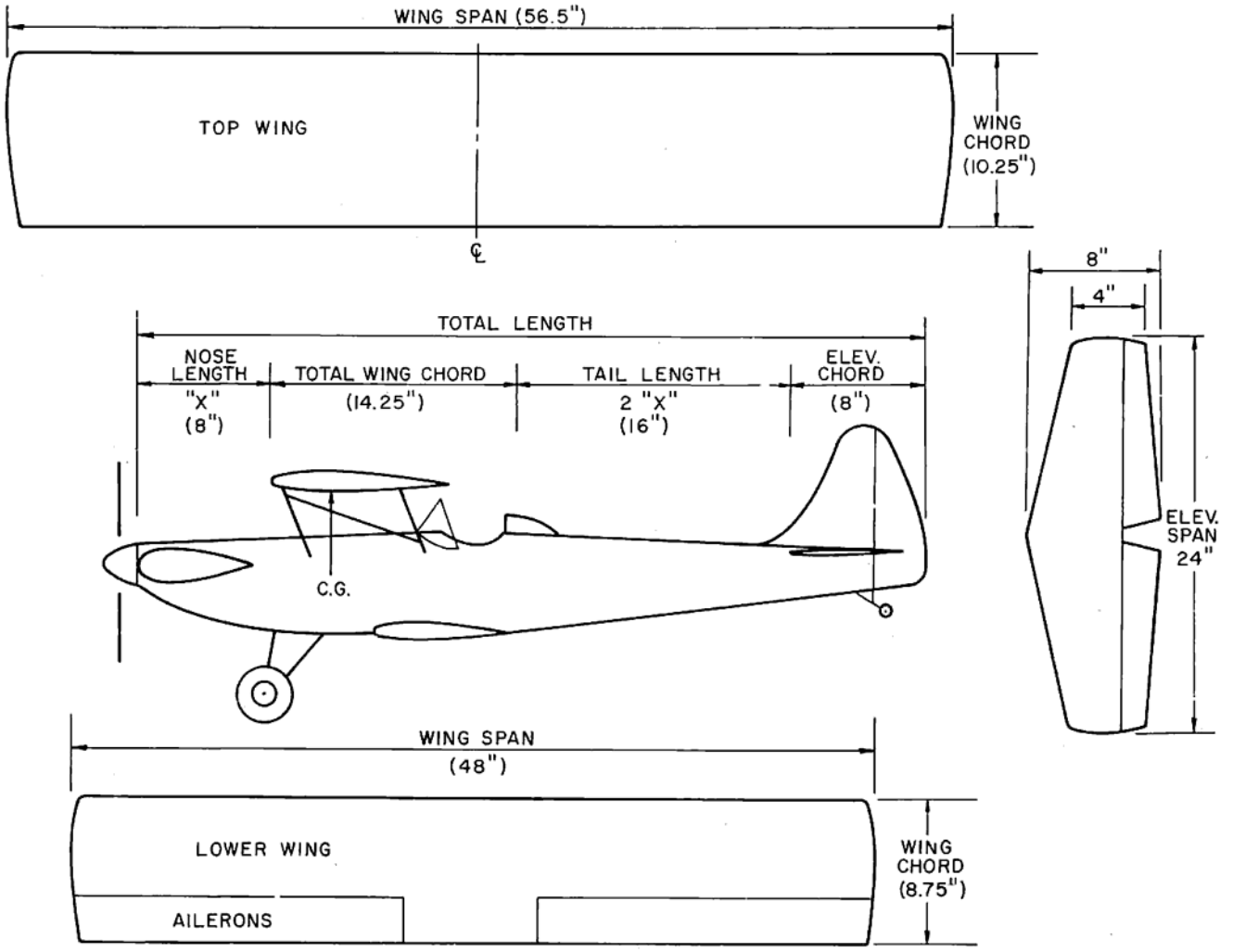
The wing planform will look best if we stay within the same aspect ratios that we considered for the larger aircraft, namely 5:1 or 5.5:1. Briefly, the aspect ratio is the relation of the wing chord to the wing span. To determine the chord and span when you know the wing area that you want, and the aspect ratio, use the formula (for an aspect ratio of 5:1) $5C^2 = A$, and $5C = S$, where C = the wing chord, and S = the wing span. For our .10 size model with a wing area of 320 sq. inches, and an aspect ratio of 5:1 we then have a chord of 8" and a span of 40".

Our horizontal stabilizer should be about twenty to twenty-five percent of the wing area. An average of twenty-two percent is optimum. For a 320 square inch wing, then, the horizontal stab would be 70 square inches. Use an aspect ratio of 3:1 on the stab, shake into the same formula as the wing, and we come out with a stab that is 5.5" x 16.5". For the vertical stab area use about one third of the horizontal stab area. Again, mixing up the pencil with the paper gives us a vertical surface of 23 sq. inches. A good eyeball will dictate the shape of this member.

So far, we are pretty much in line with our larger cousins that were investigated in earlier articles. The same will hold almost true for the fuselage.

We determined, earlier, that a fuselage length of approximately seventy-five percent of the wing span would work out well and, again, this holds true for the GG aircraft. With our wing span set at 40" we obtain a fuselage length of 30". Figure 1 then sets out the relation of the location of the engine, the wing, and the tail group to each other on the fuselage.

Now, for the differences. Our aircraft must be somewhat self-stabilizing. To accomplish this, we should build in some factors to cause it to do so. We may use a flat bottom airfoil section, a



THE "SPORTSTER" BASIC BIPLANE DESIGN

symmetrical section, or, a semi-symmetrical section. If we have an elevator on our GG ship we can set this wing at a low, or zero, angle of attack. If we are not using an elevator, then we must build in some incidence. By this we mean that the angular setting of the wing in relation to the horizontal stabilizer must be at a positive angle. Putting it another way, when viewing the aircraft from the side the wing must sit on the fuselage in such a position that the leading edge is higher than the trailing edge in relation to a line drawn through the elevator chord. Confused? Think about it a while, or better yet, take a look at one of your aircraft and see if you can visualize this.

The dihedral of the wing is another important part in the self-stabilizing design theory. For easier turns, and more relaxed flying with a small ship, let the dihedral be about three to five degrees under each tip. If you were looking at the wing from the trailing edge then the angle between the trailing edge and a horizontal surface would be this angle.

The tail group is really the most important factor. We need a large rudder to accomplish the job of steering the aircraft around the sky, and we need a small elevator to keep the aircraft from living up to its name and "galloping" about the heavens. Since, in a true GG rig, the rudder is flapping around the neutral point, the effective rudder area is only one-half of the true area. With the vertical stab area of 1/3 of the horizontal area, use about 1/3 of this area for the rudder. The elevator should be kept quite low in chord, not more than 3/4" to 1" wide at most. If the GG rig that you are using is one that has a fast pulse rate on the elevator you may use a larger surface with good results, but if it is a slow flapping surface, then it's a bit wiser to use a narrow elevator.

When checking out the controls of the finished aircraft be sure that all of the controls move very freely, and that right stick is right rudder, and up elevator corresponds to up on the stick. Be sure that each surface is pulsing equally about the neutral position, and that the trim levers are in the neutral position as well.

With a little attention to the design of your aircraft, and a good radio installation, you can have many fours of flying with galloping ghost.

Taking the problems out of the design of a biplane is really not much of a problem, and yet I have heard many modelers who would like to design their own bipe shy away from it because they are afraid that it will not fly after all of that work. I've also heard many builders say that they built an Aeromaster kit and when they set about to design their own bipe simply redesigned the Aeromaster. This is really not a bad idea, but one that need not be done if we take a good look at some of the things that make a bipe a little bit different.

First, the wing area of a biplane is not as efficient as is the wing area on a monoplane. In fact, its efficiency is of the order of 80%. This, then, means that to carry the same weight, and to be as effective as a monoplane, the total wing

area should be about twenty-five percent larger than the monoplane wing area. We must decide upon many factors when working out the design of the biplane. First, do we want a fast or slow flier? Do we want it to be scale, semi-scale, or all out futuristic? If we have unlimited power, such as an OS .80, a ST .71, or a hot HP .61, then we can look to the larger bipes, that is, if the pocketbook can stand it! If we design too small of a bipe then the wing loading may be too high, and we may not have the really good flying characteristics that we want.

If you can build a biplane with a weight of seven pounds to, perhaps, seven and one half, with a total wing area of 1000 square inches and a good powerful .60 engine, then you will have a flying machine that will give you more hours of pleasurable flying than anything else that you have ever owned. If you can possibly hold the weight down to a six to six-and-one-half pound aircraft, then watch out, you may never come in from the flying field. Frankly, I'm searching for a way to build this type of aircraft with foam, cardboard and plywood, and so far, the weight is in the 7.5 pound range, but I'm hoping to find a way to shave another pound of weight someplace.

Getting back to the size of the aircraft, if you are going to build a scale bipe then the relation of the top wing to the bottom wing is set for you by the full scale ship. You can make these wings the same size, or you can make the top wing larger than the bottom. Many full scale bipes had wings of equal area but, actually, the bottom wing does less work than the top wing, and can be a bit smaller. You will find a great number of early aircraft had a smaller lower wing. The top wing does about 58% of the work and the bottom does about 42%. Check some of the scale drawings, see if this does not work out pretty well. See if the top wing has 58% of the total wing area, and the bottom has 42% of the total area. Again, if you're building scale, then you will have the aspect ratio set for you by the full scale aircraft, but if not, then a good ratio for a bipe is 5:1. For a hypothetical "design-it-yourself-beautiful-bipe" with equal wings and a 5:1 ratio and 1000 square inches of wing area we find that the wing span equals 50 and the chord equals 10. A ship with a bit less "stubby" look will sport an aspect ratio of 6:1 and will have a wing span of 54" and a chord of 9". If this same wing area were projected out on a 58/42 percent basis, then we would have a top wing of 580 square inches and a bottom wing of 420 square inches. A 5.5:1 ratio on the wings would then give a top wing of 10.25 inches x 56.5 inches and a lower wing of 8.75 inches by 48"

While on the subject of wings, let's take a look at the ailerons. When we were investigating the stunt ships, a few issues back, we decided that an aileron area of 12% of the total wing area was a good rule of thumb, and this holds true here. If you want to be able to move when you lean on the controls then use this same relation. With a wing of 1000 square inches we then have a total aileron area of 120 square inches, or 60 square inches per wing panel. You can readily see that the ailerons will take up quite a bit of the lower wing. You can split them, and have ailerons in the top and bottom wing a-la the Spad, but for building ease, keep all of the aileron on the lower wing. You will have almost full span ailerons in the lower wing. Full span, but much wider.

The horizontal tail surface must be a little different than we were considering for a monoplane. Since we have decided that wings are only 80% as efficient as a monoplane, then if we work on a horizontal stab surface that is 22% of the 80% area we will come out with the correct surface area. In the case of our 1000 inch aircraft, our horizontal stab will be 22% of 800 square inches or a total of 176 square inches. The vertical stab at about one third of this area then gives us an area of 58 square inches.

With all of the above information we can then set about to design any size bipe, from a 1000 incher down to a 400 sq. inch cutie, or a 1600 sq. inch calm day aircraft.

The fuselage on our bipe need not be quite as large as on a conventional stunt ship to look good. Since our bipe really sports smaller individual wings the overall impression can be enhanced by scaling the fuselage to the wings. Don't make the body too small, but keep it within the realm of good looks. This time instead of working on a total length to wing span ratio we are going to start with a nose length, a tail length, the balance point of the aircraft, and the total wing chord. Some bipes have staggered wings, some have the top wings and straight lower wings such as the Jungmeister. Let's keep it simple and stick with straight top and bottom wings with a normal stagger. The optimum stagger is 1/2 of the wing chord, or average chord. On the bipe that we were working on earlier, we wound up with an average chord of 9.5 inches and a half chord stagger of 4.75 inches. Add this stagger width to the average chord and we get a total chord of 14.25 inches. This then means that the distance from the leading edge of the top wing to the trailing edge of the bottom wing (horizontal measurement) is 14.25 inches. Next we must locate the balance point. To do this we use the total chord of 14.25 inches. A CG location of 25% to 30% will give a smooth groovy flying aircraft so, 25% of the 14.25 gives us a CG location 3.6" back from the leading edge of the top wing.

The main problem of most scale bipes is that the nose moment is so short that all of the radio gear has to be packed around the engine to get the thing to balance. With our home designed bipe we can stick out the nose as far as we like and still make it come out looking ok. To keep the bipe as maneuverable as it should be, the tail moment should be kept reasonably short. For the bipe we have been discussing a nose length, or the distance from the leading edge of the top wing to the rear of the prop of 8" will give you a good balance, and a tail length, or the distance from the trailing edge of the lower wing to the leading edge of the stab of double the nose length, in this case, 16", will make for great flying. You can of course lengthen or shorten these dimensions, but, try and keep the relation the same.

The last factor to be investigated is the distance between wings. This has generally been found to work out best at a distance equal to the average chord. For our bipe, a distance of 9.5 inches. This is the distance between the chord line of each wing.

Another item to consider on the design of that biplane is to allow for plenty of down thrust to counteract the upward pitch of the high top wing, and a lot of right thrust to offset the drag of all of the wings, struts, etc.

If you are going to use a two wheeled landing gear, (and on a bipe, what else would you use?) then design the gear so that the axle falls just about under the leading edge of the wings. Some bipes have the gear too far to the rear and consequently have a very bad tendency to nose-over on landing.

I hope that you will have lots of fun with your bipe design, and that you will have many hours of pleasurable flying. Let us have some pictures of your design and we'll run them to encourage others to try their hand at it. In the meantime, we'll be working on the "Sportster" as a project with foam, cardboard and plywood and present the finished results as a construction project in the near future.

The RCM Flight Training Course

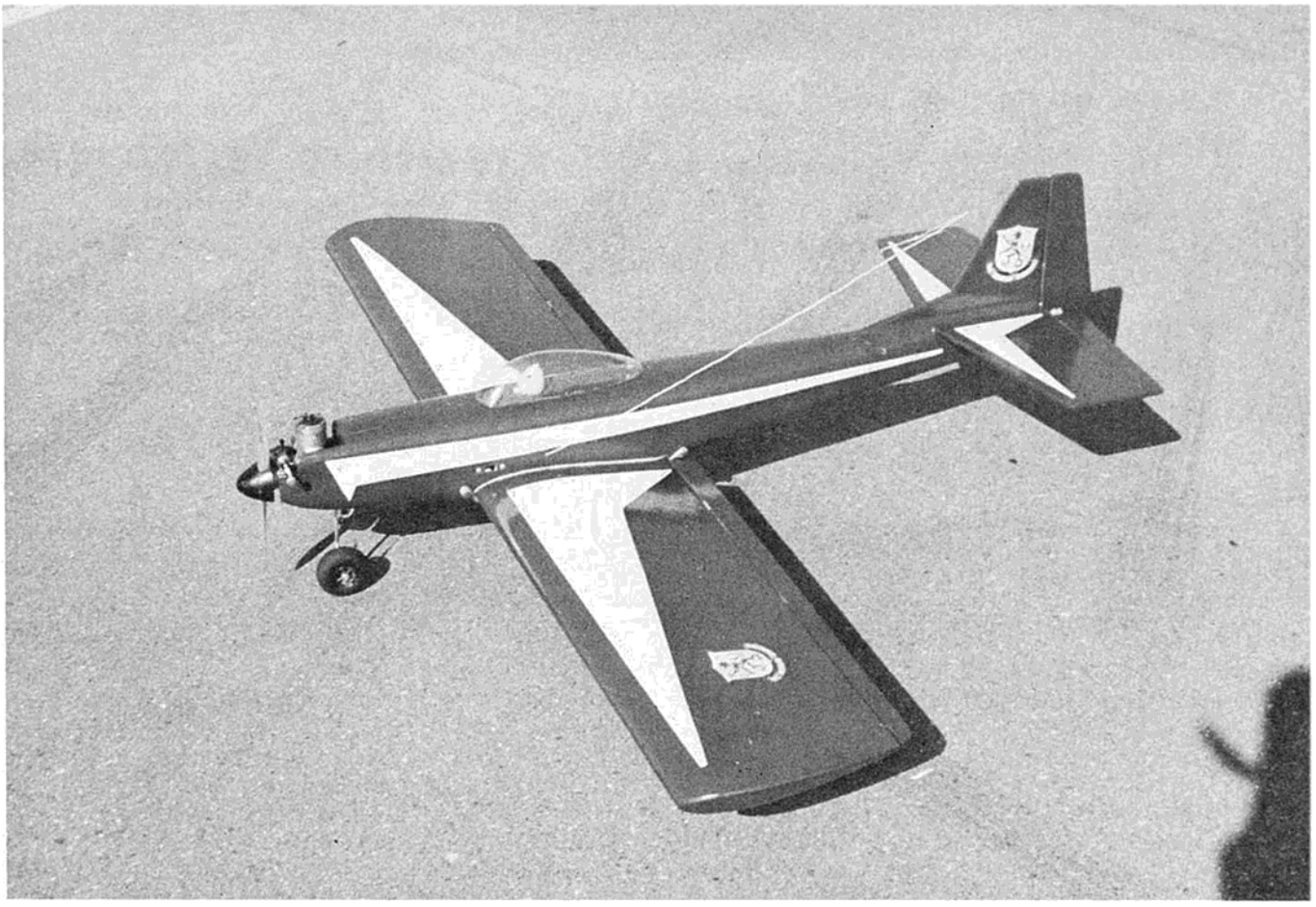
In the last installment, we discussed the various pre-flight checks that are necessary, field etiquette, and some hints on properly adjusting your engine before that first flight. Finally, we took you to a point where your RCM Trainer was heading down the runway, into the wind, toward its first trim flight. This month, we're going to delve into the proper methods and procedures for trimming out the aircraft, drawing upon the comments and ideas of two experts in the field of R/C – Don Lowe, noted flier and designer whose comments first appeared in the 'Worksheet,' monthly newsletter of the Western Ohio Radio Kontrol Society, from which they are reprinted; and Chris Olsen, British RC champion, and designer of the world famous 'Upset' design, whose original writings appeared in the British publication, 'Radio Control Models and Electronics.'

We have taken the editorial liberty of interspersing the comments of these two writers, using excerpts from both of their writings. To be certain, their comments are primarily concerned with the "full-house" competition type model, but the information they convey will be invaluable to every flier, whether novice or expert. The rules, too, are the same for every aircraft, only the procedure may differ dependent upon the type of aircraft you are flying. We assume that you have solicited the aid of a more experienced RC'er to help you with your first flights, and to get your Trainer past the crucial trim flights. If not, or if one is not available to you, remember a few simple "do's" and "don'ts" on your initial flights: DON'T fly downwind with a new plane and/or equipment; DON'T allow the plane to turn too soon after takeoff; DO keep it climbing into the wind until there is plenty of air under it; DON'T fly too low or too far away – it is difficult to see it below the horizon and nearly impossible to get it back to the field if the engine quits; DO fly a simple right hand and left hand circling pattern at less than full throttle, changing direction with "lazy," relaxed horizontal eights, until you get the "feel" of the controls, and the "perspective" of flying the aircraft toward you as well as away from you.

DO use gentle pressure on the control sticks, remembering not to yank, and thus overcontrol, the model about the sky. DO learn to visualize yourself as in the cockpit of the model, flying the aircraft rather than the transmitter. DO remember that, as when you learned to drive a car, your main problem was one of "oversteering" – learn to fly the airplane gently, FLYING IT, rather than FIGHTING it about the sky.

And now, on to the comments by Don Lowe and Chris Olsen on trimming your model:

Olsen: "... trimming here alludes to the trimming of a multi channel model so that it would fly with the least amount of interference on the part of the pilot, a factor that can both reduce the chance of crashes through pilot error and win contests. A correctly trimmed model is one that will fly straight, or, on the path intended without need of correction except those necessitated by weather conditions. That is to say, if you require three loops, you feed in up elevator, wait the required time, and release (in calm air). In practical terms, this idealistic condition very



From highwing, Clark Y airfoil, to high wing symmetrical airfoil, the next step in the thoroughly field tested Flight Training Course, is the low wing Advanced RCM Trainer. Coming soon.

seldom occurs.

Trimming. . .really starts on the building board. A straight model is relatively easy to trim, while a crooked machine is very difficult, although contrary to popular opinion, it can be done. Having constructed your model, all rigging angles have to be checked, plus C.G., downthrust, sidethrust, etc. So we start the motor . . . and . . . it flies off the board without trouble. This is where many people go wrong. It flies, so they are satisfied, but in actual fact, this is where the work begins . ."

Lowe: "Head it down the runway with a slow application of power and correcting for any minor turning tendencies. If excessive rudder is required to hold it straight, stop the take-off and investigate the cause; it could be a nose wheel improperly aligned with the rudder. Assuming it runs out reasonably straight and the engine doesn't sag (do not take off if it does), ease it off (the ground) without excessive application of elevator. If more than modest back pressure is required to break ground, especially on a smooth surface, stop and investigate. It could be excessive forward C.G., or C.G. too far forward of main gear location. Never take off at slow speed if excessive up elevator is required to break ground since you might go into a stall after take off. Incidentally, I believe in using a big engine since this is safer than too little power, especially in flying off grass with the resultant extra wheel drag. Extra power can pull you out of many tight spots and if it flies like a bomb at full bore, you can always pull back on that throttle.

Once in the air, climb to a safe altitude before attempting any trimming. Set it up straight and level, holding back pressure if necessary, and trim elevator for full bore level flight. The best trim procedure is to hold it at altitude with control pressure (on the stick) and trim out to remove (that) pressure. Never try to trim (your model) in a climb, dive, or turn. Next, trim out (any) turn with the aileron in the same fashion until the ship flies straight and level. At this point, it is difficult to tell whether you need aileron or rudder trim to correct the turn. If the airplane flies in a pronounced yaw, however, it's a cinch you need some rudder trim. If so, throw in some rudder trim and take out some aileron trim. Your most difficult problem is going to be finding the proper amount of rudder and aileron trim required, but once established, it should NEVER be changed (unless airframe changes, warps, etc., creep in). It will become apparent to you that rudder pressure will be required under some slow and high speed flight conditions, but you should always accommodate these transient conditions by using control pressure, and NOT retrimming."

Olsen: "Now throttle back. The nose should drop gently as the power comes off. If the nose lifts, there is too much downthrust which has necessitated the use of too much up trim during full power flight, due to excessive down effect of the incorrect engine thrust line. Consequently, when the power is taken off, this effect is removed, so that the counterbalancing effect of the up trim is left to induce an over elevated trim. If the nose goes down hard, then the opposite is true, and there is not ENOUGH

down thrust."

Lowe: "Okay – once the ailerons and rudder trim is "roughed in," proceed as follows: Try an inside loop or two and observe if it tracks properly and in which direction it turns. Be sure to enter the maneuver with the wings LEVEL or the results will be meaningless. Next try some outside loops and observe the results. If the ship tracks properly both inside and outside, you are home free; if not (and it probably won't if you build like me) throw it away and build another one – no, please don't, on second thought. Try the following: If the ship turns off in the same direction, both inside and outside, correct the turn with rudder trim. If it turns off in one direction on the inside loops and the other direction on the outsides, correction is made with the aileron trim. If the ship turns off unequally inside and outside, you must trim for equal divergences with rudder and then use aileron. Confused? Please don't try to fathom it, just try it, it's aerodynamically sound.

In making trimming loops, don't horse it around with full elevator, but allow it to fly around with partial elevator. Once trimmed as above, you may still find slight turning tendencies under the same conditions, i.e., inverted flight, climbs, dives, etc., but these should be corrected by holding control pressure. It is also best NOT to change elevator trim for takeoffs and landings – simply use a little control pressure instead of retrimming.

Next check the pitch trim under power and in the glide. If the ship wants to climb under power and is excessively nose down in the glide. If the ship wants to climb under power and is excessively nose down in the glide, you need to add a combination of downthrust and up trim. If the opposite is true, you must reverse the process."

Olsen: "Put the model inverted and see how much down trim is required to achieve a shallow, inverted climb. Having achieved all this at an altitude which gives you a chance to recover if something goes wrong, put the model back on the ground and (let's) have a think session.

The downthrust, or upthrust, is a design problem, and if there is a great trim change between power on, to power off conditions, it can require considerable work on the motor mount. Solve this problem before continuing the exercise.

Assuming the motor thrust line is correct, we go on to looping maneuvers. The diameter of the loops can be . . . adjusted and should be arranged so that full down will give the size of outside loop that is best suited to the model/power combination and allow for a tighter inside loop. It is very difficult to shape the size of outside loops but less of a problem to shape inside loops. So, for the (latter), a bit more up than is necessary is perfectly tolerable and is useful for the spin which we will come to later."

Lowe: "You will notice engine torque effects on trim under some flight conditions – particularly at take-off under high power, especially if lifting off at low speed. If this happens (pulls left) correct by; holding right rudder and ease if off as the model gains airspeed. Never correct for this condition with right aileron as most modelers do since the result is a flat skidding turn to the left which looks – ugh! Additional offset engine thrust will help alleviate this, but there is a limit since adverse effects will show up under other flight conditions. You will also notice left yaw tendencies when approaching a stall for a spin or wingover with power (full or partial) and correct for this condition by holding a little right rudder."

Olsen: "Correcting any skewing tendencies is most important. I make the adjustments from the outside loop, as in this maneuver lateral movement (ailerons) is more difficult to correct in outside maneuvers than inside ones.

If in an outside loop the model comes out at the top left wing down, apply some LEFT aileron and right rudder. If it comes out right wing low, apply RIGHT aileron and left rudder for right wing low vice versa.

Having made adjustments, try outside loops until they are straight, making adjustments continuously until you can do consecutive outside loops without correction.

Now . . . inside loops. If trim corrections for outside loops have not been drastic, inside loops should not be far out of true. If the model drops its left wing, use right aileron and right rudder trim to correct. Try an outside loop again, and alternate from inside to outside loops until you achieve a compromise trim which allows nearly straight maneuver both ways.

Now try a horizontal eight. This will show up a bias that sometimes does not appear in straight loops. Correct (as) previously suggested.

The rate of roll should be adjusted to give three rolls in about 4 secs when full aileron is applied. The FAI aerobatic schedule dictates that the three consecutive roll maneuvers be executed in this amount of time. It happens that this rate of roll is also useful in most other rolling maneuvers. Ailerons should therefore be adjusted so that with the aileron trim in neutral it gives this order of roll.

. . . inverted flying is best achieved by adjusting the down trim, so that full trim gives a shallow inverted climb. This should achieve inverted turns without leaning on the stick too much, for it is these in-maneuver stick movements that make the maneuver difficult . . . if you want to do a REALLY low inverted run, 18 ins. or so, trim the model for a very shallow climb which requires a bit more down trim than for level flight. Let the model come down in a SHALLOW dive to about 4 or 5 feet, level out and take your hands off the stick; if you have the model trimmed right, it will sink to about 18 ins. to 2 ft. Don't chicken out yet: the model will level out, fly for about 100 yds. then lift into a shallow climb, all on its own . . . low inverted flying is done not by the pilot but by a well trimmed model. Don't try this until you are sure of what you're doing, and **never do it at all unless you are absolutely certain that there is no one else within a mile.**

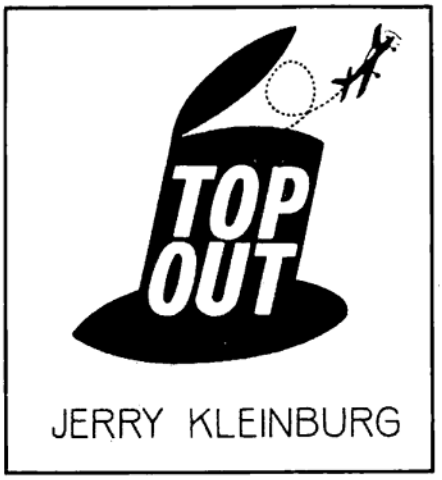
. . . to return to inverted pattern flying, a shallow inverted climb on the level usually results in a level inverted turn in calm conditions and on a calm day 360 degree inverted turns can be achieved hands off – sometimes.

These corrections can . . . be made on one or two flights and the model has been trimmed to what most people will need. However, this trim will change as models age. Most models seem to obtain a 'set' which may take upward to six months to achieve (and) trim can change (so) it is necessary to make constant trim changes.

When making trim changes, always try to keep the alterations confined to the model so that the trim levers on the Tx are always neutral.

. . . spinning . . . If the model is stable in rough air and does not drop a wing during a very slow landing approach as is the case when we try to stretch the glide, the model will not be too inclined to spin when required to do so . . . the only method I know

(continued on page 55)



Clearing customs - Mexican border officials are helpful and interested in RC. Antonio Murillo and Cisto Ursua join Customs Inspector Ernesto Sosa in learning details of TOP OUT 55.

The scene - green lawn and asphalt strips, features of Jalisco Aeromodeling Club's flying field. Club President (and contest CD) is Jose Barrios who kept operation efficient and smooth running.

GUADALAHARA – was the scene of the third round in Mexico's 5 contest marathon started last April to select a team for the 1969 International Championships set for Germany. And, as we've come to expect, the affair was spirited, close fought, and an enjoyable experience. The visit to this modern city with its colonial highlights was also a chance to 'discover' all the exciting sights and activity we've heard about, including Tlaquepaque's 'delights'. The auto trip to Guadalahara – via Zacatecas – was memorable with its wild mountains and 400' waterfalls. . .

Our August and November columns recounted the first two meets of the pentad – Mexico City and Monterrey – and this third meet saw the pace noticeably quicken as leading pattern pilots began to emerge in the tourney. This Guadalahara contest also saw a good measure of sportsmanship practiced, and proved south-of-the-border RCers are maintaining a clear perspective on their hobby/sport, despite competitive pressures. . .

Host for the meet was the Jalisco Aeromodeling Club (CAJ) at its green-lawned and pavillioned flying field with paved strips – all within a half-mile of the motels and their excellent conveniences and accommodations. Weather – temperature and wind – was just about ideal and typical, with 3 days of 4 mph breezes and mild days and evenings. A few showers, flung from an Atlantic hurricane that drenched eastern Mexico, managed to make it that far west on a couple afternoons but conveniently decided to by-pass the RC outing and its attentive spectators. After all the shouting had quieted, it was Elias Villegas flying his familiar orange Kwik-Fli III who had outscored the favorites from Mexico City and Puebla and earned the right to carry the big silver basket trophy home to Leon. In second place once again was Bob Guzman, president of the Mexico City AMR club, who made this his 3rd second place win in a row! Paco Gallegos overcame the bad fortunes of earlier contests and tallied for third place. Here's the list of fliers and scores of the top 15 which show some tight races in the FAI pattern contest:

Elias Villegas	18505	CAJ
Bob Guzman	18082	AMR
Paco Gallegas	17978	AMR
Alex Elizondo	17896	AMR
Jaime Ramirez	17253	CAJ
Jose Rivera	17174	CAP
Joe Bridi	17155	BIRDS
Luis Castaneda, Sr.	16896	CAP
Luis Brunner	16891	AMR
Ben Castaneda	16540	CAP
Salo Feiner	16183	AMR
Armando Camacho	15752	CAJ
Jesus Gomez	15101	CAJ
Carlos Solorzano	14576	CAJ
Luis Castaneda, Jr.	11376	CAP

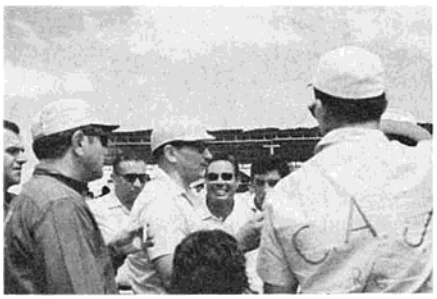
Contestants showed they were familiar with the handicap of flying at an altitude of 5000 feet where aircraft respond noticeably slower and marginally operating engines seem to especially become cranky. Joe Bridi, RCM's West Coast Contest Editor, suffered engine problems on his first round but managed to set out his needle valve setting and post good scores for a respectable 7th place with smooth patterning of his Sun-Fli III. Another U.S. flier, a regular visitor, Ray Downs unfortunately pranged his beautiful bird on the first round and leisurely spectated the rest of the time. Other visitors, incidentally, were Allen and Donna Coomber who came down to 'count the house' for Orbit and found Mexico is still "Dunham-land" as we've dubbed it with RCers going almost 100% for Orbit equipment. Other facets of the RC equipment picture show the usual range of variations; engines are almost all in the .60 cu. in. displacement size with no brand preference noted, and planes being the low wing varieties having 650 to 700 sq. in. wing areas and showing better-than-average workmanship. Ready-builts have not come on strong as yet.

Judges for this and previous meets were Mexican Air Force pilots from nearby Air Base No. 5, a pilot training school at Zapopan. Heading the judges was USAF trained Major Jose Luis Barrera S. who regularly officiates at this annual affair. Filling in on the 6 man judging team were Capt. Sergio C. Espinoza M., and First Leiutenants Juan P. Maldenado G., Jose A. Mejia R., Raul O'Hara V., and Jose L. Vasquez S. Scoring over the 3 day contest was outstandingly level without the usual toughness-to-liberal slope on scores as the contest proceeded and was attributable to the conscientious effort of this group of MAF officers.

Radio interference played a significant part in the contest results when Luis Castaneda, in first place at the time, was knocked down for no apparent reason mid-way through his third flight. Fortunately the plane was readily reparable and after a discussion regarding the interference, the contestants voted to allow Luis another flight. But it was not to be Luis' day after all. The hasty repairs had resulted in unnoticed reduction in down elevator on his Sorcerer swept-wing original, and on the outside loops Luis decked it solidly at

Moment of truth - Luis Castaneda, leading Puebla RCer, gives his Sorcorer original the needle after repairs from interference-caused crash. Not enough down elevator.

Elias Villegas, winner of annual Guadalahara meet, helped Jaime Ramirez with trim flight of his "Roman". Flight followed all night building session to replace crashed bird. Roman featured low aspect ratio, light wing loading.



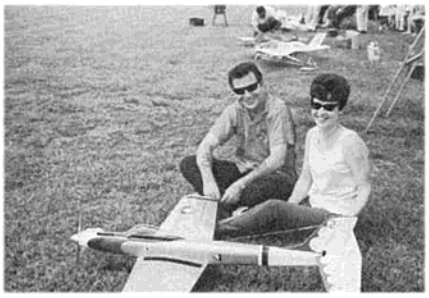
Serious discussion - claim of radio interference brought lively debate. Since all flights count, round loss means losing. Villegas, in hard hat, led to reflight for his competitor Castaneda, smiling in center.

The pill man - Dr. Alex Elizondo - with Salo Feiner - finished 4th. Mexico City RCer often prescribes remedies for victims of "Montezuma's Revenge" - helped Ken Willard last April.

RCM's West Coast Editor, Joe Bridi and neat Sun-Fli III original, finished 7th due to engine problems at 5000 foot Guadalahara altitude. Ship available in well done kit.

Bob Guzman, 2nd place (for 3rd time!) calls "Despegue!" - take-off (unglue) of ancient 6 year old Sultan. Merco 61, Orbit. Bob, perennial AMR president.

Kwik-Fli I & III combination of Amelio Lozano showed outstanding workmanship seen in many Mexican models. Slimmer 15% airfoil, Super Tigre 60G effective for Mexican altitudes.



The Coombers, Allen and Donna, enjoyed Guadalahara outing, shopping, plentiful Orbit equipment, and Paco Gallegos' beautifully rendered Twister.

Armando Camacho (r.) and his 6½ lb. Kwik-Fli III was assisted by Abel Guzman, fellow Jalisco club official. VECO 61 used black fuel tubing found best by more and more fliers.

John Babcock, ST powered Sig PT-19 and straw hat. John, retired San Mateo, Ca. Navy civilian, now lives in Guadalahara, reports over 10,000 U.S. families now reside there. Ideal climate, the main reason.

Feliciano Prat and Paco Gallegos in RC ballet during final Guadalahara round. Six judges were Mexican Air Force pilots headed by Major Jose Luis Barrera on the right. Excellent judging by experienced crew.

Spirit, from German plans by Jose Lomeli of San Luis Potosi, was 6 year old escapement rudder ship. Uses Orbit relay tube receiver with Bonner SN and compound escapements. Fox 19, 3 lbs., 54".

the bottom of the second loop! Credit, however, goes to Elias Villegas the eventual winner, for leading the discussion that gave Luis the extra flight even though it meant reducing his own chances to win. Consequently, we're happy to add our applause and an **RCM Sportsmanship Salute** for the leadership and fair play demonstrated by Elias in winning the contest.

As the 5 contest tourney now stands, Bob Guzman is in solid first place with Luis Castaneda and Elias Villegas tied for second place. Here's how the top 8 fliers line up with their tournament points:

Bob Guzman	42
Elias Villegas	34
Luis Castaneda, Sr.	34
Salo Feiner	29
Ben Castaneda	28
Alex Elizondo	24
Felix Prat	23
Paco Gallegos	23

The fourth round now moves over to Puebla – home grounds of the flying Castanedas – where the Club Aeromodelismo de Puebla will host their annual contest on November 1-3. After that the big wrap-up comes in Mexico City next April. Watch for the results, or better yet, plan to be there and join in the fun!

PUEBLA – The 4th Round.

Mexican RC pilots have a light touch on the control stick and engine carburetor. They have to. Flying at more than mile-high altitudes, it's necessary or those hot multi-propo ships won't stay airborne for long. . . .

Puebla – where the 4th round of the Mexican FAI team selection contest was held – is another test of RC men and machines with its 6350 foot altitude. And despite really ideal weather, the invisible handicap can't be ignored. Consequently, the setting of needle valves borders on being an art, and even a 25 rpm loss from a slightly leaky glow plug is considered an unpardonable mechanical sin! And patience with control sticks is a point-earning, plane-saving virtue in the thin air. . .

As far as the contest went, familiar home grounds may have helped the "Flying Castanedas" as the father and sons dominated both events staged during three ideal weather days at the CAP field. Young Ben led pattern scoring with a 3-flight total of 17,076 points, a 300 point advantage over AMR flier, Salo Feiner, who tallied a respectable 16,773 score. Elias Villegas – winner of the 3rd round in Guadalahara, scored 16,205 for 3rd place in representing the Jalisco Club. This left the FAI team standings at 42 points for Roberto Guzman, 39 for Villegas, and 38 for Feiner – a very close race that'll make the final meet in Mexico City during the first week of April. . .

In pylon – and Formula 1 is rapidly catching on despite high altitudes – Luis Castaneda leveled the misfortunes of Pattern and won a hotly contested speed event with his well-flown Mustang. The Ballerina of Jose Antonio Arroyo was fast enough for a close 2nd place while Ben Castaneda pushed his black T-tail Rivets to 3rd place for a clean sweep in Goodyear for the Puebla club.

HERE 'N THERE

NEW YORK. Good news for New York City RCers and others comes from Art Byers with information of the First Annual Jamboree and R/C Trade Show set for March 16th at the County Center in White Plains. In addition to many manufacturer's displays, events will be held for RCers wishing to attend. A static display competition will be held for scale aircraft with a special division for WW I so popular these days. A

Fly-In at Armonk, N.Y. is also tentatively set. This is a WRAM (Westchester Radio Air Modelers) sponsored affair being headed by Bob Foshay of MRC. Al Siegal is club president currently. More information is available from Art whose address is: 72 Daisy Farms Dr., New Rochelle, N.Y. 10804.

NEW JERSEY. The large interest in WW I aircraft has inspired Bill Antoine of the N. Jersey RC Club to make available the plans to his award winning Nieuport 28C1. At $6 a set, these detailed drawings give a really complete construction picture to duplicate Bill's realistic masterpiece. Scale is 2" to the foot which gives the 'right' size to the finished product and provides plenty of WW I atmosphere. Bill's address where he does the editing job on the club newsletter – PRINTED CIRCUITS – in addition to making drawings is: 10 Smith St., Waldwick, N.J. 07463. A recent item from PRINTED CIRCUITS by Howard McEntee, RC editor for AAM, gave the 'history' of the club's newsletter and is worth sharing for the insight it gives as a model history of a good many newsletters across the country. Here's what Howard had to say:

"While looking over a bunch of old R/C club newsletters I got to digging through my stack of Printed Circuits. I was rather amazed at the number of editors this paper had! The paper actually started late in 1957 and Paul O'Neill was the instigator; he kept the job until July 1959, when Art Schroeder took over. Art did the work until Nov. 1961, and Don Post was the next "victim." Rich Piccola took on the job in Nov. 1962 and continued until Sept. 1963. At this point apparently a "full time" editor couldn't be found, for a series of "guest editors" handled the job each month, they were Gordon Watson, Vic Cerelli, Rich Piccola, Pro Prewitt, Bob Shaw. This brings us up to Feb. 1964, and though his name isn't on the next issue as such, apparently our present Editor took over the task then and he has run the newsletter in fine shape ever since. I hope all NJRCC members appreciate the work that goes into this paper – the many hours Bill spends in gather-

Young Ben Castaneda is steadied by Salo Feiner and Elias Villegas who placed 2nd and 3rd in FAI tournament. Trophies donated by Coca-Cola.

Here come the judges! Mexican A.F. officers of the 206th Aero Sqdn. officiated. 1st Lts. Naval, Torres, Dias, Gonzalez, Davalos, and Rello.

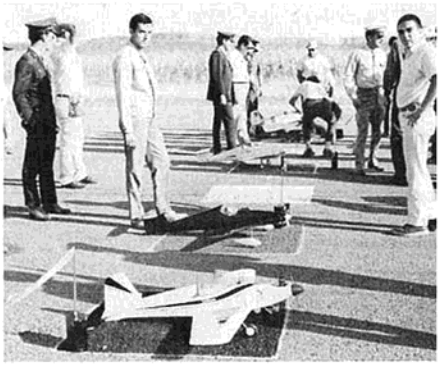
Leading CAP-ers, Pepe Rivera and Jorge Leal, show RC wares. Outstanding flying site despite altitude and mountains. That's La Malinchi in background.

After a hot pylon race, a refreshing snack. Venders are bonus feature of Mexican contests, this one selling slices of turnip-like fruit! Luis Castaneda Jr. indulges.

Luis Castaneda Sr. and fleet of well-turned Sorcerers, favorite of the Club Modelismo Puebla (CAP). Despite high altitudes, fast original design by Luis flies well.

ing material from members (like pulling teeth), getting it in order for typing, etc. And the further many hours spent on the task by our printer, Bob Shaw, and by Hubert Hall in mailing. And there are usually a few extra helpers on duty for the latter job, as has especially been the case since the Hall's have been on their western trip. These fellows are all model builders and fliers – they are giving up valuable hours so that YOU can read the latest club and other R/C news. Just think about that when you quickly glance through the paper and throw it aside – it's really well worth reading carefully, cover to cover! I have seen items credited to the Printed Circuit in club newsletters from all over the country – and from several foreign countries too. All the model mags have quoted P.C. at one time or another. *(Like now... Ed.)* Through this newsletter, our club is known just about everywhere there are R/C groups, thanks to the time and effort put into the task by Bill and his cohorts. I think they – and all the earlier P.C. workers – are due a real vote of thanks!"

Amen, Howard – and to dozens of other great newsletters all over. It's gratifying to see the ink pot set stay constant – with or without appreciation – to the task they think needs doing that THEIR club will have something



Pylon heat readied - Formula 1 catching on fast among Mexican fliers. Takes gentle touch to avoid high speed stall in turns in thin air. Models well done.

A treat. Puebla club hosted fliers and families to traditional picnic lunch each day. Puebla cuisine specialties abounded. Delicioso!

Nieuport 28C1 by Bill Antoine of the NJRCC. 2" scale makes fine WW I replica. Plans available from Bill.

its passing noted on the record... Incidentally, Howard has more to say in his regular column about newsletters which is worth reading. It's in the Jan. 1969 AAM.

Vic Cerelli, another NJRCC pillar, and Sqarus original. So is shirt.

Square Tarus is popular with NJRCC fliers. Here Bob Shaw shows his version. Bob also prints club newsletter as added modeling chore.

OKLAHOMA. Want to repeat our advice to get on the mailing list for the 16mm film mentioned last month. It's the one by Royden Freeland and Randy McGee of the TORKS. It's making ahit wherever it has been seen and it is a movie "like you've never seen" as we heard comment after the showing for the RCM Winter Nats in Tucson. Drop Roy a line at 10 N. Lee in Oklahoma City, OK. 73102, and make arrangements to see an RC flying film with a whole new approach to filming this wacky sport of ours. P.S. Those two, Randy and Roy, have others coming up which are destined to become classics...

WISCONSIN. From Dario Brisighella we hear of his latest design efforts. Dario is known for his craftsman approach to RC construction and his

drawings are considered by many as collector's items. X-Calibur is a late design Dario is trying these days and we have to agree it has a different look. It's largish, weighing 8 lbs. and features a flying stab, 800 sq. inc. in its 72" span wing, power an Enya .60, and has a detachable tail group so that the wing, nose, and engine may be taxied around separately! Flies well, Dario assures. Dario, you recall, masterminded the Vespa which has found favor among more than an average number of builders and fliers.

Front end of X-Calibur which features detachable tail group. Engine nacelle is part of wing structure. Flying stab also used on unusual original by Dario Brisighella.

RCM Training
from page 50

which will make an unwilling model spin is to keep moving the C.G. aft until the spin is readily induced. However, this is not always a good thing since the farther back the C.G. the less stable in pitch the model becomes. The only other method is to introduce differential into the elevator movement so that there is lot more up than down. (Then) it becomes difficult to achieve smooth looping maneuvers. The answer, of course, lies in a compromise of more rearward C.G. position and increase of up elevator movement, assuming, of course, that this adjustment does not prejudice other maneuvers."

Lowe: "Once trim is adjusted to your satisfaction, mechanically change trim on the ground with airplane trim adjusters so that control trims on the transmitter may be returned to neutral.

In regard to control movement, avoid excessive control travel since this makes the airplane touchy and subject to high speed stalls (excessive elevator) and inadvertent snap rolls if C.G. is too far back. Adjust throw of aileron for a nice roll rate with full aileron. Adjust elevator so that less than full travel is required for normal loops, leaving that little extra required for spins and snap rolls and for adjusting loop size and spacing. Try sudden applications of full elevator from level flight; if it stalls or turns off – you have too much elevator.

Now for some additional hints. Turning tendencies can be caused by elevators out of alignment. If they aren't zero - zero, they act like ailerons and will cause minor turning – will also show up in maneuvers. In adjusting ailerons, it is best to start with ailerons in neutral position and adjust both ailerons equally. If excessive aileron trim is required it is probably best to favor the up trim rather than down since the down going aileron creates more drag than the up going aileron.

One further flying hint. Too many pilots make that last turn on the landing approach with the nose high or level at reduced power. Keep the nose down or add power in the turn since the airplane stalls at a higher speed in a bank. A glide CANNOT be stretched once an optimum descent path has been established. It is best to descend at a little higher airspeed than necessary and use excess airspeed to stretch to spot and help flare. Don't be afraid to add power if you are too slow or short on the approach.

Happy Landings."

And there you have it – the proper procedure for trimming out that new model. If it sounds complex – if it sounds difficult, it is! It is, in fact, the most difficult and most crucial phase of RC flying. It is, also, the most IMPORTANT phase of your flying, and one that will pay large dividends in increased flying ability and aircraft longevity, once you have mastered the techniques outlined in this dissertation by Don Lowe and Chris Olsen. It isn't easy, but nothing worthwhile ever was. Read, and re-read, this article. Mentally practice every technique of the trim flight, and then practice until you know it by heart.

You'll be glad you did.

KEN WILLARD

MODIFIED ASTRO HOGS, ET AL. . . .

This month I'd like to start off with a discussion of design – and design modification, as practiced by both you Sunday fliers and the competition experts as well.

How often have you heard the remark, "I'm tired of looking at all the 'lookalike' low wing jobs that predominate all the contests. What we need is something new and different to pep up the event. If you've seen one, you've seen them all!"

In a lot of respects it's true – at least from the casual observers point of view – and there's a very good reason for it. Today's competition design was fathered by Fred Dunn's "Astrohog" design of the late fifties, but if you put an Astrohog next to a Kwik Fli, you'd see a world of difference. About the only thing they have in common is the fact that they are both low wing designs.

It used to be real easy to get a rise out of some of our better known designers. If they came out on the field with a gorgeous new high wing model, you'd look at it and say "Hey! Great! What is it – a modified Smog Hog?" Howard Bonner's Smog Hog design was one of the best known high wing designs of the times, having won many contests. Similarly, shoulder wing designs were "modified Gassers" and low wingers were "modified Astrohogs." And the designer of the gorgeous new model would gnash his teeth, give you a withering look, and say "Certainly not! It's an original. I spent many an hour pouring through the NACA reports to get just the setup I was looking for – and it's a helluva lot different."

Then you drive him crazy. "Uh-huh. But it still LOOKS like a modified Smog Hog." A-a-ugh!

The fact is, that in model aerodynamics, just as in full scale aerodynamics, there are certain rules that have to be followed if you are to accomplish specific objectives. Take full scale airliners. How come the DC-8 looks like the Boeing 707? Or, looking at forthcoming designs, how come the Douglas airbus looks like Lockheed's 1011? Because the specifications laid down dictated the major elements of the design – and so the choices left are in the engine selection, interior appointments, and other factors not evident on the surface.

Today's contest maneuvers are best performed by low wing designs – not necessarily because this is the best configuration, but because more design effort from the standpoint of refining the basic layout has been devoted to the low wing. There are still a few devotees of the shoulder wing – but most of them are in Europe, and definitely a minority group – in numbers. As long as Phil Kraft keeps winning, and modifying his Kwik Fli design, other contestants will follow suit.

In the realm of speed models, the shoulder wing predominates. I'm talking about straight-away speed as compared to closed course racing, although in the Formula I event the Williams Brothers La Jollita has proven to be one of the best, and it's a shoulder wing, while most of the models are low wing. Here, though, the reason might well be that the modelers chose scale models of the full scale Goodyear types which are low wing designs. But in straight-away speed the shoulder wing is king because it does the job best.

And for Sunday sport flying – particularly for the novice, or the flyer who never really gets a chance to practice and become proficient, the high wing design is the best answer simply because the dynamics make it the most docile.

Of course, with today's sophisticated equipment, the well-heeled Sunday flier can just about pick any design he wants, build it, get an experienced flier to teach him to fly, and get his model up and down safely, even if he can't make it perform up to its full capabilities.

But for the guy who is strictly on his own, and who may have to limit himself to the simpler control systems, the high wing design will forgive him his mistakes more readily than the others – and that's what he needs.

So much for the basic design layouts – high wing, low wing, and shoulder wing – and we'll leave the deltas, the canards, and the tailless, or flying wing designs, for discussion at another time.

So what about design modifications? You know – take a relatively well proven design, then figure out a way to make it better. And don't tell me you haven't done it, because most of you have, at least to a certain extent. Maybe not a major modification, but a little change here and there. For example; you buy a kit, and the drawing shows a beam mounted engine – and beams for that purpose are included. But you've only got a radial or firewall mounted engine, and don't feel like spending the money for a beam mounted one. What do you do? You modify the kit design to fit your own need.

Yes, I know that's a modification hardly worth mentioning, but take it a few steps further, such as in radio installations, or wing attachments, and eventually you get into modifications which are significant, and could materially affect the performance characteristics of your model.

There are all sorts of modifications. One of the most prevalent is the "modification of convenience." Like, you build a model, fly it, and this time maybe you cartwheel on landing and break the wing, but the fuselage and tail come out OK. You want to get back to flying in a hurry. Hey, there's an idea – take the other wing, stick it on this fuselage, and see what happens! It flies – sometimes better than either of the originals.

But the modifications that really count are those that are fully intentional, such as replacing a straight wing with tapered one in hopes that it will improve the roll rate or lateral stability.

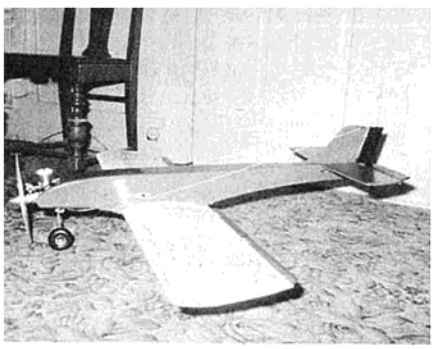
Or replacing a conventional tail with a T-tail to see if you can improve the stall characteristics. Or, as an extreme case, take the wing off the top and put it on the bottom – and that, I'll guarantee you, will completely change your model's performance. Some time ago the boss man Dewey got an idea and sketched out a low wing Top Dawg; we built it, called it the Under Dawg, and I had to warn prospective builders that although the Top Dawg is a good sport flyer for Sunday outings, the Under Dawg is a hot little job, not recommended for beginners.

At the time, that seemed like about as drastic a modification as might show up for some time, but I recently received a letter that went one step further. Larry Tener (hope that's right, Larry – writing was smudged a bit) of Little River, Kansas, sends the following:

Dear Ken:

I have learned to fly multi with a series of Headmasters, starting with a full house, .29 powered standard version (which went through a tree and fence before it finally stopped.) The second in this series of aircraft earned the name of Headhunter around our flying field. It had an almost flat wing with all control surfaces doubled. It flew very well until I watched a bomb I dropped instead of the airplane. Remove number two in a basket. Number three is still with us – an almost exact copy of number two. The reason for all this information is that number four in this series of airplanes is the one in the enclosed picture.

I turned the Headmaster fuselage over and brought the rudder around. I removed almost all of the incidence from it and most of the downthrust. I split the enlarged elevator surfaces and swept the rudder back under the stab. The wing has 1/2" of dihedral in full span. With an Enya .29 B.B. engine it is a very responsive aircraft and if I was a better flyer I'm sure it would perform the pattern with the best.



If the 'Headmaster' is a highbrow, then this must be a lowbrow!

Of all the design modifications I've seen so far, Larry's has to be the most unusual yet.

In the December issue I told a little bit about a light-weight design called the "Showcase" which I put together mainly for flying in the front yard, but it also served as a good device to demonstrate to bystanders how the servos and control surfaces are linked together. Inadvertently the photo was left out. Maybe it was just as well. A short time after I'd flown it for a while I tried a spin – and got a beauty of a flat spin from which the model simply would not recover. Curiously, as it came down, it spun faster and flatter, and almost landed horizontally on the landing gear. It was totally undamaged, so I tried it again, with the same result. So, whenever I flew it around the front yard I was always careful not to let it get into a spin. Then one day when I was flying it a pushrod worked loose (due to my own stupidity in not anchoring it to the servo properly) and the ensuing crash wiped out the front end of the fuselage. So I put it aside for a while, and then, just recently, decided to rebuild it. Remembering the spin characteristics, I decided also to build a completely new fuselage, and this time drop the stab below the wing to keep it out of the wake. Thus it should continue to be effective, even at the stall point.

This modification not only eliminated the flat spin – it made it impossible to spin the model at all. Of course, if I were to move the C. G. back it could be made to spin, but with the C. G. in the same position as it was previously the effect of the modification (lowering the stab) completely changed the spin characteristics.

As you can see from the photo, the new design now looks like the reliable old Schoolmaster, except for the highly undercambered wing. And, since it shows the equipment off, what else would you call it but the "Showmaster?"

Ken Willard and the 'Showcase.' Transparent MonoKote covering.

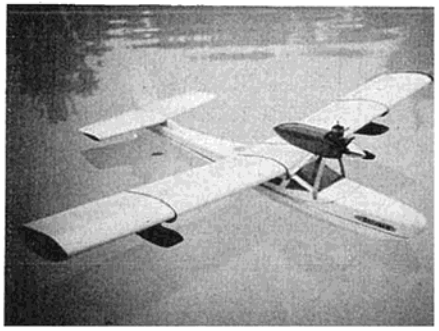
Len Tarantola holds the 'Showmaster.' Lower stab position improves stability.

And here's another modification job I recently did. The "Seafoam" amphibian, with the Midwest wing, was a real hot performer on a Max .10, but as I mentioned in the article, the Midwest foam wing, when loaded to around 18 oz. per sq. ft. has a tendency towards wingtip stall, which could cause trouble with the flying boat version if you tried to hold it off for a full stall landing on the water. So, just for kicks, I built a straight wing, with 48" span compared to the 44" of the Midwest.

Well, it eliminated the falling off on a wing when making full stall landings, but it introduced a new problem. After making a few takeoffs and landings – which is great sport with a flying boat – I headed the model up for some aerobatics. The longer wing naturally slowed down the roll rate, but not objectionably. But when I put the model into a power spin, it started down, and when I neutralized control, nothing happened; the model kept right on spinning. So, to ease the impending crash into the water, I throttled back – and the model came out of the spin, but it took almost two turns to do it. Whew! Anyway, I tried it again, and it was consistent, so now, if I want to show off before all the fishermen up at the lake, I make sure that when I spin the Seafoam I allow for a couple of turns for recovery.

But those are just a couple of examples of what might seem to be minor modifications can do to the flying characteristics of a model. So, if your

Seafoam with 48" straight wing. Airfoil is same as center section airfoil on original Midwest tapered foam wing.



model doesn't fly just exactly the way you'd like it to, remember you don't have to put up with it. Modify it until you get what you want.

—

The letters you Sunday fliers send along certainly do show a lot of originality, but the ones that really surprise me are the ones I get from your wives! I didn't know so many women read RCM until I put in that item on "Wife's Lament." I don't know how many letters I've received from modelers' wives – some of whom have taken up modeling themselves (airplanes, not fashion) – but here's one from Mrs. H. A. Bull, of Galt, Ontario, Canada, that I really enjoyed; I think you will too.

Dear Mr. Willard,

Each month my husband receives R/C Modeler Magazine and I must honestly say looks forward to it. At the present time he belongs to the Kitchener Club. Al (my husband) just started another plane "Firefly" and is getting along quite well with his Radio Control which he got last fall.

The article in October's issue of R/C Modeler titled "Wife's Lament" is just great and I agree with you that it deserves national recognition. The article preceding Wife's Lament, "What is a Modeler" was very good and inspired me to send you this letter.

Each month I receive a church bulletin, this month's bulletin had a cute message in it. Revising it a little I tried to make it into a flying message.

(A flying message behind a laugh or two.)

"ARE YOU A SOFT SOAP MODELER?"
DUZ you DREFT along with the TIDE?
VEL, now is the time to CHEER up.
If you want JOY, the TREND is to BREEZE to the flying field.
Or just once take your SWEETHEART for a drive to the SURF.
ALL day not forgetting that the day was made for LESTOIL'
Where the planes are given first consideration,
A DOVE will never have to send out an S.O.S.
For you who intend to miss flying again, maybe we ought to
DIAL you and remind you of the IVORY palaces up yonder.
Flying is intended to add ZEST to your LIFEBUOY.
So why not WISK yourselves out of bed on Sunday morning,
Dress SPIC AND SPAN, and DASH like a COMET to the flying field.
Forever flying, MR. CLEAN'

Al and I have been married for 1½ years and according to the other wives of modelers I have met, we are model widows while the men build their new planes, as I found out last winter. Al is down in the basement right now working on his "Firefly."

I find that, watching Al work on his plane, it is much like sewing (which I do a lot of), does it sound familiar? Lay out the material, put the pattern on top, cut, trace seams, etc., assemble all the pieces, matching, etc.

After meeting quite a few of the modelers, I felt I'd like to meet their wives, so I organized a club consisting of ten girls, eight of whom are "Modeler Widows." We meet once a month, play cards (simple games) gab and have a lunch enjoyable to all.

My compliments on your new magazine cover and the beautiful color photos.

Sincerely yours,
Mrs. H. A. Bull
18 Grandview Ave.
Galt, Ontario.

P.S. I just let my husband read this letter and he says the little message, doesn't make sense, part of it does, however the part that makes sense is cute, maybe you'll think so too. Can you make it make sense? Flying non-SENSE.

So good ole' H. A. doesn't think it makes sense, eh? Well, Mrs. Bull, us modelers all tend to be ragged–uh, I mean rugged, individualists. You tell him when he can modify one of his models as cleverly as you scrubbed up that soap to fit modeling, we'll publish the result.

That is, if it makes scents.

C-VUES

By BEN HERMAN and JACK CAPEHART

We received a letter recently from Howard Huebl, up Minnesota way. Howard pointed out a goof which we made in our discussion of differential throw in the December issue of this magazine (?). The mistake occurred in our figures 2 and 3 of that issue. In those figures we indicated that the described setups gave no differential. As Howard pointed out, "it ain't so." To see this, let's consider the following figure.

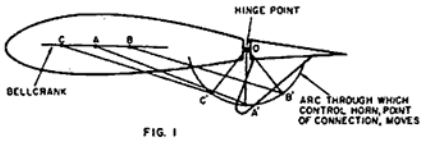


FIG. 1

In this figure, consider the setup A-A^1-0 to be the neutral position, while the positions B-B^1-0 and C-C^1-0 are the setups with full right and left aileron servo deflection. Note that in this setup, the bellcrank motion is perpendicular to 0-A^1, the condition we indicated as sufficient to insure no differential. Fig. I shows that, with equal bellcrank motion to the right (to point B), and to the left (point c) from the neutral position (A), we get more upward aileron deflection (B-B^1) than downward deflection (C-C^1). When Howard pointed this out to us, we were forced to reconsider our general rule for insuring that we were obtaining no differential when it wasn't desired. Properly stated, the rule should be as follows: To insure no differential throw, the line joining the connection point at the bellcrank (point A in Fig. 2) to the connection point at the control horn (point A^1) must be perpendicular to the line connecting point A^1 to the hinge point (point 0). Furthermore, the direction of motion of

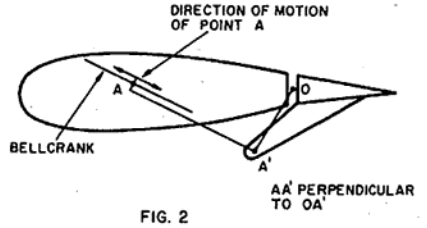


FIG. 2

the bellcrank, when in the neutral position, must be along the line A-A^1.

In order to insure that the direction of motion of point A is along A-A^1 at the neutral position, care must be excercised in locating the "arms" of the bellcrank with the servo neutralized, as having offset in the bellcrank at this position will cause the point A to have a component of motion into or out of the plane of this paper, and hence not along the line A-A^1. In fact, offsetting the bellcrank is a very common way of introducing differential. Thanks again, Howard, for pointing out our mistake.

John G. Smith, of the Flying Circuits RC Club of Fort Wayne, Indiana sent us the results of their Sept. 15 contest. The events held were Class B, C Novice, and C Expert. From all appearances, it looks like their 14th Annual meet was very

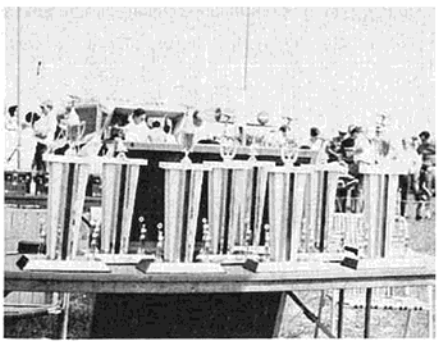
Denis Foley, 1st Class C Expert.

successful, with some real fine hardware going to the lucky winners, as shown in the accompanying photo. Trophies were awarded to the first three places in each of the above classes, and merchandise awards were presented to all other contestants. Winners were: Class B - 1st Place, Donald Snapp, 2nd Place, Larry Poole, 3rd Place Gary Putman; Class C Novice - 1st Place, Alan Dupler, 2nd Place, M. C. Reed, 3rd Place, George Estes; Class C Expert - 1st Place, Dennis Foley, 2nd Place, Don Huffman, 3rd Place, William Hutchins. John mentions that there was only one equipment failure, which resulted in the aircraft "penetrating" a parked automobile (see accompanying photo). Better keep that insurance up fellows.

John informs us that the Flying Circuits is an AMA chartered club, currently boasting 28 members, almost all of which are active flyers. In addition to their annual meet, local club contests are held the third Sunday of every month, the year around. The club president is Gerry Kray, who also took the accompanying photos. Incidentally, the gentleman handing out the goodies is John Smith, who was the C.D. We suspect he's smiling because it's all over.

At the recent RCM Winter Nationals, they are easy to judge, but with the we had the opportunity to talk with Ted White (seems we always have to talk to Ted every time we see him) and Tony Bonette (another one of those big, handsome eastern fellows) about the current pattern. Both had some interesting thoughts on it, a few of which we'd like to present here, and possibly get some reaction from the readers. Both of these top flyers were in agreement that the current C-Expert pattern is too easy (they said it, we didn't!). Tony's point was that, because of its relative ease, it makes the judge's job more difficult, as it is extremely hard to differentiate, point-wise between two nearly perfect maneuvers by different flyers. Having recently judged at the Winter Nats, we could well agree with this. When maneuvers are performed with obvious flaws,

Don Snapp, with winning trophy in Class B.



Trophies given out by the Flying Circuits at their 14th Annual Meet.

degree of perfection obtained today by many of the top flyers, distinguishing a real difference between them is almost a matter of personal preference by an individual judge. Ted had some very definite ideas on how to improve the situation. We'll try to present an outline of his ideas here to solicit your comments. However, Ted plans to write it up more completely and submit it as a proposal to the contest board later on. Here's roughly how his plan would work. The contest board would set up a list of, say, 30 maneuvers. Associated with each maneuver there would be a "K" factor, or multiplier, based on the maneuver's difficulty, just as is currently done in FAI competition. Ted would favor "real airplane maneuvers" That is, maneuvers that are currently performed in full-scale aerobatic competition, and judging from what we know about this, they have some pretty wild ones, such as lomcerak, inverted tail slides, many variations on the snap roll, etc. As far as establishing the "K" factors for the various maneuvers, this would require considerable thought, and perhaps extensive experimentation by various groups around the country. Ted has "volunteered" the services of the Albu-

Single radio failure at recent Flying Circuits contest caused this plane-auto mishap. Flying safety and spectator control a must!

Allen Dupler receiving 1st place trophy from Flying Circuits CD, J. G. Smith

querque group for just such testing. If you've ever seen Dan Parsons and Ted White fly, you'd agree that they have just the correct level of sanity for maneuvers that separate the men from the boys. Given that the "K" factors have been established, here comes the novel part which would put the whole thing on a "personal" basis. From the list of 30 maneuvers, the pilot selects his very own twenty, for HIS customized pattern. This is where the annuity comes in. Do I select the 20 easiest maneuvers, with their accompanying small "K" factor, or do I do the toughies, and risk low scores or a miss altogether, either of which could not be compensated for by a large "K" factor.

Admittedly, this type of pattern, with all contestants flying different maneuvers, would create a difficult job for the judges, but this would still be better than the current state of affairs where so many flyers have achieved near perfection, that it is almost impossible to distinguish between them. One last feature of Ted's proposal would be that the complete flight would be judged, not just the maneuvers. This could conceivably be done by a "K" factor applied to the total score at the end of the flight, or perhaps just an additional amount of points for the flight, based on how well the OVERALL flight impressed the judge. We could throw in another kicker of our own here. Perhaps the contest board could have a larger list of say, 50 or 75 maneuvers. Then, each day of the meet, the CD could pick out a list of 30 for the day's flying, from which the contestant could then pick his 20 maneuvers. We realize that this would be hell on the flyers, but it sure would stifle all cries of the pattern being too easy, at least for the next 2 or 3 years. We'd be interested to hear how you readers feel about this. We frankly, feel there is much merit in this proposal, and should be given serious thought.

We also had a chance to talk to another old friend of ours, Leland Summers, of Phoenix, Arizona. Leland is another example of a person who has overcome a physical handicap to participate in this sport of ours. He is regularly seen competing at the Southwest Regionals put on by our good neighbors to the north, the Phoenix ARCS, and this year we were happy to see him on the flight line at the Winter Nats in Marana. Leland has recently gone into business as a kit manufacturer, under the name of Uneek Models. One of his current kits, the "Mini-Multi," a 56" scale-like, low-wing job, we have personally flown, thanks to Leland's unwavering courageousness. This design combines scale-like appearance with high performance, which is really quite "uneek." Lots of luck on your new venture, Leland, even though we spotted your ad in Brand-X magazine.

Another old buddy of ours, Joe Bradley, from Dallas, visited us during the Winter Nats (by now you've got the idea that all we did was talk during this contest). Joe, along with Don Downing and other Dallas flyers have some interesting things in store for us RCers also. When we say us, we're referring to the lazy RCers, which is us. Anyway, it seems that Joe and his friends are preparing to come out with a large line of fiberglass fuselages, as well as a line of uniquely constructed, all-balsa wings. Although we can't go into any details at this time, these wings, as Joe described them, seem to be IT, as far as lightness and super-accuracy are concerned. If this plug isn't worth a couple of free wings, Joe, then we'll have to buy them, and we wouldn't like that.

Two new developments in the "beautiful finish" department have recently been brought to our, perhaps belated attention. The first has to do with those nice, shiny acrylic lacquer finishes we occasionally see. One of the drawbacks to acrylic lacquer has been its tendency to crack under vibration. One technique suggested some time ago by Johnson Quarles to overcome this, was to prepare a 50-50 mixture of acrylic lacquer and butyrate dope. We tried this, and with the brands we mixed (Acme lacquer and Sig dope) the mixture coagulated after a few days, which resulted in us having to throw away the whole mess. Presumably some brands do mix, but we weren't brave enough to try again. Anyway, Dick Schofield, of the TRCC, has been using duPont acrylic lacquer, straight out of the can (no plasticizer and no dope mixed with it) thinned to spraying consistency. This lacquer has shown no tendency at all to crack or checker, even though Dick has been flying and crashing a Sweek, covered with it, for the past several months. It appears as though this lacquer is somewhat more plastic than other brands, costing about the same. Incidentally, Dick produces as consistently a superb finish on his planes as any modeler we've ever seen, and he even flies them when they're finished.

The other product we heard about recently, although haven't seen it or used it, is acrylic enamel. It apparently has all the advantages of regular enamel, but is quick drying. Another very interesting product is Sears Spray enamel. This is a very inexpensive product that comes in an aerosol can, dries dust free in about an hour, produces a high gloss, and can be purchased off of the shelf at any Sears store. It is completely fuel proof also.

Next month, we'll discuss the designs flown by Phil Kraft and Tony Bonette at the Winter Nats. Also, since the subject has been re-opened by Jerry Nelson in another magazine, we thought we'd present some of our ideas on "professionalism" in our sport.

Savannach VG

Savannach VG

Savannach TM

Savannach TM

Savannach ADV

Savannach ADV

Savannach Bingo

Savannach Bingo